

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Community and Regional Planning Program:
Student Projects and Theses

Community and Regional Planning Program

Spring 5-5-2015

A Guide for Planning a Bike Share System at the University of Nebraska-Lincoln

Wade M. Schuldt

University of Nebraska-Lincoln, wadeschuldt@gmail.com

Follow this and additional works at: http://digitalcommons.unl.edu/arch_crp_theses



Part of the [Transportation Engineering Commons](#), and the [Urban, Community and Regional Planning Commons](#)

Schuldt, Wade M., "A Guide for Planning a Bike Share System at the University of Nebraska-Lincoln" (2015). *Community and Regional Planning Program: Student Projects and Theses*. 37.

http://digitalcommons.unl.edu/arch_crp_theses/37

This Article is brought to you for free and open access by the Community and Regional Planning Program at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Community and Regional Planning Program: Student Projects and Theses by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

**A Guide for Planning a Bike Share
System at the
University of Nebraska-Lincoln
A Professional Project**

Wade Schuldt

**Completed in partial fulfillment of requirements for the Degree:
Master of Community and Regional Planning
Community and Regional Planning Program
College of Architecture
University of Nebraska-Lincoln
Lincoln, Nebraska**

May 2015

Professional Project Advisory Committee

Professor Gordon Scholz

Dr. Yunwoo Nam

Dr. Zhenghong Tang

Project Recipient/Client

Jennifer Dam Shewchuk, University of Nebraska-Lincoln

Assistant Director of Institutional Research and Planning for Campus Planning and Space Management

Acknowledgements

Jennifer Dam Shewchuk, Assistant Director of Institutional Research and Planning for Campus Planning and Space Management at the University of Nebraska-Lincoln

for allowing me sit on the Circulation Committee during the updating of the University of Nebraska-Lincoln Master Planning process

Ms. Dam Shewchuk is the recipient of this bike share planning document.

Kurt Elder, GIS Analyst, Urban Development Department, City of Lincoln, Nebraska
for providing GIS data for the City of Lincoln, Nebraska

Michael Cooper, Facilities Maintenance and Planning, University of Nebraska-Lincoln
for providing GIS data for the University of Nebraska-Lincoln

Mike Brienzo, Transportation Planner, City of Lincoln, Nebraska
Kellee Van Bruggen, Transportation Planner, City of Lincoln, Nebraska

for providing guidance on how transportation planning projects are conceived and what is involved in the planning process toward project completion

Jordan Messerer, Assistant Director, UNL Campus Recreation, University of Nebraska-Lincoln
for providing guidance over the past year on trends of bike cultures across college campuses and how the systems in place today are succeeding

Nick Bohnenkamp, Deputy Director, Denver B-Cycle Denver, Colorado,
Ben Turner, Program Director, Omaha B-Cycle Omaha, Nebraska, Heather Croteau, ArborBike,
and Martha Laugen, Madison B-Cycle for providing insight into the bike share industry

Table of Contents

Acknowledgements	II
Table of Contents	III
Abstract	IV
1. Evolution of Bike Share	1
2. A Snapshot of Transportation at the University of Nebraska-Lincoln.....	9
3. Comparison and Planning for Bike Share on University of Nebraska-Lincoln Campus.....	25
4. What Should be Expected from a Bike Share System	33
5. Organizational Structure	37
6. Sizing of a Bike Share System and Scope	41
7. Bike Share Technology	47
8. Bike Share Funding	51
9. Bike Share Infrastructure and Maintenance	61
10. Bike Share Station Placement	63
11. Implementation of Bike Share	69
12. Bike Share Roll-Out	73
13. Recommendations for Planning for Bike Share	79
Reference List	83

Abstract

The purpose of this document is to serve as a framework for planning a bicycle share system at the University of Nebraska-Lincoln, with the possible inclusion of the City of Lincoln, Nebraska, in the system. This document provides a background review of the evolution of bike share systems and the recent rapid growth of these systems around the world. The document describes planning methodologies used in other locations and the lessons learned from the bike share systems around the world, as to what processes should be pursued to implement a successful bike share system. With the University of Nebraska-Lincoln move to the Big Ten, there has been a push to add an additional 5,000 students, which will put pressure on all existing resources. Bike share is one way to build extra capacity into the transportation system. In the case of the University of Nebraska-Lincoln being able to develop a bike share system by itself is not practical. If the City of Lincoln would consider a bike share system, the University of Nebraska-Lincoln should be an active participant. With the University of Nebraska-Lincoln, as an active partner with the City of Lincoln, there are many advantages for both parties. The City of Lincoln greatly benefits having the University of Nebraska-Lincoln and likewise the University of Nebraska-Lincoln benefits greatly by having a vibrant downtown area that makes the University of Nebraska Lincoln attractive to potential students and faculty. Bike share will not solve all the transportation issues at the University of Nebraska-Lincoln long term, but could become an important piece of the transportation systems in the future. This project looks at how new technology will be implemented in bike share and how NFC (near field communication) and RFID (radio-frequency identification) can be utilized to improve user experiences. The planning process is laid out in a way that should allow other universities and municipalities to gain knowledge to develop bike share systems that will be additions to the existing multimodal transportation options in their communities. By allowing people to access bikes at locations where they seek personal transportation and having bike share stations where they want to go, bike share systems are changing transportation in cities across the globe and helping to develop vibrant communities in those cities.

1. Evolution of Bike Share

Bike Share as Part of a System

Bike share is a component of a multi-modal transportation system that allows users to get from point A to point B in a quick and efficient manner. Users are able to use the bicycles in the system through self-service stations located in a bicycle share network. The locations act as hubs where the users are able to get bikes when they need them and return the bikes to the stations when they reach their destination. Bike share systems have been growing in popularity by helping to fulfill the intent of the multi-modal transportation systems. Bike share systems have recently become more feasible because of advancements in technology, which has improved the reliability of the systems and the ability to provide dependable service to all of their customers.

The history of bicycle share extends back into the 1970s when early variations of bike share systems were used in the Netherlands. These early systems were called “white bikes.” People could just leave the bikes wherever they pleased, once they reached their destination. Unfortunately, the bikes were snatched up and eventually disappeared. This type of system is often referred to as “First Generation Bike Share.”

First Generation Bike Share

The first generation of bike share was to acquire abandoned bikes and paint them a standard color, so they would be distinguishable from other personal bikes. Entities wanted to minimize risk and cost if these bikes were stolen because they were not locked up. Additionally, the way many communities tried to start these systems was by acquiring bikes that had been stolen but never claimed or in other cases just abandoned. The problem with this is that often these bikes were of such poor quality that the maintenance costs for keeping these bikes operational was not a viable option (City of Philadelphia 2010; DeMaio 2009; Guthrie 2011; New York City Department of City Planning; Toole 2012).

Second Generation Bike Share

The second generation bike share system model is a slightly more complex system, which either requires a designated drop-off location around a designated area or a singular check-out location. This system can also be arranged by providing standard keys to the users so that users can access the system when they choose. Still, there are issues with the bikes being stolen because of anonymity and individuals cannot be held personally responsible for those bikes. Additionally, the main downside of this generation of bike share is the lost key problems and replacement procedures of all the locks (City of Philadelphia 2010; DeMaio 2009; Guthrie 2011; New York City Department of City Planning; Toole 2012).

Third Generation Bike Share

The third generation of the bike share system is represented by the Paris bike share system Velib. The bike stations are fixed into the urban streetscape and use a RFID (Radio Frequency Identification) key system to lock up and check out bikes. Bikes are checked out and checked in through a known personal identification number. Technology has enabled the development of a system for tracking distribution of the bikes and where they are clustering during peak periods of the day. The Velib system in Paris has also had problems with the system's locking mechanism leading to the bikes being lost and trashed, which has also been a problem with the first and second generation systems. This is due to a lack of identity and not being able to tie a person back to the check-out of the bike. Unfortunately, the large riots caused by the deaths of two youths allegedly by the hands of the police that took place in France in 2011, caused a great deal of damage across the system and the city of Paris (City of Philadelphia 2010; DeMaio 2009; Guthrie 2011; New York City Department of City Planning; Toole Design Group 2012).

Fourth Generation Bike Share

The fourth generation bike share systems that have been increasingly installed across the United States have been using RFID cards or keys to not only track who is checking out the bikes, but also where they check them in. The stations have been redesigned to be mobile and to deter theft of the bikes. These stations can be picked up and moved to react to use patterns that occur seasonally or for special events. The City of Boston has done a good job in utilizing their bike share system "Hubway", which is operated by Alta Bike Share to allow for alternative ways to enable bike share users to travel to professional baseball, hockey, and basketball games during their respective seasons. There has also been a trend to add Global Positioning Systems (GPS) receivers into the bikes so that usage can be tracked and movable stations can be located in areas that best serve users. Some people may see this as intruding on their privacy rights, but that is debatable, since the bicycle is borrowed. The GPS receivers also serve as a theft deterrent and can aid in locating missing bicycles (City of Philadelphia 2010; DeMaio 2009; Guthrie 2011; New York City Department of City Planning; Toole Design Group 2012).

Most of the fourth generation bike share systems have a set time allowance of thirty free minutes per use. The reason for this time limit is to encourage short trips and thereby allow other people to utilize the bikes as a transportation mode. For example, someone could ride twenty minutes to another station and check the bike in. They then could later check a bike back out and could ride twenty minutes to go somewhere else. The bike share systems are not generally used for recreational purposes, but in some cities tourists have been using them as an inexpensive sightseeing option. Continued use of the bicycle after the first thirty minute time limit would result in a one dollar charge. This is followed by one dollar per hour up to six hours. After six hours, the renter is contacted to determine if the bike has been stolen, in which case someone who is administering the system can contact the person who last checked out the bike. The time limits and charges vary from bike system to bike system depending on local factors (City of Philadelphia 2010; DeMaio 2009; Guthrie 2011; Madison B-Cycle 2012; New York City Department of City Planning; Nice Ride Minnesota 2012; Toole Design Group 2012).

Emerging Student Philosophical Preferences

Many students would like their universities to implement energy efficient measures, greener methods that enhance existing recycling programs, and use locally grown food, but they would still like to park their cars at the location closest to their destinations on campus. With a continued emphasis on personal wellness, attitudes will likely change and evolve, making bike share a more viable option on university campuses, and specifically at UNL, in the future (Toole 2012).

Bike Share System Choices

The different generations of bike share systems that are available were discussed earlier in this section. Bike share systems and bikes continue to improve, so it would be advisable to install the most up-to-date system available. The most user-friendly of all the generations of bike share systems and most financially sustainable bike share system should be sought by the University and the City. The discussion should lead to what types of technology come with these systems. Many of the new bike share systems have smart phone applications that can be used to find available bikes and empty docking slots at the stations closest to the user's destination. One can then be advised of the best location to dock the bike share bike before leaving.

Bike Share Companies

One of the main bike share companies that serves North America is B-cycle, which is a subsidiary of the Trek Bicycle Company that manufactures bicycles for sale in shops all across the United States. Trek is located in Madison, Wisconsin. They helped the City of Madison in establishing a bike share system that now serves as a model for other cities. Trek hosts a large sales meeting during the summer in Madison, Wisconsin, for all of the bike vendors that sell the company's bikes. During that conference the bike share usage in the City of Madison spikes. In addition to Madison, Wisconsin, smaller-tier cities seem to be using the B-cycle brand, including Omaha, Nebraska; Des Moines, Iowa; Kansas City, Missouri/Kansas; Denver, Colorado, and Boulder, Colorado.

One of the advantages for going with a B-cycle system is that the company allows access, no matter where users are in the country, to their other B-cycle systems located in all of the other cities that have a B-cycle system.

The other big supplier for bike share systems that serves the North American market is Bixi, located in Montreal, Canada. The creation of this bike share brand emerged from the 2007 Montreal, Canada, master plan, with the hopes of creating a bicycle taxi system to effectively reduce and manage traffic in the City of Montreal. The City of Montreal started the Public Bike Share Company which is a subsidiary of the Montreal Parking Authority. Bixi produces and manages many of the larger systems that are located in the United States, such as the New York City Citi Bike System, Chicago Divvy System, and others around the world, including the London Barclays Cycle System. Bixi built the Minneapolis Bike Share System Nice Ride; equipment used in this system is shown in Figures 1 and 2. It should be stated that Bixi and Alta Bike Share was bought out on October 29, 2014, and is going through management changes and restructuring.

There are also some smaller companies that are creating bike share platforms similar to the white bikes used in the Netherlands in the 1970s but allow users to use their cell phone to enter a code marked on the bicycle, after which the bicycle will be unlocked for the user. The system has some disadvantages, as it could allow bikes to be hidden or taken out of the effective service area. This would be detrimental, because removal of bikes from the effective service area would seriously diminish the system's convenience and reliability. Some cities with bike share systems already have crews that go

around restocking bikes at peak times of the day or at locations that are hampered by topography. By not having stations, repositioning bikes could create more work in the end for the managing entity. This should be avoided, because if people have to go out of their way to track down bikes, the system will prove to be very inefficient, and it will not be cost effective in the long term.

A bike share program is intended to connect people to places where they want to move about in an efficient multimodal manner, making their lives easier. There are many bike share systems throughout the United States, and they are growing in number and size every year. Several of these systems are listed in Table 1, along with the respective companies that help manage the systems through planning, provision of equipment, funding, or implementation.

Figure 1

NiceRide Station with Bike Share Bikes, which are part of a 4th Generation system, Minneapolis, Minnesota





Figure 2

Nice Ride Bike Share Dock
Minneapolis, Minnesota

B-cycle	Bikes	Stations	Docks
Austin, Texas B-cycle	274 Bikes	43 Stations	568 Docks
Boulder, Colorado Boulder B-cycle	112 Bikes	22 Stations	276 Docks
Broward, Florida Broward B-cycle	144 Bikes	24 Stations	278 Docks
Charlette, North Carolina Charlette B-cycle	186 Bikes	24 Stations	330 Docks
Denver, Colorado Denver B-cycle	492 Bikes	83 Stations	1244 Docks
Des Moines, Iowa Des Moines B-cycle	35 Bikes	6 Stations	63 Docks
Fort Worth, Texas Fort Worth B-cycle	267 Bikes	35 Stations	465 Docks
Greenville, South Carolina Greenville B-cycle	23 Bikes	6 Stations	52 Docks
Houston, Texas Houston B-cycle	177 Bikes	28 Stations	328 Docks
Kailua, Hawaii Hawaii B-cycle		2 Stations	
Kansas City, Missouri Kansas City B-cycle	72 Bikes	13 Stations	148 Docks
Madison, Wisconsin Madison B-cycle	268 Bikes	36 Stations	507 Docks
Nashville Tennessee Nashville B-cycle	140 Bikes	23 Stations	269 Docks
Omaha, Nebraska Omaha B-cycle 8 Stations	51 Bikes	11 Stations	114 Docks
Salt Lake City, Utah SLC B-cycle	64 Bikes	12 Stations	182 Docks
San Antonio, Texas San Antonio B-cycle	365 Bikes	52 Stations	781 Docks
Spartanburg, South Carolina Spartanburg B-cycle		3 Stations	
Bixi			
Aspen, Colorado WE-cycle	86 Bikes	14 Stations	182 Docks
Boston, Mass. Hubway	1026 Bikes	135 Stations	2286 Docks
Chattanooga, Tennessee Bike Chattanooga	272 Bikes	33 Stations	272 Docks
Chicago, Illinois Divvy	2191 Bikes	300 Stations	5192 Docks
Columbus, Ohio CoGo	212 Bikes	30 Stations	434 Docks
Minneapolis, Minn. NiceRide	1390 Bikes	167 Stations	2911 Docks
New York City, New York Citi Bike	3867 Bikes	326 Stations	11369 Docks
San Francisco, California Bay Area Bike Share	571 Bikes	70 Stations	1235 Docks
Washington DC Capital Bikeshare	2306 Bikes	320 Stations	5266 Docks
DecoBike			
Miami, Florida DecoBike	541 Bikes	97 Stations	1470 Docks

Table 1

United States Bike Share System Sizes and Capacities (Source: Evolutive User-Centric Networks For Intraurban Accessibility Global Bike Share Map)

2. A Snapshot of Transportation at the University of Nebraska-Lincoln

UNL's Two Campuses

The University of Nebraska-Lincoln (UNL) has two campuses, one known as City Campus and the other known as East Campus, both of which are shown in Figure 3. City Campus is more of an urban setting because of its close proximity to the downtown core of Lincoln, Nebraska, which can be seen in Figure 4. East Campus, which is located about two miles east of City Campus, is in more of a residential neighborhood, which can be seen in Figure 5. The University of Nebraska-Lincoln has a total student enrollment of approximately 25,000 undergraduate and graduate students. Chancellor Harvey Perlman has stated a goal to increase the student population by 5,000 students, which would put the campus student population at approximately at 30,000, along with additional faculty and staff to meet the needs of those additional students. The City of Lincoln, Nebraska, has a total population of approximately 260,000 (Brennan 2013; Perlman 2012; Plan Big UNL Campus & Landscape Master Plans 2013).

Vehicular Access and Parking

Using a motor vehicle to get to the University of Nebraska-Lincoln's two campuses is reasonably easy, but the act of parking the motor vehicle once you have arrived can be challenging throughout the academic year (August through May). During peak class times it is very difficult to find vacant metered parking spaces. The question of how to effectively manage and facilitate the movement of people on campus once they have arrived and parked their vehicles is a key issue addressed in this document. With parking requiring a permit for all individuals in the central campus cores of the two

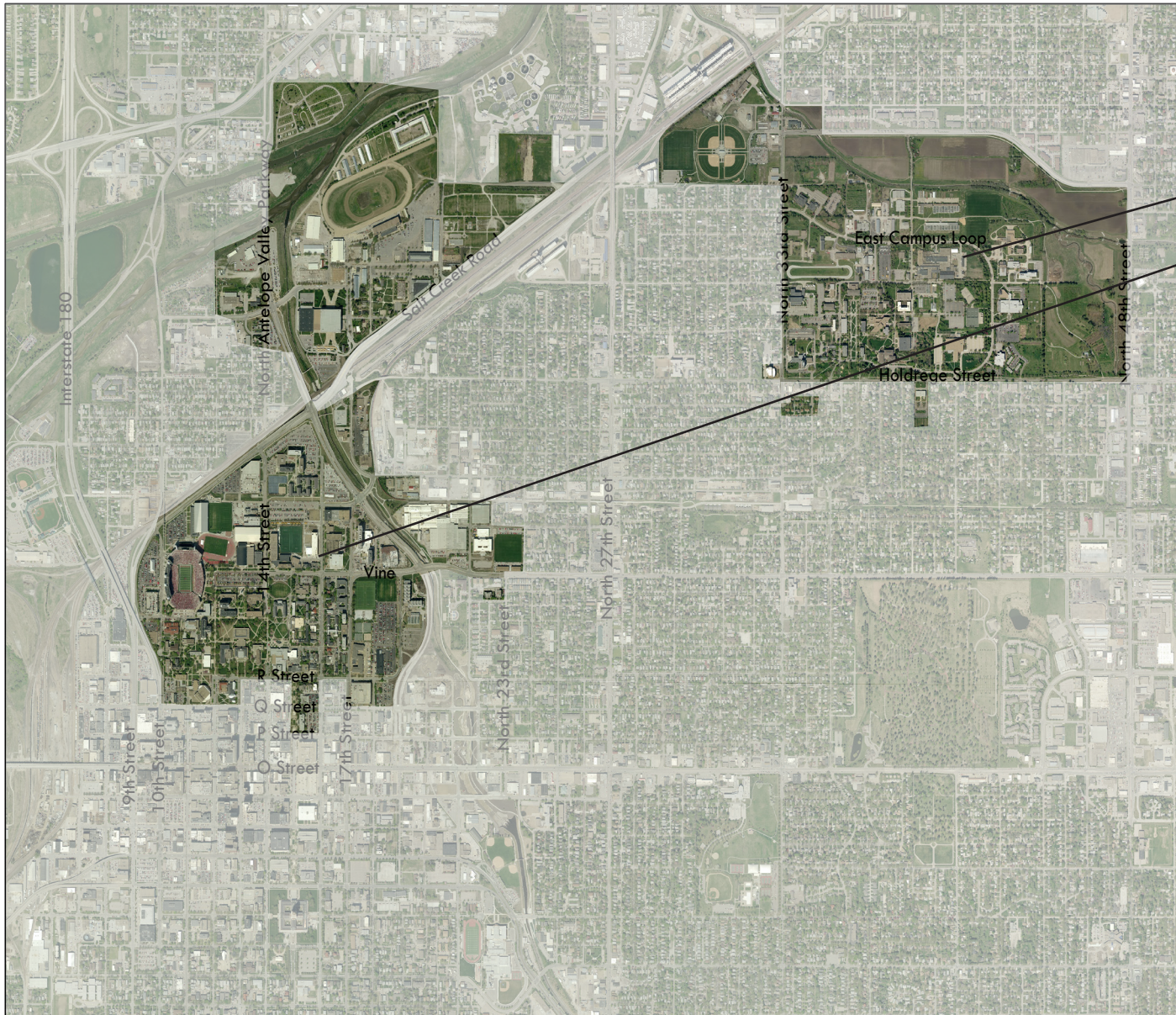
campuses, many people without permits are finding parking on the perimeters or along the interlinking bus routes that serve the two campuses. The reason that people park in close proximity to the bus routes is for the free neighborhood street parking adjacent to the Vine and Holdrege bus routes passing through 23rd Street to either the City Campus Union or East Campus Union. See Figure 6.

Campus Mobility Options

When considering campus mobility options at UNL, the main modes of transportation are walking, biking (if you have a bike), and buses with routes around the perimeters of the two campuses. The pedestrian/bike trails between the two campuses do connect; however, they are not as direct between the two campuses as they could be. Furthermore, the paths are not lit at night, thereby creating a safety and security issue. The trailheads on either end of the trail sections that students would most likely use to go between campuses are not well marked.

Figure 3

Aerial photograph of UNL City and East Campuses, Lincoln, Nebraska



East Campus

City Campus

Figure 4

Aerial Photograph of UNL
City Campus





Figure 5

Aerial Photograph of
UNL East Campus



There are no significant topographical variations on the UNL City and East Campuses. Thus, topography should not be considered a hindrance in keeping people from riding bikes on or between UNL's campuses (Toole Design Group 2012; Weichman 2013).

Existing Bicycle Services

Over the years, improvements have been made to the bicycle infrastructure network at UNL and in the City of Lincoln. UNL has added bike racks, which is perhaps the most significant improvement to the bicycle infrastructure. In 2012 the UNL Campus Recreation Center placed outdoor public air pumps near the Recreation Center for inflating tires. In the fall of 2013, the UNL Campus Recreation Center started to provide a bike valet service at the Cook Pavilion, located about one block from Memorial Stadium, during all home football game days. There is also a small bike rental program available through UNL Outdoor Adventures. The single-speed, mountain, and touring bikes there can either be rented for short periods of time or for whole semesters, with rental fees ranging from ten dollars a day to 75 dollars a semester. The downside of this program is that most of these bikes are rented out throughout the semester, so availability is limited to only a few bicyclists (Plan Big UNL Campus & Landscape Master Plans 2013; University of Nebraska-Lincoln 2013; Weichman 2013).

UNL Outdoor Adventures operates a bike repair shop in the Outdoor Adventures Center. The center also sponsors bike tours around Nebraska, as well as recreational trips. The University of Nebraska-Lincoln was recognized as a Bicycle Friendly University by the League of American Bicyclists in 2013. A bike share system would help to improve the bicycle-friendliness of the University. The new University of Nebraska-Lincoln Outdoor Adventures building will house a new bicycle maintenance facility and a secure bike storage area. This building opened to students, faculty and staff in the spring of 2014 (University of Nebraska-Lincoln 2013; Weichman 2013).

City of Lincoln Trail System

The City of Lincoln operates and maintains a bike trail system throughout the city. The city has done a good job over the years of adding to the 130+ miles of hard surface or crushed rock trail system that allows people to use bicycles on dedicated bicycle trails. Additionally, the City of Lincoln has also been in the planning stages of installing a dedicated, protected bike lane on N Street from 8th Street to 20th Street, which was originally scheduled to be open in August 2014, but is on hold (City of Lincoln, Nebraska 2013; Pascale 2013).

Relationship of Vehicular Parking to Bicycle Use

The UNL population includes approximately 25,000 students, 1,600 faculty, and 6,400 university employees, which puts the total number of people that could be on City and East Campuses at around 33,000 daily. Although there seems to be a fairly significant amount of parking, with 17,350 stalls, a logistical challenge still exists when parking facilities are full during peak periods of the day and completely empty during other times due to low demand. Most of these parking issues are related to the desire for people to park as close to their destinations as possible. Parking challenges lead to the constant complaint cycle that is repeated at UNL and across the country, where parking in dense locations is at a premium. This raises the question of how people move around once they are on campus. Whether individuals are on campus to study, teach, work, visit, or attend a sporting event, getting to their desired location means walking variable distances. In turn, the competitive parking situation motivates individuals to find the closest possible parking space available. When people are driving from place to place looking for parking, the system can lead to a situation of anger and frustration building up among drivers while they are circling city blocks (Physical Master Plan 2006-2015 University of Nebraska-Lincoln; Plan Big UNL Campus & Landscape Master Plans 2013; Weichman 2013).

Transportation Challenges at the University of Nebraska-Lincoln

As stated earlier, there are currently 17,350 vehicular parking spaces in surface lots and in parking structures located on the City and East Campuses, and several other parking garages belonging to the City of Lincoln are located within close walking distance to City Campus. There is also a significant amount of free parking on the streets in the neighborhoods surrounding both City Campus and East Campus (Niquette 2012; Physical Master Plan 2006-2015 University of Nebraska-Lincoln; Plan Big UNL Campus & Landscape Master Plans 2013).

The City of Lincoln, Nebraska, bus system, known as StarTran, provides bus service to UNL through the 24 Holdrege and 25 Vine routes that run Monday through Friday, 7AM until 6PM, serving the bus stops on the route every ten minutes. These routes are shown in Figure 6. After 6PM the time intervals increase to every twenty minutes until 9PM. UNL operates an on-call bus service between 9PM and 11:30PM. After 11:30PM the Association of Students at UNL (ASUN) provides a free cab service for students who may be in unsafe situations through the 471-Ride program that is available all night during the week and on weekends. The bus and on-call services are not offered during the summer and when classes are not in session during the different breaks throughout the school year.

These may be times when a bike share system could service the voids that are left when these other programs are shut down or providing reduced service. A bike share system will not replace any of these methods of transportation that are currently in place, but rather serve as component of a multimodal transportation system (City of Lincoln, Nebraska; University of Nebraska-Lincoln).

UNL has recently finished working with the planning consulting firm Sasaki Associates to complete a Master Plan for both City and East Campuses. The primary areas of concern in this planning work were building and land use, landscape continuity, and transportation. The transportation portion of the Sasaki study analyzed how pedestrians, bicyclists, automobile commuters, and bus riders interact together on the streets through the multimodal system that exists today. One goal of the plan is to improve upon the multimodal system by developing complete streets throughout the campus, while potentially closing several streets to regular vehicular use. The plan also proposes that bicycles use several internal and external corridors throughout and around the two campuses, which can be seen in Figure 7. The master planning project with Sasaki started in the summer of 2012, and the UNL Master Plan was approved by the University of Nebraska Board of Regents on September 20, 2013 (Plan Big UNL Campus & Landscape Master Plans 2013).

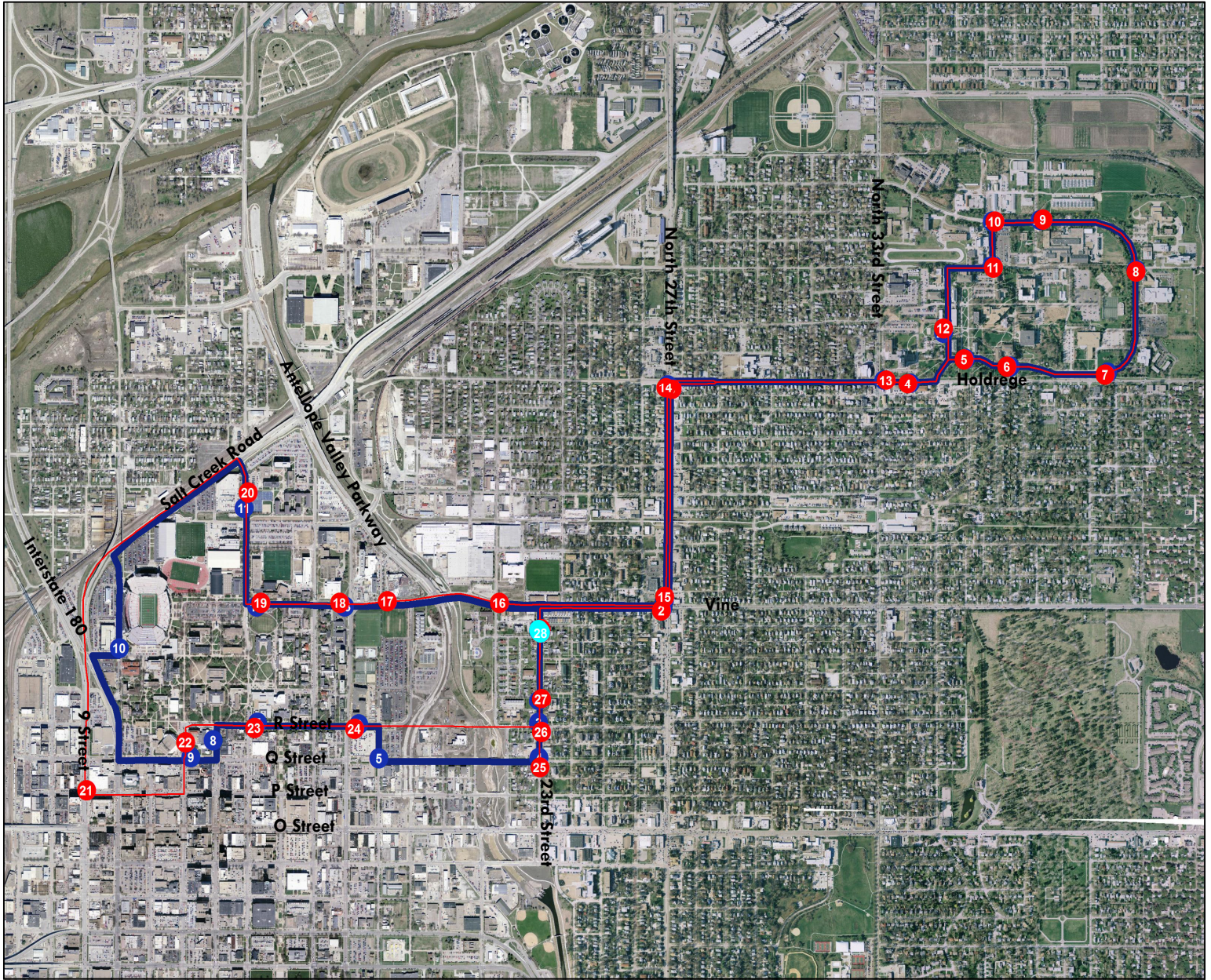


Figure 6
 Vine and Holdrege StarTran
 Bus Routes

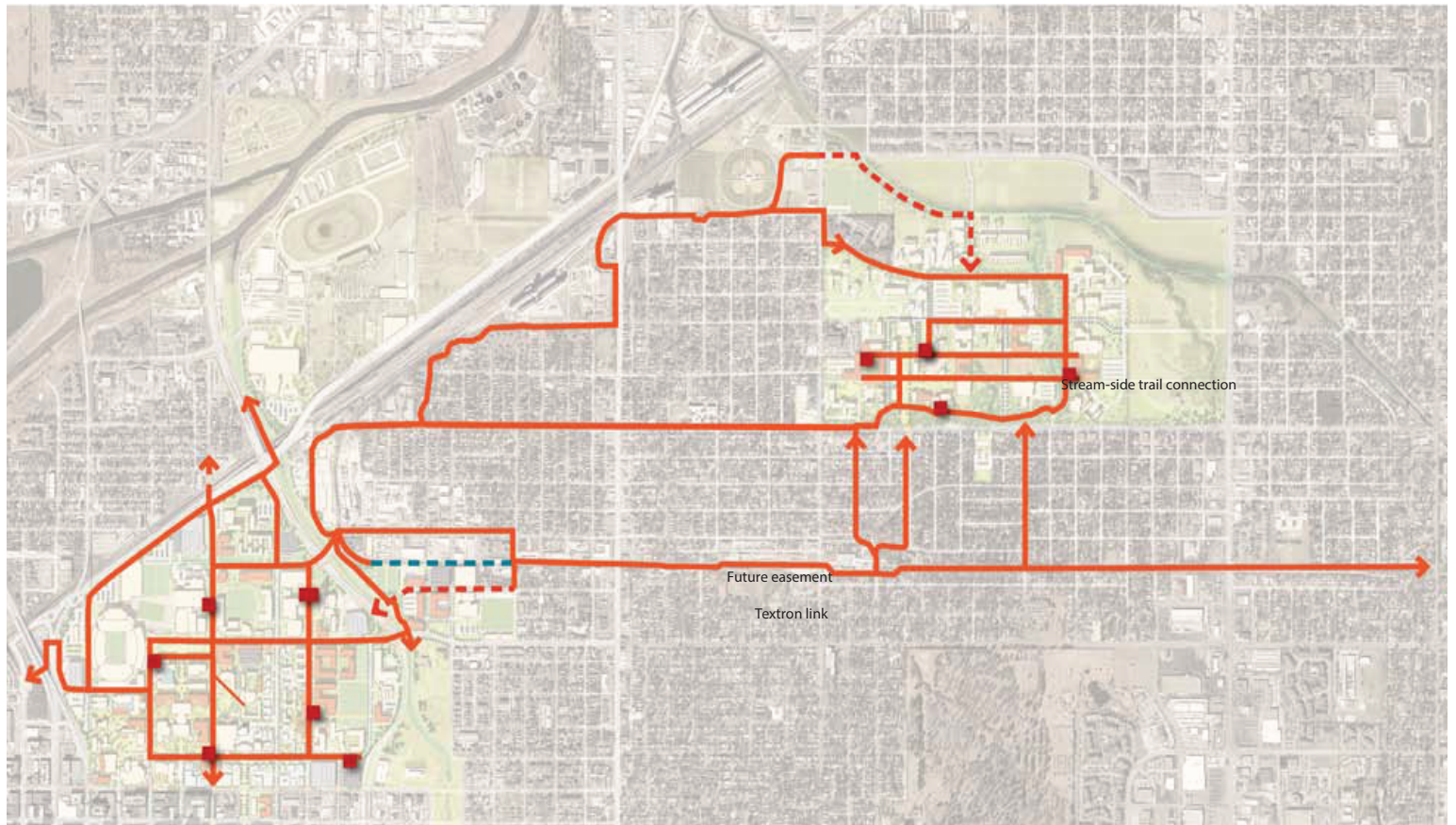
- Vine 25 Route
- Holdrege 24 Route
- Vine Bus Stops
- Holdrege Bus Stops



Figure 7

Proposed pedestrian shared bicycle routes on City Campus in the new University of Nebraska-Lincoln Master Plan (Plan Big UNL Campus & Landscape Master Plans 2013)

- Proposed Bike Routes
- Proposed Large Combined Bike Facilities



The sidewalk and pedestrian walkways vary in width and surface condition throughout both City and East Campuses. There are pinch points where pedestrians, bikers, and vehicles converge and create situations that can lead to dangerous interactions at certain locations along Vine Street, R Street, 16th Street, and 17th Street. With the proposal to close off traffic to some of these streets and add bike lanes, some of these issues could potentially be resolved. There are still challenges that exist on the two campuses, including getting the students, faculty, and staff coming to a consensus about which actions and bike education need to be put in place. If there are going to be changes in the culture on the campus, there needs to be a collective buy-in to the new bicycle routes and improved bicycle rider courtesy to pedestrians on campus (Plan Big UNL Campus & Landscape Master Plans 2013).

Currently there are 150 bike rack locations on City and East Campuses at UNL. These are traditional bicycle racks, which hold multiple bicycles, as seen in Figure 8. There are also bicycle racks, referred to as loop racks, which normally have room for two bicycles and are basically a strip of strap metal shaped in a “U” as seen in Figure 9. The loop racks have a less industrial appearance, but take up more space because of the way they are spread out. The new Master Plan proposes clustering the bike racks in common areas, for example at the City Campus Union and Hamilton Hall, instead of locating them immediately adjacent to the entrances of the buildings they serve (University of Nebraska-Lincoln).

Figure 8

Traditional long bicycle racks located in front of the Abel-Sandoz Residence Complex on the University of Nebraska-Lincoln City Campus





Figure 9

Existing “U” shaped racks located in front of Avery Hall on the University of Nebraska-Lincoln City Campus

Currently there are two marked bike lanes in downtown Lincoln that connect to the south edge of City Campus, one going north on 14th Street and the other going south on 11th Street. These lanes are located in the middle of the streets and flow with the traffic. Part of the UNL master plan proposal includes introducing bike lanes in some form along Vine Street and

R Street going east and west as depicted in Figure 10. These proposals would take the bikes off sidewalks on campus, which would hopefully reduce bike and pedestrian conflicts on the sidewalks, in addition to reducing car conflicts with pedestrians and bicycles (City of Lincoln, Nebraska; Plan Big UNL Campus & Landscape Master Plans 2013).

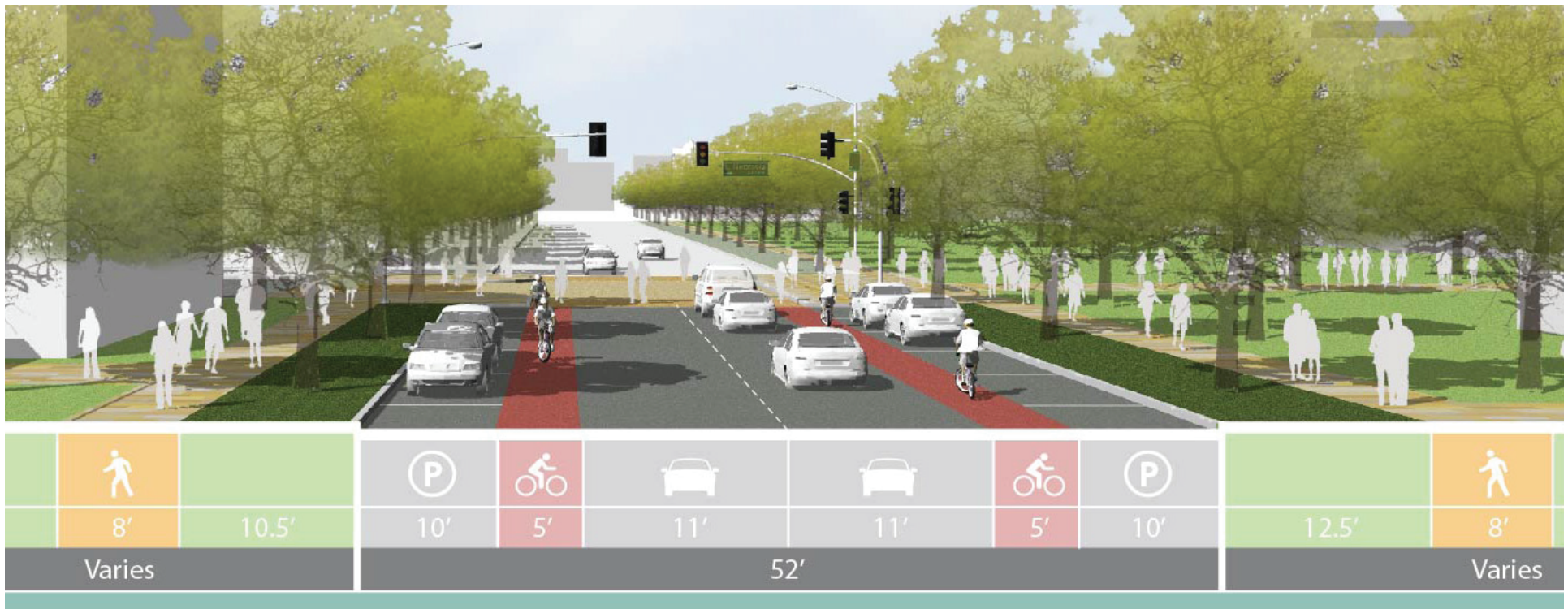


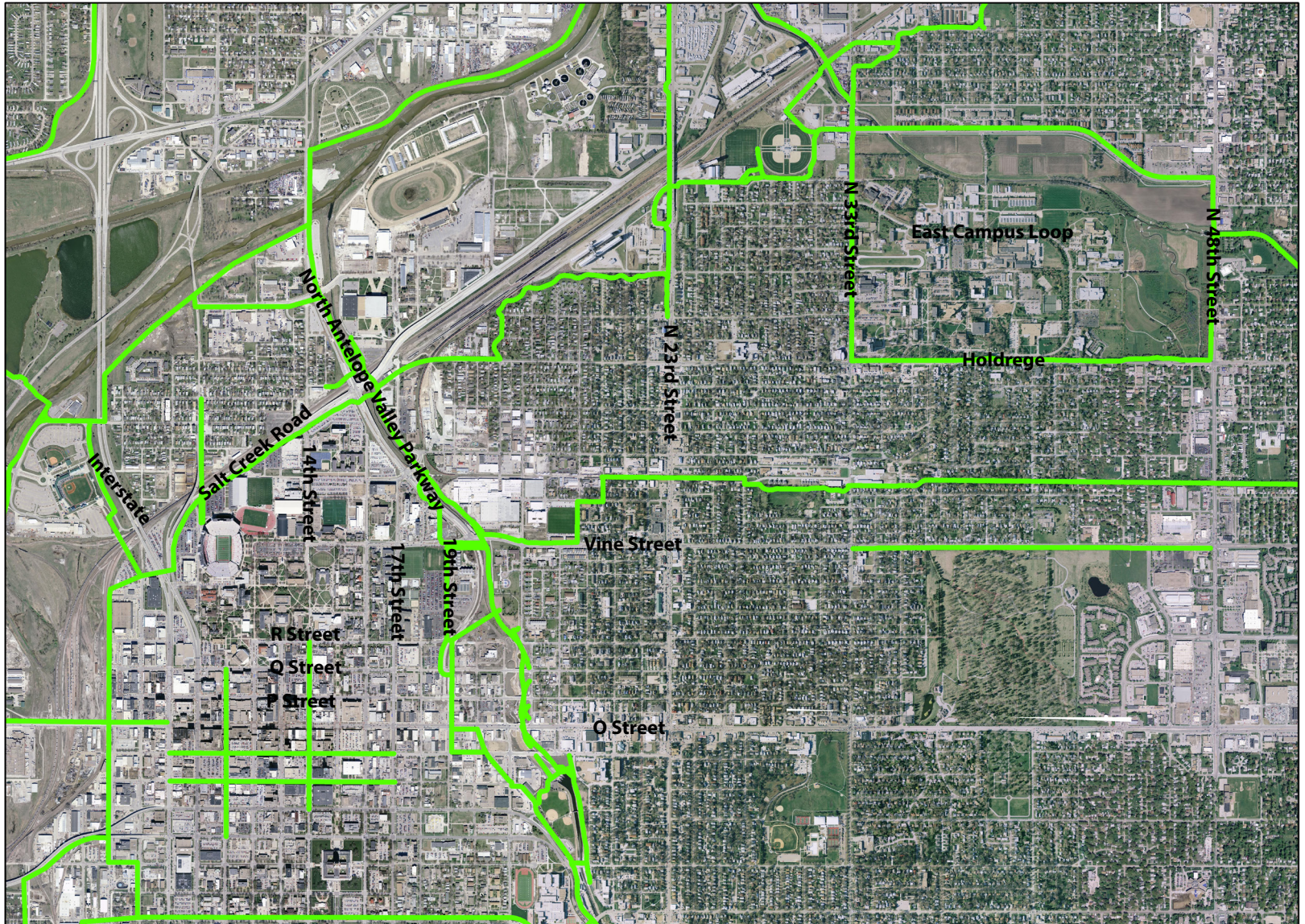
Figure 10

Cross section of the proposed changes to make R Street a complete street on the University of Nebraska-Lincoln City Campus (Plan Big UNL Campus & Landscape Master Plans 2013).

There are several different bicycle trails that allow transportation and recreational access between the two campuses and in different directions to other parts of the City of Lincoln. These trails are all maintained by the City of Lincoln, even though they skirt and connect the UNL campuses. Some of these trails lack visible way-finding access, which may limit their use. The main trails between the two campuses do not connect directly, requiring an individual to navigate through some neighborhood streets. A map of the trails can be seen in Figure 11. Connectivity and way-finding aids for these trails are needed to enable promotion of increased multimodal transportation access. An immediate effort to create bike route signage directing students through those neighborhoods should be a priority, even without a bike share program in place. Additionally, bike routes should be shown on the bus route maps to illustrate that there are multiple ways to get to and from both UNL campuses and that there is bicycle access on both campuses (City of Lincoln, Nebraska).

Figure 11

City of Lincoln bike trail routes adjacent to the University of Nebraska-Lincoln's City and East Campuses



3. Comparison and Planning For Bike Share on the University of Nebraska-Lincoln City Campus

When considering the introduction of a bike share program at the University of Nebraska-Lincoln, there needs to be an effort to look at what other universities have done and, importantly, what programs other Big Ten Conference members have in place on their campuses. This is to not only gauge or predict size and usage rates, but also to learn from the experiences of other institutions. This also applies to the cities that are homes to the Big Ten universities, when considering whether a collaborative approach to a bike share program is possible. Table 2 shows what the other Big Ten institutions have in place in relation to bicycle infrastructure on their campuses.

When comparing the overall population of the cities with Big Ten Universities, Lincoln, Nebraska, with a population of 251,624 is the third highest populated city in the Big Ten Conference, as depicted in Chart 1. When looking at the total student population for these same Big Ten institutions, the University of Nebraska-Lincoln has the second lowest enrollment of all current Big Ten member institutions, as depicted in Chart 2.

Currently, the University of Minnesota (Minneapolis), the University of Michigan (Ann Arbor), and the University of Wisconsin at Madison are the only three Big Ten member schools that have true bike share systems on their campuses. All systems have integrated bike share systems as part of greater city and regional bike share networks. There are also other learning institutions in their respective cities that connect to these systems, in addition to businesses, government buildings, centers for entertainment, and medical facilities. Many of the entities that are connected by a bike share system might participate in the funding of these systems. A bike share system was installed in Columbus, Ohio, in the summer of 2013, but it does not connect with The Ohio State University campus as the stations are all located to the south of the campus (Ferenchik 2013; Madison B cycle 2012 Annual Report 2012; Nice Ride Minnesota 2011 Annual Report 2012).

The three Big Ten Universities that currently have bike share systems on their campuses have very different payment structures in place. The University of Wisconsin at Madison currently has seven stations on campus, and their students,

Figure 12

Nice Ride Station in Downtown Minneapolis, Minnesota

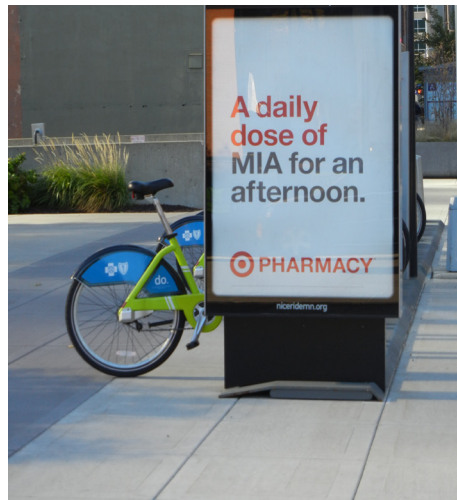


Figure 13

Nice Ride Bicycle Rider in Downtown Minneapolis, Minnesota



faculty, and staff can pay twenty dollars for an annual pass for the Madison B-cycle membership. The Madison B-cycle system is basically a demonstration bicycle share system for Trek which owns B-cycle. The University of Minnesota has ten bike share stations on their East and West Bank campuses and has contributed 150,000 dollars one time in 2011 to Nice Ride (see figures 12 and 13). They have a split payment structure with students paying 55 dollars and the general public paying 65 dollars for annual memberships. The University of Michigan has

recently agreed to support the new Arbor Bike Share system in Ann Arbor, contributing 600,000 dollars over three years, with five stations on campus. They also have a split payment structure charging students 45 dollars and 50 dollars for annual memberships for staff/faculty. These are not regular student fees charged by these universities, but are memberships provided through the respective bike share systems that serve the local communities.

Big Ten Schools	Bicycle Infrastructure	Big Ten Cities	Big Ten City Population	Number of Students
Indiana University	Nothing In Place	Bloomington, Indiana	80405	42464
Michigan State University	Recreation Center Rental	East Lansing, Michigan	48579	43159
Northwestern University	Recreation Center Rental/Divvy 2015	Evanston, Illinois	74239	14988
Pennsylvania State University	Recreation Center Rental	University Park, Pennsylvania	44817	38420
Purdue University	Recreation Center Rental	West Lafayette, Indiana	28778	39637
Rutgers University	Recreation Center Rental	Piscataway/New Brunswick, New Jersey	111225	38912
The Ohio State University	Recreation Center Rental	Columbus, Ohio	787033	56064
University of Illinois at Urbana-Champaign	Recreation Center Rental	Urbana-Champaign, Illinois	122305	41918
University of Iowa	Recreation Center Rental	Iowa City, Iowa	67062	30893
University of Maryland	Recreation Center Rental/webike*	College Park, Maryland	30587	37631
University of Michigan	Recreation Center Rental/Arborbike*	Ann Arbor, Michigan	114024	37197
University of Minnesota	Recreation Center Rental/NiceRide*	Minneapolis, Minnesota	388020	52557
University of Nebraska-Lincoln	Recreation Center Rental	Lincoln, Nebraska	251624	24593
University of Wisconsin-Madison	Recreation Center Rental/Bcycle*	Madison, Wisconsin	223389	42595

Table 2
Bicycle Infrastructure on Big Ten University Campuses

(Sources: Indiana University 2013; Michigan State University 2013; Northwestern University 2015; Pennsylvania State University 2013; Purdue University 2013; Rutgers University 2013; The Ohio State University 2013; University of Illinois at Urbana-Champaign 2013; University of Iowa 2013; University of Maryland 2013; University of Michigan 2013; University of Minnesota 2013; University of Nebraska-Lincoln 2013; University of Wisconsin-Madison 2013.)

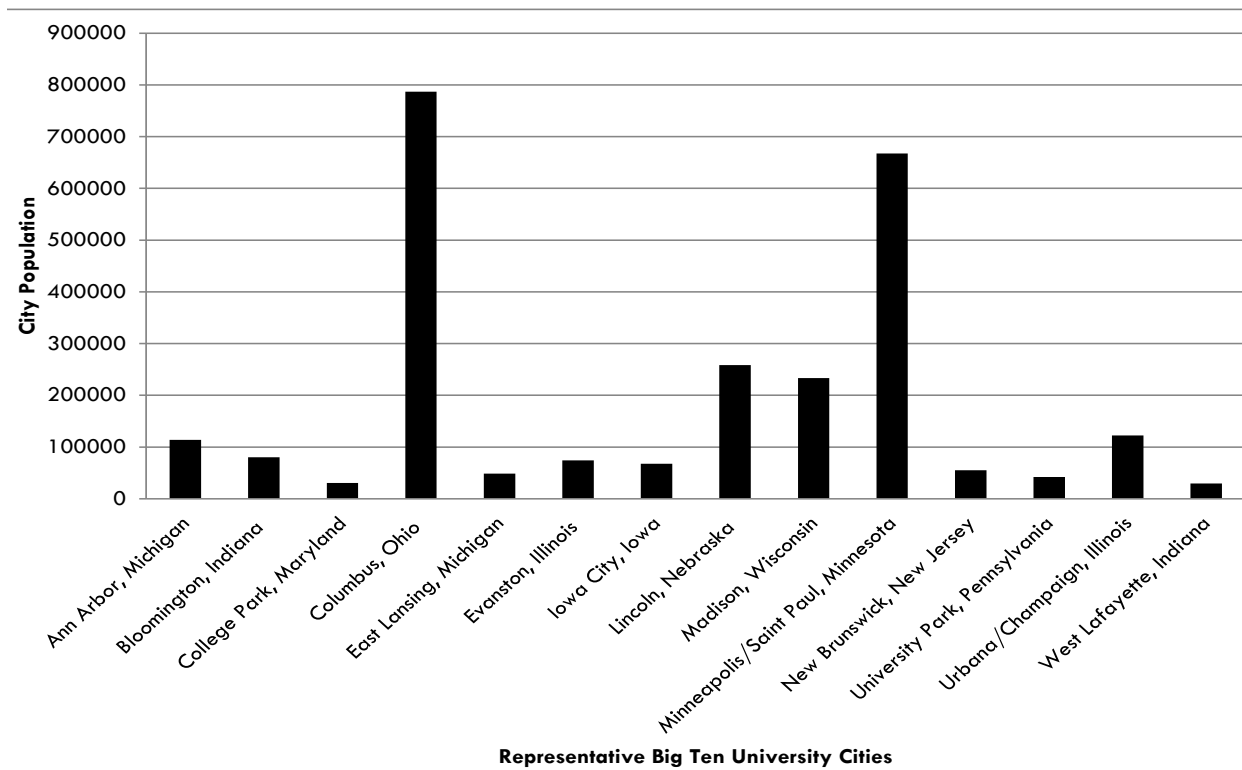


Chart 1
Population of Big Ten University Cities

(Sources: Indiana University 2013; Michigan State University 2013; Northwestern University 2013; Pennsylvania State University 2013; Purdue University 2013; Rutgers University 2013; The Ohio State University 2013; University of Illinois at Urbana-Champaign 2013; University of Iowa 2013; University of Maryland 2013; University of Michigan 2013; University of Minnesota 2013; University of Nebraska-Lincoln 2013; University of Wisconsin-Madison 2013.)

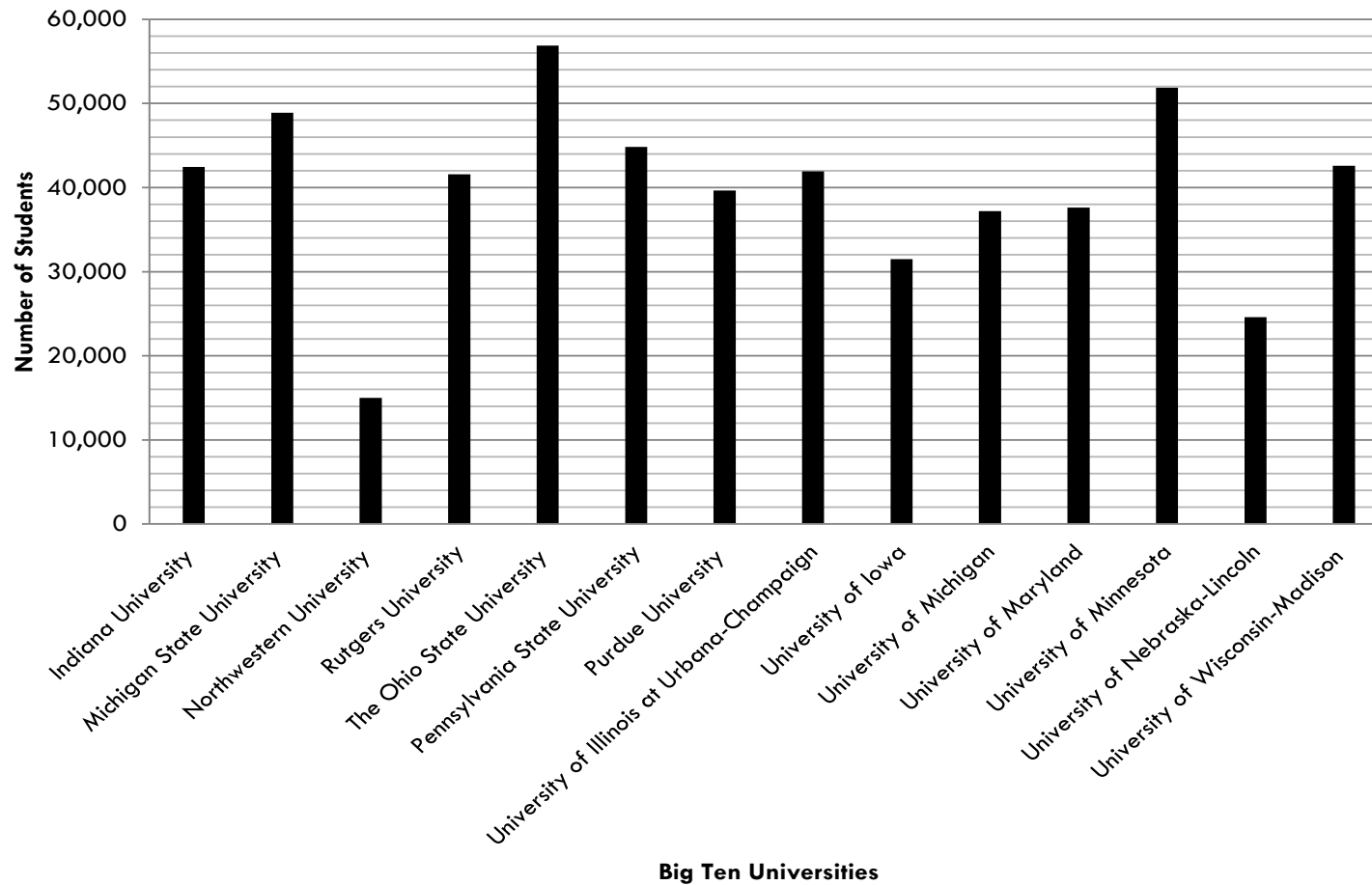


Chart 2
Big Ten University Student Enrollments

(Sources: Indiana University 2013; Michigan State University 2013; Northwestern University 2013; Pennsylvania State University 2013; Purdue University 2013; Rutgers University 2013; The Ohio State University 2013; University of Illinois at Urbana-Champaign 2013; University of Iowa 2013; University of Maryland 2013; University of Michigan 2013; University of Minnesota 2013; University of Nebraska-Lincoln 2013; University of Wisconsin-Madison 2013.)

What can be learned from Ann Arbor and Madison

Per email from Kellee Van Bruggen on March 30, 2015. The City of Lincoln recently received a grant to start a bike share program starting with 15 stations and 100 bikes. It is important to look at what other Big Ten cities have done in deploying bikes, stations, and docks as there are lessons to be learned in how the interaction between governmental entities played out in those communities and campuses. When looking at the University of Wisconsin at Madison and the University of Nebraska-Lincoln, both should probably expect to have similar issues and experiences with bike share. This is because the University of Wisconsin and the University of Nebraska-Lincoln are in cities that have similar population numbers. Per email from Martha Laugen on March 25, 2015. When Madison B-Cycle was in the planning stages, there was an early realization among stakeholders with Madison B-Cycle and the university that the campus needed to be part of the system and there were advantages to doing so.

Per email from Martha Laugen on March 25, 2015. Because of the early recognition that the Madison B-Cycle system needed to be on the campus, it allowed for a discussion with the University officials and an agreement to be signed that would allow for stations and bikes to be located on the campus. The University of Wisconsin benefits from this agreement in discounted membership rates that have been discussed earlier in this section because of the integral cultural and geographical component that the university community brings to the community as a whole. Madison B-Cycle worked with the University of Wisconsin facilities management department in finding suitable sites for the Madison B-Cycle stations at the beginning and this collaboration has continued as the

program has expanded since inception. Some of the challenges that have arisen have been due to available space on campus while still providing space for other transportation modes. An example of this has been maintaining regular bike racks that were already present in high traffic areas of the campus. The stations that are on the University of Wisconsin campus have the most turn over when compared to the rest of the system with the busiest being at the Union.

In the case of University of Michigan, the Clean Energy Coalition is the owner/operator of ArborBike. As stated earlier in this section, the University of Michigan has committed 600,000 dollars over three years to the program starting in 2014. Per email from Heather Croteau on April 3, 2015. Because of the close proximity to campus between the City and the University, five of the fourteen stations are on campus. This is very similar to what the City of Lincoln is considering by putting three stations on City Campus and possibly two stations on East Campus. With ArborBike only up and running for two months in the fall of 2014, it is difficult to get a good idea of how their current station placements will evolve or change with use of the system. Arbor Bike has not placed any stations near the large sporting venues on campus, but could in the future. Currently the University of Nebraska-Lincoln offers a bike valet at the Cook Pavilion on city campus during the football games in the fall and the spring game in spring. Per email from Martha Laugen on March 25, 2015. Madison B-Cycle does something similar with their B-Cycle program offering a virtual station near Camp Randall Stadium, and offers a tailgate for their members at that location. With these locations being really busy only seven-eight days each fall, it is difficult to justify tying up that many resources for a station location unless the system can provide additional

coverage to the surrounding area throughout the rest of the year.

Per email from Heather Croteau on April 3, 2015 and per email from Martha Laugen on March 25, 2015. Depending on the organizational structure that runs a bike share system, there could be difficulties and advantages in placing stations in certain locations. There should be early and regular conversations in regards to this issue. Placing bike share stations on university, public, or private property needs to be discussed early and often to avoid issues that could be raised by different parties. With the City of Lincoln already having funding, there should already be discussions by the University of Nebraska-Lincoln administration. Getting a good deal should be a priority to support getting approval by the board of regents if they need to approve the station placement or sponsorship of the Lincoln bike share system.

4. What Should be Expected From a Bike Share System

Assessing Demand and Need for Bike Share

Determining what is wanted and needed for a bike share system is the first question any university or city needs to answer in the process of planning such a system. This document provides background information about bike share systems that should be considered, as well as guidance for decisions that would need to be made if a bike share system were to be contemplated at UNL and/or the City of Lincoln.

One of the first things that needs to be determined is the extent of demand for a bike share system and how such a system could benefit the students attending UNL. In the future, UNL is going to need to recruit more and more out-of-state and international students to reach the goal of 30,000 students. For the students, being able to access amenities through public transportation is going to become more and more important.

With the increasing number of students expected to be attending UNL, there will be an increasing demand for vehicular parking by students, staff, faculty, and visitors coming to campus on a daily basis. How this is managed in the future and devising strategies to get people to park farther and farther away from the central parts of the campuses will need to become an essential part of the planning process. Introducing a bike share program is one way to afford those individuals a realistic option that will allow them to get to their end destination in a quick and efficient manner. By connecting multiple forms of transportation, known as a multimodal transportation system, users could walk, ride the bus, or use their own vehicle or bike. A multimodal system would enable individuals to utilize a bike share system as part of a daily commute.

When considering a bike share system, one cannot just look at it as a rental bike, but rather as an access opportunity for the City of Lincoln and UNL. A bike share system will allow users to get to classes, attend campus events, take in some entertainment, or meet up with friends and use the bikes to ride to a destination together. A bike share system could be used as a future selling point for the university and city, in that many popular destinations would be within a “bikeable” distance.

The process of planning for a bike share system would first require a survey of members of the campus community to help measure the desire for and predict utilization of a bike share system on the UNL campus. Focus group discussions including students, faculty, and staff should be organized to answer questions and hear opinions, concerns, and suggestions about a possible bike share system. The focus group discussions would be a means for communicating with the university community about typical bike share systems, including their operating policies, accessibility, user cost, etc. However, due to time and logistical limitations, it is beyond the scope of this project to conduct a survey and to facilitate focus group discussions for the purpose of determining demand for a bike share system.

Conducting focus group discussions may increase support for a bike share system among stakeholders. Some of the groups that should be represented in focus group discussions include BikeUNL, Sustain UNL, UNL Admissions, the UNL Rec Center, UNL Outdoor Adventurers, University Housing, Association of Students of the University of Nebraska, and the UNL Health Center. All of these groups could give their recommendations, in addition to the survey, to provide a more complete view

of whether or not they think a bike share system is desired or needed at UNL. These suggestions could also be addressed by setting up a MindMixer forum to assess the need for bike share in a way that anyone from UNL could have their opinion heard. Through this process, the bike share idea could also be shaped and formed to make the system function satisfactorily if it is later implemented.

Per email from Kellee Van Bruggen on March 30, 2015. With the City of Lincoln recently receiving funding for a bike share system from a Congestion Mitigation and Air Quality Grant to startup a 100 bike and 15 station bike share system, there needs to be a discussion by the UNL administration regarding the project. It is important to consider if there will be any type of sponsorship and what is the appropriate type of agreement with the City of Lincoln to allow these stations to be placed on the campus. If it is possible to agree on a reduced price membership for students, faculty, and staff, it would benefit both parties in allowing greater ridership numbers for the system having more riders in the downtown area using the system which greatly benefits the City of Lincoln. If there is the possibility of getting compatibility for students using their student identification cards for a membership pass, it should be considered along with other current and future advancement in technology.

5. Organizational Structure

University - City Collaboration

Bike share systems operated solely by universities are not commonly seen in the United States. The only two institutions that have a system of their own are Washington State University and the University of California, Irvine. Both of these bike share systems are small, with only a couple of stations each. Most of the systems that serve universities are organized and integrated with the cities where they are located. In specific areas of larger cities, transportation and parking is limited in reach and availability. People are able to utilize a bike share system as a component of a multimodal transportation system in larger cities, but college campuses are left with students possibly bringing a bike to campus while also demanding cheaper, closer, and a greater number of vehicular parking spaces on the campus.

Organizational Structure for Bike Share

In planning for a bike share system, one of the first items to be addressed is the organizational structure and key responsibilities for operating the system. UNL should engage in discussions with the City of Lincoln to determine whether there is mutual interest in partnering on a bike share system. With City Campus being an important and dynamic location in a heavily populated geographic area adjacent to downtown Lincoln, there needs to be discussion about forging a possible partnership for a bike share system. This needs to happen early in the planning process because it would determine whether the bike share system would be larger and more widely accessible or whether it would be a smaller, more campus-isolated system, with the primary users being people associated with UNL.

If the City of Lincoln decides not to enter a partnership, there needs to be a discussion about which campus administrative units should be put in charge of the process of planning, implementing, and operating the bike share system. There are several possible administrative units that could take on the bike share system. Potential options include the UNL Facilities Planning and Management Department, UNL Recreation Center, UNL Outdoor Adventures, UNL Health Center, UNL Housing, and the Athletic Department. Each administrative unit would have its own objectives in how the system would potentially function, in addition to the university-wide purposes the bike share system would serve.

Each administrative unit in this case could bring a different vision to the discussion on what a bike share system could or should be. If the City of Lincoln agrees to enter a partnership with UNL, the vision could be more of a downtown-centric plan. It would likely be much different than a campus-centric system, but would allow for greater dispersion of stations throughout the City of Lincoln. The expanded number of stations would allow people throughout the City of Lincoln and UNL to reach an increased number of destinations in a reasonable amount of time.

Another option would be for a third party, for-profit organization to run the bike share system. However, this is unlikely, because for-profit companies have primarily limited themselves to areas where year-around bike use related to tourism is a primary source of revenue. On the other hand, some cities have had third parties come in and run the system once they have it in place. This is the case with the City of Omaha and their bike share system located in the Aksarben Village area of Omaha. The City of Omaha did have a bicycle and pedestrian planner, although the management for this slowly growing system is run by B-cycle, which is a subsidiary of the Trek Bicycle Company. If the City of Lincoln decides to proceed without a partnership with UNL, the preceding steps are still relevant.

6. Sizing of a Bike Share System and Scope

Bike Share Sizing Methodologies

There is no single universally-agreed-upon methodology for sizing bike share systems. In many cases bike share systems have required significant funding to secure capital for startup, which is an issue that needs to be resolved, based on the size of an area that can be reasonably covered. There are some metrics that have been used primarily for marketing purposes by the outdoor advertising firm, JCDecaux. JCDecaux originally used the fourth formula described below when they were proposing installation of the fixed bike share system in Paris, which subsequently led to the bike share expansion throughout the world. Several sizing formulas are listed as follows, along with brief explanations.

1. Residents per Bike

This formula suggests that the ratio of 150 residents per bike share bicycle provides an adequate level of service. This method can be applied in two different ways. One would be using the population for the specific bike share service area or, secondly, the population of the entire city. It is recommended that the total city population should be used, as the system is normally accessible to all citizens and the citizens can also act as a proxy for the out-of-city commuters and tourists who may use the system (City of Philadelphia 2010).

The problem with this methodology is that it uses the population that actually lives in the area, not the people who come into the service area on a daily basis. For example, there are only around 6,000-7,000 students who live on the UNL City campus, while there are an additional 25,000 students, staff, or faculty who come to the campus on any given day. There is a tidal flow that takes place on the campus and in the downtown area with a large influx of people that come in for work or school in the morning and then leave in the afternoon. They may even return later in the evening to attend a cultural event, sporting event, or to dine out. Considerations should include population density, as well as employment density, retail businesses, existing bicycle infrastructure, recreational and tourist attractions, existing transit, topography, and what kind of vitality the university provides to the city. All of these factors are important to each community in determining a realistic goal and defining what they hope to accomplish with a bike share system (Toole Design Group 2012; Weichman 2013).

2. Stations per Square Mile

This method assumes that twenty to forty bike share stations per square mile are needed to provide a reasonable level of service. This guideline would be most relevant for a bike share program that covers a large geographic area, and it would not be appropriate for calculating the number of stations needed for the UNL Campus (City of Philadelphia 2010).

The issue with this formula is that it does not account for where people are located and where they want to go. Depending on the city in which the bike share system is located, this station density formula may or may not be applicable, since some locations can support several stations per square mile, while other areas can support only a few stations. If a city has a highly populated or popular area with a high level of pedestrian and bicycle traffic, it would make sense for a bike share system to have a higher density of stations in that area.

3. Station Spacing in Distance

This method assumes there should be a density of one bike share station for every 300 square meters or 952 square feet within the bike share service area in order to provide adequate service to the customer (City of Philadelphia 2010; Toole Design Group 2012).

This formula can serve as a reasonable guide for station placement by using a grid overlay that can help determine the distribution of stations. It also serves as a visual representation of what the actual distances are and how they fit within and enhance an existing multimodal transit system. There may be regular transit service during the day, but transit service may decrease at night and be nonexistent during the weekends. This can serve as a hindrance for individuals relying on public transit on a regular basis or as their primary mode of transportation. It is in these instances that bike share could be a valuable piece of a city's transportation network.

4. JCDecaux's Equation

The French outdoor advertising company, JCDecaux, uses an equation to determine the number of stations needed in a given conceivable bike share service area, but because JCDecaux is first and foremost an advertising company, their interest is in determining how many small advertising billboards can be supported at the bike share stations to make a profit. This formula was used in the creation of the bike share system in Paris, France.

Number of stations = $((5300\sqrt{\text{market area in sq mi}} + 1)2(1000 \text{ feet}))$
(City of Philadelphia 2010)

JCDecaux's formula is used to guide the placement of stations that are intended to produce revenue from advertising placed on public urban street furniture. Here in the United States, this formula is less likely to be applicable because the residential densities in downtown areas are less than in European cities. Depending on how the system is funded, the stations could include some form of advertising or sponsorship to provide funding for the bike share system, as is used for Nice Ride in Minneapolis. The drawback of this concept is that many cities have restrictions on advertising in their downtown core areas to protect them from becoming unsightly spaces with advertising everywhere. Again, it is important to recognize that every community is unique, and the uniqueness should be respected. One sponsor could fund the whole system, but the city may run it through a quasi-government nonprofit organization or through a distributing company (such as B-cycle), which is the case in Denver, Colorado, where the system was funded by Kaiser Permanente, or the case of Madison, Wisconsin, where the system was funded by Trek.

5. Estimated Daily Bike Share Trips

This method compares the average daily bike share trips in similar situations and cities. This method is often used when decision makers want to base usage rates for a new bike share system upon experience in other places (City of Philadelphia 2010).

This approach generally assumes that the bike share system can be used year-around and does not take into account the intent of the system and to whom the system is being marketed as likely users. In Minneapolis, Minnesota, and Madison, Wisconsin, the university students are the major users of the bike share systems on and around their respective campuses. With a majority of the students present on campus only from August through May, a major gap in usage occurs during the months of June and July. The number of bike share trips also depends on peak times of usage and how the system flexes and evolves over time. Data that is created once the system is up and running can allow a bike share system to evolve over time. By analyzing how the system is being used, planners can configure more targeted use (City of Philadelphia 2010; Madison B-Cycle 2012; Nice Ride Minnesota 2012; Toole Design Group 2012).

Each Place is Unique

These formulas and metrics do not work universally, so planners should use them cautiously, and they should only be used as guides in overall sizing of bike share systems, with more emphasis placed on the use of professional experience and judgment. Most of the North American systems have been put in place by analyzing where people congregate in the greater context of an urban area. This has been done by primarily looking at existing bicycle usage within urban areas and where people are already using their bicycles for transportation.

If UNL decides to proceed with implementing a bike share system, a decision also needs to be made on whether bike share stations should be located on East Campus. Who would be served by a bike share system on East Campus? Will the bike share system serve as just another system to use as a convenient transit option in getting back and forth from East Campus to City Campus, or will there be connections within East Campus and to what extent will that exist?

If the City of Lincoln were to take part in a bike share planning effort and become a partner with UNL, this could change the size and scope of the system. Would the system serve the greater downtown area or would it be focused on certain parts of the downtown? Would this include the multiple State of Nebraska office buildings, Haymarket, Canopy Street District, Pinnacle Bank Arena, and take more of an integrated approach in serving the downtown district as a whole? This discussion would need to take place, and the strategic placement of stations would need to correspond with available funds.

The best bike share arrangement would probably be a collaboration that serves UNL City Campus and the greater downtown of Lincoln, Nebraska. This would allow users at the University and downtown to freely use bike share bicycles and stations situated in both areas. This suggestion stems, in part, out of the need for UNL to recruit more students from out of state and abroad and whether they will need to purchase personal vehicles while they are students at UNL. With the potential addition of 5,000 more students and the faculty and staff needed to support these students, there will be an increased demand for available parking in an already dense area. This leads to the question of whether the City of Lincoln and UNL will increase the amount of available parking in the City Campus and downtown areas. Answering these questions and deciding what may be the best course of action for long-term planning will determine whether a bike share system could be used to alleviate some of these parking problems.

The UNL Environmental Sustainability Committee presented the bike share idea to the student senate in December of 2013, to help reduce the carbon footprint of UNL. During the spring of 2014, the UNL Environmental Sustainability Committee and Bike UNL were promoting the bike share idea during the annual Bikefest. They have been collecting surveys and have informed the UNL administration and members of the City of Lincoln staff about the need to complete a feasibility study (Dunker 2014).

The City of Lincoln's Current Bike Share Proposal

Per email from Kellee Van Bruggen on March 30, 2015. When planning the placement of stations for the future Lincoln Bike Share system, the City of Lincoln is currently purposing placing five stations on the UNL campus with three stations on City Campus and two stations on East Campus. This could change but it is the current proposal. The City of Lincoln is concentrating phase one on the downtown area. The City is currently looking at locating the other 10 stations at the State Office Building, The City County Building, Haymarket, along P and N Streets, and Trail Center. People who are familiar with the City of Lincoln could see these as reasonable locations for these stations and a good starting point for phase one of this project.

7. Bike Share Technology

Emerging Bike Share Technology

The growing sophistication of technology available in today's world is being introduced into bike share systems and is making them more effective and easier to use and manage. The integration of technology has allowed bike share systems to finally reach their potential for access to the greater population and become viable systems as a whole, especially in terms of energy use, data collection, bike security, electronic keys for bike checkout, and communication of maintenance issues to central hubs.

When JCDecaux installed the Velib system in Paris in 2007, much was learned regarding station design, bike design, and having either permanent or movable stations. Velib's major accomplishment was being able to utilize the Radio-Frequency Identification (RFID) technology to assign individuals to personal RFID cards, so they could check out bikes if they brought into the system. The RFID cards solved the main issue of people losing the keys, which then led to having to change locks on all the bikes and getting people new keys. If a key is now lost, that key could effectively be deactivated and no one would be able to use that key. RFID technology really brought bike share into the viable multimodal transportation mix and has allowed it to flourish.

If a bike share system could be adapted to allow students to use their N Cards (University of Nebraska-Lincoln Student Identification Cards), that would be the way to proceed. The other option would be to issue standard RFID tags that fit on a key chain, which is a fairly standard practice. It is easy to replace a piece of plastic as a form of identification that allows for an easy scan and checkout procedure that is secure and quick.

One of the main issues with the Velib system in Paris, France, was the slow installation of the stations, because they were built into the street and sidewalks. All of the stations had to have electric power run to them underground, and all racks were individually set in concrete. Not only was this installation method costly, it did not allow the Paris system to grow to fit more bikes at high-use stations and reduce bikes at low-use stations. This was a lesson learned for the Velib system, but other new systems have gained insight into what best practices should be put in place.

Another issue with the Velib system was that the stations themselves turned out to be much more susceptible to theft and damage than the new re-engineered fourth generation systems, which have had little to no theft problems. The Velib system utilized a pin attached to the side of the main bicycle frame, which is inserted into the station locks. These locks turned out to be inadequate and have resulted in a large problem with stolen bikes turning up in Africa, the Middle East, and as far away as India.

Improvements to Forth Generation Bike Share Stations

The fourth generation bike stations have been improved, and users are able to lock the bike by using the front wheel hub and the front of the head tube of the bike frame. This is an effective method for securing the bike share bikes. The new bikes are also equipped with GPS to allow the managing entity to recover the bike if it were to go missing after an extended period of time. This GPS can also be used to gather data on how people are using the system and where they are going at certain periods of time during the day or on specific days of the week. This data can then be used to adjust station capacity by lowering or raising the number of bikes that are being stored at a particular location. The station placement can also be adjusted if there is under-utilization at a given location and higher traffic in another area. Stations can be moved, which is a beneficial part of the fourth generation systems.

The new fourth generation stations also allow for either a solar powered station or wired station depending on station placement and the availability of electrical sources where the station is sited. If the stations are located in a shady/covered area or on the north side of buildings within the service area, a wired station would be suggested. One downfall of the wired stations is if a bike station needs to be moved. An electrical source at the new location would need to be found. The ease of station placement with access to electrical sources is something that should be reviewed if wired stations are being considered.

Additionally, there could be widespread adoption of new mobile payment systems such as Apple Pay that was released in October 2014. These mobile devices use a NFC (Near Field Communication) chip that allow them to communicate with a responding device to exchange payment for service. While they are similar to RFIDs, they allow for more information exchange and secure data transfer. The NFC chips can store credit card information, credentials, and PINs. There should be consideration to include NFC chips into the bike share system. This should be integrated in with the stations along with having the RFID readers because some people may not have compatible mobile phones. This could be the way of the future that would allow users to touch and go instead of having to dig for their keys or get the cards out of their wallets. Most people already have their phones in their hands or can retrieve them in short order. This would also allow visitors to quickly pay for bike usage and could potentially allow them to touch and go for their remaining paid usage period. The NFC chips are normally read-only but some allow for two-way exchanges and allow for secure communication between the two devices as along they are powered. These could eventually expand into bus passes, key cards for buildings, athletic event tickets, and other uses that could be of value to UNL.

8. Bike Share Funding

Funding Sources

Several different funding sources have been used for bike share systems around the world. The Paris Velib system was created by the JCDecaux outdoor marketing company so they could place small billboards at each station in locations all across the city. In the case of JCDecaux and the City of Paris, the billboard marketing was used to pay for the system, maintenance, and management of the bike share system over a period of time. In other cities there have been many different funding arrangements that have been used for bike share systems, and all sources should be examined to find the best possible fit for each bike share system and community.

Student Fees

If UNL decides to pursue a bike share program, one of the funding sources to consider would be to approach the Association of Students of the University of Nebraska-Lincoln (ASUN). This should gauge the student body's willingness to create a student fee to either create the bike share system and/or support the management of the bike share system in the long term. This leads to the need for a decision of whether there should be universal membership for all students, faculty, and staff of UNL or whether there should be a pay-to-use fee.

The student fee would need to be voted on, which could be a challenge because it would require an extensive educational process as to what bike share is and the expected benefits of the system to the average student. This could also be difficult if the plan involves only putting the system on City Campus, as it could draw negative opinions from those students who primarily attend classes or study on East Campus; they could be paying a fee that does not necessarily improve their campus experience. Additionally, with the increasing costs of attending a university or college in the United States, the added expense could be seen as limited value by some students while attending UNL.

Grants

Grants that have been used in the past are listed below, with most likely sources being grants from federal transportation agencies. These transportation grants would not be available to UNL alone. However, if the City of Lincoln were to take the lead on this project instead of UNL, more transportation funding options would be available to carry out the goal of creating a bike share system which would be mutually beneficial. Federal sources of funding which have been used in the past by bicycle share systems include:

Federal Highway Administration

- Congestion Mitigation Air Quality (CMAQ)
- Surface Transportation Program: Transportation Enhancements (TE)
- Transportation, Community and System Preservation Program (TCSP)
- Transportation Investment Generating Economic Recovery Grant (TIGER)
- Non-motorized Transportation Pilot Program

Federal Transit Administration

- Job Access Reverse Commute (JARC)
- Bus Livability Pilot Programs
- Paul S. Sarbanes Transit in Parks Grant Program

Centers for Disease Control and Prevention

- Health and Obesity Prevention Grant

Department of Health and Human Services

- Communities Putting Prevention to Work

Department of Energy (DOE)

- Energy Efficiency Conservation Block Grant

State and Local Funding Sources

- Public Health Grants
- Local Transportation Funds

(Nice Ride Minnesota 2012; Robertson 2010; Toole Design Group 2012)

One of the funding sources that has been overlooked by many cities, which may be open to UNL, is the Centers for Disease Control Health and Obesity Prevention Grant. This grant could be applied for in conjunction with the UNL Health Center, with the goal of creating a healthier student, faculty, and staff population. This could be a different way of gaining support for a UNL bike share program. While it would not be directly looking at this issue from the multimodal transportation viewpoint, this funding source could still be used to help create a multimodal transportation network that includes a bike share system.

This CDC wellness grant sometimes has been overlooked because it is available through the Centers for Disease Control and Prevention and funded by the Affordable Care Act. The City of Nashville, Tennessee, is the only municipality or government entity to apply for funds from this grant program for the city's bike share program. The question could also be asked as to how one would quantify the benefit from this funding source. This would be extremely difficult, if not impossible, to measure because of the long term inability to collect the required data on individual health outcomes, especially with the student population. While it may be difficult to sell a transportation system as a healthy exercise system, Blue Cross Blue Shield, Humana, and Kaiser Permanente have been big sponsors for many of the bike share systems and see them as good investments for urban multimodal transportation networks.

With Blue Cross Blue Shield, Humana, and Kaiser Permanente being large sponsors of several of the bike share systems that have been installed over the past several years, these health insurers should be considered as potential system naming sponsors. The health insurers have a financial interest in having healthier customers to insure and may have a strong interest in helping UNL reduce the institution's health insurance costs over the long term. Working with the health insurers could prove to be a more reliable and less controversial source of funding that would be mutually beneficial for creating a bike share system.

Regarding the federal transportation funding sources that are listed above, the funding for many transportation projects has not been consistent from year to year in the current political climate. Several of the first bike share systems in the United States utilized federal transportation funding to establish the systems in their respective cities. There is currently 600 million dollars in Transportation Investment Generating Economic Recovery Grant (TIGER) funding for the year 2014, but there have been 9.5 billion dollars in transportation related applications. The ability to get funding through these transportation related funding channels could be a difficult task, and it might be better to spend time applying for health-related funding for the bike share system.

The City of Lincoln staff already has experience writing transportation grants, which would be invaluable. This would allow the city to seek grant funding as they plan for establishing, maintaining, and expanding a bike share system.

Local Sponsors

There are also other funding sources that could be considered. Many local companies could be sponsors, making this not only a University asset, but also a community asset for the downtown Lincoln area, serving the people that live, work, shop, or visit for entertainment. Some individuals may use the system while visiting Lincoln for business or pleasure, as this system could prove to be a valuable resource for the businesses and UNL in the future. Smaller sponsorship opportunities could be offered, such as station sponsorships, which have helped fund the Nice Ride bike share program in Minneapolis.

UNL could pursue a bike share program by using grants or sponsorship funds for the bike share system. This could limit the start-up size of the system, but more stations and bikes could be added over time. UNL could include a fee for the system on vehicular parking passes, where anyone having a parking pass would also have a bike share pass. This could make UNL parking passes more desirable to those who come to campus every day or live on campus. At the same time many students might not like the additional fee to subsidize the bike share system. The bike share system could then operate as an additional option available to those purchasing parking passes from the UNL Department of Parking and Transit Services. Depending solely on grants for on-going support of the system could be a significant challenge due to the likelihood of decreasing amounts of grant funding available over time.

If the City of Lincoln were to develop a bike share system, it would be advantageous to apply for transportation grants and other funds that are currently available. There is also wording within the Lincoln Lancaster County Comprehensive Plan 2040 that encourages other forms of transit and a desire to make a more “bikeable city.” A bike share system would make Lincoln a more bike-friendly city. At the same time, it should be stated that the City of Lincoln has been dealing with budget cuts for services like many cities in the United State, and this may make it difficult to justify capital expenditures for a bike share system.

Funding is a significant and important part of the planning process of creating a bike share program. The way the bike share system is set up and operates greatly affects whether it is successful. This is primarily because of the challenge to get people to change their habits. If the bike share system does not work for users the first time, they will be dissatisfied and will be unlikely to become repeat customers. The ease of access and usability of the system is effectively the customer service end of the bike share system, and this part of the system must be must be easy to figure out and use from the outset.

The following pages are examples of funding sources and sponsorships that have been used by other cities to fund their bike share systems.

Different Naming and Supporting Sponsors of B-Cycle Bike Share Systems in the United States

Boulder, Colorado: Amandeus Consulting, AT&T, Bike Belong Coalition, Boulder Beer, Boulder Arts & Crafts Gallery, Boulder Convention & Visitors Bureau, Clif Bar, CF+B, Downtown Boulder, Elevations Credit Union, Ergo Bike Ergonomics, EKS&H, Faegre Baker Daniels, GNIP, Go Lite, Google, Hazel Beverage World, Jacque Michelle, Kiosk, Newhope360, Patagonia, Polar Bottle, Sir Richards's, University Corporation for Atmospheric Research, University of Colorado-Boulder, and White Wave Foods.

Broward, Florida: Humana and Broward County.

Charlotte, North Carolina: Blue Cross Blue Shield of North Carolina, Carolinas HealthCare System, Verizon Wireless, Charlotte, Charlotte Center City Partners, Silo's South End, Colonial Reserve at South End, Fountains SouthEnd Apartments, Johnson & Wales University, Charlotte Area Bicycle Alliance, Trips for Kids Charlotte, and UNC Charlotte Center City.

Denver, Colorado: Kaiser Permanente, RTD, Frontier Airlines, LiveWell Colorado, Bicycle Village, Brownstein | Hyatt | Farber | Schreck, CBS Outdoor, Colorado Convention Center, Colorado Rockies, Kentwood City Properties, Noble Energy, The Denver Post, The Convention & Visitors Bureau, Xfinity, Anadarka, Gates, Suncor Energy, US bank, White Wave Foods, Clif Bar, Riverfront Park Community Foundation, Highland Park Apartments, Colorado Rapids, Whole Foods, Elevations Credit Union, IMA Financial Group, Kroenke Sports Enterprises, OzoneAware, Serendipity Catering, Integer, and Denver Housing Authority.

Des Moines, Iowa: Des Moines Bicycle Collective.

Fort Worth, Texas: The T, Fort Worth South Inc., Downtown Fort Worth, Inc., City of Fort Worth, West 7th, Sundance Square, UNT Health Science Center, Texas Christian University, Texas Health Harris Methodist Hospital Fort Worth, Higginbotham, City Place, Omni Hotels and Resorts, Kimbell Art Museum, Amon Carter Museum of American Art, The Modern, The Trailhead, and Museum Place.

Greenville, South Carolina: Upstate Forever and Greenville Health System.

Kailua, Hawaii: Healthy Hawaii and Kaneohe Ranch.

Houston, Texas: Bike Houston, Downtown Houston, Bike Barn, Blue Cross Blue Shield of Texas, and the Houston Mayor's Office.

Kansas City, Missouri: Blue Cross and Blue Shield Kansas City, and Bike Walk Kansas City.

Madison, Wisconsin: Trek Bicycle

Nashville, Tennessee: Centers for Disease Control and Prevention, YMCA of Middle Tennessee, Lightning 100 and Team Green, NashVitality, and the City of Nashville.

Omaha, Nebraska: Blue Cross and Blue Shield of Nebraska.

San Antonio, Texas: San Antonio Bikes Office of Sustainability.

Salt Lake City, Utah: Salt Lake City, Downtown Salt Lake City Alliance, and Select Health.

Spartanburg, South Carolina: Mary Black Foundation, Future for Active Living, and City of Spartanburg.

Bixi/Alta Bike Share System Sponsors in the United States

Boston, Massachusetts: Thomas Menino Mayor, New Balance, Allston, Beth Israel Deaconess Medical Center, Brigham and Women's Hospital, Boston Children's Hospital, Fan Pier, Harvard University, Landmark Center, Massachusetts Bay Commuter Railroad Company, Massachusetts Convention Center Authority, Northeastern, P&G Gillette, Prudential Center, Putnam Investments, Equity Office, Red Sox Foundation, Seaport Square in South Boston, Seaport, TD Garden, UMass Boston, and Barr Foundation.

Chattanooga, Tennessee: Blue Cross and Blue Shield of Tennessee, Chattanooga History Center, One North Shore, Tennessee Aquarium, Volkert, and Chattanooga Area Chamber of Commerce.

Minneapolis, Minnesota: Blue Cross and Blue Shield of Minnesota, Bike Walk Twin Cities, Minnesota Department of Transportation, National Park Service, U.S. Department of Transportation Federal Highway Administration, Target, Allina Health, MPLS Parking, ABC Ramps, Equal Exchange, Abbott Northwestern Hospital, SuperValu, Dorsey & Whitney, Freewheel Bike, The Wedge, Augsburg College, Red Stag Supper Club, Dero Company, The Saint Paul Foundation, Seward Community Co-op, HIWAY Federal Credit Union, McNally Smith College of Music, University of St. Thomas, Peace Coffee, Bryant-Lane Bowl, Birchwood Cafe, Third North, Barbette, Central Corridor Funders Collaborative, Mississippi Market, Roepke, QBP, Macalester College, Surly, Roundpeg, Persuasion, Duffy & Partners, Metro Transit, ClockWork, Minneapolis, Citypages, and Pieper Whitaker & Bjorks.

New York City, New York: Citi Bank

Washington DC: Platinum: Back on My Feet, Hoffman-Madison Waterfront, League of American Bicyclists, The McClendon Center, and Trout Design Studio

Gold: Acceleration Space/OSI Offices, Akridge, Airlines Reporting Corporation, The Blind Dog Café, BuckleySandler LLP, Catalist LLC, Carbon Cross / EcoHouse, Defense Point Security, Destination DC, Destination Sales & Marketing Group, District Department of the Environment, Faith in Public Life, Fors Marsh Group LLC, Friends of the Earth, Gallaudet University, Georgetown University GUWellness, Global Zero, Google, Gorove/Slade Associates Inc., Hattaway Communications, Inc., The Hay-Adams Hotel, Hickok Cole Architects, HOK, Inter-American Development Bank, International Justice Mission, KGP Design Studio, National Alliance for Hispanic Health, Northeast-Midwest Institute, Ocean Conservancy, The Office of Congressman Earl Blumenauer, The Shakespeare Theatre Company, Social Driver, Spitfire Strategies, Treliant Risk Advisors, USDA Foreign Agricultural Service, U.S. Department of the Interior, U.S. Green Building Council, U.S. Office of Personnel Management, The Washington Center, Whitman-Walker Health, and The World Bank
Silver: American Council for an Energy-Efficient Economy, American Society for Training and Development, Airlines Reporting

Corporation, Council of the District of Columbia, Cowgirl Creamery, Debevoise & Plimpton LLP, DowntownDC Business Improvement District, Events DC, Federal Communications Commission, Gensler, Human Rights Campaign, International Monetary Fund, National Geographic Society, Qorvis Communications, Sebesta Blomberg, and Trust for America's Health

Bronze: Institute of International Finance, John Snow Inc., PBS, PFLAG National, SRA International, Inc., and Winrock International.

Canada

Montreal, Quebec: City of Montreal, Desjardins, LA Presse, and Telus

What can be gathered by the listings above is that there are different support structures present for bike share systems. There is no single way or method to approach sponsors or to determine how many sponsors a system needs. Support often depends on how big the system is and how much support is needed by the system. The sponsors need to have good reasons and perhaps some incentives to support their local system, whether it would be corporate image, advertising, or sometimes to provide passes for company employees (a strategy that can help reduce health insurance costs for the company). There are also different models for what works in different cities, and the citizens of those cities know what will work and what will not in their communities.

Grant Funding Received by the City of Lincoln

Per email from Kellee Van Bruggen on March 30, 2015. The City of Lincoln applied for a Congestion Mitigation and Air Quality grant in January of 2015 and has received funding for an initial 15 stations and 100 bikes. It is still early and there have not been any contracts or agreements signed, but there will be a need for a community support and sponsorship in the future similar to many of the other systems. There are many different avenues and ways to pursue sponsorship to benefit both the bike share system and the advertisers.

9. Bike Share Infrastructure and Maintenance

University-Operated Run Bike Share System

An advantage UNL would have in running a bike share system is an existing bike shop with part-time student mechanics already servicing student bikes on campus. This is one major advantage that many other bike share systems do not have and could be a major advantage in the overall maintenance of the system. If UNL and the City of Lincoln were to partner on a bike share system, the University could offer their bicycle maintenance services in exchange for providing several bike share stations on campus in return.

With the expansion of the UNL Outdoor Adventure Center, the new facility will offer a bike locker system, allowing students, faculty, and staff to ride their bikes to campus and then place them within a secure storage facility. If, at this point, riders still need transportation to their end destination, a bike share system could be a source of transportation to other destinations on the campus.

If it is determined that UNL Recreation and UNL Outdoor Adventures cannot be used for the maintenance services, perhaps a private company could provide maintenance service at a reasonable cost. There are two private bike shops, Cycle Works and Monkey Wrench, both located within a short distance of downtown Lincoln. Other local bike shops could serve as the maintenance provider, but it may require them setting up a central downtown location, or incurring the potential transportation costs when taking on the maintenance contract.

There is one more option which would involve using city employees to perform maintenance through their 21st Street city maintenance facility. There are plans to move this facility to a new location in the near future. With this being considered, a bike maintenance facility could be included in the development of this maintenance facility. With this option, the City of Lincoln would need to hire and potentially train someone to maintain the bike share system.

10. Bike Share Station Placement

Bike Station Placement at UNL

Bike station placement on the UNL campus could be based upon several different concepts, all of which would be driven by demand, with bike station placement adjusted incrementally over time in response to seasonal or use cycles.

All of the different generations of bike share should be considered, but if UNL goes with a fourth generation system, it would allow the university to move stations based on time of year and what is taking place on campus. The ability to change the placement at different points during the year could serve multiple purposes, allowing greater access to bikes by users of the system.

One concept would place bike stations at locations where there is a concentration of student-centered services, such as the University Housing residential complexes and the Nebraska Union. Each of these locations has a high density of students between August and May. Student residence density drops off significantly during the summer. During the summer, some of the station capacity could be reduced or stations could be moved to other locations to allow access for summer camps, university events, and festivals, where bike share access could be utilized.

Another concept would be to equally space the bike share stations throughout the campus in common areas, which would serve larger areas instead of specific locations. This option would allow the system to serve more users from a variety of different locations. By using this concept at the beginning of the implementation process, the bike share system managers could analyze user data to more precisely site stations in the future.

A parking-focused concept would allow bike share access for students who park their cars and then use the system to get on campus from the neighborhoods and parking garages around the campuses. The Husker Hall residence hall, for example, would be a good model location to try out this concept. The neighborhood around Husker Hall at 23rd and U Streets is located along the Vine and Holdrege bus routes where people can overwhelm bus supply during the peak morning hours. This could also serve the North Bottoms Neighborhood, where there is a dense student rental housing population.

With any station placement concept, the bicycle infrastructure needs to be strengthened to allow users access to the bike share system in the way it is intended. Having bike routes and bike racks already on campus is a big step. With the introduction of a bike share system, the existing bike culture at UNL will help in leading the system to long-term success. Most cities that introduced bike share systems into their communities already had an existing bike infrastructure in place and were able to reap the full benefits of the bike share system.

Lessons Learned from Madison, Wisconsin and Ann Arbor, Michigan

Per email from Heather Croteau on April 3, 2015 and per email from Martha Laugen on March 25, 2015. The University of Wisconsin and the University of Michigan have found station placement to be one of the challenging issues in getting bike share into certain areas of their campuses. This includes having the space to implement bike share while still allowing for other current transportation modes that are in place on the campus. By working with the facilities departments at the respective universities, these issues have been addressed and appropriate

bike share station locations have been found on the respective campuses.

Per email from Martha Laugen on March 25, 2015. The University of Wisconsin has been able to implement bike share stations to serve major events on campus either through current station placement or through a virtual bike share station. The virtual bike share station is similar to the current bike valet system in place at UNL for the seven to eight home football games in the fall and the spring game. With the UNL Recreation Centers on City and East campuses providing this service and not technically part of the university, there will need to be discussions with the Recreation Center representatives. Per email from Kellee Van Bruggen on March 30, 2015. As stated earlier, the City of Lincoln is currently purposing placement of five stations on the UNL campus. The current proposal is for three stations on City Campus and two stations on East Campus, but this could change. However, the City of Lincoln is concentrating phase one in the downtown area. The City is currently looking at locating the other ten stations at the State Office Building, The City County Building, Haymarket, along P and N Streets, and Trail Center.

Collaboration Between UNL and the City of Lincoln

If the City of Lincoln were to take on the bike share system, there are several different concepts and approaches that could be implemented to serve the city. It depends on who the city wants as users of the system. If there is a partnership between the City of Lincoln and UNL, an interaction and meshing process will be needed, where students, faculty, and staff can access the larger geographic area of the city. There is already a large and dense population concentration of individuals on the UNL campus, but allowing these individuals a greater sense of access

to the downtown area will help bring a greater vitality to the entire area that makes up the university campus and downtown Lincoln.

There are several large employers in the downtown area of Lincoln, and if there is an interest by these entities, bike share stations could be located near their offices. In some communities, companies and apartment/condo buildings have even gone one step further as part of the benefits of either working at that business or living in that location by allowing access to the bike share system. This could be a discussion point for city officials seeking sponsorships to bring bike share to the downtown employers. Utilization of bike share could be added as part of company benefit packages. With this benefit being available, employers could see health insurance cost savings because of their employees leading more active lifestyles.

One of the largest employers that should be approached is the State of Nebraska, with multiple office locations throughout the downtown. These employees could use the bikes instead of walking or driving to meetings at the other locations, which is currently the case. By working with their health insurer, they could potentially lower health insurance costs, which would benefit the State of Nebraska. This could also be the case for the staff and faculty at UNL if they were able to show, through short-term data driven results, that a significant number of employees utilize the system.

Another concept involves approaching the hotels in the downtown area to suggest that they provide bike share access at their locations. Thus, hotels would enable their guests to have full access to Lincoln's downtown area, in addition to any event they may be attending. For example, if there was an

event at another hotel location or an event at UNL, they could utilize the bike share system as their mode of transportation to and from that event. The hotel concept would allow people coming to the city for entertainment or business to utilize bike share as a transportation mode. Individuals using airlines for travel to and from Lincoln are not likely to have a bike or even a car; bike share could provide a useful option for them to access and enjoy what the city has to offer.

Collaboration between the City of Lincoln and UNL on a bike share system would enhance student access to the downtown. With the greater number of student housing options currently under construction near the downtown area, bike share could keep many students out of their cars and allow them easier access to the campus and the city as a whole. An even greater number of students will utilize the campus in the future as the university grows to 30,000 students.

With the key entertainment spots in the downtown Lincoln area now separated by greater distances, a bike share system would allow people better access to all that Lincoln has to offer. The new Canopy Street entertainment district, which includes the new Pinnacle Bank Arena and Rail Yard has additional parking. If people are able to utilize this parking but still want to have access to all of downtown, bike share will allow access without requiring people to move their cars. A bike share system would allow access to City Campus, O Street entertainment district, 9th Street entertainment district, and the multitude of businesses in between.

Right-of-way needs to be considered, as well as the best locations for station placement, so the stations are not blocking fire hydrants and emergency exits. For example, space needs for bike share stations are illustrated with the photos of a NiceRide Bike Share station in Figure 14 and 15. There are certain days during the year when sidewalk congestion and traffic could block the stations and access to the bikes. The City of Lincoln has this information readily available. This also needs to be a consideration of UNL in what are appropriate spaces that are not going to impede access for regular maintenance and emergency vehicles or personnel. UNL Landscape Services should be consulted to determine appropriate locations and design of the bike share stations that will enhance rather than harm, the overall appearance of the UNL campus.



Figure 14

NiceRide Bike Share station in Downtown Minneapolis, Minnesota

Solar Panel

Computer Payment, Communications, and Electrical Box

Bike Share Dock

Bike Share System Map + Advertising Sign

Bike Share Bikes

Plates Holding Docking Stations

Figure 15

NiceRide Bike Share kiosk in
Downtown Minneapolis,
Minnesota



11. Implementation of Bike Share

Introducing a Bike Share System

If funding is obtained for a bike share system, implementation of the project is the next step in the process. The first part of this process is the marketing effort at UNL to educate people as to why bike share is a desirable alternative transportation option. Bike share will require significant explanation of how it will enhance life for the average UNL student, especially if student fees are used for potential funding of the system. It is difficult to show people how an extensive bike share system can improve the UNL transportation system if they have never seen or experienced bike share. Overcoming this challenge would be a first step.

Marketing

Marketing the concept at UNL could be accomplished by enlisting the student-run advertising Jacht Club Ad Lab Firm, which is part of the UNL College of Journalism and Mass Communications, or a private firm to develop the brand name and marketing plan for the bike share system. This would be an opportunity to create enthusiasm for the project. If the City of Lincoln would decide to proceed with this project alone or partner with UNL, this would still be a good place to build the brand for the bike share system. Furthermore, if there is funding by sponsors for the system, the Jacht Club could participate in the marketing plans going forward. This could be a more cost effective plan for the future. Students at UNL could get experience and the opportunity to do a project for UNL and the City of Lincoln while building their portfolios.

If the determination is made to have a professional marketing firm take on this project, there are several marketing firms located in the City of Lincoln that could manage the project. These marketing firms may already have contracts with either UNL or the City of Lincoln.

If a bike share system is implemented and there are stations on UNL City and/or East Campuses, it is important that the bike share is considered part of the transportation system overall. This means that bike share stations and bike routes need to be included on the bus route maps. The map that goes out to all students needs to not only have the bus routes, but also the bike routes on City Campus and the designated routes back and forth to East Campus. Most importantly, consideration needs to be given to where bike share stations should be located. Moveable bike share stations would be an option, depending on popular sport seasons or other special events taking place. Locations could be symbolized on maps by different colors indicating those seasonal locations.

Branding

If there are no sponsors and the bike share system start-up is funded through federal or other government dollars, it will still need a name. Branding would be very important, regardless of which entity is in charge of the bike share system. If the bike share system is part of UNL, it could have a University-oriented name. Likewise, if the City of Lincoln is leading the implementation of the system, it could have a name that is more connected to the city. The Yacht Club could be a resource that could be helpful in getting materials and branding work done, again allowing students to gain valuable experience. Sometimes naming contests are used to enlist support from the community.

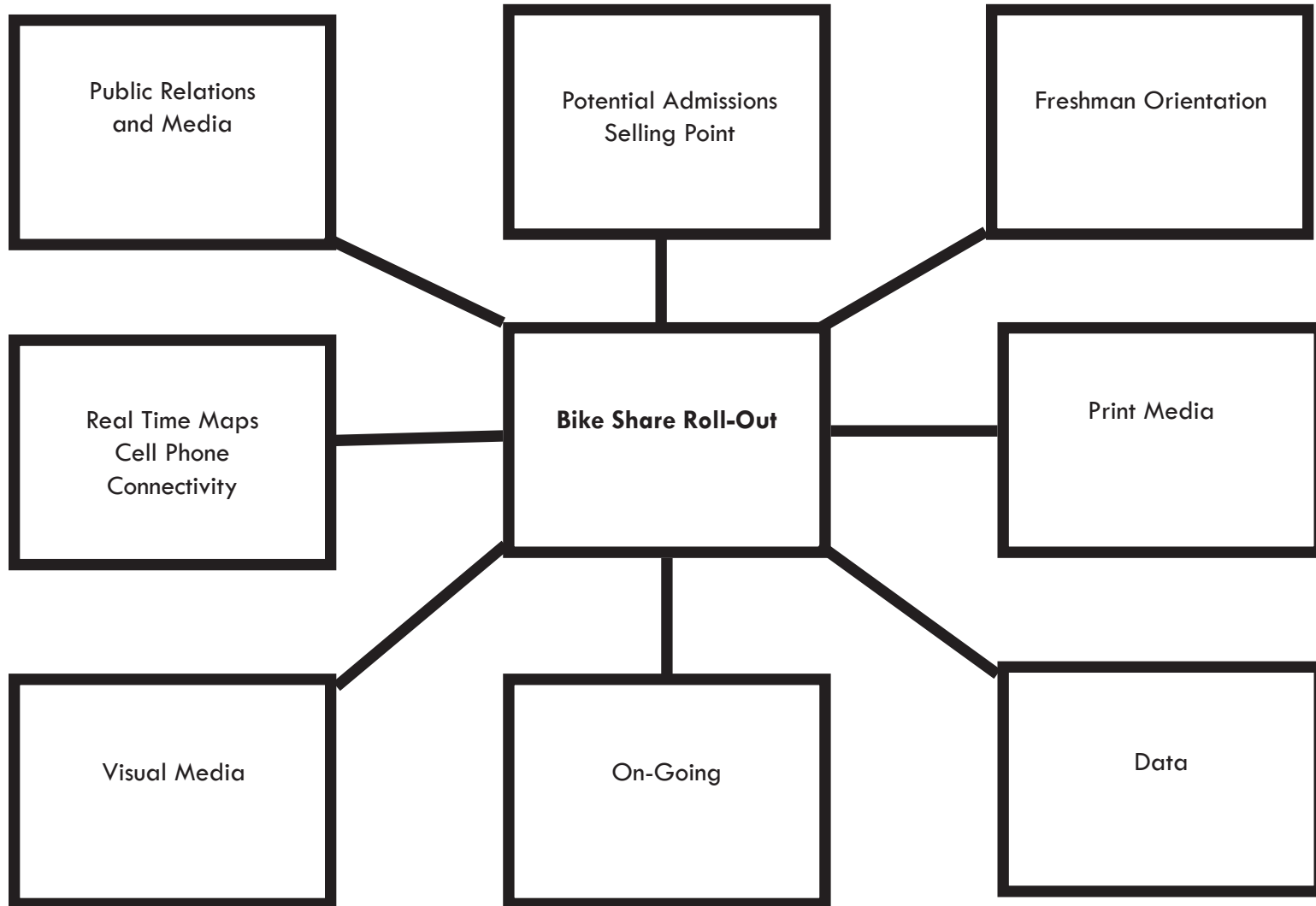
Several possible University of Nebraska-Lincoln and City of Lincoln Bike Share Branding ideas are listed below:

- Red Bike
- Black Bike
- Bike LNK
- Husker Bike
- Lincoln Bike Share
- Husker Bike Share
- UNL Bike Share
- Scarlet Ride
- Bike Right
- Scarlet Bike

There also needs to be a color palette that is bold and iconic to make it easy for riders to locate the bike share stations.

Branding and color palettes add to the ease of identification of the bike share system and should be an important factor when planning this system. If the bikes look good and are clean and in good repair, the likelihood that people will try the system vastly improves. B-cycle has also introduced some large tricycle bikes for people who are not comfortable with only riding on two wheels. Additionally, Velib in Paris, France, will be placing children's bikes at several park locations in the summer of 2014 to enable children to ride with their parents (Beardsle 2014).

12. Bike Share Roll-Out



Real Time Maps and Cell Phone Connectivity

Maps of the bike share system need to be available at the stations, and having the system map available for smart phones with the ability to see which stations have bikes and where the stations are fully-occupied or empty should be included in the roll-out. Having a way to communicate with the customers in an efficient manner, by providing the option to sign up for e-mail notifications or downloading an application, could enhance the system. As the ability to conduct more financial transactions over smart phones increases, the system could enable people from out of town to sign up for the program quickly and easily.

Public Relations and Media

There needs to be promotion of the system through a variety of different methods and channels, no matter which entity takes on this project--UNL, the City of Lincoln, or a partnership. A partnership could allow for more media contacts and internal processes to get information about the system out to users. After the system is activated, promotion needs to continue, with positive stories from users and reports on how the system has made improvements through suggestions from users and assessment of data.

Social Media

UNL has countless social media platforms in many different departments and organizations. Getting those internal contacts involved with publicizing the bike share system is important. This is true with the City of Lincoln, as well, being able to reach all citizens, many of whom may choose to “like” or “follow” the bike share system on their social media platforms. This cannot be only a one-way flow of information going out about the bike share system. A responsive dialog would be required. By interacting with the individuals who start postings to large diverse populations, people could be educated on the benefits of bike share and what it can bring to UNL and the City of Lincoln. Consistent feedback would be important to make on-going improvements in the system, along with a long-term commitment to keep a vibrant bike share system operating.

Print Media

Engaging the *Lincoln Journal Star* to get press coverage about the bike share system and how it will work, with effective info-graphics would be important in the days before the roll-out of the system. If classes at UNL are in session, the *Daily Nebraskan* should also be contacted to get the word out about the new bike share system. Promotional information could be provided through internal newsletters that go out to state offices and downtown businesses. These could reach many people who work downtown and would be potential users of the system. This could be achieved by working with the Downtown Lincoln Association in promoting the bike share system.

Visual Media

Working with the local television stations to broadcast news about the bike share system would ensure that most viewers in the City of Lincoln and surrounding area would become aware of the system. Members of the media could use the bike share bikes and stations to show viewers how to utilize the system at UNL and in the City of Lincoln. Additionally, because of the relatively close proximity of the City of Omaha and the regularity that citizens of Omaha come to Lincoln for work, entertainment, education, and sporting events, Omaha media should also be contacted. Finally, if one of the television stations, the *Lincoln Journal Star*, or the marketing company would create the branding and campaign for the system, a short educational video could be embedded into the bike share Web application. This could provide new users with a brief orientation on how to use the system. Getting a strong informational message out before the launch would ensure that the system gets going on a positive trajectory.

On-going Obligations

Maintenance of the bike share system should be a major priority. With a smaller system, it is risky to have too many bikes in disrepair, because it will compromise the bike share system's functionality. It is very important that the bikes and the stations are in good working mechanical order. When a user checks in a bike, he or she needs to have the option of pressing a maintenance button that will alert the system that there is something wrong with the bike.

Some users have taken matters into their own hands and will actually spin the seats around to act as more of a visual symbol to others that the bike has a mechanical issue or possibly a flat tire. Relying on customers to report issues is not the best approach, because they will mostly likely complain to someone else rather than report it.

In addition to staying on top of the maintenance issues, the bikes should be cleaned occasionally. With the bikes being outside in all types of weather, having a clean bike will be the difference between someone possibly riding the bike or the bike remaining locked up at the station and not receiving much use. If there are covered locations available on campus or in the downtown, they would be optimal bike share stations for keeping the bicycle clean over the long term. Having an adequate inventory, cleaning, and maintenance schedule would be the best way to stay on top of all of these issues, so that the system has a positive image to portray to the public and customers.

Data

Over time, data should be collected about who is using the bike share system, which times they are using the system, what stations they are using, and potentially how they are getting to the stations. Analyzing the data is important, so that the system managers can enhance the system and allow it to evolve over time. This could mean moving station placement, adjusting more or less capacity for stations, or adding new locations to serve more people in a particular area.

The data must be collected from the very beginning of the system's operation, quickly analyzed, and responded to. If there are stations that end up having bikes repositioned at them on a regular basis or routinely filling up quickly, requiring users to find other stations, an increased capacity will be required at those locations. This could initially involve repositioning bike dock slots to other locations. It is important to make needed adjustments for riders using the systems at the beginning of the roll-out. By providing bikes at stations for individuals that start using the system at the beginning, users will feel a sense of reliability, thereby encouraging regular use. This needs to be the case if either UNL or the City of Lincoln is in charge of system or if they have a partnership when implementing a bike share system in the area.

Freshman Orientation

If UNL moves forward and implements a bike share program or partners with the City of Lincoln, there needs to be education and marketing messages sent to students about having access to a bike share system. Making it known that a system is available could provide valuable savings for some students who might not purchase a bike of their own. Having the bike share system explained to residence hall students during orientation by their resident assistant would be advisable, as they are the largest population living on campus and would be regular users of the system during the academic year. Freshman orientation would be an ideal opportunity to create enthusiasm for the system. This would be an opportunity to instill enthusiasm and begin to create a culture of bicycle use on campus and in the community.

Potential Admissions Selling Point

With the goal of UNL to increase the student population to 30,000 students, there will be a need to recruit a larger number of students from outside of the state of Nebraska. This will mean an ever-increasing number of individuals who come to Lincoln from across the United States and from around the world. Some of these students will be coming to UNL with no form of transportation and limited access to retail stores where they can purchase basic items.

There are currently plans to construct a small Hy-Vee Market at 21st and N Streets, which will be completed within the next 5 years as part of a larger mixed-use project in that area. With this downtown location, along with several other potential new mixed-use and residential projects that are either in the process of being built or in the planning stages, the City of Lincoln and UNL will become an even better place to live. Bike share could be the piece that eventually ties together all of these new pieces for UNL and the City of Lincoln. This access should be noted as part of the University's advertising and admissions materials, as it could change someone's mind, knowing that they could attend UNL and live in the city without having a car.

13. Recommendations for Planning for Bike Share

A Bike Share Partnership

It is recommended that the City of Lincoln and UNL become partners in establishing a bike share system. This would offer users of the system a broader choice of destinations. There are mutual benefits that the City of Lincoln and UNL bring to the table that would allow a joint system to be beneficial to both entities.

System Choice

It is suggested that UNL and the City of Lincoln should choose a fourth generation bike share system from one of the larger companies, so that software and hardware can be upgraded in the future. There is also the advantage of being able to add bikes and stations to the system if there is a need to expand or modify the system. By having one of the more reputable companies operating the system, future problems, such as lack of parts and supplies, hopefully could be minimized.

Having the system compatible with mobile devices and being able to connect with UNL student identification cards (N-Cards) through the RFID tags would be a major convenience factor allowing for standardization across the campus. For users who do not have a UNL identification card, an attractive key fob or identification card would be the recommended choice.

Station Placement

In determining station placement, it is suggested that students, faculty, and staff of UNL be surveyed to determine which buildings they most often use, in addition to where they park their cars. Students, faculty, and staff should also be surveyed on how they utilize the City of Lincoln bus system, StarTran, as part of their regular transportation routine. This same surveying process would need to take place for the City of Lincoln through the Downtown Lincoln Association, by contacting their members to survey employees about their interest in a bike share system in the downtown and whether they would use it. It would be beneficial to also survey citizens who do not live downtown, but visit on a regular basis, to determine if and how they would utilize the system. Community outreach of this kind will help people feel like they are participants in the project, and they would hopefully take “ownership” of something they can be proud of for their university and city.

Flawless Implementation

The successful implementation phase of this project cannot be stressed enough. If people have a bad first experience with the system, it could cause negative sentiment, leading to those persons never trying the system again. With any large new system, some technology glitches are expected, so getting those worked out before the system goes online would be highly recommended. If there are glitches that happen during the roll-out, it is imperative that those issues would be resolved as soon as possible. At the time of implementation, it would be imperative to have company representatives in town to train individuals about the system before and during the launch.

Company representatives could initially help resolve technical glitches in a quick and effective manner.

Promotion and Marketing

Work that can be done going into the roll-out in getting people signed up for the bike share system, through effective marketing, will help immensely in making the system succeed from the outset. Some people have not ridden a bike since they were children, and having people just like them using the system to get around would be an opportunity for a “get on the bandwagon” marketing concept. When considering a bike share system, the price needs to be affordable, and stations need to be placed in convenient locations. Thought-provoking promotions that are relatable to average non-bicycle users can be effective in targeting new users.

Maintenance

No matter who ends up performing the maintenance on the bike share bikes and stations, quality maintenance and predictable, continuous operation are key elements of a successful bike share system. The UNL Recreation Center, through the Outdoor Adventures, would be a natural fit for maintaining the system. They have individuals who are already trained bicycle mechanics and have the maintenance facilities already in place. Additionally, these individuals see bicycle transportation as an essential piece of a multimodal transportation system, not only on the UNL campus, but also in the City of Lincoln.

Successful Collaboration

By following this planning process, the City of Lincoln and UNL should have a successful bike share program in the end. This study initially focused on examining the planning process to put a bike share system on the UNL campus. There was a quick realization that the City of Lincoln needs to be involved in a partnership with UNL to create a more dynamic bike share system than if UNL were to go it alone. Through collaboration, this system could take a variety of different forms and uses. It could exemplify a great bike share system in a smaller tier city. By learning from the experiences and successes that other cities have encountered, a bike share partnership between the University and the City could prove to be a model system for other places that are also considering a bike share system.

Integrated Bus, Bike, and Bike Share Station Maps

Integrated bike routes maps should be included on maps marketed with the bus routes to show other options to get back and forth between the two campuses. This would be an opportunity for bike awareness objectives that the University is trying to carry out due to limited additional space for vehicular parking that may be available in the future at UNL.

Reference List

Beardsle, Eleanor. In Paris, Training Wheels For The Littlest Riders, 2014: http://www.npr.org/2014/06/29/326555743/in-paris-training-wheels-for-the-littlestriders?sc=17&f=1001&utm_source=iosnewsapp&utm_medium=Email&utm_campaign=app (accessed June 29, 2014)

Brennan, Thomas. 2013. TDM Strategy for Lincoln, Stakeholder Summary Report meeting , June 5, 2013, in Lincoln, Nebraska.

Buehler, Ralph. Virginia Tech Capital Bikeshare Study, 2011: A Closer Look at Casual Users and Operations. http://katana.hsrc.unc.edu/cms/downloads/CapitalBikeshareStudy_VATech.pdf (accessed July 12, 2012)

City of Lincoln, Nebraska <http://www.lincoln.ne.gov/city/> (accessed July 12, 2012)

City of Philadelphia. Philadelphia Bikeshare Concept Study, 2010: www.metrobike.net/index.php?s=file_download&id=27 (accessed July 12, 2012)

Cooper, Adam. The University of British Columbia public bicycle system feasibility study, 2009: http://transportation.ubc.ca/files/2010/10/PBS_Final.pdf (accessed June 13, 2012)

Copeland, Larry. 2013. Young people driving less, embrace other transportation, Two new studies find that young Americans are changing the nation's transportation landscape. They drive less, want to stay connected as they travel, embrace car-sharing, bike-sharing, ride-sharing. October 1,

Daddio, David, "Maximizing Bicycle Sharing An Empirical Analysis of Capital Bikeshare Usage" (Masters Project, University of North Carolina at Chapel Hill, 2012)

DeMaio, Paul. Bike-sharing: Its History, Models of Provision, and Future, 2009: <http://nctr.usf.edu/jpt/pdf/JPT12-4DeMaio.pdf> (accessed June 13, 2012)

Dossett, Bill. Non-Profit Business Plan for Twin Cities Bike Share System, 2008: http://www.velotraffic.com/wpcontent/uploads/2010/09/Twin_Cities_Bike_Share_Project_Business_Plan.pdf (accessed June 12, 2012)

Dunker, Chris. 2014. UNL students pitching bike-share system. Lincoln Journal Star, April 26,

Egan, Sophie. 2013. Bike Sharing Can Mean Safer Biking. New York Times, June 13,

Elliott, Stuart. 2013. Never Mind Citi Bike , Here's Campus Bike. New York Times, August 26,

Evolutionary User-Centric Networks For Intraurban Accessibility Global Bike Share Map <http://bikes.oobrien.com/global.php> (accessed June 20, 2014)

Flegenheiner, Matt. 2013. Bike-Share Effort Draws Riders and Hits Snags. New York Times, June 11,

Flegenheiner, Matt. 2013. Bike Share in New York, Built From Ideas Around World. New York Times, May 21,

Flegenheimer, Matt. 2013. Bike Sharing? Sure. The Racks? No Way. New York Times, May 14,

Flegenheimer, Matt. 2012. Flooding Apparently Damaged Equipment for Bike-Share Program. New York Times, November 14,

Flegenheimer, Matt. 2013. For Bloomberg and Bike-Sharing Program, the Big Moment Arrives. New York Times, May 26,

Flegenheimer, Matt. 2013. Out for a First Spin: City's Bike Share Program Begins. New York Times May 27,

Flegenheimer, Matt. 2013. Questions and Answers on Citi Bike. New York Times, May 26,

Ferenchik, Mark. 2013. Pedal on, Columbus! City bike-share program up and running. Columbus Dispatch, July 31,

Forte, Gabriel. Cleveland Bike Share, 2012: The Potential and Possibility. <http://www.gcbl.org/files/resources/clevelandbike-share-finalreport.pdf> (accessed June 13, 2012)

Garcia-Palomares, Juan Carlos, Javier Gutierrez, Marta Latorre. 2012. Optimizing the Location of stations in bike-sharing programs: A GIS approach. Applied Geography 35 (2012) 235-246, <http://www.sciencedirect.com/science/article/pii/S0143622812000744> (accessed January 20, 2013)

Gay, Jason. 2013. A Nutty Idea for a Crazy Town: Bike Share Blossoms in NYC. Wall Street Journal, September 26,

Gomberg, Ben. Mayors Bicycle Advisory Council, January 2006:

City of Chicago Bike 2015 Plan. <http://www.bike2015plan.org/pdf/bike2015plan.pdf> (accessed July 12, 2012)

Guthrie, Neil. National Transport Authority, June 2011: Proposals for Introducing Public Bike Schemes In Regional Cities-Technical Feasibility Study. <http://nationaltransport.ie/downloads/Bike-Scheme-Technical-Report.pdf> (accessed June 13, 2012)

Henry Grabar. 2013 Bike shares can be perfect!: Solving the commuting algorithm, Mathematicians and urban planners are working together to make sure there's a bicycle exactly where you need it. October 24, http://www.salon.com/2013/10/24/bike_shares_can_be_perfect_solving_the_commuting_algorithm/ (accessed October 27, 2013)

How We're Visualizing New York's New Bike Sharing System, as the popularity of CitiBike grows, so do the interactive graphics that show its use. <http://www.fastcoexist.com/1682698/how-were-visualizing-new-yorks-new-bike-sharing-system> (accessed July 30, 2013)

Kaminsky, Ilya. California State University Northridge Institute for Sustainability, 2010: MBA Field Study Experience Graduate Project (accessed June 20, 2012)

Lin Lee, Ting, and Huey-Jiuan Yeh. Using Product Service System in the Study of Bike Sharing System , 2010: A Case of Kaohsiung City Public Bike (C-Bike) <http://www2.druid.dk/conferences/viewpaper.php?id=501943&cf=43> (accessed June 12, 2012)

Madison B-cycle 2012 Annual Report. December 2012: <http://madison.bcycle.com/LinkClick.aspx?fileticket=PH2i0HRwo7w%3d&tabid=474>

Mann, Ted. 2013. Bike Sharing Gets Into Gear. Wall Street Journal, April 8

Mende, John and Greg Stewart. The Car is No Longer King, 2008: <http://www.tac-atc.ca/english/resourcecentre/reading-room/conference/conf2008/docs/a1/mende.pdf> (accessed June 12, 2012)

Michigan State University <http://www.msu.edu/> (accessed October 28, 2013)

Midgley, Peter. United Nations Department of Economic and Social Affairs, May 2011: Bicycle-Sharing Schemes Enhancing Sustainable Mobility in Urban Areas <http://cistup.iisc.ernet.in/Urban%20Mobility%208th%20March%202012/Background-Paper-%20Bicycle%20schemes.pdf> (accessed June 6, 2012)

Nazaryan, Alexander. 2013. How I Learned to Stop Worrying and Love New York's Bike Share. The Atlantic Cities Place Matters, May 28, <http://www.theatlanticcities.com/commute/2013/05/how-i-learned-stop-worrying-and-love-new-yorks-bike-share/5719/> (Accessed May 28, 2013)

New York City Department of City Planning. Bike-Share Opportunities in New York City, Spring 2009: http://www.nyc.gov/html/dcp/pdf/transportation/bike_share_complete.pdf (accessed July 12, 2012)

Nice Ride Minnesota 2011 Annual Report 2012 Mid-Season Update, https://www.niceridemn.org/_asset/9n2z8n/NICE_RIDE_2012_ANNUAL_REPORT_OPT.pdf

Niquette, Mark. 2012. Ohio State Set to Park \$483 Million From Lease Deal: Muni Credit. Bloomberg, June 22, 2012

Northwestern University <http://www.northwestern.edu/> (accessed October 28, 2013)

Pascale, Jordan. 2013. Hello, green: Centennial Mall bike lane design gets OK. Journal Star, October 24,

Pennsylvania State University <http://www.psu.edu/> (accessed October 28, 2013)

Plan Big UNL Campus & Landscape Master Plans University of Nebraska-Lincoln. 2013

Physical Master Plan 2006-2015 University of Nebraska-Lincoln. 2006. Accessed October 22, 2012,

Purdue University <http://www.purdue.edu/> (accessed October 28, 2013)

Robertson, David J. Application for Funding from the Transportation Investments Generating Economic Recovery II (TIGER II) Competitive Grant Program Administered by the U.S. Department of Transportation <http://www.mwcog.org/uploads/committee-documents/bV5YWIxe20100820155649.pdf> (accessed June 6, 2012)

Rosenthal, Elisabeth. 2012. To Encourage Biking, Cities Lose the Helmets. New York Times, September 29,

Rutgers University <http://www.rutgers.edu/> (accessed October 28, 2013)

Sadik-Khan, Janette, "Street Design Manual 2nd Edition," New York City Department of Transportation (2013), <http://www.nyc.gov/html/dot/downloads/pdf/nycdot-streetdesignmanual-interior.pdf> (accessed October 18, 2013)

Same Bike, Different City, Graphic Design's role in popular bike share systems, August 20, 2013: <http://www.designersand-books.com/blog/same-bike-different-city> (accessed August 20, 2013)

Shaheen, Susan, Health Maddox, Jim Sebastian, Eileen Kadesh, Parry Burnap, Nick Bohenkamp, Lucy Dyke, Allan Crawford, Lys Mendez, and Lynne GoldSmith. Los Angeles County Metropolitan Transportation Authority Approval Bike Share Strategy, January 18, 2012, in Los Angeles, California

Somayajula, Siddharth, Using GIS to identify Potential Locations for Bike Rentals in Houston Area, December 2010: Civil Engineering Texas A&M University. <https://ceprofs.tamu.edu/folivera/TxAgGIS/Fall2010/Siddharth%20Somayajula.pdf> (accessed January 20, 2013)

State of the University Address 2012, University of Nebraska-Lincoln, 2012 <http://www.unl.edu/ucomm/chancellor/sua2012/> (accessed January 10, 2013)

The Associated Press. 2013. Bike Valet Service Available During Husker Games, August 24,

The Bike Share Partnership. King County Bike Share Business Plan, 2012: http://pugetsoundbikeshare.org/wp-content/uploads/2012/07/KCBS_Business_Plan_FINAL.pdf (accessed July 12, 2012)

The Economist Blog ,How do Bike-Sharing Schemes Shape Cities. <http://www.economist.com/blogs/economist-explains/2013/10/economist-explains-14> (Accessed October 23, 2013)

The Ohio State University <http://www.osu.edu/> (accessed October 28, 2013)

Toole Design Group. Bike Sharing in the United States, September 2012: State of the Practice and Guide to Implementation. <http://www.bicyclinginfo.org/promote/bikeshareintheus.pdf> (accessed September 9, 2012)

University of Illinois at Urbana-Champaign <http://illinois.edu/> (accessed October 28, 2013)

Indiana University <http://www.iub.edu/> (accessed October 28, 2013)

University of Iowa <http://www.uiowa.edu/> (accessed October 28, 2013)

University of Michigan <http://www.umich.edu/> (accessed October 28, 2013)

University of Maryland <http://www.umd.edu/> (accessed October 28, 2013)

University of Minnesota <http://www1.umn.edu/twincities/index.html> (accessed October 28, 2013)

University of Nebraska-Lincoln. <http://www.unl.edu/> (accessed October 28, 2013)

University of Wisconsin-Madison <http://www.wisc.edu/> (accessed October 28, 2013)

United States Department of Transportation <http://www.dot.gov/tiger> (accessed June 20, 2014)

Weichman, Taylor. League of American Bicyclists application, e-mail message to author, February 25, 2013

Wieczner, Jen, "Bicycles Steer clear of Obamacare, Why cities refuse to use health funds for cycling programs" Wall Street Journal, June 13, 2013, Market Watch section.

Wine, Jamie. Bicycle Share Feasibility Study New Orleans, May 2012: A Bike Easy Project. http://bikeeasy.org/files/Blke-Easy-Bicycle-Share-Feasibility-Study_6-20-12_1_1.pdf (accessed July 12, 2012)

