Oklahoma City
Bicycle Transportation Plan

The City of
OKLAHOMA CITY
Planning Department

April 10, 2008

Oklahoma City
Bicycle Transportation
Strategic Action Plan 2008-2015

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Bicycle Transportation Plan Steering Committee

The City of Oklahoma City Planning Department invited bicycle clubs/groups within Oklahoma City to a series of public meetings to gather input for the creation of the Bicycle Transportation Plan. The steering committee developed the issues, goals, objectives and policies for the plan. They also developed the list of proposed bicycle routes that travel throughout Oklahoma City and connect with the surrounding communities. The steering committee is comprised of the following members:

Mary Barron
Cat Berry
Wilton Berry
Ted Burns
Stuart Chai
Dennis Clark
James Corder
Dick Coyle
Sergeant Charles Epperly
Jeffery Field
Mike Flenniken
Talesa Flenniken
Steve Florentz
Major Charles Foley
Randy Galloway
Walter Jacques
Daniel Jamet
Anna Jenkins
Lisa Kehoe
Tom Kilpatrick
Pam King
Pete Kramer
Hal McKnight
Joseph Mills
Daniel O'Donoghue
Miranda Quigley
Ron Salazar
Steve Schlegel
John Sharp
Kevin Stamey
Gil Summy
Brian Swingle
Laura Swingle
Alan Taylor
Sarah Tracy
Rick Wild
Mike Wilp
Bill Wylie

Oklahoma City has many partners that support the Bicycle Transportation plan, ranging from the Oklahoma City Police Department, Public Works Department, Parks and Recreation Department, the Oklahoma State Department of Health, the Oklahoma City/County Health Department, EZ Riders, Oklahoma Bicycle Society, Oklahoma Bicycle Coalition, Oklahoma Earthbike Fellowship, OKC Velo Club, and Tri OKC Triathlon Club.

Executive Summary
Oklahoma City Bicycle Transportation Strategic Action Plan 2008-2015

Oklahoma City's Bicycle Transportation Strategic Action Plan for 2015 is the City's first formal bicycle transportation plan. Although signed bicycle routes have been in use in Oklahoma City for many years, bicycle transportation has not been a well-supported mode of transportation within the larger transportation network. In order to reap the economic, environmental, and social benefits of a bicycle-friendly community, this plan describes current bicycling conditions and the necessary ingredients of a successful bicycle transportation system in the first five chapters, and then details actions and funding that will help Oklahoma City become a bicycle-friendly city in Chapters 6-8 and the Appendices.

A Bicycle Plan Steering Committee was developed to create the vision, goals, and recommended actions of this plan through a series of seven public meetings between September of 2006 and March of 2007. Active involvement by residents, city staff, the Association of Central Oklahoma Governments, members of various local and state bicycling organizations, and other bicycle advocates have resulted in the development of a plan that is realistic, achievable, and low in cost relative to other modes of transportation.

The Bicycle Steering Committee developed the following vision and goals; **The vision of the Oklahoma City Bicycle Transportation Plan is to provide safe, convenient, connected, and user-friendly bicycle routes for the residents of Oklahoma City.** To help facilitate this vision, coordination of the following goals and recommended actions is essential.

Goal 1: Phase 1 Bike Routes: To develop a bike routes system that connects employment and activity centers throughout Oklahoma City.

Goal 2: Education: To promote bicycling as a healthy activity on Oklahoma City roadways through the education of all road users.

Goal 3: Safe Routes: To create a safe environment for bicyclists in Oklahoma City through effective design, education, encouragement, and enforcement.

Goal 4: Effective Design: To create and improve bicycle transportation by using national design guidelines and innovative design elements to promote recreational and community purposes, prioritizing connectivity.

Goal 5: Enforcement: To improve enforcement of all traffic laws pertaining to bicyclists and motorists, especially those related to bicyclist/motorist intersections.

Goal 6: Encouragement: To promote the use of bicycles for transportation, recreation, and the improvement of public health.

This plan focuses on the establishment of bicycle routes, wide curb lanes, and signed shared roadways, as well as education, encouragement, and enforcement as equally important components. The proposed bicycle route facilities include urban and suburban elements, as well as connections and interfaces with multi-use paths that are part of the 1997 Oklahoma City Trails Master Plan.

The design guidelines included in this plan are from the 1999 American Association of State Highway and Transportation Officials' (AASHTO) Guide for the Development of Bicycle Facilities, and the Manual on Uniform Traffic Control Devices (MUTCD).

Chapter 1. Introduction

1.1 Background

Bicycling is an important mode of transportation as well as a healthy recreational activity in Oklahoma City. Bicycling is easily available to people of almost every age and socioeconomic level. As a mode of transportation, bicycling is particularly efficient and convenient in an urban area, and provides a high degree of flexibility and independence relative to schedule and destination.

During the 2005 and 2006 Bike-to-Work events, Oklahoma City Council members recognized the need for a Bicycle Transportation plan for Oklahoma City to facilitate a more lively and sustainable community for Oklahoma City residents. After informal discussions with other members of the City Council and the Planning Director, the City staff and bicycle clubs of Oklahoma City began meeting in September 2006 to discuss the necessary components of a Bicycle Transportation plan. The Bicycle Transportation planning meetings have been well attended by city residents and Association of Central Oklahoma Governments staff.

All across the country, bicycle and pedestrian facilities are proving to be a wise economic investment for the communities through which they pass. Studies have shown that they stimulate local economies by attracting bicyclists, hikers, and other tourists to an area. This, in turn, attracts and revitalizes businesses, creates jobs, and increases public revenue. Trails and pathways also have a positive effect on nearby properties as homebuyers and business owners realize the value that such facilities bring to a community. Choosing a location that will help attract and retain key personnel was cited as the number one factor in selecting office locations (by a June 8, 1989 San Francisco Chronicle article), and corporate real estate executives now say employee "quality of life" issues are as important as cost when deciding where to locate a new factory or office.[1]

Bicycle transportation can provide economic benefits to Oklahoma City by increasing tourism, revitalizing commercial corridors, and increasing business investment in Oklahoma City. The residents of Oklahoma City can directly benefit from reduced traffic congestion and improved air quality; perhaps most importantly, bicycle transportation can help improve the health of Oklahoma City's residents through more opportunities to incorporate exercise into daily activities. Environmental benefits of bicycle transportation include the reduction of vehicle

[1]" The Economic and Social Benefits of Off-Road Bicycle and Pedestrian Facilities," NBPC Technical Brief, National Bicycle and Pedestrian Clearinghouse Technical Assistance Series, Number 2, September 1995.

emissions, which account for almost a third of the total air pollution in the United States (EPA 2006).

1.2 Plan Scope

The focus of the Oklahoma City Bicycle Transportation Plan is on bicycling for transportation rather than recreation. Of primary importance to bicycle use for transportation are trip origins, destinations, and purposes, such as commuting to work or school, shopping, or attending social events. The focus of recreational bicycle use is on enjoyment of the trip rather than efficient travel to a particular destination. Fortunately, many bicycle trips and facilities may serve both purposes; off-street multi-use paths may be popular for recreation but can serve as connections between important bicycle routes, for example.

Most Federal transportation aid programs require that bicycle projects be primarily for transportation purposes for funding eligibility. Federal guidelines consider any bicycle path or trail other than a closed loop as being primarily for transportation rather than recreation. To ensure coordination of all bicycle route facilities, this plan incorporates major recreational multi-use paths as part of the larger bicycle transportation network.

Oklahoma City's Bicycle Transportation Plan follows the comprehensive and cooperative approach to bicycle transportation planning used by cities with successful bicycle transportation networks such as: Madison, Wisconsin; Austin, Texas; Portland, Oregon; Tucson, Arizona; and Davis, California, among others. This comprehensive and cooperative approach includes the "5 E's":

- Engineering
- Education
- Encouragement
- Enforcement
- Evaluation and Planning

The "5 E's" approach is useful because it not only provides for physical bicycle route facilities and their ongoing maintenance and improvement, but also for the necessary components of:

- Education of both bicycle riders and motor vehicle drivers
- Encouragement of potential bicycle riders to go ahead and use their bicycles for transportation as well as recreation
- Enforcement and support from law enforcement agencies to ensure the safety of all users of the transportation system which includes the bicycle transportation network
- Engineering that will provide for a safe and efficient bicycle transportation network
- Evaluation and Planning to monitor current programs and facilities to develop ways to improve the overall bicycle system

This plan includes facility recommendations for the Oklahoma City urban area that are deemed necessary for bicyclist safety, mobility, and access to important destinations such as employment centers, schools, government and public institutional centers, commercial areas, transit stops, and recreational areas. Specifically, the facility recommendations contained in this plan are identified as "Phase 1." This includes designating approximately 200 miles of bicycle routes concentrated in the central part of Oklahoma City. Approximately 300 miles of future bicycle routes identified in "Phase 2"; however, these fall outside the time horizon of this plan

1.3 Plan Purposes

The Oklahoma City Bicycle Transportation Plan is intended to serve the following purposes:

- To create a strong network of safe bikeways
- To facilitate the economic, social, and environmental benefits of bicycling
- To promote bicycling as a healthy and safe mode of transportation through the education of all road users
- To prioritize enforcement of all existing traffic laws pertaining to bicyclists and motorists by establishing rapport with law enforcement personnel
- To fulfill the requirements of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, which includes a specific requirement that bicyclists and pedestrians be given due consideration in the Metropolitan Planning Organization transportation planning process and in designing and constructing transportation facilities
- To serve as a blueprint for continued improvements of bicycling conditions and safety in Oklahoma City
- To increase levels of bicycling activity
- To identify desirable bicycle routes
- To provide information to residents interested in bicycle transportation, and
- To provide guidelines for planning, designing, and maintaining bicycle route facilities.

1.4 Public Participation

Public participation is an important phase in the plan development process. This phase helps City staff gauge the needs of the community and determine the resources needed to design and implement an on-street bike route system.

This plan was prepared with the guidance of a Steering Committee that included members of the Association of Central Oklahoma Governments (ACOG), various local bicycling organizations/clubs, members of the City Council of Oklahoma City,

Public Works Department staff, Oklahoma City Police, and Planning Department staff.

The public participation phase included seven public meetings from September 2006, through March 2007. These meetings were held in order to develop existing bicycle facility issues and to create goals, objectives and policies to address the issues. Other elements that came from the meetings included identification of the types of bicyclists and roadways, location of activity nodes considered to be bicycle traffic generators, identification of existing bicycle routes and travel corridors, and coordination with surrounding municipalities to link up with the existing bikeway network.

1.5 Plan Organization

Chapters 2-5 of the plan provides background information and is organized in the following manner:

Chapter 2 outlines and illustrates the facility needs of bicyclists and addresses the various conditions and factors that affect bicycle use. Chapter 2 also discusses land use and street design that promote bicycle use.

Chapter 3 presents information about existing bicycling conditions and facilities in Oklahoma City. An analysis of bicycle compatibility of the major roadways identifies current deficiencies in the level of service for bicycling.

Chapter 4 describes federal, state and local policies, programs, and regulations related to bicycling.

Chapter 5 addresses bicycle operation and safety considerations as well as programs and activities for education, encouragement, and enforcement. Bicycle laws and bicycle crash data are given, and the common factors related to crashes are presented and discussed. Existing bicycle safety programs, encouragement policies, and enforcement of bicycle laws are discussed.

Chapters 6-8, and appendices A-E details the bicycle transportation plan and are organized as follows:

Chapter 6 presents the vision, goals, and recommended actions.

Chapter 7 describes recommended Oklahoma City bicycle route facilities and provides information on costs, revenues, and the transportation budgeting process.

Chapter 8 presents information on implementation and funding of the recommended actions.

Appendix A includes design and engineering guidelines for bicycle route facilities.

Appendix B provides bicycle parking information.

Appendix C presents Oklahoma statutes pertinent to bicycling.

Appendix D presents the suitability assessment for proposed bicycle routes.

Appendix E includes an outline for an educational program.

Chapter 2. The Importance of Bicycling and Bicyclists' Needs

The Oklahoma City Area Regional Transportation Study (OCARTS) Area 2030 regional transportation plan states that it is important to have an integrated, multimodal, and intermodal transportation system to have a more efficient and cost-effective movement of people and goods. One of the goals of the plan is to provide a safe, secure and environmentally, economically and socially responsible transportation system. Acknowledging and providing for the needs of bicyclists when planning and designing all transportation improvements and new neighborhoods will help to achieve that goal.

This chapter examines the benefits of bicycling, the different types of bicyclists, and their needs. This information provides a useful context for the analysis of existing facilities, programs, and policies that follow in Chapters 3 and 4, and will also be helpful for the interpretation and understanding of the plan goals, recommended actions, and facility improvements. *Detailed bicycle facility design guidelines are provided in Appendix A.*

2.1 The Benefits of Bicycling for Individuals and Communities

Bicycling is a quiet, non-polluting, efficient form of transportation that is also a fun and healthy activity, as well as inexpensive relative to other forms of transportation. Bicycling is especially useful for short trips of up to five miles, and within urban areas door-to-door times can be comparable to those of driving cars.

Bicycling will not replace all trips made by motor vehicles, but it can be practical for many types of trips, including:

- Trips to work or school
- Visits to friends' or relatives' homes
- Light errands
- Children's activities, and
- Intermodal trips, such as bicycling to a park-and-ride transit facility, or a transit facility that will transport bicycles.

Increasing the use of bicycles for transportation purposes in many cities has improved the efficiency of the transportation system and improved neighborhood livability by:

- Reducing motor vehicle traffic and associated congestion and pollution
- Reducing the need for motor vehicle parking, and
- Reducing motor vehicle crashes, injuries, and property damage.

Bicyclists take up very little roadway space, (see photo 1). Under most urban traffic conditions, bicyclists will affect the flow of traffic, but not significantly. If some motorists are converted to bicyclists at least part of the time, roadway capacity can be potentially increased and congestion can be decreased. Studies have also shown that the more bicycles that are present in the traffic stream, the lower the accident rate involving bicyclists.

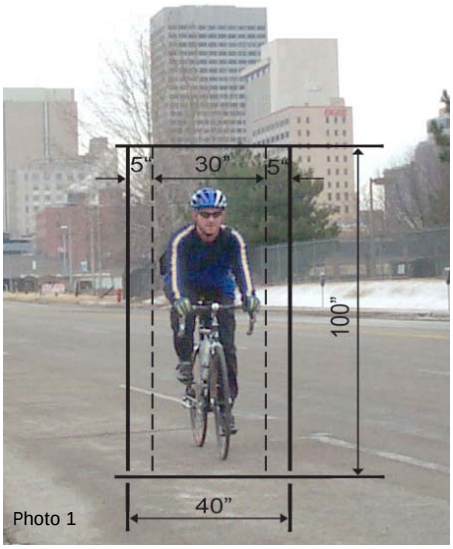


Photo 1

Making Oklahoma City more bicycle-friendly can also provide non-transportation related benefits to the community. Bicycle riders often purchase food and other needs closer to their homes. The tourism industry benefits as more bicycle riders are attracted from outside the city. The overall quality of life is enhanced by the presence of bicyclists and pedestrians, as social interactions are more likely to occur spontaneously and people feel safer outdoors in a bicycle-friendly city.

Other ways in which improving bicycling transportation conditions can benefit Oklahoma City include:

- Improvement of public health
- Providing those unable to drive or those without access to a car with more independence and freedom of movement
- Increasing safe opportunities for children to transport themselves to school, social events, and recreational activities
- Allowing households to meet transportation needs with fewer cars
- Enhancing recreational opportunities

2.2 Improving Bicycling Conditions

Improving bicycling conditions requires the provision of bicycle route facilities. Many improvements can be made to existing roadways to make the transportation system inclusive of bicyclists. Land use practices, street design, and connections with other transportation modes must all be considered as well as improvement to roadways to truly create a more bicycle-friendly environment in Oklahoma City. Bicycling is less practical if land use practices and street network design results in long distances between origins and destinations. Oklahoma City has over 600 square miles within the corporate city limits. Large land area combined with inexpensive land in the rural areas has contributed to urban sprawl and a car-centric development pattern. Other important considerations that would help to improve bicycling conditions in Oklahoma City are education and enforcement of traffic laws.

Accommodation of bicycling in the community includes bicycle parking and storage facilities, locations designated for showers at the work place and bike stations, and a general community-wide awareness and welcoming attitude for bicyclists. Bicycle parking and storage facilities should be considered at all major traffic generators and at transit stations and bus stops to encourage intermodal travel.

2.3 Meeting the Needs of all of Bicyclists' Types

People of all ages and skill levels ride bicycles for transportation and/or recreation. The skill level and confidence of bicyclists vary widely. Some bicyclists are comfortable riding anywhere they are legally allowed to operate and can navigate through busy and high speed roads that have few, if any, special accommodations for bicyclists. Many riders, however, are less confident and prefer to use roadways with a more comfortable amount of operating space, perhaps with designated space for bicyclists, or multi-use paths that are away from motor vehicle traffic. Children may be confident riders and have excellent bicycling skills, but may not yet have the traffic sense and road experience of an adult rider. All categories of rider require smooth riding surfaces with bicycle-compatible highway appurtenances, such as bicycle-safe drainage inlet grates.

A 1994 report by the Federal Highway Administration used the following general categories of bicycle user types to assist highway designers in determining the impact of different facility types and roadway conditions on bicyclists:

Advanced or experienced bicyclists are generally using their bicycles as they would a motor vehicle. They are riding for convenience and speed and want direct access to destinations with a minimum of detour or delay. They are typically comfortable riding with motor vehicle traffic; however, they need sufficient operating space on a travel way or shoulder to eliminate the conflict between modes when a shift in position is necessary. (See Photo 2)


Photo 2

Basic or less confident adult riders may also be using their bicycles for transportation purposes, e.g., to get to the store or to visit friends, but prefer to avoid roads with fast and busy motor vehicle traffic unless there is ample roadway width to allow easy overtaking by faster motor vehicles. Thus, basic riders are comfortable riding on neighborhood streets and multi-use paths and prefer wide shoulder lanes on busier streets. (See Photo 3)


Photo 3

Children, riding on their own or with their parents, may not travel as fast as their adult counterparts but still require access to key destinations in their community, such as schools, convenience stores and recreational facilities. Residential streets with low motor vehicle speeds, linked with multi-use paths and busier streets with well-defined pavement markings between bicycles and motor vehicles can accommodate children without encouraging them to ride in the travel lane of major arterials.[i] (See Photo 4)


Photo 4

The needs of all types of bicyclists must be considered in planning and designing bike route systems. All streets should be designed to accommodate bicyclists. Streets designed to accommodate the needs of moderately skilled bicyclists will meet the needs of most riders. Presently, Oklahoma City has no provisions for bicycles in any roadway design standard.

2.4 Accommodating Bicyclists on Roadways

Existing roadways must serve as the framework for any bicycle transportation system, as it presents the greatest opportunity for improving bicyclists' mobility and access needs, as the origins and destinations for bicyclists are generally located along the existing roadway system.

Bicyclists may often be accommodated on neighborhood streets with relatively little modifications to the streets. However, accommodating bicyclists on arterials and collectors is critical because they:

- Serve mobility needs by providing the most direct, continuous routes
- Have many destination points located on them for which they provide convenient access
- Are somewhat protected from minor street cross traffic
- Provide controlled crossings of other arterial streets
- Help to avoid obstacles like expressways and railroad tracks

2.5 Engineering Appropriate Facilities

Well-designed bicycle facilities attract users. A lack of bicycle facilities on major streets limits access to bicyclists, results in a fragmented bikeway network, and creates hazardous conditions for bicyclists, pedestrians, and motorists.

Different types of streets require different types of facilities. The various types of bicycle facilities are briefly described below, followed by a list of other necessary considerations. Appendix A provides more detailed descriptions and standards for the development of the following facilities.

Signed Shared Roadways

Figure 1

Signed shared roadways are shared roadways that have been designated as preferred bicycle routes. Signs and/or pavement markings alert drivers of motor vehicles to the presence of bicyclists on the roadway. Signed shared roadways usually indicate to bicyclists that there are advantages to using the signed routes as opposed to other routes. Bike route signs may be used on roadways with bike lanes as well as on shared roadways. Bike route signs are often numbered by route or provide destination information. A curb lane of about 14 feet is desirable for shared roadways on most city streets. In areas of slow-moving (<20 mph), low-volume traffic (<3000 ADT), a 12-foot shared lane may be adequate. In all cases, shared use roadway signing should include information on distance, direction and destination, and should not end at a barrier such as a major intersection or narrow bridge.[ii] (See Photo 5)


Photo 5

Wide Outside Curb Lanes

Wide outside lanes can be established on most streets where the speed limit and traffic counts are higher. The wide outside lane can accommodate bicycles and motor vehicles without reducing the roadway capacity for motor vehicle traffic. This is accomplished by adding 1-2 feet of pavement to the outside lane, making the lane 14-15 feet wide with a 12-13 foot wide inside lane. This allows for a minimization of operating conflicts both real and perceived between bicycles and motor vehicles and increases the capacity of the roadway by the number of bicyclists potentially accommodated. Share the Road signage is encouraged along this type of bicycle facility. (See Photo 6)


Photo 6

Bicycle Lane

A bicycle lane is described as a portion of the roadway designated by striping, signing, and pavement markings for the exclusive use of bicyclists. Bike lanes are one-way facilities that carry bicycle traffic in the same direction as the adjacent motorized traffic. A bicycle lane is 4-5 feet wide and located on the outside lane with a 4" to 6" solid white stripe delineating the bike lane from the vehicular traffic lane. "Bike Route" or "Bike Lane" signage should be installed along the route to educate bicyclists and motorists of the existing bike lane. Installation of a bike lane will impact on-street parking, especially in residential and commercial areas, since parking is not allowed in a bicycle lane. This should be looked at closely before a bike lane is considered. (See Photo 7)


Photo 7

Shoulder Bikeways

The roadway shoulder can accommodate bicyclists in rural areas where no curbs exist, and with adequate width and pavement surface. Roadway shoulders should be at least 6 feet wide, especially as road capacity and speed limits increase. Debris from vehicular traffic can collect on the roadway shoulder and should be cleaned on a regular basis. The wider the roadway shoulder the safer it is for the bicyclist. (See Photo 8)


Photo 8

Bike Paths / Multi-Use Paths (off-street)


Photo 9

A multi-use path is defined as a facility on exclusive right-of-way, separated from vehicular traffic with minimal cross flow by motor vehicles. Multi-use paths are sometimes called trails, but many people refer to the term *trails* as an unimproved recreational facility. Users on multi-use paths are non-motorized and include bicyclists, pedestrians (both walkers and runners), in-line skaters, roller skaters, wheelchair users, people with baby strollers, and people walking dogs. Multi-use paths are generally designed for two-way travel and are sometimes referred to as

"Bike Paths", or "Bike Trails". These trails or paths can consist of many different types of material including; asphalt, concrete, commercial soil stabilizers, limestone screenings, crushed rock, rubberized surfaces, bark mulch, and boardwalks. A multi-use trail may only allow certain users based upon the surface material used and the design of the facility. (See Photo 9)

Bike Route Signage

Bike routes can be signed on any bicycles facilities including, signed shared roadways, wide outside lanes, bicycle lanes, shouldered bikeways, and bike paths/multi-use pathways. Bike routes consist of a system of bikeways with appropriate directional and informational route markers, with or without specific bicycle route numbers. Bike routes should establish a continuous routing, but may be a combination of any and all types of bikeways. (See Figure 2)

Figure 2

2.6 Safe Intersections and Street Crossings

Most conflicts among users of the roadways occur at intersections and driveways. Intersections and ramp interchange areas designed exclusively for motor vehicle traffic can be very difficult for bicyclists to cross. A network of bike routes does not meet the needs of bicyclists if intersections present obstacles. Intersection design should create space and a travel path for bicyclists that is direct, logical, and as consistent with the path of motor vehicle traffic as possible. Following the design guidelines from the American Association of State Highway and Transportation Officials (AASHTO), and the Manual on Uniform Traffic Control Devices (MUTCD), will help Oklahoma City design safe, efficient intersections for bicycles and motor vehicles. (See figures 7, 8, 9, 10, 11, 12, and 13)

2.7 Traffic Signals

Demand-actuated traffic signals often do not detect bicyclists, either because of the location of the inductive loop, the small size of the bicycle, or the lightweight composite material bikes are constructed of today. Bicycle-sensitive loop detectors should be used to make traffic signals work for bicyclists. Pavement markings can be used to show bicyclists where to ride to cross the most sensitive portion of a loop, (See Figure 3). If pedestrian buttons are used they should be placed near the street so that bicyclists do not have to dismount to activate the button.

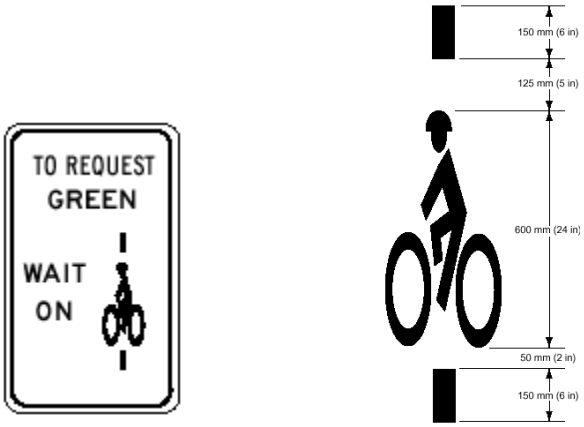


Figure 3

2.8 Barriers and Hazards to Bicyclists

Barriers and hazards, such as railroad crossings and drainage grates, can be addressed to mitigate the dangers to bicyclists.

2.9 Off-Street Facilities

Off-street bicycle paths can complement the on-street bicycle transportation network and provide connectivity and continuity where bicyclists cannot be safely accommodated on the roadway. Off-street paths can provide short cuts within and between neighborhoods and can provide throughways along rail corridors, greenways, water features and other linear corridors.

2.10 Regular Facility Maintenance

Bicycle routes are subject to the accumulation of debris and surface deterioration, and require regular maintenance for proper function. Small rocks, sand, and other small debris can deflect a bicycle wheel, as can minor ridges in the pavement. Shards of glass or sharp stones can puncture a bicycle tire. Bicycle lanes and paved shoulder bikeways tend to acquire debris from motor vehicle traffic. Funding is not available to maintain additional bicycle lanes in Oklahoma City. This issue will need to be studied further to assure a safe and convenient network.

2.11 Bicycle Parking and Other Ancillary Facilities

Just as motor vehicle drivers require convenient and secure parking at destination points, bicyclists require convenient and secure parking at all likely destinations. Other necessary ancillary facilities include proper lighting for off-street facilities and shower and locker facilities at employment centers. Appendix B describes bicycle parking in more detail.

2.12 Intermodal Connections

The transit and bicycle transportation system can complement one another, as bicyclists can achieve increased access to travel longer distances. To encourage the relationship between transit and bicycle transportation, bicycle parking at transit stations and bus stops must be secure. It helps that METRO Transit, the local transit provider, provides two or three spaces for bicycles on each of their buses through front mounted bike racks. (See Photo 10)


Photo 10

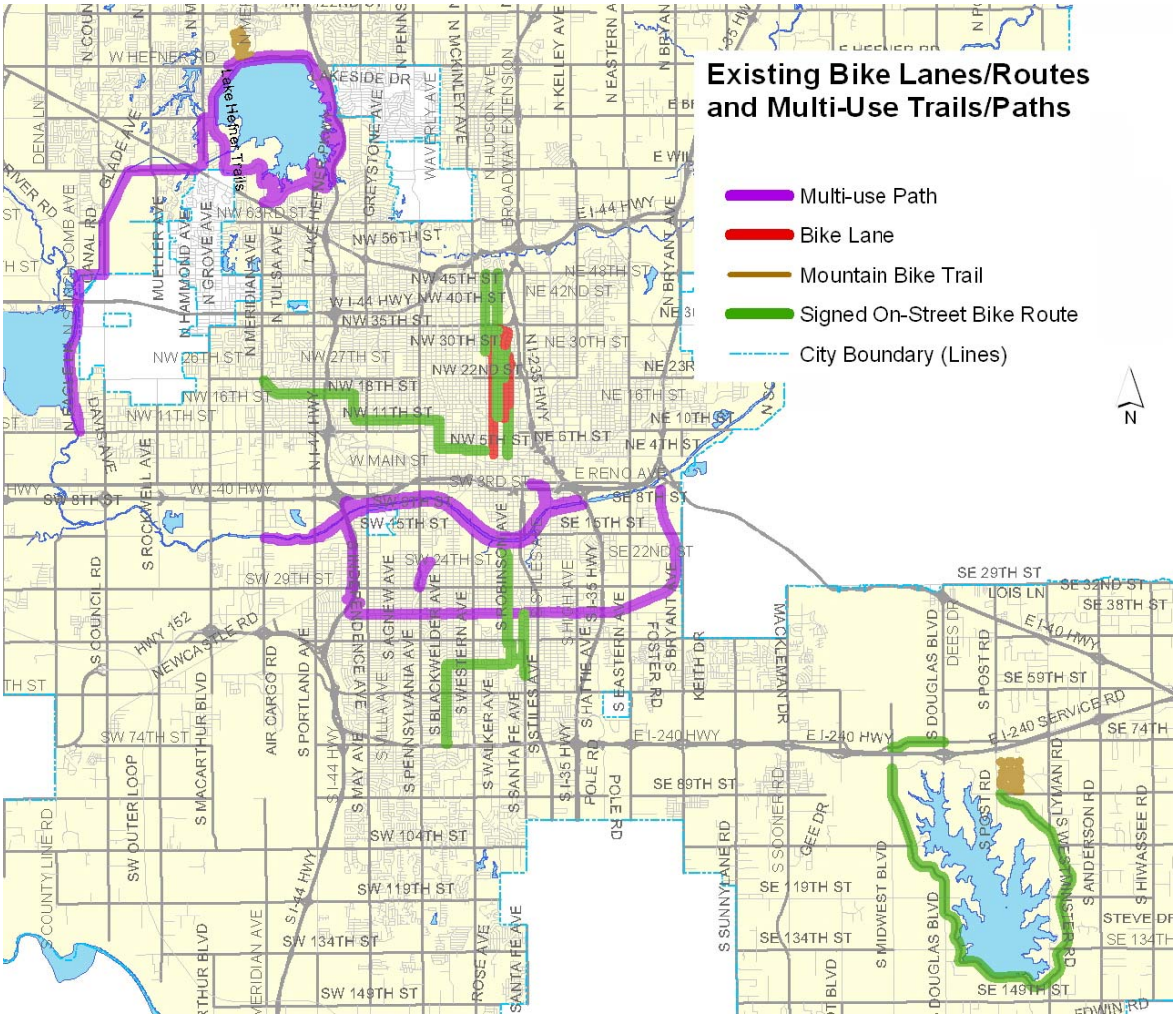
2.13 Bicycle Friendly Land Use and Street Design

An interconnected street system provides direct routes and alternatives to high-volume roadways for bicyclists. Developments with cul-de-sacs result in circuitous routes and limit options for routes; where cul-de-sacs are incorporated into developments, paths can be provided between the cul-de-sac and other streets for bicycle and pedestrian access.


Photo 11

Compact, mixed-use development provides destinations within easy bicycling or walking distance of people's homes, workplaces, and shopping needs. Land uses that encourage bicycling are organized so that schools, shopping, parks, and other destinations are within walking and bicycling distance, and are connected by a network of streets and paths. To accomplish this, the Oklahoma City Subdivision Regulations would need to be changed to address these land use changes. (See Photo 11)

Chapter 3. Existing Bicycle Facilities



Map 1

Existing Bicycle Facilities in Oklahoma City

Existing bicycle facilities in Oklahoma City consist of bikeways located on City streets, trails and pathways within the street right-of-way but separated from the street, and mountain bike trails located off the roadway and used for recreational use. (See Map 1)

3.1 Bike Routes

Throughout the 1980's, Oklahoma City utilized a Federal program called the Bicycle/Transit Integration Program to install bike racks/lockers and bike routes within the City. In August of 1995, a bike lane was added to the Lake Hefner Dam road during a reconstruction of the roadway. Most recently, in 2006, additional

signage was added along with a striped bike lane on Shartel Avenue between NW 50th Street and NW 30th Street to accommodate bicycle travel.

Presently there are 30.3 miles of bikeways in Oklahoma City. This includes all on-street bike lanes and signed shared roadway bike routes in Oklahoma City. The on-street bike routes are primarily located within or near downtown Oklahoma City in the urbanized area. Most of the bikeways are the Share-the-Road type bicycle facilities with bicycle route signs.

3.2 Trails and Pathways

There are 43.1 miles of multi-use trails or multi-use paths within Oklahoma City. These trails/paths are part of the 1997 Trails Master Plan and are located adjacent to a public street within street right-of-way. Trails and pathways are a multi-use facility to be used by pedestrians and bicyclists. Legal devices for trails include ones that are powered by the individual, except as authorized by state law, and motorized mobility aide devices used by individuals with disabilities. Combining bicyclists and pedestrians can create conflict between users and care must be taken when designing these facilities.

3.3 Mountain Bike Trails

Mountain bike trails exist at Lake Stanley Draper and at Bluff Creek near Lake Hefner. These trails are for recreational use and are not part of the bicycle transportation network. The NuDraper Mountain Bike Trails include approximately 13 miles of trails located within the northeast section of the Lake Stanley Draper Reservation. Bluff Creek Trails are located to the north of the Lake Hefner Reservation within Bluff Creek Park and include 4 miles of trails.

Both of these mountain bike trails are maintained and managed by Oklahoma Earthbike Fellowship, a statewide club dedicated to the enhancement of the sport of off-road bicycling through trail advocacy, maintenance and cooperation with land managers and users.

Chapter 4. Existing Policies Related to Bicycling

This chapter presents existing Federal, state, and local government policies, programs, plans, and regulations related to bicycle facility planning and development. This information about current bicycle transportation planning efforts will serve as a context for the development and implementation of this plan.

4.1 Federal Policies:

Federal Highway Administration (FHWA)

Policy and American Association of Highway Transportation Officials (AASHTO) Standards

The Federal Highway Administration's policy is that all streets shall be designed and constructed to serve experienced (Group A) bicyclists at a minimum, and to provide more secure bike lanes and paths for inexperienced bicyclists in those corridors where there are no alternate routes for less experienced children and adult bicyclists (Groups B and C). FHWA's report, *Selecting Roadway Treatments to Accommodate Bicycles* is the appropriate standard to adopt for design criteria for facilities to accommodate bicycles, and AASHTO's (American Association of State Highway and Transportation Officials) *Guide for the Development of Bicycle Facilities* sets appropriate design standards for geometric design of all roadways to accommodate bicyclists.

In a recent memorandum transmitting Program Guidance on bicycle and pedestrian issues to FHWA Division Offices, the Federal Highway Administrator wrote, "We expect every transportation agency to make accommodation for bicycling and walking a routine part of their planning, design, construction, operations and maintenance activities."

Federal Legislation and Bicycle Transportation

The enactment of the Intermodal Surface Transportation Efficiency Act (ISTEA) created an opportunity for communities to focus on multimodal systems of transportation, including rail, freight, airport access, pedestrian, and bicycle facilities. ISTEA increased attention for pedestrian and bicycle transportation as it increased opportunities for communities to access federal funds for the development of pedestrian and bicycle facilities. The Transportation Equity Act for the 21st Century, TEA-21, continued the requirements for the mainstreaming of bicycle and pedestrian projects into the planning, design, and operation of each state's transportation infrastructure. The Clean Air Act Amendments (CAAA) of 1990, aimed at reducing air pollution, also created more access to federal funding for alternative modes of transportation. SAFETEA-LU, enacted in 2005 for fiscal years 2005-2009, continues the funding of transportation programs that reduce pollution and provide alternatives to automobile transportation. Federal legislation that makes funding available for bicycle transportation projects are discussed in detail in Appendix C.

4.2 State Policies: Oklahoma Department of Transportation

Bicycle transportation is a component of ODOT's 2005 – 2030 Oklahoma Statewide Intermodal Transportation Plan. Policies regarding bicycle transportation are in Chapter 8 of the 2005-2030 Oklahoma Statewide Intermodal Transportation Plan and are quoted below:

> Incorporate in Department project engineering and construction facilities for disabled persons, pedestrians, and bicyclists in conformance with the latest design and safety standards.
>
> Institute an Intermodal Advisory Council with the following functions: (1) Improve communication for intermodal needs such as disabled transportation, pedestrian needs, bicycle needs, passenger and freight rail, air transportation, waterways transportation and both rural and urban transit between providers and users of such intermodal transportation; and (2) recommend improvements to transportation projects to assist with intermodal transportation.

The Oklahoma Department of Transportation (ODOT) Commission rules and *ODOT Roadway Design Manual* are two other sources of state regulations and policies that apply to bicycle and pedestrian facilities within the state. State legislation that addresses bicycle transportation is detailed in Appendix C.

4.3 Local Policies: The Association of Central Oklahoma Governments

In Oklahoma City, bicycle transportation is a component of the 2030 Oklahoma City Area Regional Transportation Study (OCARTS) Long Range Transportation Plan by the Association of Central Oklahoma Governments (ACOG). As the Metropolitan Planning Organization for the Oklahoma City metropolitan area, the Association of Central Oklahoma Governments (ACOG) is responsible for ensuring regional continuity as local government bicycle plans and facilities are developed. The Oklahoma City Area Regional Transportation Study (OCARTS) guides the development of a regional plan by inventorying all of the cities existing programs, proposed routes, and accessory facilities with the intent of developing linkages and complimentary facilities among systems.

The Association of Central Oklahoma Governments (ACOG), the Metropolitan Planning Organization (MPO) for the Oklahoma City metropolitan statistical area, has chosen to allow cities within the ACOG's area to develop and maintain their own individual bike and pedestrian programs. ACOG fulfills its responsibility for providing a regional plan by inventorying all of the cities' 97 existing programs, proposed routes, and accessory facilities with the intent of developing linkages and complimentary facilities among systems. Currently, ACOG has identified about 200 miles of existing bicycle facilities. The 2030 OCARTS (Oklahoma City Area

Regional Transportation Study) plan recognizes approximately 400 miles of planned bicycle facilities by 2030.

Within the Oklahoma City metropolitan area, the primary focus of transportation planning has been on building streets and highways. As traffic volumes have increased new roads have been built or additional lanes have been constructed to reduce traffic congestion. However, building new streets has become a spiraling function. As new capacity has been added, additional traffic has been generated to occupy the added capacity thereby causing a need for still more capacity.

The 2020 OKC Plan, Oklahoma City's comprehensive plan, contains policies that call for a balance of transportation alternatives, based on regional cooperation, that include walking, driving, biking, and travel by bus, air, rail and water.

The following are actions within the OKC Plan regarding trails, walkways, and bikeways:

- Pursue the implementation of the Trails Master Plan using local and TEA-21 funding.
- Integrate and coordinate trails into the total transportation system with linkages to buses, trolleys, and trains.
- Keep trails safe by providing good lighting with regular police patrols.
- Prepare and implement a bike routes plan.
- Provide a definite division between bike and auto lanes for the safety of both bike riders and cars.
- Require a pedestrian plan as a part of the platting process including sidewalks along collector and arterial streets.

Chapter 5. The Five "E"'s

The Bicycle Transportation Plan is intended to promote bicycling as an alternative means of transportation, encourage recreational bicycling, promote safe bicycle practices, increase acceptance of bike riders as legitimate users of the road, and provide useful and safe bicycling facilities. Bicycle planning professional often utilize the five E's to accomplish the Bicycle Transportation Plan's intent, which are: Education, Encouragement, Enforcement, Engineering, and Evaluation and Planning.

Implementation strategies will include education, encouragement, awareness, incentives, engineering, enforcement, policy, evaluation, and communication. To increase the usage of bicycles for transportation and recreation, the construction of bicycle facilities must be combined with education, awareness and encouragement activities.

5.1 Education

According to the Bicycle Transportation Institute, "...the best way to increase bicycle use is to create a climate where bicyclists are considered by all to be legitimate users of any road and where bicycling is considered to be an activity with benefits far in excess of its risks." Public perception must be managed so that motorists recognize the rights of bicyclists and so that bicyclists feel confident to use the roads. Public awareness programs, laws governing the use of bicycles and detailing the rights of bicyclists, law enforcement, and good roads all encourage bicycling for transportation and help to manage public perception.

"Share the Road" signs, bumper stickers, license plates, and public service announcements all bring bicycling as transportation into the public awareness. Brochures that summarize the laws that concern bicycling can be helpful to educate the public. Most crashes between motor vehicles and bicycles happen because one or the other did not obey the traffic laws. Safety education programs can be combined with enforcement programs that focus on common violations by bicyclists and motorists that lead to crashes. (See Figure 4)

Figure 4

Incorporating bicycling education and share-the-road policies throughout drivers' education manuals and programs can be helpful to educate motorists and bicyclists alike, since most driving rules are applicable to all vehicles.[iii]

Training bicyclists in traffic operation is critical for their success when riding on the street in mixed traffic and will reduce the potential for crashes. Education of motor vehicle drivers in sharing the roadway with bicyclists, as well as education of developers, planners, engineers, and other people involved in the land development process about the needs of bicyclists will also help create a bicycle-friendly community.

5.2 Encouragement

Encouragement addresses the promotion of bicycling as a means of transportation through creating promotional campaigns and benefits for bicyclists.

Encouragement includes providing a bikeway network, end-of-trip facilities, and bicycle-transit services, holding encouragement events, providing incentives, and providing information and/or maps with recommended bicycling routes. Both public agencies and private employers can encourage bicycle transportation by providing for bicyclists' needs such as convenient and secure bicycle parking, showers and changing rooms, and flextime.

Bike-to-Work Day, the culminating event of the National Bike Month promoted by the League of American Bicyclists, is an example of an encouragement event. Five communities in central Oklahoma currently participate in the annual Bike-to-Work Day event: Oklahoma City, Norman, Edmond, Guthrie, and Yukon.

5.3 Enforcement

Like facilities for other transportation modes, a network of bicycle facilities must be used appropriately to be effective. For example, bicycle facilities are designed under the assumption that bicyclists ride the correct direction on streets and stop at red traffic lights and that motorists yield to bicyclists when turning and do not drive or park in designated bicycle lanes. Therefore, it is not acceptable for bicyclists or motorists to disregard traffic rules. Breaking these laws puts bicyclists and other roadway users at risk and is inconsistent with Oklahoma City's overarching goal of increasing safety.

An effective enforcement/education program will take a balanced approach to improving behaviors of both bicyclists and motorists. Motorist behaviors that should be targeted include:

- Turning left and right in front of bicyclists
- Passing too close to bicyclists, (3' safe passing distance state law)
- Parking in bicycle lanes
- Opening doors of parked vehicles in front of bicyclists

Bicyclist behaviors that should be targeted include:

- Ignoring traffic control regulations (all posted regulations)
- Riding the wrong way on a street
- Riding with no lights at night
- Riding without helmets (establish city ordinances and state laws to require helmet use)

Bicyclist safety is a responsibility to be shared among all roadway users.

5.4 Engineering

Engineering relates to the creation of a safe and efficient bicycle transportation network within Oklahoma City. Bicycle facilities such as bike lanes, routes, on/off street routes, pathways, and bike racks must be designed appropriately and follow national design standards and requirements for the safety of motorists, pedestrians, and bicyclists. Oklahoma City leaders need to look at what bicycle facilities exist, and what has been built to promote bicycling in the community. Accommodation of bicyclists on public roads is important, and the existence of well designed bike lanes and multi-use paths will help further the goals of this plan. Also, the connectivity of the on-street and off-street bicycle facilities is essential to the development of a useful bicycle network.

5.5 Evaluation and Planning

Monitoring and researching outcomes and trends through the collection of data, including the collection of mode share data before and after the program intervention(s). Physical bicycle facilities should be examined to determine how safe and convenient they are for the citizens. Measuring the amount of bicycling taking place in the community, crash and fatality rates, and ways that the community works to improve these numbers is important. How much of the bike plan has been implemented, and future steps to improve the system will also be evaluated.

Chapter 6. Vision, Goals, and Recommended Actions

Making Oklahoma City a Great Place for Bicycle Transportation:
The need to inventory, assess, and maintain existing bikeways, as well as the need to develop new bicycle route facilities, resulted in the collaboration between the City of Oklahoma City and bicycle enthusiasts to develop this plan to address bicycle route facilities as an integrated part of the larger transportation system.

There are over 500 miles of bike routes that the Bicycle Plan Steering Committee has identified. In order to implement the maximum number of miles, the bikeways have been divided into two different categories, Phase 1 and Phase 2. The Phase 1 bicycle facility map identifies 200 miles of bikeways located throughout Oklahoma City. This network was selected by the steering committee as a priority and should be implemented within a 5-8 year period, (see map 2, on page 33). Phase 2 bicycle facilities include bikeways that may be implemented within the next 8-15 years, and are typically located along difficult routes or are in areas that are less densely populated, (see map 3 on page 34).

A series of public meetings involving bicycle clubs in Oklahoma City yielded the vision, goals and objectives of this plan. Ongoing public participation will be necessary for the vitality and implementation of the Bicycle Transportation Plan.

6.1 Plan Vision, Goals, and Recommended Actions

The vision of the Oklahoma City Bicycle Transportation Plan is to provide safe, convenient, connected, and user-friendly bicycle routes for the residents of Oklahoma City. To help facilitate this vision, coordination of the following six goals and recommended actions are essential.

6.2 Plan Goals

Goal 1: Bike Routes:

To develop a bike route system that connects employment, recreation, and activity centers throughout Oklahoma City and surrounding municipalities.

Recommended Actions

- Gain approval of the bicycle plan by the Traffic and Transportation Commission, the Planning Commission and City Council.
- Identify, map and approve bicycle facilities locations.
- Implement the Phase 1 bicycle facilities through Oklahoma City's Capital Improvement Program, the General Obligation Bond Program and Federal and local grants.

Goal 2: Education:

To promote bicycling as a safe and healthy activity on Oklahoma City roadways through the education of all road users.

Recommended Actions

- Coordinate with state and local agencies to develop bicycle brochures and informational flyers.
- Develop a bicycle education website to inform the general public about the rights and responsibilities of bicyclists and motorists.
- Distribute bicycling information literature to the general public at bike races, tag agencies, the State Fair, and other major events, and through Public Service Announcements and drivers' education curriculums.
- Produce an audio and video Public Service Announcement to promote proper and legal bicyclist behavior.
- Educate the public on the new three feet minimum passing distance law, passed in 2006.
- Incorporate bicycling-related questions within the Department of Public Safety driver education tests to increase awareness of bicyclists' rights and responsibilities.
- Promote the use of helmets through educational brochures and with free/low-cost helmets, and change the state law to increase helmet use.
- Develop an educational plan with community partners to address the diverse educational needs of Adult Bicyclists, Motorists, Children Bicyclists, Employers, Community Leaders, Law Enforcement Personnel, and Policymakers. (See Appendix F)
- Promote community support of cyclists to ensure access to restrooms, supplies and shelter as needed.
- Develop, support, and distribute educational material for a child/adult bicycle educational program.

Goal 3: Safe Routes:

To create a safe environment for bicyclists in Oklahoma City through effective design, education, encouragement, and enforcement.

Recommended Actions

- Develop zoning and subdivision regulations and land use policies to accommodate and promote bicycle use in and to activity centers, schools, parks and neighborhoods.
- Maintain street surfaces on all public streets, including designated bikeways, and install bicycle-friendly drainage gates.
- Update existing rules, regulations, and ordinances as they pertain to bicycling in Oklahoma City.
- Monitor other state bicycle laws and ordinances and determine if changes to local laws and ordinances are needed.

- Create an interactive website to report problem areas for trail and on-street bike users.
- Utilize bicycling groups to identify dangerous intersections/roads and report these issues to the appropriate City department.
- Keep bike routes free of surface debris and obstacles.

Goal 4: Effective Design:

To create and improve bicycle transportation by using national design guidelines and innovative design elements to promote recreational and community purposes, prioritizing connectivity.

Recommended Actions

- Develop design standards for bicycle route facilities that include signage and construction guidelines based upon national standards, MUTCD (Manual on Uniform Traffic Control Devices) and AASHTO (American Association of State Highway and Transportation Officials).
- Develop and implement an integrated color-coded bicycling route system that connects major destination points in Oklahoma City and shows connections to bike routes in adjacent communities.
- Design safe bike/automobile interaction points through proper signage, pavement markings, and traffic control devices.
- Develop a Bicycle Transportation Committee to aid in the planning and design of bicycle route facilities.

Goal 5: Enforcement:

To improve enforcement of all traffic laws pertaining to bicyclists and motorists, especially those related to bicyclist/motorist intersections.

Recommended Actions

- Develop bike education workshops for the general public through grants and other public entities.
- Develop local and CLEET approved certification for metro area Police on bicycling laws and ordinances.

Goal 6: Encouragement:

To promote the use of bicycles for transportation, recreation, and the improvement of public health.

Recommended Actions

- Promote and evaluate existing and planned bike route usage.
- Develop and implement an integrated color-coded bicycling route system that connects major destination points in Oklahoma City and shows connections to bike routes in adjacent communities.

- Provide news releases for bicycle planning and bicycle facility development and actively solicit public input.
- Produce and distribute and on-street Bicycle Transportation map.

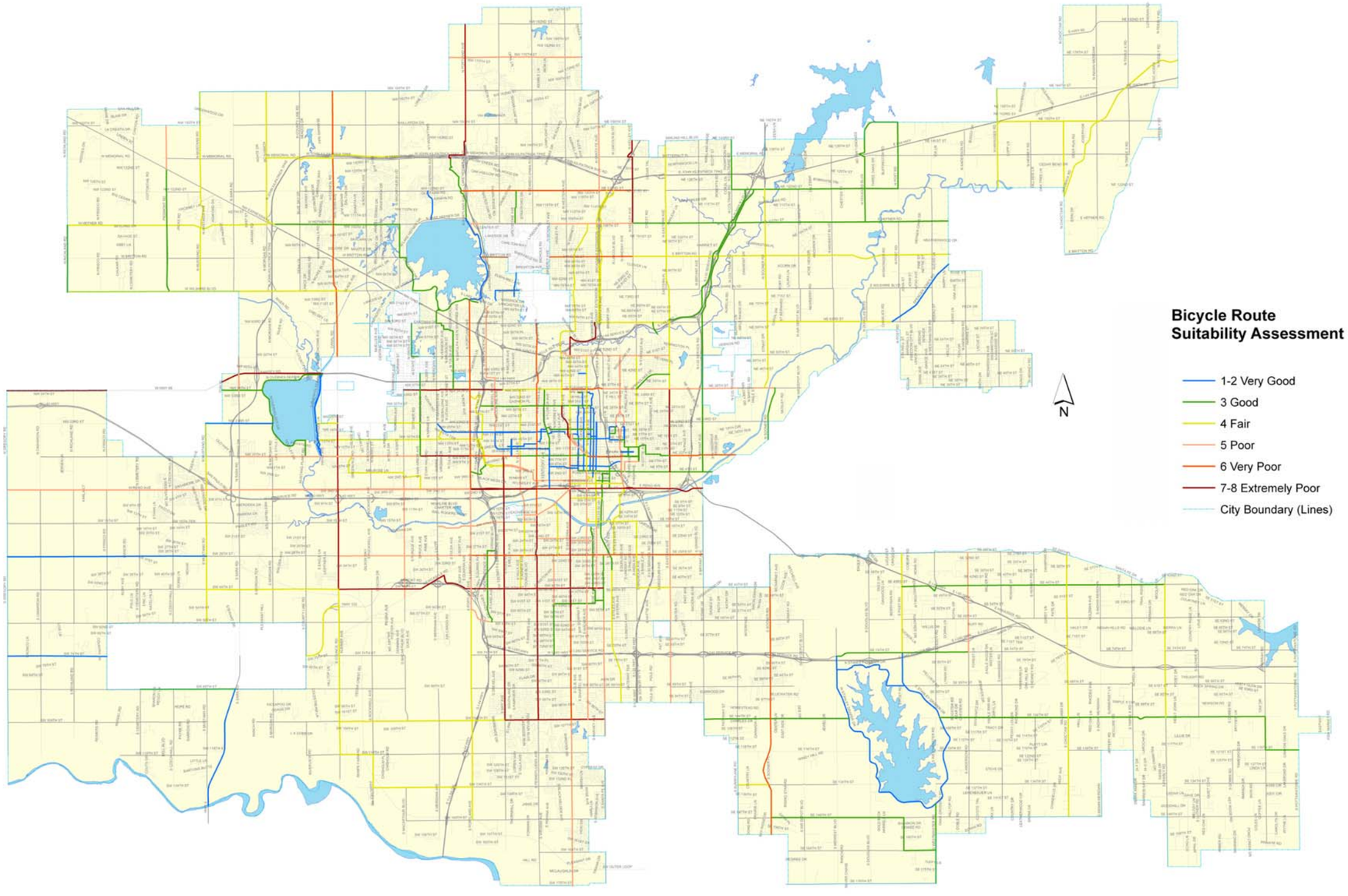
Chapter 7. Recommended Bicycle Routes

7.1 Bicycle Suitability Assessment

The purpose of the bike route assessment was to ultimately identify priority bike routes as a first phase in establishing a bike route system for Oklahoma City. Throughout their meetings, the on-street bike route Steering Committee identified a list of suggested bicycle routes covering Oklahoma City based upon the connectivity of neighborhoods with shopping and employment centers, entertainment districts, and recreational facilities. The identified bicycle routes were then evaluated based upon criteria that would determine if an existing street would be suitable for bicycle travel. The suitability assessment identified not only the most viable bicycle routes, but also whether they were suitable for designation as sign shared roadways or bike lanes.

In order to evaluate according to this criteria, staff utilized the Oklahoma City's geographic information mapping system. The mapping system contains evaluation data that is based upon a bicycle suitability assessment of each bicycle route. Each route has a rating that describes its viability. A "1" or "blue" rating is "very good" and an "8" or "red" is "extremely poor". The evaluation considers general road factors such as annual average daily traffic, total number of through lanes, speed limits, and existing bike lane or paved shoulder. Pavement factors are also scored including pavement condition, presence of a curb, railroad crossings and storm grates. Location factors are taken into consideration including, on-street parking, turn lanes, presence of a median, paved shoulder, marked bike lanes, severe grades, frequent curves, restricted sight distance, number of driveways and intersections, current land uses, and the presence of sidewalks.

Bicycle Suitability Assessment Map



7.2 Proposed Bicycle Routes

City Staff examined the proposed bicycle routes that were identified by the steering committee and developed a phasing strategy for construction. The plan identifies bicycle facilities as either phase I or phase II, based upon need, cost estimate, facility type, population density, linkage/connectivity, and safety. Phase I route facilities include 200 miles of bicycle routes identified as high priority for the bicycle transportation network to be constructed over the next 8-10 years. All recommended Phase I route facilities are primarily signed shared roadways along with a few bike lanes, and connect to residential and commercial activity centers throughout Oklahoma City. There are however, routes that travel away from the central portion of Oklahoma City, leading to a route segment, known as rural bicycle routes where some of the bicycle clubs prefer to ride. Some of these routes also connect with adjacent municipal bike routes systems. Recommended Phase II route facilities consist of approximately 300 more miles of bicycle routes that fall outside the time horizon of this strategic plan.

These routes were developed through a series of seven public meetings that the City of Oklahoma City held in 2006 and 2007. Citizens from the bicycling community were invited to meet and gather information on bicycle issues, future goals for bicyclists, and to develop the bicycle route map. The bicycle route map reflects the routes that are presently used by the various bicycle clubs and emphasizes the connectivity between activities centers, neighborhoods and to other municipalities.

Staff used the following criteria to determine the bike routes in the phase I development stage.

Need: the desirability of the route was based upon information obtained during the bicycle steering committee meetings that were held during the plan development process. The steering committee was composed of cyclists that use the streets on a daily basis and therefore, know the proper routes.

Cost Estimate: Cost is an important factor when considering that most of the proposed bike routes will be retrofitted to an existing vehicular transportation system. Streets that connect activities centers and have adequate pavement width have become a major factor to keeping costs down.

Facility Type: The type of bicycle facility is determined by the existing roadway conditions and the amount of funding available. Ideally, it would be great to widen every street to provide for a bike lane, but some streets can accommodate both vehicular and bicycle traffic without a major investment, based upon existing traffic volume and street width.

Population Density: The intention is to serve as many citizens of Oklahoma City as possible, thereby, placing bicycle routes close to residential areas is the main focus.

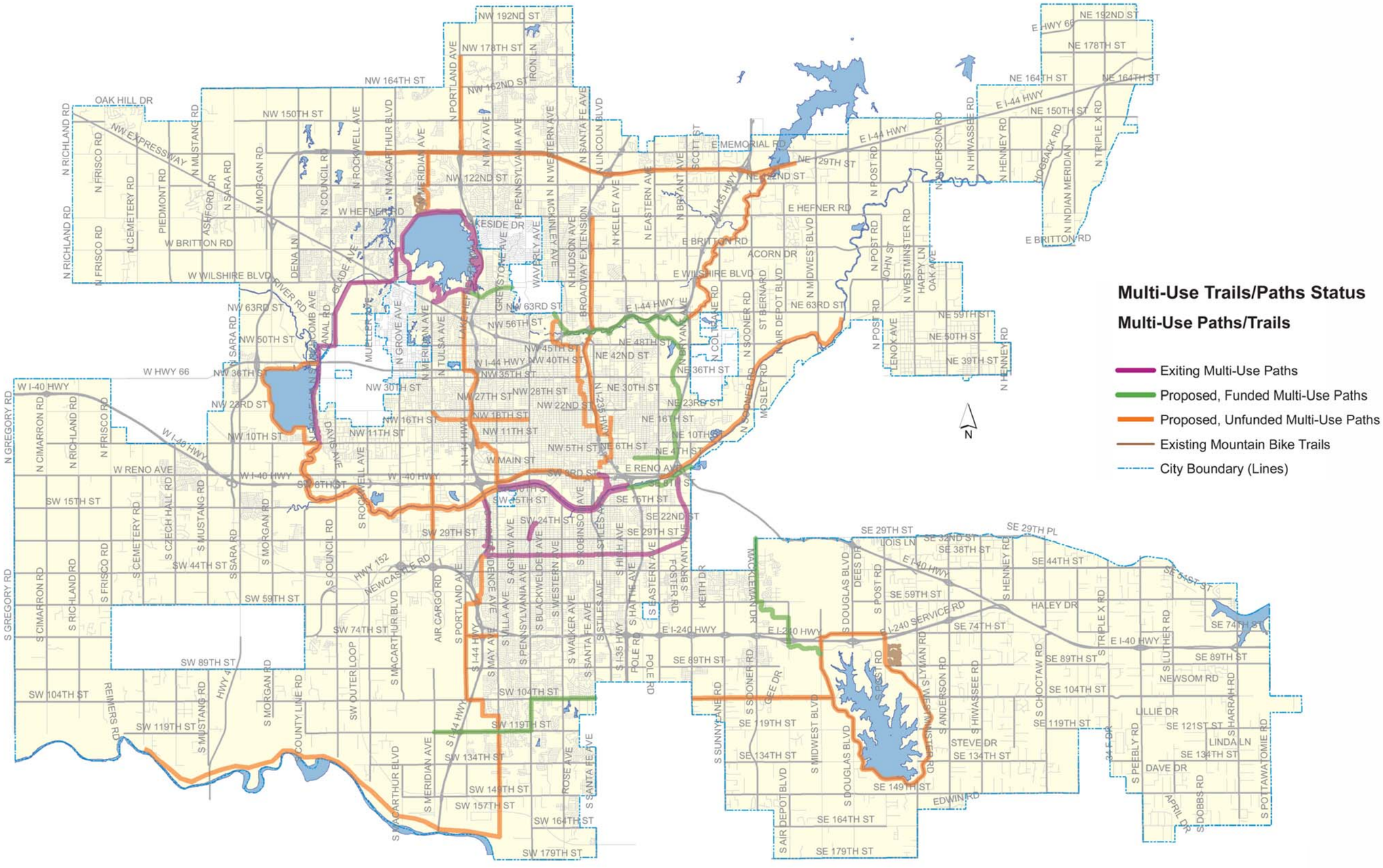
Linkage/connectivity: The steering committee identified activity centers and areas that could be served by a bicycle transportation system. It is imperative to

connect residential areas to employment centers, shopping districts, and recreational areas.

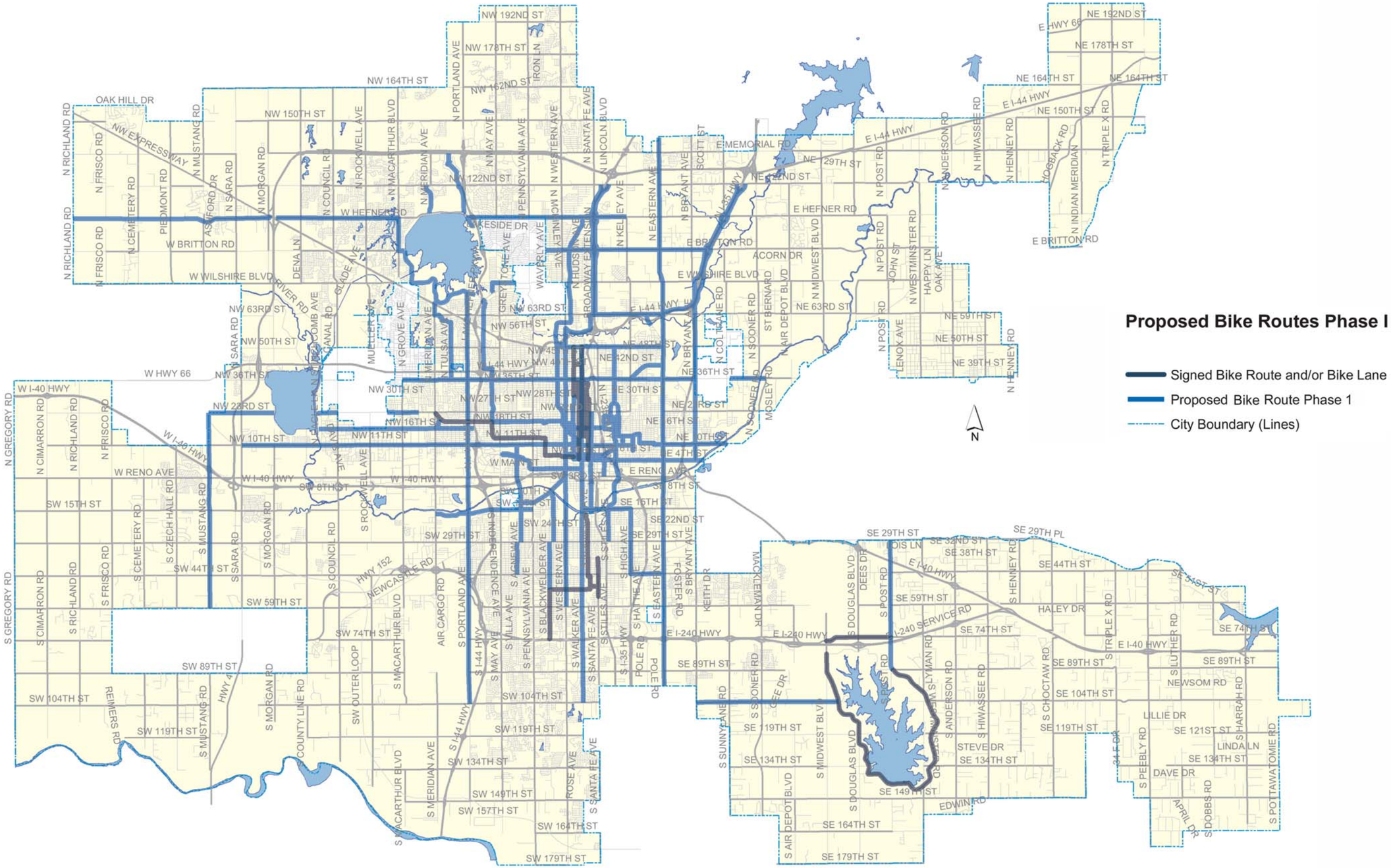
Safety: The safety of the cyclists is an important concern, since the bicycle transportation system is intended to serve all levels of riders, from children to advanced cyclists. Safe routes that included low traffic volumes were selected as well as routes that were important, but needed some improvements to make them safer for cyclists.

The selected routes in Phase I and II are intended to be used as a guide for the development of the bicycle route network. Some route locations may be altered due to unknown street, land use or traffic conditions. Each project will be evaluated to determine the safest, most economical and convenient route for bicycle travel.

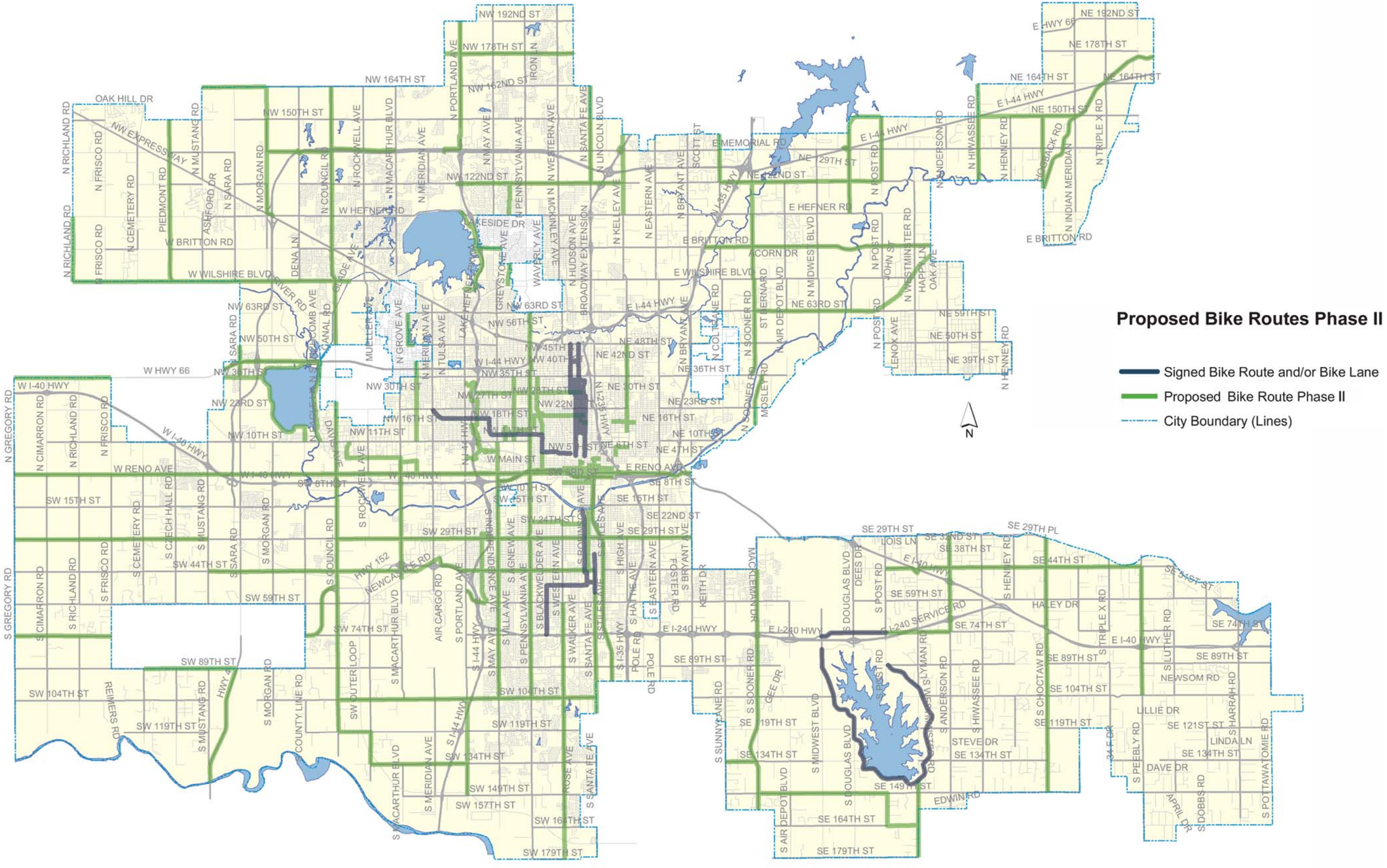
Multi-Use Trail/Path Map



Phase I Bicycle Route Map



Phase II Bicycle Route Map



7.3 Proposed Bike Routes Cost Estimate

Phase I

The proposed bike route cost estimates were derived from discussions with bicycle professionals from across the United States based on bike route and bike lane cost figures from these professionals. The average cost per mile for bike lanes and bike routes are $5,500 to $7,000 per mile. The bike routes and bike lanes may consist of signage, pavement markings, and new bicycle friendly drainage grates.

Proposed Bike Route Table
Phase I Cost Estimate

Bike Route Name	Bike Facility Type	Street Boundary	Street Boundary	Length in Miles	Estimated Cost / Mile	Construction Cost Estimate
4th St NE/NW	Signed Route	Shartel	Canadian River	4.10	$5,500	$22,571
6 Harrison Ave NW	Signed Route	Western	Lincoln	1.59	$5,500	$8,731
10th St NE	Signed Route	Lincoln/Walker	MLK/Stonewall	5.61	$5,500	$30,848
10th St NW	Signed Route	Sara	Walker	10.50	$5,500	$57,724
15th St / High	Signed Route	Walker	Eastern	4.61	$5,500	$25,361
15th St SW	Signed Route	Meridian	Penn	3.04	$5,500	$16,694
16th St NE	Signed Route	Olie	Lincoln	1.47	$5,500	$8,088
16th St NW	Signed Route	Lake Overholser	I-44	5.14	$5,500	$28,281
18th St NW	Signed Route	Olie	Shartel	0.17	$5,500	$958
19th St NW	Signed Route	Drexel	Ellison	2.23	$5,500	$12,246
23rd St NW	Signed Route	Donald	Eagle Lane	3.63	$5,500	$19,987
36th St NE	Signed Route	Maloney	Bryant	5.34	$5,500	$29,343
36th St NW	Signed Route	MacArthur	Classen	4.77	$5,500	$26,215
50th St NW/NE	Signed Route	Classen	MLK	3.35	$5,500	$18,418
63rd St NE	Signed Route	Broadway	MLK	2.23	$5,500	$12,288
104th East	Signed Route	S Bryant	Draper	4.37	$5,500	$24,027
Agnew Ave	Signed Route	NW 10th	SW 29th	3.01	$5,500	$16,569
Blackwelder Ave S	Signed Route	SW 29th	SW 51st	1.46	$5,500	$8,036
Britton Rd NW/NE	Signed Route	Waverly	I-35	4.88	$5,500	$26,836
Broadway Service Rd	Signed Route	NE 122nd	NE 63rd	8.34	$5,500	$45,855
Bryant Ave N	Signed Route	NE 63rd	NE 4th	4.55	$5,500	$25,036
Byers Ave	Signed Route	Reno	SE 29th	2.47	$5,500	$13,591
Classen Blvd	Signed Route	Hefner	NW 16th	7.14	$5,500	$39,258
Classen Dr N	Signed Route	NW 18th	NW 10th	1.30	$5,500	$7,138
Drexel Independence	Signed Route	Grand	NW 18th	4.19	$5,500	$23,038
Eastern Ave N	Signed Route	NE 36th	Smiling Hills	9.98	$5,500	$54,888
Eastern Ave S	Signed Route	NE 4th	SE 95th	6.96	$5,500	$38,292
Exchange Ave N	Signed Route*	Western	Agnew	1.65	$7,000	$11,583

Bike Route Name	Bike Facility Type	Street Boundary	Street Boundary	Length in Miles	Estimated Cost / Mile	Construction Cost Estimate
Grand Blvd NE	Signed Route	NE 63rd	Deep Fork	0.42	$5,500	$2,285
Hefner Rd Bike Route	Signed Route	Portland	Kelley	5.24	$5,500	$28,797
Hefner Rd W	Signed Route	Lake Hefner	Richland	11.11	$5,500	$61,117
I-35 Service Road	Signed Route	NE 122nd	NE 63rd	9.53	$5,500	$52,399
Lake Hefner Dr S	Signed Route	Britton	Portland	3.85	$5,500	$21,185
Lincoln Blvd	Signed Route	NE 50th	Reno	8.17	$5,500	$44,953
Lindsay Ave	Signed Route*	NE 21st	NE 16th	0.85	$7,000	$5,932
Main General Pershing	Signed Route*	May	Walker	3.49	$7,000	$24,444
Meridian N	Signed Route	NW 122nd	Lake Hefner Dr	0.92	$5,500	$5,076
McKinley Ave S	Signed Route	Exchange	SW 20th	1.61	$5,500	$8,848
Mustang Rd	Signed Route	NW 23rd	SW 59th	6.01	$5,500	$33,048
Phillips Ave	Signed Route*	NE 13th	NE 10th	0.56	$7,000	$3,954
Portland Ave N	Signed Route	Hefner	Reno	7.78	$5,500	$42,812
Portland Ave S	Signed Route	Reno	SW 104th	6.98	$5,500	$38,395
Post Rd S	Signed Route	SE 29th	SE 74th	2.99	$5,500	$16,451
Robinson Ave	Signed Route	NE 4th	OK River	2.01	$5,500	$11,030
Robinson Ave N	Signed Route*	NW 23rd	NW 4th	1.98	$7,000	$13,839
Shartel Ave	Signed Route	NW 30th	NW 5th	1.90	$5,500	$10,455
Springlake Dr NE	Signed Route	Kelley	MLK	1.16	$5,500	$6,365
Stiles Ave NE	Signed Route	NE 21st	Walnut	0.37	$5,500	$2,045
Stonewall Ave	Signed Route*	NE 13th	NE 7th	0.90	$7,000	$6,329
Tulsa Ave N	Signed Route	Lake Hefner	NW 36th	3.04	$5,500	$16,708
Villa Ave S	Signed Route	SW 30th	SW 44th	1.00	$5,500	$5,509
Walker Ave N	Signed Route	NW 4th	NW 50th	3.48	$5,500	$19,151
Walker Ave S	Signed Route	NW 4th	SW 104th	7.51	$5,500	$41,280
Walnut Ave N	Signed Route*	Reno	NE 16th	1.24	$7,000	$8,650
Western Ave N	Signed Route*	Reno	NW 63rd	5.87	$7,000	$41,057
Western Ave S	Signed Route	Reno	SW 59th	3.99	$5,500	$21,961
Wilshire Blvd W	Signed Route*	Dorset	Grand Blvd	1.03	7,000	$7,210
			Total Miles	**223.06**	Total Cost	**$1,253,185**

An * indicates the bike routes that may meet the requirements for the installation of a Bike Lane. Further study needs to be completed before this determination can be made.

Phase II

Phase II bike routes were created to include all of the routes that were identified as bicycle routes by the Bicycle Steering Committee. These routes are important to connect activity centers, but may require additional study to determine the proper improvements needed to create a safe and efficient bicycle route. These routes have issues that have been identified by staff that may cause additional design and construction work.

Proposed Bike Route Table
Phase II

Bike Route Name	Bicycle Facility Type	Status	Length in Miles	Estimated Cost / Mile	Estimated Construction Cost
5th St SW	Signed Route	Unfunded	0.96	$7,000	$6,720
8th St-Lindsay Ave NE	Signed Route	Unfunded	0.73	$7,000	$5,110
14th St NW	Signed Route	Unfunded	0.95	$7,000	$6,650
17th St NW	Signed Route	Unfunded	0.17	$7,000	$1,190
18th St NW	Signed Route	Unfunded	0.12	$7,000	$840
20th St NW	Signed Route	Unfunded	1.74	$7,000	$12,180
22nd St-23rd St SW	Signed Route	Unfunded	1.75	$7,000	$12,250
29th St S	Signed Route	Unfunded	10.98	$7,000	$76,860
30th St NW	Signed Route	Unfunded	3.32	$7,000	$23,240
36th St NW	Signed Route	Unfunded	1.21	$7,000	$8,470
44th St SE	Signed Route	Unfunded	8.09	$7,000	$56,630
63rd St NE	Signed Route	Unfunded	3.76	$7,000	$26,320
74th St S	Signed Route	Unfunded	3.99	$7,000	$27,930
89th St SW	Signed Route	Unfunded	2.86	$7,000	$20,020
104th St SW	Signed Route	Unfunded	3.01	$7,000	$21,070
119th St SW	Signed Route	Unfunded	2.00	$7,000	$14,000
122nd St N	Signed Route	Unfunded	5.21	$7,000	$36,470
134th St S	Signed Route	Unfunded	1.91	$7,000	$13,370
149th St S	Signed Route	Unfunded	6.03	$7,000	$42,210
149th St-Sooner Rd	Signed Route	Unfunded	7.55	$7,000	$52,850
150th St NE	Signed Route	Unfunded	3.13	$7,000	$21,910
164th St NW	Signed Route	Unfunded	2.00	$7,000	$14,000
178th NW	Signed Route	Unfunded	4.00	$7,000	$28,000
Anderson Rd	Signed Route	Unfunded	3.00	$7,000	$21,000
Ann Arbor Ave N	Signed Route	Unfunded	2.50	$7,000	$17,500
Black Gold Dr	Signed Route	Unfunded	0.72	$7,000	$5,040
Britton Rd E	Signed Route	Unfunded	7.03	$7,000	$49,210
Britton Rd W	Signed Route	Unfunded	0.79	$7,000	$5,530
Choctaw Rd	Signed Route	Unfunded	8.17	$7,000	$57,190
Colcord-Couch Dr	Signed Route	Unfunded	0.34	$7,000	$2,380

Bike Route Name	Bicycle Facility Type	Status	Length in Miles	Estimated Cost / Mile	Estimated Construction Cost
Coltrane Rd	Signed Route	Unfunded	1.50	$7,000	$10,500
Council Rd N	Signed Route	Unfunded	8.02	$7,000	$56,140
Council Rd S	Signed Route	Unfunded	5.39	$7,000	$37,730
Douglas Blvd N	Signed Route	Unfunded	4.10	$7,000	$28,700
Exchange-Penn Ave S	Signed Route	Unfunded	6.26	$7,000	$43,820
Greystone Ave N	Signed Route	Unfunded	1.72	$7,000	$12,040
Grove Ave N	Signed Route	Unfunded	1.21	$7,000	$8,470
Hiwassee Rd N	Signed Route	Unfunded	2.99	$7,000	$20,930
Hogback Rd	Signed Route	Unfunded	5.82	$7,000	$40,740
Hwy 152	Signed Route	Unfunded	2.15	$7,000	$15,050
Hwy 4 S	Signed Route	Unfunded	3.68	$7,000	$25,760
Hwy 66 W	Signed Route	Unfunded	3.00	$7,000	$21,000
I-40 Blvd	Signed Route	Unfunded	3.69	$7,000	$25,830
Independence Ave S	Signed Route	Unfunded	3.32	$7,000	$23,240
Indiana Ave	Signed Route	Unfunded	0.67	$7,000	$4,690
Indiana-Kentucky Ave	Signed Route	Unfunded	1.84	$7,000	$12,880
Kelley Ave	Signed Route	Unfunded	5.75	$7,000	$40,250
MacArthur Blvd S	Signed Route	Unfunded	3.64	$7,000	$25,480
Main St	Signed Route	Unfunded	0.42	$7,000	$2,940
May Ave	Signed Route	Unfunded	7.96	$7,000	$55,720
Melrose Ln W	Signed Route	Unfunded	3.24	$7,000	$22,680
Memorial Rd W	Signed Route	Unfunded	4.18	$7,000	$29,260
Miller Ave N	Signed Route	Unfunded	0.49	$7,000	$3,430
Morgan Rd N	Signed Route	Unfunded	4.16	$7,000	$29,120
Overholser Dr E	Signed Route	Unfunded	2.55	$7,000	$17,850
Overholser Dr N	Signed Route	Unfunded	2.25	$7,000	$15,750
Overholser Dr W	Signed Route	Unfunded	2.89	$7,000	$20,230
Peebly Rd S	Signed Route	Unfunded	4.00	$7,000	$28,000
Penn Ave	Signed Route	Unfunded	5.79	$7,000	$40,530
Piedmont Rd N	Signed Route	Unfunded	5.12	$7,000	$35,840
Portland Ave	Signed Route	Unfunded	10.34	$7,000	$72,380
Post Rd N	Signed Route	Unfunded	2.01	$7,000	$14,070
Reno Ave W	Signed Route	Unfunded	16.04	$7,000	$112,280
Richland Rd N	Signed Route	Unfunded	2.02	$7,000	$14,140
Robinson Ave S	Signed Route	Unfunded	1.85	$7,000	$12,950
Santa Fe-44th St SW	Signed Route	Unfunded	15.75	$7,000	$110,250
Santa Fe Ave N	Signed Route	Unfunded	3.01	$7,000	$21,070
Sara Rd N	Signed Route	Unfunded	1.00	$7,000	$7,000
Sheridan Ave	Signed Route	Unfunded	1.60	$7,000	$11,200
Shields Blvd	Signed Route	Unfunded	6.91	$7,000	$48,370
Sooner Rd	Signed Route	Unfunded	7.42	$7,000	$51,940
Spencer Jones Rd	Signed Route	Unfunded	2.46	$7,000	$17,220
Villa Ave	Signed Route	Unfunded	2.01	$7,000	$14,070

Bike Route Name	Bicycle Facility Type	Status	Length in Miles	Estimated Cost / Mile	Estimated Construction Cost
Virginia Ave	Signed Route	Unfunded	0.42	$7,000	$2,940
Western Ave S	Signed Route	Unfunded	8.02	$7,000	$56,140
Westminster Rd S	Signed Route	Unfunded	2.40	$7,000	$16,800
Wilshire Blvd W	Signed Route	Unfunded	8.61	$7,000	$60,270
Woodward Ave	Signed Route	Unfunded	4.96	$7,000	$34,720
		Total Miles	**302.65**	Total Cost	**$2,118,550**

Chapter 8. Funding and Implementation

While the development and implementation of a viable bicycle transportation system can benefit Oklahoma City in many ways, the majority of recommended actions will not result in a significant capital expense. The majority of the recommended bicycle route facilities will require only signage and road striping; compared to other modes of transportation, the creation and improvement of bicycle route facilities and a bicycle-friendly environment are relatively low-cost and have the potential to yield significant direct and indirect economic benefits. The recommended actions of this strategic plan are expected to be possible within five to seven years.

Bicycle and pedestrian projects are broadly eligible for funding from almost all the major Federal-aid highway, transit, safety, and other programs. Bicycle projects must be "principally for transportation, rather than recreation, purposes" and must be designed and located pursuant to the transportation plans required of States and Metropolitan Planning Organizations.

8.1 Bicycle Transportation Program Manager

The establishment of a position for a Bicycle Transportation Program Manager within the City of Oklahoma City should lead the implementation of the recommended actions contained in this plan and facilitate the accommodation of bicycling as a viable transportation option in Oklahoma City. The role of a Bicycle Transportation Program Manager would be to institutionalize bicycle planning, incorporating and integrating bicycle planning into the daily operations of city government. The responsibilities of a Bicycle Transportation Program Manager include coordination with multiple agencies involving transportation planning, policy development and update, facility design and update, incident recording and analysis, public relations, facilitation of educational programs related to bicycling, legislative attention, and the garnering of funding for the maintenance of the program. The establishment of the position of Bicycle Transportation Program Manager would be an important step toward increasing bicycle transportation and the development and ongoing success of a safe, convenient, connected, and user-friendly network of bicycle routes.[iv]

The matrix below details the vision, goals, recommended actions, agencies/entities responsible for the implementation of each recommended action, and potential funding sources.

8.2 Goal Implementation:

The vision of the Oklahoma City Bicycle Transportation Plan is to provide safe, convenient, connected, and user-friendly bicycle routes for the residents of Oklahoma City.

Recommended Action: Establish the position of a Bicycle Transportation Program Manager to lead the implementation of the recommended actions contained in this plan and facilitate the accommodation of bicycling as a viable transportation option in Oklahoma City.

Goal 1: Bike Routes: To develop a bike route system that connects employment, recreation, and activity centers throughout Oklahoma City and surrounding municipalities.		
Recommended Actions	**Agency/Entity Responsible**	**Potential Funding Sources**
Gain approval of the priority bike route map by the Traffic and Transportation Commission, the Planning Commission and City Council.	OKC Planning Department OKC Public Works Dept. OKC Parks & Recreation Department OKC Police Department Trails Advisory Committee	Private Sector Funding Local Foundations
Implement the Bicycle Transportation Plan through Oklahoma City's Capital Improvement Program, G.O. Bond Issues and Federal and Local Grants.	OKC Planning Department Oklahoma State Department of Public Safety	General Funds Local Foundations Local Grants Federal Grants
Install bike routes based upon the Bicycle Transportation Plan.	OKC Planning Department OKC Public Works Dept. OKC Public Information Office OKC Police Department	General Funds Local Foundations Local Grants Federal Grants

Goal 2: Education: To promote bicycling as a safe and healthy activity on Oklahoma City roadways through the education of all road users.		
Recommended Actions	**Agency/Entity Responsible**	**Potential Funding Sources**
Coordinate with state and local agencies to develop bicycle brochures and informational flyers.	OKC Planning Department OKC Public Works Dept. ODOT ACOG	SAFETEA-LU Private Sector Funding Local Foundations

Develop a bicycle education website to inform the general public about the rights and responsibilities of bicyclists and motorists.	OKC Planning Department OKC Public Works Dept. OKC Public Information Office OKC Police Department	General Funds Local Foundations and Grants
Distribute bicycling information literature to the general public at bike races, tag agencies, the State Fair, and other major events, and through Public Service Announcements and drivers' education curriculums.	OKC Planning Department Oklahoma State Department of Public Safety	
Produce an audio and video Public Service Announcement to promote proper and legal bicyclist and motorist behavior.	OKC Planning Department OKC Public Information Office OKC Public Works Dept. ODOT ACOG	SAFETEA-LU Private Sector Funding Local Foundations
Educate the public on the new three feet minimum passing distance law, passed in 2006.	OKC Planning Department OKC Public Information Office OKC Police Department	
Produce on-street Bicycle Transportation map for public distribution.	OKC Planning Department OKC Public Works Dept.	SAFETEA-LU Private Sector Funding Local Foundations
Incorporate bicycling related questions in driver education tests to increase awareness of bicyclists' rights and responsibilities.	Oklahoma State Department of Public Safety OKC Planning Department ACOG	
Promote the use of helmets through educational brochures and with free/low-cost helmets. Change state law to increase helmet use.	OKC Planning Department OKC Public Information Office	Private Sector Funding Local Foundations

Develop a bicycle educational plan with community partners to address the educational needs of the different users and entities.	OKC Planning Department OKC Public Information Office	Private Sector Funding Local Foundations
Promote community support of bicyclists to ensure access to restrooms, supplies and shelter as needed.	OKC Planning Department OKC Public Information Office	Private Sector Funding Local Foundations

Goal 3: Safe Routes: To create a safe environment for bicyclists in Oklahoma City through effective design, education, encouragement, and enforcement.

Recommended Actions	Agency/Entity Responsible	Potential Funding Sources
Develop zoning and subdivision regulations and land use policies to integrate bicycle use in school parks, activity centers, and neighborhoods.	OKC Planning Department OKC Public Works Dept. OKC Parks and Recreation Department OKC Police Department	
Update the existing rules, regulations, and ordinances as they pertain to bicycling in Oklahoma City.	OKC Planning Department OKC Police Department OKC Public Works Dept. Traffic Commission	
Monitor other state bicycle laws and ordinances and determine if changes to local laws and ordinances are needed.	OKC Planning Department OKC Public Works Dept. OKC Police Department	
Utilize bicycling groups to identify dangerous intersections/roads to the proper city departments.	OKC Planning Department Private Bicycling Groups/Clubs	
Keep bike routes free of surface debris and obstacles.	OKC Planning Department OKC Public Works Dept.	

Goal 4: Effective Design: To create and improve bicycle transportation by using national design guidelines and innovative design elements to promote recreational and community purposes, prioritizing connectivity.		
Recommended Actions	**Agency/Entity Responsible**	**Potential Funding Sources**
Develop design standards for bicycle route facilities that include signage and construction guidelines based upon national standards, MUTCD (Manual on Uniform Traffic Control Devices) and AASHTO (American Association of State Highway and Transportation Officials). A revision to paving standards will be required.	OKC Planning Department OKC Parks and Recreation Department OKC Pubic Works Dept. OKC Police Department	
Develop and implement an integrated color-coded bicycling route system that connects major destination points in Oklahoma City and shows connections to bike routes in adjacent communities.	OKC Planning Department OKC Public Works Dept.	Private Sector Funding Local Foundations
Design safe bike/automobile interaction points through proper signage, pavement markings, and traffic control devices.	OKC Planning Department OKC Public Works Dept.	SAFETEA-LU Private Sector Funding Local Foundations

Develop a Bicycle Transportation Committee to aid in the planning, design, implementation and evaluation of bicycle route facilities.	OKC Planning Department OKC Public Works Dept. OKC Parks and Recreation Department	

Goal 5: Enforcement: To improve enforcement of all traffic laws pertaining to bicyclists and motorists, especially those related to bicyclist/motorist intersections.		
Recommended Actions	**Agency/Entity Responsible**	**Potential Funding Sources**
Develop bike education workshops for the general public.	OKC Planning Department OKC Public Works Dept. Private Bicycling Groups/Clubs OKC Police Department	SAFETEA-LU Private Sector Funding Local Foundations and Grant Agencies
Educate the Police throughout the metropolitan area on bicycling laws and ordinances.	OKC Planning Department OKC Public Works Dept. Private Bicycling Groups/Clubs OKC Police Department	SAFETEA-LU Private Sector Funding Local Foundations

Goal 6: Encouragement: To promote the use of bicycles for transportation, recreation, and the improvement of public health.		
Recommended Actions	**Agency/Entity Responsible**	**Potential Funding Sources**
Promote and evaluate existing and planned bike route usage.	OKC Planning Department OKC Public Works Dept.	
Provide news releases for bicycle planning and bicycle facility development and actively solicit public input.	OKC Planning Department OKC Public Works Dept. OKC Public Information Office	

Private Bicycling Groups/Clubs may consist of one or more of the following bicycle groups or clubs; Velo Club of Oklahoma City, Team BikeBuddies of OKC, Oklahoma Bicycle Society, Oklahoma Bicycle Coalition, Oklahoma Earthbike Fellowship, and the Tri-OKC Club.

8.3 Funding Sources

Funding to implement the Bicycle Transportation Plan will come from a variety of sources including: the City of Oklahoma City, private sources, local foundations, and local, and federal grants.

Local Funding Sources

Bond Referendums

Local ballots to approve bond propositions have been successful in the past to support the improvements in Oklahoma City. Most communities across the United States use general obligation bonds to fund their capital improvement program.

Impact Fees

Local governments can levy monetary one-time fees on new development that could support ADA requirements and the bicycle transportation plan. Impact fees can be applied to finance bicycle route facilities located beyond the boundary of development and will ensure that adequate capital facilities will be provided to serve the public.

Capital Improvement Programs

Oklahoma City could appropriate an annual source of funds by dedicating funding through the Capital Improvement Program, (CIP). Bicycle route facilities could be developed and maintained year after year through the CIP.

Sales Tax

A dedicated portion of the Oklahoma City sales tax could be earmarked to construct bicycle route facilities. This method of funding construction projects has become more popular over the past few years, with the success of the MAPS projects in Oklahoma City.

Local Private Sector Funding

Private businesses and local industries can provide support of bicycle facility construction projects through donations of cash, services, labor or materials. Not-for-profit organizations can also hold fund raising events to gain support from a multitude of various businesses and organizations.

Bike Club Sponsors

A sponsorship program can provide contributions from bike clubs that want to assist with the development of a specific bike route. Projects can include rest stops, benches, landscaping, signage, bike racks, and litter elimination programs. Plaques or signage are usually installed as recognition of their efforts.

Volunteer Work

The public-private relationship is an opportunity for projects to be completed and this also gives the participants a sense of ownership in a project. Projects like the installation of bike racks or bike lockers adjacent to a business, or an Adopt-a-bike route program fall into this category.

Federal Funding Sources

Federal Transportation Enhancement Grants

A primary source of funding for many cities is the Safe Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users, (SAFETEA-LU) Federal grant program. This Act provides $244.1 billion dollars in federal funds for the fiscal year 2005-2009, for transportation projects in the United States.

Surface Transportation Program (STP)

The STP provides flexible funding that may be used by States and localities for projects on any Federal-aid highway project. A total of $32.5 billion in STP funds are authorized through 2009. Surface Transportation Funds can be used for any project, and they are not limited to the federal-aid highway system. Projects include bicycle transportation and pedestrian walkways and safety improvements. The flexibility of this category, and the fact that about one-third of it is programmed at the metropolitan level, makes it a good source of funds for bicycle and pedestrian projects. Each State must set aside a portion of their STP funds (10 percent or the amount set aside in 2005, whichever is greater) for transportation enhancements activities.

Surface Transportation Program (STP) funds may be used for either the construction of bicycle transportation facilities and pedestrian walkways, or non-construction projects (such as maps, brochures, and public service announcements) related to safe bicycle use and walking. TEA-21 added "the modification of public sidewalks to comply with the Americans with Disabilities Act" as an activity that is specifically eligible for the use of these funds. *23 USC Section 217 (a)*

Federal-aid Highway Program

National Highway System funds may be used to construct bicycle transportation facilities and pedestrian walkways on land adjacent to any highway on the National Highway System, including Interstate highways. *23 USC Section 217 (b)*

Ten percent of each State's annual STP funds are set-aside for Transportation Enhancement Activities (TEAs). The law provides a specific list of activities that are eligible TEAs and this includes "provision of facilities for pedestrians and bicycles, provision of safety and educational activities for pedestrians and bicyclists," and the "preservation of abandoned railway corridors (including the

conversion and use thereof for pedestrian and bicycle trails)." *23 USC Section 109 (a)(35)*

Another 10 percent of each State's STP funds are set-aside for the Hazard Elimination and Railway-Highway Crossing programs, which address bicycle and pedestrian safety issues. Each State is required to implement a Hazard Elimination Program to identify and correct locations, which may constitute a danger to motorists, bicyclists, and pedestrians. Funds may be used for activities including a survey of hazardous locations and for projects on any publicly owned bicycle or pedestrian pathway or trail, or any safety-related traffic calming measure. Improvements to railway-highway crossings "shall take into account bicycle safety." *23 USC Section 152*

Congestion Mitigation and Air Quality Improvement Program funds may be used for either the construction of bicycle transportation facilities and pedestrian walkways, or non-construction projects (such as maps, brochures, and public service announcements) related to safe bicycle use. *23 USC Section 217 (a)*

Recreational Trails Program funds may be used for all kinds of trail projects. Of the funds apportioned to a State, 30 percent must be used for motorized trail uses, 30 percent for non-motorized trail uses, and 40 percent for diverse trail uses (any combination). *23 USC Section 206*

Provisions for pedestrians and bicyclists are eligible under the various categories of the Federal Lands Highway Program in conjunction with roads, highways, and parkways. Priority for funding projects is determined by the appropriate Federal Land Agency or Tribal government. *23 USC Section 204*

National Scenic Byways Program funds may be used for "construction along a scenic byway of a facility for pedestrians and bicyclists." *23 USC Section 162 (c)(4)*

Job Access and Reverse Commute Grants are available to support projects, including bicycle-related services, designed to transport welfare recipients and eligible low-income individuals to and from employment. *TEA-21 Section 3037*

High Priority Projects and Designated Transportation Enhancement Activities identified by Section 1602 of TEA-21 include numerous bicycle, pedestrian, trail, and traffic calming projects in communities throughout the country.

Federal Transit Program

Title 49 U.S.C. (as amended by TEA-21) allows the Urbanized Area Formula Grants, Capital Investment Grants and Loans, and Formula Program for Other than Urbanized Area transit funds to be used for improving bicycle and pedestrian access to transit facilities and vehicles. Eligible activities include

investments in "pedestrian and bicycle access to a mass transportation facility" that establishes or enhances coordination between mass transportation and other transportation. *49 USC Section 5307*

TEA-21 also created a Transit Enhancement Activity program with a one percent set-aside of Urbanized Area Formula Grant funds designated for, among other things, pedestrian access and walkways, and "bicycle access, including bicycle storage facilities and installing equipment for transporting bicycles on mass transportation vehicles". *49 USC Section 5307(k)*

Highway Safety Programs

Pedestrian and bicyclist safety remain priority areas for State and Community Highway Safety Grants funded by the Section 402 formula grant program. A State is eligible for these grants by submitting a Performance plan (establishing goals and performance measures for improving highway safety) and a Highway Safety Plan (describing activities to achieve those goals). *23 USC Section 402*

Research, development, demonstrations and training to improve highway safety (including bicycle and pedestrian safety) is carried out under the Highway Safety Research and Development (Section 403) program. *23 USC Section 403*

Federal/State Matching Requirements

In general, the Federal share of the costs of transportation projects is 80 percent with a 20 percent State or local match. However, there are a number of exceptions to this rule:

Federal Lands Highway projects and Section 402 Highway Safety funds are 100 percent Federally funded.

Bicycle-related Transit Enhancement Activities are 95 percent federally funded.

Hazard elimination projects are 90 percent federally funded. Bicycle-related transit projects (other than Transit Enhancement Activities) may be up to 90 percent federally funded.

Individual Transportation Enhancement Activity projects under the STP can have a match higher or lower than 80 percent. However, the overall Federal share of each State's Transportation Enhancement Program must be 80 percent.

States with higher percentages of Federal Lands have higher Federal shares calculated in proportion to their percentage of Federal lands.

The State and/or local funds used to match Federal-aid highway projects may include in-kind contributions (such as donations). Funds from other Federal programs may also be used to match Transportation Enhancement, Scenic Byways, and Recreational Trails program funds. A Federal agency project sponsor may provide matching funds to Recreational Trails funds provided the Federal share does not exceed 95 percent.

Appendix A. Design Guidelines for Bicycle Route Facilities

The main bicycle route facility suggested for use in Oklahoma City in this plan are bike lanes, signed shared roadways, and wide outside curb lanes on shared roadways. Standards for the development of only these facilities are detailed in this appendix. The definitions and standards outlined in this appendix are based on the American Association of State and Highway Transportation Officials' (AASHTO) manual "Guide for the Development of Bicycle Facilities 1991," with supplementary material from the Oklahoma Department of Transportation's *Roadway Design Manual*. AASHTO's "Guide for the Development of Bicycle Facilities" is the industry standard for the design of bicycle route facilities. While this appendix discusses AASHTO's standards for bike lanes, signed shared roadways, and wide outside curb lanes on shared roadways, for all other design issues concerning the development and use of bicycle route facilities the AASHTO guide should be consulted.

All traffic control devices must conform to the "Manual on Uniform Traffic Control Devices" (MUTCD) as adopted by The Oklahoma Department of Transportation.

Definitions

BICYCLE—Every vehicle propelled solely by human power upon which any person may ride, having two tandem wheels, except scooters and similar devices. The term "bicycle" for this publication also includes three and four-wheeled human-powered vehicles, but not tricycles for children.

BICYCLE FACILITIES—A general term denoting improvements and provisions made by public agencies to accommodate or encourage bicycling, including parking and storage facilities, and shared roadways not specifically designated for bicycle use.

BICYCLE LANE or BIKE LANE—A portion of a roadway that has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.

BICYCLE PATH or BIKE PATH—See Multi-Use Path.

BICYCLE ROUTE SYSTEM—A system of bikeways designated by the jurisdiction having authority with appropriate directional and informational route markers, with or without specific bicycle route numbers. Bike routes should establish a continuous routing, but may be a combination of any and all types of bikeways.

BIKEWAY—A generic term for any road, street, path or way that in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

HIGHWAY—A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

MULTI-USE PATH—A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. Multi-use paths may also be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users.
RAIL–TRAIL—A multi-use path, either paved or unpaved, built within the right-of-way of an existing or former railroad.
RIGHT-OF-WAY—A general term denoting land, property or interest therein, usually in a strip, acquired for or devoted to transportation purposes.
RIGHT OF WAY—The right of one vehicle or pedestrian to proceed in a lawful manner in preference to another vehicle or pedestrian.
ROADWAY—The portion of the highway, including shoulders, intended for vehicular use.
RUMBLE STRIPS—A textured or grooved pavement sometimes used on or along shoulders of highways to alert motorists who stray onto the shoulder.
SHARED ROADWAY—A roadway that is open to both bicycle and motor vehicle travel. This may be an existing roadway, street with wide curb lanes, or road with paved shoulders.
SHOULDER—The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use and for lateral support of sub-base, base and surface courses.
SIDEWALK—The portion of a street or highway right-of-way designed for preferential or exclusive use by pedestrians.
SIGNED SHARED ROADWAY (SIGNED BIKE ROUTE)—A shared roadway which has been designated by signing as a preferred route for bicycle use.
TRAVELED WAY—The portion of the roadway for the movement of vehicles, exclusive of shoulders.
UNPAVED PATH—Paths not surfaced with asphalt or Portland cement concrete.

Bicycle Route Facilities and Design Standards

Bike Lanes

Bike lanes can be incorporated into a roadway when it is desirable to delineate available road space for preferential use by bicyclists and motorists, and to provide for more predictable movements by each. Bike lane markings can increase the confidence of bicyclists that motorists will not stray into their travel path. The benefit for motorists is that they will find swerving left out of their lane to avoid bicyclists on their right to be unnecessary.

Bike lanes should be one-way facilities and carry bike traffic in the same direction as adjacent motor vehicle traffic. Two-way bike lanes on one side of the road are not recommended when they result in bicycles riding against the flow of motor vehicle traffic. Wrong-way riding is a major cause of bicycle crashes and violates the rules of the road. Bicycle-specific wrong-way signing may be used to discourage wrong-way travel. However, there may be special situations where a two-way bike lane for a short distance can eliminate the need for a bicyclist to make a double crossing of a busy street or travel on a sidewalk. This should only

be considered after careful evaluation of the relative risks and should be well documented in the project file.

On one-way streets, bike lanes should generally be placed on the right side of the street. Bike lanes on the left side are unfamiliar and unexpected for most motorists. This should only be considered when a bike lane on the left will substantially decrease the number of conflicts, such as those caused by heavy bus traffic or unusually heavy turning movements to the right, or if there are a significant number of left-turning bicyclists. Thus, left-side bike lanes should only be considered after careful evaluation. Similarly, two-way bike lanes on the left side of a one-way street could be considered with a suitable separation from the motor vehicle traffic after a complete engineering study of other alternatives and relative risks.

Bike Lane Widths

To examine the width requirements for bike lanes, figure 1 shows four typical locations for such facilities in relation to the roadway. For roadways with no curb and gutter, the minimum width of a bike lane should be 4 feet. If parking is permitted, the bike lane should be placed between the parking area and the travel lane and have a minimum width of 5 feet. Where parking is permitted but a parking stripe or stalls are not used, the shared area should be a minimum of 11 feet without a curb face and 12 feet adjacent to a curb face. If the parking volume is substantial or turnover is high, an additional 1 to 2 feet of width is desirable. (See Figure 5)

Striped Bike Lane

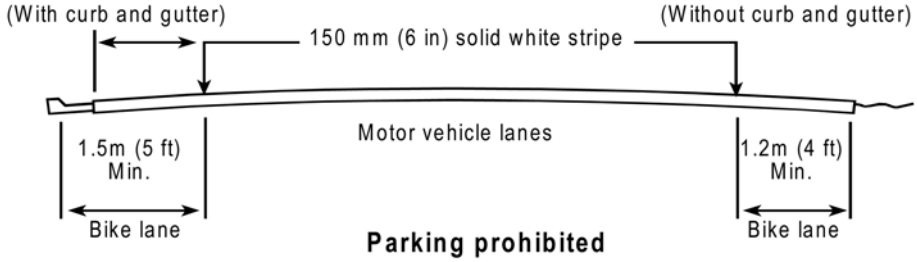


Figure 5

Bike Lane with On-Street Parking Stripe or Stall

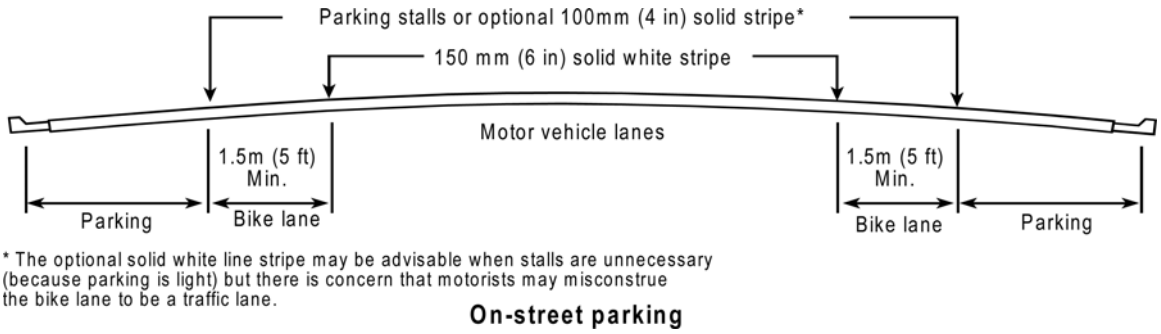


Figure 6

Bike Lane without On-Street Parking Stripe or Stall

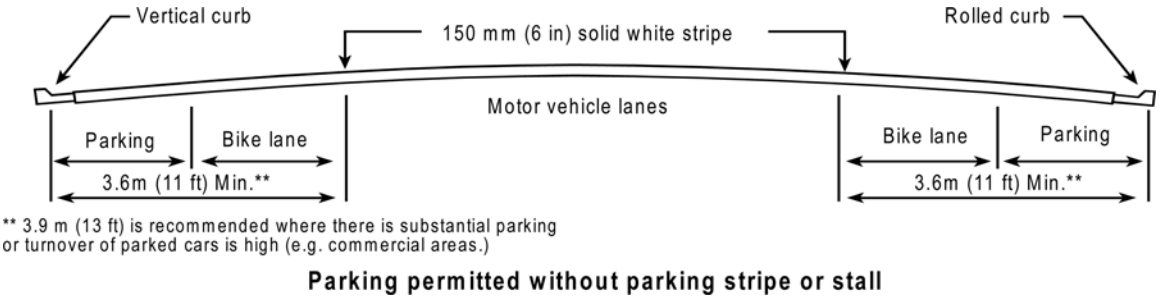


Figure 7

Bike lanes should never be placed between the parking lane and curb lane. Bike lanes between the curb and parking lane can create obstacles for bicyclists from opening car doors and poor visibility at intersections and driveways and they prohibit bicyclists from making left turns.

The recommended width of a bike lane is 5 feet from the face of a curb or guardrail to the bike lane stripe. This 5-foot width should be sufficient in cases where a 1-2 foot wide concrete gutter pan exists, given that a minimum of 3 feet of ridable surface is provided, and the longitudinal joint between the gutter pan and pavement surface is smooth. The width of the gutter pan should not be included in the measurement of the ridable or usable surface, with the possible exception of those communities that use an extra wide, smoothly paved gutter pan that is 4 feet wide as a bike lane. If the joint is not smooth, 4 feet of ridable surface should be provided. (See Figure 6)

Since bicyclists usually tend to ride a distance of 32-40 inches from a curb face, it is very important that the pavement surface in this zone be smooth and free of

structures. Drain inlets and utility covers that extend into this area may cause bicyclists to swerve, and have the effect of reducing the usable width of the lane. Where these structures exist, the bike lane width may need to be adjusted accordingly.

Bike lanes should be located within the limits of the paved shoulder at the outside edge in outlying areas where infrequent parking is handled off the pavement. Bike lanes may have a minimum of 4 feet, where the area beyond the paved shoulder can provide additional maneuvering width. A width of 5 feet or greater is preferable and additional widths are desirable where substantial truck traffic is present, or where motor vehicle speeds exceed 50 mph.

A bike lane should be delineated from the motor vehicle travel lanes with a 6-inch solid white line. Some jurisdictions have used an 8-inch line for added distinction. An additional 4-inch solid white line can be placed between the parking lane and the bike lane. This second line will encourage parking closer to the curb, providing added separation from motor vehicles, and where parking is light it can discourage motorists from using the bike lane as a through travel lane. (See Figure 7)

Bike lanes should be provided with adequate drainage to prevent ponding, washouts, debris accumulation, and other potentially hazardous situations for bicyclists. The drainage grates should be bicycle-safe. A smooth riding surface should be provided and utility covers should be adjusted flush with the surface. Raised pavement markings and raised barriers can cause steering difficulties for bicyclists and should not be used to delineate bicycle lanes.

Bike Lanes at Intersections

Bike lane striping should not be installed across any pedestrian crosswalks, and, in most cases, should not continue through any street intersections. If there are no painted crosswalks, the bike lane striping should stop at the near side cross street property line extended and then resume at the far side property line extended. The only exception to this caveat might be the extension of dotted guidelines through particularly complex intersections or multi-lane roundabouts. The same bike lane striping criteria apply whether parking is permitted or prohibited in the vicinity of the intersection.

At signalized or stop-controlled intersections with right-turning motor vehicles, the solid striping to the approach should be replaced with a broken line with 2-foot dots and 6-foot spaces. The length of the broken line section is usually 50 feet to 200 feet.

Since there are usually small volumes of right-turning motor vehicles at non-signalized minor intersections with no stop controls, solid bike lane striping can continue all the way to the crosswalk on the near side of the intersection. However, if there is a bus stop or high right-turn volume, the 6-inch solid line

should be replaced with a broken line with 2-foot dots and 6-foot spaces for the length of the bus stop. The bike lane striping should resume at the outside line of the crosswalk on the far side of the intersection (see Figure 8).

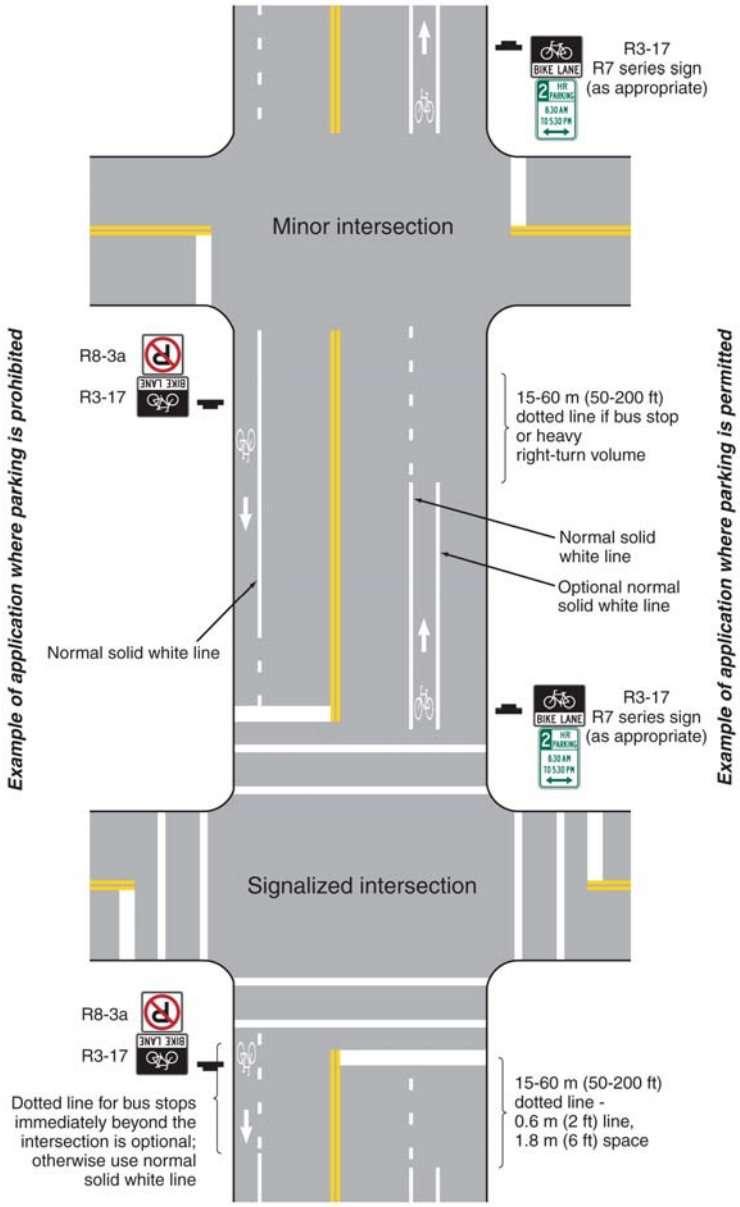


Figure 8. Typical pavement markings for bike lane on two-way street

If a bus stop is located on a far side of the intersection rather than on a near side approach, the solid white line can also be replaced with a broken line for a distance of at least 80 feet from the crosswalk on the far side of the intersection.

At T-intersections with no painted crosswalks, the bike lane striping on the side across from the T-intersection should continue through the intersection with no break. If there are painted crosswalks, the bike lane striping on the side across

from the T-intersection should be discontinued only at the crosswalks (see Figure 9).

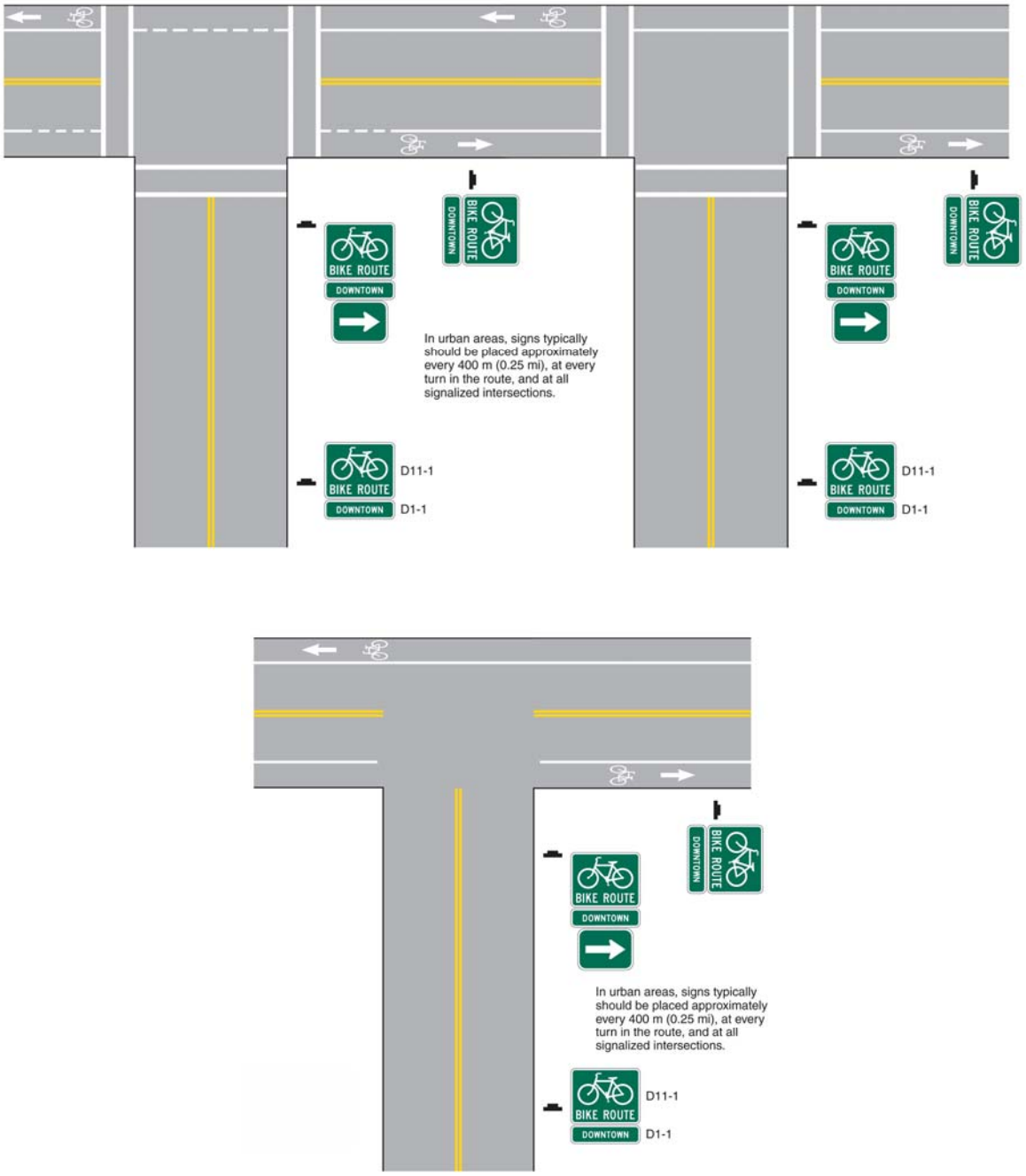


Figure 9. Typical Bike Lane Striping at T-intersections

Bike Lanes and Turning Lanes

Bike lanes sometimes complicate bicycle and motor vehicle turning movements at intersections. Because they encourage bicyclists to keep to the right and motorists to keep to the left, both operators are somewhat discouraged from merging in advance of turns. Thus, some bicyclists may begin left turns from the right-side bike lane and some motorists may begin right turns from the left of the bike lane. Both maneuvers are contrary to established rules of the road and may result in conflicts; however, signing and striping can lessen these.

At intersections, bicyclists proceeding straight through and motorists turning right must cross paths. Striping and signing configurations that encourage crossings in advance of the intersection, in a merging fashion, are preferable to those that force the crossing in the immediate vicinity of the intersection. One example of such a configuration is given in Photo 12. To a lesser extent, the same is true for left-turning bicyclists; however, in this maneuver, most vehicle codes allow the bicyclist the option of making either a "vehicular style" left turn (where the bicyclist merges leftward to the same lane used for motor vehicle left turns) or a "pedestrian style" left turn (where the bicyclist proceeds straight through the intersection, turns left at the far side, then proceeds across the intersection again on the cross street (see Figure 10). Figure 11 presents optional treatments for pavement markings where a bike lane approaches a motorist right-turn-only lane

Markings for Bike Lane Merge in Advance of Intersection

(or lanes). Where there are numerous left-turning bicyclists, a separate turning lane can also be considered. The design of bike lanes should also include appropriate signing at intersections to warn of conflicts. General guidance for pavement marking of bike lanes is contained in the MUTCD 2. The approach shoulder width should be provided through the intersection, where feasible, to accommodate right-turning bicyclists or bicyclists who prefer to use crosswalks to negotiate the intersection. Intersections with throat widening at approaches that provide an exclusive left-turn bay can also provide an exclusive right-turn lane for motor vehicles. In those cases where throat widening has reduced the available pavement width below the minimum requirements for bike lane operation and it is

not possible to widen the pavement, the bike lane striping should be discontinued following a regulatory sign. Bicyclists proceeding straight through the intersection should be directed to merge with motor vehicle traffic to cross the intersection. (See Figure 6.) Where sufficient width exists, a separate through bike lane should be placed to the right of the through lane as shown in Figure 10.

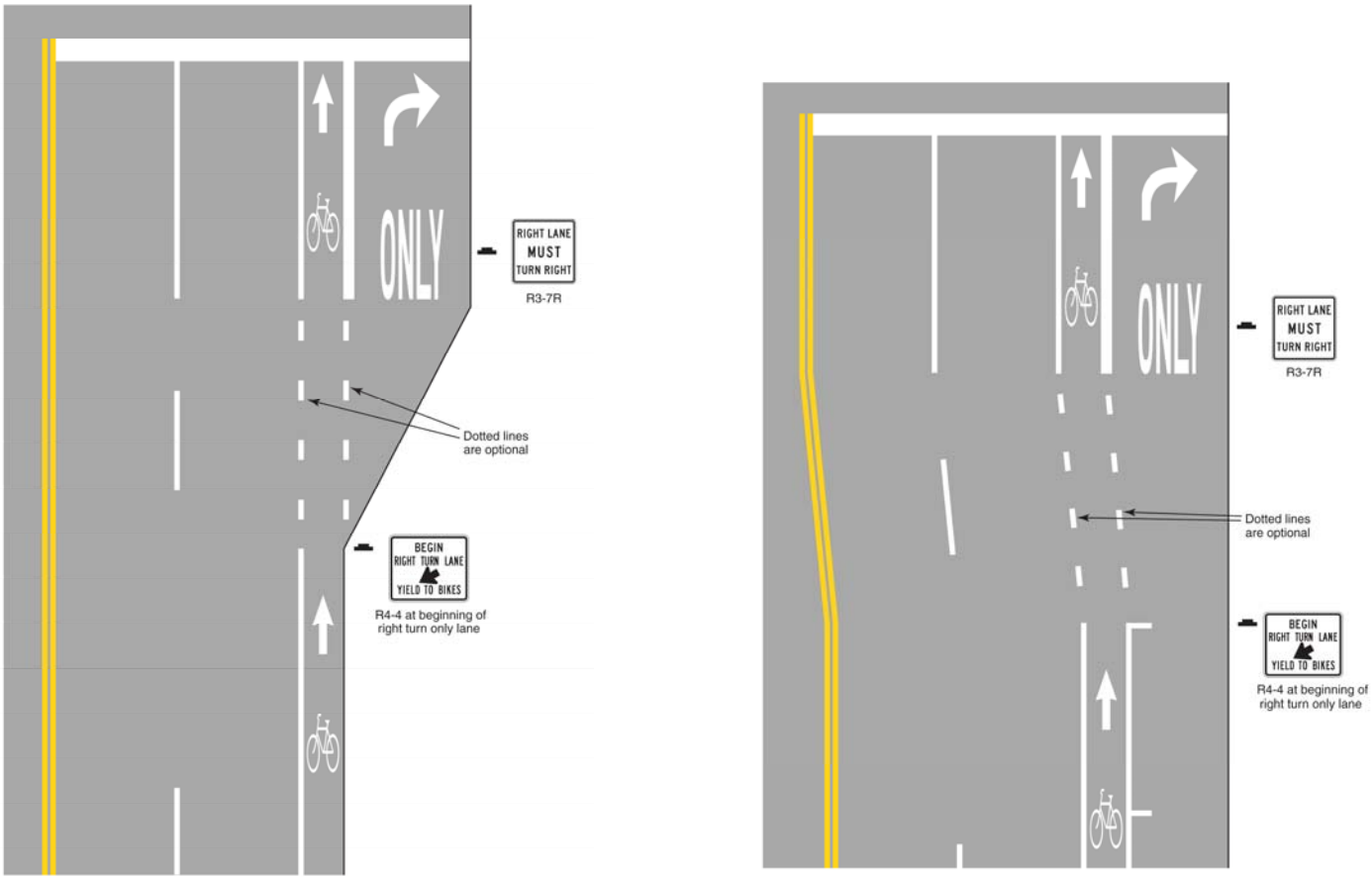


Figure 10. Bike Lanes Approaching Right-Turn-Only Lanes

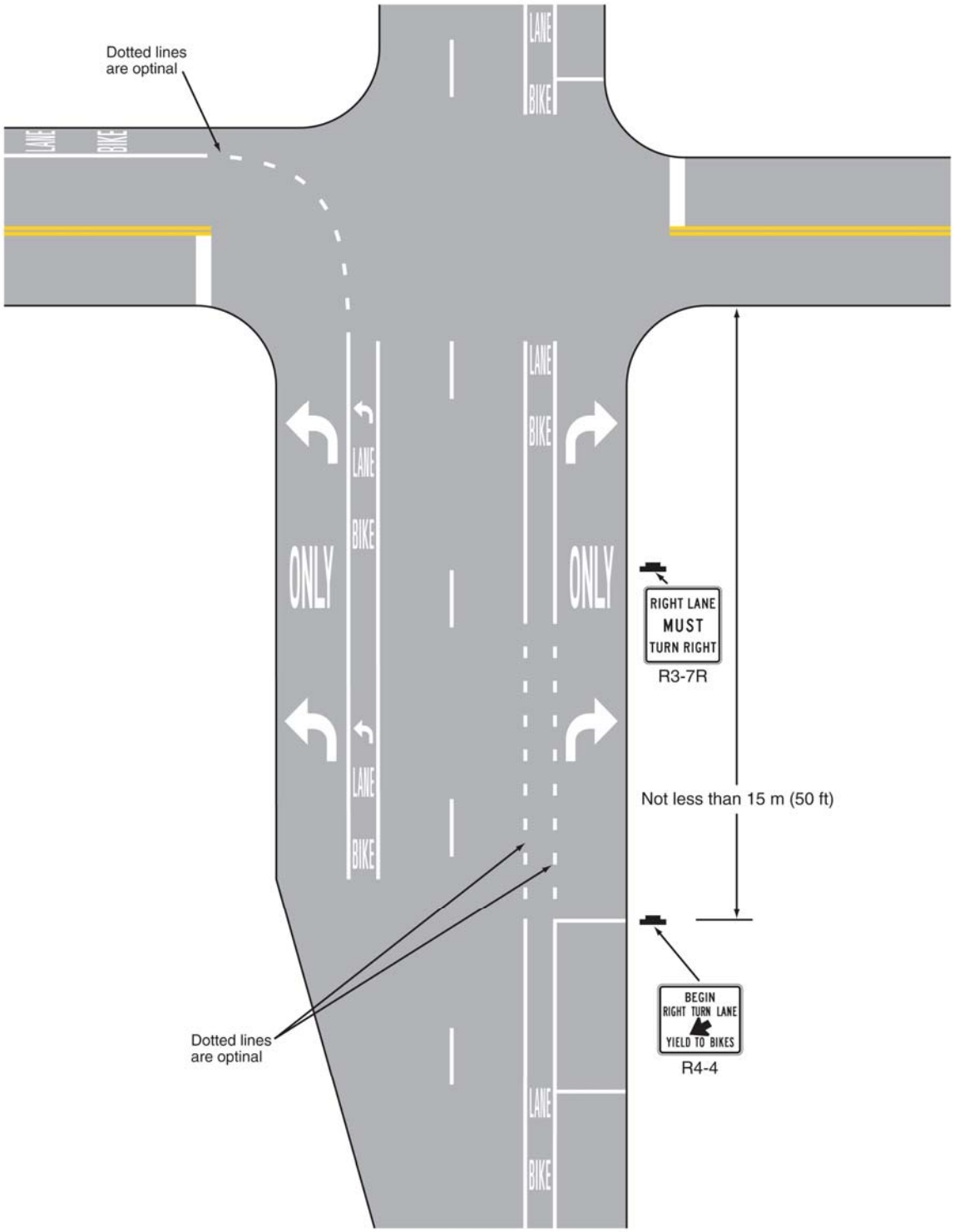


Figure 11. Example of Intersection Pavement Markings – Designated Bicycle Lane with Left-Turn Area, Heavy Turn Volumes, Parking, One-Way Traffic, or Divided Highway

Bike Lane Symbol Guidelines

A bike lane should be painted with standard pavement symbols to inform bicyclists and motorists of the presence of the bike lane. The standard pavement symbols are one of two bicycle symbols (or the words “BIKE LANE”) and a directional arrow. (See Figure 12.) These symbols should be painted on the far side of each intersection. (See Figure 13.) Additional stencils may be placed on long, uninterrupted sections of roadway. All pavement markings are to be white and reflectorized. The Preferential Lane Symbol (“diamond”) previously used as a pavement marking and on signs to show preferential use by different classes of vehicles should no longer be used for bikeways, due to the confusion with the use of the diamond for High Occupant Vehicle (HOV) lanes, and the misinterpretation of the diamond as a two-way arrow. These symbols should be eliminated through normal maintenance practices. (See Photo 13)

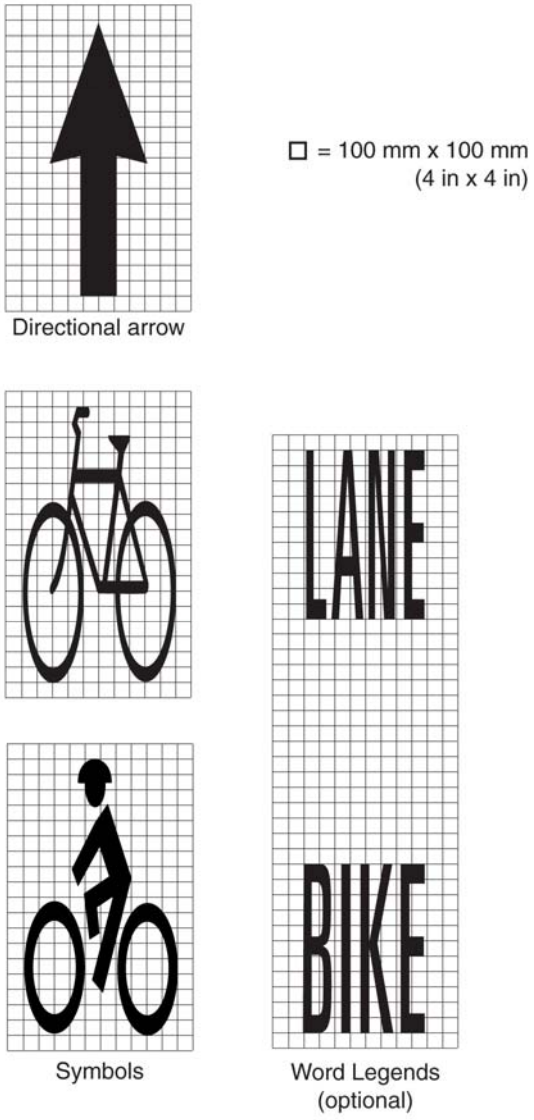
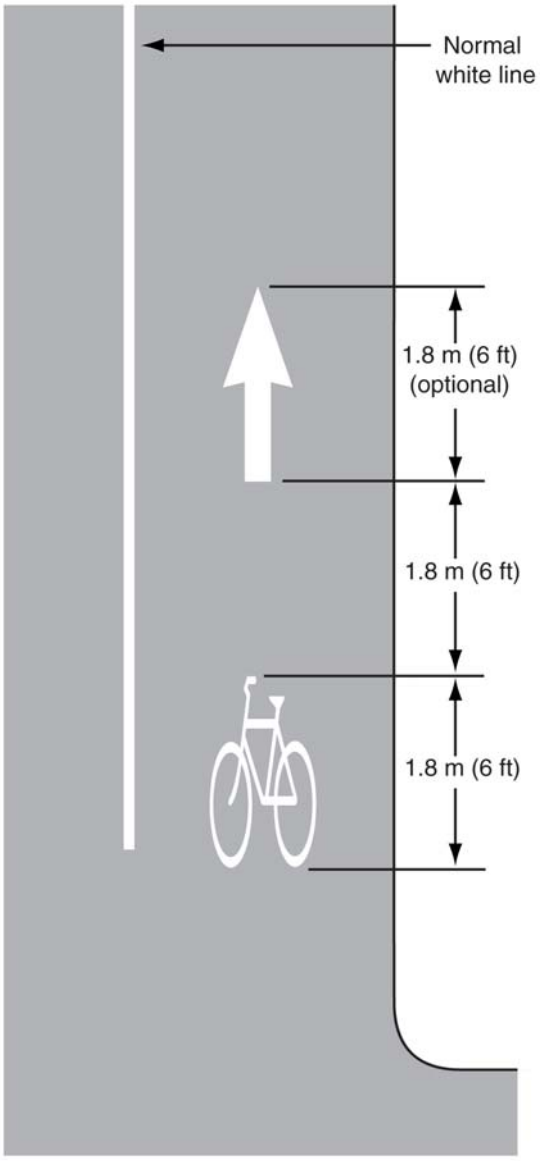


Figure 12. Typical Bike Lane Symbols



Notes:
1. The bicycle rider symbol or the word pavement marking "BIKE LANE" may be used instead of the bicycle-only symbol.
2. See Figures 2 and 7 for additional information.

Figure 13. Typical Bike Lane Marking on Far Side of Intersection

Wide Outside Curb Lanes

Wide curb lanes for bicycle use are usually preferred where shoulders are not provided, such as in restrictive urban areas. On highway sections without designated bikeways, an outside or curb lane wider than 3.6 m (12 feet) can better accommodate both bicycles and motor vehicles in the same lane and thus is beneficial to both bicyclists and motorists. In many cases where there is a wide curb lane, motorists will not need to change lanes to pass a bicyclist. Also, a wide curb lane provides more maneuvering room when drivers are exiting from driveways or in areas with limited sight distance. In general, 4.2 m (14 feet) of usable lane width is the recommended width for shared use in a wide curb lane.

Usable width normally would be from edge stripe to lane stripe from the longitudinal joint of the gutter pan to lane stripe (the gutter pan should not be included as usable width). On stretches of roadway with steep grades where bicyclists need more maneuvering space, the wide curb lane should be slightly wider where practicable [4.5 m (15 feet) is preferred]. The 4.5-m (15-foot) width may also be necessary in areas where drainage grates, raised reflectors on the right-hand side of the road, or on-street parking effectively reduce the usable width.


Photo 13

With these exceptions in mind, widths greater than 4.2 m (14 feet) that extend continuously along a stretch of roadway may encourage the undesirable operation of two motor vehicles in one lane, especially in urban areas, and therefore are not recommended. In situations where more than 4.5 m (15 feet) of pavement width exists, consideration should be given to striping bike lanes or shoulders. Restriping to provide wide curb lanes may also be considered on some existing multi-lane facilities by making the remaining travel lanes and left-turn lanes narrower. This should only be considered after careful review of traffic characteristics along the corridor and supported by a documented engineering analysis based on applicable design criteria.

On-Street Parking

On-street parking increases the potential for conflicts between motor vehicles and bicyclists. The most common bicycle riding location on urban roadways is in the area between parked cars and moving motor vehicles. Here, bicyclists are subjected to opening car doors, vehicles exiting parking spaces, extended mirrors that narrow the travel space, and obscured views of intersecting traffic. Therefore, 3.6 m (12 feet) of combined bicycle travel and parking width should be the minimum considered for this type of shared use.

Pavement Surface Quality

The smoothness of the riding surface affects the comfort, safety and speed of bicyclists. Pavement surface irregularities can do more than cause an unpleasant

ride. Pavement surfaces should be smooth, and the pavement should be uniform in width. Wide cracks, joints or drop-offs at the edge of traveled way parallel to the direction of travel can trap a bicycle wheel and cause loss of control; holes and bumps can cause bicyclists to swerve into the path of motor vehicle traffic. In addition, a reduction in the operating speed of the bicyclist below a comfortable level results in less stability of the bicycle. As pavements age it may be necessary to fill joints or cracks, adjust utility covers or even overlay the pavement in some cases to make it suitable for bicycling.

Drainage Inlet Grates

Drainage inlet grates and utility covers are potential obstructions to bicyclists. Therefore, bicycle-safe grates should be used, and grates and covers should be located in a manner that will minimize severe and/or frequent maneuvering by the bicyclist. When new highway facilities are constructed, curb-opening inlets should be considered to minimize the number of potential obstructions. Drainage inlet grates and utility covers should be placed or adjusted to be flush with the adjacent pavement surface. Drainage inlet grates with slots parallel to the roadway, or a gap between the frame and the grate, can trap the front wheel of a bicycle, causing loss of steering control. If the slot spacing is wide enough, narrow bicycle wheels can drop into the grates. Conflicts with grates may result in serious damage to the bicycle wheel and frame and/or injury to the bicyclist. These grates should be replaced with bicycle-safe, hydraulically efficient versions. When this is not immediately possible, a temporary correction is to weld steel cross straps or bars perpendicular to the parallel bars at 100-mm (4-inch) center-to-center maximum spacing to provide a maximum safe opening between straps. While identifying a grate with pavement markings would be acceptable in some situations, as indicated in the MUTCD, bar grates with bars parallel to the direction of travel deserve special attention. Because of the serious consequences of a bicyclist missing the pavement marking in the dark or being forced over such a grate inlet by other traffic, these grates should be physically corrected, as described above, as soon as practicable after they are identified.

Signed Shared Roadways

Signed shared roadways are those that have been identified by signing as preferred bike routes. There are several reasons for designating signed bike routes:

a. The route provides continuity to other bicycle route facilities such as bike lanes and multi-use paths.

b. The road is a common route for bicyclists through a high demand corridor.

c. In rural areas, the route is preferred for bicycling due to low motor vehicle traffic volume or paved shoulder availability.

d. The route extends along local neighborhood streets and collectors that lead to an internal neighborhood destination such as a park, school or commercial district.

Bike route signs may also be used on streets with bike lanes, as well as on multi-use paths. Regardless of the type of facility or roadway where they are used, it is recommended that bike route signs include destination information, as shown in Photo 15. Signing of shared roadways indicates to bicyclists that there are particular advantages to using these routes compared to alternate routes. This means the responsible agencies have taken action to ensure these routes are suitable as shared routes and will be maintained. The following criteria should be considered prior to signing a route:

a. The route provides through and direct travel in bicycle-demand corridors.

b. The route connects discontinuous segments of multi-use paths, bike lanes and/or other bike routes.

c. An effort has been made to adjust traffic control devices (e.g., stop signs, signals) to give greater priority to bicyclists on the route, as opposed to alternative streets. This could include placement of bicycle-sensitive detectors where bicyclists are expected to stop.

d. Street parking has been removed or restricted in areas of critical width to provide improved safety.

e. A smooth surface has been provided (e.g., adjust utility covers to grade, install bicycle-safe drainage grates, fill potholes, etc.)

f. Maintenance of the route will be sufficient to prevent accumulation of debris (e.g., regular street sweeping).

g. Wider curb lanes are provided compared to parallel roads.

h. Shoulder or curb lane widths generally meet or exceed width requirements included under Shared Roadways.

Designating Sidewalks as Signed Bikeways

In general, the designated use of sidewalks (as a signed shared facility) for bicycle travel is unsatisfactory. It is important to recognize that the development of extremely wide sidewalks does not necessarily add to the safety of sidewalk bicycle travel, since wide sidewalks encourage higher speed bicycle use and increase potential for conflicts with motor vehicles at intersections, as well as with pedestrians and fixed objects. Sidewalk bikeways should be considered only under certain limited circumstances, such as:

a. To provide bikeway continuity along high speed or heavily traveled roadways having inadequate space for bicyclists, and uninterrupted by driveways and intersections for long distances.

b. On long, narrow bridges. In such cases, ramps should be installed at the sidewalk approaches. If approach bikeways are two-way, sidewalk facilities also should be two-way.

Whenever sidewalk bikeways are established, unnecessary obstacles should be removed. Whenever bicyclists are directed from signed shared roadways to sidewalks, curb cuts should be flush with the street to assure that bicyclists are not subjected to problems associated with crossing a vertical lip at a flat angle. Curb cuts at every intersection are necessary, as well as bikeway yield or stop signs at

uncontrolled intersections. Curb cuts should be wide enough to accommodate adult tricycles and two-wheel bicycle trailers. In residential areas, sidewalk riding by young children is common. With lower bicycle speeds and lower cross street auto speeds, potential conflicts are somewhat lessened, but still exist. Nevertheless, this type of sidewalk bicycle use is accepted. It is inappropriate to sign these facilities as bicycle routes. In general, bicyclists should not be encouraged through signing to ride facilities that are not designed to accommodate bicycle travel.

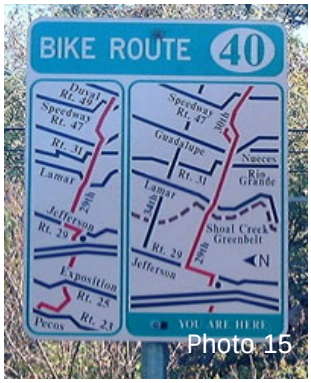
Signing of Shared Roadways

Typical shared roadway and bicycle route signing is shown in Figure 14. For these signs to be more functional, supplemental destination plates should be placed beneath them when located along routes leading to high demand destinations (e.g., “To Downtown”, “To State College”, etc.). There are instances where it is necessary to sign a route to direct bicyclists to a logical destination; however, the route does not offer any of the above signed shared roadway criteria. In such cases, the route should not be signed as a bike route, although destination signing may be advisable. A typical application of destination signing would be where bicyclists are directed off a highway to bypass a section of freeway. Special signs would be placed to guide bicyclists to the next logical destination, much as motorists would be directed if a highway detour were required. In urban areas, signs typically would be placed every 500 m (approximately every 1/4 mile), at all turns, and at major signalized intersections.

Example of a Signed Shared Roadway

Photo 14

Figure 14



Typical Signed Shared Roadway and Bike Route Signing

Roadway design guidelines specific to the state of Oklahoma, from the Oklahoma Department of Transportation Roadway Design Manual

Bicycle Lanes

The occupation of a portion of a roadway by a bicycle lane implies a reasonable degree of safety for the bicyclist. Conditions must be generally less severe than those that warrant a bicycle path. The use of a bicycle lane is normally restricted to bicycles, but exceptions may be made. Some sort of physical or symbolic barrier must be employed to delineate the bicycle portion of the roadway. Commonly, this is a painted stripe on the roadway surface.

The cost of installing a bicycle lane is normally a fraction of the expense associated with bicycle paths. Another advantage of bicycle lanes is the relatively minor land requirements. They can be installed in many areas where the construction of paths would be next to impossible. In practice, bicycle lanes, although not ideal, may be the most practical means of developing bikeways.

The following warrants may be used to justify a bicycle lane:

- Moderate to low vehicular speed on adjacent roadway;
- Moderate to low vehicular traffic volume on adjacent roadway;
- Moderate bicycle traffic volume;
- Anticipated increase in bicycle traffic volume;
- Insufficient land to construct bicycle paths without major disruptions on the surroundings;
- Demonstration that the facility would serve a definite purpose; and
- Indication that the bicycle lane would be the safest and only feasible method of providing a bicycle facility.

Shared Roadway

There are many different factors that can help determine whether bicycles and motor vehicles should share the same roadway. There are instances, however, where this is a practical method of establishing a bikeway. Because only bikeway signs designate a shared roadway, it is implied that the roadway provides safe conditions for bicyclists and motorists. Where some type of bikeway is warranted, shared roadways should be allowed only where the existing conditions either do not justify the greater expense of a higher type of facility or prevent their installation.

The following warrants may be used to justify a shared roadway:

- Low vehicular speed on roadway;
- Low vehicular traffic on roadway;
- Low percentage of trucks on roadway;
- Moderate bicycle traffic volume;
- Anticipated increase in bicycle traffic volume;
- Demonstration that the facility would serve a definite purpose;
- Indication that the shared roadway would be the safest and only feasible method of providing a bicycle facility; and
- A higher grade facility not warranted.

Bikeway Design Elements

Widths and Clearances

The widths and clearances required for the proper and safe operation of a bikeway are important. The following lists the various width requirements based on the type of bikeway facility:

Shared Roadways—There usually is no additional width provided with a shared roadway facility. Desirably, a smooth paved shoulder will be present.

Bicycle Path—A desirable paved width of 10 ft. should be provided on two-directional paths. An 8 ft. bicycle path may be used if the bicycle volume is expected to be low and where the pedestrian use of the facility is expected to be minimal. Where there is expected to be a significant number of pedestrians or where bicyclists will be likely to ride two abreast, it is desirable to increase the width to 12 ft.

- If it is determined that the bicycle path will be one-directional, then the minimum paved width may be 5 ft.

- To provide lateral clearance from trees, poles, walls, fences, guardrails, or other hazards, a minimum 2 ft. graded area should be maintained adjacent to both sides of the pavement area.

- Bicycle Lane—The width of a bicycle lane depends on whether curbing is used and/or parking is allowed.

- If a parking lane is present, a 5 ft. width should be provided between the parking lane and vehicular traffic lane. Where parking is permitted but a parking lane is not provided, the combination lane, intended for both motor vehicle parking and bicycle use, should be a minimum of 12 ft. wide.

- If parking is not allowed, the minimum bicycle lane width is 4 ft. If curbing is present, a minimum width of 5 ft should be provided between the curb face and the travel lane.

Design Speed

The speed of a bicyclist is dependent upon the type of bicycle and equipment, slope, surface conditions, air resistance, wind velocity and the physical condition of the bicyclist. Bicycles have the capability of traveling at high speeds, but this is not the normal case. A bicyclist's average speed is in the vicinity of 10 to 11 mph, with a normal traveling range between 7 and 15 mph.

For design purposes, an overall minimum design speed of 20 mph is established for paved surfaces. On unpaved surfaces the minimum design speed is 15 mph. Greater design speeds should be used where conditions, primarily governed by slope, indicate a need. A design speed of 20 mph should be used for grades between +3% and –3%. For grades steeper than 3%, the design speed should be 30 mph or higher if the slope is very long. For climbing grades greater than 3%, a minimum of 15 or 20 mph should be sufficient.

Grade

Grades on bicycle paths should be kept to a minimum, especially on long inclines. Grades greater than 5% are undesirable because the ascents are difficult for many bicyclists to climb and the descents cause some bicyclists to exceed the speeds at which they are competent. Where terrain dictates, grades over 5% and less than 500-ft long are acceptable when a higher design speed is used and additional bicycle path width is provided. Grades steeper than 3% may not be practical for bicycle paths with crushed stone surfaces.

This discussion is generally applicable only to bicycle paths. The roadway of which they are part determines the slopes for other types of facilities.

Sight Distance

The safe operation of any bicycle facility requires that the design of the facility provide for adequate stopping sight distance. The sight distance required is determined by the design speed and gradient. Sight distance design values may be calculated much the same as for motor vehicles.

Stopping sight distance should be applied to horizontal and vertical curves. A smaller coefficient of friction is used for unpaved bikeways, resulting in longer

sight distance requirements. The height of eye is 4.5 ft and the height of object is assumed to be 0 ft. This is to recognize that hazards to bicycle travel are at pavement level.

In general, sight distance considerations are necessary only in the case of bicycle paths. Because shared roadways and bicycle lanes occupy a portion of a facility designed for motor vehicles, sight distances are normally more than adequate. There are exceptions, however, and any questionable situations should be inspected when locating such a facility.

Horizontal Curves and Super-elevation

Simple, circular curves are adequate for bicycle route facilities. The comfort and safety of a horizontal change of direction is determined, to a large extent, by the size of the radius of curvature. A very sharp curve may result in an upset or loss of control. A wide curve presents no riding difficulties.

Radius of curvature should be directly proportional to the anticipated operating speed. It is there for chosen as a function of the design speed of a facility.

Super-elevation is inversely proportional to the minimum radius of curvature and should be employed in the construction of bicycle paths. The minimum value should be 0.02 ft per ft to ensure adequate drainage. This value will be adequate for most conditions and will simplify construction. Super-elevation should not exceed 0.05 ft per ft.

The point-mass equation for horizontal curves on highways also applies to bikeways:

$R=V^2/15(e+f)$

Where: R=minimum radius, ft
V=design speed, mph
e=super-elevation rate
f=coefficient of friction

Figure 16 provides criteria for minimum radii for various design speeds. The table assumes a super-elevation rate of 0.02; if a higher rate is used, the designer should use the equation directly. The friction values have been extrapolated from those used in highway design.

Minimum Curve Radii for Bikeways

Design Speed (mph)	e	f	R (ft)
15	0.02	0.3	50
20	0.02	0.27	95
15	0.02	0.25	155
30	0.02	0.22	250

Figure 16. Minimum Curve Radii

This discussion of horizontal curves is not applicable to bicycle lanes or shared roadways. The roadway that is designed for motor vehicles determines their geometry. Highway curves will be more than adequate for bicycle use.

Vertical Curves

Like sight distance, vertical curve lengths on bikeways are computed much the same as for motor vehicles. It is determined largely by bicycle speed and grade difference. On a two-way facility, the design speed for the descending grade is used.

Surface and Structural Section

The surface of a bikeway of any type must be smooth, hard and durable. A smooth surface is required for the safety and comfort of the bicyclist. Tough surfaces can result in a lack of control, and due to the poor ride quality of modern bicycles, result in a very bumpy, uncomfortable ride. Durability of a bikeway surface is important because it will prolong the life of the facility and reduce maintenance costs and effort.

The primary criteria governing a bikeway structural section are its own stability and the ability to support anticipated wheel loads. This is determined primarily by the maintenance equipment and other motorized vehicles that must use or cross the facility, rather than by the bicycles themselves.

Bicycle lanes and shared roadways use existing pavements intended for motor vehicle use, which normally will satisfy the surface and structural criteria. Should widening and/or resurfacing be required, acceptable material would automatically be used. It is highly recommended that the surface of bicycle lanes be of equal or better quality than the adjacent travel lanes to encourage the bicyclist to use the bicycle lanes. Wherever a shoulder is widened, the entire shoulder should be resurfaced to avoid seams or irregular surfaces.

Drainage

Adequate drainage should be provided for all types of bicycle route facilities.

To ensure proper runoff, all bicycle paths must be cross-sloped. The slope may be to one side or crowned, as conditions dictate, and should not exceed 0.02 ft per ft on straight sections. To avoid problems with icing and flow of excess water, bicycle paths should be crowned wherever practical. Paths placed on a hillside, where a significant amount of runoff is expected, must be provided with a drainage ditch on the up-slope side. Other related drainage structures, such as catch basins and underdrains, should be installed where appropriate. Ditches should also be provided in other areas where the soil has poor drainage qualities. In extreme cases, subdrainage may be warranted.

Bicycle paths crossing waterways should be designed with culverts or combinations of culverts and sags in the profile which will provide for the passage of storm flow without hazard to private property or highways. The design frequency should be based on the particular conditions at the site.

Existing roadway drainage systems will normally be adequate to satisfy the drainage requirements of bicycle lanes and shared roadways. Any questionable situations, however, must be investigated and corrected if necessary.

The primary problem with roadway drainage systems is the hazard presented by metal catch basin grates. Any of these within the bikeway should be equipped with grates or with some other configuration which will not entrap a narrow bicycle tire. All grates must be placed and maintained at grade in order to ensure a smooth ride. See ODOT *Drainage Manual* for a discussion on bicycle-safe grates.

Signing and Marking

Adequate signing and marking are essential on bicycle paths, especially to alert bicyclists to potential hazards and to convey regulatory messages to both bicyclists and motorists at highway intersections. In addition, guide signing, such as to indicate directions, destinations, distances, route numbers and names of crossing streets, should be used in the same manner as they are used on highways. In general, uniform application of traffic control devices, as described in the MUTCD, will tend to encourage proper bicyclist behavior.

Intersection and Crossing Treatment

A well-designed intersection is essential to safety at all points where a bikeway crosses a roadway or other transportation facility. This is especially true if one or both facilities carry a large volume of traffic. A grade-separated crossing is far safer than an at-grade crossing. These may take one of two forms—the overpass or underpass. The latter has the advantage of the downgrade being first, allowing the bicyclist to gain momentum which facilitates upgrade pedaling. There is also less vertical distance to be traveled. The overpass has the advantage of being less

expensive and less of a security problem in high crime areas. Either type of grade-separated crossing is prohibitively expensive and is justified only in the most severe conditions.

At-grade crossings and intersections should be provided with some Share the Road facilities, especially if there is a large amount of turning traffic. This will tend to restrict the movement of both bicyclist and motorists to areas that are designated for them. Each crossing and intersection is a unique situation and should be treated as such.

Capacity

Bicycle capacity has several aspects, including:

- The impacts of bicycles on the capacity of a highway which also serves as a shared roadway or bicycle lane;
- The impacts of bicycles on intersection capacity; and
- The capacity of bike paths.

The Highway Capacity Manual provides criteria for each of the above.

Railroad Crossings

Railroad-bikeway grade crossings should ideally be at right angles to the rails. The greater the crossing deviates from this ideal crossing angle, the greater the potential for a bicyclist's front wheel to be trapped in the flange way, causing loss of steering control. It is also important that the roadway approach be at the same elevation as the rails.

Consideration should be given to the materials of the crossing surface and to the flange way depth and width. If the crossing angle is less than approximately 45 degrees, consideration should be given to widening the outside lane, shoulder, or bicycle lane to allow bicyclists adequate room to cross the tracks at a right angle. Where this is not practical, commercially available compressible flange way fillers can enhance bicyclist safety. In some cases, abandoned tracks can be removed. Warning signs and pavement markings should be installed in accordance with the MUTCD.

Appendix B. Bicycle Parking

Parking facilities for bicycles must be accessible, convenient, and functional. The lack of secure bicycle parking can deter many people from using bicycles for basic transportation. Unsecured parking can lead to the theft or damage of a bicycle. This is why it is important to select the appropriate racks and place the racks in correct locations where users can access them easily. Bicycle parking facilities should be located in a highly visible area to minimize theft and vandalism.

Bicycle Parking Categories

There are two categories of bicycle parking, short and long-term. Short-term parking provides a convenient and accessible place to park bicycles for shoppers, customers, and other visitors who generally park for two hours or less. This type of parking should be located within 50 feet of a main entrance and located away from pedestrian travel paths. Long-term parking provides employees, students, commuters and others who generally visit a location for several hours a secure and weather-protected place to park a bike. This type of parking should be located within 750 feet of a visited site and could consist of bicycle lockers and/or a covered bicycle rack.

There is a wide variety of equipment available for storing bicycles, providing different levels of security and protection from the elements. The Federal Highway Administration divides these levels into three different categories for bicycle parking.

> Class I – High security, long term parking which offers complete protection from theft, vandalism and weather. Bike lockers or attended covered parking are examples of Class I parking. There are several types of Class I facilities that offer a high level of security at varying costs. Bicycle lockers are fully enclosed lockers, located outside that will hold 2 bikes each and range in cost from $225 to $1000 per bicycle space.
>
> Class II – Medium security parking which protects against theft but not against weather or vandalism. Both wheels and the frame are secured to the rack or past with a simple user supplied lock, but without the need for cables or chains supplied by the user. These bike racks range in price from $50 for a single bike rack to $1000 for a multi-bike rack.
>
> Class III – Minimum security bike racks or fixed objects that protect against theft but only in conjunction with a user-supplied cable, chain and lock. Racks are more likely to cause damage to bikes due to crowding bikes falling over. These bike racks range in price from $40 for a single bike rack to $1000 for a multi-bike rack.

Bicycle Space and Rack Area Site

The space required for a bike rack depends upon the number of bicycles required to secure. Each bike rack with a bike attached would take up a space of 6' x 3', or 18 square feet for each bike. The location of a bicycle rack in relationship to the building it serves is very important. Existing pedestrian patterns should be looked at closely as to not interfere with pedestrian movements in and out of the building. Racks will not be used if they are far from the entrance, hard to find, not maintained, or perceived to be vulnerable to vandalism.

A bicyclist makes the transition from vehicle to pedestrian when parking, by dismounting, attaching bike to rack and then walking into the building. Adequate space is needed to provide for this transition and to keep all users of the space safe. The location of the rack should be clearly visible from the entrance that it serves. Multiple buildings should not be served by one combined, distant rack area. It is preferred to place smaller rack areas in locations that are more convenient.

Appendix C. Oklahoma Statutes

STATE OF OKLAHOMA

2nd Session of the 50th Legislature (2006)

HOUSE BILL 2926 By: Terrill

AS INTRODUCED

An Act relating to motor vehicles; amending 47 O.S. 2001, Section 1-104, as last amended by Section 1, Chapter 521, O.S.L. 2004 (47 O.S. Supp. 2005, Section 1-104), which relates to bicycles, electric-assisted bicycle, and motorized bicycle; modifying certain definition; providing an exception; amending 47 O.S. 2001, Section 11-1205, as last amended by Section 15, Chapter 521, O.S.L. 2004 (47 O.S. Supp. 2005, Section 11-1205), which relates to operation of bicycles and play vehicles; modifying roadway requirement for bicycles or motorized scooters; deleting path restriction; providing guidelines for overtaking and passing bicycles; providing administrative penalties when injury or death occurs; repealing Section 78, Chapter 411, O.S.L. 2003 (47 O.S. Supp. 2005, Section 12-705), which relates to bicycles; providing for codification; and providing an effective date.

BE IT ENACTED BY THE PEOPLE OF THE STATE OF OKLAHOMA:

SECTION 1. AMENDATORY 47 O.S. 2001, Section 1-104, as last amended by Section 1, Chapter 521, O.S.L. 2004 (47 O.S. Supp. 2005, Section 1-104), is amended to read as follows:

Section 1-104. Bicycle, Electric-assisted Bicycle, and Motorized Bicycle.

A. A bicycle is any ~~device~~ vehicle propelled solely by ~~human power upon which any person~~ pedals, operated by one or more persons ~~may ride, having a seat or saddle for the use of each rider and:~~

~~1. On a bicycle, two tandem wheels, either of which is twenty (20) inches or more in diameter;~~

~~2. On a tricycle, three wheels in any configuration, of which at least one is twenty (20) inches or more in diameter; or~~

~~3. On a quadcycle, four wheels in any configuration, of which at least two are twenty (20) inches or more in diameter.~~

~~The wheel diameter provisions of this subsection shall not apply to recumbent bicycles~~ and having two or more wheels, excluding any tricycle for children.

B. An electric-assisted bicycle is any bicycle with:

1. Two or three wheels;

2. Fully operative pedals for human propulsion and equipped with an electric motor:

a. with a power output not to exceed one thousand (1,000) watts,

b. incapable of propelling the device at a speed of more than twenty (20) miles per hour on level ground, and

c. incapable of further increasing the speed of the device when human power alone is used to propel the device at a speed of twenty (20) miles per hour or more.

An electric-assisted bicycle shall meet the requirements of the Federal Motor Vehicle Safety Standards as set forth in federal regulations and shall operate in such a manner that the electric motor disengages or ceases to function when the brakes are applied.

C. A motorized bicycle is any bicycle having:

1. Fully operative pedals for propulsion by human power;

2. An automatic transmission; and

3. A combustion engine with a piston or rotor displacement of fifty cubic centimeters (50 cu cm) or less, regardless of the number of chambers in the engine, which is capable of

propelling the bicycle at a maximum design speed of not more than thirty (30) miles per hour on level ground.

D. As used in this title, the term "bicycle" shall include tricycles, quadcycles, or similar human-powered devices, electric-assisted bicycles, and motorized bicycles unless otherwise specifically indicated.

SECTION 2. AMENDATORY 47 O.S. 2001, Section 11-1205, as last amended by Section 15, Chapter 521, O.S.L. 2004 (47 O.S. Supp. 2005, Section 11-1205), is amended to read as follows:

Section 11-1205. A. Every person operating a bicycle or motorized scooter upon a roadway at less than the normal speed of traffic at the time and place and under the conditions then existing shall ride as ~~near~~ close as ~~practicable~~ is safe to the right-hand curb or edge of the roadway, except under any of the following situations:

1. When overtaking and passing another vehicle proceeding in the same direction;

2. When preparing for a left turn at an intersection or into a private road or driveway;

3. When reasonably necessary to avoid conditions and while exercising due care, including but not limited to:

a. fixed or moving objects,

b. parked or moving vehicles,

c. pedestrians or animals,

d. surface hazards, or

e. any time it is unsafe to continue along the right-hand curb or edge of the roadway; and

4. When riding in the right-turn-only lane.

B. Any person riding a bicycle or motorized scooter upon a one-way street or highway with two or more marked lanes of travel may ride as near as practicable to the left-hand curb or edge of the street or highway.

C. No person operating a bicycle or motorized scooter shall pass other vehicles between lanes of traffic traveling in the same direction.

D. Persons riding bicycles or motorized scooters upon a roadway shall not ride more than two abreast except on paths or parts of roadways set aside for the exclusive use of bicycles or motorized scooters. Persons riding two abreast shall not impede the normal and reasonable flow of traffic and, on a laned roadway, shall ridge within a single lane.

~~E. Wherever a usable path for bicycles or motorized scooters has been provided adjacent to a roadway, bicycle or motorized scooter riders shall use the path and shall not use the roadway if required by local, municipal or county ordinances.~~

SECTION 3. NEW LAW A new section of law to be codified in the Oklahoma Statutes as Section 11-1208 of Title 47, unless there is created a duplication in numbering, reads as follows:

A. When overtaking and passing a bicycle proceeding in the same direction, a person driving a motor vehicle shall exercise due care by leaving a safe distance between the motor vehicle and the bicycle of not less than three (3) feet until the motor vehicle is safely past the overtaken bicycle.

B. If a person violates the provisions of subsection A of this section and the violation results in a collision causing serious physical injury to another person, the person shall be subject to an administrative fine of not more than Five Hundred Dollars ($500.00).

C. If a person violates the provisions of subsection A of this section and the violation results in the death of another person, the person shall be subject to an administrative fine of not more than One Thousand Dollars ($1,000.00).

SECTION 4. REPEALER Section 78, Chapter 411, O.S.L. 2003 (47 O.S. Supp. 2005, Section 12-705), is hereby repealed.

SECTION 5. This act shall become effective November 1, 2006.

50-2-9025 GRS 01/13/06

§47-11-1202.

Every person riding a bicycle upon a roadway shall be granted all of the rights and shall be subject to all of the duties applicable to the driver of a vehicle by this act, except as to special regulations in this article and except to those provisions of this act which by their nature can have no application.

§47-11-1203.

(a) A person propelling a bicycle shall not ride other than upon or astride a permanent and regular seat attached thereto.

(b) No bicycle shall be used to carry more persons at one time than the number for which it is designed and equipped.

§47-11-1204.

No person riding upon any bicycle, coaster, roller skates, sled or toy vehicle shall attach the same or himself to any vehicle upon a roadway.

§47-11-1205.

(a) Every person operating a bicycle upon a roadway shall ride as near to the right side of the roadway as practicable, exercising due care when passing a standing vehicle or one proceeding in the same direction.

(b) Persons riding bicycles upon a roadway shall not ride more than two abreast except on paths or parts of roadways set aside for the exclusive use of bicycles.

(c) Wherever a usable path for bicycles has been provided adjacent to a roadway, bicycle riders shall use such path and shall not use the roadway if required by local, municipal or county ordinances.

§47-11-1206.

No person operating a bicycle shall carry any package, bundle or article which prevents the driver from keeping at least one hand upon the handle bars.

§47-11-1207.

(a) Every bicycle when in use at nighttime shall be equipped with a lamp on the front which shall emit a white light visible from a distance of at least five hundred (500) feet to the front and with a red reflector on the rear of a type approved by the Department which shall be visible from all distances from fifty (50) feet to three hundred (300) feet to the rear when directly in front of lawful upper beams of head lamps on a motor vehicle. A lamp emitting a red light visible from a distance of five hundred (500) feet to the rear may be used in addition to the red reflector.

(b) Every bicycle shall be equipped with a brake which will enable the operator to make the braked wheels skid on dry, level, clean pavement.

§47-11-1401.

(g) It shall be unlawful to drive, operate or ride any bicycle or other man-powered vehicle or means of transportation on a turnpike, and the Authority may prohibit any light mechanically-powered vehicle from entering the turnpike, or any other vehicle which it determines would be injurious to the turnpike surfacing or a traffic hazard.

§47-40-103.

No driver of a two-or-three wheel motor vehicle or bicycle shall carry any other person on, upon or within such vehicle on any street or highway in the State of Oklahoma, except as hereinafter provided; provided, however, that if any two-or-three wheel motor vehicle with a wheel diameter of twelve (12) inches or greater or any bicycle shall have either a double seating device with double foot rests or a side car attachment providing a separate seat space within such side car attachment for each person riding therein so that such person shall be seated entirely within the body of said side car, then it shall be permissible for an operator who has attained the age of sixteen (16) or older to carry a passenger. A demonstration ride by a licensed dealer or his employee is excepted from the provisions hereof. No motorcycle or motor scooter shall be ridden upon any sidewalk of any city or town in this state. Handlebars on motorcycles and motor

scooters shall not exceed twelve (12) inches in height, measured from the crown or point of attachment. No rider of a motorcycle or motor scooter shall hold to any moving vehicle for the purpose of being propelled. No driver of a motorcycle, motor scooter, or bicycle shall pass other vehicles in between lanes of traffic traveling in the same direction, authorized emergency vehicles excepted.

§74-1857.

F. 1. The Commission shall encourage the provision of bicycle routes within the rights-of-way of federal aid system highways and on or along county and city roadways. These bicycle routes will be composed of three types of pathways: bicycle trails, bicycle lanes and bicycle routes. Bicycle trails will be distinct pathways which separate bicycles from motorized vehicular traffic by means of an open space or barrier. Bicycle lanes will use designated portions of existing roadways and will be clearly marked and separated from automobile lanes. Bicycle routes will be existing, low-volume roads and will be designated by clearly-marked signs.

2. Prior to the designation and construction of the bicycle pathway system, the Commission will authorize the development of a bicycle master plan. This plan will be comprised of a set of clearly defined goals, a statement of current and projected demands, a proposed layout of routes, construction specifications, cost projections and the scheduling of implementation. This plan will likewise devote serious consideration to those design criteria which will help to insure the safety of bicyclist, pedestrian and motorist alike.

3. Funds received for this pathway program will be expended in amounts deemed reasonable and necessary by the Commission for the establishment of said bicycle pathway system.

Appendix D. Route Suitability Assessment

Bicycle Suitability Assessment Form (V.040802)
(Adapted by James Emery, MPH from N. Eddy, 1996)

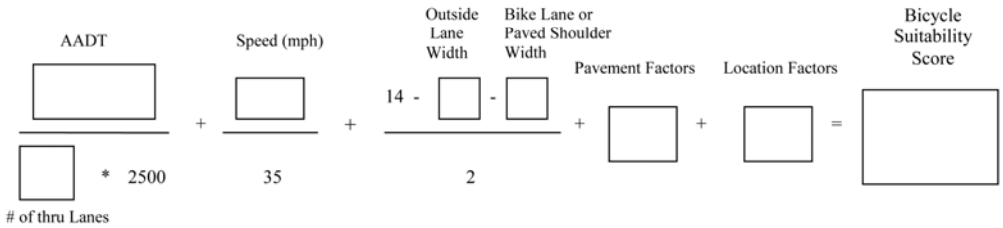
Date:	Comments/Suggested Improvements:
Data Collector Name:	
Segment ID Number/Name:	
Boundary streets:	

A) General Road Factors	Measures
1) Annual Avg. Daily Traffic (AADT)	
2) Total number of through lanes	
3) Speed (mph)	
4) Outside lane width (e.g., 11.5')	
5) Bike lane or paved shoulder width (e.g., 4.5') (Note - a **marked** bike lane.)	

Record these measures in the formula below

B) Pavement Factors	Score
1) (*circle one pavement description*) Very Good = 0.25 Good = 0.75 Fair = 1.50 Poor = 2.25 Very Poor = 3.75	(*record score*)
2) Presence of a Curb Y N	Yes = 0.25
3) Rough RR Crossing Y N	Yes = 0.50
4) Storm Drain Grate Y N	Yes = 0.75
TOTAL Scores *Record score in formula below*	

C) Location Factors	Yes/No (*circle*)	Score for "Yes"
1) Angle Parking	Y N	0.75
2) Parallel Parking	Y N	0.50
3) Right-Only Turn Lanes	Y N	0.25
4) Center (Both)Turn Lane	Y N	*-0.25*
5) Physical Median	Y N	*-0.50*
6) Paved Shoulder	Y N	*-0.75*
7) Marked Bike Lane	Y N	*-1.00*
8) Severe Grades	Y N	0.50
9) Moderate Grades	Y N	0.25
10) Frequent Curves	Y N	0.25
11) Restricted Sight Distance	Y N	0.50
12) Numerous Driveways	Y N	0.50
13) Numerous Intersections	Y N	0.75
14) Difficult Intersections	Y N	1.00
15) Industrial Land Use	Y N	0.50
16) Commercial Land Use	Y N	0.25
17) Sidewalk Only One Side	Y N	0.25
18) Sidewalks do not exist	Y N	0.50
TOTAL all "YES" points *Record score in formula below*		



v

Bicycle Suitability Assessment Form (V.040802)
(Adapted by James Emery, MPH from N. Eddy, 1996)

N. Eddy Bicycle Suitability Assessment Scores:

Very Good (less than 3.00) – color **blue**.
A road that is bicycle friendly and usable by all levels of bicyclists. There are few improvements needed.
Good (3.00 - 3.99) – color **green**.
A road that can be used safely by most bicyclists. Minimal improvements may be needed.
Fair (4.00 - 4.99) – color **yellow**.
A road that has some hazards, but can be still be used by adults for bicycling. Not recommended for children. Specific improvements are needed.
Poor (5.00 - 6.99) – color **orange**.
This road has many hazards and would require adult bicyclists to be very careful. Not safe for children. Many improvements are needed.
Very Poor (higher than 6.99) – color **red**.
This road has many hazards, heavy traffic and bad road conditions. Not safe for any bicyclists. Improvements are greatly needed.
Adapted from: Eddy, N. (1996)

Appendix E. Educational Plan

Develop an educational program specifically for Adults that includes:

- Bicycling benefits to health
- How to get started
- Bicycling maintenance and repair
- 'Best' safety practices, observe traffic signs, ride with traffic, and differential between group riders, individuals and families.

Develop an educational program specifically for Motorists that includes:

- Share the road
- 'Give them room', road hazards a bicyclists may encounter on the road
- Laws pertaining to cyclists, like the 3' passing law
- Passing a cyclist
- Common road rules and courtesy
- Benefits of a bicycle friendly community

Develop an educational program specifically for Children that includes:

- Safety for children cyclists
- 'Best' safety practices, always wear a helmet, observe traffic signs, stay away for busy streets, and ride with traffic

Develop an educational program specifically for Employers and Communities that include:

- Needs of bicyclists at a work place, such as showers, food, water and restrooms

Develop an educational program specifically for Law Enforcement agencies that include:

- Current state and city laws and ordinances
- 'Best' safety practices for citizens and the bicycle Police

Develop an educational program specifically for Policymakers that include:

- Useful and safe bike routes
- Maintenance of routes and pathways
- Benefits of a bicycle friendly community
- Bicyclist needs

Appendix F. Commission and Committee Comments and Concerns

Comments addressed from the 02-15-2008 Trails Advisory Committee for the Bicycle Transportation Plan

Comment: Plans are needed to now to educate the public using the trails and roadways.
Response: The Bicycle Transportation Plan includes an educational element that will educate both the motorist and the bicyclists on safe operation and interaction between the two users.

Comment: There is a need to produce a single page brochure indicating the bicycle routes listed within Phase I of the Bicycle Transportation Plan. It was suggested that the Trails Advisory subcommittee be involved in the preparation of the brochure.
Response: A bicycle route map can be produced that will show the Phase I bicycle routes.

Comments addressed from the 02-18-2008 Traffic & Transportation Commission for the Bicycle Transportation Plan

Comment: How do we keep track of accidents between bicyclists and motorists?
Response: If an accident happens on a public road, then a state collision report will be filed.

Comment: Will there be a system set up for licensing and or inspecting bicycles?
Response: Other cities have tried this without much success, mainly because of the time it takes to monitor the system. It is difficult to staff a licensing and inspection system because of limited manpower and resources. We can look at other cities that have been successful and see how they work.

Comment: Is it possible to install more emergency boxes along trails and routes?
Response: Yes, the Police Department has been looking at different locations to install Call Boxes on the Oklahoma River Trail. Bike routes will be located along public streets, no Call Boxes will be required in these locations.

Comment: Should a sub-committee be set up to answer these questions?

Response: A few of the commission members have commented that the report is comprehensive enough and may not need a sub-committee set up. Nothing was ever determined.

Comment: Will the final draft highlight what has been changed or altered based upon the Traffic Commissions concerns.
Response: Yes, we will address all comments and include them within the addendum.

Comment: What about medical attention for accidents along the trails and routes?
Response: Any accident on public streets will be handled like any other traffic accident that requires medical attention.

Comment: In isolated areas when an accident occurs, is there a provision to notify the police of an accident?
Response: Yes, the 911 system for traffic accidents when reported with a cell phone will be able to locate the accident site. Along certain trails like the Lake Hefner Trails and the Oklahoma River Trails, City officers travel along the trail. A large number of people carry cell phones.

Photos

Photo 1 Oklahoma City Staff
Photo 2 www.pedbikeimages.org/ Dan Burden
Photo 3 www.pedbikeimages.org/ Dan Burden
Photo 4 www.pedbikeimages.org/ Dan Burden
Photo 5 www.pedbikeimages.org/ Dan Burden
Photo 6 www.pedbikeimages.org/ Dan Burden
Photo 7 Oklahoma City Staff
Photo 8 Unknown
Photo 9 Oklahoma City Staff
Photo 10 Oklahoma City Staff
Photo 11 Unknown
Photo 12 Unknown
Photo 13 Unknown
Photo 14 Unknown
Photo 15 Unknown

Figures

Figure 1 MUTCD 2003, Manual on Uniform Traffic Control Devices, Part 9, Traffic Control for Bicycle Facilities
Figure 2 MUTCD 2003, Manual on Uniform Traffic Control Devices, Part 9, Traffic Control for Bicycle Facilities
Figure 3 MUTCD 2003, Manual on Uniform Traffic Control Devices, Part 9, Traffic Control for Bicycle Facilities
Figure 4 MUTCD 2003, Manual on Uniform Traffic Control Devices, Part 9, Traffic Control for Bicycle Facilities
Figure 5 MUTCD 2003, Manual on Uniform Traffic Control Devices, Part 9, Traffic Control for Bicycle Facilities
Figure 6 MUTCD 2003, Manual on Uniform Traffic Control Devices, Part 9, Traffic Control for Bicycle Facilities
Figure 7 MUTCD 2003, Manual on Uniform Traffic Control Devices, Part 9, Traffic Control for Bicycle Facilities
Figure 8 MUTCD 2003, Manual on Uniform Traffic Control Devices, Part 9, Traffic Control for Bicycle Facilities
Figure 9 MUTCD 2003, Manual on Uniform Traffic Control Devices, Part 9, Traffic Control for Bicycle Facilities
Figure 10 MUTCD 2003, Manual on Uniform Traffic Control Devices, Part 9, Traffic Control for Bicycle Facilities
Figure 11 MUTCD 2003, Manual on Uniform Traffic Control Devices, Part 9, Traffic Control for Bicycle Facilities
Figure 12 MUTCD 2003, Manual on Uniform Traffic Control Devices, Part 9, Traffic Control for Bicycle Facilities
Figure 13 MUTCD 2003, Manual on Uniform Traffic Control Devices, Part 9, Traffic Control for Bicycle Facilities
Figure 14 MUTCD 2003, Manual on Uniform Traffic Control Devices, Part 9, Traffic Control for Bicycle Facilities
Figure 15 MUTCD 2003, Manual on Uniform Traffic Control Devices, Part 9, Traffic Control for Bicycle Facilities

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[i] *Guide for the Development of Bicycle Facilities*. American Association of State Highway and Transportation Officials. 1999.

[ii] " On-Street Facilities," Bicyclinginfo.org Pedestrian and Bicycling Information Center. www.bicyclinginfo.org/de/onstreet.cfm

[iii] Bicycle Transportation Institute. www.bicycledriving.com Accessed 2/23/2007.

[iv] www.ci.austin.tx.us/bicycle Accessed 3/2/2007.

[v] Bicycle Suitability Assessment Form, (Adapted by James Emery, MPH, from N. Eddy, 1996)