

BICYCLE/ PEDESTRIAN TRANSPORTATION



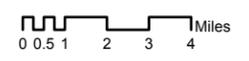
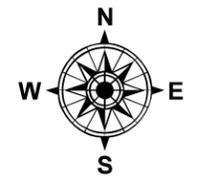
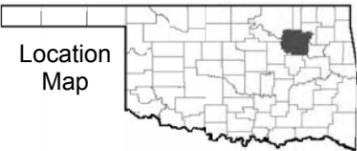
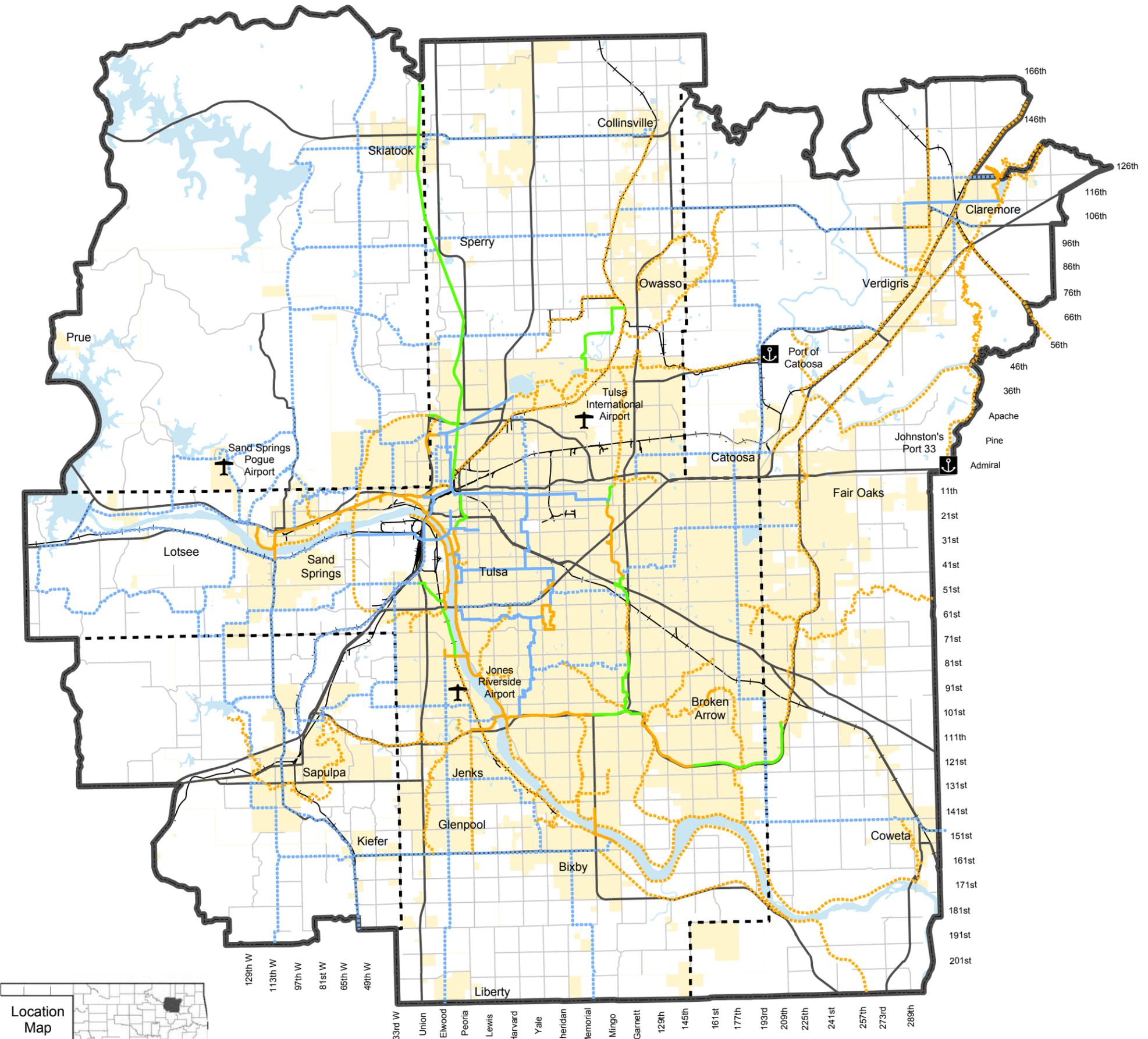
Chapter 4





2030 Bicycle/Pedestrian Plan

- Existing Bikeway
- Proposed Bikeway
- Existing Trail
- Proposed Trail
- Funded
- Highways
- Arterials
- Rail
- Corporate Limits
- County Boundary
- Transportation Management Area





INTRODUCTION

Transportation planning has typically focused on streets and highways as the traditional means for transportation. Bicycling and walking facilities have generally been considered recreational amenities and have not yet realized their potential as transportation modes. As a result of air quality issues, public advocacy, and the increase in traffic

congestion, the integration of bicycle and pedestrian planning into the overall transportation planning process is gaining momentum. The result is an emerging focus on a more balanced transportation system among all modes of travel. In the Tulsa Transportation Management Area (TMA), bicycle and walking facilities can complement motorized transportation and provide another travel choice for many users, particularly for short trips, throughout much of the year.

Resident Priorities

The bicycle and pedestrian planning process has included public involvement through focus group meetings, area-wide planning sessions, and opinion surveys. An inventory of local comprehensive plans, policies, requirements and the identification and assessment of existing facilities was also conducted. Several key recommendations originated from the public outreach effort and they are listed as follows in order of priority:

1. Improve pedestrian circulation and multimodal connections in the land development process by acquiring trail access easements, creating additional sidewalk connections, and incorporating planned transit stops
2. Continue development of the multi-use regional trail system
3. Finance the development and maintenance of bicycle/pedestrian facilities including sidewalks, trails, and bikeways
4. Provide connectivity between the trail system and neighborhoods
5. Ensure that trail and on-street bikeway design standards are implemented consistently
6. Provide additional trail lighting
7. Improve the maintenance along the trails
8. Provide for directional, locational, and safety signage throughout the trail system
9. Construct a dual trail on the River Parks East Bank Trail where needed

The aforementioned recommendations coincide with the vision and goals of the *Tulsa Transportation Management Area Trails Master Plan*, adopted in May 1999. The Bicycle and Pedestrian Element of the *Destination 2030* Long Range Transportation Plan (LRTP) incorporates and expands upon the trail plan (*2030 Bicycle Pedestrian Plan* map, Page 63).

In 2000, a survey of communities within the TMA was conducted to determine local sidewalk requirements. The twelve communities surveyed were: Bixby, Broken Arrow, Catoosa, Collinsville, Coweta, Glenpool, Jenks, Owasso, Sapulpa, Sand Springs, Skiatook, and Tulsa. With the exception of Catoosa, every community had some form of requirement regarding sidewalks on residential collector streets and arterials.

Most suburban communities require concrete sidewalks on both sides of arterial and collector streets, typically with a minimum width of 4 feet on collectors and as much as 8 feet on arterials. Although sidewalk requirements are present in subdivision regulations, the enforcement of the regulations have not been universal. For those communities strictly enforcing sidewalk regulations, it has been the responsibility of the developer to construct sidewalks. Sidewalks or access to trails is often viewed as an amenity by the public, and neighborhoods with sidewalks and trails often boast higher property values due to the presence of these facilities.

In commercial and office districts, a public sidewalk generally abuts the adjacent street. Internal sidewalks to commercial or office development often provide access to and from parking areas. Often, these sidewalk designs are not connected and do not accommodate pedestrians from the public sidewalk to the building. To this end, the LRTP encourages transportation and area city planners to ensure the continued construction of more sidewalks as well as the elimination of sidewalk gaps between public sidewalks and commercial or office developments, which can be efficiently achieved through the land development process in each of the communities.

Trails Master Plan

In 1998, INCOG initiated development of a trail master plan for the TMA to delineate an interconnected system of trails and complementary bikeways with the goal of enhancing transportation choices. The proposed trail route plan resulted from the evaluation of existing conditions, including a review of physical features, park locations, urban activity corridors, residential neighborhoods, schools, colleges and universities, special use areas (e.g., libraries, cemeteries, and museums), utility easements, and employment centers.

The resulting Trails Master Plan proposed a 283 mile network of off-road multipurpose trails and a 207 mile system of on-road bikeways throughout the TMA area. Access to the trails or bikeways was an important evaluation criterion in the development of the trail route plan. According to the Trails Master Plan, 98% of the population within the TMA will be served by a planned trail or bikeway within 2.5 miles of their homes, and 87% will be served by a trail or bikeway within 1 mile of their residence.

The overall system was divided into 3 phases: *near-term* to be built in the next 5 years, *mid-term* to be built in 5 to 10 years, and *long-term* to be built in 10 or more years. Near-term trail projects were estimated to cost between

\$17 and \$20 million to fully develop, mid-term projects would cost between \$16 and \$18 million to develop, and the long-term projects would range from \$28 to \$32 million to fully develop. The entire system was estimated to cost between \$62 and \$71 million based on 1999 dollars.

The 283 mile network of off-road multipurpose trails is extensive and comprehensive, and at the same time provides a realistic program for

satisfying the needs of local residents regarding access to outdoor resources and transportation bikeways to many destinations. In the *near-term* phase, it is envisioned that local government agencies will work in partnership with neighborhoods and private sector organizations to develop



Citizens provide feedback on trails and bikeways in the Tulsa TMA during an open house meeting at Hicks Park.

an estimated 78 miles of trail projects. Near-term projects began development in 1999. During the *mid-term* phase, an additional 77 miles of trail projects would be developed, and the *long-term* phase envisions that the remaining 127 miles of trail projects would be implemented.

The 207 mile system of on-road bikeways is divided into 2 phases. In the *near-term* phase, it is envisioned that 99 miles of bikeways would be constructed. The remaining 108 miles would be implemented in the *mid-term* phase. In addition, the City of Tulsa has prepared a conceptual on-street bike route map that serves as the basis for a comprehensive citywide bikeway system.

Tulsa's on-street bicycle route plan has been enthusiastically embraced by numerous members of the bicycling community and will be updated as new connections are warranted and traffic conditions change. The *Existing and Planned Regional Bikeways* map on Page 69 is a composite of existing and planned bikeways in and around the City of Tulsa.

As of 2005, approximately 65% of the total planned miles for the near-term trails (totaling 78 miles) have been funded, with many of the projects either in the design or construction phases. *Table 11* provides a snapshot of recently funded trail projects in the TMA. The *Existing and Planned Regional Trails* map on Page 71 illustrates existing and planned trail routes.

Table 12 compares the total population served by the trails and on-street bikeways in years 2000 and 2030. This analysis looks at the number of existing and funded trails versus those trails proposed. In 2000, 63.1% of the TMA population resided within 1 mile of existing and funded trails or bikeways. In 2030, assuming full LRTP implementation, the population residing within 1 mile of a trail or bikeway will increase to 89.7%, slightly above the 87% level projected in the Trails Master Plan. The *Existing Regional Trails and Bikeways* map on Page 73 includes the trails funded and/or built to date.

On-Street Bikeways

During the development of the Trails Master Plan, the need for providing on-street bikeways in the region was frequently discussed. As a response to public input and to maintain connectivity between trails, it was determined that on-street bikeways should be established. Arterial streets are not appropriate for most riders due to safety concerns far outweighing the benefits. Residential collectors and trails provide the best routes, in terms of user safety and system connectivity, for a continuous bicycle/pedestrian network.

As part of the Trails Master Plan, the City of Tulsa's Public Works and Traffic Engineering divisions proposed a network of on-street bicycle routes that utilize collector streets as their primary corridors. In most cases, the planned on-street bicycle

TABLE 11
Recently Funded Trail Projects in the TMA

Trail	Miles
West Bank I & II Trail	4.00 miles
Cherry Creek Trail	1.18 miles
Broken Arrow South Loop Trail	8.92 miles
Jenks River Trail	2.50 miles
Katy Downtown Trail Extension	0.93 miles
Midland Valley Extension Trail	1.73 miles
Mingo Trail	7.70 miles
Osage & Osage Prairie Trail	17.43 miles
River City Trail	1.80 miles
Mohawk Owasso Trail	4.25 miles
Mingo Creek Trail (3 segments)	1 mile/each
TOTAL	53.44 miles

TABLE 12
Comparisons of Bike/Pedestrian Trail Access in Years 2000 & 2030

Year 2000 Total TMA Population	Year 2000 Population Within 1 mi.	% Total TMA Population in 2000	Year 2030 Total TMA Population	Year 2030 Population Within 1 mi.	% Total TMA Population in 2030
701,600	442,500	63.10%	865,500	776,700	89.70%

routes intersect primary arterial streets at signalized locations for safe crossings. By linking the off-street trails and on-street facilities, an efficient and cost-effective system was created. The Conceptual On-Street Bike Route Plan anticipates over 200 miles of proposed on-street bikeways, while existing routes currently comprise approximately 30 miles.

For more information regarding the background and design aspects of the regional trail and bicycle facility system in the TMA, refer to the *Overview of the Tulsa Trails Master Plan* section located later in this chapter.

Funding

Historically, multipurpose trails have been funded primarily with local sales tax revenue and city bond issues as a part of park development. Sidewalks are included in new development, construction, and expansion projects. The newest source of funding for bicycle/pedestrian facilities and, to a much more limited degree, sidewalk renovation, is Transportation Enhancement funds available through the Transportation Equity Act for the 21st Century (TEA-21). Transportation Enhancement funds have provided improved opportunities for expansion of the bicycle/pedestrian system. In recent years, there has been a marked increase in the issue of sidewalk funding. Neighborhood residents are strong advocates for sidewalk construction or repairs, and sidewalks have typically been the most requested projects in local capital improvement programs (*i.e.*, sales tax and bond issues).

The proposed system for 2030 should be funded by continuing aggressive pursuits of Transportation Enhancement funds and by incorporating bicycle/pedestrian needs into the design of future construction and expansion projects. Specific dollar estimates have been included as a part of the overall financial strategies for the LRTP. In addition, several funding sources have been proposed, such as:

- ◆ Local Government Initiatives
- ◆ Capital Programs (bond issues and sales tax)
- ◆ Federal Trail Programs
- ◆ Enhancements and Recreational Trails
- ◆ State Programs
- ◆ National and Local Foundations
- ◆ Public/Private Partnerships



Gaining Public Support

Following the national trend of public support and advocacy for improved bicycling and walking conditions, there has been greater concern by groups in the TMA that more should be done locally to enhance the safety, comfort and convenience of nonmotorized travelers. Over the past decade, public opinion survey results throughout the nation have demonstrated strong support for increased planning, funding and implementation of trails, pathways and on-street facilities. The Bicycle and Pedestrian Element of the LRTP seeks to endorse and incorporate the objectives set forth by the federal government, which states “bicyclists and pedestrians shall be given due consideration in the planning process and that bicycle facilities and pedestrian walkways shall be considered, where appropriate, in conjunction with all new construction and reconstruction of transportation facilities except where bicycle use and walking are not permitted.”⁵

Bicycling and walking are important elements of an integrated, intermodal transportation system. Constructing sidewalks, installing bicycle parking at transit stations, equipping local public transit buses with bike racks, teaching children to ride and walk safely, installing curb cuts and ramps for wheelchairs, designating and signing bikeways and building trails—all contribute to achieving national, as well as local, transportation goals of safety, mobility, economic growth, and enhancement of communities and the natural environment.

Trails have long been recognized as a part of a multimodal transportation system that has proven to add to, not detract from, a community’s quality of life. In addition to providing pedestrians of the Greater Tulsa metro with another choice for short commuter trips, other benefits of trails can include improving property values, promoting healthy lifestyles, producing recreational venues, enhancing air and water quality, jumpstarting economic opportunities via tourism and providing educational opportunities for our leaders of tomorrow.

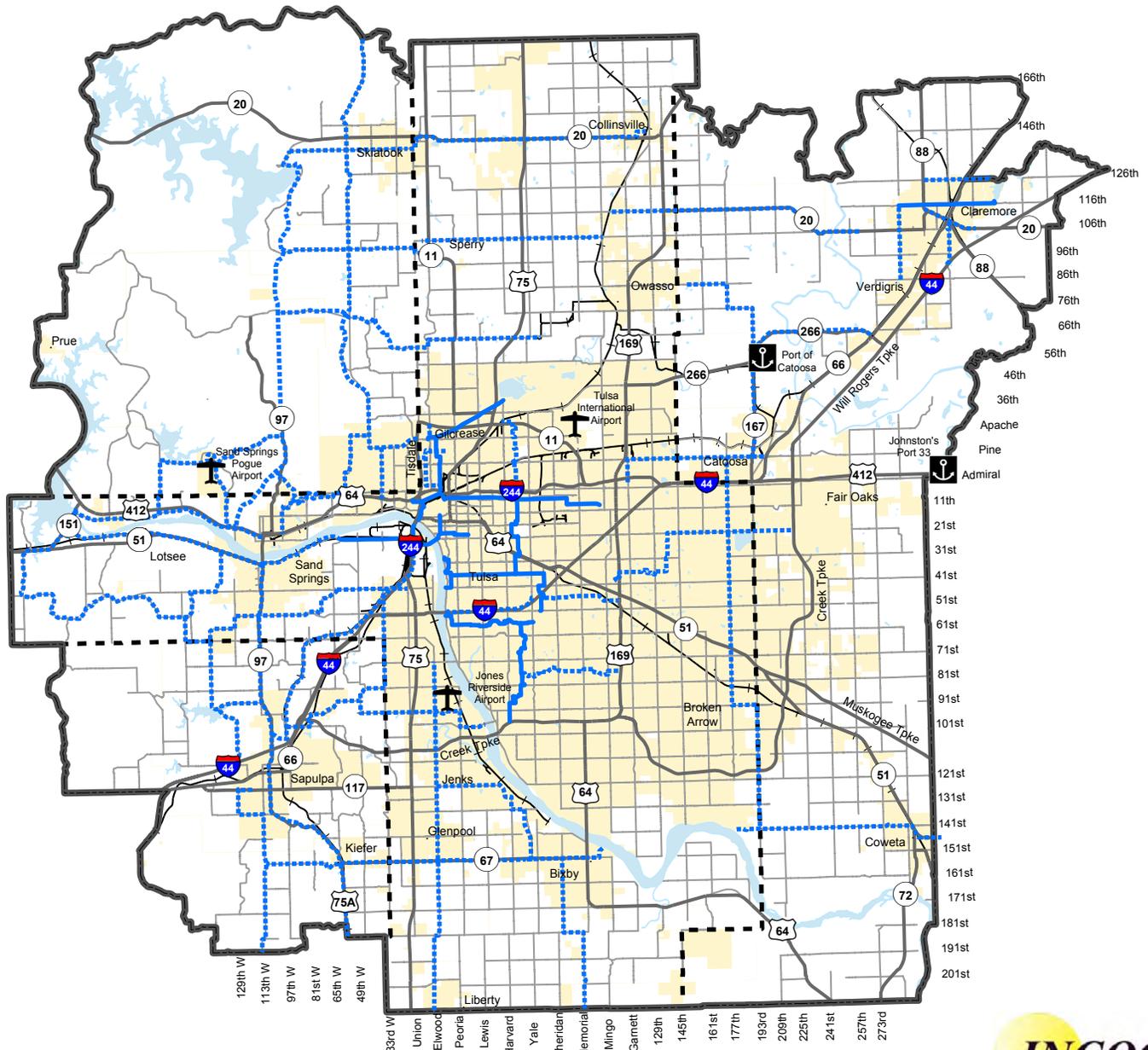
⁵ U.S. Department of Transportation, *A Summary Bicycle and Pedestrian Provision of the Federal-Aid Program*, 1998, Page 8.

Existing and Planned Regional Bikeways

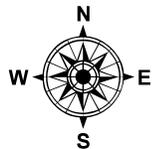


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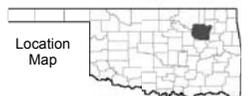
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- Existing Bikeway
- ⋯ Proposed Bikeway
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- Rail
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Map Scale - 1:410,000

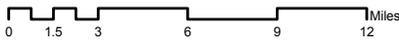
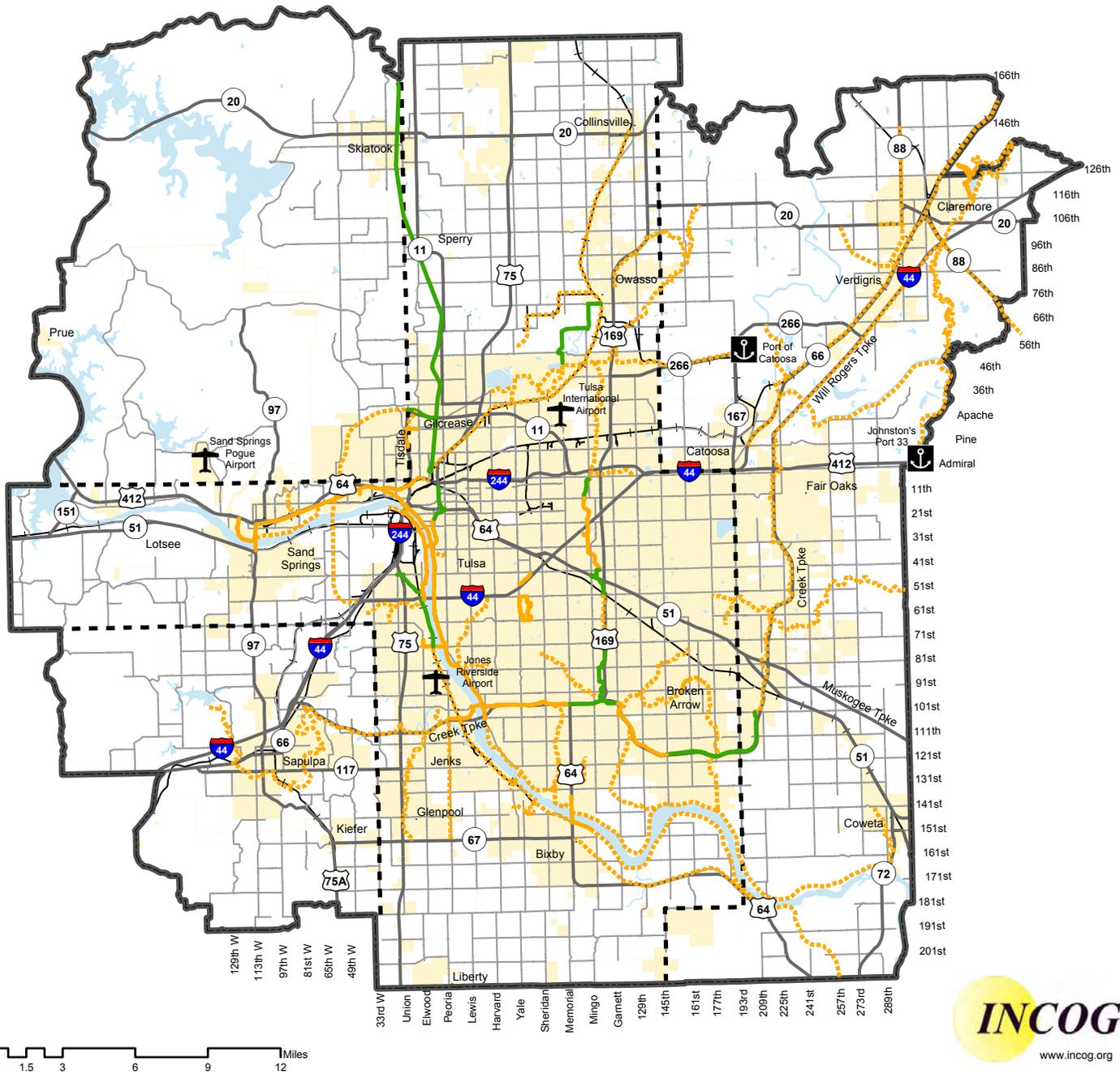


Existing and Planned Regional Trails

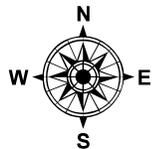


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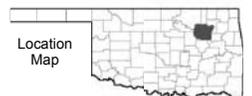
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- Existing Trail
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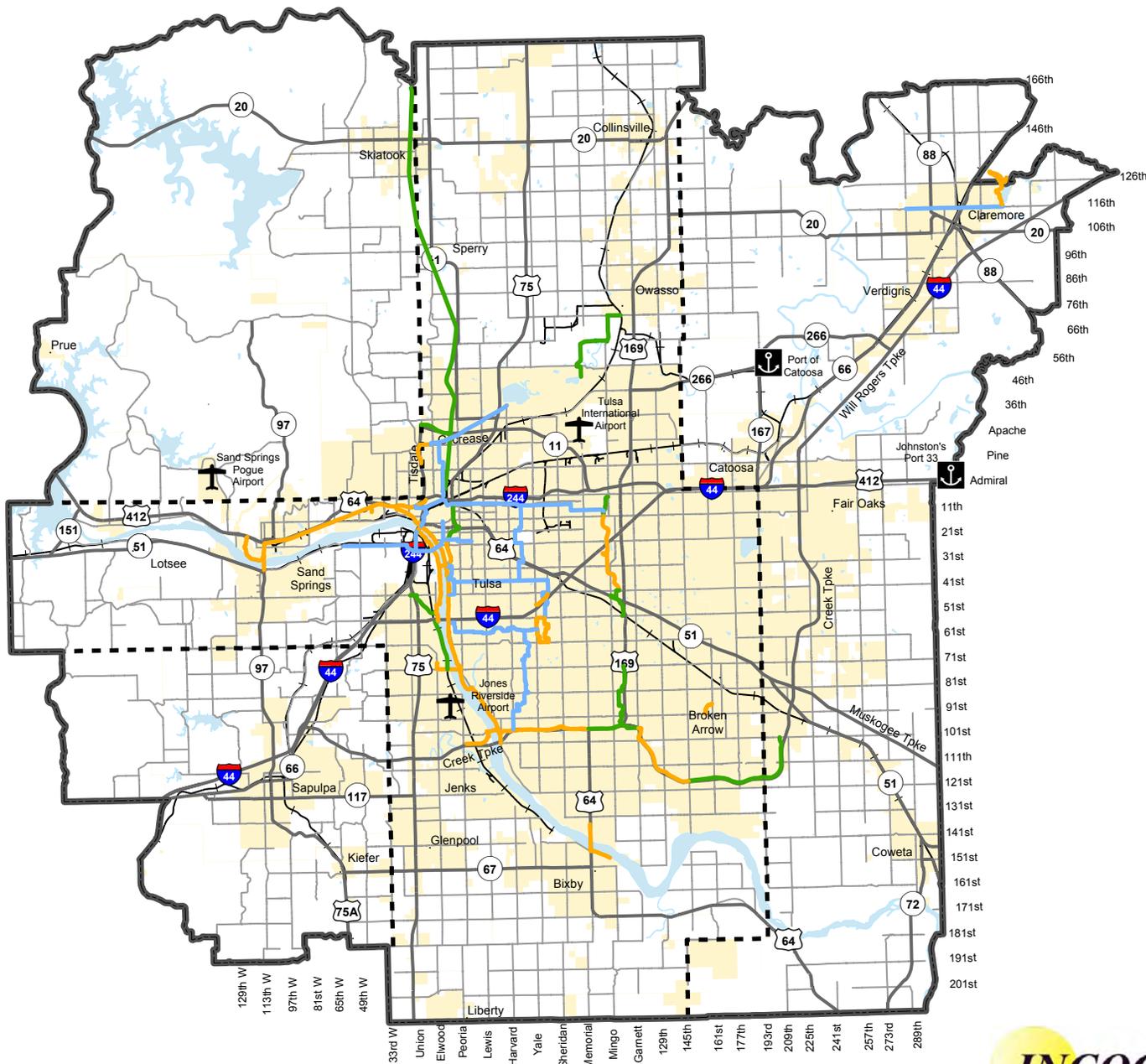


Existing Regional Trails and Bikeways

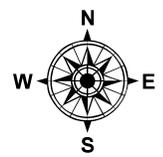


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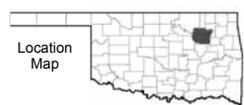
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Map Scale - 1:410,000



In short, trail corridors are:

- ◆ Alternative transportation routes connecting homes, workplaces, schools, parks and cultural attractions
- ◆ A measuring stick used by many industries, investors, and cities to help determine a community's quality of life
- ◆ Economic assets that increase the real estate value of adjacent properties
- ◆ Important ecological tools for the protection and enhancement of the natural environment
- ◆ Multi-use facilities that can accommodate different types of activities, such as bicycling, walking, running, hiking, in-line skating and wheelchair use
- ◆ Recreational assets that can include parking areas and other amenities such as benches and informational signage⁶

TRAILS MASTER PLAN OVERVIEW

In this section of the Bicycle and Pedestrian Element, an overview of the Trails Master Plan is provided, focusing on the master plan executive summary, the vision, goals and objectives, the design guidelines, a description of trail system, and implementation. The full Trails Master Plan is included in the *Supporting Documents*.

Trails Master Plan Executive Summary

The *Tulsa Transportation Management Area Trails Master Plan* offers recommendations for improving community access to outdoor resources by building a network of off-road multipurpose paved trails and bikeways. The Trails Master Plan was developed by INCOG in association with a steering committee of citizens, a team of national and local consultants, and residents of the metro area. It responds to specific needs that were defined by residents through a series of public workshops. Of particular interest to local residents was the issue of safety, especially as it

applies to the safety of bikeways and trail uses for corridors that parallel roadways. Using the information gathered during the public workshops and other available information, the consultants worked for 3 months to define a comprehensive community-wide system of trail corridors that would support a variety of trail uses and meet the needs that were described by residents.

Vision Statement

The vision statement below for the Trails Master Plan was crafted for the TMA as an overall guide to developing the proposed trail/bikeway system. Goals that support this vision, and a series of objectives that would be implemented to achieve each goal, are also presented.

“A trail system throughout the TMA will provide safe and convenient facilities for walkers, runners, bicyclists, skaters, and wheelchair users within 2.5 miles of their homes. It will connect residential areas to significant outdoor recreation areas, including area lakes and parks. The system will offer citizens an alternative to automobile travel, providing routes to popular destinations, including employment centers, retail establishments, tourist attractions, medical facilities and schools. Since trails promote nonpolluting forms of transportation, the trail system will improve air quality and reduce congestion in the area. Greenway trail corridors will improve water quality and reduce the impacts of flooding by preserving floodplain lands and streamside buffers. The local economy will also benefit from trail development through increased tourism revenues, property values and business attractions. In all, the TMA Trail System will make the region a cleaner, greener and better place to live, work and play for generations to come.”

⁶ LandPlan Consultants, Inc. and Greenways, Inc., *Metro Trails Master Plan Newsletter*, June 1998.

Goals and Objectives

The goals are listed below. The full description of the goals and objectives are included in the *Supporting Documents*. The goals and objectives serve to support the vision statement. Goal categories are representative of trail benefits related to the environment, transportation, education, recreation/fitness, safety and trail maintenance. Goals are not listed in order of priority.

ENVIRONMENTAL GOAL - Enhance the local environment by improving air and water quality, conserving floodplain lands, restoring landscapes and protecting wildlife habitat

TRANSPORTATION GOAL - Provide alternative transportation facilities for residents and visitors to the TMA

EDUCATION GOAL - Highlight and enhance significant historical and natural resources in the area. Trail users and potential supporters will be made aware of the trail system and its rules and benefits

RECREATION/FITNESS GOAL - Improve opportunities for safe, close-to-home recreation in the TMA

SAFETY GOAL - Design and manage so as to maximize safety and security of users

ECONOMIC GOAL - Improve the economic health of the area through increasing property values, attracting businesses, providing tourism revenue and reducing the costs of flooding

MAINTENANCE AND MANAGEMENT GOAL - Properly manage and maintain to increase user safety and enhance the quality of facilities

Design Guidelines

This section provides guidelines to both public and private entities for the development of trail facilities throughout the TMA. The regional guidelines herein are based on the best practices in use throughout the United States as well as accepted national standards for trail facilities.

The general attributes of the TMA regional trail system have been determined through the master planning process. These attributes include, but are not limited to: 10-foot wide (minimum) paved trails with a center line stripe, a comprehensive signage system, grade separated crossings where feasible, safe at grade crossings where necessary, and trail heads with drinking fountains, benches, and landscaping at appropriate intervals. Some trails may have phased construction, being built initially with limestone screenings as the surface, with asphalt or concrete being installed later as the permanent surface.

The guidelines should be used with the understanding that each trail project is unique, and that design adjustments may be necessary in certain situations in order to achieve the best results. Such projects should be evaluated on a

case-by-case basis, in consultation with local or state bicycle and pedestrian coordinators, a qualified landscape architect, and/or an engineer. Refer to the *Supporting Documents* for descriptive information regarding trail design.

Description of Trail System

This section provides descriptions of the 85 specific trails and bikeways that have emerged from the Trails Master Plan. These trails and bikeways were selected based on their potential to accommodate bicycle and pedestrian facilities, as well as their location as part of the overall trail system. The proposed system, which totals 509 miles, provides access to many of the TMA's schools, parks, neighborhoods, retail and employment areas, as well as accomplishing the overall goal of linking the TMA communities together via off-road trails and on-street bikeways.

PROPOSED OFF-ROAD TRAILS

Fifty-five off-road trails have been identified as part of the Trails Master Plan. Thirteen of these trails currently exist or are funded, while 42 are proposed. These trails would

be aligned along roadways with ample rights-of-way that would accommodate a bicycle/pedestrian trail, along the edges of creeks, or within existing utility or railroad rights-of-way. The trail corridors identified in this plan should be considered the spine of the trail system and should accommodate bicycles, in-line skaters, and runners, as well as pedestrians. Additional trails, such as nature trails or trails with alternative surfaces for horseback riding, jogging, or mountain biking, are considered secondary to the overall trail system and may be identified within the individual community trail plans. In addition, local trails providing connections to the regional system or serving a particular destination such as a trail around a park or stormwater detention area will also be identified within individual community trail plans.

CONCEPTUAL ON-STREET BIKEWAYS

During the numerous public meetings, the topic of providing on-street bikeways in the region was frequently discussed. In fact, during the citizen mapping of trails and bikeways, over 1,000 miles of on-street routes were delineated for the TMA region. Even though the purpose of this master plan is primarily for off-street multi-use trails, it is important to recognize the need for on-street bikeways in the area. Based on the identified bikeway corridors, the proposed bikeways are recommended for further evaluation. It is anticipated that further refinement to the bike route plan will be made by various local governments from time to time as further field inspections are made and as traffic patterns change. Current copies of the on-street bike route plan can be obtained from INCOG or the City of Tulsa Traffic Engineer.



Plan Implementation

The Metro Trails System offers tremendous potential to improve the quality of life for community residents. The Trails System will improve access to outdoor resources, link people to their favorite destinations, stimulate economic growth, expand opportunities for education, and shape community growth in the 21st Century. All of this is possible as the trail system is successfully developed during the coming years. The key to this success is implementation. This section describes an innovative and strategic plan for building, managing, and operating the Metro Trails System.

BUILDING THE METRO TRAILS SYSTEM

The Master Plan is only the initial step in the future development of a Metro Trails System for the TMA. More detailed design development work is required before actual trail tread is constructed and residents are able to use the trail corridors. Therefore, the continued involvement of citizens, businesses, and neighborhoods is vital to the ongoing development of a successful design.

Each trail corridor and/or segments of each corridor will require a more detailed site design process to determine the appropriate routing and alignment of the actual trail tread. Additionally, the location of trail amenities, such as seating, landscaping, restrooms, parking, and lighting need to be defined and positioned throughout the corridor.

The Trails Master Plan proposes the development of an interconnected system of asphalt/concrete paved trails and on-street bikeways within each of the corridors. Detailed site plans and design development documents should be prepared for all trail segments. Staff resources and/or professional design consultants with previous experience in trail/on-street bike route design and construction should be employed to prepare the necessary site plans and design development documents for each of the trail and on-street linkage (bikeway) corridors. A full description of the phasing strategy is included in the Trails Master Plan in the *Supporting Documents*.

ESTIMATED COSTS FOR FACILITY DEVELOPMENT

The following cost estimates are general in nature and are based on national industry or Oklahoma state averages. A listing of the industry averages are provided below and on the following pages. The purpose of these cost estimates is to provide general guidance for budgeting and developing trail segments. The estimates are reliable to the extent that a general expectation can be derived from their use. Specific site development factors unique to each corridor will influence final design development costs. More detailed costs should be developed as a part of corridor specific conceptual plans. Final construction cost estimates should be based on final design plans.

Preliminary construction cost estimates are provided in tabular form for the *near-term*, *mid-term* and *long-term* trail projects. The unit costs are provided for budgeting purposes only. Adjustments will have to be made to these costs on a project by-project basis to compensate for changes in unit price trends over time. All cost estimates have been adjusted for inflation to 2005 costs (*Table 13*).

TABLE 13
Typical Costs for Off-Road Multi-Use Trail Facilities

Category/Description of Facility		Unit	Unit Costs
Trail Treads			
	6-foot Bare Earth Hike/Mtn. Bike Trail	Linear Feet	\$6
	8-foot Bare Earth Equestrian Trail	Linear Feet	\$9
	8-foot Woodchip Pedestrian Trail	Linear Feet	\$11
	10-foot Soil-Cement Trail	Linear Feet	\$14
	10-foot Aggregate/Stone Trail	Linear Feet	\$17
	10-foot Asphalt Multipurpose Trail	Linear Feet	\$29
	10-foot Concrete Multipurpose Trail	Linear Feet	\$40
	10-foot Wood Deck/Boardwalk Trail	Linear Feet	\$285
Signage			
	Information Signs	Each	\$1,140
	Direction Signs	Each	\$230
	Warning Signs	Each	\$230
	Mile/Kilometer Markers	Each	\$290
Furniture/Furnishings			
	Benches	Each	\$680
	Trash Receptacles	Each	\$460
	Security Bollards	Each	\$290
	Bicycle Racks	Each	\$570
	Fencing (Board-on-Board)	Linear Feet	\$23
	Gates	Each	\$860
	Emergency Phones	Each	\$1,100
	Drinking Fountains	Each	\$2,900
	Restrooms	Each	\$68,500-\$102,700
	Landscaping	Per Mile	\$28,500

Parking Lots			
Capacity	Unit	Gravel Lot*	Asphalt Lot
10 cars	Each	\$8,600	\$16,000
20 cars	Each	\$17,100	\$32,000
40 cars	Each	\$34,200	\$63,900

**Gravel lots are prohibited in some jurisdictions*

In limited circumstances, it may be necessary to install on-road bicycle facilities in order to connect the off-road trail system defined by the LRTP. Itemized below are costs for facilities that would most likely be needed to provide linkage (*Table 14*).

TABLE 14
Typical Costs for Bicycle and Pedestrian Facilities

Re-stripping		
<i>Conducted as part of a regularly scheduled roadway resurfacing project and does not include right-of-way acquisition and changes to signal actuation.</i>		
	Bicycle Lanes	\$8,200/mi
	Wide Outside Lanes	\$7,400/mi
Independent Projects		
<i>The following listing is for development of various facility types as independent projects. These costs do not include right-of-way acquisition. Real estate values fluctuate dramatically and will need to be adjusted on a parcel-by-parcel basis as right of way is needed.</i>		
	Share the Road Bikeways (signage, pavement symbols, bicycle actuated signals)	\$17,100/mi
	Urban Bike Lanes (4' wide, both sides)	\$228,000/mi
	Rural Bike Lanes (4' wide, both sides)	\$126,000/mi
	Paved Shoulders (4' wide, both sides)	\$126,000/mi
	Wide Curb Lane (14' wide, both sides)	\$148,000/mi
Other Bicycle Facilities		
	Class I Parking (Bicycle Lockers - per 2 bicycles)	\$570-\$1,700
	Class II Parking (Secure wheels and frame-per bike)	\$75-\$170
	Class III Parking (Inverted U's or rail racks- per bike)	\$75-\$90
	Bike Route/"Share the Road" sign (each)	\$280
Typical Costs for Pedestrian Facilities		
	Sidewalks (6' wide, 2 sides)	\$148,000/mi
	Pedestrian Signal Heads (for 2 corners)	\$2,000/ea
	Pedestrian Signal Heads (for 4 corners)	\$4,200/ea
Other Pedestrian Facilities		
	Prefabricated Pedestrian Bridge/Overpass	\$115/sq ft
	Constructed Bridge/Overpass	\$75/sq ft
	Crosswalk Striping	\$280 each
	Curb Extensions	\$5,100 each



Developing the Trails Master Plan

If the momentum generated by the Trails Master Plan is sustained over the next 15 years, the opportunity exists to implement a total of 491 miles of multi-use trails in near-term, mid-term, and long-term phases. A detailed listing of trail costs estimates is included in the *Supporting Documents*.

The on-street bikeways identified as a part of the Trails Master Plan are intended to provide bikeways between various off street trails and allow greater access to the

overall regional trail system. The cost estimates for these types of facilities is general in nature and based on national industry or Oklahoma state averages. The estimate includes items such as share the road signs, bike route signs, bicycle activated traffic signals, on-street share the road pavement markings, replacement of drainage grates and other minor street construction items.

Operations and Management

Maintenance and management of individual trail segments will be the responsibility of the local governments and their partners. It is anticipated that these maintenance and management duties can be shared among trail supporters in the public and private sectors. For example, currently the City of Tulsa owns the land where River Parks has developed the existing trails system.

River Parks maintains the system of trails, even though the land is owned by Tulsa. The following costs are provided as a guide to establishing a budget for the operation, maintenance and management of trail segments (*Table 15*).

TABLE 15
Typical Maintenance Costs (For a 1 Mile, Paved Trail)

Description	Cost per Mile
Drainage and storm channel maintenance (4 x/year)	\$800
Sweeping/blowing debris off trail tread (24 x/year)	\$1,800
Pick-up and removal of trash (24 x/year)	\$1,800
Weed control and vegetation management (10 x/year)	\$1,540
Mowing of 3-ft grass safe zone along trail (24 x/year)	\$2,000
Minor repairs to trail furniture/safety features	\$570
Maintenance supplies for work crews	\$340
Equipment fuel and repairs	\$900
Estimated Maintenance Costs Per Mile of Paved Trail	\$9,750
Re-Surfacing of Asphalt Trail Tread (10 year cycle)	\$57,000 - 69,000

ISSUES AND ACTIONS

In the TMA, community planners and citizens are continuing to work together to activate the trails system for our communities, as established in the Trails Master

Plan. As a part of maintaining this quality approach to achieving a balanced transportation system, key issues regarding bicycle and pedestrian transportation have been identified. These issues include: safety and education awareness, legal considerations, development practices, facilities and support facilities.

Development Practices

Examination of existing laws, ordinances, and land-use planning would help provide legitimacy of bicycling and walking as transportation modes. The following addresses the legal considerations and development practice issues.

- ◆ Encourage the multiple use of transportation rights-of-way, including safely designed facilities for use by bicyclists and pedestrians
- ◆ Encourage development of residential collector streets that address bicycle/pedestrian needs
- ◆ Advocate compliance with subdivision regulations requiring sidewalks in new development
- ◆ Consider incentives for new office/commercial development that integrates bicycle/pedestrian facilities in the design
- ◆ Consider incentives for residential development that integrates trails and sidewalks into the design
- ◆ Encourage the consideration of transit and pedestrian planning in the land development process
- ◆ Advocate transit and pedestrian/bicycle connections during the subdivision design process – through the acquisition of trail easements, sidewalk extensions, and planned transit stops with associated amenities
- ◆ Work with staff and development community to further improve and integrate pedestrian circulation plans
- ◆ Encourage the provision of transit stops/shelters during development design
- ◆ Encourage the provision of pedestrian/bicycle amenities such as benches, street furniture, bicycle racks/lockers, support facilities, etc.

LEGAL CONSIDERATIONS

- ◆ Work with state and local officials to develop consistent laws and guidelines for bicyclists
- ◆ Advocate rails-to-trails conversions on existing rail corridors that are no longer economically viable

Facilities and Support Facilities

Improvements must be made to existing and planned facilities to provide intermodal connections, a continuous regional network of bicycle routes, and supporting facilities such as storage areas, showers, and bus-mounted bicycle racks.

FACILITIES

- ◆ Encourage implementation of the Tulsa Transportation Management Area Trails Master Plan
- ◆ Support implementation of the City of Tulsa's on-street bikeways system and encourage other area cities to develop and implement similar plans
- ◆ Pursue Transportation Enhancement funds for projects that provide facilities to encourage bicycling and walking as alternate modes of transportation
- ◆ Encourage provision of bicycle and pedestrian facilities that connect residential areas to parks, churches, employment centers, schools, libraries, and other services
- ◆ Identify gaps in the arterial sidewalk system and implement a plan to fill those gaps giving priority to schools, churches, libraries, shopping, and other major destinations
- ◆ Encourage removal of physical barriers and provision of facilities (such as ramps, curb cuts, and adequate sidewalks) for persons with physical disabilities
- ◆ Design and implement transportation enhancement projects that better integrate the transportation system into the community and encourage use of alternate modes of transportation (e.g., bicycling and walking)
- ◆ Identify and develop strategies to mitigate major physical barriers, such as expressways, that pose obstacles to the bicycle and pedestrian network



SUPPORT FACILITIES

- ◆ Pursue development of a major trailhead in downtown Tulsa in proximity to the planned connections of the Katy Trail, SKO Trail, Midland Valley Trail, Osage Trail and various on-street bicycle routes
- ◆ Publish bicycle facility/roadway suitability maps, safety information, and other promotional materials, and encourage their dissemination through user groups, local bicycle shops and other central locations
- ◆ Encourage provision of access to showers and bicycle storage at employment centers
- ◆ Encourage provision of aesthetic and functional amenities on bicycle/pedestrian routes (e.g., water fountains, benches, and restrooms)
- ◆ Encourage secure and convenient parking for bicycles at major employment centers and other destinations
- ◆ Pursue Transportation Enhancement funding for projects to develop bicycle/pedestrian support facilities

Safety and Education Awareness

Bicycling and walking should be viable and important modes of everyday transportation, but ever-increasing auto traffic and planning to accommodate the automobile have greatly reduced the opportunity for safe and pleasant bicycling and walking.

SAFETY

- ◆ Evaluate the appropriateness of posting additional instructional signs for bicycle users to improve the safety of bicycle travel and to increase motorists' awareness of bicycle activity
- ◆ Require safe design and construction practices on all roadways, and use consistent standards (American Association of State Highway and Transportation Officials - e.g., perpendicular grates, modified railroad crossings)
- ◆ Encourage installation of traffic signal devices that are bicycle sensitive, particularly along designated bicycle routes
- ◆ Encourage installation of pedestrian-actuated crossing signals at intersections that currently do not have them, lengthening the crossing time where necessary
- ◆ Encourage maintenance on bridges and outside curb lanes to eliminate debris for cyclists

SAFETY - CONTINUED

- ◆ Improve collection and use of accident data for vehicle accidents involving bicycles and pedestrians (e.g., helmet usage, accident site characteristics/conditions, etc.)
- ◆ Encourage installation of street lights, as needed, along pedestrian routes to bus stops to enhance security for early morning and evening riders
- ◆ Review local municipal bicycle/pedestrian ordinances and recommend updates as appropriate to provide a safer riding or walking environment

EDUCATION/AWARENESS

- ◆ Work with local user groups and the media to increase public awareness of bicycle laws, safety, user courtesy/protocol, cost-effectiveness of bicycling and walking, and positive environmental and health benefits
- ◆ Encourage training for area students on all aspects of safe bicycling and walking
- ◆ Support improved skills training for cyclists
- ◆ Encourage employers to provide employee incentives and facilities (showers, bike storage, etc.) to promote bicycling as a commuter option
- ◆ Support posting “Share the Road” signs and pavement markings on designated bikeways; also launch a media campaign that informs cyclists and motorists about “Share the Road” laws
- ◆ Encourage curriculum changes in driver education classes to include sections related to motor vehicle drivers’ responsibility to bicycles and pedestrians
- ◆ Encourage the adoption of universal design for both roadway construction and land development, such as the application of ITS – lit crosswalks, audible pedestrian signals, infrared detection, visual countdown pedestrian crossing signals, surface treatments
- ◆ Advocate safety improvements during development design by encouraging staff and the development community to look at physical improvements, such as traffic calming, public sidewalk connections to office/commercial developments, and pedestrian safety improvements (e.g., median pedestrian crossings, bump outs, raised medians, etc.)
- ◆ Develop an informational brochure that addresses the benefits of trails, including economic development, lower crime rates, and improved quality-of-life