Oak Ridge
Bicycle and Pedestrian Plan

March 2011

Prepared by the Knoxville Regional Transportation Planning Organization

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Adopted by:

The Oak Ridge City Council on April 11, 2011

Prepared by the Knoxville Regional Transportation Planning Organization

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Overview

Oak Ridge is a city with a unique history. Carved out of the ridges and valleys of Anderson and Roane counties in the early 1940s, the city was built to house the workers and plants needed to produce materials for an atomic weapon.

This history has made a mark on the Oak Ridge of today. Many of the original neighborhoods designed for workers still remain, along with greenbelts and walking paths created for recreation, exercise and transportation.

New places have been built or redeveloped in Oak Ridge since the end of World War II, some that are walkable and bicycle-friendly, many others that are not.

Much of the land in and around Oak Ridge remains property of the federal government, which creates some additional barriers to walking and bicycling improvements, but presents many opportunities as well.

This bicycle and pedestrian plan is not about the history of Oak Ridge, but about its present and, most important, its future.

This plan describes the current state of walking and bicycling in the City of Oak Ridge, and it lays out a plan for improving bicycling and walking conditions in the years to come.

Background

When Oak Ridge transitioned to civilian hands in the late 1940s, the City stretched east to west along the Oak Ridge Turnpike, with a mix of housing, schools, churches and commercial areas lying between the Oak Ridge Turnpike and Black Oak Ridge to the north. These older parts of Oak Ridge are still where most of the City's sidewalks and walking paths are found today. They are also home to the greatest density and diversity of development found in Oak Ridge. These areas lend themselves easily to walking and bicycling for transportation. As a result, these established areas of Oak Ridge are a focus of many of the strategies identified in this plan. However, the plan's scope covers the entire City of Oak Ridge, and seeks to make walking and bicycling a citywide transportation priority.

Previous plans, dating back to the City's creation, have touched on bicycle and pedestrian issues.

1948 Master Plan

The 1948 Master Plan by Skidmore Owings & Merrill called for a new downtown with a pedestrian plaza as its "Main Street," with parking areas and circulation for cars, trucks and buses confined to the periphery of that downtown.

That 1948 plan also recognized that the City's existing greenbelts and ridges should be reserved for walking and bicycling trails and other recreational uses.

The plan also acknowledged the need for sidewalks on some streets, but, as was common at the time, devotes its analysis of transportation needs to automobiles.

1978 Land Use Plan

The City's 1978 Land Use Plan, in its transportation section, called for the "extension of sidewalks and bicycle paths throughout various sections of the city."

Comprehensive Plan

The City's most recent Comprehensive Plan, created in 1985 and updated in 1988, describes pedestrian and bicycle facilities as peripheral to the City's transportation network, and fails to include sidewalks or bicycle lanes in its Design Guidelines for Roadways. The 1988 update includes policy statements concerning the need to replace deteriorating sidewalks, to create a citywide bicycle system, and to coordinate the City's Transportation Plan with other elements of the Comprehensive Plan.

Greenways Oak Ridge Task Force Report

In 1993, the Oak Ridge City Council adopted a Greenways Oak Ridge Task Force Report that expressed the need for a citywide greenway system, described the proposed system and proposed mechanisms for implementation. The report proposed a number of specific

greenways, some of which have been completed:

- The Emory Valley/Melton Lake Greenway shown in the report has been partially completed. The unbuilt portion includes:
    1. A link along the CSX railroad line from the Emory Valley Road/Briarcliff Avenue intersection up to the existing Melton Lake Greenway;
    2. A continued westward link along Emory Valley Road and then south along Lafayette Drive to South Illinois Avenue; and
    3. A link from Lafayette Drive/Emory Valley Road through the Woodland neighborhood to the cluster of civic buildings in A.K. Bissell Park.

  A greenway along the CSX rail line and continuing a bicycle and pedestrian facility along Emory Valley Road to Lafayette Drive and South Illinois Avenue were both mentioned in the public process for this bicycle and pedestrian plan and are included among the suggested projects.
- A portion of the Edgemoor Road Greenway is being planned as Phases IV and V of the Melton Lake Greenway. Phase IV is funded by a Transportation Enhancement grant from the Tennessee Department of Transportation (TDOT), and Oak Ridge expects to complete construction in 2011. Phase V will be constructed as part of a TDOT road project on Edgemoor Road. The unbuilt and unfunded portion of the greenway loops around Haw Ridge Park. The City's current plans are for the greenway to connect with the trail system in Haw Ridge Park, not loop around it.
- The section of Cedar Hill Greenway within Cedar Hill Park has been constructed, but the larger loop that connects through the existing greenbelt to Blankenship Field and Jackson Square has been created, in part, as only an unpaved path. The need for greater bicycle/pedestrian connectivity to Jackson Square and other Central City locations was frequently cited in the public process for this plan, and continuation of this greenway would be one means for achieving that goal.

Greenways described in the report that have not been funded or built include:

- South Illinois Avenue to Knox County Greenway: This link was identified in the original greenway report to connect Central Oak Ridge to the Solway area and into the planned Knox County greenway system. Several corridors and intersections along this route were identified in the public process for this plan as in need of bicycle and pedestrian accommodation and are included among the suggested projects.
- DOE Reservation Greenway
- Tuskegee Drive Greenway
- Mississippi Creek Greenway
- East Fork Poplar Creek Greenway

Vision & Mission

The City of Oak Ridge Bicycle and Pedestrian Advisory Committee, working with City staff and planners from the Knoxville Regional Transportation Planning Organization (TPO), arrived at the following vision and mission statement to guide the development of this plan:

Vision

It is easy and safe to travel by foot and bicycle in and around Oak Ridge.

Mission

To develop a plan that will:

- *identify and prioritize needed pedestrian and bicycle facilities*
- *ensure that bicycle and pedestrian facilities are included in all new projects*
- *develop programs to promote walking and bicycling through education and enforcement*

This vision and mission statement has guided the City's Bicycle and Pedestrian Advisory Committee in overseeing the public process for this plan and selecting the programs, policies and projects that the plan recommends.

A family walks along Melton Lake Greenway, one of Oak Ridge's many shared-use paths.
Photo credit: Ripely Photography

Plan Process

The process of creating this plan began in the fall of 2009, with meetings between City of Oak Ridge and TPO bicycle and pedestrian planning staff. Oak Ridge staff recruited City residents to form a Bicycle and Pedestrian Advisory Committee, which began meeting in October 2009 and met regularly throughout the planning process.

A public meeting was held January 5, 2010, at the Oak Ridge Civic Center, and was attended by about 75 people. An overview of the planning process was presented, and attendees were provided maps and worked together in small groups with a facilitator to answer the following questions:

- What locations do you want to be able to reach by foot or bicycle, but can't right now? (e.g. a park, a school, work)
- What are the most critical gaps in the bicycle and pedestrian system that should be filled, and barriers that should be fixed (like an intersection that is unsafe for pedestrians)?

The first question determined whether any bicycle and pedestrian destinations had been left off the maps that were presented at the meeting. (Parks, school facilities, major employers, public buildings and other Oak Ridge landmarks were identified on the maps. See Appendix A for a complete list of destinations included on the maps.)

Responses to the second question were compiled and divided into two lists: (1) spot locations and (2) corridors. Spot locations are intersections or other specific locations that residents want to be able to safely reach or cross on foot or by bicycle. Corridors are portions of streets or other corridors that residents want to be able to travel along via foot or bicycle.

These lists were then refined and transformed into preliminary project lists by the Advisory Committee, Oak Ridge staff and TPO staff. The projects were prioritized, based on criteria developed from priority statements ranked by the public and the Advisory Committee. Projects that filled in gaps in the transportation system or were close to schools, parks, homes and workplaces were given more points than projects that did not meet those criteria. The prioritization process is explained in more detail on p. 23. The draft lists and plan were presented at a public meeting attended by about 50 people on Dec. 7, 2010. Feedback from the meeting and other public comments have been incorporated into this plan.

Bicycle lanes were recently added to part of Oak Ridge Turnpike.
Photo credit: Oak Ridge Staff

Why Walking and Bicycling Matter

At a time when there are serious challenges to our economy, our environment and our security, walking and bicycling may seem like trivial issues for citizens and local government to address. However, improving the environment for walking and bicycling in our communities can have a significant positive impact on all of these issues. Furthermore, advocating safe places for walking and bicycling is a way for citizens and local governments to have an impact on several issues of national and global importance.

Economic development

Walkable places are at a premium for both residential[1] and commercial[2] development. This means that the walkability of a place pays off for both the development community and for local governments collecting property and sales taxes. A recent report on real estate from the Urban Land Institute and PriceWaterhouseCoopers generally paints a gloomy picture for the United States, with the exception of walkable urban places: "Road congestion, higher energy costs, and climate change concerns combine to alter people's thinking about where they decide to live and work. 'It's a fundamental shift.' The lifestyle cost-of-living equation starts to swing away more dramatically from bigger houses on bigger lots at the suburban edge to greater convenience and efficiencies gained from infill housing closer to work." [3]

Public health

We all know that the United States, Tennessee included, is dealing with skyrocketing rates of people who are overweight and obese. In 2010, Tennessee ranked second in the nation in adult obesity prevalence, and sixth in childhood obesity.[4] Increasing physical activity is one way of reducing obesity, and access to walking and bicycling can boost physical activity.[5] Researchers at the University of Tennessee recently conducted a study in Knoxville which found that building a greenway in a neighborhood resulted in increased physical activity in the neighborhood surrounding the greenway.[6]

Clean air

Anderson County is currently in nonattainment for federal air quality standards for particulate matter, and is part of a maintenance area for ground level ozone pollution. Emissions from cars contributes significantly to both types of

[1] "How Walkability Raises Home Values in U.S. Cities," CEOs for Cities, accessed online on 11/30/2010 at http://blog.walkscore.com/wp-content/uploads/2009/08/WalkingTheWalk_CEOsforCities.pdf.

[2] "The Walkability Premium in Commercial Real Estate Investments," Gary Pivo and Jeffrey D. Fisher, accessed online on 11/30/2010 at http://www.u.arizona.edu/~gpivo/Walkability%20Paper%208_4%20draft.pdf.

[3] "Emerging Trends in Real Estate 2010," p. 32, Urban Land Institute and PriceWaterhouseCoopers.

[4] "F as in Fat: How Obesity Threatens America's Future 2010," Trust for America's Health, accessed online on 11/30/2010 at http://healthyamericans.org/reports/obesity2010.

[5] "New Urban Community Promotes Social Networks and Walking," New Urban News, accessed online on 11/30/2010 at http://www.newurbannews.com/14.6/sep09newurban.html.

[6] "Urban Trails and Physical Activity: A Natural Experiment," Fitzhugh et al., American Journal of Preventive Medicine, September 2010 (Volume 39, No. 3).

pollution. In the Knoxville region, 16 percent of the trips people take are less than a mile, and 44 percent are less than 3 miles. These distances are walkable or bikeable for many people, if safe places to bike and walk are available. Yet more than 90 percent of short trips are taken by car.[7] When walking and bicycling can be substituted for car trips, they can help reduce the air pollution that is damaging to Oak Ridge's physical and economic health.

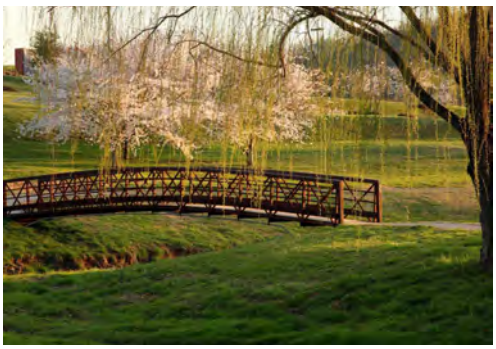
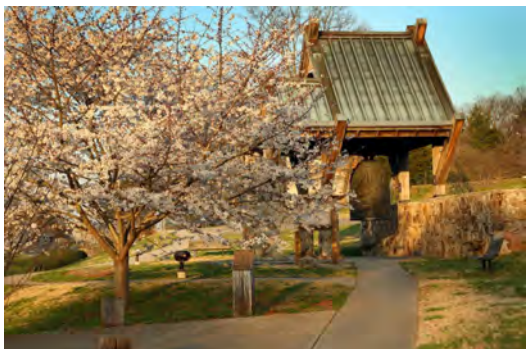
Safety and security

Pedestrians and bicyclists are more likely to be involved in fatal crashes than other road users, relative to the number of pedestrians and cyclists on the road. (Nationally, pedestrians account for more than 12 percent of crash fatalities, but only 10.9 percent of all trips. Bicyclists account for 2 percent of all crash fatalities, even though less than 1 percent of trips are made by bicycle.[8]) Projects that accommodate pedestrians and bicyclists along and across roads can help reduce the rate of these crashes. Programs that increase the number of bicyclists and pedestrians on the road can increase the safety of travel as well, possibly by making these road users more visible to drivers.[9]

Walking and bicycling can even play a role in disaster preparedness. Many localities include walking and bicycling routes in their emergency evacuation plans for incidents that are small in geographic scale, yet where roads may not be adequate to allow everyone to evacuate by motorized vehicle.[10]

Changing demographics

Between 2010 and 2050, the United States is projected to experience rapid growth in its older population. In 2050, the number of Americans aged 65 and older is projected to be 88.5 million, more than double its projected population of 40.2 million in 2010.[11] More than one-fifth (21 percent) of those 65 and older don't drive,[12] so the ability to walk (or even bicycle) safely to destinations is especially important for seniors. Street design should take into account the needs of seniors behind the wheel, and those who are walking or bicycling as well.

A.K. Bissell Park is home to some of Oak Ridge's unpaved greenway trails.
Photo credits: Ripely Photography

[7] Knoxville Regional TPO travel modeling data.
[8] Statistics from the Pedestrian and Bicycle Information Center website, accessed online on 12/13//2010 at http://www.pedbikeinfo.org.
[9] "Safety in Number: More Walkers and Bicyclists, Safer Walking and Bicycling," Injury Prevention, Jacobsen, accessed online on 11/30/2010 at http://injuryprevention.bmj.com/content/9/3/205.
[10] Integrating Pedestrian Disaster Preparedness and Mass Evacuations on Foot Into Emergency Evacuation Operations, Local Infrastructure Needs & Long Range Transportation Planning," James M. Ercolano, accessed online on 11/30/2010 at http://www.walk21.com/papers/James_Ercolano.pdf.
[11] Older Driver Highway Design Handbook, Publication Number: FHWA-RD-97-135, 1998, accessed online on 12/17/10 at http://www.fhwa.dot.gov/publications/research/safety/97135/index.cfm.
[12] Aging Americans: Stranded Without Options, Surface Transportation Policy project report, accessed online on 12/17/2010 at http://www.transact.org/report.asp?id=232.

Existing Conditions

Sidewalks

Oak Ridge has an existing network of sidewalks that provide pedestrian accommodation for most of the older parts of the City. The City completed an inventory of its sidewalks and greenways in 2009. Fifty-seven miles of standard concrete sidewalks were mapped, in addition to 45 miles of asphalt sidewalks. (By way of comparison, the City maintains 230 miles of surface streets.)

Some of the existing sidewalks are in disrepair, especially the older asphalt ones. As in most cities, some of the existing sidewalks are not accessible under the regulations of the Americans With Disabilities Act (ADA) because of missing ramps, inadequate width, excessive slopes, or other factors.

Sidewalks have recently been constructed on both sides of the Oak Ridge Turnpike (SR95) between Illinois Avenue and Westover Drive as part of a road widening project by TDOT. It adds approximately 8.5 miles of sidewalks to the City's inventory.

Oak Ridge's Melton Lake Greenway

See Map 1 on page 35 for Oak Ridge's existing pedestrian and bicycle network and planned improvements.

Greenways

The City also has an extensive network of greenway trails, which are paths designed for shared use by bicyclists, pedestrians, skaters and others. Oak Ridge's paved greenways total 7 miles, with dozens of additional miles that are unpaved, some designed primarily for recreational use such as those found in Elm Grove, A.K. Bissell and Cedar Hill Parks.

As noted in the Background section of this plan, two additional phases of the Melton Lake Greenway adjacent to Edgemoor Road are also funded.

Bicycle lanes

The first on-street bicycle lanes in Oak Ridge were added recently as part of the Oak Ridge Turnpike project mentioned above.

New bicycle lanes on Oak Ridge Turnpike.
Photo credit: Oak Ridge Staff

Policy and Ordinance Recommendations

Complete Streets policy

A Complete Streets policy can take the form of an ordinance, a resolution, or a design manual. It says that bicycle and pedestrian accommodation should be included as part of all projects unless there is a compelling reason not to include them.[13] Judging the need for facilities based on current bicycle or pedestrian counts or projected levels of bicycle and pedestrian activity is often unreliable due to existing disincentives for walking and bicycling. Since facilities are constructed on a project-by-project basis, bicycle and pedestrian facilities should be provided even for short sections of infrastructure improvements (like intersection improvements or bridges). The National Complete Streets Coalition (www.completestreets.org) has extensive guidance on Complete Streets policies and implementation.

Development policy revisions

Examine the City's development standards for policies that do not encourage walking and bicycling. Consider the use of urban design overlays, form-based codes and other tools to create development patterns that are more conducive to walking and bicycling as means of transportation.

Street design guidelines

Review the City's street design standards for opportunities to improve safety and accessibility for bicyclists and pedestrians.

Maintenance policy

It is common practice for public roads, sidewalks and on-street bikeways to be maintained by a combination of state and municipal resources. Maintenance is extremely important for pedestrians and bicyclists to travel safely. Based on these conditions the following policy is recommended:

> *Oak Ridge is a pedestrian and bicyclist friendly community, and will provide and maintain pedestrian and bicycle facilities as an integrated part of managing our public infrastructure. Property owners and agencies are expected to construct and maintain facilities in accordance with this policy Streets will be in a state of good repair, with appropriate signage and pavement markings and kept clear of debris on a regular basis. Bicyclists have the legal right to use all streets, unless prohibited by state policy. Sidewalks and greenways will be kept in good and safe repair in a clean condition, free from obstructions or encumbrances.*

In order to implement this policy, it is recommended that the City of Oak Ridge create and implement a system by which it inspects its public infrastructure—including bicycle and pedestrian facilities—on a regular basis and budget adequate funding for maintaining the infrastructure appropriately.

[13] US DOT Policy Statement on Bicycle and Pedestrian Accommodation (2010) http://www.fhwa.dot.gov/environment/bikeped/policy_accom.htm, TDOT Bicycle and Pedestrian Policy (2010) http://www.tdot.state.tn.us/bikeped/pdfs/policy.pdf, Knoxville Regional TPO Bicycle and Pedestrian Accommodation Policy (2002) http://www.knoxtrans.org/plans/bikeplan/policy.htm#accom

Programs

Share the Road campaign

Educate motorists, bicyclists and pedestrians about sharing the road and the laws related to bicycling and walking. There are many methods of education. The Knoxville Regional TPO Bicycle Program uses Bicycling Ambassadors to conduct one-on-one outreach via booths at community events. The Bicycle Program has also started an "I Bike" awareness campaign using banner displays featuring local bicyclists at locations such as malls and movie theaters to reach the general public with tips on sharing the road.

Well-designed and distributed public information can vastly increase the community's awareness and use of bicycling and walking. It can also help positively influence the behavior of motorists, pedestrians and bicyclists.

Safe Routes to School

Develop a communitywide Safe Routes to Schools program to encourage physical activity and increased walking and bicycling to and from schools. The best Safe Routes to School programs are comprehensive. They are often based on "the five E's": engineering, encouragement, enforcement, education and evaluation. Common starting points for a Safe Routes to School program include conducting an assessment of walking and bicycling conditions around a school; creating a Walking School Bus where parents or other volunteers take turns leading groups of kids to school; and organizing educational events, like bicycle safety rodeos, where children learn handling and other skills. Encouragement programs where children receive rewards for each day they walk or bicycle to school are very popular. The National Center for Safe Routes to School (www.saferoutesinfo.org) is a great resource.

Bike rack and greenway amenities program

It is important to have places for people to lock their bicycles throughout the community. It is also important to provide amenities like water fountains and automobile parking at trailheads

A dad and his daughter at a Safe Routes to School event in Knoxville.

along bicycle routes and greenways. This amenities program would analyze where such things are needed and oversee installation and continued maintenance.

Hoop style bicycle racks meet recommended guidelines.

Targeted enforcement

Work with law enforcement to identify key locations where motorists do not comply with laws related to pedestrians and bicyclists and periodically conduct enforcement operations. Enforcement areas could include yielding to pedestrians in crosswalks, passing bicyclists with at least 3 feet of space, not parking on sidewalks, and leash laws for dogs.

Annual community bike ride

Plan, organize and promote a family-oriented community bike ride around Oak Ridge as a way to encourage physical activity and cycling. This would be modeled after the popular Neighborhood Bike Ride or Tour de Lights, both co-sponsored by the City of Knoxville and the Bicycle Program. The rides are designed to be for beginners, with a slow pace and distance less than 15 miles.

Knoxville community bike rides attract hundreds of riders.

Active living club

The community can establish a club that encourages walking and bicycling, with a regular schedule of events and incentives such as discounts at local businesses, and a system for monitoring health and fitness. Oak Ridge could work with the TPO's Smart Trips program to establish incentives and rewards for being active. The club could also coordinate with the City's Recreation and Parks department to administer the Secret City Trekker program; hikers that hike all of the trails within the City's greenway system, about 35 miles, receive a Secret City Trekker Patch.[14] One model to emulate is the Knox County Health Department's successful Active-8 program, which has many events and promotions during an eight-week period, including reminder emails to interested participants.

[14]More information about the Secret City Trekker program can be found here: http://web.eecs.utk.edu/~dunigan/greenways/trekker.pdf

Recommended Projects

Prioritization process

The potential projects identified for Oak Ridge will be implemented in phases over time. To assist in establishing a rational process for prioritization, criteria were developed and used to rank the recommended projects. Each project received points based on these criteria. The criteria were developed from the priority statements, which were ranked by the Bicycle and Pedestrian Advisory Committee after public input.

The ranking criteria estimated potential demand for walking and bicycling in the vicinity of a given project. Projects that are near homes, schools, parks, major employers and other locations that people might walk or bicycle to or from are assumed to have greater demand, so those projects were given more points. (The full list of community facilities, major employers, parks and schools is in Appendix A.)

Map 2 (page 36) depicts the location of all the parks, school facilities, major employers and community facilities used to prioritize projects.

These prioritization tools will help the community to understand the relative value of potential projects so that facilities can be developed in a manner that is appropriate to local issues. The identified project prioritization listings should be considered as a flexible guideline that will be used in combination with professional judgment, available resources and opportunities for developing the recommended improvements.

Ranking Criteria	
Within ½ mile of a school facility	1 point per school
Within ½ mile of community facility[15]	1 point per community facility
Within ½ mile of park	1 point per park
Within ½ mile of major employer[16]	1 point per worksite
Within ½ mile of major residential	1-3 points, depending on density
Fills in gap in system	10 points
Within high health impact area[17]	up to 5 points
Ease of construction	up to 5 points

[15]A complete list of community facilities is in Appendix A to this plan.
[16]Major employers are those employing 150 or more workers as of 2009, based on the Tennessee Community Data Sheet for Oak Ridge published by the Tennessee Department of Economic & Community Development. The list of major employers is in Appendix A to this plan.
[17]Census tracts with a higher percentage of low-income, elderly or minority populations.

Spot Location projects			Destinations within 1/2 mile:1 point each								
Map letter	Project location	Preliminary project description	school facility	community facility	park facility	major employer	residential (1-3 points)	network gap (10 points)	high health impact (5 points max.)	ease of imple-mentation (up to 5 points)	total score
A	Turnpike & Georgia	Enhanced pavement markings, countdown timers, signage needed. Check signal timing for pedestrian and bicycle crossings. Consider additional enhancements.	2	9	3	3	3	10	2	5	37
B	Rutgers & Northwestern	Enhance existing unsignalized cross-ing of Rutgers.	2	9	1	2	3	10	2	5	34
C	Turnpike & Tyler	Enhanced pavement markings, countdown timers, signage needed. Check signal timing for pedestrian and bicycle crossings. Consider additional enhancements.	1	8	3	5	0	10	2	5	34
D	Turnpike & W. Main	Enhanced pavement markings, countdown timers, signage needed. Check signal timing for pedestrian and bicycle crossings. Consider additional enhancements.	2	8	1	3	3	10	2	5	34
E	Emory Valley RD near the Senior Center	Icy sidewalk is often a problem. Enhanced crossing of Emory Valley needed to access the Senior Center.	1	6	2	3	3	10	2	5	32
F	Turnpike & Lafayette	Enhanced pavement markings, countdown timers, signage needed. Check signal timing for pedestrian and bicycle crossings. Consider additional enhancements.	2	4	3	4	2	10	2	5	32
G	ORTP between Tulane and Robertsville	Critical crossing between high school and Civic Center. Enhanced crossing treatments needed for unsignalized location.	1	11	1	1	0	10	2	5	31
H	Rutgers & Manhattan	Enhanced pavement markings, countdown timers, signage needed. Add sidewalks to Wal-Mart entrance on the west side of Rutgers. Check signal timing for pedestrian and bicycle crossings. Consider additional enhancements.	1	6	2	0	3	10	2	5	29
I	Turnpike & Illinois	Enhanced pavement markings, countdown timers, signage needed. Check signal timing for pedestrian and bicycle crossings. Consider additional enhancements.	1	5	1	1	3	10	2	5	28
J	Illinois & Rob-ertsville	Enhanced pavement markings needed. Consider additional enhance-ments.	2	3	1	0	3	10	2	5	26
K	Illinois & Rutgers	Enhanced pavement markings, countdown timers, signage needed. Check signal timing for pedestrian and bicycle crossings. Consider additional enhancements.	0	5	1	0	3	10	2	5	26
L	Illinois & Tulane	Enhanced pavement markings, countdown timers, signage needed. Check signal timing for pedestrian and bicycle crossings. Consider additional enhancements.	0	8	2	1	0	10	0	5	26

continued >>

Spot Location projects			Destinations within 1/2 mile:1 point each								
Map letter	Project location	Preliminary project description	school facility	community facility	park facility	major employer	residential (1-3 points)	network gap (10 points)	high health impact (5 points max.)	ease of imple-mentation (up to 5 points)	total score
M	Vermont & Pennsylvania	Marked crosswalk needed to ease crossing of Vermont.	3	3	1	2	2	10	0	5	26
N	Florida/Olney/ Outer intersec-tion	Enhancements needed to create safer pedestrian crossings.	1	1	1	2	1	10	0	5	21
O	Lafayette & Hendrix	Enhanced pavement markings, countdown timers, signage needed. Check signal timing for pedestrian and bicycle crossings. Consider additional enhancements.	1	0	0	4	1	10	0	5	21
P	Cedar Hill Park	Establish safe crossings for access to park.	1	1	2	0	1	10	0	5	20
Q	Melton Lake DR crossing at Amanda DR	Enhanced crossing of Melton Lake DR needed.	0	1	1	0	1	10	2	5	20
R	Melton Lake DR crossing at Emory Valley RD	Enhanced crossing of Melton Lake DR needed.	0	1	1	0	1	10	0	5	18
S	Solway Bridge	Bicycle and pedestrian facilities needed on bridge. Signs and pave-ment markings needed at Edgemoor Road interchange for guidance of bicyclists and drivers.	0	0	1	0	0	10	0	1	12
T	Lafayette/Il-linois/Scarboro intersection	Critical crossing, especially for bicy-clists. Provides access to ORNL and Y-12. Enhanced pavement markings, countdown times, signage needed. Check signal timing for pedestrian and bicycle crossings. Consider additional enhancements.	0	1	1	1	0	0	2	5	10
U	Illinois & Bethel Valley RD	Can't turn left from Bethel Valley to Illinois (this is to be corrected with signage and may be part of a bike route project).	0	0	1	1	0	0	2	5	9
V	Edgemoor Bridge	Bicycle and pedestrian accommoda-tion needed. This bridge is part of TDOT's SR 170 widening project, which should include bicycle and pedestrian facilities.	0	0	4	0	0	0	2	1	7
W	Emory Valley Greenway access	Enhanced crossing(s) needed for access from neighborhoods to greenway.	0	1	2	0	1	0	0	3	7
X	Melton Lake DR crossing at Riv-ers Run BLVD	Enhanced crossing of Melton Lake DR needed.	0	0	0	0	1	0	0	5	6

Corridor projects				Destinations within 1/2 mile: 1 point each								
Map letter	Project location	Preliminary project description	Corridor length (in miles)	school facility	community facility	park facility	major employer	residential (1-3 points)	network gap (10 points)	high health impact (5 points max.)	ease of implementation (up to 5 points)	total score
A	Oak Ridge Turnpike, between Illinois and Florida	Need bicycle lanes and sidewalks where there are gaps.	1.0	7	25	5	9	3	10	2	3	64
B	East-West bicycle route (follows Jefferson Ave., Robertsville Rd., Providence Rd., Pennsylvania Ave., Tennessee Ave., Florida Ave., Fairbanks Rd., Coalyard Rd., Warehouse Rd.)	Define route and create directional and other signage.	2.7	8	24	8	9	3	0	2	5	59
C	Illinois Avenue	Sidewalks needed where missing.	1.2	2	13	2	2	3	10	2	3	37
D	Lafayette DR	Sidewalk with curb (on west side) and bicycle lanes needed.	1.0	2	5	3	8	3	10	2	3	36
E	Melton Lake to Y-12 rail line	Create rail-to-trail greenway.	2.0	3	9	7	11	3	0	2	1	36
F	Oak Ridge Turnpike, between Florida and Melton Lake Drive	Need bicycle lanes and sidewalks.	1.5	2	5	3	4	3	10	2	1	30
G	Tuskegee DR-Illinois to Tempura DR	Bicycle facilities needed.	1.9	0	8	3	0	3	10	2	3	29
H	Emory Valley greenway	Where the greenway is along the road, install rumble strip or physical barrier. Rumble strip will be short-term fix, physical barrier long-term solution.	0.3	1	3	2	2	3	10	2	5 (rumble strip); 1 (physical barrier)	28 (rumble) or 24 (barrier)
I	Emory Valley RD-Lafayette to Donner RD	Add bicycle lanes or extend greenway.	2.0	3	9	3	4	3	0	2	1	25
J	Illinois Avenue	Bicycle lanes needed.	5.6	2	13	2	2	3	0	2	1	25
K	Hendrix Drive	Pedestrian facility or traffic calming needed.	1.7	2	4	2	6	3	0	2	1	20
L	95/58 Interchange	Signs and markings needed for bicycle safety around interchange.	2.0	0	1	0	0	0	10	0	5	16
M	Scarboro RD	Shoulders or another form of bicycle & pedestrian accommodation facility needed.	1.8	0	3	2	5	1	0	2	3	16
N	Gum Hollow RD	Bicycle and pedestrian facilities needed.	4.7	0	1	0	0	3	10	0	1	15
O	Outer and West Outer Drives-east of Illinois	Need bicycle lanes and sidewalks.	3.0	2	3	1	2	3	0	2	1	14
P	Edgemoor RD	Bicycle facilities needed. This is expected to be part of TDOT's SR 170 widening project, which should include bicycle and pedestrian facilities.	2.0	0	1	3	2	1	0	2	1	10
Q	Bethel Valley RD-Scarboro RD to Checkpoint	Shoulders or another form of bicycle & pedestrian accommodation facility needed.	4.0	0	0	1	1	0	0	2	3	7
R	West Outer Drive-west of Illinois	Need bicycle lanes and sidewalks.	5.0	1	0	0	0	1	0	2	1	5

Other projects:

Bicycle and pedestrian projects on federal land

There have been several suggestions about repurposing roads on federal properties that prohibit public access as bicycle and pedestrian facilities, or building bicycle and pedestrian facilities along these roads on federal property that are still in use. This type of project would require collaboration with the federal agencies that control and maintain these roads. City of Oak Ridge staff will continue to work with these agencies to explore this possibility.

Connecting to the Knox County greenway system

The Knoxville-Knox County Park, Recreation, and Greenways Plan, adopted in 2009, describes plans for the Pellissippi Parkway/I-140 Greenway:

Continue to develop this greenway, working with Oak Ridge, Blount County and the state to create a regional separated greenway trail, linking the communities and their greenway systems and the schools and employment centers near the route.

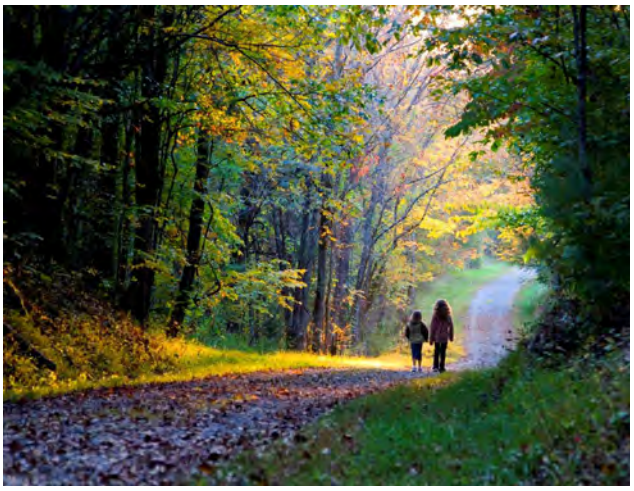
5 Year Program

Carmichael Road to Dutchtown area

15 Year Program

Pellissippi Community College to Oak Ridge (plan in conjunction with State Route 475 or other parkway improvements)
Dead Horse Lake to Dutchtown area
I-40/75 to Blount County

In order for Oak Ridge to be a part of this regional greenway network, the City should continue working with adjoining municipalities and make plans to link with their greenways.



The North Boundary Greenway, left, and Melton Lake Greenway are two of Oak Ridge's popular trails.
Photo credits: Ripely Photography

Design

Design Principles

The built environment must be well designed for pedestrians and bicyclists in order for these modes of travel to achieve their potential as integral elements of a community's transportation system. The primary elements that are essential for pedestrians are sidewalks and safe crossings.

For bicyclists, the necessary street improvements are similar: safe, user-friendly streets, intersections, and parking facilities. Trails and shared-use paths are also important facilities for both pedestrians and bicyclists. On streets and roadways, low-to-moderate motor vehicle traffic speeds and volumes and good behavior of motorists are essential. In addition, facilities must be well maintained for bicyclist and pedestrian safety and utility.

These features are summarized as follows:

1. The pedestrian/bicyclist environment should be safe, secure and user-friendly;
2. The pedestrian network should be accessible for all ages and abilities;
3. Sidewalks should be continuous, concrete or similar material, 5-foot minimum width in residential areas, with wider sidewalks in commercial areas;
4. Provide a network of shared-use paths and trails;
5. Provide on-street bikeways including bike lanes, signed routes, shared lanes and, in more rural settings, shoulders;
6. Provide bicycle parking as a standard part of the streetscape and new development;
7. Provide safe pedestrian crossings, with pavement markings and signage that are compliant with the most recent Manual on Uniform Traffic Control Devices (MUTCD);
8. Ensure that urban streetscapes include pedestrian-scaled facades, lighting, benches, signage and amenities;
9. Pedestrian right-of-way laws must be enforced; and
10. Speed limits should be appropriate for pedestrian and bicyclist safety.

Design Guidelines

The design of pedestrian and bicycle facilities should be based on current state and national guidelines, including the most recent editions of the AASHTO Guide for Development of Bicycle Facilities; the AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities; and the MUTCD. These documents provide a baseline for minimum conditions and describe solutions for the majority of facility types. It is recognized that on facilities maintained by TDOT, the State's design guidelines will apply, and that Oak Ridge has the potential to exceed these minimum guidelines, where conditions warrant, on facilities within their jurisdiction.

Street crossing improvements include basic elements such as marked crosswalks and signals

that feature pedestrian indications and are timed to meet the needs of pedestrians and bicyclists, as well as drivers. Streets crossings—either signalized or unsignalized—can be enhanced with curb extensions and median islands to shorten pedestrians' crossing distance and reduce their exposure to traffic. Pedestrian-scale lighting also improves the safety of street crossings.

The Federal Highway Administration's Bicycle & Pedestrian program has numerous resources to help choose the correct crossing treatment for each situation[18].

Here are some common treatments:

Median islands provide pedestrians with a safe refuge part way through a street crossing. They can be used at signalized or unsignalized locations. At unsignalized locations, medians can be enhanced with signs and beacons to make the crossing more obvious to drivers.

Pedestrian refuge islands break up wide street crossings.

Photo credit: www.pedbikeimages.org/Dan Burden

[18]Visit http://safety.fhwa.dot.gov/ped_bike.

Curb extensions at street crossings shorten the crossing distance for pedestrians. At intersections, they help bring turning traffic to appropriate speeds.

Curb extensions shorten crossing distances for pedestrians.

Photo credit: www.pedbikeimages.org/Dan Burden

Pedestrian facilities, or walkways, include:

Sidewalks: Located along roadways, separated with a curb and/or planting strip or swale, sidewalks have a hard, smooth surface.

Shared-Use Paths (also called trails, greenways or multi-use paths): Facilities separated from motor vehicle traffic by an open space or barrier, either within the roadway right-of-way or within a separate right-of-way. These are typically used by pedestrians, joggers, skaters and bicyclists. Shared-use paths are appropriate in corridors not well served by the street system, to create short cuts that link origin and destination points, and as elements of a community trail plan. Paths may be unpaved (packed gravel), if they are smooth and firm enough to meet ADA requirements.

Shoulders: In areas where population densities are too low to justify sidewalks, shoulders should be wide enough (6 feet minimum) to accommodate pedestrian and bicycle traffic.

Bicycle facilities, or bikeways (in no particular order), include:

Shared Roadway: Bicyclists and motorists ride in the same travel lanes. There are no specific dimensions for shared roadways. They are usually narrow, so a motorist has to cross over into the adjacent travel lane to pass a cyclist. Shared roadways are common on neighborhood residential streets, rural roads and low-volume highways.

Bicycles are legally classified as vehicles and are ridden on most public roads in Tennessee, with a few exceptions (including controlled-access facilities, like Interstate highways). Roadways must be designed to allow bicyclists to ride in a manner consistent with the vehicle code.

Shoulders: A shoulder bikeway is a paved shoulder that provides a suitable area for bicycling, reducing conflicts with faster-moving motor vehicle traffic. Most bicycle travel on the rural state highway system, and on many county roads, is accommodated on shoulder bikeways.

Bike Lane: A portion of the roadway designated for preferential use by bicyclists. Bike lanes are appropriate on busy urban thoroughfares. They may be used on other streets where bicycle travel and demand is substantial. Bike lanes are marked to call attention to their preferential use by bicyclists.

Shared-Use Paths (also called trails, greenways or multi-use paths): Facilities separated from motor vehicle traffic by an open space or barrier, either within the roadway right-of-way or within a separate right-of-way. These are typically used by pedestrians, joggers, skaters and bicyclists. Shared-use paths are appropriate in corridors not well served by the street system, to create short cuts that link origin and destination points, and as elements of a community trail plan.

Bike Lane
Photo credit: Oak Ridge Staff

Shared-Use Path
Photo credit: Ripely Photography

Bicycle Boulevards: The operation of a local street is modified to function as a through street for bicyclists while maintaining local access for automobiles. Traffic calming devices reduce traffic speeds and discourage through trips by automobiles. Traffic controls limit conflicts between automobiles and bicyclists and give priority to through bicycle movement.

> *(Note: a **Bicycle Route** involves installing directional signs including destinations. A bicycle route is not a bicycle facility, but provides an amenity for bicyclists. Signed bicycle routes are useful where bicyclists are directed to follow a routing that differs from the routing recommended for motorists. The routing must have obvious advantages over other routes, such as for safety, convenience, or because bicyclists are banned from a section of roadway. See Appendix B [page 41] for more details on bicycle signage.)*

The Americans with Disabilities Act

The Americans with Disabilities Act (ADA) prohibits discrimination on the basis of disability and mandates that all disabled persons be provided full access to all public facilities in the country. Designing and constructing public facilities that are not usable by people with disabilities is a violation of the ADA.

Current ADA standards, which are contained in the 2002 edition of the Americans with Disabilities Act Accessibility Guidelines (ADAAG), thoroughly outline requirements for building design. However, ADAAG provides little guidance regarding the design of facilities in public rights-of-way. There are several resources available that offer guidelines for accessible design for public rights-of-way, sidewalks, sidewalk ramps, street crossings, and related pedestrian facilities. The City is in the process of adopting the International Code Council/ American National Standards Institute (ANSI) A117.1 *Accessible and Usable Buildings and Facilities,* which provides architectural features and site design of public buildings and residential structures for persons with disabilities.

Ramps with textured surfaces help make streets accessible for all users.
Photo credit: www.pedbikeimages.org/Dan Burden

Next Steps/Implementation

The City of Oak Ridge will oversee implementation of this plan. The first and most vital step is to establish roles and responsibilities within City staff to implement and coordinate elements of the plan.

After that, it will take great cooperation and commitment to accomplish the recommendations and projects put forth in this plan. Every step forward is an investment in a future where bicycling and walking are safe and convenient, giving people another choice for how they get around their communities.

Funding

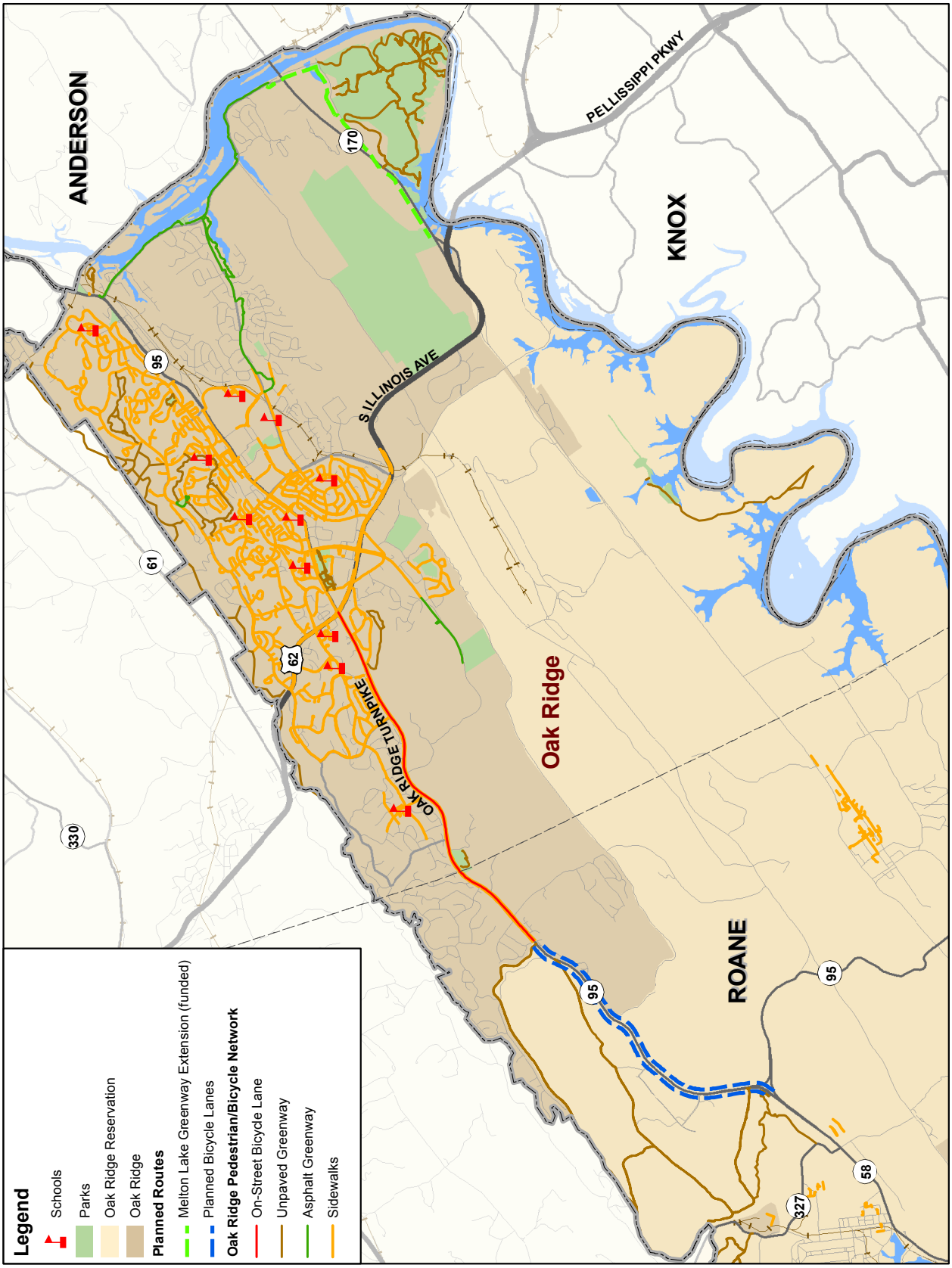
There are numerous funding sources for bicycle and pedestrian infrastructure planning and projects. The 2009 Regional Bicycle and Pedestrian Study completed by the Nashville Area Metropolitan Planning Organization compiled a list of funding sources, which is reprinted below with their permission. For more information on these programs, refer to Technical Memorandum #7 of the study: Funding Toolbox (http://www.nashvillempo.org/docs/bikeped/Tech_Memo_7_final_113009.pdf).

Funding Source	Category	Relevant Project Type(s)
Interstate Maintenance (IM) Funds	Federal	Facilities (Interchanges/Overpasses)
National Highway System (NHS) Funds	Federal	Facilities (National Highway System only)
Surface Transportation Program (STP) Funds	Federal	Facilities, Programs, ADA Projects
Transportation Enhancement (TE) Grant Funds	Federal	Facilities, Educational Activities, Rail-Trails
Congestion Mitigation and Air Quality Improvement Program (CMAQ) Funds	Federal	Facilities, Safety Projects
High Priority Projects (HPP) Program Funds	Federal	Facilities
Highway Bridge Program (HBP) Funds	Federal	Facilities (Across Bridges)
Recreational Trails Program Grant Funds	Federal	Trail Facilities
Transportation, Community, and System Preservation (TCSP) Program Grant Funds	Federal	Planning and Facilities
National Scenic Byways Program Grant (NSBP) Funds	Federal	Planning, Facilities, and Programs
Federal Lands Highway Program Grant (FLHP) Funds	Federal	Facilities (e.g. trails) near/inside Federal lands
Safe Routes to School Program (SRTS) Grant Funds	Federal	Facilities, Education, & Enforcement (School-Based)
Highway Safety Improvement Program (HSIP) Funds	Federal	Safety-Related Programs and Projects
State and Community Highway Safety Grant Funds	Federal	Safety-Related Programs and Projects
State Planning & Research (SPR) Funds	Federal	Planning and Research
Metropolitan Planning (PL) Funds	Federal	Planning and Programs
Federal Transit Program Funds	Federal	Access to Transit
Job Access and Reverse Commute (JARC) Grant Funds	Federal	Bicycle-Related Services
Land and Water Conservation Fund (LWCF) Grants	Federal	Trail and Greenway Facilities

continued >>

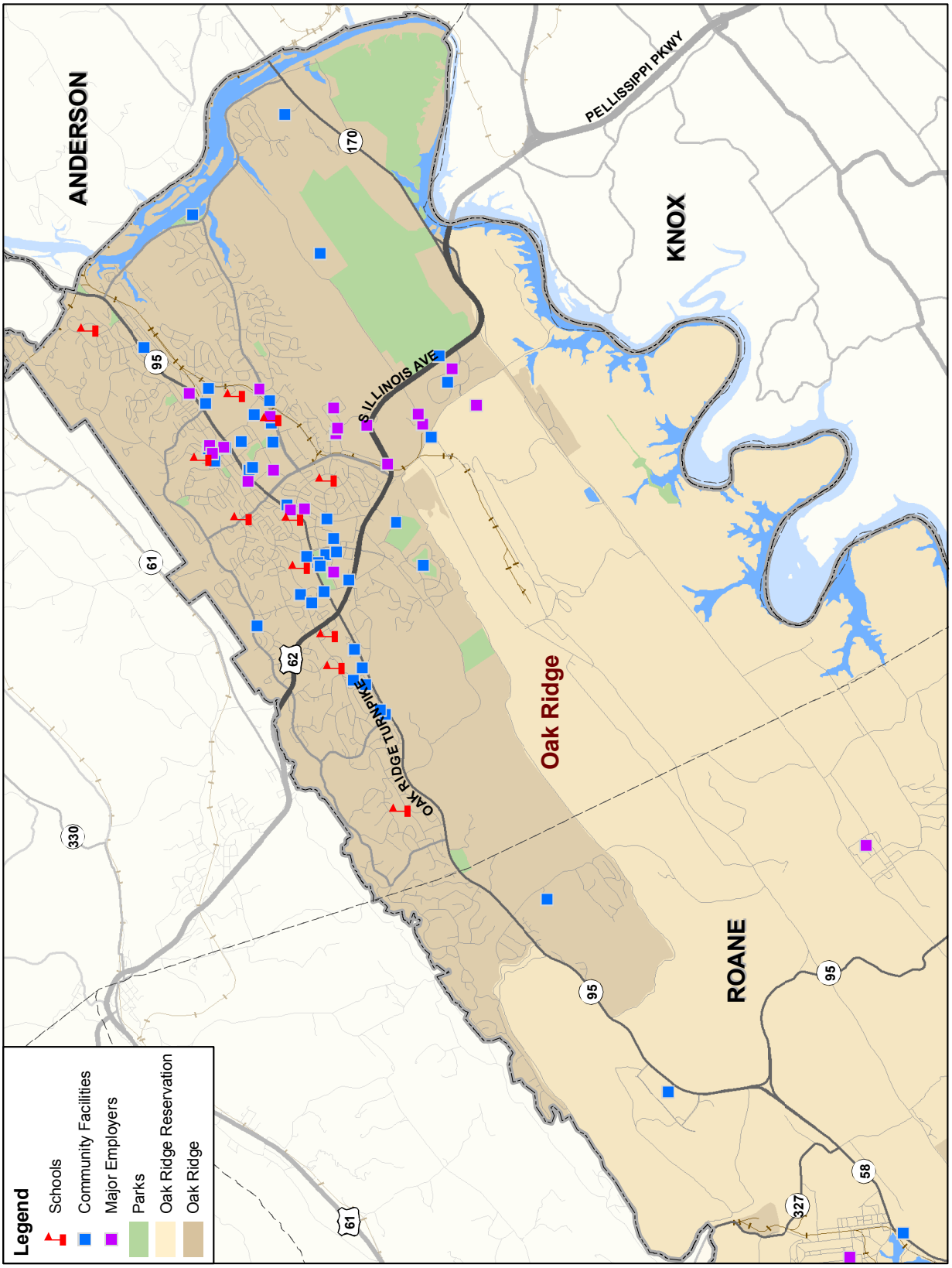
Funding Source	Category	Relevant Project Type(s)
EPA Climate Showcase Communities Grants	Federal	Climate Change Initiatives
HUD Community Development Block Grant (CDBG) Funds	Federal	Facilities
Tennessee Tax-Based Funding Sources	State/Local	Facilities
Hotel-Motel Tax	Local	Facilities
Local Parks and Recreation Fund (LPRF) Grants	State	Greenway/Trail Projects
Natural Resources Trust Fund (NRTF) Grants	State	Greenway/Trail Projects
Private Sector Requirements	Local	Facilities
Bikes Belong Coalition Grants	Private	Trail Projects
National Civilian Community Corps Grants	Private	Trail Projects
Kodak American Greenways Awards	Private	Greenways
Fish America Foundation Grants	Private	Greenways
American Hiking Society National Trails Fund Grants	Private	Hiking Trails
Global ReLeaf Program Grants	Private	Trail Tree Plantings
Robert Wood Johnson Foundation Grants	Private	Physical Activity-Related, Environments, or Policies

Map 1: Existing Network and Planned Improvements



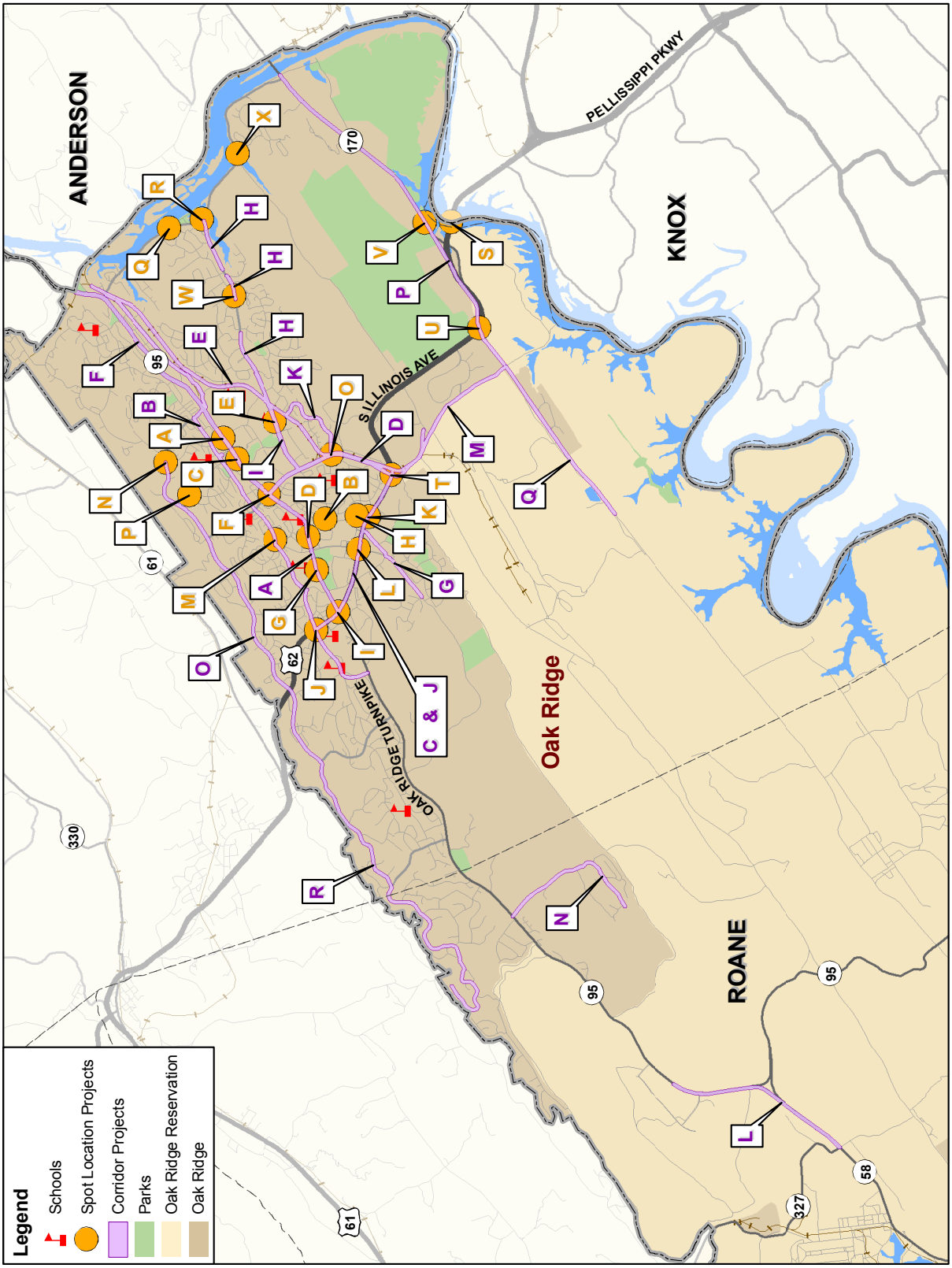
Map 2: Schools, Community Facilities, Major Employers and Parks

For a list of all the locations shown here, see Appendix A. For a description of how these locations were used to prioritize projects, see page 23.



Map 3: Spot Location Projects and Corridor Projects

For identifying information, see pages 25-27.



Appendix A

The following locations were considered community facilities for the purpose of prioritizing the projects in this plan.

A&W Plaza
American Museum of Science and Energy
Big Ed's Pizza
Briarcliff Square
Central Services Complex
Civic Center
Chamber of Commerce
Children's Museum
Commerce Office Park
Convention & Visitors Bureau
Fairbanks Plaza
Federal Building
Four Oaks Center
Frank Callaghan Towers
Girls Inc.
Grove Center
Horizon Center
Jackson Plaza
Jackson Square
Jefferson Center
K-25 Overlook
Manhattan Place
Municipal Building
New Hope Center
Oak Ridge Boys & Girls Club
Oak Ridge Golf and Country Club
Oak Ridge Mall
Oak Ridge Marina
ORAU Center for Science Educations
Outdoor Pool
Post Office at 301 S. Tulane Ave.
Post Office at 108 Administration Road
Public Library
Ridgeway Center
Roane State Community College
Rogers Group
Scarboro Community Center
Security Square
Senior Center
Skate Park
Tennessee Centennial Golf Course
UT Arboretum
West Side Plaza
Woodland View Apartments
YWCA

The following locations were considered major employers for the purpose of prioritizing the projects in this plan.

Ametek
Answer Financial
Bechtel Jacobs
Bechtel National
ClientLogic
Duratek
Emory Valley Center
Energy Solutions
Jacobs Engineering
Methodist Medical Center
Navarro Research & Engineering
Oak Ridge Associated Universities
ORNL
ORNL Federal Credit Union
Pro2Serve
SAIC
Theta Technologies
USEC
UT-Battelle
Wackenhut-Oak Ridge
Washington Group
Weskem
Y-12

School facilities

Blankenship Field
Glenwood Elementary
Jefferson Middle School
Linden Elementary School
Montessori Center of Oak Ridge
Oak Ridge High School
Oak Ridge Schools' Preschool
Robertsville Middle School
St. Mary School
Willow Brook Elementary School
Woodland Elementary School

Parks

A.K. Bissell Park
Big Turtle Park
Briafcliff Park
Carl Yearwood Ball Park
Cedar Hill Park
Clark Center Park
Elm Grove
Elza Gate Park
Gamble Valley Rec Hall
Groves Park
Haw Ridge
Hopkins/Strang Park
Melton Lake Park
Milt Dickens Park
Pinewood Ball Park
Scarboro Community Center
Scarboro Park
Soloway Park
Tennis Courts
University of Tennessee Abroretum

Appendix B: Bicycle Signage

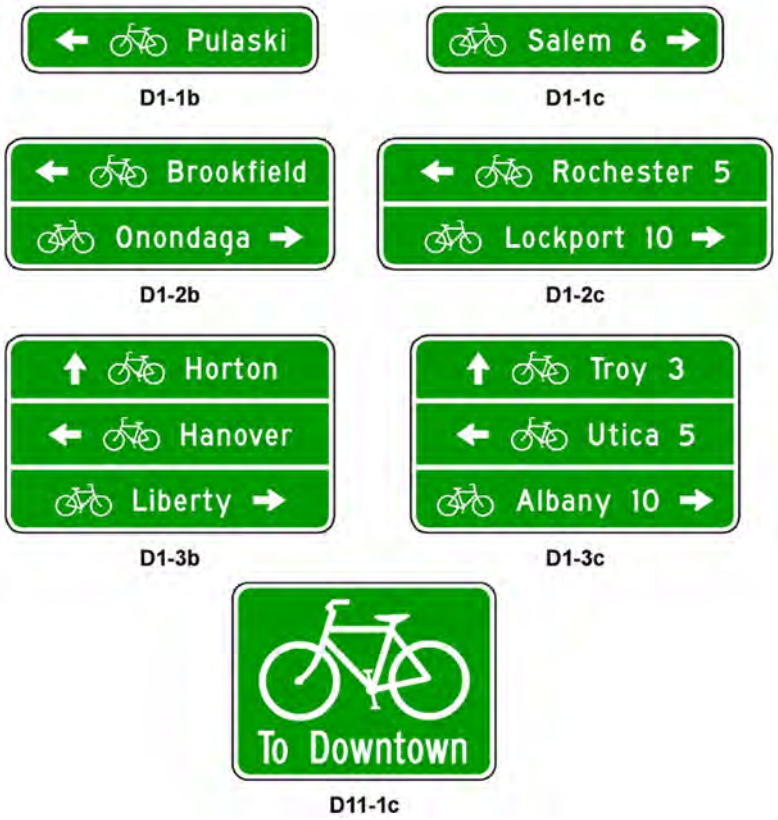
Part 9 of the 2009 *Manual on Uniform Traffic Control Devices* (MUTCD) should be followed in providing traffic controls for bicycle facilities. Below is additional information to assist in determining placement of signs.

Bicycle guide (route) signs are helpful to direct bicyclists along urban and suburban streets, and highways in rural areas. Guide signs provide bicyclists the following advantages:

- Information about intersecting bicycle routes and shared-use paths; and
- Specific guidance to desirable destinations such as parks and recreation areas, schools, libraries and post offices, commercial centers.

Bicycle guide signs are typically used to mark one or more bicycle routes, ideally a system of routes planned for a local jurisdiction or region. Designated bicycle routes are often developed to serve one or more of various bicycle trip types—such as recreational, commuting or utilitarian trips. The overarching purpose for providing guide signing along a bicycle route should include one or more of the following:

- To provide wayfinding guidance that is necessary to ensure efficient and successful bicycle navigation of a route;
- To provide guidance to a specific place or series of places that are frequented by bicyclists or to which bicyclists are likely to desire access;
- To provide an element of permanent and highly visible bicycle transportation marketing in the public realm, as an encouragement to increased use of the bicycle to meet transportation needs, or to support bicycle touring as an economic development activity; or
- To complement published maps and/or brochures providing bicycle route and travel information related to a specific community, or place within a community.



The 2009 MUTCD offers several options for bicycle guide signs, including the D11-1 & D1-1a assembly, D1-1c and D11-1c.

Share the Road (W11-1 with a W16-1 plaque) warning signs can be used to alert motorists of the presence of bicyclists in locations where conflicts between motorists and bicyclists are frequent, and where there are no immediate opportunities to provide additional space for bicyclists.

The following are examples of where Share the Road signs may be used:

- where bicycling conditions are poor (i.e. high traffic volumes, operating speeds greater than 35 mph, no shoulder space);
- areas of roadway with poor sight distance;
- transitions to shared travel lanes at the end of shoulders or bicycle lanes;
- where an obstacle prevents bicyclists from continuing on an otherwise rideable shoulder.

In general, Share the Road signs should not be used in locations with good bicycling conditions, such as roadways with low traffic volumes or roads with wide paved shoulders or bicycle lanes.

Shared lane pavement markings may be used along urban and suburban roadways where bicycling is frequent and where it is not possible to stripe a separate bicycle lane due to width constraints. The shared lane marking may be used to:

- Help bicyclists position themselves in lanes too narrow for a motor vehicle and a bicycle to travel side by side within the same traffic lane;
- Encourage safe passing of bicyclists by motorists;
- Reduce the chance of a bicyclist hitting the open door of a parked vehicle in a shared lane with on-street parallel parking;
- Alert road users of the lateral location bicyclists may occupy; and
- Reduce the incidence of wrong-way bicycling.

The shared lane pavement marking should not be placed on roadways with speed limits posted above 35 mph.

Bicycles May Use Full Lane signs (R4-11) may be used on roadways with no bicycle lanes or adjacent shoulders usable by bicyclists and where travel lanes are too narrow for bicyclists

Shared-lane pavement marking
Photo credit: BikeArlington

and motor vehicles to operate side by side. The Bicycles May Use Full Lane sign may be used in locations where it is important to inform road users that bicyclists may occupy the travel lane in order to prevent unsafe passing.

On narrow rural roads commonly used by cyclists, it may be helpful to install bike warning signs (W11-1) with ON ROADWAY or ON BRIDGE plaques, where there is insufficient shoulder width for a significant distance. Signs should be placed in advance of the roadway condition. If the roadway condition is continuous, "NEXT XX MILES" plaque may be used.

Where a shared roadway, shoulder bikeway, bike lane or shared-use path crosses a railway at an unfavorable crossing angle, or if the crossing surface is rough, an angled railroad crossing warning sign may be used (W10-12 and W11-1).

W10-12

W11-1

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