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CHAPTER ONE:
2025 TRANSPORTATION PLAN

1.1 Introduction

Transportation planning in the Columbia area has enjoyed a long history beginning with the adoption of "A City Plan for Columbia, Missouri" in 1935. The first Major Thoroughfare Plan depicting the location of future roadways in Columbia and Boone County was developed by the Columbia Area Transportation Study Organization (CATSO) in 1968. In 1994, CATSO revised and adopted the current 2015 Transportation Plan, The Major Thoroughfare Plan element of the 2015 Plan has been amended by CATSO and adopted by Boone County and the City of Columbia in 1997.

Over the years this series of transportation plans have provided guidance for development of facilities that serve the transportation needs of Boone County and the City of Columbia. The plan goals have been to move people and goods within and through the community in an efficient, cost-effective manner and to minimize disruption to neighborhoods and other sensitive areas. The implementation of a transportation plan has a direct effect on the form and character of a community by influencing development decisions. For this reason, land use and land use planning have traditionally been tied to transportation issues.

The Intermodal Surface Transportation Efficiency Act (ISTEA) passed by Congress in 1991 brought about significant changes in the MPO transportation planning process. The ISTEA planning process required updates to transportation plans for a 20-year time horizons, placed emphasis on reducing the growth in vehicle miles travelled by individuals, implementing Clean Air Act requirements, intermodal means of transportation, and examining the land use implications of transportation decisions. Equally significant was the ISTEA requirement that the transportation plan be financally constrained. Funding for transportation investments (roads, aviation, transit, bicycle/pedestrian) identified in the plan must be shown to be available over the twenty year period.

It is the intent of this plan is to continue the process begun with ISTEA and address the Transportation Equity Act for the 21st Century (TEA-21) requirements to develop a plan that meets the needs of the Columbia and Boone County through the first quarter of the 21st century.

1.2 Goals and Objectives

The goals for the CATSO 2025 Transportation Plan are as follows:

1. Plan and develop a coordinated and comprehensive intermodal transportation system to provide for safe and efficient movement of people and goods within and through the community;

2. Provide coordination with applicable land use and development plans in order to insure that the transportation system contributes to orderly development of the community;

3. Identify policies to make more efficient use of the existing transportation system to accommodate existing and future travel demands, and specify facilities which should function as part of the integrated metro area transportation system;

4. Integrate all forms of transportation, where possible, focusing in particular on alternate forms of transportation to the auto in order to reduce congestion and environmental impact, save energy and provide a reasonable alternative to driving.

5. Analyze the socioeconomic and environmental impacts of all transportation projects.

The Transportation Equity Act for the Twenty-first Century (TEA-21) 1991 mandates the following for transportation planning: "The metropolitan (and statewide) transportation planning process for a metropolitan area (of State) under this section shall provide for consideration and strategies that will:

A) Support the economic vitality of the metropolitan area (or State), especially by enabling global competitiveness, productivity and efficiency;

B) Increase the safety and security of the transportation system for motorized and nonmotorized users;

C) Increase the accessibility and mobility options available to people and freight;

D) Protect and enhance the environment, promote energy conservation, and improve quality of life;

E) Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;

F) Promote efficient system management and operation; and

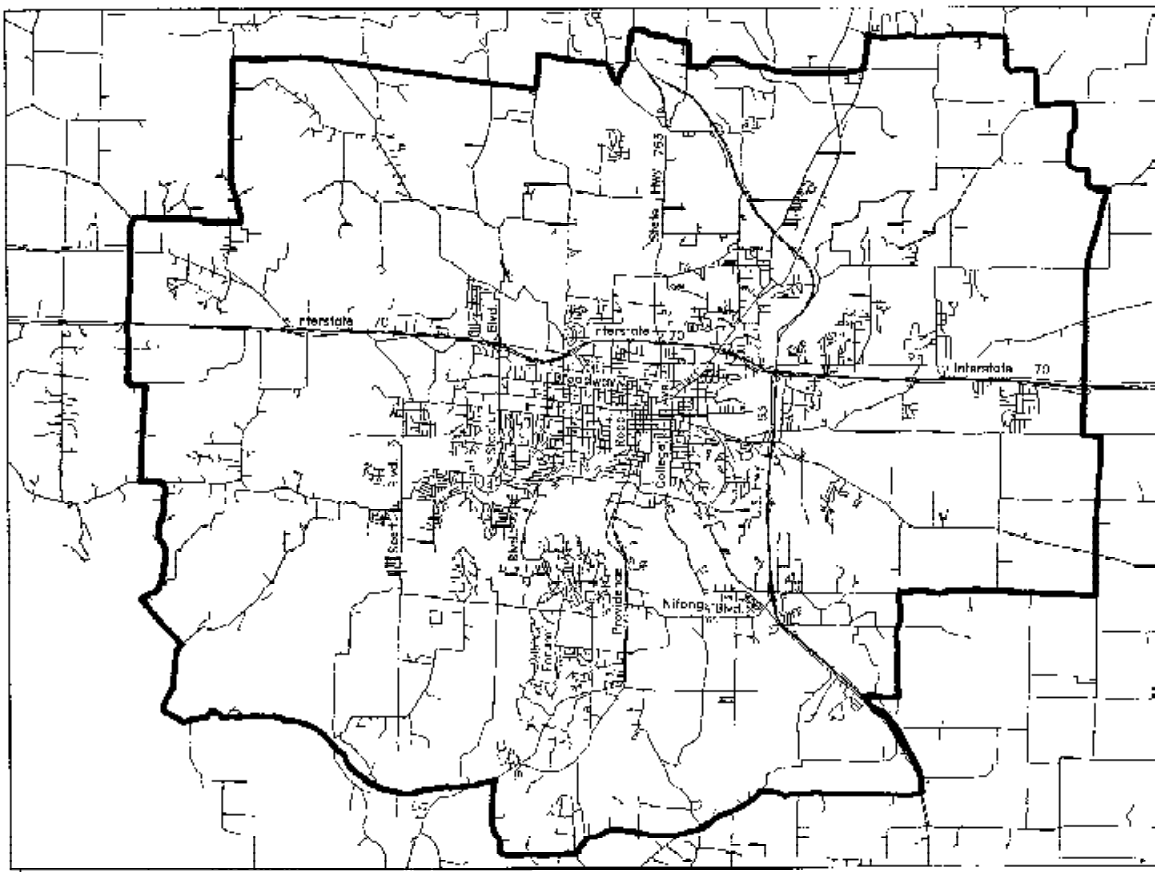
G) Emphasize the preservation of the existing transportation system."

1.3 Study Organization

In 1974, the Columbia Area Transportation Study (CATSO) was designated by the Governor of Missouri as a Metropolitan Planning Organization (MPO). Along with the MPO designation came access to federal funds for street and bridge improvement projects as well as a responsibility to perform transportation-related planning in accordance with the federal "3-C" process. The "3-C" process of continuing, cooperative and comprehensive planning is funded in large part by the Federal Highway Administration and the Federal Transit Administration in Columbia, and is required in order to continue to receive federal/state capital and operating monies.
The Columbia Area Transportation Study Organization relies on two committees to perform its 3-C planning. The technical committee is comprised of staff level planners, engineers and other transportation professionals from the Missouri Highway and Transportation Department, Boone County, and the City of Columbia who, as the name implies, undertake technical aspects of plans, studies and reports for the metropolitan area. The coordinating committee is made up of upper level city and county staff members, local elected officials, Missouri Department of Transportation staff, Federal Highway Administration staff and Federal Transit Administration staff. This is a policy making group which directs the activities of the technical committee and approves documents prepared on behalf of the MPO. Staff support for CATSO is provided by the City of Columbia Department of Planning and Development.

1.4 Study Area

Map 1: Columbia Metropolitan Area; shows the City of Columbia and those areas in Boone County addressed by this plan and by the duties of the CATSO committees. The planning area includes the City of Columbia and the surrounding areas in Boone County that are expected to urbanize within the next 20 years. This area was adopted by the Coordinating Committee on March 18, 1993. Transportation Analysis Zones (TAZ's) have been developed for the entire area for eventual traffic analysis. Much of the data found in this report are a mix of Columbia and Boone County statistics which were extracted from 1990 census information or have been developed for the entire area for eventual traffic analysis.



Map 1. Columbia Metropolitan Area

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CHAPTER TWO:

POPULATION AND EMPLOYMENT: 2025

2.1 Population Forecast: 2025

There are several methods and sources available for projecting population growth for Boone County and the smaller study area to the year 2025. Each of these have been examined as have their underlying assumptions about migration, birth and death rates, and other factors. Table 5: Population Growth and Projections; illustrates product of several projections.

For purposes of transportation planning, a projection of 147,000 people in the year 2025 for the county is selected. The resulting figures for the metro area and for the county, on 5-year increments, are shown in Table 6: Selected Population Projection; The metro area population is expected to retain the current share of total county population. The projections represent a slight increase in the county share of state wide population for 2025.

Regular monitoring of local growth will allow us to adjust these figures over time, and formal adjustment will occur as the transportation plan is updated every 5 years.

Forecasting population growth for the Columbia Metro Area for the year 2025 was based on local housing demographic data including the 1990 Census and building permit information from Boone County Planning and Building Inspection and the City of Columbia.

The population of the Metro Area is expected to increase to 138,600 persons by 2025. This is an increase of 34,507 persons from the 2000 Metro estimated population of 104,093. It is projected that 88% of this increase, or 30,366 persons, will occur within the City of Columbia by 2025.

2.2 Employment Forecast: 2025

A number of sources were examined to arrive at 2025 employment projections. Woods and Poole Economics, Inc., Bureau of Economic Analysis, Regional Projections to 2040, and the U.S. Census all show a steady relationship between population and employment throughout the planning period. In 1990, there was a ratio of .55 persons per job in Boone County. This ratio has increased slowly over the years, partially because more women have entered the work force. As fewer people are in the work force toward the end of the period, the ratio decreases. Furthermore, all sources indicate decreasing rates of growth in employment. For these reasons, a continuation of the .55 persons per job ratio is applied to the 2025 projection population, yielding an employment projection of 80,850 in Boone County. Assuming 90% of the jobs will be in the study area, the plan suggests 72,765 as the projected employment figure for 2025.

It must be emphasized that this number does not represent the total number of employed persons within the county. Rather, it is employment within the county, regardless of place of residence. The total employment figure and employment locations provide essential data needed for transportation modeling.

In forecasting employment growth for the Columbia Metro Area for the year 2025, use was made of the state of Missouri's Department of Labor employment projections. For Service Delivery Area (SDA) Five, which contains eight central Missouri counties, including Boone, the Department of Labor forecasts an annual job growth of 1.25%. This would result in a total of 207,172 employees in SDA Five in 2025. Boone County's current percentage of total employment in the area is 44%, and if this percentage is maintained Boone's total employment in 2025 would be 91,156.

Since the Columbia Metro Area is the principal job generator of the region, however, it is projected that employment growth in Boone County will occur at a faster rate than in the rest of SDA Five. The anticipated growth rate for Boone County for the period from 2000 to 2025 is 1.3% annually. This results in an increase of 22,624 jobs to a total employment of 95,137 in 2025. Boone County's share of the SDA Five's total employment would be approximately 46%. The Columbia Metro Area's share of total employment in Boone County is assumed to be 90%, so employment in the Metro Area would increase by 20,361 persons. This is a total of 85,623 jobs, and a 31% increase from the 2000 total of 65,261.

For 2025, it is projected that the above classifications will have minor changes, with some percentage growth in government and services, and minor declines in manufacturing and commercial. The following percentages are estimated for the new jobs to be created through 2025:

Table One: Metro Area Population and Employment Growth through 2025 by Type

Employment & Population Growth	2000	2025	Growth: 2000 - 2025
Metro Area Population:	104,093	138,600	+34,507
Employment by Type:	65,261	85,623	+20,362
Manufacturing	5,940	6,422	+482
Government	20,296	28,256	+7,960
Services	14,096	19,693	+5,597
Commercial	15,141	19,265	+4,124
Agricultural	391	514	+123
Mining	65	85	+20
Construction	2,806	3,425	+619
Transport & Utilities	2,415	2,826	+411
Finance/Insurance/Real Estate	4,111	5,137	+1,026

2.3 Metro 2025 Land Use Forecast

To plan for improvements to the transportation system, it is necessary to anticipate where the 2025 population will live and work. For travel demand modeling purposes, the projected increase and location of future housing and employment is allocated by Transportation Analysis Zone (TAZ). To estimate future travel demand, data from the City of Columbia household survey conducted the Department of Planning and Development in the summer of 1993 and the U.S. Census Journey-to-Work information from the Census Transportation Planning Package is included with the growth allocation. This data is used with a along with a travel demand model to produced trip generation estimates assign trips to a model street network.

Future population (dwelling units) and employment were allocated to individual TAZ's within Columbia and Boone County. For unincorporated portions of the study area, Boone County Planning Department officials were consulted. For TAZ's within Columbia, the City of Columbia's 1992 Land Use Plan provided the basis for the allocation based upon the Plan's recommended land uses.

It is projected that 17,253 new housing units will be constructed in the Metro area. This projection assumes a 10% vacancy rate, and an average of 2.2 persons per household. Of these, 10,142 will be single-family houses, with 3,643 duplex units and 3,468 multi-family units. For single family homes, a range from 1-6 units per acre could be expected, with two or three units per acre the typical density. Land requirements for the total of 10,142 projected dwelling units could vary from 1,680 acres at the highest density, to 8,895 acres at the lowest density. Given typical range of densities, it is estimated that between 3,381 to 5,070 acres would be necessary for new single family development. At 2.5 units per acre, the midpoint of the range, 4,057 acres would be required for the construction of the projected 10,142 new single family residences.

Duplexes are typically constructed at densities ranging from five to seven dwelling units per acre. The projected 3,643 duplex dwelling units could require the development of between 728 acres at the lowest density to 519 acres at the highest density. At six units per acre, the midpoint of the range, 607 acres would be required for the construction of the projected new duplexes.

Multi-family units are built to the highest densities, and can range from 7 to 17 units per acre. This group includes townhouses, condominiums, single and two-story apartments. Acreage requirements for the projected 3,468 units could run from 495 acres at the lowest density (seven units/ acre) to 203 acres at the highest density of 17 units per acre. A density of 10 to 11 units per acre is most typical. At 11 units/acre, 315 acres would be necessary.

The estimated total acreage needed to build the projected 15,336 new housing units to be added to the Columbia metro area by the year 2025, at the typical densities constructed, would be approximately 4,979 acres, or 7.8 square miles.

Estimated acreage requirements for this employment will vary by the type of classification. For purposes of estimating the acreage necessary to accommodate new employment, the above employment types are combined and assigned to either office, industrial, or commercial categories. Industrial (1,532 new jobs) includes manufacturing, construction, transport & utilities, agriculture, and mining. Office (11,785 new jobs) includes government and finance, insurance, and real estate and fifty percent of the estimated employment for services. Commercial (6,922 new jobs) includes commercial and fifty percent of the estimated employment for services.

Office uses are estimated to have on average 29 employees/acre, industrial uses an estimated 18 employees/acre, and commercial uses estimated with 20 employees/acre.

To accommodate the projected additional 20,362 employees in the Metro Area by 2025, it is estimated that a total of approximately 837 acres will be needed. This includes; 85 acres for industrial, 406 acres for office, and 346 acres for commercial.

Table Two: Estimated Acreage by Land Use for New Development through 2025

Land Use	Acres	Percent of Total
Residential	4,979	84.6%
Office	274	4.7%
Commercial	463	7.9%
Industrial	175	2.8%
Total	5,891	100.0%

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CHAPTER THREE:

EXISTING TRANSPORTATION FACILITIES

3.1 Streets, Roads, and Highways

Within the Study area, there are approximately 490.3 miles of roadway. Boone County is responsible for 162.3 miles, the City of Columbia maintains approximately 266 miles of street, and there are 100.25 miles of streets and highways maintained by the State of Missouri (including Interstate 70). As of January 1, 1980, there existed 211 miles of city streets and 58 miles of state routes. Streets within the metro area are planned and designed according to the hierarchy of functional classification. The MPO uses a somewhat different classification system than does the State of Missouri and the Federal Highway Administration. Roadways are classified in order of function, such as property access, length and purpose of trip, traffic volumes and relationship to the rest of the system. Highways and expressways, for example, typically carry the highest volumes of traffic, carry through trips or cross-town traffic, offer limited access to adjoining property and are the "receivers" or "senders" of large amounts of traffic to and from the rest of the system. Arterial streets are the next in order of importance; collectors carry traffic from and to neighborhoods and activity centers, while local streets carry low volumes of traffic and provide direct access to adjoining property. This concept is meant to achieve efficiency and order in the street system.

The Missouri Department of Transportation (MoDOT), Boone County, and the City of Columbia are the three agencies in the metro planning area responsible for the maintenance and construction of the transportation infrastructure. The following table provides a summary of the arterial and collector street mileage by agency:

Table Three: Arterial/Collector Street Mileage by Agency

Agency	Miles In Urbanized Area	Miles In Metro Area
MoDOT	63.28	100.25
Boone County	18.29	81.17
City of Columbia	95.25	95.25

Highways on the state and federal systems provide much of the roadway network structure and capacity in all the roadway corridors in the metro area. Of the 100.25 miles of roadway under MoDOT jurisdiction, approximately 22% is comprised of high speed, limited access facilities.

Appendix A: Functional Classification of Roadways; provides a summary of the total mileage of roadways in the Metro area and the mileage by functional classification for streets and highways in the CATSO Major Roadway Plan.

The private automobile is by far the preferred mode of transport operationing on the Columbia area street network. The demographics and work trip characteristics for auto trips in the Urbanized area are outlined in Appendix B: Work Trip Travel Characteristics.

3.2 Public Transportation

A. Columbia Transit

The City of Columbia operates Columbia Transit, formerly CATS, which serves as the sole publicly funded bus service in the metro area. The City of Columbia began providing public transportation service in 1965 with the creation of the Columbia Municipal Bus System.

Columbia Transit runs four full service fixed routes, one commuter route and offers complimentary ADA paratransit service within the City of Columbia. Map Two: CT Service Area; shows those areas of the metro area covered by public bus service. The estimated population served is 57,370. Fixed route and paratransit ridership for FY-1999 was 602,547

The City of Columbia policy on providing transit service is:

1) Provide public transportation in the most cost efficient manner possible;
2) Develop public confidence in the public transportation system;
3) Establish and maintain a direction for growth of the public transportation system and a level of commitment to future service; and
4) Encourage the use of public transportation as an alternative to travel by auto mobile to promote the preservation of the environment through the conservation of fossil fuel resources and improved air quality.

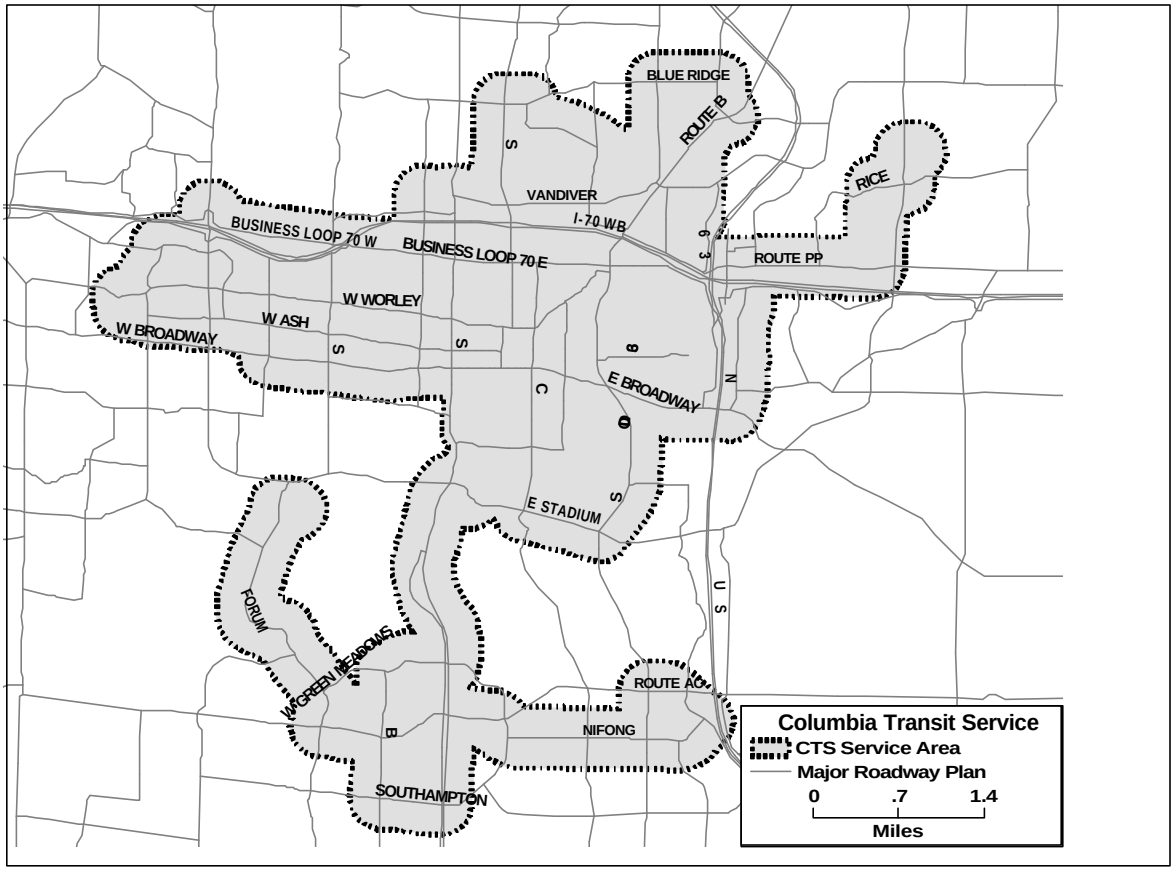
Household survey information indicates that the average transit travel time to work is 29 minutes, which is double the average for all other modes except carpools. For transit to begin to attract ridership from other modes, the average travel time will need to be approximately 21 minutes.

The annual ridership in 1980 was 1,100,000+. From that high in 1980, ridership declined from 1981 to 1990. The decline in ridership follows the national trend of reduced transit ridership. Locally, the decline in fixed route ridership was picked up on the University of Missouri Parking Lot Shuttle Bus which is operated by the City of Columbia under contract with the UM/C. The combined ridership in 1993 for Columbia Transit and the Parking Lot Shuttle Bus was approximately 1,100,000 riders. The shift to the UM/C system can be attributed to the increase in the parking supply on and near the campus.

In August 1993, the previous ten route looping bus system designed in 1965 was replaced with a five route crosstown routing scheme. The effect of the changes were reduced travel times for transit riders and a greatly reduced transfer rate, from 35% to 14%. The time spent per trip was reduced from a maximum of one hour and five minutes to a maximum of thirty-five minutes. FY-1999 ridership was 576,073+ with another 283,300 served by the University of Missouri Parking Lot Shuttle, giving a combined ridership of 859,573. CT has been experiencing a 20+% growth rate over the last three years on the fixed route system. CT maintains a fleet of 17 buses, all equipped with wheelchair lifts. All of the buses fully comply with ADA design standards and feature a “low floor” design which utilizes ramps instead of lifts providing unassisted boarding for riders using wheelchairs. The low floor/ramp system is more reliable than the conventional lift system and has significantly fewer operational problems

In January 1993 para-transit service was started at CT for individuals with disabilities which prevents them from using fixed route service. Initially this service was operated with three vans that were converted to ADA specifications locally. This initial ridership of 4,567 in FY 93 has grown to an annual ridership of 26,474 in FY-1999. The system currently has eight vehicles running a peak service of four vehicles all day long. Paratransit continues to grow at a 5+% growth rate per annum.

CT fixed route transit and paratransit services are available from 6:25 a.m. to 6:05 p.m., Monday through Wednesday and from 6:25 a.m. to 10:05 p.m., Thursday through Friday, and 9:45 a.m.



Map Two: Columbia Transit System Service Area

to 10:05 p.m. on Saturday. Buses run on 40 minute headways during the peak morning and evening periods and 80 minute headways midday, night, and Saturday on three routes; as well as 40 minute headways all the time on one route. Paratransit service is operated on a one hour response time, reservations must be made 24 hours in advance. Paratransit serves the whole city with priority given to ADA service area (3/4 mile from a fixed route).

CT's transfer facility is located downtown in the Wabash Station building. This facility should remain in its current location, serving the City Center and adjacent neighborhoods. Higher density development promotes greater transit ridership. As such, the higher density residential in the City Center and adjacent areas, and the three campuses with their student populations are prime locations for transit service. Major employment areas should also be served by transit. Such areas include the University of Missouri campus, the Columbia Mall, and other commercial areas such as those in the Interstate 70 corridor.

The demographics and work trip characteristics for transit trips in the Urbanized area are outlined in Appendix B: Work Trip Characteristics. Appendix C: Columbia Transit Equipment; provides a description of the inventory of transit vehicles in service.

B. OATS, Inc.

OATS, Incorporated, is a private not-for-profit transportation service provider serving 87 of Missouri's 114 counties. OATS' corporate offices are located in Columbia at 100 East Texas Avenue. Its Mid-Mo operation, serving 15 central Missouri counties, is also based in Columbia at the Parkade Plaza at 601 Business Loop 70 West. OATS' door-to-door services are prioritized for seniors and persons with disabilities. The City of Columbia and Boone County are served with a total of 20 vehicles, some of which are back up equipment. In the urbanized area of Boone County, services are available to the general public provided they pay for the service

since no subsidy is available. In the rural portion of Boone County, general public service is available on a space available basis to the general public whose needs can be met by OATS schedules. Operating funding is through a variety of contracts, including Area Agency on Aging, United Way, City of Columbia/Boone County, the dialysis clinic and numerous other smaller other contracts. Capital funding is obtained from FTA Section 5309 discretionary funds.

3.3 Bicycle Facilities

The City of Columbia established the Commission on Bicycling in 1977, in response to citizen concerns about bicycling issues. The Commission serves as an advisory board, examining problems relating to bicycling and suggesting solutions. In 1978 the Commission developed a Bicycle Master Plan, which was adopted by the City of Columbia in November,1979. The plan proposed a number of bicycle routes. Included were three types of routes:

Class I: Bicycle routes used exclusively by bicycles and pedestrians.

Class II: Bicycle lanes along existing public streets, separated from vehicle traffic by painted stripes.

Class III: Signs on existing public streets designating bicycle routes, with no vehicle separation.

A comprehensive revision of the City of Columbia Bicycle Master Plan was undertaken in 1993. This exercise includes only Class II and III routes, and contains a total of 95.16 miles of bicycle routes. Included are both existing and proposed routes. This document was prepared by the Commission, and revised with assistance from city staff. The revised Bicycle Master Plan was approved by the Commission and the Planning & Zoning Commission in July,1993. The plan was adopted by the City Council in November,1993. Implementation of the plan is pending.

As of 2000, Columbia has three Class I routes. One of these is the MKT parkway, which extends southwest 4.7 miles from the Fourth and Cherry Street intersection to Scott Boulevard. The second route is the newly opened Phase I of the Hinkson Creek Trail. This extends for one mile from Old 63 to Capen Park. The third route is the newly opened Bear Creek Trail which currently extends 2.2 miles from Cosmo Park to Rangeline Street. An additional 1.2 miles long section, which will run east from Rangeline to Albert-Oakland Park, is in the works.

A number of locations present problems for bicycle travel. Some of these are so-called “pinch points”, which frequently are bridges, where the narrowing of the road makes bicycling dangerous. Others are major roadways or intersections which present a barrier to bicyclists. The 1993 Plan identified 14 such problem areas on the proposed bicycle route system. Included are a number of narrow bridges, such as the Paris Road bridges over I-70 and the Business Loop. Other problems include the Forum Boulevard-Stadium Boulevard and West Boulevard-Business Loop-Creasy Springs intersections, both of which pose serious obstacles to cyclists attempting to cross them.

The adopted plan, even if implemented, still fails to provide the connections needed to facilitate bicycling as a serious mode of travel. It also contains no Class I routes. The latter have greater recreational potential than other types of routes, in addition to providing a facility for non-recreational travel. In Chapter Nine, recommendations are made for a revised and expanded bicycle plan and pedestrian plan for the Columbia metro area. This plan, called PedNet, addresses the need to eliminate the fragmentation of the existing system. It proposes a number of Class I bicycle routes, which would follow the drainages of the major creeks in the area. The use of these floodways, some of which are potential greenbelt trails, is the most workable way of accommodating Class I routes. PedNet also propses a number is bicycle/pedestrian facilities, called pedways, along major streets. The PedNet plan would add approximately 379 miles of routes to the currently adopted Bicycle Master Plan.

Appendix B: Work Trip Characteristics, gives information about Columbia work trips made by bicycle.

3.4 Pedestrian Facilities

In order to accommodate walking as a mode of travel, both residential and other types of development need to provide facilities for pedestrians. Most important is a sidewalk system along public street right-of-way, allowing pedestrians to be separated from vehicle traffic. Within the Columbia metro area, a system of sidewalks exists only within the boundaries of the City of Columbia. Outside the city limits, no such facilities are present. Current city subdivision regulations require sidewalk construction on both sides of new streets. In the early part of the century, sidewalks were constructed as urbanization took place. Later on, there was an extended period after World War II during which sidewalks were not constructed as part of new development. In 1974, new city subdivision regulations took effect which require sidewalk construction on both sides of new streets as new development occurs, except in industrial areas. As a result of the years of development without sidewalks, there are a number of neighborhoods that have no sidewalks, or only a partial sidewalk system. This has left gaps between the older central parts of Columbia and newer neighborhoods. A Master Sidewalk Plan adopted in 1976 attempted to address this problem.

The most recent Master Sidewalk Plan for Columbia was adopted in 1996 and amended in 1997. This document originated from a proposed revision to the Master Sidewalk Plan was prepared by city staff and adopted by the Planning and Zoning Commission on January 3, 1992. The amended plan identifies 41 new sidewalk construction projects. These potential projects fall into two categories: 1) Sidewalk projects along currently improved (with curb and gutter) streets (25 projects); and 2) Sidewalks to be built as part of future street improvement projects (16 projects). The plan focuses on improving the existing system by constructing important connections, particularly near schools, parks and other facilities where pedestrian traffic can be expected. The plan proposes sidewalk construction along a total of 6.8 miles of improved streets, and on 13.2 miles of streets in conjunction with future street construction projects. Since the plan had been adopted, approximately 2.15 miles of sidewalk have been constructed.

The majority of the street mileage within the City of Columbia itself has no sidewalks. This is true in all categories of streets as classified by the Major Roadway Plan. Of the 43.7 miles of arterial streets within Columbia, over half (23.3 miles) have no sidewalks. Only 11.5 miles of the total have sidewalks on both sides of the street. For collector streets, of the 66.7 miles total, 36.2 (54%) have no sidewalks. Local streets in the city comprise 254.1 miles, with approximately 60% (151.9 miles) of the total having no sidewalks. There is an additional 17.8 miles of streets, of various categories, which lack sidewalks. These were projects listed in the Master Sidewalk Plan which have yet to be constructed. The three street categories have a total of 229 miles of streets lacking sidewalks. While there are two other categories of streets in the Major Roadway Plan, Interstate-Freeway and Expressway, which also lack sidewalks, no sidewalks are recommended for these classifications.

As the numbers illustrate, the existing sidewalk system is not adequate to encourage and accommodate pedestrians. The system is deficient in terms of connectivity, and also is lacking in sidewalks along major street corridors. Since the latter carry much greater traffic volumes than local streets, the need for pedestrian facilities is much more critical. To allow pedestrians the safety and convenience they need, an extensive program of sidewalk construction needs to be undertaken, with special attention given to heavily traveled corridors. Policy standards which mandate sidewalks along both sides of arterial and collector streets should be implemented. The 1997 Plan targets a fraction (8.5%) of the street mileage without sidewalks.

In addition to the sidewalks associated with the street system, the metro area also has the MKT Parkway, a pedestrian and bicycling facility which follows the former MKT Railroad right-of-way. The trail extends approximately 9 miles from downtown Columbia beyond the southwestern city limits and on to the statewide Katy Trail at McBaine. The MKT Parkway provides recreational opportunities as well as serving as an alternative transportation corridor between central Columbia and southern parts of the area. There are two other greenbelt trails in Columbia, the

Bear Creek Trail and the Hinkson Creek Trail. These are discussed in detail in Section 8.6, as is the proposed PedNet. PedNet will add additional greenbelt trails as well as other pedestrian and bicycle facilities, called pedways, along major street rights-of-ways.

Although sidewalk and other pedestrian facilities can be expected to be concentrated within the city limits of Columbia, there are urban areas on Columbia's fringe that have sufficient density to be served by a sidewalk system. A potential extension of the city of Columbia sidewalk policy, to be adopted for the Columbia MPO, would be for sidewalks to be required along both sides of arterial streets within the urbanized area. This would provide for safe pedestrian movement along arterial streets both in Columbia and in the fringe area in unincorporated Boone County. Arterial streets can be major barriers to pedestrian travel in the absence of sidewalks.

Appendix B: Work Trip Characteristics, gives information about Columbia work trips made by pedestrians.

CHAPTER FOUR:

LAND USE & TRANSPORTATION FACILITIES

4.1 Land Use and Access

Traffic movement and land access are two functions of roadway systems which are both necessary, but often conflicting. A variety of roadway designs are utilized to provide the movement/ access function. Arterial streets are primarily intended for the movement of through traffic. Local streets provide access to individual tracts at the expense of through traffic movement. Freeways and expressways are designed with limited access to provide entirely for the efficient movement of traffic. Collector streets, residential or commercial, provide equal service to the access and through movement functions.

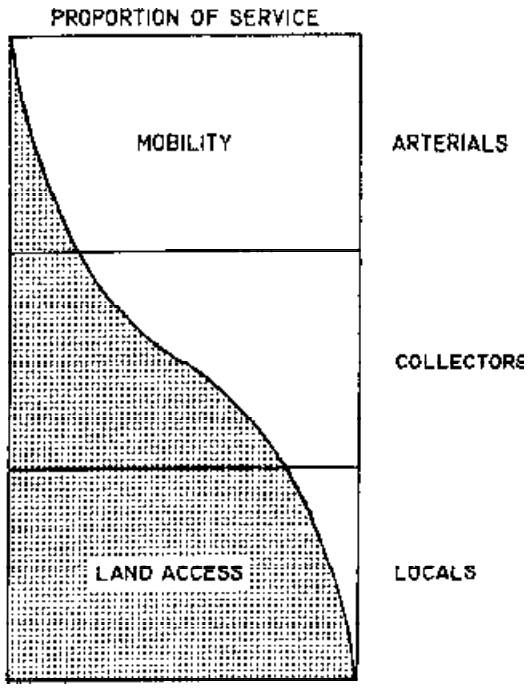
Figure One: Traffic Mobility and Land Access depicts the relationship of the roadway functional classification in serving traffic mobility and land access.

Access must be provided to residential areas and to trip destinations where people work and shop. Along the desired travel paths, mobility is the most important feature.

4.2 Transportation System Connectivity

The phrase “transportation connectivity” refers to the continuity of the roadway system within each of the functional classifications and the compatibility of design and capacities of the roadways within the metropolitan planning area. To insure system continuity, the requirements for main lane capacity, functional classification, roadway design and access must be balanced into a roadway system which will provide continuous travel paths and avoid abrupt transitions between these elements along the length of the roadway.

Figure One: Traffic Mobility and Land Use



The classifications of roadways within the metro area relate to both the service function and access function the road provides. The basic roadway types and their functional descriptions are shown in Table Four: Roadway Function by Facility Type.

The access and through movement functions described form the basis for designing the future transportation system. System continuity along an individual roadway may address the alignment, functional classification, the length of the roadway, and the roadway design cross-section.

The methodology for estimating the functional classification and lane requirements for the 2025 roadway system are initially based on a segment-by-segment assessment of traffic volumes produced from a computerized travel demand model.

The projected traffic volumes for 2025 are compared to the assumed capacities of compatible roadway designs and matched by both functional classification and ability to adequately serve the projected demand.

There are six different roadway designs and three lane configurations which were assessed for the transportation plan. The description of design elements and access management are included in the following examples:

1. Freeway - 4, 6, or 8 travel lanes with a minimum of 400 feet of right-of-way. A limited access roadway with full grade separated interchanges. Access on and off the roadway is accomplished by ramps connecting to frontage roads or interchanges. Access limited to interchanges and driveways on frontage roads.

2. Expressway - 4 or 6 travel lanes with a minimum of 250 feet of right-of-way. A high vol ume, high capacity arterial roadway with widely spaced signalized intersections at minor intersections. Major intersections are grade separated. Limited or no direct access to the main lanes from property fronting the roadway with access limited to right in-right out movements when access is available.

3. Major Arterial - 4 or 6 lanes with 90 to 150 feet of right-of-way. A high volume roadway with at-grade street intersections and regulated driveway access. Signalized at significant intersections with priority given to the arterial through movement. A raised center median with a minimum spacing requirement for median breaks or a flush median may be provided depending on the access requirements of the properties fronting the arterial.

4. Minor Arterial - 2 or 4 lanes with 90 to 120 feet of right-of-way. A secondary arterial facility to provide access to major arterials or limited access roadways. Serves localized circulation and access needs. The roadway may be either divided or undivided and typically supports the access requirements of concentrations of commercial or residential development.

5. Major Collector - 2 or 4 lanes with up to 90 feet of right-of-way. Lower capacity roadway to provide local access and circulation to the arterial network.

6. Neighborhood Collector - 2 lanes with up to 66 feet of right-of-way. A low volume, low speed roadway to provide access for local residential traffic to the collector and arterial network.

The design and functional classification of each roadway in the Major Roadway Plan must be appropriate to provide for the following; 1) design continuity, 2) adequate main lane capacity, 3) access for adjacent tracts, and 4) functionality with the roadway network. The street standards of the local implementing agencies need to be reviewed to provide for the design and right-of-way requirements for the expanded arterial and collector street functional classifications upon which the CATSO 2025 Roadway Plan is based.

On State maintained roadways, MoDOT requires right-of-way (r.o.w) consistent with the adopted highway design standards. The state standards for r.o.w. are substantially greater than those of the City of Columbia or Boone County, especially for “rural” roadways which are not constructed with curb and gutter but rely on ditches to provide drainage. The right-of-way requirements for the roadways under the jurisdiction of the City of Columbia have been established by City policy through the Public Works Street Design Standards and the City of Columbia subdivision regulations. For roadways under the jurisdiction of Boone County, r.o.w. has been established by County Commission policy through the County Street Design Standards and Boone County subdivision regulations. Appendix E: Agency Street Design Standards; provide the adopted right-of-way standards for each agency.

Table Four: Roadway Function by Type

Classification	*Principal Function*	*Trip Length*	*Land Use Linkage*
Freeway	Through movements. Access by frontage roads and ramps.	3 - 5 miles	CBD, major generators
Expressway	Through movements Interchanges at major intersections. Restricted driveway access.	3 - 5 miles	CBD, major generators
Arterial	Through movements. Limited driveway access.	1 - 3 miles	CBD, secondary generators
Collector	Through movements and land access	1 mile	Local areas
Local	Land access.	1/2 mile	Individual tracts

All r.o.w. must be adequate to allow for the roadway pavement, sidewalks, utility easements, street lighting, traffic control devices and signage, drainage, and bicycle/pedestrian facilities.

The connectivity of streets is a major concern for public transit . Collector streets should be through streets, not winding cul-de-sacs, to provide efficient access for bus routes. The street design should include adequate intersection geometrics to accommodate the turning movements of buses, fire trucks, and service vehicles used for trash collection and curbside recycling.

4.3 Street Standards

The streets in the roadway system in the metro area must be designed to safely perform the intended access/mobility function. The right-of-way width, number of lanes, lane width and geometric design features reflect the traffic volumes and speeds anticipated on the roadway. Provisions for transit, pedestrian, bicycle facilities must also be included in the roadway design.

In the Columbia metro area, Boone County, the City of Columbia, and the Missouri Department of Transportation have responsibilities for the design and construction of roadways under their jurisdictions. A review of the street standards indicate that MoDOT design standards do not include sidewalks or bike lanes on any classification of roadway. The City of Columbia has standards which call for sidewalks and bike lanes on all classifications of street. Appendix E: Agency Design Standards provides an outline of each agencies street design requirements.

4.4 Multi-modalism

Multi-modalism is defined as the utilization of transportation facilities and corridors for more than one mode of transport. Some degree of multi-modal activity occurs on most facilities, such as pedestrian, transit, and bicyclist use of major streets designed principally for motor vehicles. TEA-21 places emphasis on developing a street system that accommodates pedestrians, bicyclists and buses as well as vehicular traffic. The planning and provision of transportation facilities to address the specific needs of alternate transportation modes of public transportation, walking, and bicycling includes;

1. Provide continuous street connections to accommodate point-to-point travel;

2. Provide facilities for persons traveling on foot or bicycle along or on the roadway; and;

3. Eliminate or ameliorate barriers to pedestrian and bicycle movement.

Providing for non-auto modes on the street and the elimination of barriers to travel is intended to provide the same unrestricted access that is available to motorized vehicles.

High volume and high speed auto traffic on arterial and collector streets frequently create a barrier for pedestrians and bicyclists who must cross the facility. Transit use is also effected, since pedestrians are a supporting mode for mass transit, and need access to transit stops.

CHAPTER FIVE:

TRANSPORTATION SYSTEM MANAGEMENT

5.1 Congestion and Congestion Management

Traffic congestion and travel delay are among the most visible manifestations of an area's transportation problems. Drivers experience congestion for the most part as a personal annoyance although traffic congestion is a problem that wastes time, consumes energy resources, and contributes to lowered air quality.

Traffic congestion in the metro area is typically confined to the morning and evening peak hours of travel. Delays from congestion occur at specific locations such as Interstate ramps, signalized intersections, and bridges. Congestion in the metro area lasts less than 30 minutes in the morning and evening. In the Columbia area, the average travel time to work of 14 minutes did not change significantly from 1980 to 1990. An examination of national trends points to the consistency of the average travel time while the duration of traffic congestion during the peak hours increases.

Expanding the capacity of roadways is not the sole solution to congestion. The new roadways, bridges, and highways built to relieve congestion satisfy latent and shifted demand for travel. The use of alternate modes, land use regulation, access management, and improvements to intersections and traffic signals can all contribute to an overall program to manage traffic congestion.

There are two major methods of gauging congestion, facility-based measures and travel time. The facility-based congestion methods focuses on the road itself, and usually are based on traffic volume and capacity comparisons. Such comparisons may include volume-to-capacity ratios and traffic volume per lane-mile. The travel time method of measuring congestion indicates the same conclusion, however. These trip-based measures, which are tied to the individual traveler's congestion problems, and oriented to the length of the trip. Average travel time to work is an example of one such measure.

In Columbia, this figure remained unchanged from 1980 to 1990, with the Census Bureau finding an average of 14 minutes in both years. The figure for 2000 has not been released yet. A 1994 National Research Council report notes that changes in individual behavior keep congestion from getting worse, as travelers make route and other changes to avoid delay. So travel times do not necessarily increase in proportion to congestion on particular sections of roadway. With continued population growth, and with residential development spreading further into outlying areas, vehicle trips have been increasing. Existing streets are forced to carry greater volumes. Traffic volumes are increasing, and an examination of individual streets would likely show that capacity is not keeping up. The conclusion might be drawn that congestion is worsening in the metro area as more roadways are becoming crowded.

A number of indicators may be used to gauge and manage congestion in the Columbia area. These are divided into four categories.

1. Facility-based measures:

    Average vehicle speed in peak hour
    Ratio between peak volume & nominal capacity (V/C)
    Total vehicle-hours of delay
    Proportion of daily travel by speed or V/C range
    Frequency and duration of incidents
    Average daily traffic (ADT) per freeway lane

2. Personal travel effects:

    Proportion of personal travel by speed range
    Delay added to average person trips by time of day, travel purpose
    Delay added to average person trip by place of residence
    Delay to transit vehicles
    Number of accidents due to congestion

3. Effects on the economy:

    Delay added to average commuter trip by place of work
    Percentage of truck travel by speed or V/C range
    Vehicle-hours of delay to trucks/delivery vehicles
    Truck scheduling costs attributable to travel time uncertainty
    Market perceptions of congestion as an influence on economic activity

4. Environmental impacts

    Extra vehicle emissions due to stop-and-go conditions
    Extra gas consumption due to stop-and-go conditions

1. Levels of Service

Level of Service is defined as conditions within a traffic stream as perceived by the users of a traffic facility. In practice, levels of service have been defined by measures of effectiveness for each facility type, relating more to speed, delay and density than to qualitative factors or safety. The following describes levels of service, according to the Highway Capacity Manual.

Level of Service A describes primarily free flowing operations at average travel speeds usually about 90 percent of the free flow speed for the arterial class. Vehicles are com pletely unimpeded in their ability to maneuver within the traffic stream. Stopped delay at signalized intersections is minimal.

Level of Service B represents reasonably unimpeded operations at average travel speeds usually about 70 percent of the free flow speed for the arterial class. The ability to maneuver within the traffic stream is only slightly restricted and stopped delays are not bothersome.

Level of Service C represents stable operations. However, ability to maneuver and change lanes in mid-block locations may be more restricted than in LOS B, and longer queues and/or adverse signal coordination may contribute to lower average travel speeds of about 50 percent of the average free flow speed for the arterial class.

Level of Service D borders on a range on which small increases in flow may cause substantial increases in approach delay and, hence, decreases in arterial speed. This may be due to adverse signal progression, inappropriate signal timing, high volumes, or some combination of these. Average travel speeds are about 40 percent of free flow speed.

Level of Service E is the point at which the roadway has reached its maximum capacity. Traffic operaions are unstable, speeds and flow rates fluctuate, and there is little independence for driver speed selection or manuevering.

Level of Service F characterizes forced flow at extremely low speeds below one-third to one-quarter of the free flow which will drop to zero at times . Intersection congestion is likely at critical signalized locations, with high approach delays resulting. Adverse progression is frequently a contributor to this condition.

The Technical Committee of the Columbia Area Transportation Study Organization has adopted Level of Service C as the goal for traffic movement in the community. This is a commonly accepted goal in most communities. Level of Service D is acceptable at certain critical locations during the peak hour of flow at certain locations, but is not considered a design goal for new facilities. The Level of Service at signalized intersections was evaluated using the observed stopped delay method described in the Highway Capacity Manual.

5.2 Access Management

The management systems outlined in the Transportation Equity Act for the 21st Century (TEA-21) improve or maintain the ability of the roadway system to move traffic safely and efficiently. An important aspect in maintaining roadway capacity is the effective control of driveway and street access to arterial roadways.

The functional classification for roadways is based on the movement vs access concept. Arterial streets are primarily intended for the movement of through traffic. Local streets provide access to individual tracts at the expense of through traffic movement. Freeways and expressways are designed with limited access to provide entirely for the efficient movement of traffic. Collector streets, residential or commercial, provide equal service to the access and through movement functions. However, uncontrolled land access often produces conflicts that compromise the movement function of a roadway system.

Although arterials are designed for higher speeds and serve longer travel distances than do collectors or local streets, they often become heavily used for short distance trips as well. The higher traffic volumes are attractive to commercial interests, especially if driveway access is available to the property fronting the arterial. Uncontrolled driveway access for commercial land uses signficantly reduces the capacity of an arterial to carry traffic. Depending upon the number of turning movements, number of travel lanes and the arterial traffic volumes, a driveway permitted access to an arterial street will reduce roadway capacity by up to 25%. The movement function of the arterial is quickly degraded to that of a collector street.

Although access to abutting property generally is permitted from arterial streets in the Columbia area, less permissive driveway regulations are needed to control the turning movements into and out of the properties in order to minimize the interference with traffic on the arterial streets.

Turning movements from driveways are typically controlled by regulating the spacing, width, and curb return radii of driveways. Left turns into or out of commercial driveways can be a major source of congestion and accidents. Left turns may be prohibited or driveways designed for "right in - right out" movements, although it is difficult to successfully implement either remedy. For full effectiveness, a raised or barrier median is required. Left turn access to abutting properties may be permitted at predetermined median breaks with protected left turn storage provided within the median.

5.3 Right-of-Way and Corridor Preservation

The preservation and acquisition of right-of-way for planned roadways or roadway expansions is the most important element in implementing the 2025 Transportation Plan. The corridor alignments for the planned roadways are identified in the CATSO 2025 Roadway Plan in order to guide the reservation of future right-of-way and avoid the preemption of the roadway by new construction or subdivision activity within the r.o.w corridor. The corridor alignments for the planned roadways are general in nature and subject to adjustment to meet engineering and land use requirements.

The acquistion of r.o.w by Boone County and the City of Columbia is typically accomplished during the subdivision process or as part of a site plan process for planned commercial zones. The r.ow. is dedicated to the City or County by the developer in order to comply with subdivision regulations and zoning. However, r.o.w. dedication cannot be required when a building permit is

issued even though a site plan is required. Boone County and the City of Columbia should develop regulatory mechanisms that require developer dedication of r.o.w. at all phases in the development process or establish a pool of capital for the County or City to use for purchasing r.o.w.

5.4 Energy Conservation

There are a number of options available to policy makers to reduce the energy consumption of the transportation system. Such options fall into three general categories:

A. Economic Incentives

These include direct taxes, the granting or elimination of tax breaks, subsidies, regulatory exemptions, and making pricing more efficient. The imposition of efficiency standards, zoning, fuel use requirements, speed limits, inspection and maintenance requirements, and travel restrictions can have an impact on energy use.

Some of the above policy options are beyond the scope of the governments of the City of Columbia and Boone County. For example, gasoline taxes and automobile fuel economy standards are mechanisms which may be used by the state and federal government. But others have possibilities for influencing energy use in the Columbia metro area.

B. Public Investment

Investment in new transportation infrastructure (such as new types of mass transit systems), maintenance and rehabilitation of existing transportation systems, urban development, and research and development are examples of this category.

Mass transit systems are frequently touted by their advocates as having major potential for reducing fuel consumption. This potential could only be fully realized, however, with a shift to transit of a substantial percent

In addition to the high costs, there are questions whether most American transit systems, as they currently exist, save a significant amount of energy over the amount of consumption that would occur in their absence. Statistics indicate that fuel-use per passenger mile of bus systems increased by 70% from 1970 to 1989. This was primarily due to lower passenger loads, growing urban congestion, and a greater orientation to suburban services that require low or no revenue backhauls.

In Columbia, peak hour commuter routes, one of which serves south Columbia, are an example of the latter type of service. These routes are higher mileage, as they serve outlying parts of the city, and usually have minimal ridership. For the existing buses comprising the Columbia Transit System, the break even point for fuel consumption savings is a load of seven passengers. If the bus carries more than seven passengers, then there is a fuel savings compared to the scenario of those seven persons each driving individual automobiles. A load of less than seven riders would be more fuel efficient in their own vehicles. Currently, there is little difference on average between auto and public transportation efficiency in BTU's per passenger mile. There is no doubt that under the right circumstances, transit systems can save substantial amounts of fuel. These circumstances may include high passenger loads; private vehicles operating in congested conditions, particularly with single occupancy; and transit operating on its own ROW or lane, or sharing an HOV lane. Obviously the above conditions are dependent on a number of other factors in order to occur.

C. Regulatory Incentives

The presence of public transit alone does not guarantee that the system can function as a viable transit option. A sufficient density of land uses, particularly residential density, is needed

to enable transit systems to operate efficiently. Centralization and a mix of land uses also are important factors in determining the extent to which public transportation is utilized, in addition to being critical to pedestrian and bicycling travel modes. Cities with high residential densities (e.g. >12 persons/acre), a centralized focus, and a mix of residential, commercial, and employment land uses show a tendency to have a low per capita travel rate and relatively high utilization of public transit, walking and bicycling. This is in contrast to cities with lower densities, widely separated land uses, and a lack of a centralized downtown or major commercial/office area, which tend to have much higher overall per capita travel rates and lower use rates of public transportation, as well as a lower use of walking and bicycling. In order to increase the opportunities for use of transit, walking, bicycling, and other more energy-efficient modes, the distances required to provide access from residential areas to other types of land uses must be compressed. In order to reduce the travel distances and consequently the energy consumption, there must be a shift in land use patterns to accommodate alternative forms of development.

In the Columbia area, changes to Columbia and Boone County zoning ordinances to allow higher densities and a greater mix of land uses would be one step towards establishing a new pattern of development more compatible with alternative modes of travel. A combination of policies focused on providing better facilities for walking and bicycling, improving transit services, and increasing land use density could potentially reduce auto travel and give substantial energy savings.

5.5 Transportation Demand Management

Transportation demand management (TDM) is a strategic response to roadway capacity deficiencies that does not rely on the construction of new or expanded roadways. TDM actions are calculated to reduce vehicle demand by increasing vehicle capacity or providing an alternate mode. While new construction to eliminate traffic bottlenecks and expand roadways is the most direct and effective practice to resolve congestion, this approach does not offer a complete solution. A variety of strategies are available to reduce congestion by providing incentives to individuals to use alternative modes of transportation or to eliminate the need to make a trip. The following outlines several approaches that may be taken:

1. Increase Vehicle Occupancy

    a. Ridesharing programs, local and regional
    b. Transportation management associations which coordinate opportunities and incentives for shared travel, usually through employers or business associations.
    c. Cash-out parking subsidies; which allow employees to convert employer paid parking subsidies to transit subsidies or cash.
    d. Restrict availability and/or increased parking cost for single occupancy vehicles.

2. Enhance Access to Alternative Modes

    a. Mixed use development conducive to walking, cycling and transit alternatives to the automobile.
    b. Transportation enhancements such as improved bicycle paths and pedestrian facilities to improve choices available to commuters.
    c. Staggered work hours to more evenly distribute the number of commuters on the road throughout the day.
    d. Telecommuting; which allows employees to work out of a home base on at least a part-time basis.
    e. Electronic commerce; which allows individuals to conduct personal and busi ness transactions electronically without physically making a trip.

5.6 Transportation System Management

Transportation system management (TSM), encompasses a broad range of strategies intended to operate the existing roadway system in the most productive, safest, and cost-effective manner. Whereas travel demand management address the congestion by reducing vehicle demand on the roadway system, TSM focuses on engineering improvements which increase the vehicle capacity on the roadway system. Typical traffic engineering improvements for TSM include:

Left turn lanes
Right turn lanes
Intersection widening
One-way streets
Improved signage/pavement markings
Coordinated traffic signal systems
Signal timing optimization
Actuated traffic signals

These improvements improve the capacity of the street or intersection, reduce travel time, and improve motorist safety.

5.7 Signalized Intersections

There is a physical limit to the number of through movements and turning movements that can be safely accomodated by a signalized intersection. When the demand for any movement at the intersection exceeds the available capacity, congestion and delays ensue; reducing the average travel speed and increasing the travel time. There are three basic strategies available to contend with intersection delays; 1) construct a grade separated interchange, 2) construct a new roadway to divert traffic from the congested intersection, and 3) accept the delay and provide mitigation to improve safety and access.

To preserve the capacity of the major arterials, it is essential that the distances between intersecting roadways with signalized intersections are adequate to provide for smooth, uninterupted flow of traffic. Signalized intersections are directly responsible for most of the delays experienced on the roadway system. Appendix F: Existing and Future Signalized Intersections, identifies appropriate and anticipated signal locations in the metro area.

CHAPTER SIX:

INTERREGIONAL TRANSPORTATION

6.1 Moving Goods and Services

There are a number of ways in which goods and services are transported in and out of the Columbia metro area. The majority of the freight and passenger movement is accomodated by the area's highway system, principally Interstate 70 and US Highway 63, with other state routes, such as Route B, carrying large volumes of traffic through the region. Other types of interregional transportation that serve the region and are described in the following sections.

6.2 Railways

The Columbia metro area has no direct passenger rail service. Jefferson City, 30 miles south of Columbia, is the nearest community with Amtrak service. Freight service to the area is provided by the Columbia Terminal Railroad (COLT), which is owned and operated by the City of Columbia. The city acquired this line from Norfolk Southern in October 1987. The railroad serves the communities of Centralia, Hallsville, Browns Station, and Columbia.

The COLT has one locomotive and generally uses a two-man crew for train operations. The COLT infrastructure consists of its track, right-of-way, bridges, signals, crossings, culverts and all other items related to railroad operation.

The railroad's main track runs between Columbia and Centralia and has 21.43 miles of mainline track. The entire main track is maintained to FRA Class 2 standards, which allows for speeds up to 25 mph for freight trains and 30 mph for passenger trains. Train speeds are limited to 10 mph in selected areas of Columbia and Centralia.

In 1999, 1,495 carloads of freight were carried on the COLT line. The 1999 freight load represented a 59% increase from 1994, and was a higher traffic load than was transported by Norfolk Southern in the 1980's. The line served 8 commercial customers during 1999, including the City of Columbia Water and Light Department, which is the department responsible for the COLT operation.

The COLT has 38 at-grade public highway/rail crossings and 24 private crossings. The average number of public highway/rail crossings per mile is 1.77, which is the second highest concentration of all railroads operating in Missouri. As a result of the MoDOT widening of Route B in Columbia during 1999-2000, two highway/rail crossing signal systems were taken out of service, leaving eleven of the COLT crossings with active warning devices.

The at-grade highway/rail crossing on U.S. Highway 63 has been the location of several accidents as a result of the requirement for buses and select commercial vehicles to come to a complete stop prior to proceeding through the crossing. The posted speed limit on U.S. Highway 63 is 70 mph. The potential for serious or fatal injury accidents at the crossing will persist as long as vehicles must stop in the main travel lanes.

The COLT has been working to develop a multi-modal rail to truck transload facility. The COLT has identified several potential movements of freight into mid-Missouri that could be taken off of the highways and put on the railroad, if a suitable transload facility was available. A transload facility would need to have good access to both the COLT and the major highway system, have indoor railcar loading and unloading capabilities, equipment for heavy lifting, and a warehouse where goods could be stored for a short time while awaiting final delivery by motor carrier. At this time, a transload facility is still only in the planning stages, as funding has yet to become available.

6.3 Pipelines

There are two energy transportation pipelines within the Columbia metro area. One is the Williams Pipeline Company line which runs east-west and crosses US 63 southeast of Columbia, and which carries gasoline and fuel oil. The other line belongs to Panhandle Eastern Company, and is located several miles north of Columbia. It runs east-west and has a spur line which runs south to the Prathersville area. This line carries natural gas.

6.4 Interstate Freight

The Columbia metro area's location along Interstate 70 provides access to a major east-west route for interstate freight movement. Up to thirty percent of the daily traffic on sections of I-70 through Columbia are multiple-axle trucks. US Highway 63 provides north-south access to the area. A number of motor freight companies have terminals located in Columbia. These companies are listed in Appendix G: Local Freight Haulers.

Local freight companies had several concerns related to the condition and design of roadways and intersections in the metro area. The primary issue was geometrics at intersections which do not meet the requirements of truck movement. Inadequate intersection geometrics restrict or prohibit a truck from making a turn. This situation creates traffic delays, breaks down curbs, and can damage vehicles. A list of problem intersections in the urbanized area will be developed for future attention.

6.5 Airports

The Columbia metro area is served by the Columbia Regional Airport, which is located 8.5 miles southeast of Columbia, several miles outside of the metro area boundary. The airport is owned and operated by the City of Columbia, and consists of approximately 1,516 acres. Initial construction at the site was completed in 1968, with the passenger terminal building being constructed in 1969 and the air traffic control tower in 1973.

Major east-west highway access to the Columbia airport is provided by Interstate 70. Principal access to the airport is provided by US Highway 63, and State Route H provides direct access to the airport access road on the west side of the facility. This access road is an internal circulation road providing access to the facilities, including the terminal, on the west side of the airport. It forms a one-way loop around the vehicle parking lot west of the terminal, and also accesses the general aviation area, the FAA Automated Flight Service Station, the US Postal Service facility and maintenance hangar. Another road provides access to the air traffic control tower on the east side of the airport. Access to this road is provided by Range Line Road.

Dedicated limousine service and commercial taxicab service is available between Columbia and the airport, and several local motels provide airport shuttle service. A Hertz car rental agency is based in the passenger terminal.

Terminal facilities include the terminal building, ramp, hangar storage, auto parking, fuel facilities, and aircraft servicing areas. The terminal area includes almost 21,000 square feet of space for lease purposes. Parking facilities are included for the public, employees, and rental car operations. Public parking is provided for approximately 300 vehicles, with an overflow lot containing about 50 spaces. About 30 spaces are provided for employee and rental car parking.

The airport facility includes two runways. At present, there are no commercial airlines providing regularly scheduled passenger service. The airport is served twice daily by Airborne Express, an air freight service. Central Missouri Aviation, Inc., provides aircraft charters, rentals, maintenance and repairs, aircraft and aviation fuel sales, and flight instruction. CMA also provides terminal handling for unscheduled air freight shipping and receiving.

6.6 Regional Bus Lines

Regional bus service through the Columbia metro area is provided by the Greyhound Bus Lines which operates the only regularly scheduled service. An average of eight buses a day traveling east and west provide connections to Kansas City and St. Louis.

Charter services are available from Ryder Student Transportation Services and Tiger Coaches and Charter.

6.7 High Speed Passenger Rail

MoDOT has discussed the possibility of preserving a corridor along Interstate 70 for further use as a high speed railway. Along with the eight midwestern state departments of transportation and Amtrak, MoDOT was a participant in the of the Midwest Regional Rail System study, completed in February, 2000, to evaluate the potential for improved passenger rail service. The major plan elements outlined in the study include:

1. Use of 3,000 miles of existing rail rights-of-way to connect rural, small urban, and major metropolitan areas;

2. Operation of a "hub-and-spoke" passenger rail system providing through service in Chicago to locations throughout the midwest;

3. Introduction of modern train equipment operating at speeds up to 110 mph;

4. Provisions of multi-modal connections to improve system access; and

5. Improvement in reliability and on-time performance.

The rail line through Missouri follows the existing Amtrak service from Kansas City to St. Louis along the U.S. Highway 50 corridor. Jefferson City is the closest station location to the Columbia metro area, and a feeder bus service is shown to provide a connection to the regional rail system.

At present, the maximum permitted speed on railways in the State of Missouri is 79 mph. The railways used for passenger service are shared with freight, which limits the speeds. If high speed rail service is to be implemented, changes in the speed limits will need to be considered. The use of the I-70 corridor for high speed passenger rail would provide the opportunity to construct a dedicated facility with speeds of 110+ mph. Columbia, with its central location in the state and along the I-70 corridor should have a station on any high speed rail proposal.

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CHAPTER SEVEN:
FUTURE PROJECT PLAN

7.1 Introduction

To examine the adequacy of the metro area transportation system over the twenty-five year period ending in 2025, it is necessary to develop a metro area forecast for the rate of growth, type of growth, the location of growth, and household travel characteristics.

In the preparation of this transportation plan, information on land use and population was obtained from Boone County, the City of Columbia, and the 1990 Census to establish a baseline for residential and commercial development in 1997. In addition, three major data collection projects were conducted to obtain individual travel characteristics, time/delay and average speed on arterial streets, and peak hour and 24 hour traffic counts. The following databases, studies, and sources were used:

City of Columbia Existing Land Use Inventory
Vacant Land Inventory
City of Columbia Comprehensive Land Use Plan
Boone County Land Use Plan
MoDOT 1997 Traffic Counts on Major Roadways
Household Survey of 1500 households for Work Trips by TAZ
City of Columbia Sidewalk Inventory 1990 Census
1990 Census Transportation Planning Package
CATSO Employment forecast for 2025
CATSO Population forecast for 2025
CATSO Geographic allocation of 2025 population
CATSO Geographic allocation of 2025 employment

Products for all the aforementioned surveys and data sources contributed to the information necessary to develop a travel demand model for the metro area. This model was used to assess the ability of the existing transportation system and the adopted CATSO Major Roadway Plan to accommodate the anticipated growth over the next twenty-five years.

7.2 Forecasting Travel Demand

Travel demand modeling is a tool designed to test the performance of a transportation system based upon a given land use scenario. The assumed land use scenario dictates the total number and the origin and destination of person trips. The output from the model provides the data needed to determine whether the proposed transportation system can adequately serve the projected land use.

The adopted Columbia Area Transportation Study Major Thoroughfare Plan served as the base highway network for modeling the 2025 land use. Each roadway segment in the Plan was coded with distance, facility type, and capacity\hour\lane. Travel demand forecasting relies on a series of mathematical models that produce four primary components; 1) trip generation; 2) trip distribution 3) mode choice; and 4) trip assignment.

Trip generation models translate land use and demographic information into the number of trips created by an area. For this plan, the Columbia metro area is divided into 212 traffic analysis zones (TAZ). Trips originating and or destined outside of the metro area (external trips) have been included. Estimated trips are calculated based upon TAZ information, including number of households, population, number of employees, number of vehicles per household and median income.

Trip distribution models estimate where trips will be made within the study area. The primary objective is to distribute the total number of trips originating in each traffic analysis zone among all possible destination zones. The distribution model used for this plan is commonly known as the gravity model. The gravity model assumes that trips are proportional to the number of attractions in all possible destination TAZ's and inversely proportional to the travel time between the TAZ's. The number of attractions in a TAZ is correlated with the number of employees in the TAZ.

Mode choice models assign trips to the various modes of travel available. The basic assumption of the mode choice models is that travelers make rational choices between the available modes based upon economic cost and the time.

Trip assignment models assign the distributed volumes of vehicle trips, by mode, to individual network links representing roadway segments. An incremental capacity restraint trip assignment model was used for this plan. This model assumes that the choice of route is based upon minimizing the total travel time. Using the network and its data, the model estimates the shortest paths between each TAZ and every other TAZ based upon travel time. The incremental capacity restraint assignment model assigns or "loads" a percentage of the total trips onto the network in a series of iterations. For this plan, a series of three iterations were used; 50 percent of the trips assigned in the first iteration, and 25% in the subsequent iterations. The travel times between TAZ's are modified after each iteration to reflect congestion created by the cumulative traffic volumes assigned to each network link in the previous iterations.

The basic output of the travel demand modeling process are the travel forecasts. These forecasts are summarized by estimated traffic volumes on each segment of the roadway network. These volume estimates are used to indicate whether the transportation system can adequately serve the forecasted land use and employment.

7.3 Capacity Constraints and Recommendations

Overall, the adopted CATSO Roadway Plan, when fully implemented, adequately addresses the roadway capacity needs for the metro area in 2025. However, CATSO Major Roadway Plan does not address the congestion problems at signalized intersections, which are directly responsible for most of the delays in the roadway system.

To preserve the capacity of the major arterials, it is essential that the distances between intersecting roadways with signalized intersections are adequate to provide for smooth, uninterupted flow of traffic. Signalized intersections are directly responsible for most of the delays experienced on the roadway system. Appendix E: Existing and Future Signalized Intersection Locations, catalogues the existing traffic signals and identifies the desired locations for signalized intersections through 2025.

7.4 Future Roadway Projects

In the Metro area, there are several arterial roadways which should be considered for construction or improvement in the next 15 years. The issues related to the roadways include jurisdiction and ultimately funding. Many of the immediate planning challenges facing the City of Columbia and Boone County stem from changes in MoDOT funding priorities and the results of planning studies on I-70 and US 63. These include:

1. US 63/I-70 Major Investment Study recommendation to downgrade extension of MO 740 (Stadium Boulevard) from an expressway to an arterial;

2. US 63/I-70 Major Investment Study recommendation to remove the ramps on and off I-70 to Business Loop 70 East and consider a new interchange; and

3. Options to widen I-70 or construct an I-70 bypass

The issues generated by the discussion surrounding MoDOT's plans for the expansion of I-70 have highlighted the need for an expanded arterial system to move local traffic within the Metro area. Four roadways have been selected for examination; 1) Business Loop 70, 2) Broadway extension, 3) Providence Road extension, and 4) the creation of an circumferential roadway system.

A. Business Loop 70

Business Loop 70 is a primary arterial and an older commercial corridor within the Metro area. The changes under consideration for the I-70/US 63 interchange and for the widening of I-70 will have impacts on the Business Loop. The following is a section by section description of the roadway issues.

1. Route E to I-70 Drive Southwest

This section of the Business Loop is a built as a 2 lane major collector with a continuous center turn lane. Land uses in the roadway corridor include small office, retail, and industrials uses. The primary focus of activity is Cosmo Park and the soccer and baseball fields. There are no roadway capacity problems.

Capacity and traffic operations problems are experienced between I-70/Business Loop 70 Interchange. Some of the deficiencies included:

a. Two through lanes under I-70
b. Roundabout with 5 approaches
c. Business Loop 70 intersection with I-70 Drive SW and proximity to I-70 East bound ramps
d. West Boulevard terminated at I-70 Drive SW
e. Lack of pedestrian access, especially to Cosmo Park

The majority of the operational problems occur on MoDOT roadways. Local traffic from Creasy Springs Road and West Boulevard are routed through the I-70 interchange intersections, which complicates traffic control and limits capacity.

The I-70 interchange is an important connection for Business Loop 70. The existing bridge structure on the interchange is inadequate to serve the present needs of the Business Loop.

An interchange study should be initiated to develop a design which will eliminate many of the existing operational problems, provide improved collector street connectivity, and provide pedestrian access across the I-70 Corridor to Cosmo Park. Planning for the reconstruction of the I-70/Business Loop 70 interchange.

2. I-70 Drive Southwest to College Avenue

This section of Business Loop 70 is constructed as a four lane arterial with a flush median. Land uses along the corridor include shopping centers, restaurants, a high school, car dealers, a hospital, and fast food restaurants, and the driveways associated with these uses. The right-of-way is crowded with utility poles and there no sidewalks along most sections of roadway. The capacity of this section of roadway is adequate, although the number of driveways present and the proximity of utility poles to the roadway is a safety problem.

Access management and utility relocation would be the key issues for this section of roadway. A redevelopment study should be initiated for this section Business Loop 70 to explore alternatives for consolidating access points and for providing underground utilities.

3. College Avenue to Old 63

From College Avenue east to Route B, this section is constructed as a four lane arterial with a flush median. Near Route B, the number lanes drops to two (2) as the roadway passes under a bridge for the COLT Railroad and a second bridge under Route B. The two lane section continues to the signalized intersection at Old 63. There is an improved railroad crossing in place near the City of Columbia power plant. Land uses along the corridor are primarily industrial.

One of this primary problems with this section of roadway is it lacks a full direct connection to Route B. In addition, the pavement narrows to two lanes to pass under two bridges, one for the COLT railroad and the other for Route B. The are existing pedestrian access problems stemming from the lack of sidewalks along the Route B bridge.

Addressing the reconstruction of the bridges for Route B and COLT Railroad are primary issues.

The CATSO Major Roadway Plan should be amended to provide for the realignment of Route B with Old 63 to create a four-way signalized intersection that provides the Business Loop direct access to Route B. Remove the existing Route B bridge to provide four lanes on Business Loop 70. Construct a pedestrian crossing only along the old Route B bridge alignment. Reconstruct or remove the COLT Railroad bridge to provide four lanes on Business Loop 70.

The MoDOT I-70/US 63 Major Investment Study shows a possible new interchange for Business Loop 70 with I-70, just west of Route B. A further evaluation of the interchange options and potential realignment of Route B should be pursued.

4. Old 63 to Conley Road

At present, Business Loop 70 terminates at East Boulevard just east of the ramps onto I-70. The roadway is constructed as a two lane section with a turn lane at Old 63. Land uses along the corridor include retail and industrial uses.

The I-70/US 63 Major Investment Study (MIS) completed by MoDOT in 1999 recommended the removal of the Business Loop 70 ramps on I-70 to improve the operation of the I-70/US 63 interchange. Removing the ramps to and from I-70 will leave this section of the Business Loop as a cul-de-sac frontage road that serves only as access function until the planned extension of the roadway to Conley Lane can be constructed.

The extension of Business Loop 70 to Conley Road will require a bridge over Hinkson Creek and may be a problem if the MoDOT preferred alternative for I-70 is to widen along the existing ROW. Right-of-way would need to be acquired from the Columbia Country Club golf course. Water quality in Hinkson Creek will be an issue during the construction phase.

As identified in the I-70/US 63 MIS, the extension of Bus. Loop 70 East to Conley Road would improve area traffic circulation. When MoDOT determines the preferred alternative for I-70, a preliminary alignment and design should be developed for the extension of Business Loop 70.

B. Broadway (Route WW and TT)

1. West Broadway Extension (Route TT)

The CATSO Roadway Plan shows the extension of West Broadway as a major arterial from Route UU (I-70/Hwy 40 interchange) to Scott Boulevard. The extension of Broadway is intended to provide an alternative route for traffic entering Columbia from the west.

Perche Creek and the associated flood plain presents a natural barrier that must be bridged. At present, only I-70 and Gilliespie Bridge Road provide for east/west travel in the western portion of the Metro area.

Delays on I-70 during construction or caused by accidents are magnified owing to the absence of a viable alternative route parallel to I-70. Local traffic with origins or destinations in south-west and west Columbia must use Stadium Boulevard to enter and exit I-70. The extension of Broadway to the I-70/Hwy 40 interchange would significantly reduce travel times and reduce traffic volumes on Stadium Boulevard, in addition to reducing delays on I-70.

Preliminary engineering needs to be completed to accommodate the proposed realignment of Scott Boulevard and Strawn Road to create a 4-way intersection with Broadway. Residential development limits the available roadway rights-of-ways and need to be identified and protected from further encroachment.

Crossing Perche Creek and the flood plain will require a bridge structure that will have a significant cost. The Major Roadway Plan shows the preliminary location of the bridge structure.

The roadway extension involves multiple jurisdictions, MoDOT, Boone County, and City of Columbia. Construction of the Broadway extension will require cooperation to acquire right-of-way and construct the roadway. Right-of-way will need to be surveyed and purchased through the Perche Creek bottoms to Route UU. Environmental concerns related to water quality, especially during the construction phase will need to be addressed.

The roadway corridor offers little development potential owing to the topography and flood plain. However, the scenic potential of the roadway should be evaluated and natural features preserved to create an attractive west entrance to Columbia.

The benefits of the Broadway extension occur on the MoDOT system including the redistribution of traffic from I-70 and Stadium Boulevard that would be occur by connecting Route TT with Route UU and Highway 40/I-70. Residents of the Metro area would benefit from signficantly reduced travel times to south and southwest Columbia.

MoDOT should consider designating the extension of Broadway west to Route UU as Route TT. The City of Columbia should consider assuming maintenance responsibility for Scott Blvd (Route TT) from Broadway south and for Strawn Road (Route ZZ). Should MoDOT choose to widen I-70 along the existing alignment, the Broadway extension would become a high priority to provide an alternative route during the construction of I-70.

2. East Broadway (Route WW) Widening

The CATSO Roadway Plan identifies East Broadway/Route WW as a major arterial from Garth Avenue to the eastern boundary of the Metropolitan Area. East of U.S. Highway 63, Route WW is a two lane rural arterial. West from U.S. Highway 63, the roadway cross-section is predominately four lanes to College Avenue. The exception is a section between Brickton Road and Old 63. A two lane bridge over Hinkson Creek requires the four lane sections on the east and west to merge into 2 lanes. The merging traffic creates delays at the PM peak hour which pushes queues of merging traffic into the intersection of Broadway and Old 63, disrupting the traffic movement of all four intersection approaches. In addition, the existing bridge does not have sidewalks for pedestrians.

The replacement of the Hinkson Creek bridge with a new structure designed to accommodate four lanes as well as sidewalk and/or bike paths on both sides of the travel lanes is needed to provide needed capacity to eliminate travel delays and pedestrian barriers.

During the design phase, special consideration should be given to the bridge=s relationship to the Hinkson Creek Greenbelt. The bridge design should provide generous vertical and horizontal

clearances to accommodate a 12 foot trail underneath the bridge. Connections from the sidewalk/pedways should be provided from the bridge to the trail facility.

C. Providence Road Extension

The previous CATSO Roadway Plan shows the planned extension of Providence Road running north from Vandiver Drive to US Highway 63. The 2025 CATSO Plan removes the northern connection to US Highway 63 and connects the northern terminus of the Providence Road extension to Route VV and downgrades the roadway to a minor arterial.

Land uses proposed in the corridor have transitioned from industrial to residential. Given the developing residential character, the connection to US Highway 63 is not needed to serve an industrial district. Traffic from US 63 to I-70 will use Rangeline (Hwy 763).

The present interchange of Providence Road with I-70 is underutilized without a northern extension. A parallel route to Rangeline, which is a commercial and industrial corridor is needed to serve existing and future residential development, in particular the Clearview Subdivision.

There is an existing power line easement with electrical transmission towers which interferes with the proposed roadway extension. In addition, development requests in the corridor have been encroaching on future ROW.

The City of Columbia and Boone County will need to cooperate with the planning of the roadway and when reviewing subdivision and rezoning requests to facilitate right-of-way preservation and control access. Construction of the Providence Road extension may be a joint City/County project. The Providence Road extension will cross Bear Creek and the Bear Creek Trail, requiring construction of a bridge. Access to the Bear Creek Trail should be provided from Providence Road as well as sidewalks on the bridge. Water quality in Bear Creek will be an issue during the construction phase.

A preliminary alignment and design for the Providence Road extension should be developed.

D. Circumferential Roadway System

The proposed Circumferential Roadway System builds upon many of the roadways already in place within the Metro area. West of US 63, of the 12.2 miles of the proposed system, only .85 miles, or seven percent (7%) of the total length would be along a new street ROW.

Beginning with Stadium Boulevard (MO 740) at US Highway 63, the loop would extend along Stadium Boulevard then north along Route E and Blackfoot Road, to Wilcox Road and Obermiller Road to Creasy Springs Road. From Creasy Springs Road, the Circumferential System proceeds northeast along a new alignment to meet Brown School Road east of Clearview Road and proceeds along the Brown School Road alignment to the interchange with US Highway 63.

East of US Highway 63, the Circumferential System follows a realignment of Starke Lane to Brown Station Road. From Brown Station Road, a new roadway would be extended to Route B. From Route B, the roadway would follow a new alignment heading southeast to intersect with Route PP From the intersection with Route PP, the Circumferential System would use the Ballenger Road alignment to Clark Lane, then extend across I-70 following the Ballenger Lane extension alignment to connect with the alignment for the extension of Stadium Boulevard (MO 740) to complete the system at U.S. Highway 63.

With the exception of the existing sections of Stadium Boulevard,and the segment from Route B to Route PP, the Circumferential Roadwayl System would ultimately be constructed as a four lane, primary arterial with a raised barrier median to control access. The following sections provide a section by section description of the proposed system.

1. Blackfoot Road from Route E to Wilcox

At present, Blackfoot Road is a 18-20 foot paved collector street with substandard geometrics, inadequate right-of-way, steep grades, and poor horizontal geometrics (sharp turns).

The existing rock quarry operation west of Blackfoot Road is expanding to provide underground storage. This change in use will generate industrial traffic, especially large trucks. The City of Columbia Public Works Department is in the process of negotiating for additional ROW on Blackfoot Road to upgrade the present roadway to an arterial cross-section. In addition, a proposal has been made to realign Route E to create a "T" intersection with Blackfoot Road. MoDOT is currently evaluating this proposal.

Blackfoot Road would be upgraded to a Major Arterial. The City of Columbia should provide MoDOT with the supporting material to create a "T" intersection for Route E into Blackfoot Road. Sufficient right-of-way to accommodate a four lane major arterial should be acquired.

2. Obermiller Road from Wilcox to Creasy Springs Road

This section is a two lane roadway built to County standards. The existing roadway alignment has a 90 degree turn which may limit the design speed on this section of the Loop. Additional right-of-way may have to be purchased to provide a minimum of 100 feet.

Additional ROW should be acquired along Obermiller Road to provide a 4 lane roadway with raised barrier median. The curve on Obermiller Road should be engineered to accommodate 45 mph traffic speeds.

3. Northwest Arterial from Creasy Spring Road to Brown School Road and U.S. Highway 63

This is a new roadway alignment starting from the intersection of Obermiller Road and Creasy Spring Road. Using the platted ROW for Sanderson Lane from the intersection with Creasy Springs Road, the proposed Northwest Arterial section would be aligned to the northeast to meet the present alignment of Brown School Road approximately 1500 feet east of Clearview Road. Smiley Lane and Clearview Road would have "T" intersections with the Northwest Arterial. Maintaining a minimum distance between the intersection of 1320 feet.

Inadequate ROW along the existing Sanderson Lane alignment is a problem, along with the proximity of several residences to the future roadway. Boone County is currently considering the construction of the extension of Smiley Lane. The Northwest Arterial relies on the Sanderson Lane portion of the Smiley Lane alignment and would have Smiley Lane form a "T" intersection.

This section is the key piece of the western portion of the system. It completes the connection of US Highway 63 with I-70. If the extension of Smiley Lane is constructed to Obermiller Road, provisions should be made in the design to facilitate the construction of the Northwest Loop and create a "T" intersection for Smiley Lane.

4. Starke Lane from the US Highway 63 Interchange to Route B

The construction of the interchange at US 63/Oakland Gravel Road in the early 1990's to improved access to the Boone County Fairgrounds and prompted changes to the road alignments of Oakland Gravel Road, Roger I. Wilson Memorial Drive, and Brown School Road. Brown School was subsequently upgraded from a collector to an arterial road.

At present, Starke Lane is a narrow, two lane roadway that ends at Brown Station Road. The primary land uses along the corridor is the Boone County Fairground. The CATSO Roadway Plan is proposing the realignment of Starke Lane and its extension eastward to Route B.
East of US 63, Oakland Gravel Road and Starke Lane meet at a "T" intersection with Brown

School Road just 200 feet east of the north bound ramps of US 63. The present intersection configuration requires all vehicles heading east across US 63 to stop and then turn.

To eliminate this intersection configuration and provide for through traffic along the proposed arterial loop, Starke Lane would be realigned through the Fairground property to serve as an extension of Brown School Road. To accomplish the realignment, a significant quantity of fill will be required east of US 63. Oakland Gravel Road would be shifted east to create a new intersection with Starke Lane.

A critical link in the development of the Circumferential System will be the extension of Starke Lane east from Brown School Road to Route B as a major collector. Most of the available roadway corridors are developed with small residences and duplexes. Acquiring ROW to construct the Starke Lane extension would most likely involve the purchase on a number of residential properties.

Boone County is the key stakeholder in this corridor. Improved access to the Boone County Fairground and surrounding property would be a direct benefit of the roadway realignment.

5. Northeast Collector from Route B to Route PP

From Route B, the Northeast Collector would run east then turn south as a major collector to intersect with Route PP. The roadway would cross Hinkson Creek and its flood plain. The area adjacent to the proposed roadway corridor is sparsely developed with residences. Industrial uses on the east side of Route B limit the opportunities for intersection locations for the Northeast Collector. A major bridge would be required for the crossing of Hinkson Creek.

Water quality in Hinkson Creek will be an issue during the construction phase. This section is the key piece of the eastern portion of the loop. It completes the connection of US Highway 63 with service roads in the I-70 corridor. Access to a future Hinkson Creek Trail should be provided from the Northeast Loop as well as sidewalks on the bridge.

This project has not been included in the Major Roadway Plan at this time. An alignment study will be completed for this section of the Circumferential Roadway System to evaluate the alternatives, costs, and impacts. A future plan amendment to consider the Northeast Collector is anticipated.

6. Ballenger Lane Extension from Clark Lane (Route PP) to St. Charles Road

The Ballenger Lane Extension would cross I-70 via an overpass to intersect with I-70 Drive SE and with St. Charles Road on the south as a major arterial. The overpass at I-70 would also bridge Hominy Branch Creek.

The extension of Ballenger Lane was added to the Roadway Plan in 1997 in response to the growing traffic volumes and delays being experienced at the Clark Lane (Route PP) US Highway 63 intersection and the need to identify and preserve a possible alignment for the planned extension of Stadium Boulevard (MO 740). The key feature is a overpass over I-70 to provide north/south access for the northeast Columbia area. The proximity of the overpass to the existing I-70/US Highway 63 interchange limits the addition of ramps to create a new interchange for Ballenger Lane or Stadium Boulevard.

There is considerable development pressure and subdivision activity in what would be the roadway corridor, especially adjacent to I-70 Drive SE and Clark Lane. At present, there is no existing development that would be directly impacted by the proposed arterial street, however the proposed alignment does divide several large residential tracts developed with a single residence.

The Ballenger Lane Extension will require a bridge crossing of Hominy Branch Creek and the City of Columbia's Hominy Branch Greenbelt. The greatest threat to the water quality of Hominy Branch Creek and downstream at Hinkson Creek will occur during the construction of the street and bridge structure.

The construction of the I-70 overpass was included in the MoDOT I-70/US 63 Major Investment Study as an important improvement for relieving congestion to the I-70/US 63 interchange. The cost and responsibility for the roadway and overpass is a significant issue.

At present, MoDOT has not committed to including this roadway section in the State's Long Range Transportation Plan, and is still considering whether to add it to the State system. Given the cost of the bridge structure required for the overpass and the connection/extension to existing MoDOT roadways (U.S. Highway 63 and Route PP), jurisdictional responsibility for this improvement needs to be clearly established.

7. Stadium Boulevard (MO 740) from Richland Road to Broadway (Route WW)

From its intersection with Richland Road, Stadium Boulevard would run southwest to intersect with Broadway (Route WW) just east of Grindstone Creek as an expressway.

The CATSO Roadway Plan indicates a preliminary alignment which has been selected for this section of the Circumferential Roadway System. There is the potential for considerable development pressure and subdivision activity in what would be the roadway corridor. MoDOT has not removed this section of roadway from its Fifteen Year Plan, but has downgraded it from an expressway to an arterial.

The connection of this section with the I-70 overpass was included in the MoDOT I-70/U.S. 63 as an important improvement for relieving congestion to the I-70/U.S. 63 interchange. Agency responsibility for this roadway has not been determined.

A Major Investment Study (MIS) will need to be completed to determine the alignment and right-of-way requirements for the construction of an expressway.

8. Stadium Boulevard (MO 740) from U.S. Highway 63 to Broadway (Route WW)

From the intersection with Broadway (Route WW) just east of Grindstone Creek, Stadium Boulevard would run southwest to connect with its existing eastern terminus near US Highway 63 as an expressway. The proposed roadway corridor is developed with single family residences on large acreages.

The eastern portion of the U.S. Highway 63/Stadium Boulevard interchange is unused. East/west traffic movement is restricted by US Highway 63. Broadway (Route WW) provides the only route.

Right-of-way will need to be purchased and will likely require the acquisition of property by condemnation. Issues related to water quality and impacts on the greenbelt are likely given the proximity to Grindstone Creek.

This section connects the incomplete interchange at U.S. 63 to State Route WW and would logically be considered a MoDOT project. A Major Investment Study will need to be completed to determine the alignment and right-of-way requirements for the construction of MO 740 extension as an expressway.

E. Stadium Boulevard (MO 740)

The extension of Stadium Boulevard (MO-740) is described as part of the Circumferential Roadway System (MO 740 eastern terminus to Richland Road) and is identified as an expressway from Richland Road to the Lake of the Woods interchange with I-70.

The extension of MO-740 has been in the CATSO Major Thoroughfare Plan for several decades, and remains in the MoDOT Project Plan and was a identified project in the "Fifteen Year

Plan". The 1994 CATSO Transportation Plan identified the MO-740 extension as an expressway, and as a project that would require the completion of a Major Investment Study under the provisions outlined in TEA-21.

MoDOT recently completed the MIS for the I-70/US 63 interchange. The extension of MO-740 became one of the possible project improvements to relieve the existing traffic operation and safety problems being experienced at the I-70/US 63 interchange and Route PP (Clark Lane).

Regarding the extension of MO-740, the MoDOT I-70/63 Major Investment Study Final Report states:

> "An extension of Route 740 (Stadium Boulevard) from US-63 to I-70 is included in the CATSO Long Range Transportation Plan. The MIS Study addressed the issue of whether or not a Route 740 extension is needed and the appropriate type of functional classification. From the review of future land uses and examining regional traffic flows using the travel model, it was determined that benefits were apparent related to improvements in accessibility to this part of the Columbia region.
>
> This MIS supports the construction of a four-lane arterial roadway with a median access restricted to intersecting public streets providing a minimum of ½ mile intersection spacing. The travel demand is projected to exceed 20,000 vpd on this new route. The recommendation of this study is to include an arterial roadway to connect the terminus of MO-740 with I-70 in the CATSO Long Range Transportation Plan."

MoDOT's decision to shift the planned Major Investment Study for MO-740 to the I-70/US 63 interchange has delayed the selection of an alignment for the MO-740 extension. The necessary studies should proceed in a timely manner to preserve the opportunity to identify an alignment for the roadway that will not be compromised by the construction of additional homes and businesses.

Right-of-way will need to be purchased and will likely require the acquisition of property by condemnation. Existing development at and near the Lake of the Woods interchange will likely require the purchase of businesses and homes. Issues related to water quality and impacts on the greenbelt are likely given the proximity to Grindstone Creek.

F. Rangeline Street (MO 763)

MO-763 (Rangeline Street) is designated as a major arterial and would be widened to four lanes with a median from U.S Highway 63 to Big Bear Boulevard. The corridor is partially developed and in need of access control. The design of the roadway should anticipate the redevelopment of older, existing industrial properties to commercial and residential uses.

The existing bridge over Bear Creek should be retrofitted to provide for bicycles and pedestrians, and convenient access to the Bear Creek greenbelt and future trail.

G. Vandiver Road

The extension of Vandiver Drive from its eastern terminus to and interchange with U.S. Highway 63 as a major arterial with raised median. The intersections of Vandiver Road with the southbound ramps of U.S. 63 and the northbound ramps of U.S 63/Creekwood Parkway have been identified as future signalized intersections.

The interchange and/or bridge structure should be designed to accomodate bicycles and pedestrians to facilitate the connection with the Hinkson Creek Greenbelt and trail.

H. Mexico Gravel Road

East of U.S. Highway 63, Mexico Gravel Road is shown as a major arterial with an new alignment. The new alignment runs from the intersection of the northbound ramps of the U.S. Highway 63 interchange and Lakewood Parkway, east then north along the eastern side of Hinkson Creek to rejoin the existing Mexico Gravel Road alignment approximately 2,000 feet west of Route PP (Ballenger Lane).

The roadway realignment will require a new bridge over Hinkson Creek. The bridge structure should be designed to accomodate bicycles and pedestrians and to provide a convenient connection to the Hinkson Creek Greenbelt and trail.

Right-of-way will need to be purchased and will likely require the acquisition of property by condemnation. Issues related to water quality and impacts on the greenbelt require special attention given the bridge construction in the greenbelt and the roadway's proximity to Hinkson Creek.

I. Gans Road

From Providence Road to U.S. Highway 63 along the existing alignment as a minor arterial with a new alignment east of Bearfield Road to an interchange at U.S. Highway 63. The intersections of Gans Road with Ponderosa Street, Bearfield Road, Rock Quarry Road, and Hwy. 163 are identified as future signalized intersections.

Gans Road is designated as a minor arterial due to the limited development potential of the areas south of the roadway. The roadway is located in the drainage area for Clear Creek which flows into Rockbridge State Park. The construction phase presents the greatest threat to the water quality of the creek and potential impacts to Rockbridge State Park.

Gans Road should be considered for local designation as a scenic road, to create an attractive southern entrance into south Columbia and preserve the unique character of the corridor.

J. Lemone Industrial Boulevard

The extension of Lemone Industrial Boulevard as a major collector from the existing northern terminus across Grindstone Creek to MO-740 (Stadium Boulevard). Future signalized intersection at Lemone Industrial Boulevard and MO-740. The bridge structure should include provisions for bicycle and pedestrians and provide for convenient access to the future Grindstone trail.

Construction of this roadway will require a substantial bridge structure to cross the confluence of the North and South Forks of Grindstone Creek and the Grindstone Creek greenbelt.

Serious issues related to water quality and impacts on the greenbelt must be addressed given the threat to the water quality of Grindstone Creek and downstream at Hinkson Creek that would occur during the construction of the street and bridge structure.

K. MO 163 (Providence Road)

The widening of Southampton Drive to Route K to four lanes. The right-of-way for the widening is available, although additional right-of-way may be required for the intersection of MO 164 with Route K and Old Plank Road.
MO 163 is identified as part of the PedNet Backbone, and provisions to accomodate the appropriate pedway design needs to be included in the widening project.

L. Route TT (Scott Boulevard)

The widening of Route TT to a four or five lane urban section south of Route ZZ (Strawn Road) to end of State maintenance norh of Chapel Hill Road. Right-of-way will need to be acquired for the widening.

The widening will affect the existing residences along the Route TT in the King's Meadow Subdivision, and the Rothwell Heights neighborhood south of Mt. Carmel Lane to Smith Drive, and in the Georgetown subdivision south of Ludwick Boulevard to Georgetown Drive.

M. Scott Boulevard

The extension of Scott Boulevard south from Route KK to Highway K as a two land minor arterial. Right-of-way for the extension will need to be acquired through the subdivision process or purchased.

7.5 Other Roadway Improvements and Plan Amendments

A. Other Roadway Improvements

1. COLT Railroad Overpass

The construction of a grade-seperated crossing for the COLT Railroad at U.S. Highway 63. U.S. Highway 63 is a four lane divided limited access highway with a posted speed limit of 70 mph. The Columbia Terminal Railroad (COLT) crosses US 63, in north Columbia at an at grade intersection. Certain classes of commercial vehicles and school buses are required to come to a complete stop at the railroad crossing, creating a safety hazard. In addition, the entrance and exit ramps for Route B are located within the highway-rail crossing area. When U.S. 63 was built due to the uncertainty surrounding the future operation of the railroad line at that time (early 1980s). The current railroad track was realigned and an at grade highway/rail crossing was constructed in lieu of a grade separation, anticipating the abandonment of railroad service.

The short line railroad was purchased by the City of Columbia and operates two trains per day over the U.S. Highway 63 highway/rail crossing. The proposed project will construct a railroad bridge over U.S 63 on the original alignment of the railroad. By placing the track back on its original alignment, sufficient vertical clearance will be created between US 63 and the railroad. The bridge will be approximately 300' in length. In addition, the existing highway-rail crossing surface, track, and active warning devices will be removed. The project is estimated to cost $3.8 million.

2. I-70/U.S. 63 Interchange: Limited Build Alternative

The Major Investment Study completed by MoDOT in 2000, identified a "Limited Build Alternative" as one of the preferred strategies to address the capacity deficiences at the I-70/U.S. 63 interchange. This alternative is a series of intersection and on/off ramp modifications intended to relieve traffic congestion at the interchange for an interim period of five to ten years. Appendix P: Limited Build Components, outlines the location, improvement, and the problem addressed by the 12 elements of the "Limited Build Alternative". The project is estimated to cost $5,000,000.

B. Major Roadway Plan Amendments

A number of collector streets have been added to the updated Roadway Plan. East Walnut and Woodrail Avenue have been included in past plans. Several of the roadways in the following list are existing roadways and others are new facilities. In addition, the 2025 Major Roadway Plan recommends the realignment of two arterial intersections to improve traffic flow and reduce delay.

The roadways to be included, reclassified or realigned include:

1. Neighborhood Collectors

    a. East Walnut; from Old 63 east to its terminus
    b. Woodrail Avenue; from Forum Boulevard to Nifong Boulevard
    c. Hackberry Boulevard; from Clearview Road to Rangeline (MO 763)

2. Major Collectors

    a. Lenior Street; from New Haven Road to Gans Road extension
    b. Gans Road; from U.S Highway 63 to New Haven Road

3. Intersection Realignments

    a. Realignment of Route B with Business Loop 70 and Old 63 to provide a four-way signalized intersection
    b. Realignment of Ponderosa Street at Route AC to align with Bluff Creek Drive to provide a four-way signalized intersection

7.6 Bicycle/Pedestrian Facilities

It is proposed that the current City of Columbia Master Bicycle Plan be replaced by a more comprehensive pedestrian/bicycle network that will cover the entire Columbia metro area. This new plan, tentatively called Pednet, will improve linkages and eliminate routes which provide no connections. The Pednet plan will include Class I routes, unlike the current bicycle plan. The entire network is technically Class I routes, since none of the system facilities will share street pavements with motor vehicles. The proposed Pednet plan will include 119.6 miles of greenbelt trails. It will also include 259.3 miles of pedways, which are facilities within the street right-of-way but separated from the street itself. Pednet would add a total of 379 miles of facilities to existing bicycle routes.

The new pedestrian/bicycle plan is designed to provide greater opportunities for bicycle and pedestrian travel throughout the City and metro area through the construction of a system connecting to all parts of the area. In particular, it will be designed to allow children, the elderly, and the disabled to walk or bicycle across the community in safe and attractive surroundings. The construction of the greenbelt trail system will provide an entirely separate transportation system for bicyclists and walkers to use in moving from one part of the metro area to another. This will complement existing sidewalks and bicycle routes, as well as the pedways that will be part of Pednet.

The pedway concept includes two types of facilities. The traditional pedway will be a paved, two-way path from 10' to 12' wide. A painted stripe will separate the lanes. This type will be constructed on one side of the street right-of-way only. The other side of the right-of-way may have a typical 4' to 5' sidewalk. A split pedway will include paved paths on both sides of the street right-of-way, each of them 6' to 8' wide. One-way travel will be encouraged, though not required, on each side.

The Pednet network also classifies facilities in terms of their importance to connectivity. Those facilities which are called the Pednet backbone include both pedways and trails. Included are the pedways along Broadway and Providence Road (Missouri Route 163), which are the centrally located major roadways in the metro area. These pedways are critical to providing east-west and north-south access across the city. Other backbone pedways provide access off Broadway to the future community recreation center and Cosmo Park, and additional downtown access. Also included in the backbone are trail facilities which form a complete loop around the community. These include greenbelt trails in the Hinkson, Bear, Perche, and Grindstone creek corridors, as well as the existing MKT Trail. The MKT Trail not only forms a portion of the loop,

but provides connections to downtown Columbia and to the statewide Katy Trail. Portions of the trail to be part of the network have been constructed along Bear Creek and Hinkson Creek, and more are in the works. The backbone system also provides access across Interstate 70 and U.S. Highway 63, which are major barriers to pedestrian and bicycle travel. Appendix O: CATSO Bicycle/Pedestrian Network Plan, depicts the 2025 bicycle plan adopted by CATSO.

1. Sidewalks

As stated in Chapter Four, the existing street system is inadequately served by sidewalk facilities. Approximately 238.1 miles of streets within the City of Columbia have no sidewalks. The 1997 City of Columbia Master Sidewalk Plan revision proposed 41 projects which would construct 19.7 miles of new sidewalks. The Plan focused on identifying those segments in most critical need of sidewalks. The total mileage, however, is only a small percentage of the streets in need of a sidewalk system. Revisions need to be made both to the Master Sidewalk Plan, and to general city policies for pedestrian facilities. As of 2001, six of the projects have been completed, adding 2.15 miles of new sidewalks.

A number of policy recommendations are appropriate for improving the pedestrian environment within the Columbia metro area. The provision of continuously connected walkways is a major factor in accommodating pedestrian traffic. Connectivity is critical to allow walking as a serious travel mode. Sidewalks should be provided on both sides of major streets, particularly major trafficways such as arterial streets. Walkways should be a minimum of 5 feet wide to allow disabled persons access. A separation from the road- way should be provided, with a 6 to 7 foot space recommended by the accessibility guidelines of the Americans with Disabilities Act (ADA). The minimum width of 4 feet would likely apply in residential areas, while in areas of greater pedestrian use, such as downtown Columbia and other commercial areas, wider walk-ways are appropriate. A 50/50 ratio of vehicle space to pedestrian space is suggested for public spaces in downtown areas, both for public safety and to maximize economic development.

Intersections are significant locations for pedestrian travel. and pedestrian safety needs to be a prime consideration in intersection geometry. A suggested maximum length for pedestrian street crossings is 48 feet. The intersection design should incorporate features such as medians to minimize pedestrian exposure to vehicle traffic. General roadway design needs to keep vehicle turning speeds to safe levels, below 20 mph for left turns, and below 10 mph for right turns. It is suggested that left turns be minimized or even eliminated in downtown areas and other locations with large numbers of pedestrians. Pedestrian signalization should be timed for a maximum walking speed of 3.5 feet per second. Intersection approaches and pedestrian crossing and waiting areas should be well illuminated, ideally creating backlighting to make pedestrians clearly visible to approaching vehicles.

On major streets, particularly those with four lanes, the construction of raised medians provides a refuge for pedestrians from traffic, and allows them to more safely cross the street. The median should be cut at the crossing point to meet ADA requirements.

To maximize student safety, school areas need specific pedestrian access points, including some which avoid crossing points with vehicles. Roadway design needs to minimize vehicle travel speeds to 15-20 mph. Raised crossings, traffic diverters, and on-street parking are some of the possible methods for slowing traffic. All school approaches should have curb and gutter sections, and street geometry should insure maximum sight distance on all pedestrian ac-cesses and crossings.

Commercial and office areas should provide independent access ways for pedestrians separate from vehicle access. Ideally, there would be direct pedestrian access for adjacent residential areas. Site planning should minimize the amount of walking that must occur in vehicle parking areas, to lessen the chances of collisions with pedestrians as vehicles back out of spaces. Side lot and on-street parking are two ways to avoid having vehicles back over walkways. Another possibility, particularly for the downtown area, is to restrict vehicle traffic to particular spaces or

times of day. Such auto restricted zones (ARZ's) offer protection for pedestrians. Limiting parking and instituting true cost parking measures are further incentives to encourage walkers.

The use of access management, ARZ's, parking restrictions, and other such mechanisms alone will not provide for functional commercial or office developments. An example can be found in the communities that closed downtown streets and eliminated parking to create pedestrian malls. Shoppers then found it less convenient to get to the downtown, since the majority of them were traveling by auto. The result was frequently the deterioration of the downtown. To counter this possibility, methods for restricting auto access and protecting pedestrians need to be combined with land use planning that emphasizes walkable scale development. A critical element is the provision of a variety of residential options within walkable distance of commercial and office areas. The proximity of a mixture of land uses is necessary to promote the pedestrian mode. Without such land use planning, restricting auto access to commercial areas will only lead to a loss of function.

Walkable scale land use planning needs to be employed in all types of land uses, in both new and infill developments, to maximize the benefit to pedestrians. Mixed use developments and traditional neighborhood designs are two ways of achieving this. Land use ordinances should provide for neighborhood schools, pocket parks, and neighborhood-scale commercial areas. Seating should be provided throughout retail areas and other pedestrian corridors. Ideally, businesses should front on sidewalks, with parking in side or rear areas.

7.7 Major Investment Studies

TEA-21 requires that highway improvements that have a significant effect are subject to a major investment study (MIS). The purpose of the MIS is to examine the impacts and consequences of proposed transportation investment strategies. The MIS process involves the evaluation of alternative investment strategies, a draft environmental impact statement or environmental analysis, and the involvement and input of local governments, citizen organizations, and interested members of the public. Appendix O: CATSO Major Investment Study Policy; contains the adopted MIS process for the Columbia Metropolitan Area.

Projects that require a MIS would include highway or transit improvements receiving federal funding that have a substantial cost and are expected to have a significant effect on facility capacity, traffic flow, level of service or the mode share. The MIS must include quantative and qualitative information on costs, benefits, and impacts to evaluate each alternative and a baseline "no build" alternative.

In the CATSO Major Roadway Plan, there is one project that clearly meets the test for a MIS. The planned improvements for Interstate 70 will have effects on capacity, traffic flow, level of service, and will have substantial cost.
In 2000, MoDOT elected to begin the Environmental Impact Statement (EIS) process for the I-70 improvement. The process outlined in the National Environmental Policy Act (NEPA) for the EIS is identical to the MIS process. The EIS work will continue through 2001. This section outlines the planned improvements and highlights some of the issues identified by CATSO to be addressed in the EIS.

A. Interstate 70 - Additional Travel Lanes

Interstate 70 is a four lane freeway which serves as the major east/west throughfare through the Urbanized Area, the region, and the State of Missouri. The CATSO Roadway Plan shows I-70 as a freeway, without specifying the planned number of travel lanes. MoDOT completed the Route I-70 Feasibility Study in December, 1999. This study identified the need for eight travel lanes through Columbia. The first tier Environment Implace Statement being completed for MoDOT identifies 3 options for providing the eight lanes through Columbia; 1) a northern relocation of I-70 with 4 travel lanes, 2) an inner relocation of I-70 approximately 2 miles north of the existing alignment, and 3) I-70 to be reconstructed as a eight lane freeway with frontage roads.

A widening of I-70 will require the reconstruction of all the interchanges and bridges. Of particular concern is the design of the interchange at I-70 and Business Loop 70. The design for this interchange must take into account Creasy Springs Road, I-70 Drive SW and West Boulevard. Existing traffic conflicts at these locations are a direct result of the present interchange location and design. The I-70/U.S. 63 Major Investment Study completed in June, 2000, examined alternatives for improving the capacity and operation of the I-70/Hwy 63 interchange. Alternatives considered included a range of improvements from a "limited build" option to a fully directional, high speed interchange.

Either of the I-70 relocations will have a profound impact on the development patterns of Columbia and Boone County. Interchange locations and providing for uninterupted local traffic circulation are critical issues that will need to addressed during the EIS.

Design

The result of the travel demand modeling forecast for the year 2020 produced 24 hour traffic volumes in the range of 75,100 to 85,600. In 1997, 24 hour traffic volumes on I-70 ranged from 37,200 to 54,100 vehicles. This represents an increase of 8.0-9.5 percent from 1992. Truck traffic accounts for approximately 15-30 percent of the total volume.

As constructed, the present capacity for I-70 is 4,000 vph at the peak hour. The preliminary MoDOT long range plan call for 8 lanes, although the previous Fifteen Year Design Program indicated 6 lanes. The six lane configuration would provide adequate capacity to accomodate the 2015 forecast traffic volumes.

The widening of I-70 will require the reconstruction of all the affected interchanges and bridges. Of particular concern is the design of the interchange at I-70 and Business Loop 70. The design for this interchange must take into account the local circulation needs for Creasy Springs Road, I-70 Drive SW and West Boulevard. Existing traffic conflicts at these locations are a direct result of the present interchange location and design. Access to the City of Columbia's Cosmo Park is a critical issue.

All interchange bridge structures should be designed to provide bicycle and pedestrian access along both sides of the roadway

Right-of-way

The existing right-of-way through the urbanized area varies from 200 feet to 300 feet. The final design for the additional lanes may require a R.O.W. greater than 400 feet to accomodate slopes, to construct sound barriers, provide frontage roads, and to provide landscaping.

Natural Environment

The EIS will include an environmental report incorporating the principles and requirements of the National Environmental Policy Act (NEPA). The report will identify the affected environment, quantify potential environment impacts and address the environmental consequences of the I-70 widening and provide mitigation options. The potential for significant environmental impacts to be examined will include, but are not limited to the following;

a. Surface water
b. Ground water
c. Native habitat
d. Rare & endangered species
e. Critical environmental features
f. Cultural and historic sites
g. Air Quality
h. Noise

Noise intrusion into existing neighborhoods is a primary concern, as well as potential surface water contamination from pavement runoff and siltation during the construction of additional travel lanes and interchanges.

Existing Development

Residential and commercial development is more or less continuous in the corridor adjacent to I-70 and in the corridors shown for the relocation alternatives. There are significant concentrations of single family residences and mobile homes in the segment of I-70 between Business Loop 70 West and MO 763. The Parkade subdivision, residences along Clark Lane, and the Rainbow Village Mobile Home Park would both be directly effected by the reconstruction project and possible noise impacts.

Subdivision Activity

The majority of the property adjacent to I-70 is platted and developed, with the exception areas located along the segment west of Stadium Boulevard to Perche Creek. Recent subdivision activity in this area has been slow and primarily for small commercial or office uses.

In the area designated for the inner relocation, subdivision activity and construction activity have been very active. The City of Columbia is completing the extension of sewer lines in northern Columbia and has acquired the water district in order to provide service to this area. Growth in the inner relocation corridor is anticipated to occur rapidly over the next five years.

Fiscal Impact

Total engineering and construction cost for the additional lanes, including right-of-way for I-70 is estimated at $278,319,000.

I-70 is part of the National Highway System and designated as a freeway in the FHWA functional classification and is eligible for Federal assistance. The MoDOT would be responsible for funding the remaining part of this project.

Recommendations

The Columbia Area Transportation Study Organization will assist and review MoDOT proposals for I-70 project throughout the EIS process. The widening of I-70 should remain in the CATSO 2025 Transportation Plan, as presently adopted.

B. MO 740 (Stadium Boulevard) - Eastern Extension

The eastern extension of MO 740 from its current terminus east of US 63 to the I-70/Lake of the Woods interchange is shown in the Major Roadway Plan (MRP) as an expressway. The number of lanes and pavement width are not specified in the current CATSO Major Thoroughfare Plan. The planned MO 740 extension is approximately three miles in length.

Projected Demand

The result of the travel demand modeling completed as part of the MIS for the I-70/US 63 interchange, 24 hour traffic volumes on the MO 740 extension were in the range of 20,000+ vehicles.

Design

Expressway. Four lane divided roadway with median on 200 - 300 feet of R.O.W.. Signalized, at grade intersection with Route WW (Broadway) and at Richland Road.

The planned capacity for MO 740 is 2,000 vehicles at the peak hour LOS C. A four lane arterial configuration would provide adequate capacity to accomodate the 2025 forecast traffic volumes. An expressway designation exceeds the design requirements for this roadway.

Design alternatives for MO 740 should include provisions for bicycle and pedestrian access in the right-of-way.

Right-of-way

All of the right-of-way through the urbanized and metropolitan area will vary from 200 feet to 300 feet. The final design for the MO 740 extension may require a R.O.W. greater than 300 feet to accomodate slopes, to construct sound barriers, provide for landscaping, and to accomodate bicycle and pedestrian facilities where appropriate. Access rights will need to be purchased to eliminate the potential for private driveways and non-arterial street connections.

Natural Environment

The potential for significant environmental impacts to be examined will include, but are not limited to the following;

a. Surface water
b. Ground water
c. Native habitat
d. Rare & endangered species
e. Critical environmental features
f. Cultural and historic sites
g. Air Quality
h. Noise

The proposed alignment for MO 740 will have noise impacts and may have significant impacts on surface water resources.

Existing Development

A number of residential and commercial developments are located along St. Charles Road corridor. The area at I-70 and St. Charles Road/Lake of the Woods Road interchange has a concentration of commerical uses along with the Lake of the Woods subdivision located south and east of St. Charles Road. A large commericial area is in the process of being developed at the southeast corner of Lake of the Woods/I-70 interchange. In addition, two mobile home parks are within the corridor; Renner Trailer Park and Richland Heights.

Subdivision Activity

In the past five years, subdivision activity has been slow, and limited primarily to residential uses. Commercial subdivision activity is expected to increase in the I-70 corridor.

Fiscal Impact

Total engineering, right-of-way acquistion and construction costs for the extension of MO 740 is estimated at $29,468,000.

MO 740 is designated as an expressway in the FHWA functional classification within the urbanized area and is eligible for Federal assistance. MoDOT would be responsible for funding the majority of this project.

Recommendation

The Columbia Area Transportation Study Organization and the Missouri Department of Transportation should initiate a MIS for the MO 740 extension project as soon as funding will permit. Until the completion of the MIS, the extension of MO 740 (Stadium Boulevard) should remain in the CATSO 2025 Transportation Plan as placeholder project. If the MIS or another study concludes an arterial roadway would be the preferred alternative, MoDOT should proceed with a location study to identify the roadway corridor.

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CHAPTER EIGHT:
FINANCING TRANSPORTATION IMPROVEMENTS

8.1 Introduction

The CATSO 2025 Transportation Plan is a financially constrained plan prepared for the Columbia urbanized area. The evaluation of the area's financial capacity is based upon estimates of reasonably anticipated funding from federal, state, Boone County, and the City of Columbia, and of the system maintenance and capital improvement costs through 2025.

TEA-21 requires that funding be available for all elements included in the 2025 Transportation Plan that are in the Columbia Urbanized Area. While the CATSO Transportation Plan covers the Metro Planning area, in this section, only the improvements in the Urbanized Area will be analyzed.

Revenue to pay for the planned improvements and maintenance come from four sources,

1. Federal funding for roadways and transit;
2. State funding for roadways;
3. Boone County
4. City of Columbia

The twenty-five year revenue projections included in the Plan were provided by the Missouri Department of Transportation, Boone County Public Works, and the City of Columbia Finance Department. This chapter summarizes the primary methods and conclusions of the financial capacity analysis for the CATSO 2025 plan.

8.2 Funding for Transportation Projects

Funding for streets and highways in the metro area comes from a combination of federal, state, and local sources. The majority of state programs are financed from federal funds with additional revenues from state motor fuel taxes, and user fees. Local programs rely on state suballocations of motor fuel tax revenue, property and sales taxes, general fund allocations, and other local fees with some assistance from federal funds for highways and bridges.

Most major capital projects would not be possible without federal participation. The use of federal funds significantly increases the ability of state and local governments to complete construction projects by providing 80% of the funding for eligible projects. The remaining 20%, also know as the "local match" is provided by the agency requesting the funds.

Historically, most federal funding has been divided into specific program categories which restricted the use of the funding to a particular type of roadway or to a single mode. TEA-21 has broadened the program categories and placed fewer restrictions on the use of the funds so that funds traditionally reserved for highways may be used for transit, bicycle and pedestrian facilities, historic preservation, and landscaping.

8.3 Boone County

In 1993, Boone County residents passed a 1/2 cent sales tax to fund roadway improvements. The 1/2 cent assessment is in force for a five year period, 1993-1998. In 1998, the electorate voted to continue the 1/2 cent assessment through 2003. A four percent annual growth in tax revenue is factored into the five year revenue estimate. In addition, Boone County receives reimbursements from the State of Missouri from revenue collected from State motor fuel tax, sales and use tax, and licenses and fees.

Federal Highway Adminstration funds come to Boone County through the Missouri Department of Transportation. Appendix I: Boone County Revenue Projections; outlines the annual projected revenues from the sales tax and all other revenue sources to estimate the dollar amount available for transportation projects.

The TEA-21 regulations permit the inclusion of revenue that can be reasonably anticipated during the 25 year planning period. To provide a consistent approach to funding for the plan and only for the purposes of this plan, the assumption has been made that the 1/2 cents sales tax will be retained by the electorate through 2025.

8.4 City of Columbia

Funding for transportation improvements in the City of Columbia comes from a variety of sources such as property tax, development charges from new construction, user fees, special assessments, the sale of general obligation bonds, and the City's 1/2 cent Transportation Sales Tax. In addition, the Columbia receives revenue from Boone County as part of a County rebate ordinance and reimbursements from the State of Missouri from revenue collected from State motor fuel tax, sales and use tax, and licenses and fees.

Federal highway and transit funding comes to the City of Columbia through the Missouri Department of Transportation.

From these sources the City allocates the funding for street construction, street maintenance, and the capital and operating requirements of the Columbia Regional Airport and the Columbia Transit System.

Appendix J: City of Columbia Revenue Projections; outlines the annual projected revenues from the transportation sales tax and all other sources to estimate the dollar amount available for transportation projects.

The TEA-21 regulations permit the inclusion of revenue that can be reasonably anticipated during the 25 year planning period. To provide a consistent approach to funding for the plan and only for the purposes of this plan only the fixed funding sources have been included in the revenue forecast, however it is assumed that all or parts of the roadways will be financed through general obligation bonds and private development interests.

8.5 State Funding for Transportation Projects

Funding for state roadway maintenance and constructions comes primarily from the $0.17/gallon motor fuel tax levied by the State of Missouri, and secondarily from sales and use tax, and licenses and fees. Funds are annually programmed from projects in the three year Transportation Improvement Program (TIP) for each district based upon the district's stated needs, population, mileage on the state and federal roadway system, safety, anticipated growth, vehicle miles traveled, and other criteria. Appendix K: Projected State Funding; outlines the projected revenues from all state sources.

8.6 Federal Funding for Transportation Projects

Federal funding for roadway maintenance and construction comes primarily from the national $0.184/gallon motor fuel tax and secondarily from excise taxes on tires and batteries. The revenue collected from the fuel and excise taxes is placed in the Federal Highway Trust Fund (FHTF) and allocated to each state using a funding formula under the provisions of TEA-21. The total dollar amount available annual from the FHTF vary due to fluctuations in revenue because of such factors as economic conditions, and Congressional limits on the percent of funds to be allocated. TEA-21 provides a funding formula for each program element which may use the state population, roadway mileage, vehicle miles traveled, and other relevant factors related to the program objectives. The State of Missouri receives funding from the Federal

Highway Trust Fund through the U.S. Department of Transportation (USDOT). The Missouri Department of Transportation then allocates the federal funds to the larger Metropolitan Statistical Areas and the other urbanized areas under 200,000.

The allocation of Federal funding for state and local projects within an Urbanized Area is determined, in part, by the local Metropolitan Planning Organization (MPO). Locally, the Columbia Area Transportation Study Organization has this responsibility. Appendix L: Projected Federal Funding, outlines the projected revenues from all federal sources. Appendix M: Projected Federal Funding for Transit outlines the anticipated revenues from the Federal Transit Administration for operating and capital assistance.

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9.1 Introduction - Financially Constrained Improvements

The absence of financial constraints in developing a transportation plan can result in the inclusions of projects and programs that are unrealistic or unjustified. A strategic approach to addressing future transportation projects requires that priorities be established to allocate limited resources among competing needs.

For the past twenty-five years the CATSO Transportation Plan for the Columbia Area has been focused on maintaining the existing infrastructure and proceeded on the assumption that the resources to maintain and expand the transportation system would be found as needs arose.

The CATSO 2025 Transportation Plan places its priorities on investing in long term solutions to existing transportation needs and providing adequate capacity to accommodate future growth while preserving the existing investment in transportation infrastructure. The ability to fund the maintenance and provide for planned investments is a major controlling factor in the decisions made about the future of the metro area transportation system. CATSO plans prior to 1994 have identified needs and proposed solutions without regard to the ability of state or local governments to fund the new projects or examine the costs. In contrast, the CATSO 2025 Transportation Plan and the TIP will be authoritative statements of the area's transportation investment strategy; a product of planning and engineering assessments of transportation solutions limited by financial constraints.

9.2 Cost Estimates for Transportation Improvements

Estimates were developed for the cost of all the roadways, transit improvements, pedestrian and bicycle facilities covered in the Plan through 2025. Likewise, estimates of revenues from various sources for transportation improvements have been developed through 2025.

The estimates for new construction, reconstruction and annual maintenance were provided by the Missouri Department of Transportation (MoDOT), Boone County Public Works Department, and the City of Columbia Public Works Department.

Appendix H: CATSO 2025 Roadway Plan; provides a segment by segment description of the planned improvements and an estimated cost.

The methodology used to develop the cost of the planned roadway improvements is the cost of right-of-way acquisition and construction. Specific cost estimates could not be calculated because there are no detailed construction plans for these roadways. It is the normal procedure to use a standard cost per linear foot or per mile to estimate the total construction cost. Because each roadway is unique, additional construction money is added for bridges, culverts and for any additional features needed for that particular roadway. Approximate costs for engineering (design, surveying, administration), inspection and testing are based on the estimated construction cost data for the mid-Missouri area. The total engineering and construction cost shown for each roadway reflects the estimated cost of building the entire roadway to the adopted design standard.

For new roadways, all estimates are based on the most advantageous roadway alignment that could be determined at this preliminary stage of the project development. Minor adjustment to the alignments may be made during the design phase of each roadway. The cost factors used in preparing these estimates are shown in Table Five: Estimated 2000 Roadway Costs Per Linear Foot for New Construction.

Table Five: Estimated 2000 Roadway Costs Per Linear Foot for New Construction.

Neighborhood Collector	$250/L.F.
Major Collector	$300/L.F.
Minor Arterial	$450/L.F.
Major Arterial	$550/L.F.

The cost factor used in preparing these estimates include excavation, flexible base, surfacing, curb and gutter, drainage, engineering design, administration, inspection and testing, and basic site restoration. Additional costs for bridges, culverts, overpasses, and interchanges are included on individual roadways as needed. In all cases 15% was added for miscellaneous construction items and contingencies on arterial roadways. All cost estimates were done in 2000 dollars. A 3% annual inflation factor has been included in the estimates through 2025. The cost of right-of-way acquisition was considered for each roadway. Land costs vary widely due to a variety of factors such as existing uses, zoning, the desirability of the area, and the perceived potential for future development. When available, recent sales of property were considered when estimating ROW costs. Purchasing ROW to permit the widening of an existing roadway is almost always more expensive than constructing a new roadway through vacant tracts.

As a general rule for new construction, approximately 5% of the parcels needed will be dedicated at no cost. Approximately 80% of the parcels will be purchased for the appraised value offered. The remaining 15% of the parcels needed will end up in condemnation proceedings, with the cost sometimes greater than their appraised value.

9.3 Maintenance and Operating Costs

Maintenance of the existing transportation infrastructure is an important aspect of TEA-21. Estimates for maintenance through 2025 were developed by MoDOT, Boone County, and the City of Columbia. Costs were developed for each functional classification on a per mile basis. Table Six: Maintenance and Transit Operating Costs; outlines the projected costs of maintaining the roadways in the urbanized area through 2025 and operating public transit.

Table Six: Maintenance and Transit Operating Costs

Roadway Classification	MoDOT	Boone County	Columbia	Total	% of Total
Interstate	$28,879,360	Not Applicable	Not Applicable	$28,879,360	8.6%
Freeways/Expressways	$22,406,400	Not Applicable	Not Applicable	$22,406,400	6.6%
Major Arterials	$3,112,000	$3,000,000	$2,092,625	$8,204,625	2.4%
Minor Arterials	$7,780,000	$3,000,000	$4,124,612	$14,904,612	4.4%
Major Collectors	$62,240	$7,000,000	$7,291,076	$14,353,316	4.4%
Neighborhood Collectors	Not Applicable	$7,000,000	$4,861,770	$11,861,770	3.5%
Other					
Transit Operations	$0	$0	$81,713,143	$81,713,143	24.2%
Local Streets/Sidewalks	$0	$0	$154,769,255	$154,769,255	45.9%
Total	$62,240,000	$20,000,000	$254,852,481	$337,092,481	100.0%
Percent of Total	18.5%	5.9%	75.6%	100.0%	

9.4 Construction and Capital Costs

Table Seven: CATSO Tranportation Project Needs; outlines the cost of new roadway construction on new alignments, upgrading the capacity of existing roadways, as well as the costs associated with the acquistion of transit vehicles. A detailed accounting of the construction costs is included in Appendix H: CATSO 2025 Major Roadway Plan. This appendix provides a segment by segment description for all roadways in the Plan.

The CATSO Major Roadway Plan identifies the major roadways in the metro area and provides a functional designation based upon future needs and function. Within the Plan, each roadway segment is evaluated and given the designation of new construction, capacity upgrade and no change. The new construction designation identifies roadways which will be constructed on a new alignment as a relocation, extension of an existing facility, or a new roadway on a new alignment. On existing roadways, the capacity upgrade designation indicates that improvements to a roadway, such as the construction of turn lanes or additional travel lanes are planned. For existing roadways which provide adequate capacity to meet future needs, the designation of "no change" is assigned.

Table Seven: CATSO Transportation Project Needs; provides a summary of the estimated costs of the projects identified by roadway classification and by agency.

Table Seven: CATSO Transportation Project Needs

Roadway Classification	MoDOT	Boone County	Columbia	Total	% of Total
Interstate	$278,319,000	$0	$0	$278,319,000	52.8%
Freeway/Expressway	$34,468,000	$0	$0	$34,468,000	6.5%
Major Arterials	$50,372,440	$0	$30,209,080	$80,581,520	15.3%
Minor Arterials	$0	$25,150,040	$15,681,600	$40,831,640	7.7%
Major Collectors	$0	$8,080,480	$27,402,640	$35,483,120	6.7%
Neighborhood Collectors	$0	$11,536,800	$9,202,200	$20,739,000	3.9%
Other					
Transit Vehicles	$0	$0	$26,892,705	$26,892,705	5.1%
Bicycle Facilities	$0	$0	$3,052,740	$3,052,740	0.7%
Pedestrian Facilities	$0	$0	$6,908,044	$6,908,044	1.3%
Total in 2000 $	$363,159,440	$44,767,320	$119,349,009	$527,275,769	100.0%
Adjusted Total thru 2024	$599,213,076	$73,866,078	$196,925,864	$877,280,528	
Percent of Total	68.9%	8.5%	22.6%	100.0%	

9.5 Total Revenues

The total highway and transit revenues projected for the Columbia metro area through 2025 are displayed in Table Eight: Highway and Transit Revenues by Source: 2000 - 2024.

The projected totals, especially gasoline tax revenues may be reduced due to increases in the retail price of gasoline and the subsequent reduction in demand. Revenues derived from the sale of bonds, which are subject to voter approval, have not been included in the totals. However, it may be assumed that at some time during the 25 year period covered by the Plan, that bonds will be issued for specific transportation improvements.

The projected revenues must provide for roadway maintenance, transit operation, capital replacement, new construction, system expansion, rehabilitation projects, and reconstruction.

Table Eight: Highway and Transit Revenues by Source: 2000 - 2024

Mode Category	MoDOT	Boone County	Columbia	Total	% of Total
Total Roadways	$118,600,000	$345,335,613	$264,029,618	$727,965,231	86.6%
New Construction	$33,500,000	$325,335,613	$90,890,280	$449,725,893	53.5%
Maintenance	$62,400,000	$20,000,000	$173,139,338	$255,539,338	33.1%
Other (1)	$22,700,000	$0	$0	$22,700,000	
Total Transit	Not Applicable	Not Applicable	$112,493,143	$112,493,143	13.4%
Capital (2)	Not Applicable	Not Applicable	$30,780,000	$30,780,000	3.6%
Operating	Not Applicable	Not Applicable	$81,713,143	$81,713,143	9.8%
Total Revenues	$118,600,000	$345,335,613	$376,522,761	$840,458,374	100.0%
Percent of Total	14.1%	41.1%	44.8%	100.0%	

Notes:
(1) Includes revenue dedicated to rehabilitation and reconstruction and safety.
(2) Revenue for transit assumes federal capital assistance at approximately 37.6% of total revenues for operating

9.6 The Twenty-Five Year Transportation Plan

The focus of the CATSO 2025 Transportation Plan is the movement toward a more diverse transportation system that supports the use of walking, bicycling, and buses as an alternative to the automobile. This multimodal strategy relies on the construction of bike and pedestrian facilities and monitoring their usage. Financial support for transportation facilities can then be based upon the demonstrated demand. Over the next five years, CATSO is committed to facilitating the development of engineered alignments for all new roadway construction to be cooperatively implemented by Boone County and the City of Columbia and to improving access for bicycles and pedestrians in the metro area.

The CATSO 2025 Transportation Plan retains most of the roadways in the current CATSO Roadway Plan as adopted. Several new planned roadways have been considered or have been included in the Plan. Implementation of the recommendations from the MoDOT Major Investment Study for I-70/US 63 interchange and the result of the Environmental Impact Study on I-70 could have substantial impacts on the Transportation Plan.

Map Three: CATSO 2025 Major Roadway Plan; show the adopted roadway system for 2025. Appendix H: CATSO 2025 Roadway Plan; provides a segment by segment description for each roadway in the plan. Costs for the construction/reconstruction and years for construction of the roadway are included. Map Four: CATSO 2025 Bicycle/Pedestrian Network Plan; show an integrated system of trails and pedways. Appendix N: CATSO 2025 Bicycle/Pedestrian Network Plan; provides a segment by segment description for each type of facility in the plan.

All of the long range projects for MoDOT, Boone County, and the City of Columbia have been identified and cost estimates have been prepared. All the dollar figures are in year 2000 dollars. The highest priority is placed on maintenance of the existing system. New construction and system expansion are funded only if revenue is available.

A. Missouri Department of Transportation (MoDOT) Long Range Projects:

1. New Construction

Freeways/Expressways:

MO 740: U.S. Highway 63 to I-70.	Project cost: $29,468,000

Major Arterials - 4 lanes

Route TT: Route UU to Scott Boulevard.	Project cost: $5,111,040
Route AC: Green Meadows Road to U.S. Highway 63.	Project cost: $12,152,400
Ballenger Lane: I-70 Drive SE to Route PP	Project cost: $4,000,000

2. Capacity Upgrade

Interstate

Interstate 70: West urban limit to East urban limit.	Project cost:$278,319,000

Freeways/Expressways

I-70/U.S. Highway 63: Limited Build Improvements.	Project cost: $5,000,000
MO 163: Southampton Drive to State Route K.	Project cost: $1,875,000

Major Arterials

Route AC: State Highway 163 to Green Meadows Road.	Project cost: $3,427,600
Route PP: Robert Ray Drive to East urban limit.	Project cost: $5,050,000
Route WW: U.S. Highway 63 to East urban limit.	Project cost: $1,151,400
Route WW: Old 63 to U.S. Highway 63.	Project cost: $4,928,000
Route TT: Smith Drive to end of State maintenance.	Project cost: $2,262,000
State Highway 763: U.S. Hwy 63 to Big Bear Blvd.	Project cost: $12,290,000

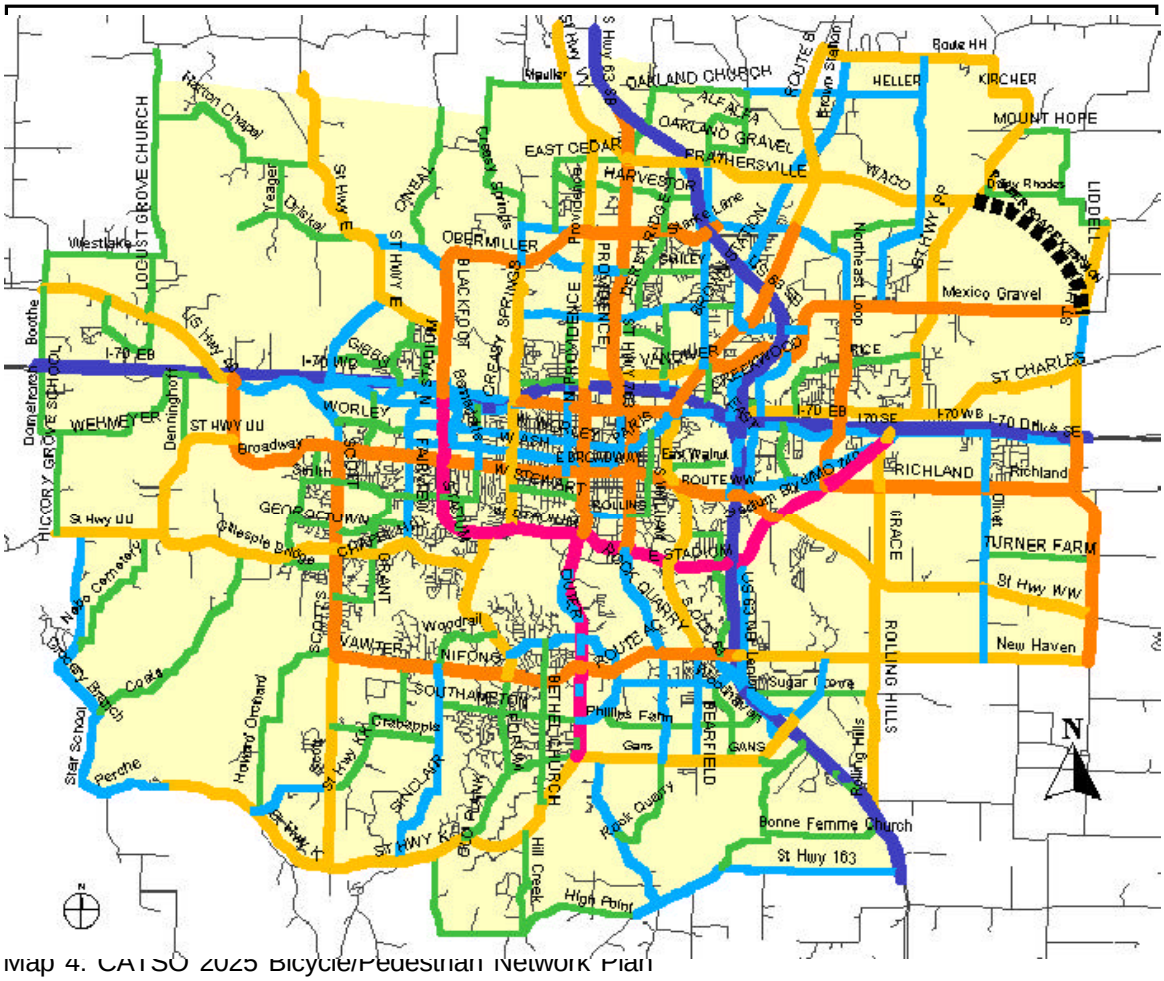
3. MoDOT Plan Status

The majority of MoDOT projects shown in are "illustrative". Of the $606,488,586 in projects identified as needed through 2025, the estimated revenue available is $33,500,000. Adjusted for year 2000 dollars, the total funding available for projects is $20,303,030.

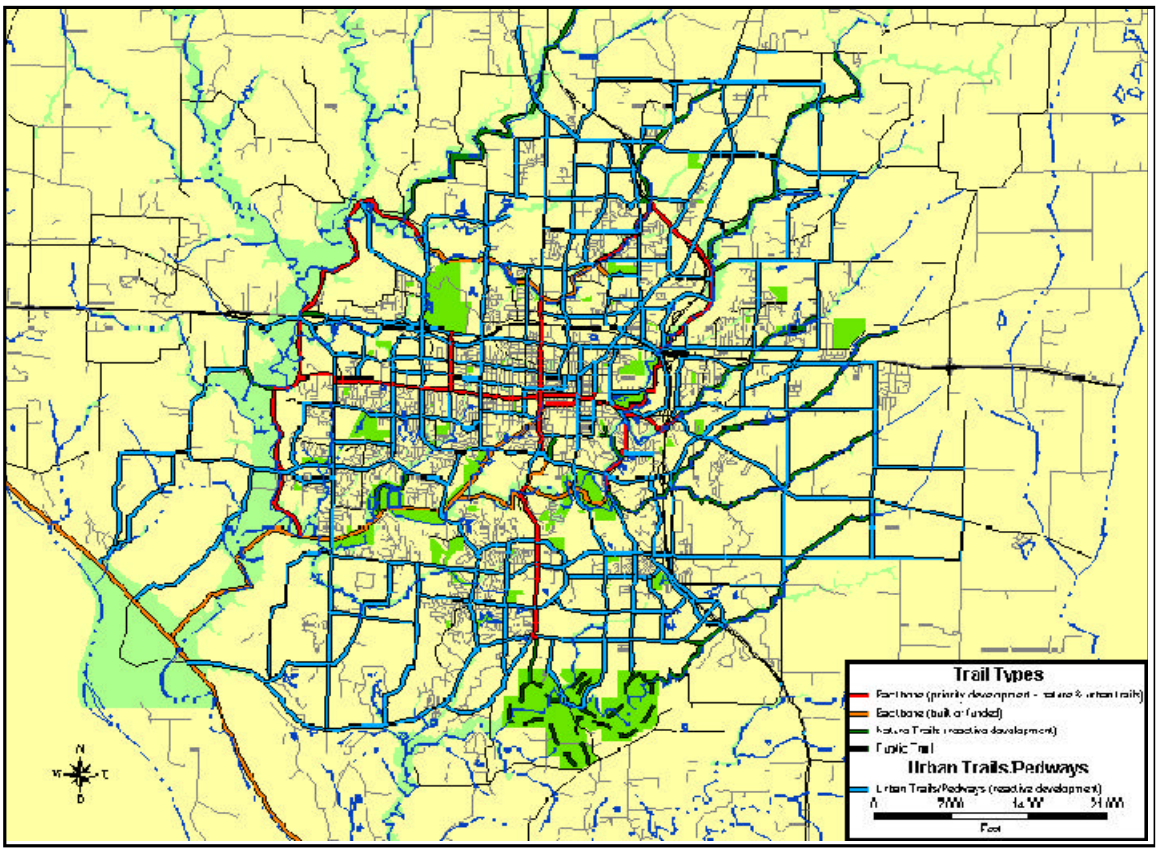
The following projects total $22,218,000 and are included in the Plan with identified revenue and are not illustrative:

Interstate 70/U.S. Highway 63: Limited Build Improvements.	Project cost: $5,000,000
Route WW: Old 63 to U.S. Highway 63.	Project cost: $4,928,000
State Highway 763: U.S. Hwy 63 to Big Bear Boulevard.	Project cost: $12,290,000

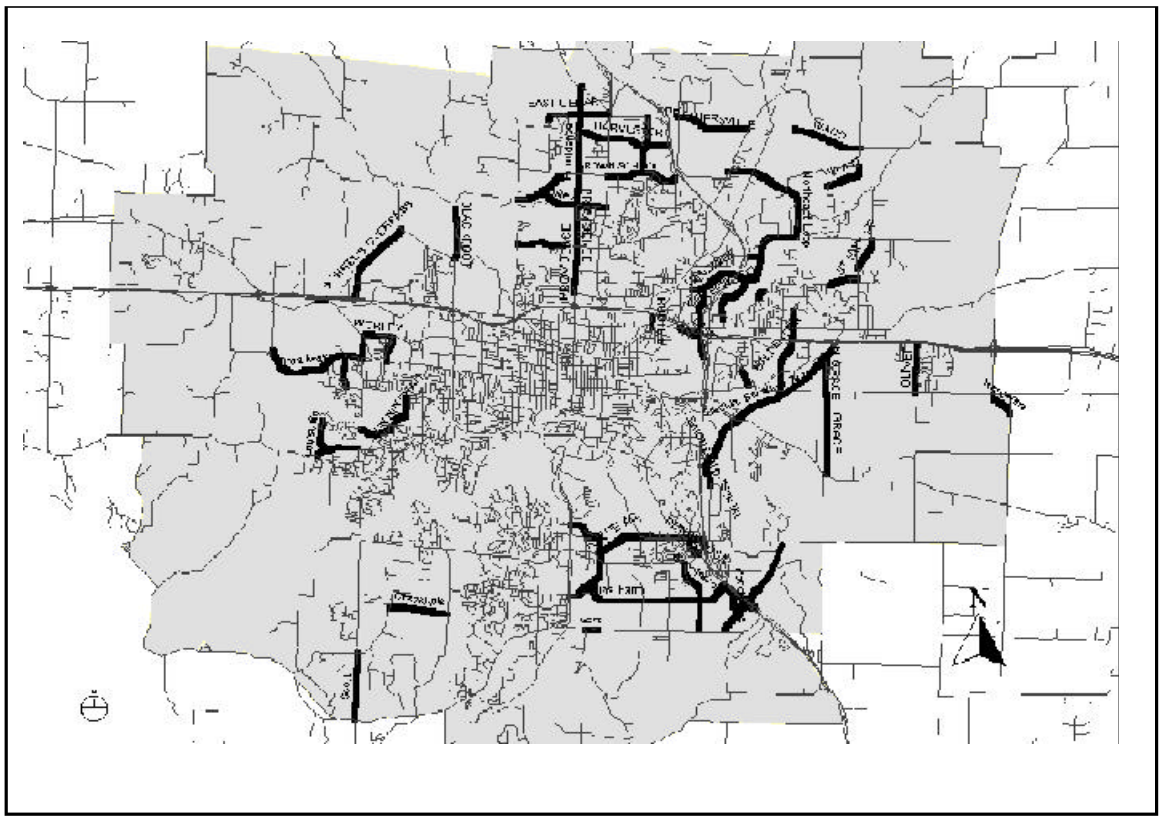
Map 3: CATSO 2025 Major Roadway Plan



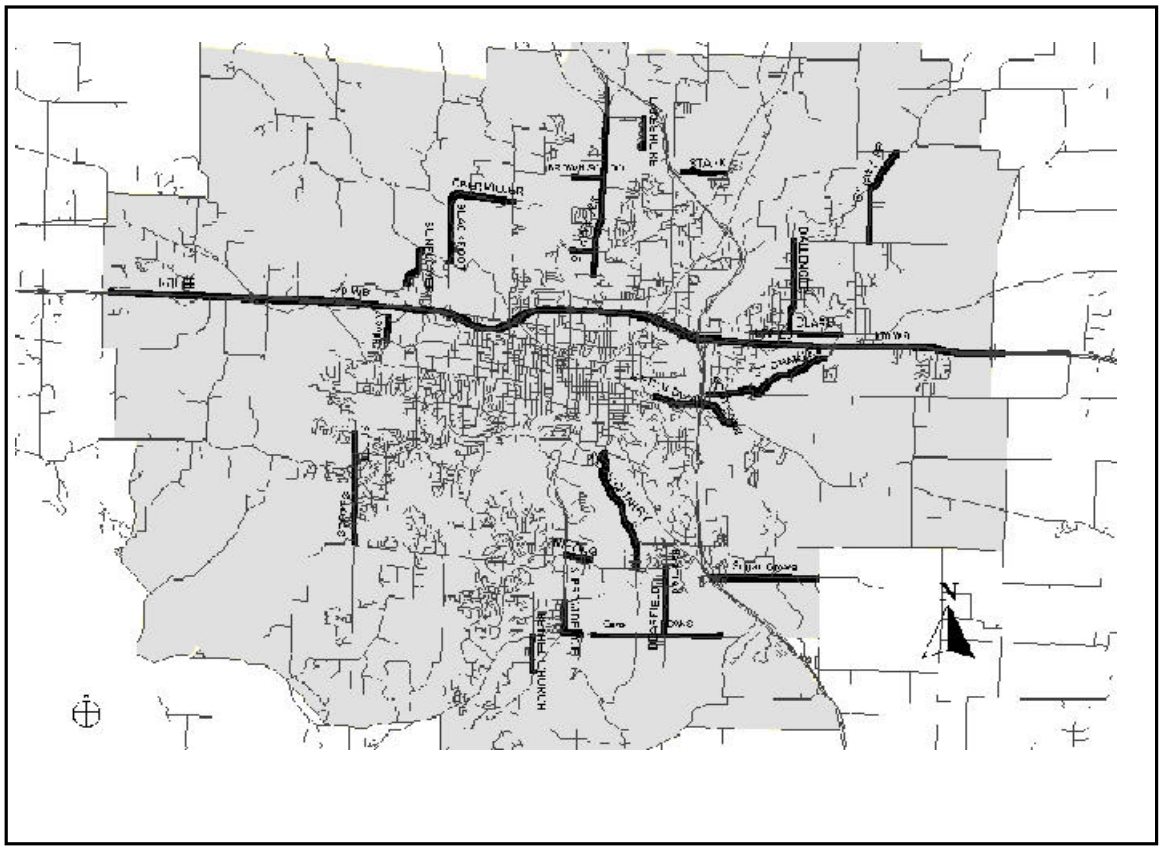
Map 4: CATSO 2025 Bicycle/Pedestrian Network Plan



Map 5: Location of New CATSO Roadway Projects



Map 6: Location of CATSO 2025 Capacity Upgrade Roadway



B. City of Columbia Long Range Projects:

1. New Construction

Major Arterials: 2-4 lanes

Ballenger Lane: Richland Road to I-70 Drive SE.	Project cost:	$3,194,400
Brown School Road: State Highway 763 to US Hwy 63.	Project cost:	$4,617,360
Mexico Gravel Road: Vandiver Drive to Route PP.	Project cost:	$2,439,360
Northwest Loop: Creasy Springs Road to Brown School Rd.	Project cost:	$2,457,400
Vandiver Drive: Sylvan Lane to Mexico Gravel Road.	Project cost:	$7,114,800

Minor Arterials: 2-4 lanes

Chapel Hill Road:Old Gillespie Bridge Rd to Scott Blvd.	Project cost:	$1,829,520
Old 63 Realignment: Route AC to Stadium Boulevard.	Project cost:	$594,000
Providence Road: Vandiver Drive to Brown School Rd.	Project cost:	$4,894,560
Waco Road: Brown Station Rd to Oakland Gravel Rd	Project cost:	$2,946,240
Waco Road: Route B to Rogers Road.	Project cost:	$3,611,520

Major Collectors:

Bernadette Drive: I-70 Drive SW to Fairview Road.	Project cost:	$696,960
Blue Ridge Road: Creasy Springs Road to Garth St.	Project cost:	$1,203,840
Creekwood Parkway: Golden Bear Dr. to Vandiver Dr.	Project cost:	$1,378,080
East Boulevard: East Business Loop 70 to Conley Rd.	Project cost:	$1,092,960
Green Meadows Road: U.S.Highway 163 to Route AC.	Project cost:	$681,120
Lake Ridgeway Drive: Clark Lane to Vandiver Drive.	Project cost:	$1,235,520
Lemone Industrial Blvd: Grindstone Creek to MO 740.	Project cost:	$3,706,000
Mexico Gravel Road: U.S. Hwy 63 to Vandiver Drive.	Project cost;	$1,378,080
Smiley Lane: Northwest Loop to Providence Rd.	Project cost:	$1,045,500
Sorrel's Overpass: I-70 Drive NW to State Highway E.	Project cost:	$2,280,960
Southampton Drive: U.S.Highway 163 to Route AC.	Project cost:	$2,977,920

Neighborhood Collectors:

Cunningham Road: Bray Avenue to Rollins Road.	Project cost:	$712,800
Dublin Avenue: Scott Boulevard to terminus.	Project cost:	$264,000
Forum Boulevard: Old Plank Road to terminus.	Project cost:	$675,000
Hanover Boulevard: Olympic Boulevard to Rice Road.	Project cost:	$198,000
Louisville Drive: Chapel Hill Road to Smith Drive.	Project cost:	$1,570,800
Rice Road: Lake of the Woods Road to terminus.	Project cost:	$462,000
Southampton Drive: Sinclair Street to Forum Blvd.	Project cost:	$1,201,200
West Worley Street: Strawn Road to Silvey Lane.	Project cost:	$686,400
Woodhaven Drive: Gans Road to Nifong Boulevard.	Project cost:	$1,597,200
Woodridge Drive: St. Charles Road to terminus.	Project cost:	$396,000

2. Capacity Upgrade

Major Arterials: 2-4 lanes

Blackfoot Road: State Highway E to O'Neal Road.	Project cost:	$2,787,840
Brown School Rd: Creasy Springs Rd to State Hwy 763.	Project cost:	$4,297,920
Scott Boulevard: Chapel Hill Road to Brookview Terrace.	Project cost:	$3,300,000

Minor Arterials: 2-4 lanes

Clark Lane: Ballenger Lane to St. Charles Road.	Project cost:	$1,995,840

Major Collectors:

Bearfield Road: Phillips Farm Road to Nifong Boulevard.	Project cost:	$982,080
Blue Ridge Road: Garth Avenue to State Highway 763.	Project cost:	$982,080
Heriford Drive: Parker Street to Route B.	Project cost:	$491,040
Rock Quarry Road: Nifong Boulevard to Stadium Blvd.	Project cost:	$3,294,720
St. Charles Road: Keene Street to Grace Lane.	Project cost:	$3,373,920

Neighborhood Collectors:

Silvey Street: West Worley Street to I-70 Drive SW.	Project cost:	$528,000
Sunflower Street: Grayson Drive to State Highway E.	Project cost:	$910,800

3. City of Columbia Plan Status

All of the projects shown in the CATSO 2025 Plan have estimated revenue to provide for the construction of the improvement over the twenty-five planning period. Developer contributions to the construction of roadways, especially the Neighborhood Collectors, will provide additional revenue. There are no illustrative projects shown for the City of Columbia

C. Boone County Long Range Projects

1. New Construction

Minor Arterials: 2-4 lanes

Gans Road: U.S. Highway 163 to U.S. Highway 63.	Project cost $6,016,760
Grace Lane: State Highway WW to MO 740.	Project cost: $4,728,240
Prathersville Rd: Oakland Gravel Rd to Brown Station Rd.	Project cost: $2,922,480
Providence Road: Brown School Rd to State Highway VV.	Project cost: $3,421,440
Palmer Road: Route PP to Route Z.	Project cost: $5,400,000
Scott Boulevard: State Highway K to State Highway KK.	Project cost: $2,661,120

Major Collectors:

Ponderosa Street: Gans Road to Phillips Farm Road.	Project cost: $839,520
Van Horn Tavern Road: Route UU to I-70 Drive SW.	Project cost: $1,253,440

Neighborhood Collectors:

Crabapple Lane: Old Mill Creek Road to Sinclair Road.	Project cost: $1,267,200
Hackberry Drive: Providence Road to State Highway 763.	Project cost: $673,200
Harvestor Road: State Hwy 763 to Wilson Memorial Drive.	Project cost: $1,333,200
Lakeshore Drive: Brown School Road to Harvestor Road.	Project cost: $620,400
Phillips Farm Road: Southampton Dr. to Ponderosa Street.	Project cost: $3,260,400
Prathersville Road: Providence Road to State Hwy 763.	Project cost: $633,600

2. Capacity Upgrade

Major Collectors:

Bearfield Road: Gans Road to Phillips Farm Road.	Project cost: $807,840
Starke Avenue: Brown School Road to Brown Station Rd.	Project cost: $2,265,120
Wyatt Lane: Mexico Gravel Road to Palmer Road.	Project cost: $2,914,560

Neighborhood Collectors:

Bethel Church Road: State Highway K to Old Plank Road.	Project cost: $792,000
Lakeshore Drive: Harvestor Road to Prathersville Road.	Project cost: $660,000
Sugar Grove Road: Lenoir Street to Rolling Hills Road.	Project cost: $2,296,800

3. Boone County Plan Status

All of the projects shown in the CATSO 2025 Plan have estimated revenue to provide for the construction of the improvement over the twenty-five planning period. Developer contributions to the construction of roadways, especially the Neighborhood Collectors, will provide additional revenue. There are no illustrative projects shown for Boone County.

9.7 Conclusions

A review of the projected revenue, estimated maintence costs, and cost for construction and capital indicate that all the member agencies have sufficient revenue to implement the CATSO 2025 Transportation Plan. Table Nine: CATSO 2025 Transportation Plan Projects and Revenue; provides a summary of the cost of new construction, transit costs, maintenance costs and the the revenue available through 2025.

Table Nine: CATSO 2025 Transportation Plan Projects and Revenues

Twenty-Five Year Costs	MoDOT	Boone County	Columbia	Total
Construction Total	$36,659,700	$73,866,078	$151,873,464	$262,399,242
Roadways	$36,659,700	$73,866,078	$135,438,171	$245,963,949
Bicycle/Ped Facilities	$0	$0	$16,435,293	$16,435,293
Transit Total	$0	$0	$112,493,143	$112,493,143
Capital	$0	$0	$26,892,705	$26,892,705
Operating	$0	$0	$81,713,143	$81,713,143
Total Maintenance	$62,240,000	$20,000,000	$173,139,338	$255,379,338
Grand Total	$98,899,700	$93,866,078	$437,505,945	$630,271,723
Revenue	$118,600,000	$345,335,613	$376,522,761	$840,458,374
Surplus/Deficit (1)	$19,700,300	$251,469,535	($60,983,184)	$210,213,651

Note: (1) MoDOT surplus includes funding dedicated to rehabilitation, reconstruction and safety projects only. This funding is not available for system expansion projects.

A. Missouri Department of Transportation

Table Seven: CATSO Transportation Project Needs; identifies a total of $365,034,440 in new MoDOT projects. The available funding over the 25 year period of the Plan is $33,500,000, leaving a unfunded amount of $331,534,440. The majority of the deficit is attributable to the $278,319,000 estimated cost of construction of the Interstate 70 improvements in year 2000 dollars and adjusted for inflation over the twenty-five year planning period. The decision on whether or not to widen I-70 along the existing right-of-way or relocate I-70 on a new alignment through the Columbia metro area has not been finalized.

For the purposes of this plan, all I-70 improvements must be considered "illustrative", which means no funding source has been identified, but if funds become available, the project would proceed. The Missouri Department of Transportation shows a total surplus of $19,700,300. The surplus is attributable to funds for rehablitation and reconstruction projects which are not identified in the Plan. These projects would include bridge replacements and resurfacing.

Including the I-70 improvements as an "illustrative" project and removing the construction costs estimate from the total, the estimated MoDOT deficit for unfunded projects falls to $53,215,440. Due to the imprecision of 25 year forecasts and the conservative revenue forecast provided by MoDOT, the majority of the MoDOT portion of the plan is "illustrative". Maintaining the illustrative roadway and system expansion projects in the Major Roadway Plan is necessary identify the functional classifications and to provide system continuity for local transportation planning. The projects included in the Plan along with the illustrative projects, meet the test for financial constraint.

B. City of Columbia

The City of Columbia shows transportation project costs of $437,505,945 through 2025 with revenues of $376,522,761. This leaves a deficit of $60,983,184 through 2025 planning period. For purposes on the Plan, a project costs that falls within a 10% + or - range with the revenues, is considered to be financially constrained. The City's deficit of $60,983,184 is approximately 16% greater than the forecast revenues.

The City of Columbia has a history of successful elections to authorize general obligation bonds. The revenue from anticipated general obligation bonds and construction completed by development interests can reasonably fund any deficit for the City construction and transit projects contained in the CATSO 2025 Transportation Plan, should one occur. The City of Columbia portion of the Transportation Plan reasonably meets the test for financial constraint.

C. Boone County

Revenue projections indicate that Boone County could experience a revenue surplus of $251,469,535 through 2025. This projected surplus is the product of the revenue forecast assumes continued voter reauthorization of the County 1/2 cent sales tax. The majority of the projected revenue surplus will be accounted for by the maintenance and reconstruction projects throughout Boone County over the next twenty-five years.

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CHAPTER TEN:
PLAN IMPLEMENTATION AND RECOMMENDATIONS

10.1 Introduction

This chapter contains a review of the local regulatory tools required or recommended to implement the provisions outlined in the Transportation Equity Act for the 21st Century (TEA-21).

Providing for future roadways, the preservation of scenic corridors, the reduction of auto trips, and the management of roadway access to preserve capacity and reduce congestion are all elements that contribute to the goal of balance. Boone County and the City of Columbia are responsible for the construction and maintenance of their respective roadways and for the regulation of development in their jurisdictions. The range of permissible land uses are regulated by the zoning ordinances and the development of land is regulated by the subdivision regulations. It is through these ordinances that the balance between land use and the transportation system is to be achieved.

The policies and recommendations outlined in this section are intended to serve as a resource for future action.

10.2 Effects and Impacts of the Plan

A. Social Impacts

The 2025 Transportation Plan does attempt to make some incremental changes to the transportation habits in the Columbia metro area. The probability remains that the single occupancy vehicle will remain the overwhelming mode of choice for residents. While the plan continues to maintain the current focus of providing facilities for automobiles, it also seeks to give attention to other modes for which facilities have been deficient.

The social impacts of a land use pattern designed around a transportation network for private vehicles have been the subject of much discussion and research. The street system is generally designed for traffic flow and vehicle mobility, and not to promote social interaction among members of the community. Occupants of individual vehicles have no direct interaction with other persons outside their own particular vehicle. The fact that the majority of the auto trips are by single-occupancy vehicles makes for even greater isolation for individuals using the transportation system. Those individuals seeking privacy benefit from this system, but residents who want a more social experience are precluded from it by the emphasis on the private vehicle. The focus on the automobile also puts those citizens using non-motorized modes at a disadvantage, in that the street system gives priority to vehicles and frequently does not provide adequate accommodations for pedestrians and bicyclists. Neighborhoods are not oriented towards pedestrian access and interaction, but have their design focused on auto access and traffic flow. This has negative effects on socialization among neighborhood residents.

More positive social impacts will be found through the implementation of land use designs that allow for transportation options that foster more social interaction and interpersonal contact. The establishment of a more compressed development pattern and thus the opportunity for more persons to be mobile without using a vehicle gives individuals greater choices in transportation.

A more compact structure of land use also is more conducive to operation of the city bus system, providing the greater population density which transit needs to function efficiently. The continued operation of the bus system has major social benefits. It allows the transit dependent population, including physically handicapped persons and those unable to afford an automobile, the mobility necessary to get to their jobs and to take care of other personal needs. The presence of a transit mode also gives those persons who merely prefer this mode the opportunity to choose it.

B. Economic Impacts

1. Roadway Plan

A major economic impact of the roadway plan will be in the construction involved in its implementation. Numerous jobs will be provided by the various street construction projects required to complete the network of streets shown in the roadway plan. Most new street construction and reconstruction projects are contracted out by the city and state, and so give work to private construction companies. This will have a positive effect on the local economy, particularly on contractors and their related suppliers. The employment provided as a result of these projects will have the usual multiplier effect on the local economy, in that the money spent at local establishments by project employees will provide additional jobs. A well-maintained road system should save individual motorists the expenses for maintenance and repair that might otherwise be incurred driving on a system in bad condition.

2. Bicycle and Pedestrian Elements

Similar impacts will be felt from construction projects to implement the bicycle and pedestrian elements of the plan. Additional contracting jobs will no doubt result from the building of new sidewalks and bicycle routes. Some of these will be constructed as part of new street projects, but their inclusion will add to the economic impact, due to the additional expense and time involved in constructing these facilities. Presumably if bicycling were to become more popular, then local bicycle retailers would enjoy increased sales and realize more revenue from providing additional repair and maintenance services to more customers.

The presence of more and better facilities for bicyclists and pedestrians will in theory provide financial benefits for individual households. Making it more convenient, safe, and attractive to use means of travel besides the automobile has the potential to provide residents cost savings. If household members were to walk and bicycle for a greater number of their daily trips, then they would reduce expenses due to less frequent gasoline purchases and lower auto maintenance bills.

On a more long-term level, lowering the annual mileage put on household vehicles could allow residents to keep vehicles for longer periods, saving the expense of a new vehicle and providing revenue to use for other means. A possible incidental economic benefit might occur for those individuals who begin a more regular routine of walking and/or bicycling. This additional exercise could realize individual health benefits and save on medical expenses.

3. Transit Element

The transit element of the plan has positive economic benefits in that it allows those persons without any private means of transportation the mobility necessary to attain and hold employment, as well as to make shopping trips and fulfill other needs. This in particular effects those lower-income persons who without bus access would have no way to reach their jobs. The community realizes an economic gain by having these persons filling a job, being self-sufficient, and having an income to spend locally.

C. Energy

In the Columbia metro area the majority of trips of all types are made by private motor vehicle, including 88.6% of all work trips. Of these motor vehicle trips, approximately 76% are single occupancy trips. This mode preference is expected to continue. This trend requires a comparatively greater energy expenditure than other modes of travel. It also requires more energy and materials to be used to provide the additional street mileage, pavement width, parking facilities, and the like to accommodate vehicles carrying only one person.

The 2025 Plan inventories the existing street facilities and presents the Roadway Plan for the Columbia metro area. This plan assumes the construction of new collector and arterial streets which are anticipated to be needed as new development proceeds and more outlying areas of the metro area are annexed into the City of Columbia. As the population grows, the trend towards single family homes on large lots will further the physical spread of the community over a wider geographic area and produce additional VMT, the need for more street mileage, and additional gasoline consumption. The roadway plan anticipates this and attempts to provide major street facilities to handle the additional traffic. One beneficial impact is that the plan attempts to provide additional street connections that potentially will allow for shorter trips through more direct routes.

The 2025 Plan does make recommendations to provide better facilities for the non-motorized travel modes of walking and bicycling, which potentially could provide energy savings should persons find this an attractive travel alternative to vehicle use. The Plan seeks to increase the bicycle's share of the Columbia travel mode by providing a more extensive and convenient system of bicycle routes across the city. These new recommended routes will provide additional access to areas previously inconvenient for bicycle travel. The implementation of the planned bicycle route improvements will hopefully encourage more residents to use a bicycle for both work and non-work trips. Currently, only 1.9% of total work trips are made by bicycle. An increase in the percentage of all trips made by bicycling could lead to a decrease in gasoline consumption locally, or at least to a reduction in the rate of increase of fuel use in the Columbia area.

The Plan also seeks to improve pedestrian facilities in the Columbia metro area, through the Bicycle and Pedestrian Network Plan. This plan seeks to encourage and allow pedestrians access to all sections of the city, by providing sidewalks and eliminating major barriers. One policy to be recommended is to provide sidewalks along both sides of arterial streets, to facilitate pedestrian use of these corridors. Walking is the second most common travel mode among Columbia residents, with 5.6% of work trips made that way. Given these statistics and the energy savings realized by pedestrian travel, a greater emphasis on pedestrian safety and access is warranted.

The Plan also makes provisions for the continuation of the Columbia Transit System, which provides bus service in Columbia. The availability of bus service provides a means of transportation to those residents unable to afford a private vehicle, disabled persons who cannot drive or otherwise get around on their own, and those who choose transit purely on preference. It also provides the potential for additional energy savings should economic or other circumstances dictate that more residents switch from the automobile to transit use. Only 1.4% of work trips are now made by bus, and the possibility exists for a much greater percentage of all trips to be made by transit.

D. Environmental

The current Columbia metro area transportation system is designed for individual vehicles, most of which contain only a single occupant. In general, this system promotes many potentially harmful environmental consequences. Air pollution from vehicle exhaust is probably the most frequently cited problem, but there are others as well. Traffic noise impacts may deminish the quality of life, and the runoff of water from the pavement of streets, parking lots, and driveways degrades the quality of streams and groundwater. Additional ecological impacts result from the production cycle of the automobile industry, and from the disposal of junked vehicles. The 2025 Plan assumes that the current transportation network and mode preferences will continue over the next twenty years. While this necessarily means that negative environmental impacts from the current system will remain, both beneficial and harmful environmental impacts may arise from the implementation of the 2025 Plan. Each of numerous elements of the plan may have positive and negative effects.

1. Major Roadway Plan

Construction of the street projects contained in the Major Roadway Plan will have some negative impacts on the specific neighborhood/area in which they are constructed, through the loss of green space and the addition of more impervious surface. The latter will increase stormwater runoff, as well as introducing runoff of pollutants such as oil and antifreeze from vehicle traffic. There will also be air pollution and noise impacts on the immediate area around the road corridor. Construction impacts include soil compaction and disturbance, soil erosion from wind and water, noise impacts, and impacts to stream beds and floodplains at the major creek crossings. After completion of the projects, traffic noise impacts may be severe, particularly in the case of the widening of Interstate 70 or with the construction of a bypass. Noise abatement to protect adjacent residential developments is needed along the existing sections of I-70.

Potential positive impacts from new street construction may include congestion reduction through the dispersal of existing traffic over a larger physical area, due to the provision of new alternative routes. Such new routes may provide shorter and more direct access for motorists, thus decreasing driving times and trip distances, as well as reducing traffic congestion. If this were the result, air and noise pollution across the area could be reduced, since idling vehicles produce a greater amount of exhaust. New street projects may allow for greater consideration to non-polluting traffic modes, through the inclusion of bicycle lanes and improved sidewalk facilities as part of new roadway construction.

2. Bicycle and Pedestrian Network plan

The 2025 CATSO Bicycle/Pedestrian Network Plan builds upon the Bicycle Plan adopted in the 2015 CATSO Transportation Plan. The PedNet organization has been instrumental in providing much of the field work necessary to develop the CATSO plan. CATSO staff has worked with the City of Columbia Bicycle and Pedestrian Commission and PedNet representatives to create the pedway concept, which offers greater mobility, safety, and comfort for all non-motorized traffic.

The Bicycle/Pedestrian Plan moves away from the traditional on-street bike lane by removing the bike lane from the street, to a become a combined bicycle/pedestrian facility or pedway. An illustrated comparison of the traditional street design and the pedway and split pedway designs are attached for review.

The plan identifies two phases for implementation. The initial phase is referred to as the “Backbone” which is comprised of key sections of the system which facilitate bicycle and pedestrian movement throughout the Metro area. The “Backbone” is formed by a loop trail system around Columbia along with a pedway system along Providence Road and Broadway, the two centrally located arterials through the City. The majority of the plan would be implemented as funding and opportunities to make connections become available.

Revisions were made to improve connectivity and establish a more complete network. The implementation of this element would largely have positive effects for the local environment. The accommodation of bicyclists in a comprehensive transportation system is a step towards reducing vehicle traffic volumes or at least lowering the rate of increase of traffic. Since bicycling is a non-polluting and quiet travel mode, the environmental benefits are numerous.

One impact that could be viewed as an environmental negative is if providing bicycle lanes requires the widening of existing streets, as well as building new streets to greater pavement widths than would otherwise be constructed. This could require the removal of trees and other vegetation that otherwise would be preserved, and the creation of more impermeable surface. These impacts would probably be offset by the beneficial effects of greater bicycle ridership.

The pedestrian element of the 2025 Plan includes a sideway plan and gives attention to major pedestrian barriers across Columbia. As with the bicycling element, the provision of better

facilities for pedestrians is one method of attempting to reduce motor vehicle traffic and its resulting noise and air pollution. The impacts of walking on the natural environment are minimal. Creating an atmosphere more conducive to pedestrian travel can have beneficial effects for the community. As with bicycling, constructing more pedestrian facilities likely will involve the paving of a greater amount of street right-of-way, with the resultant loss of additional green space. The net environmental impact of more sidewalks and other pedestrian facilities would likely be positive assuming that any pedestrian trip replaces a trip that would have been made by automobile.

3. Land use

Positive ecological impacts could be realized through implementation of changes to local land use regulations. Land use is the most critical factor in structuring a transportation network. In order to achieve a more environmentally benign system for moving people and goods, land use controls must allow for a development pattern that allows methods of transport other than private vehicles to be convenient and efficient. The use of mixed-use developments, cluster and small lot residential housing, and in general allowing for more compact development within a geographical area is conducive towards providing residents viable alternatives to vehicle use. A mixture of different types and economic levels of housing, within walking or biking distance of each other and to employment and shopping opportunities, is a major step in fostering non-motorized transportation and a cleaner environment.

10.3 Environmental Justice

Identifying the effects of all transportation programs, policies, and activities on "minority populations and low-income populations" is the essense of environmental justice as outlined in the 1994 Presidential Executive Order. The three fundamental environmental justice principles are:

1. To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations;

2. To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process; and

3. To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

As the MPO for the Columbia area, CATSO should serve as the primary forum where MoDOT, Boone County, the City of Columbia, other agencies, and the public may develop transportation plans to meet local needs. To address the environmental justice concerns related to CATSO plans, programs, and other activities, CATSO will need to:

1. Provide enhanced demographic analysis to ensure that the Transportation Plan and the annual Transportation Improvement Program (TIP) comply with the provisions of Title VI;

2. Identify residential, employment, and transportation patterns of low-income and minority populations so that their needs can be identified and addressed, and the benefits and burdens of transportation investments can be fairly distributed; and

3. Evaluate and improve the CATSO public involvement process to reduce participation barriers and engage minority and low-income populations in transportation decisions.

A. Demographic Profile

The 1990 Census and the 1990 Census Transportation Planning Package were the primary sources for the demographic profile for the Columbia metro area shown in Table Ten: Target Populations and Thresholds. The threshold values for the various populations represent the average percentage for the metro area. The purpose of the threshold is to provide a standard to identify concentrations of the target populations.

Table Ten: Target Populations and Thresholds

Data Set	1990 Total for Metro Area	Threshold
Total Population	89,238	- - -
Total Households	33,518	2.66 persons/household
Minority Population	13,184	14.7 percent of total
Low-Income Population	20,010	22.4 percent of total
Low-Income Minority Population	8,004	60.7 percent of minority total
Person with Disabilities	8,130	9.1 percent of total
ADA Paratransit Eligible (estimated)	930	11.4 percent of disabled total
Zero Car Households	3,291	9.8 percent of total households

The geographic distribution of the 1990 data identifies the west and north central areas of Columbia as the areas with the highest concentrations of the target populations. When the 2000 Census data is available, an updated analysis will be completed.

B. Identifying Transportation Needs

Identifying the transportation needs of the target populations is an ongoing process, much of which derives from agencies delivering social services. Many social service agencies report their clients need for transportation, although to date, no comprehensive accounting has been attempted. In general, the comments offered by agency personnel fall into the following categories:

1. The need for public transportation system that is reliable, accessible, affordable, convenient, and timely that can respond to an individual's full range of daily activities;

2. The lack of commitment to transportation services and public transit by employers and the general public; and

3. A lack of support for alternative modes of transportation.

The transportation needs of the disabled and low-income have been traditionally addressed by fixed route public transit and the ADA paratransit services. The transportation needs of the minority populations are not easily quantified. This emphasizes the need to involve members of the minority community early in the planning process to ensure they are not disproportionately adversely impacted as a result of any CATSO policies or plans.

C. Public Involvement

Recognizing the importance of involving the public in planning for the future of the Columbia metro area, CATSO will review the adopted Public Participation Plan, to identify changes that would facilitate a more proactive planning process and provide for a greater role for community interaction.

The CATSO Transportation Plan and the Annual Transportation Improvement Program are made available to the public by the City of Columbia Department of Planning and Development, at the Regional Library, on the CATSO webpage, and upon request.

Section 10.4 Specialized Transportation

Travel is essential for independence. In evaluating the transportation systems planned for the Metro area, the proposed improvements do serve the majority of the travel needs through 2025. However, there are segments of the population that are under served or lack service. There are individuals who because of physical or mental disability, income status, or age are unable to transport themselves or to purchase available transportation and are therefore dependent upon others to obtain access to health care, employment, education, shopping, social activities, or other life-sustaining activities. This also includes children who are handicapped or high-risk or at-risk. These individuals represent the transportation disadvantaged. The Americans with Disabilities Act (ADA) and the provisions of Environmental Justice have addressed some of the transportation barriers experienced by the transportation disadvantaged, however, not all the transportation needs are being meet. Access to public transportation is the key issue.

Strategies for expanding the public transportation to address the gaps in services should be developed and evaluated. Public transportation resources are often not coordinated and frequently duplicate expenditures and service efforts. They lack cooperation and communication, provide inadequate levels of service, vary in service quality, provide inadequate and unreliable information about service and costs, and have no comprehensive plan for meeting service needs. The fragmented system confuses consumers and fails to address the needs of many individuals who do not meet specific agency or program eligibility requirements.

Coordination is one strategy for improving performance and increasing mobility. This involves the pooling of transportation resources and activities of several human service agencies with one another or with existing transit operations.

Coordination may be an effective strategy if one or more of the following conditions exists:

1. Substantial unused vehicle time;
2. Substantial unused vehicle capacity;
3. Opportunities for economies of scale in planning, administration, operations, purchasing, or maintenance.

Even where coordinated service results in better use of resources, having enough resources is crucial.

Locally, the fixed route transit provider is the Columbia Transit System (CTS), which is operated by the City of Columbia. Paratransit service is also provided within the corporate limits of Columbia for individuals qualifying for service under the definitions contained in the Americans with Disabilities Act.

Some pooling of transportation resources occurred in 1993, when the CTS initiated the paratransit service as required by the ADA. Several local agencies eliminated the van service they directly provided to their clients, in favor of utilizing the CTS service. In Boone County, the Older Americans Transportation System (OATS) provides curb-to-curb public transportation service to County residents. OATS resources are limited and trip scheduling is prioritized by

individual need. Expanding the resources for public transportation is an obvious solution to meeting the needs of the transportation dependent. Although the nature of the problem is clear, the magnitude is difficult to estimate. A review of the available transportation services should be completed by advocacy groups and/or a group of agency stakeholders. A multi-agency group could assess the problems, define the obstacles, and outline potential solutions. On the system side, the questions would be how to provide service and what organization would deliver the service. On the resources side, the questions are can the existing rolling stock be more efficiently utilized and what sources of funding are available to provide expanded service.

At present, the City of Columbia dedicates 8% of the 2 cent City sales tax for transportation to transit uses. Boone County has a similar 2 cent sales tax although it is specifically directed for roads and bridges and cannot be used for transit. In 2000 this tax generated $8,950,000 in revenue. If the County ½ cent sales tax for roads and bridges is to be considered for transit uses, the sales tax enabling legislation would need to be amended. If 8% of this revenue were available, approximately $716,000 could be allocated annually for transportation services in Boone County.

The creation of a county-wide transit authority to provide for public transportation needs in the unincorporated portions within the Metro area, and throughout Boone County, is an option that could be considered.

10.5 Regulatory Changes and Recommendations

A. Scenic Roadways

Beginning with the Intermodal Surface Transportation Efficiency Act (ISTEA) passed by Congress in 1991, and continued in TEA-21, the National Scenic Byways Program permits states to designate and conserve scenic roadways. Within the program, designations both for National Scenic Byways and for All-American Roads are included. In Missouri, the National Scenic Byways program is to be administered by the Missouri Department of Transportation.

The All-American Roads is a special category of scenic byways that meet higher standards for the quality and level of protection of their scenic resources. Scenic byways are typically defined as roads with significant cultural, historic, natural, or scenic features. Such roads are based on the presence of six types of intrinsic resources: scenic, historic, recreational, cultural, natural, and archaeological. Protecting these resources allows communities to also protect the potential for economic development and tourism. The designation of scenic roadways at the state level is limited to roadways under state or federal jurisdiction.

B. Local Scenic Roadways

Although the scenic roadways provisions of TEA-21 apply to roadways on the state and federal system, local governments may designate scenic roadways within their respective jurisdictions. A local scenic roadway designation could range from a scenic roadway declaration to statutory requirements that establish guidelines and standards to regulate development to protect the roadway's scenic qualities. The scope of the regulatory measures depends upon the degree of preservation the local government chooses to pursue. A local scenic roadway designation could be used by the Columbia Area Transportation Study Organization as an additional factor when ranking projects for STP enhancement funding.

To pursue a local scenic roadway program, the factors to be used to establish a scenic roadway should be established. A local process for administration of the scenic roads must be developed and the mechanisms for implementing the program, whether voluntary or regulatory, need to be in place. There are several regulatory options available to local governments to protect scenic roadways. Most rely on the use of zoning ordinances, building codes, and sign ordinances. Scenic America suggests focusing protection for scenic roads through the use of a corridor management plan.

Each local jurisdiction through which a scenic corridor passes would adopt a plan to protect and improve the corridor appearance. The National Trust for Historic Preservation lists three steps in developing a corridor management plan:

1. Determining what is valuable and worthy of protection about a particular scenic road,

2. Deciding what methods of protection are necessary or appropriate for the corridor, and

3. Making a committed effort to apply those methods. A corridor management plan would typically include;

    a. Roads should have significant features of scenic, natural, cultural, historic, and/ or archaeological importance.
    b. Such roads should have local support and citizen participation which is coordinated with relevant agencies and organizations in the locality.
    c. Roads should provide a relaxing travel experience, and scenic designation should not compromise the road's safety.

Standards that require protection of the land generally adjacent to the road right-of-way can be enacted by 1) regulation of land use and development density, 2) detailed land use and site planning, 3) control of outdoor advertising, 4) control of land disturbance and landscaping, and 5) design and appearance of buildings and equipment.

One manner of providing corridor management would be through zoning regulations. A zoning ordinance could be utilized to restrict commercial land uses to a central downtown area and to major highway intersections, which, if strictly enforced, would prevent business development sprawled out along roads on the fringes of town. This could reduce or eliminate the pressure for commercial development which so often mars the scenic beauty of road corridors. In the case of residential development, provisions may be made for clustering housing units away from the road, while maintaining open space along the corridor. Development may be guided to ensure that the view of housing units is blocked from the road corridor by vegetation or topography.

A second zoning ordinance application would be the use of special zones called overlay zones which may be applied to specific areas, such as historic or scenic road corridors. Within such zones special restrictions apply to tracts of all types of zoning. A road corridor overlay district is the most typical method for protection of a road corridor through the zoning mechanism. Overlay districts might limit signs in height, size, and proximity to the road; and could have greater building height restrictions. Such districts frequently include a standard setback or greenbelt buffer along the road corridor which restricts any development within a certain distance, and requires preservation of existing trees or new landscaping in the setback. Existing highway corridor overlay districts are mostly in metropolitan areas where greater development pressures along road corridors have necessitated more restrictive regulations and design standards.

Another manner of distributing development to protect a scenic road corridor is the transfer of development rights (TDR). Such a program entails the acquisition of the right to develop to a certain density in one area (the road corridor area to be protected) and transferring that right to another area away from the corridor, where increased density will be allowed. Usually TDR programs are applied over a broad area and not just the road corridor.

Tree protection policies must be developed as trees can be a significant contributor to scenic beauty along roadways. Tree and vegetation removal should be allowed only in special cases. One such tree protection provision limits tree branch and shrub trimming to circumstances when it is necessary for the safety of travelers. Selective trimming may also be given consideration for the preservation of historic views.

Controlling billboards and other outdoor advertising is critical to preserving the character and vistas of scenic roads. The banning of off-premise signs in rural areas, or the prohibi-

tion of all billboards along roads, is one method of control. A process may be established to buy and accept donations of land and easements along scenic roads. Acquiring easements protects the scenic quality of the road while maintaining the private ownership of the land. Strong local participation/coordination should be developed with local agencies. Public participation needs to be part of the process. A public comment period for proposed changes to scenic roads allows time for analysis of the changes. Such public notification may encourage agencies to be more responsive in formulating policy. Regulations for general highway operations and maintenance work on scenic roads are helpful in guarding against activities that might alter the scenic nature of the road. Rules for such work as road widening, changes of grade, repaving, roadbed construction, and winter maintenance can protect the scenic qualities of the route.

In the Columbia area, a number of roads that might be considered for scenic road status are multi-jurisdictional, existing both within the city and outside the city limits. So any scenic road program would preferably be done at both city and county levels for purposes of coordination. The establishment of a scenic roadway program would need to begin with the passage of a scenic road ordinance, defining the process in which scenic roads would be designated, and the criteria to be used in the evaluation of roadways for scenic road status. A review board could be established for the purpose of reviewing scenic road applications from property owners, neighborhood associations, and others. A corridor management plan should be adopted for each roadway designated. Upon the recommendation of the review board, the City Council or Boone County Commission would formally designate scenic roadways and adopt corridor management plans. The use of overlay zoning could be appropriate for some road corridors. As noted, coordination of scenic road legislation and zoning controls between Columbia and Boone County would be preferable. The MPO could serve to coordinate scenic roadway issues between Columbia and Boone County.

C. Access Management

The proliferation of driveways along arterial streets will seriously reduce the capacity of the roadway to carry the traffic. The delay caused by traffic turning into and pulling out of driveways impedes the flow of traffic on the arterial. As a result, the ability of the arterial to move through traffic declines and the accident rate increases. TEA-21 regulations mandate better management of the existing investment in roadways by local and state agencies. Access management provides an inexpensive strategy to preserve the function and capacity of the metro area arterials.

The current driveway standards, subdivisions regulations, and zoning ordinances for Boone County and the City of Columbia do not attempt to manage access on arterial streets. The existing driveway standards make little distinction between local, collector, and arterial streets.

Planning for and managing access on arterials requires a comprehensive regulatory approach. Revisions to the zoning ordinance is a key element.

Policy - adopt an access management policy
Planned Districts - negotiate access points
Zoning - minimum lot frontage requirements for all zoning districts, site plan requirement for all properties with arterial access
Subdivision - minimum site frontage of 700 feet along arterials. No access for residential lots
Design Standards - Revise driveway spacing standards for arterial roadways

1. Driveway Design Standards

Driveways accessing arterial streets should provide for safe ingress and egress and turn speeds of 5 - 10 mph, to minimize the speed differential between turning vehicles and through

traffic. Recommended driveway standards for access on to arterial streets would be;

Minimum width 30 feet, maximum 38 feet.
Minimum curb return radii 15 feet - max. 25 feet.

The Missouri Department of Transportation (MoDOT) controls access by the purchase or condemnation of rights of access to the highway from abutting property, has the authority to approve grants of access where MoDOT has acquired the right of access to a highway, and issues driveway or road approach permits where the adjacent property owner has a right of access.

Boone County regulates driveways through the use of design standards adopted by the County Road and Bridge Commission. The City of Columbia regulates driveways through the use of driveway design standards. The design standards are not adopted by ordinance but are set forth in the Public Works Department's Street and Storm Sewer Specifications and Standards Manual as provided for in Section 24-31 of the Code City for Columbia, Missouri.

On state routes in the City of Columbia, MoDOT issues driveway and street connection permits. The City of Columbia does not issue a driveway permit on a state maintained roadway, although on local streets connecting with a state roadway, the City does an inspection of the connection. The City of Columbia should issue a driveway permit on State roadways prior to MoDOT issuing a permit. If local driveway spacing and design standards are to be successful, MoDOT must require that the local regulations be met, even if the regulations are more restrictive than current MoDOT standards, prior to issuing a driveway permit.

Compatible driveway design standards for MoDOT, Boone County and the City of Columbia should be cooperatively developed to support an access management program.

2. Driveway Spacing

The proper spacing for driveways along an arterial is a function of the design speed for the roadway. Vehicles turning into driveways must reduce speed in advance of the turn. The number of opportunities to turn at driveways should be limited with adequate distances between driveways to maintain higher average speeds on the arterial. For a typical arterial with an operating speed of 35 - 40 mph a minimum spacing between driveways of 200 - 300 feet should be adequate. At intersections, driveways should be located as great a distance as is practical from the operational area of the intersection based upon the turn lane configuration. As a minimum, driveways should be no closer than 350 feet from the points of intersecting right-of-way on arterial streets.

3. Driveway Permits

The MoDOT District 5 Office should not issue any driveway permit in Boone County or the City of Columbia until a local driveway permit has been issued. This policy agreement should be signed with the District 5 Office.

4. Street Standards

Local street standards should be amended to provide for an arterial street designed with raised median and medians breaks for access. Driveways can align with median breaks. Minimum distance between median breaks is set by the design speed of the arterial, generally a minimum distance of 800 feet. The location and number of median breaks are fixed during the design phase for the arterial. Public streets are given priority for median breaks.

5. Recommendation

Boone County and the City of Columbia should consider adoption of a Primary Arterials ordinance which requires a site plan for all property accessing arterial roadways. The site plan would be a requirement at the time of rezoning or when applying for a building permit. The primary arterial ordinance should specify minimum driveway spacing requirements, require right-of-way dedication, and include standards for driveway widths. Subdivision regulations should be amended to prohibit the platting of residential lots with arterial access, require a minimum site frontage of at least 700 feet for new commercial lots with access to an arterial roadway. For lots within a commercial subdivision, joint use access rights should be granted to promote shared driveways and travel between parking lots for contiguous uses.

D. Right-of-Way Preservation

The ability to require the dedication of right-of-way is critical to provide for future transportation needs. The roadway alignments and right-of-way shown in the Major Roadway Plan depend upon the local government for implementation. In Boone County and the City of Columbia subdivision ordinances are the primary tool for preserving and acquiring the right-of-way needed for new roadways. The planned office and planned commercial zoning districts offer the opportunity for right-of-way dedication as part of the approval process of the site plan required within the planned zoning districts.

1. Right-of-way Standards

Additional functional classifications and street standards for divided arterials should be examined and included as part of local subdivision regulations. Provisions should be made for a primary and secondary arterial classification. A standard width for the r.o.w. for each street classification should be established to eliminate the range of width currently in use. The difficulty of acquiring r.o.w. when a width range is used, is that the minimum r.o.w. often becomes the maximum r.o.w. when requiring r.o.w. dedication through the subdivision process. A variance from the standard r.o.w. width could be requested if the full r.o.w. width is not required to accomodate fill slopes, utilities, pedways, etc.

All r.o.w. should be dedicated through the subdivision process or a site plan. Metes and bounds descriptions of r.o.w. should not be accepted for public streets unless specifically requested by Boone County or the City of Columbia.

For Boone County, r.o.w. acquisition occurs through the subdivision process at the time a preliminary plat is approved. Typically, Boone County can require a 1/2 width r.o.w. along existing streets. On new alignments or planned extensions, r.o.w. can be requested, but not required. The ability of Boone County to require r.o.w. dedication for new roadways is limited by State statute. Set-backs from the future r.o.w. can be enforced and construction within the future r.o.w. can be prevented. The r.o.w. must be donated or Boone County must purchase a r.o.w. easement.

The implementation of the Major Roadway Plan depends upon the Boone County Planning and Zoning Commission, which has the final approval for subdivision plats in the county. Although the Boone County Commissioners may adopt the Major Roadway Plan, plan implementation is subject to approval by appointed officials which may not support implementation of the Plan. Failure to implement the adopted Plan would place Boone County in a position which would require purchase of the necessary r.o.w. or could preclude the construction of the roadway. This has the effect of having the appointed officials of the Planning and Zoning Commission control the County's transportation policy and creating a situation which would require the committment of County funds.

It is recommended that admininstrative procedures for Boone County subdivisions be modified to forward any recommended deviations from the Major Roadway Plan by the County Planning

and Zoning Commission for review and approval by the Boone County Commissioners prior to subdivision plat approval by the Boone County Planning and Zoning Commission.

2. Roadway Alignments

At present, there are no engineering alignments for the extensions of new roadways which fall jointly within the jurisdictions of Boone County and the City of Columbia. In years past, "plan lines" of roadway alignments were shown on plats and plans to indicate the path of the future roadway. However, legal challenges to the "plan line" approach have removed this technique from local practice. To address the need to maintain future alignments, preliminary engineering studies should be completed to select appropriate and cost effective alignments. The preliminary engineering alignments could be cooperatively developed by CATSO for use by all agencies.

3. Recommendations

Boone County and the City of Columbia need to support changes in state enabling legislation that would strengthen the ability of county governments to require r.o.w. dedication without compensation.

Changes in the Boone County and City of Columbia zoning regulations should be evaluated as an approach to acquiring r.o.w.. The requirement for a site plan, such as in the planned commercial districts in the current County and City zoning regulations could be expanded or amended to cover all properties accessing arterial streets.

E. Alternative Land Use - Mixed Use Zoning District

The structure of the overall transportation system, which is primarily the network of streets, is closely related to land use regulations. In the Columbia metro area, as well as numerous other communities, land use regulations tend to encourage development to spread out over a large geographical area. Boone County and City of Columbia zoning regulations mandate the separation of land uses, and allow for substantial large lot residential development. These policies generally establish a land use pattern that requires residents to drive to make their daily trips to work, due to the distances between various uses. Other types of trips are similarly affected, as the distances between residential neighborhoods and shopping areas, medical facilities, and other types of services tends to be too large for most persons to consider alternative ways to travel.

In order to provide an alternative to the motor vehicle as the dominant mode of travel, it is necessary to have a land use pattern that allows trips of all types to be made on foot or by bicycle. This is particularly important in older central city areas where residents are increasingly being isolated from employment and services as these facilities are relocated to fringe areas. Alternatives to the current land use plans and policies might allow commercial, office and other types of facilities that are neighborhood-oriented in scale to be intermixed with residential areas. Other revisions might be made to allow small lot developments. These would achieve greater population density, provide for more compact development, and reduce the mileage of street construction required to serve the area.

Another land use tool for reducing auto trips is mixed-use developments. Such projects put a variety of land uses on one site, ideally siting residential, service, commercial, and other uses within walking distance of one another. These type of developments are beneficial in that they allow residents to reduce their vehicle miles travelled, and the length and frequency of auto trips. National studies have shown that the average length for renters' work trips is approximately 27% shorter than those for home owners. As employment location choices are generally

more limited than choices for place of residence, a greater mix of housing options, including rental opportunities, would help to reduce work trip lengths. Revisions to land use regulations would afford developers the opportunity to construct projects of the type mentioned. A land use pattern that incorporates mixed uses on a greater scale would not only allow residents more choices in choosing modes of travel, but would be more efficient as well, through cost savings on street construction and maintenance, utility extensions, and other services.

Studies show that land use planning is one of the most effective methods for reducing both total vehicle miles travelled (VMT) and the number of trips, both work and non-work. Table Eleven: Trip Reduction Strategies and Impacts; outlines the trip and VMT reduction potential of various alternate modes, and other strategies. Research indicates that revisions to current patterns of land use development offer the best potential to reduce both total VMT and trips by up to 5.2 percent.

Table Eleven: Trip Reduction Strategies and Impacts

Trip Reduction Strategy	*% VMT*	*% Trips*
Employer trip reduction	0.2 - 3.3	0.1 - 4.1
Area-wide ridesharing	0.1 - 2.0	0.5 - 1.1
Transit improvements	0.0 - 2.6	0.6 - 2.5
HOV lanes	0.2 - 1.4	0.5 - 0.6
Park-and-ride lots	0.1 - 0.5	0.0
Bicycle/pedestrian facilities	(a)	(a)
Parking pricing		
work	0.5 - 4.0	0.4 - 4.0
non-work	3.1 - 4.2	3.9 - 5.4
Congestion pricing	0.2 - 5.7	0.4 - 4.2
Compressed work week (b)	0.0 - 0.6	0.0 - 0.5
Telecommuting (b)	0.0 - 3.4	0.0 - 2.8
Land use planning (b)	0.0 - 5.2	0.0 - 5.2
Signal timing	(a)	(a)
Incident management	0.1 - 0.0	0.1 - 0.0
Emissions/VMT tax	0.2 - 0.6	0.1 - 0.9
Buy-backs of older cars	N/A	N/A

Notes:

1. Numbers in parentheses represent increases in VMT or trips.
2. Numerical estimates have been converted from the literature into common units and rounded to the nearest tenth of a percent. The estimates reflect the specific parameters for the case studied or the assumptions in any predictive model-all from existing literature. Actual impacts in specific regions will depend on the level of implementation and local circumstances.

(a) Impact is less than 0.1 percent.

(b) No literature reported impact as low as 0; literature indicated that the potential impact of this measure is highly speculative, and we have therefore reported a range starting at 0. Conversely, the upper end of the range may exceed that reported here.

In the discussion of development issues, a major topic recently has been the so-called neo-traditional form of development. This format emphasizes a mixture of land uses to make communities more accessible to pedestrians and bicyclists, and to reduce trip lengths both for commuting and for other types of trips. A typical neo-traditional neighborhood ordinance might include the following elements:

1. Residential, employment, civic, and commercial land uses are all located in close proximity within the same neighborhood, within walking or biking distance.

2. The street system is designed to serve the needs of pedestrians, bicyclists, and motorists equally.

3. Green spaces, plazas, and parks are interspersed throughout the neighborhood, providing for social activities and recreation.

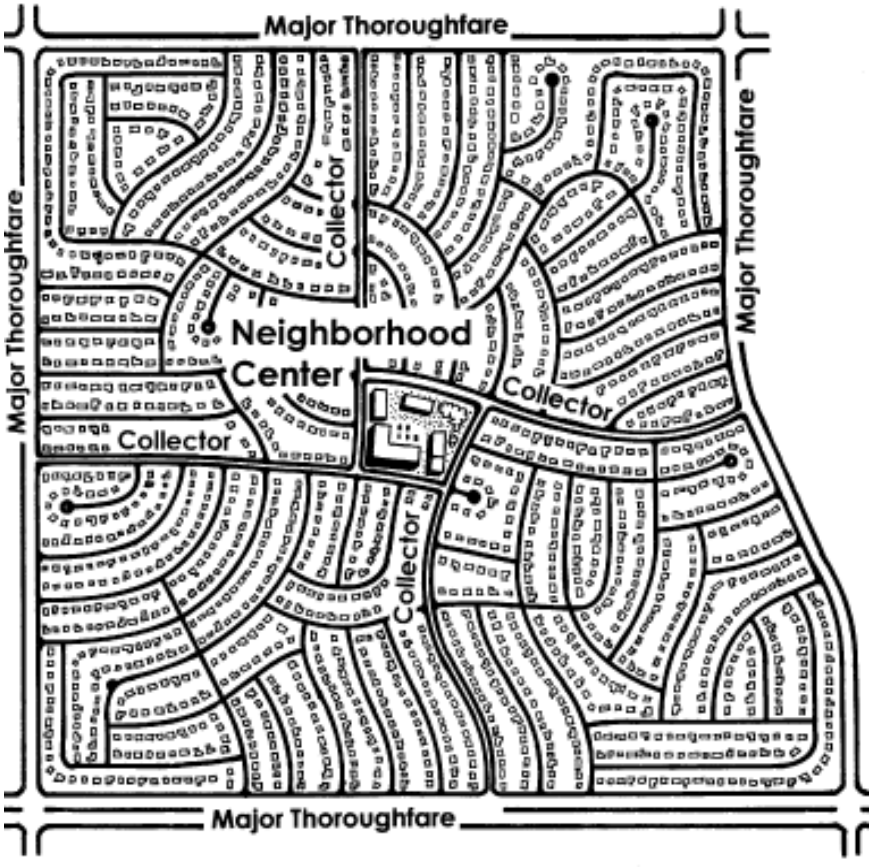
4. The neighborhood is spatially limited in size to the degree necessary to permit convenient nonmotorized travel. A suggested range for the physical size of the neighborhood is from 40 to 200 acres.

Most cities in Missouri were originally laid out with a grid system of streets to create tracts of land for development. This grid street system provided access to property and operated effectively with horse-drawn vehicles and the early automobile. As auto ownership and economic activity surged after World War II, the need to move large numbers of automobiles to and from the new employment centers and new subdivisions presented demands on the grid street system that it was not designed to serve. Established residential areas were not protected from adverse effects produced by the increasing volumes of through traffic.

The hierarchical arrangement of functionally classified streets grew out the concerns and shortcomings of the grid system. The advantage of the grid system is the dispersal of traffic in a number of directions. However, the grid system uses up to 40% of land area for streets. This adds to the cost of an individual lot, increases stormwater runoff due to the high percentage of impervious cover and extends vehicle travel times.

In 1968, the Neighborhood Concept was adopted as a guide to transportation planning. Figure Two: Neighborhood Concept; illustrates the design intent, which is still in place today, with some variations. It depicts the hierarchical arrangement by laying out major roadways on the edge of large neighborhoods, thereby keeping unrelated traffic away. Collector streets feed traffic to the arterials. One development trend in Columbia/Boone County has been the evolution of the neighborhood concept toward neighborhoods with cul-de-sacs and long loop streets, to permit even less through traffic within a neighborhood. The use of cul-de-sacs of is an appropriate design response to natural conditions, slopes and streams, however designing for privacy by excluding street connections is a response to the demands of the real estate market.

Figure Two: Neighborhood Concept



The lack of internal streets in a neighborhood erodes overall traffic circulation in an area and makes it difficult for residents to walk, jog, or bike within their own neighborhood. In addition, this lack of connectivity complicates providing bus service, trash pick-up, and emergency services. The Neighborhood Concept will be continued as a guide to development of this plan, with efforts made to improve circulation while not disturbing neighborhoods. The Neo-Traditional Approach to city and transportation planning is currently receiving attention by the planning community. This approach essentially calls for a return to a modified grid system, with streets designed not completely with the car in mind, but with non-auto circulation and neighborhood integrity needs in mind. It suggests more pedestrian and bicycle orientation and closer proximity of employment and service/retail centers to residences. The CATSO Transportation Plan offers this type of development scenario, and others, as alternatives to be examined for impact on the transportation system, the Columbia and Boone County Land Use Plans, development regulations, and community acceptance.

Figure Three: Neighborhood Design Alternative

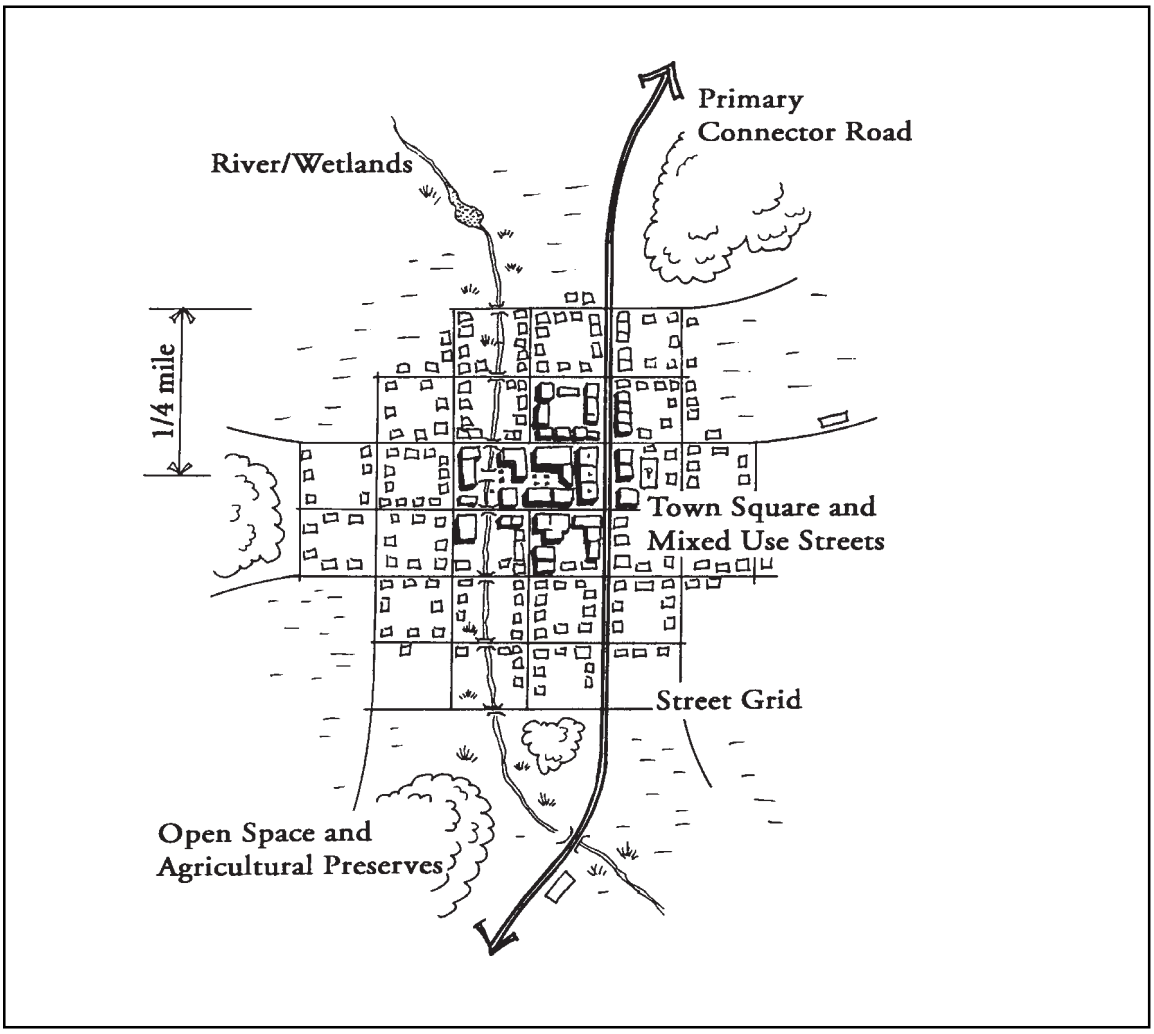


Figure Three: Neighborhood Design Alternative; shows a sample neighborhood design which is oriented towards pedestrian travel. This model is a compact, high density residential enclave which has minimal employment, with its commercial and service facilities in the town square oriented principally to the neighborhood. It contains 160 residential acres and has a population of 4,500 and 1,600 dwelling units (DU). This assumes 2.8 persons per DU and 10 DU's per acre. Total non-residential acreage is 5.6, with a total employment of 230. Not only does this

physical arrangement permit most residents pedestrian access to the town square mixed use area at the center of the neighborhood, it also facilitates the use of carpooling to employment locations outside the neighborhood.

10.6 Local Monitoring and Coordinated Planning

Traffic conditions and development change on a continuing basis. It is important that these changes are the subject of on-going study. Monitoring traffic volumes and travel patterns is one element of a local program. In 1997, traffic count information was jointly collected for Metro area roadways by the Missouri Department of Transportation, Boone County and the City of Columbia. The next metro area count is scheduled for Spring, 2001. A local traffic count program should be developed and implemented for provide annual and seasonal counts in Columbia and Boone County.

Development and subdivision activity are currently monitored by the City of Columbia Department of Planning and Development and the Boone County Planning and Zoning Department. The information collected should be integrated to provide a complete database for growth in the metropolitan planning area.

10.7 Recommendations

For the five year period (2000-2005) the CATSO should focus on the following plan implementation strategies:

1. Develop preferred engineered alignments for new roadways in the CATSO 2025 Roadway Plan.

2. Develop preferred alignments and identify bridge locations, underpasses and trailheads for the backbone portion of the CATSO 2025 Bicycle/Pedestrian Network Plan.

3. Examine the arterial and collector street system north of I-70 and west of Stadium Boulevard and make recommendations.

4. Update the CATSO Transportation Plan in 2005.

5. Provide technical support to local government to assist with regulatory reform.

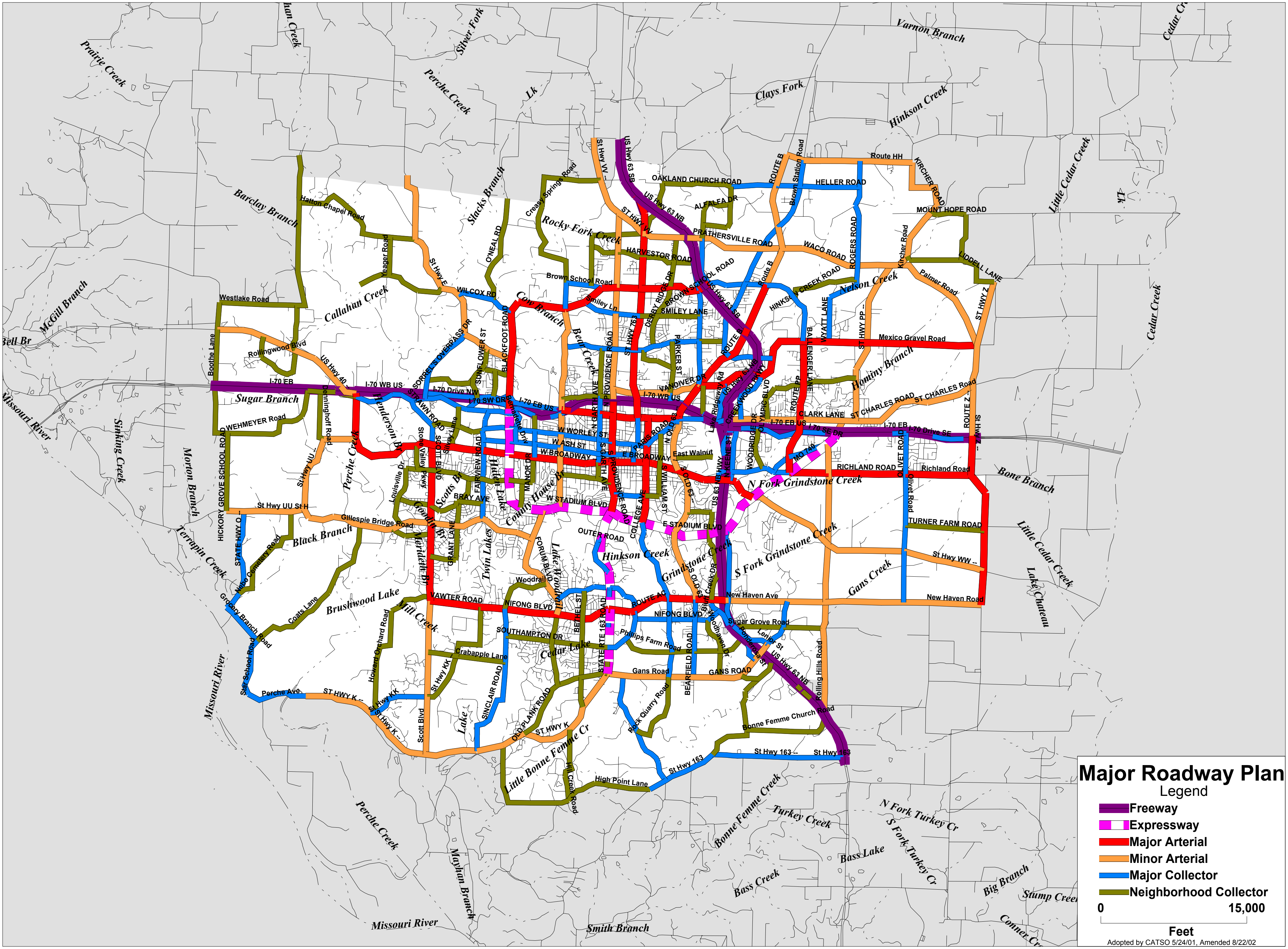
6. Provide input to the Missouri Department of Transportation on the I-70 Environmental Impact Study, preferred alignments, and preliminary designs.

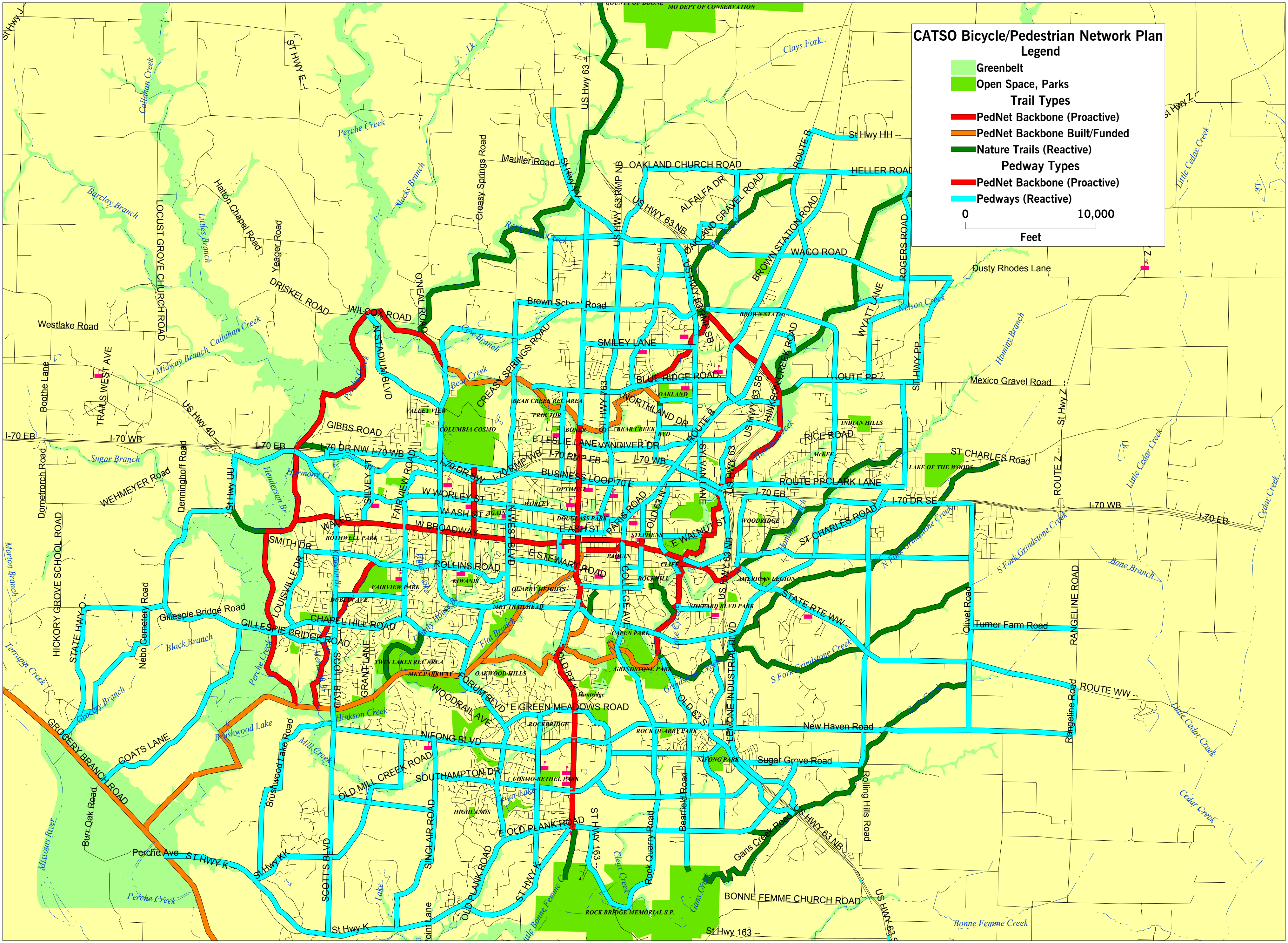
7. Examine the potential for a multi-modal freight facility, including the COLT railroad.

8. Examine the options for expanding public transportation services in the incorporated and unincorporated portions of the Metro Area.

9. Initiate a study for the MO 740 extension project as soon as funding will permit to determine the purpose and need for a project. If the study concludes a roadway would be the preferred alternative, the study would also determine the appropriate functional classification and alignment.

10. Cooperate in the development of a regional transportation system (ITS) architecture plan.


Major Roadway Plan
Legend
Freeway
Expressway
Major Arterial
Minor Arterial
Major Collector
Neighborhood Collector
0
15,000
Feet
Adopted by CATSO 5/24/01, Amended 8/22/02
Varnon Branch
Prairie Creek
Silver Fork
Perche Creek
Clays Fork
Hinkson Creek
Barclay Branch
Slacks Branch
Rocky Fork Creek
Little Cedar Creek
Cedar Creek
McGill Branch
Callahan Creek
Cow Branch
Bear Creek
Nelson Creek
Hominy Branch
Missouri River
Sugar Branch
Sinking Creek
Morton Branch
Terrapin Creek
Black Branch
Brushwood Lake
Mill Creek
Meredith Br
Twin Lakes
Hinkson Creek
Grindstone Creek
N Fork Grindstone Creek
S Fork Grindstone Creek
Gans Creek
Bone Branch
Lake Chateau
Cedar Lake
Little Bonne Femme Cr
Bonne Femme Creek
Turkey Creek
N Fork Turkey Cr
S Fork Turkey Cr
Bass Lake
Bass Creek
Big Branch
Mayhan Branch
Smith Branch
Missouri River
I-70 EB
I-70 WB US
I-70 EB US
I-70 SE DR
US Hwy 63 SB
US Hwy 63 NB
US Hwy 40
OAKLAND CHURCH ROAD
HELLER ROAD
Route HH
MOUNT HOPE ROAD
PRATHERSVILLE ROAD
WACO ROAD
HARVESTOR ROAD
Brown School Road
WILCOX RD
Westlake Road
Rollingwood Blvd
Mexico Gravel Road
ST CHARLES ROAD
CLARK LANE
RICHLAND ROAD
Richland Road
TURNER FARM ROAD
St Hwy WW
New Haven Road
New Haven Ave
W WORLEY ST
WASH ST
W BROADWAY
E BROADWAY
East Walnut
W STADIUM BLVD
E STADIUM BLVD
OUTER ROAD
WEHMEYER Road
HICKORY GROVE SCHOOL ROAD
St Hwy UU St H
Gillespie Bridge Road
VAWTER ROAD
NIFONG BLVD
ROUTE AC
SOUTHAMPTON DR
Crabapple Lane
Phillips Farm Road
Gans Road
GANS ROAD
Sugar Grove Road
Bonne Femme Church Road
Rock Quarry Road
St Hwy 163
High Point Lane
Perche Ave
ST HWY K
OLD PLANK ROAD
SINCLAIR ROAD
Scott Blvd
Coats Lane
Gregory Branch Road
Howard Orchard Road
Rolling Hills Road


CATSO Bicycle/Pedestrian Network Plan
Legend
Greenbelt
Open Space, Parks
Trail Types
PedNet Backbone (Proactive)
PedNet Backbone Built/Funded
Nature Trails (Reactive)
Pedway Types
PedNet Backbone (Proactive)
Pedways (Reactive)
0
10,000
Feet
MO DEPT OF CONSERVATION
Clays Fork
US Hwy 63
ST HWY E
Callahan Creek
Perche Creek
Mauller Road
OAKLAND CHURCH ROAD
HELLER ROAD
St Hwy HH
ROUTE B
Barclay Branch
Slacks Branch
Greasy Springs Road
Hatton Chapel Road
LOCUST GROVE CHURCH ROAD
Yeager Road
ALFALFA DR
OAKLAND GRAVEL ROAD
BROWN STATION ROAD
WACO ROAD
ROGERS ROAD
Dusty Rhodes Lane
DRISKEL ROAD
O'NEAL ROAD
Brown School Road
WILCOX ROAD
Westlake Road
N STADIUM BLVD
SMILEY LANE
WYATT LANE
Nelson Creek
CREASY SPRINGS ROAD
BLUE RIDGE ROAD
ROUTE PP
Mexico Gravel Road
Hominy Branch
Boothe Lane
TRAILS WEST AVE
US Hwy 40
BEAR CREEK REC AREA
NORTHLAND DR
GIBBS ROAD
VALLEY VIEW
COLUMBIA COSMO
RICE ROAD
INDIAN HILLS
I-70 EB
I-70 WB
I-70 DR NW
E LESLIE LANE
VANDIVER DR
ST CHARLES Road
LAKE OF THE WOODS
Sugar Branch
Harmony Cr
BUSINESS LOOP 70 E
ROUTE PP CLARK LANE
ROUTE Z
WEHMEYER Road
Denninghoff Road
Dometorch Road
W WORLEY ST
I-70 DR SE
St Hwy UU
W ASH ST
Henderson Br
WALES
W BROADWAY
E ASH ST
PARIS ROAD
E WALNUT ST
HICKORY GROVE SCHOOL ROAD
SMITH DR
ROTHWELL PARK
WOODRIDGE
ST CHARLES ROAD
Morton Branch
ROLLINS ROAD
E STEWART ROAD
S Fork Grindstone Creek
Bone Branch
RANGELINE ROAD
LOUISVILLE DR
FAIRVIEW PARK
KIWANIS
QUARRY HEIGHTS
COLLEGE AVE
US HWY 63 NB
AMERICAN LEGION
STATE RTE WW
Gillespie Bridge Road
Nebo Cemetery Road
STATE HWY O
CHAPEL HILL ROAD
SHEPARD BLVD PARK
Olivet Road
Turner Farm Road
Black Branch
GILLESPIE BRIDGE ROAD
Flat Branch
CAPEN PARK
Terrapin Creek
SCOTT BLVD
GRANT LANE
TWIN LAKES REC AREA
MKT PARKWAY
OAKWOOD HILLS
GRINDSTONE PARK
Grindstone Creek
ROUTE WW
Grocery Branch
FORUM BLVD
WOODRAIL AVE
E GREEN MEADOWS ROAD
LEMONE INDUSTRIAL BLVD
Rangeline Road
Hinkson Creek
OLD 63 S
Little Cedar Creek
GROCERY BRANCH ROAD
Brushwood Lake
Brushwood Lake Road
Mill Creek
NIFONG BLVD
ROCKBRIDGE
ROCK QUARRY PARK
New Haven Road
COATS LANE
OLD MILL CREEK ROAD
NIFONG PARK
Sugar Grove Road
SOUTHAMPTON DR
COSMO-BETHEL PARK
Cedar Creek
Rolling Hills Road
Burr Oak Road
HIGHLANDS
E OLD PLANK ROAD
ST HWY 163
Rock Quarry Road
Bearfield Road
Gans Creek Road
US HWY 63 NB
Missouri River
Perche Ave
ST HWY K
St Hwy KK
SCOTT'S BLVD
SINCLAIR ROAD
OLD PLANK ROAD
ST HWY K
Clear Creek
Perche Creek
ROCK BRIDGE MEMORIAL S.P.
BONNE FEMME CHURCH ROAD
Bonne Femme Creek
St Hwy K
St Hwy 163
US HWY 63 S