Frankfort Urban Area

Final Report

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Kentucky Transportation Cabinet
Division of Multimodal Programs
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Frankfort, Kentucky 40622

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KENTUCKY TRANSPORTATION CABINET

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TABLE OF CONTENTS

Page

Chapter I - Introduction.....1

Chapter II- Public Involvement 4

Chapter III - Existing Transportation System.....7

Chapter IV - Forecasts 26

Chapter V - Downtown Transportation Study.....40

Chapter VI - Operational Improvement Plan.....49

Chapter VII - Future Transportation Needs 58

Chapter VIII - Recommended Improvements.....64

List of Figures

Page

Figure I-1. Project Location 1
Figure III-1. Study Area 8
Figure III-2. Study Area Transportation Network 9
Figure III-3. Functional Classification System 13
Figure III-4. 1998 Average Daily Traffic Volumes 14
Figure III-5. 1998 Levels of Service 16
Figure III-6. High Accident Sections (1995 – 1997) 18
Figure III-7. High Accident Intersections (1995 – 1997) 21
Figure III-8. Existing Transit Service 24
Figure IV-1. Traffic Analysis Zones 27
Figure IV-2. Planned and Programmed Improvements 38
Figure IV-3. Year 2020 Projected Traffic Volumes 39
Figure V-1. Downtown Frankfort 40
Figure V-2. Downtown Traffic Circulation 45
Figure V-3. Deliveries and Parking 45
Figure V-4. West Main Street Parking Inventory 47
Figure V-5. One-Way "Cross-Alley" 48
Figure VI-1. Operational Improvement Projects 51
Figure VI-2. Wilkinson Boulevard Intersection Improvements 52
Figure VI-3. Wilkinson Boulevard Pump Station 53
Figure VI-4. Multiple Access Points 57
Figure VI-5. Poor Roadway Edge Delineation 57
Figure VI-6. Potential Conflict Points 57
Figure VII-1. Year 2020 System Deficiencies 59
Figure VII-2. Long Range Transportation Plan Alternatives 63
Figure VIII-1. Recommended Long-Range Improvements 66

List of Tables

Page

Table III-1. Routes with ADT Greater than 25,000 12
Table III-2. Accident Analysis Summary 19
Table IV-1. 1998 Study Area Population and Employment Data 29
Table IV-2. 2020 Study Area Population and Employment Data 32
Table IV-3. 1998 - 2020 Population and Employment Changes 34
Table VI-1. Operational Improvement Projects 50
Table VIII-1. Recommended Long-Range Transportation Improvement Projects 67

CHAPTER I – INTRODUCTION

The Kentucky Transportation Cabinet (KYTC), through its Division of Multimodal Programs, has the responsibility for assisting urban areas of the Commonwealth with an examination of their transportation systems. To this end, the Cabinet, in cooperation with local governmental officials and the U.S. Department of Transportation, has sponsored urban transportation studies for areas having populations greater than 5,000 persons.

The urban transportation studies are primarily oriented to the analysis of present and future highway travel and identify, on a system-level basis, existing deficiencies and forecasts of future deficiencies in the urban area's roadway system. Transportation improvements to alleviate those deficiencies are subsequently developed, with projects largely involving improvements to state and federal highway systems facilities. These studies provide for the development of both short-range and long-range highway improvements. In addition, these studies may address multimodal and intermodal transportation concerns at levels of detail appropriate for individual areas, including bicycle and pedestrian facilities, transit service, trucking operations, rail facilities, and aviation issues.

BACKGROUND

The ability of Frankfort to function effectively as an urban society depends upon the efficient movement of people and goods. Compounding this challenge is the fact that Frankfort is the home of state government in Kentucky. With the State Capitol and many state government offices, there is a tremendous daily influx of employees and visitors. Frankfort's continued success in functioning as the home of state government will be related in part to its ability to accommodate future demands on its transportation system.

In addition to being the Capital City of Kentucky, Frankfort serves as the county seat of Franklin County. Franklin County is located in the north central part of Kentucky, just west of the famous Bluegrass Region, between Lexington and Louisville. The location of Frankfort relative to the surrounding areas of the state can be seen in **Figure I-1**.

The development of Frankfort began over 200 years ago, along the banks of the Kentucky River. As the community grew, it expanded beyond the river valley, onto the surrounding slopes and plateaus. The topography has had an interesting effect on the development of the street system.

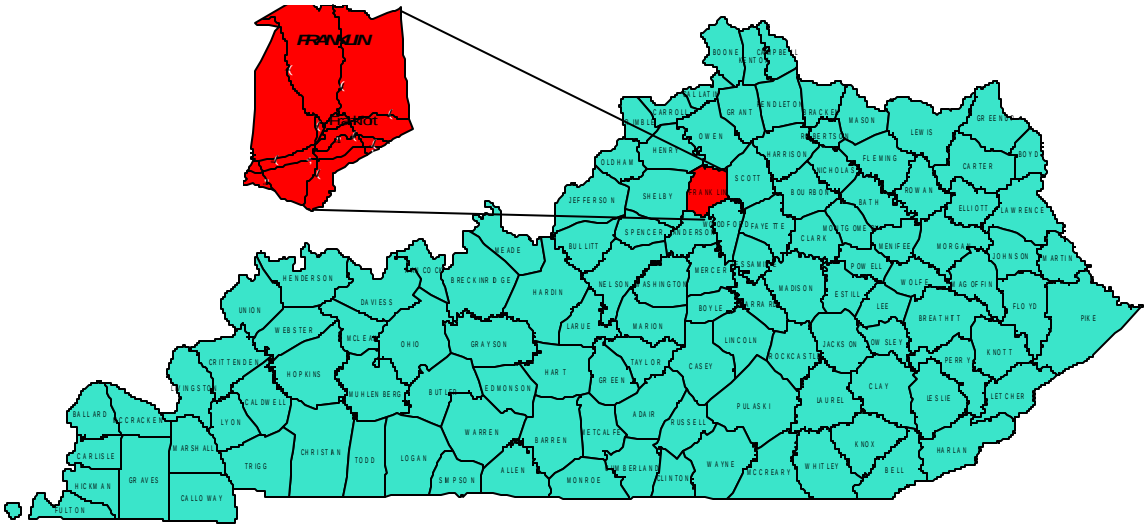

Figure I-1. Project Location

The early system was centered around three river crossings that connected North and South Frankfort. These created bottlenecks and corresponding traffic jams, as both through and local trips were funneled into the downtown area. Later, circuitous perimeter routes were built that removed through traffic from downtown and provided alternatives for local trips.

PURPOSE

Transportation planning is a dynamic, continuous process. Because demands and thus plans change, it is important for transportation plans to be updated regularly. Several earlier studies were done for Frankfort in which long range transportation plans were developed. Those include:

- Frankfort Major Transportation Plan, 1959[1]
- Frankfort Transportation Needs Study, 1964 (revised 1965)[2]
- Frankfort Transportation Needs Study, 1969[3]
- Frankfort Commuter Study, 1977[4]

Obviously there is an immediate need to update the previous studies. It has been more than 20 years since any type of transportation study was done for Frankfort and 30 years since a comprehensive urban area transportation study and resulting long range transportation plan were produced. Moreover, the twenty-year planning horizon of the 1969 study is more than ten years gone by.

The basic objectives of this study, however, remain consistent with those in the past. Generally, those are:

1. Establish an integrated system of streets and roads that efficiently accommodate existing and future travel demands;
2. Base future travel desires and resulting plans on projected socioeconomic and land use activities;
3. Produce a recommended transportation plan that reasonably reflects the financial capabilities of the Commonwealth of Kentucky, the City of Frankfort, and Franklin County; and
4. Conduct this study and develop a long range plan that can be updated easily in the future.

SCOPE

The scope of this study was to conduct a comprehensive transportation study for the Frankfort Urban Area and develop a financially feasible transportation plan that will sufficiently accommodate projected transportation demands through the Year 2020. There are two components of the recommended plan:

1. Short-term Operational Improvement Plan. This consists of smaller scale, relatively low cost projects that can be implemented easily. Projects in the Operational Improvement Plan can be incorporated into the State *Six Year Highway Plan* or may be implemented by local government.
2. Long Range Transportation Plan. Projects in the Long Range Plan are larger-scale, capacity expansion-type projects. Long Range Plan projects are prioritized and, depending

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[1] *Frankfort Major Thoroughfare Plan*, prepared for the Department of Economic Development, Commonwealth of Kentucky, prepared by Hammer and Company Associates, Atlanta, Georgia, June 1959.

[2] *Urban Transportation Needs, Frankfort, Kentucky*, Kentucky Department of Highways, Division of Planning, October 1964, revised January 1965, and June 1965.

[3] *Urban Transportation Needs, Frankfort, Kentucky*, Kentucky Department of Highways, Division of Planning, July 1969.

[4] *Frankfort Commuter Study*, prepared for the Kentucky Department of Transportation, prepared by Schimpeler-Corradino Associates, Louisville, Kentucky, July 1977.

on those priorities, are consistent with the *Six Year Highway Plan* (i.e. Years 1 through 6) and the *Statewide Transportation Plan* (Years 7 through 20).

The recommended Frankfort Long Range Transportation Plan is intended to also serve as the transportation element of the *Frankfort/Franklin County Comprehensive Plan*, which is being updated currently. This has not been the case with previous versions of the Comprehensive Plan, as there have been no new urban area studies for 30 years.

Additional studies were conducted for the downtown Frankfort area. The Commonwealth of Kentucky has considered constructing new state office buildings in the downtown area, including the new facility for the Transportation Cabinet. Detailed traffic simulation studies were done to determine the adequacy of the downtown street system in handling peak hour traffic demands in the Year 2020 from those new buildings. The findings and recommendations are contained in a separate chapter of this document.

CHAPTER II – PUBLIC INVOLVEMENT

PUBLIC INVOLVEMENT PLAN

Public involvement is an important component of any urban area transportation study. The public must be a partner in the development of the long range transportation plan by which it will be served. Public ownership of the product through participation in its development is a necessary criterion for plan acceptance.

A public involvement plan was developed for the Frankfort Urban Area Transportation Study. With the assistance of the Mayor and County Judge/Executive, a Citizens Advisory Committee (CAC) was established to provide input and guidance to the Transportation Cabinet and its consultant. Regular CAC meetings were held throughout the course of the study. Additionally, two public meetings were held to present information about the study and to receive input and comments. At the first public meeting, basic study facts and existing system deficiencies were presented. Also, details of the downtown traffic analyses were made available. At the second public meeting, future system demands and deficiencies were presented, along with the analyses of alternatives and the recommended transportation plan.

CITIZENS ADVISORY COMMITTEE

The Citizens Advisory Committee was established to provide input and guidance, and was comprised of state and local officials and other community leaders. The CAC was viewed as a collective representative of the citizens of Frankfort and Franklin County. Individual CAC members were:

- Teresa A. Barton - Franklin County Judge/Executive
- William I. May - Mayor, City of Frankfort
- Paige R. Bronk – Director, Frankfort Department of Planning and Building Codes
- Mike Cornette – Executive Director, Capital Plaza Operations
- Darrell R. Gilliam – Executive Director, Capital Community and Industrial Development Authority
- Lisbon Hardy – President, Frankfort Chamber of Commerce
- Barry House – Transportation Engineer Specialist, Kentucky Transportation Cabinet
- Rex Hunt – Deputy Secretary, Kentucky Cabinet for Finance and Administration
- Ed Powe - Kentucky State University
- Vickie Sewell – Director, Franklin County Planning and Zoning
- Rebecca Horn Turner, Director, Downtown Frankfort, Inc.

SIGNIFICANT ISSUES

As the study progressed, several key issues were identified through interaction with the CAC. These issues were considered in the development of the Long Range Transportation Plan and include:

- Location of new state office buildings in the downtown Frankfort area and their resulting impacts on the transportation system;
- Downtown traffic circulation, particularly with respect to the one-way portion of Main Street and a potential re-opening of the St. Clair Mall;

- Improvements to the Holmes Street corridor;
- A potential Cardwell Lane interchange with Interstate 64;
- Future population and distribution of state employees;
- Downtown parking and truck loading unloading; and
- Traffic congestion locations.

GOALS AND OBJECTIVES

Goals are the basis for all human decisions. In order to make sound decisions, goals must be clearly identified and logically organized. Goals also must be measurable, at least qualitatively, as there is no reason to have goals when progress toward those goals cannot be measured.

While goals are generalized statements that reflect public interest and give direction, objectives are more specific statements which grow out of goals. While goals typically are too broad or general to quantify, objectives represent elements which can be accomplished and directly measured.

A set of Goals and Objectives was developed for the Frankfort Urban Area Transportation Study. These were used as a guide in developing the Recommended Long Range Transportation Plan. The Goals and Objectives are:

Goal 1: Provide for a Safe, Efficient, Balanced Transportation System

Objective 1.1. Identify high accident locations and develop improvements.

Objective 1.2. Increase transportation system efficiency by making the most effective use of existing facilities and by using advanced technologies and management methods, as appropriate.

Objective 1.3. Identify existing and projected future congestion locations and develop strategies to reduce congestion and improve travel times.

Objective 1.4. Improve intermodal connectivity of the transportation system.

Goal 2: Enhance Economic Development Opportunities

Objective 2.1. Improve/enhance highway and/or public transportation access to industrial sites, water ports and terminals, the airport, rail and intermodal facilities, freight distribution points, and military installations.

Objective 2.2. Improve access to undeveloped areas.

Objective 2.3. Enhance access to recreational areas and tourist sites.

Goal 3: Provide for an Environmentally Sensitive Transportation System

Objective 3.1. Protect and preserve existing scenic views and viewsheds.

Objective 3.2. Preserve/enhance special historic districts, historic sites, prehistoric sites, and natural environments.

Objective 3.3. Develop a transportation system that minimizes adverse impacts on noise, air quality and water.

Goal 4: Proactively Plan for Future Transportation System Needs

Objective 4.1. Identify and prioritize future transportation system needs.

Objective 4.2. Develop a prioritized list of projects for inclusion in the State's Long Range Plan.

Objective 4.3. Encourage inclusion of projects in the State's Six Year Plan and promote funding for those projects.

Objective 4.4. Develop (promote) alternative funding mechanisms for State and local projects.

CHAPTER III – EXISTING TRANSPORTATION SYSTEM

The evolution of Frankfort's transportation system has been impacted most significantly by the area's topography. Over 200 years ago, Frankfort began to develop as a settlement along the banks of the Kentucky River. The area was visited by English explorers, beginning in 1751, and settlement began in the 1780's. Most likely the name comes from Stephen Frank, a settler who was killed at what came to be known as Frank's Ford (near the present Broadway Bridge). The town was established in 1786 as Frankfort, Virginia, and became the capital of the new state of Kentucky in 1792.

The original town of Frankfort was on the north side of the Kentucky River. It has been expanded to include once independent towns of South Frankfort, south of the river, and Leestown, which was just north of the original town. The Kentucky River, which bisects present-day Frankfort into East Frankfort and West Frankfort, flows generally northward through Franklin County, but turns and flows in a westerly direction in the downtown area before resuming its northerly course near the Broadway Bridge. In the downtown area, the Old Capitol and the Central Business District lie on the northern bank. South of the river on an overlooking hill is the location of the present Capitol and Annex.

As Frankfort grew, development spilled out from the Kentucky River Valley and onto the neighboring slopes and plateaus. All major roads led to the downtown area and, until the 1960's, the two halves were connected by bridge crossings at three locations: Capital Avenue (Memorial Bridge), Bridge Street Bridge, and Broadway Bridge. The West Frankfort-Capital Plaza Connector twin bridges opened in 1989 and the Broadway Bridge was closed to all traffic in 1992.

The topography of the area limited the radial development pattern of the principal routes into Frankfort, funneling them in the general orientation of the river. The topography also prohibited the development of a good cross-town roadway system, thus forcing all traffic into downtown Frankfort, where the river could be crossed feasibly. This created considerable peak period traffic congestion, which was documented as early as 1959 in the *Frankfort Major Thoroughfare Plan*[1].

Cross-town movement has been improved considerably over the last 35 years. Interstate 64 was built in the southern part of Franklin County in the mid-1960's. The East-West Connector (KY 676) opened in 1980 and provided an east-west alternative that was closer to downtown. In the late 1980's, the West Frankfort-Capital Plaza Connector was built, opening in 1989. Designated as US 127, it improved the accessibility of West Frankfort to downtown.

STUDY AREA

The Frankfort study area encompasses the Frankfort City Limits and incorporates the southern half of the Franklin County. It contains approximately 95 percent of the county's population and is the same as was established for the Frankfort traffic model update by the Transportation Cabinet in 1988. The study area is shown in **Figure III-1**.

TRANSPORTATION NETWORK

The transportation network considered for the Frankfort Urban Area Transportation Study includes Interstate 64, all U.S. designated highways and state routes, plus other significant local streets. Most local city streets and county roads were excluded from consideration. The transportation study network is shown in **Figure III-2**.

[1] *Frankfort Major Thoroughfare Plan*, prepared for the Department of Economic Development, Commonwealth of Kentucky, prepared by Hammer and Company Associates, Atlanta, Georgia, June 1959.

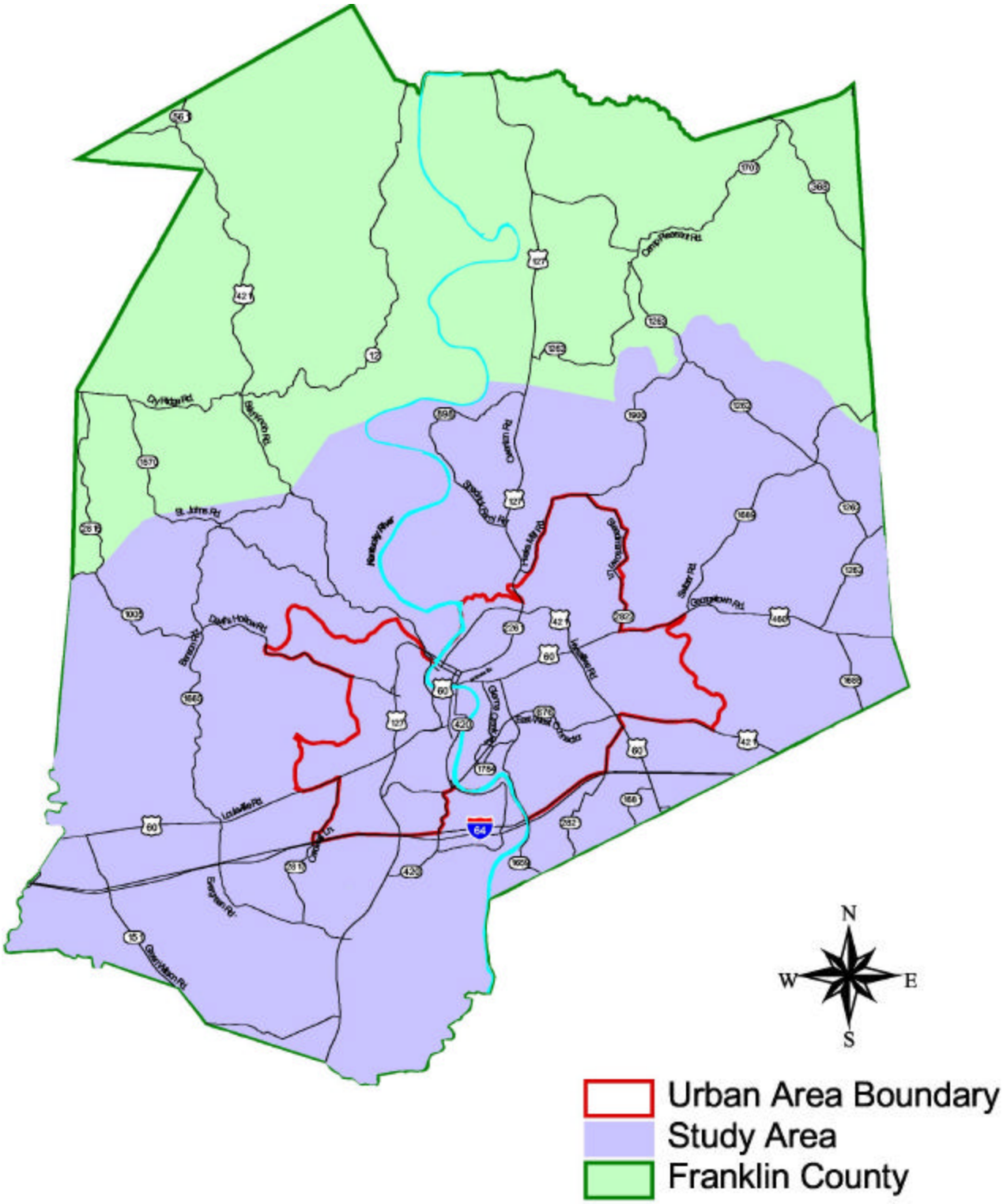

Figure III- 1. Study Area

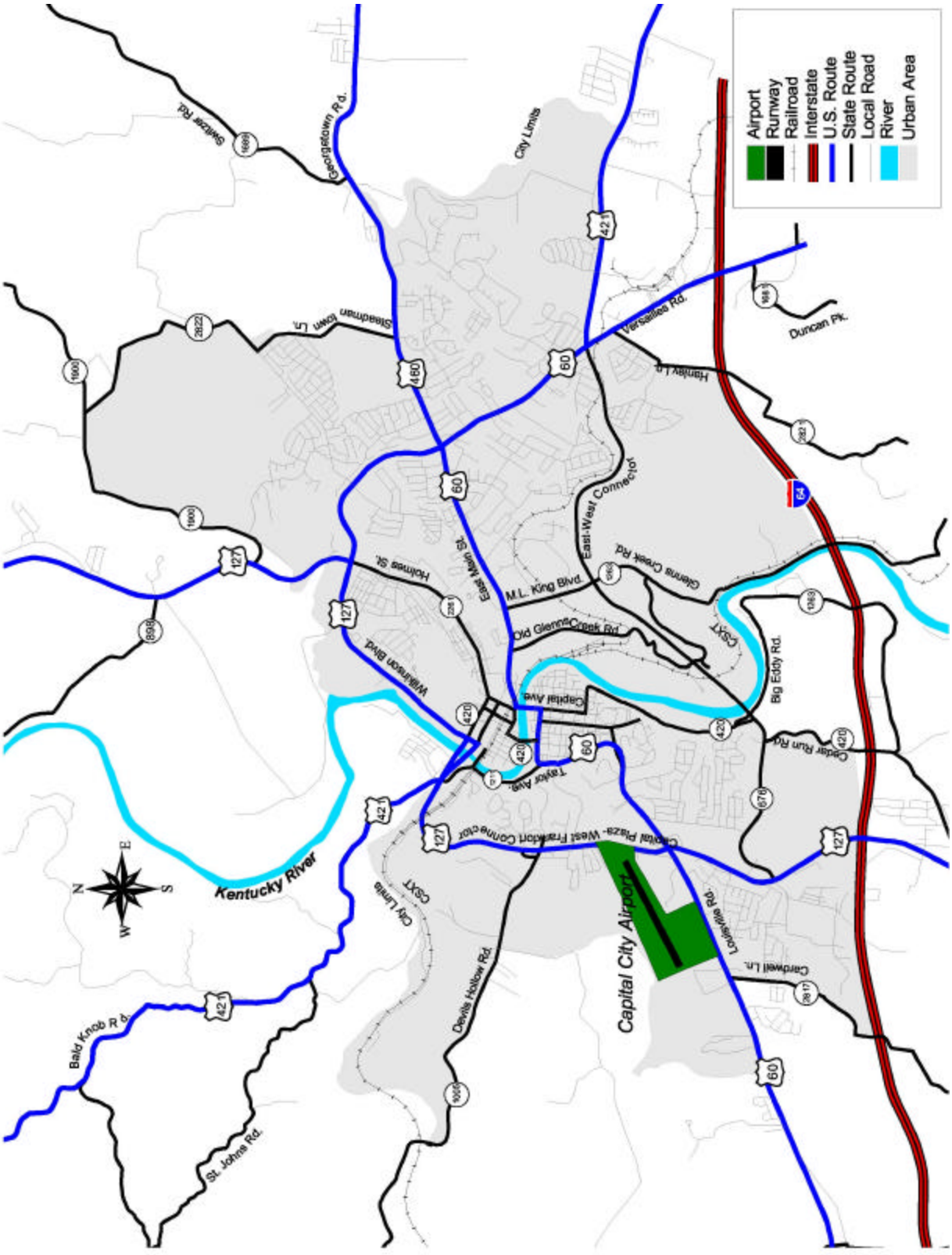

Figure III- 2. Study Area Transportation Network

Interstate 64 is the dominant route through Franklin County, passing to the south of Frankfort and connecting Louisville and Lexington. Presently there are three interchanges with I-64 in Franklin County – at KY 151 (Exit 48) near Graefenburg in western Franklin County, at US 127 (Exit 53) on the west end, and at US 60 (Exit 58) on the east end of Frankfort.

Two other major regional highways pass through the study area. US 60, connecting Louisville and Lexington, enters Franklin County from the west at the Shelby County Line and departs in southeast Franklin County at the Woodford County Line. US 60 is mostly two-lane in western Franklin County, then becomes a four-lane divided facility just west of US 127. It reduces to two lanes as it approaches downtown from the west, then becomes four-lane again at Bridge Street (St. Clair Street). US 60 then is four-lane divided from US 460 in east Frankfort all the way to Lexington.

The other major highway is US 127, which connects Frankfort with Lawrenceburg and the Blue Grass Parkway to the south. US 127 is a four-lane divided highway all the way from the Parkway (and beyond) to Wilkinson Boulevard. The West Frankfort-Capital Plaza Connector was designated as US 127 with its opening in 1989. North of Frankfort, US 127 continues to Owenton and ultimately to the Ohio River at Warsaw in Gallatin County. North of Frankfort, US 127 is four-lane briefly, then reverts to two-lane. Ultimate plans are to make US 127 four-lane all the way from Frankfort to Owenton.

Other federally designated routes in the study area are US 421 and US 460. US 421 connects Frankfort with Midway and Lexington to the east and ultimately crosses the Ohio River to the north at Milton in Trimble county. From the east, US 421 is two-lane until it intersects and runs concurrently with US 60. As Wilkinson Boulevard (also known as Thornhill Bypass), it is four-lane divided from US 460 to the West Frankfort-Capital Plaza Connector (US 127). North of Frankfort, it is two-lane entirely through northern Franklin County.

Frankfort is the western terminus of US 460, which ultimately runs to Virginia Beach, Virginia. In Frankfort, US 460 is four-lane divided from US 60/US 421 to just east of Steadmantown Lane (KY 2822). Ultimately, US 460 is expected to be four-lane from Frankfort all the way to Georgetown and Interstate 75.

The East-West Connector (KY 676) is the most significant state-designated route in the network. It connects US 421 at US 60 in east Frankfort to US 127 in west Frankfort. As a four-lane divided facility, it provides an east-west alternative to Interstate 64 with service to the Capitol, Human Resources, and Kentucky State University. Interestingly, previous Frankfort transportation studies [1,2,3] called for a Todd Street-to-Versailles Road connector to provide access between the Capitol area and east Frankfort. Ultimately, the East-West Connector was built a little farther to the south. Another interesting fact is that the East-West Connector/US 60/US 421 interchange was the first single-point urban interchange in Kentucky.

Frankfort is well-connected to the neighboring metropolitan areas of Louisville and Lexington. Both Interstate 64 and US 60 pass through Frankfort and connect these two cities. Two more routes connect Frankfort to Lexington – US 421 and KY 1681 (Old Frankfort Pike).

Other significant state routes in the study area include:

- KY 420 (Capital Avenue)
- KY 1005 (Devils Hollow Road)
- KY 1263 (Big Eddie Road)
- KY 1659 (Glenns Creek Road; Martin Luther King, Jr. Boulevard)
- KY 1681 (Old Frankfort Pike; Duncan Pike)

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[1] Op Cit

[2] *Urban Transportation Needs, Frankfort, Kentucky*, Kentucky Department of Highways, Division of Planning, October 1964, revised January 1965, and June 1965.

[3] *Urban Transportation Needs, Frankfort, Kentucky*, Kentucky Department of Highways, Division of Planning, July 1969.

- KY 1689 (Switzer Road)
- KY 1784 (Old Glenns Creek Road)
- KY 1900 (Peaks Mill Road)
- KY 2261 (Holmes Street/Ann Street)
- KY 2817 (Cardwell Lane)
- KY 2821 (Hanley Lane)
- KY 2822 (Steadmantown Lane)

Significant streets and local roads that were included in the study area were:

- Broadway
- Clinton Street (KY 420)
- Mero Street (KY 420)
- Schenkel Lane
- West Main Street

FEDERAL-AID ROUTES AND FUNCTIONAL CLASSIFICATION

Prior to the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, the Federal-aid Highway Program was directed primarily toward the construction and improvement of four Federal-aid systems: the Interstate (FAI), Primary (FAP), Urban (FAU) and Secondary (FAS) systems. The ISTEA restructured the Federal-aid system and repealed the FAP, FAU and FAS systems. Instead of four Federal-aid systems, now there are two systems: the National Highway System (NHS) and the Interstate system, which is a component of the NHS.

National Highway System

The National Highway System focuses Federal resources on routes that are most important to interstate travel and the national defense and on roads that connect to other modes of transportation or are essential for international commerce. The NHS is designed to maintain system connectivity within the State and with adjacent states.

Section 103 (b) (1) of 23 U.S.C. defines the purpose of the NHS as:

> *"to provide an interconnected system of principal arterial routes which will serve major population centers, international border crossings, ports, airports, public transportation facilities, and other major travel destinations; meet national defense requirements; and serve interstate and interregional travel."*

The Federally mandated components of the NHS are: 1) the Interstate System, 2) other urban and rural principal arterials, 3) Intermodal connectors, which provide motor vehicle access to a major port, airport, public transportation facility, or other intermodal transportation facility, 4) the Strategic Highway Network (STRAHNET) which is a network of highways important to the United States strategic defense policy and which provides defense access, continuity, and emergency capabilities for the movement of personnel, materials, and equipment in both peace time and war time, and 5) major STRAHNET connectors.

Functional Classifications

Streets and highways are grouped into classes or systems according to the character of service they are intended to provide. This process is called functional classification. An integral part of this process is the recognition that individual roads and streets do not serve travel independent from the rest of the highway system. Rather, most travel involves movement through a network of roads, so it is necessary to determine how this travel can be categorized within the network in a logical and efficient manner.

Functional classification can be applied in planning highway system development, determining the jurisdictional responsibility for particular systems, and in fiscal planning. Functional classification is also important in determining eligibility for Federal-aid funding.

Urban and rural functional systems are classified as such:

Principal Arterials

Principal arterials are designed to provide for major travel desires between, across, and within urban areas. Expressways within this system do not provide access to adjacent land. Principal arterials are intended to carry high traffic volumes and serve the longest trip lengths.

Minor Arterials

Minor arterials are moderate volume streets and roads that interconnect with and augment the principal arterial system. More emphasis is placed on land access than for principal arterials, but the primary emphasis is on the movement of traffic. Also, travel desires typically are shorter for minor arterials than for principal arterials.

Collectors

Collector streets penetrate neighborhoods and the urban core, collecting and distributing trips from arterials to the local street system. Collectors provide both access to adjoining land and through movement of traffic.

Local Streets and Roads

The sole function of local streets is to provide access to abutting land. Local streets often comprise the largest portion of total street mileage in an urban area but carry only a small portion of the total vehicle-miles traveled. Local streets were not evaluated in this study.

In rural areas, collectors are further divided into two categories: **rural major collectors** and **rural minor collectors**.

The functional classification system for the Frankfort Urban Area Transportation Study Network is shown in **Figure III-3**. This includes National Highway System routes.

DAILY TRAFFIC VOLUMES AND LEVELS OF SERVICE

Average daily traffic volumes for facilities in the study area network are presented in **Figure III-4**. These data were obtained from the Kentucky Transportation Cabinet for the Year 1998. The Transportation Cabinet maintains several permanent count stations in the area, plus numerous temporary locations at which counts are undertaken and updated on a regular basis.

A number of facilities within the Frankfort study area carry significant traffic volumes of more than 25,000 vehicles per day. A list of those roads and 1998 average daily traffic volumes is presented in **Table III-1**.

Table III-1. Routes with ADT Greater than 25,000

Route	ADT	Location
I-64	32,000	From US 127 to US 60 (Versailles Road)
KY 676	25,400	From KY 420 to KY 1263
US 127	27,800	From US 60 to KY 676
US 421	28,100	From Holmes Street to Schenkel Lane
US 60	32,000	From US 421 Underpass to Crittenden Drive
US 127	30,000	From I-64 to US 60

Levels of Service

Level of service is a qualitative measure of traffic conditions. There are six levels of service, expressed in letter grades A through F. Level-of-service (LOS) A represents the best traffic conditions – free flowing, with high travel speeds and no delays. At the other end of the spectrum, LOS F represents the worst traffic conditions – heavy congestion, with long delays and low travel speeds resulting from stop-and-go flow. A facility is considered to have reached its physical capacity at LOS E. For planning, it is typically desirable to maintain a LOS D in urban areas and a LOS C in rural areas.

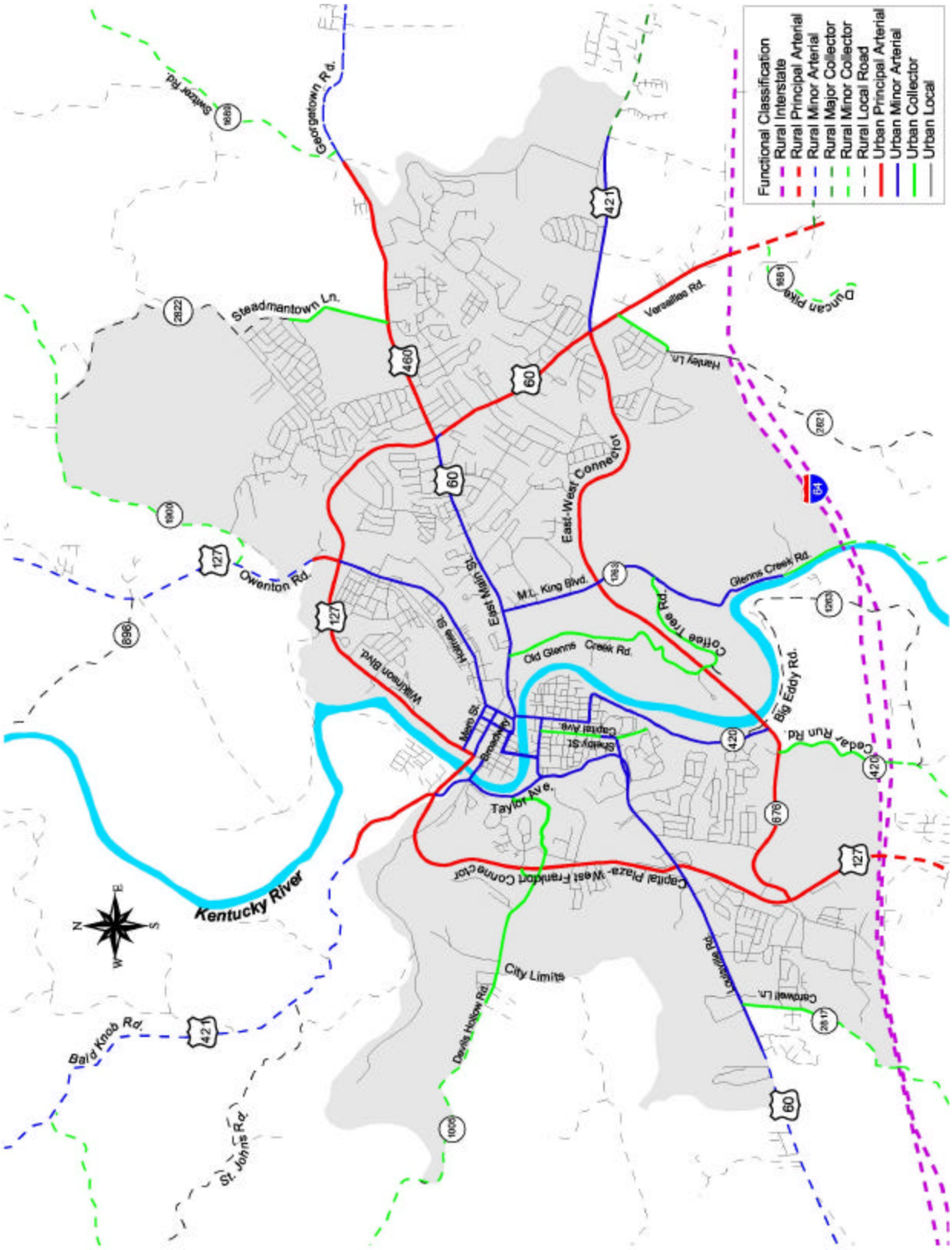

Figure III- 3. Functional Classification System

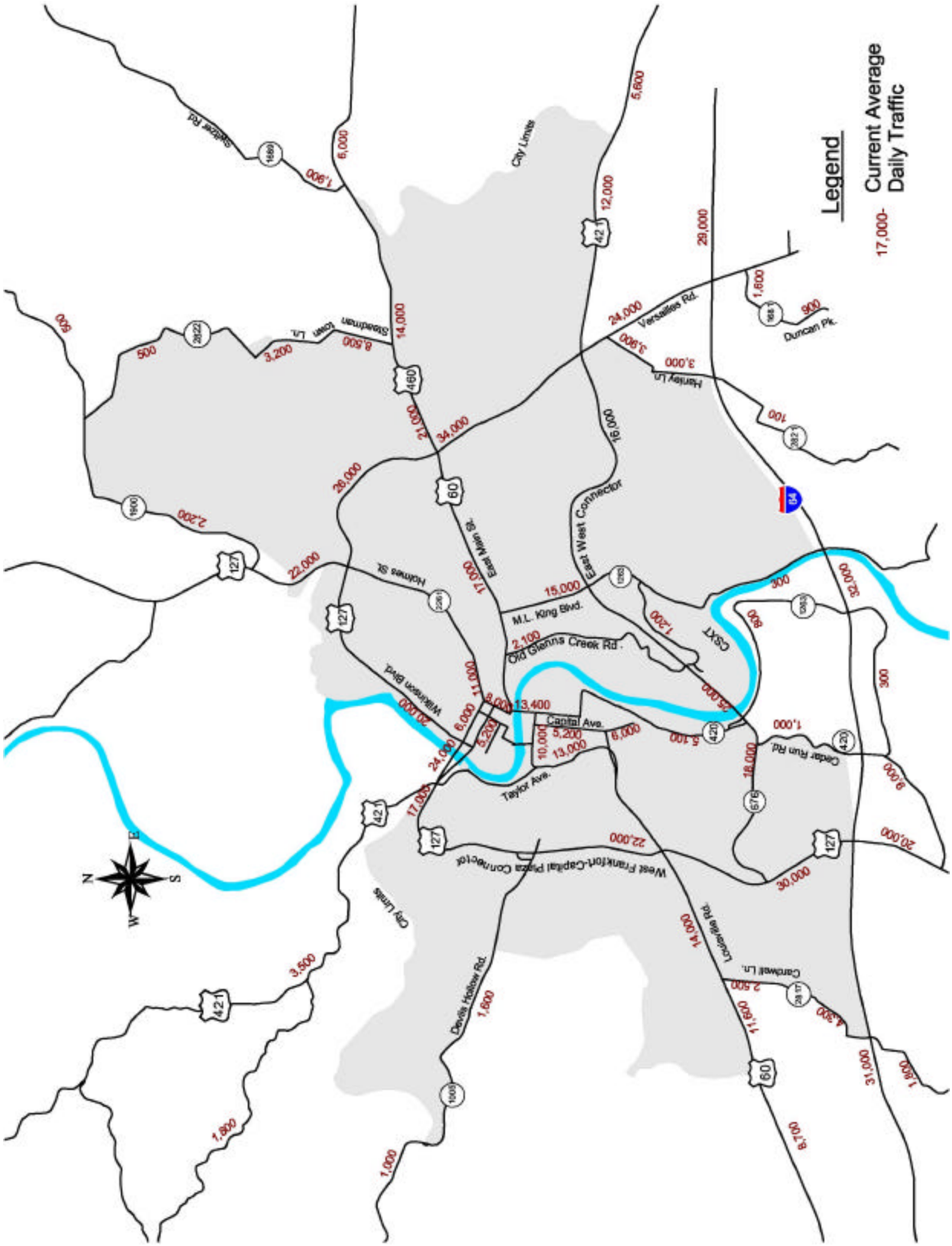

Figure III- 4. 1998 Average Daily Traffic Volumes

Level of Service Analysis

Level of service can be computed for specific facility types (e.g. freeways, arterial streets, signalized intersections, etc.) based on methodologies prescribed in the Highway Capacity Manual[4] (HCM). Depending on the facility type, there are a number of methods varying in complexity and accuracy that are based on the HCM and can be used to compute level of service. These methods range from generalized look-up tables of daily traffic volumes to very detailed, data intensive operational analyses.

For the Frankfort study, a planning LOS analysis was used to identify current and projected future capacity deficiencies. The method estimates level of service for roadway sections based on observed or forecasted daily traffic volumes. For individual streets and roads, specific parameters related to geometry, traffic control, and traffic characteristics serve as input variables. This planning LOS analysis method is a widely accepted practice in urban area planning and corridor studies.

Base year (1998) levels of service for roadways in the Frankfort study area are shown in **Figure III-5**. Both US 127 (I-64 to US 60) and US 60 (KY 676 to US 460) are at physical capacity during peak hours and are shown at LOS E. Also, in the downtown area, Clinton, Ann and a short section of East Main Street are shown at LOS E. Downtown, the poor levels of service are a result of heavy peaking characteristics of state employee traffic and in reality last only a short time. Although Holmes Street was computed to be at LOS F, this too is confined very briefly to the peak periods and is concentrated at the west end of the street, near the State Office Building.

Five other facilities are shown to be at LOS D – US 60 West (Louisville Road), Wilkinson Blvd., East Main Street, M. L. King, Jr. Blvd., and KY 676 (East-West Connector). While LOS D is considered to be acceptable for urban areas, there are segments of significant congestion during peak hours, such as KY 676 at the west end and US 60 near US 127. Outside the peak periods, traffic on these facilities is noticeably less, thus the impact of peak hour demand on daily traffic volumes and overall LOS is slightly underestimated using this method.

ACCIDENT ANALYSIS

Accident data were collected from the Kentucky Transportation Cabinet for the three-year period from January 1, 1995, through December 31, 1997. Of the roads comprising the study area network, there were 3,134 reported accidents during this time frame.

Accident rates were computed for roadway sections of the network. Accident rates, expressed in terms of *accidents per 100 million vehicle-miles*, normalize the comparison by taking into account the amount of traffic on a section. The Critical Accident Rate is a statistically derived value that the KYTC uses as a threshold to identify high accident locations. Those roadway sections having an accident rate higher than the critical accident rate therefore are considered to be high accident locations and thus candidates for safety improvements. Critical accident rates for the roadway study sections were computed based on information obtained from the Kentucky Transportation Center[5]. The following formula was used to calculate critical accident rates:

[4] *Highway Capacity Manual*, Special Report 209, Transportation Research Board, National Academy of Sciences, Washington, D.C., 1997.

[5] *Analysis of Traffic Accident Data in Kentucky (1993 – 1997)*, Research Report KTC-98-16, Kentucky Transportation Center, College of Engineering, University of Kentucky, Lexington, Kentucky, September 1998.

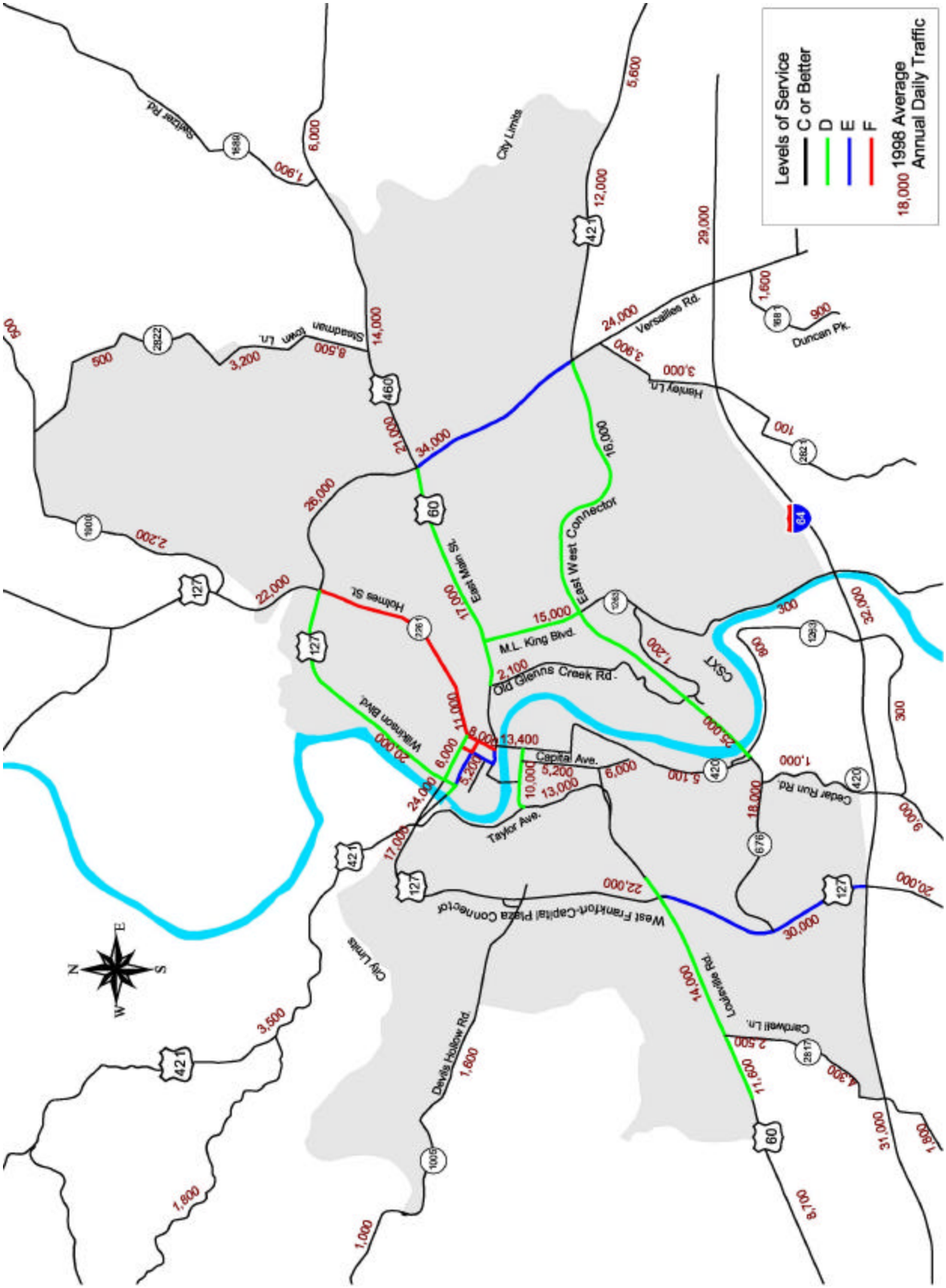

Figure III- 5. 1998 Levels of Service

$$A_c = A_a + K\sqrt{A_a/M} + 1/2M$$

Where

A_c = Critical Accident Rate

A_a = Average Accident Rate

K = Constant related to level of statistical significance (a probability of 0.95 was used wherein K = 2.576), and

M = Exposure (for roadway section, M is expressed in terms of 100 million vehicle-miles)

Figure III-6 illustrates high accident roadway sections based on the three-year data. For each section, a Critical Accident Rate Factor (CARF) was computed as the observed accident rate divided by the critical accident rate. Where this ratio is greater than 1.0, the roadway section can be considered to be a high accident location when compared to like facilities throughout Kentucky. The accident analysis results are summarized in **Table III-2**.

Because Frankfort is an urban area and because its traffic is heavily influenced by peak travel patterns of state government employees, it is not surprising that several roads were computed to have a CARF greater that 1.0. It is most reasonable to focus on those roads or sections having an extremely high CARF; that is, where the computed rate is two to three times higher than the critical rate. As seen by examining Figure III-6 and Table III-2, there are four roadway sections that have an extremely high CARF. These are:

- US 127 from I-64 to US 60
- US 60 from KY 676 to US 460
- I-64 from US 127 to US 60
- KY 676 from US 127 to KY 420

For these four sections, accident records obtained from the KYTC were examined in more detail in an attempt to identify causative factors. The computer records are less detailed than the actual police reports, however.

The accident problem on US 127 is related to congestion and heavy traffic demand. The majority of the accidents were at the intersection with KY 676. Additionally, there were a number of accidents in the vicinity of the Century Plaza Shopping Center, between KY 676 and US 60. Rear-end and right-angle accidents were dominant types.

On Versailles Road, accidents were concentrated at the intersections, particularly at Walnut Street, Lyons Drive, Sunset Drive and Laralan Avenue. Again, rear-end and right-angle accidents were the dominant types.

The accidents on Interstate 64 were concentrated at the US 60 interchange, particularly the westbound exit ramp. There was no dominant factor upon reviewing the records, but there was a tendency toward multi-vehicle accidents.

Accident problems on the East-West Connector were concentrated at two intersections – Limestone Drive and Collins Lane. Traffic signals presently exist at both of these intersections. Rear-end collisions were dominant.

Intersection accidents for the three-year period are summarized in **Figure III-7**. The following intersections had the highest frequencies between 1995 and 1997:

- US 60 at Lyons Drive – 43
- US 60 at Sunset Drive – 42
- East Main Street at Winding Way/Allnut – 42
- Second Street at Capital Avenue – 41
- US 60 at Laralan Avenue - 38
- Wilkinson Boulevard at Mero Street – 35
- KY 676 at M. L. King, Jr. Boulevard – 34
- US 127 at US 60 – 31
- I-64 at US 127 Interchange – 30
- KY 676 at Galbraith Road – 30

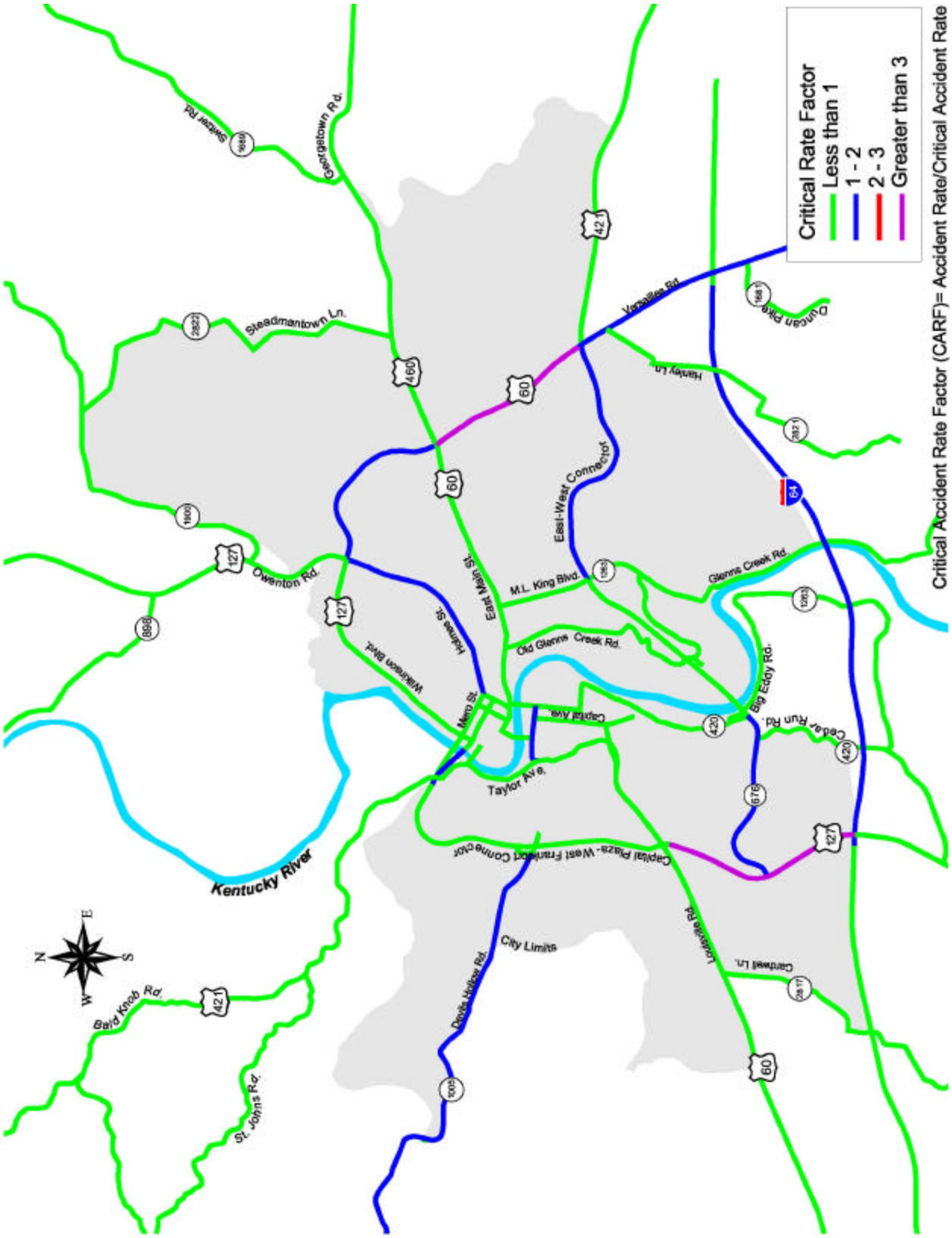

Figure III- 6. High Accident Sections (1995 – 1997)

Table III-2. Accident Analysis Summary

Facility	Section	AADT	Begin MP	End MP	Length (miles)	No. Acc. ('95 – '97)	Accident Rate (Acc/100 MVM)	Functional Class	Critical Acc. Rate (Acc/100 MVM)	Critical Acc. Rate Factor*
I-64	Shelby Co to KY 151	32,800	46.303	47.740	1.437	36	70	Rural Interstate	103	0.7
I-64	KY 151 to US 127	28,600	47.740	53.118	5.378	141	84	Rural Interstate	80	1.0
I-64	US 127 to US 60	30,500	53.118	57.860	4.742	238	150	Rural Interstate	81	1.9
I-64	US 60 to Woodford County Line	24,433	57.860	59.431	1.571	25	59	Rural Interstate	108	0.6
Shelby St.	Tanglewood Dr. to Second Street	3,475	0.000	0.785	0.785	22	737	Urban Collector Street	1029	0.7
KY 420	US 60 to East Main	6,990	3.753	4.145	0.392	29	967	Urban Minor Arterial Street	1000	1.0
KY 420	KY 676 to Capital Ave	4,690	2.145	3.753	1.608	63	763	Urban Minor Arterial	758	1.0
East-West Connector	US 127 to KY 420	15,314	0.000	1.492	1.492	92	368	Urban Principal Arterial	200	1.8
East-West Connector	KY 420 to ML King	19,467	1.492	3.172	1.680	43	120	Urban Principal Arterial	183	0.7
East-West Connector	ML King to US 60	15,700	3.172	5.287	2.115	73	201	Urban Principal Arterial	182	1.1
US 127	KY 1665 to I-64	19,333	2.224	4.428	2.204	69	148	Urban Principal Arterial	173	0.9
US 127	I-64 to KY 676	23,233	4.428	5.194	0.766	138	708	Urban Principal Arterial	213	3.3
US 127	KY 676 to US 60	29,800	5.194	6.102	0.908	189	638	Urban Principal Arterial	191	3.3
US 127	US 60 to KY 1005	19,900	6.102	7.264	1.162	41	162	Urban Principal Arterial	199	0.8
US 127	KY 1005 to US 421	18,883	7.264	8.542	1.278	49	185	Urban Principal Arterial	197	0.9
US 127	US 421 to Wilkinson Blvd.	20,433	8.542	8.943	0.401	39	435	Urban Principal Arterial	271	1.6
US 421	Old Leestown Rd. to US 60	11,900	1.680	3.072	1.392	30	165	Urban Minor Arterial	644	0.3
US 421	US 60 to US 127	23,550	3.072	4.520	1.448	49	131	Urban Principal Arterial	105	1.3
US 421	Wilkinson Blvd. to Owenton Rd.	19,041	8.943	10.94	1.997	25	60	Urban Minor Arterial	566	0.1
Georgetown Rd.	US 60 to Franklin Co. HS	18,333	0	0.560	0.560	20	178	Urban Principal Arterial	251	0.7
Georgetown Rd.	Franklin Co. HS to KY 1689	11,172	0.560	2.310	1.750	29	135	Urban Principal Arterial	208	0.7
US 60	SGF to US 127	13,532	4.692	6.537	1.845	101	369	Urban Minor Arterial	602	0.6
US 60	US 127 to KY 1211	13,211	6.537	7.922	1.385	69	344	Urban Minor Arterial	633	0.5
US 60	KY 1211 to KY 420	13,211	7.922	8.353	0.431	64	1026	Urban Minor Arterial	812	1.3
US 60	Capital Avenue to KY 1659	15,083	8.556	9.004	0.448	42	568	Urban Minor Arterial	778	0.7
US 60	KY 1659 to US 421	19,967	9.004	10.667	1.663	216	594	Urban Minor Arterial	577	1.0
US 60	US 460 to US 421	32,363	10.667	12.090	1.423	328	650	Urban Principal Arterial	170	3.8
US 60	US 421 to I-64	23,167	12.090	13.308	1.218	79	256	Urban Principal Arterial	189	1.4
US 60	I-64 to Woodford Co. Line	17,133	13.308	14.038	0.730	41	299	Rural Principal Arterial	269	1.1

Table III-2 (continued)

Facility	Section	AADT	Begin MP	End MP	Length (miles)	No. Acc. ('95 – '97)	Accident Rate (Acc/100 MVM)	Functional Class	Critical Acc. Rate (Acc/100 MVM)	Critical Acc. Rate Factor*
Ann St.	US 420 Mero to US 60 Main St	4,800			0.320	9	535	Urban Minor Arterial	1216	0.4
Clinton St.	US 127 Wilkinson to US 420 High St.	5,410			0.380	18	800	Urban Minor Arterial	1098	0.7
High St.	KY 2261 Holmes to US 60 Main Street	8,000	4.111	4.381	0.2700	13	550	Urban Minor Arterial	1080	0.5
Holmes St.	Mero to US 127	5,143	0.162	1.832	1.670	90	957	Urban Minor Arterial	735	1.3
M.L. King	US 60 East Main to KY 676 East West Connector	13,850	3.356	4.086	0.730	29	262	Urban Minor Arterial	710	0.4
Main St.	KY 420-1 Ann St. to KY 420 High Street	11,800			0.600	36	464	Urban Minor Arterial	769	0.6
KY 420	KY 2261 Holmes St to US 127 Wilkinson Blvd.	10,000	4.381	4.732	0.351	26	676	Urban Minor Arterial	927	0.7
Taylor Ave.	US 127 Wilkinson Blvd. to US 60 Second St.	2,782	0	0.889	0.889	7	259	Urban Minor Arterial	1033	0.3
Versailles Rd.	I-64 to Woodford County Line	17,133	13.308	14.038	0.730	41	299	Rural Principal Arterial	269	1.1
Steadmantown Ln.	US 460 to KY 1900	2,795	0	3.075	3.075	13	138	Urban Collector	758	0.2
Owenton Rd	US 127 Wilkinson Blvd. to KY 898	6,365	10.887	21.507	10.620	86	116	Rural Minor Arterial	300	0.4
Bark Rd.	US 127 to KY 1570	3,898	4.523	17.886	13.363	111	195	Rural Minor Arterial	311	0.6
Devil's Hollow Rd.	US 127 to Shelby County line	1,079	0	7.290	7.290	100	1161	Urban Collector	774	1.5
Cardwell Ln.	I-64 to US 60	1,900	0	2.340	2.340	26	534	Rural Minor Collector	607	0.9
Cardwell Ln.	I-64 to US 60	2,172	2.340	3.074	0.734	10	573	Urban Collector	1231	0.5
Hanley Ln.	US 60 to Woodford Co	2,870	0	2.905	2.905	14	153	Rural Local	404	0.4
Old Glenns Creek	US 60 to Glenn's Creek	2,000	0	2.632	2.632	2	35	Rural Local	465	0.1
Louisville Rd.	Shelby Co to SGF	5,683	0	4.832	4.832	57	190	Urban Collector	613	0.3
US 127	US 420-1 Clinton St. to KY 2261	20,433	8.917	10.88	1.967	107	243	Urban Principal Arterial	562	0.4

** Critical Accident Rate Factor (CARF) equals Accident Rate divided by Critical Accident Rate. A CARF greater than 1.0 indicates that the section would be considered as a high accident section and subject to safety-related improvements.*

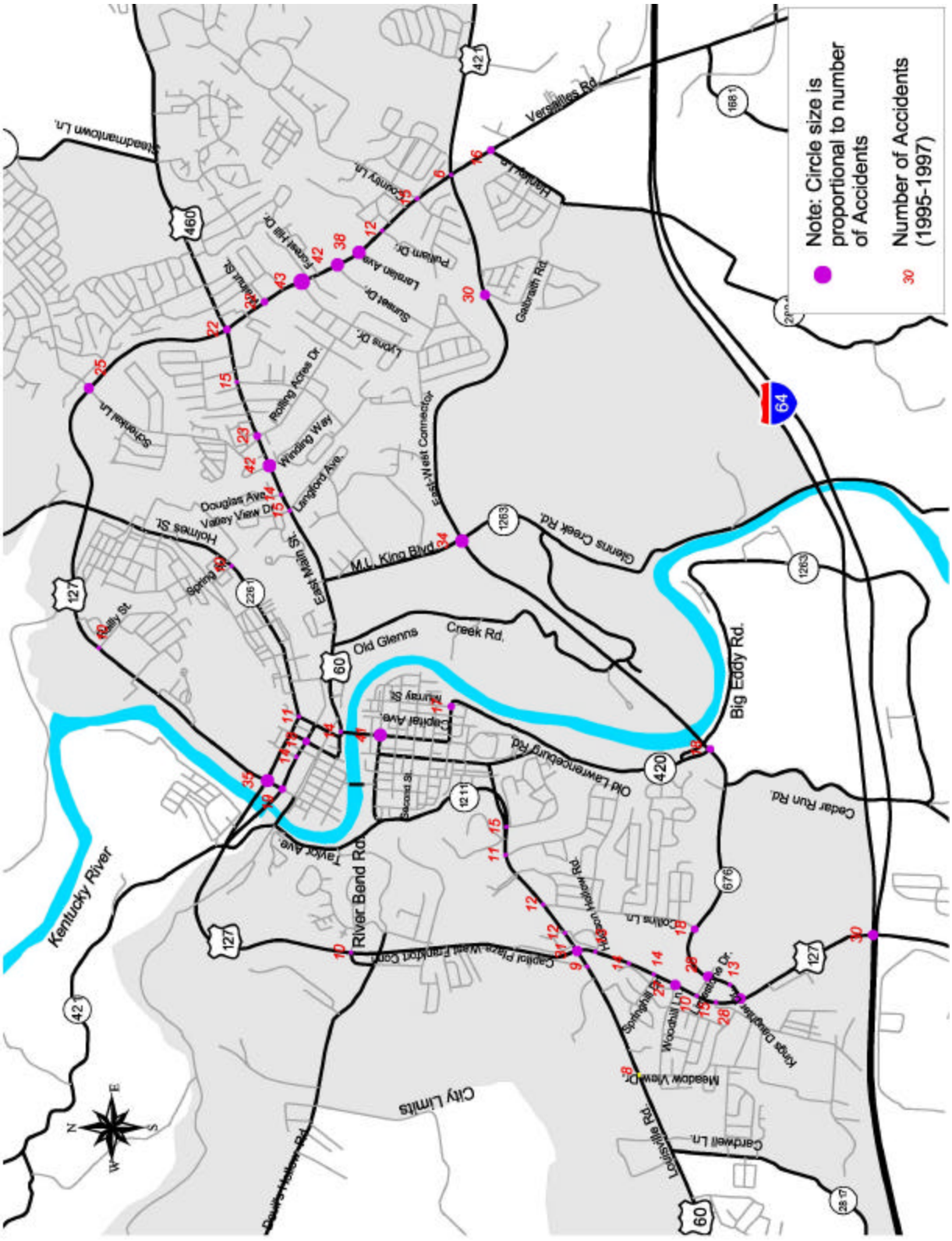

Figure III- 7. High Accident Intersections (1995 – 1997)

SYSTEM DEFICIENCIES

The biggest deficiency of the current Frankfort transportation system is insufficient capacity of principal arterials to handle peak hour congestion. US 127 South, US 60 East (Versailles Road), and KY 676 (East-West Connector) are the major traffic-carrying arterials that experience regularly occurring peak hour congestion. The congestion is confined primarily to the a.m. and p.m. peak periods, as well as a mid-day noontime peak. During off-peak periods, congestion is not a problem.

In addition to the congestion, other current system deficiencies relate to safety and the land use-transportation relationship. A more detailed discussion follows:

Congested Areas

Regularly occurring traffic congestion in Frankfort is confined mostly to the traditional A.M. and P.M. peak commute periods. Because of the concentration of state government employees in Frankfort, the peak hour is very condensed. Observations during this study indicate that employee arrivals and departures at work are concentrated within a 30-minute period each during the morning and afternoon. There also is a lesser peak during the noon hour as employees break for lunch.

Those areas where congestion is most significant are along the principal arterials, especially US 127 South from I-64 to Louisville Road (US 60) and US 60 (Versailles Road) from US 421/US 460 to the East-West Connector (KY 676). Access control has a pronounced effect on traffic congestion. Access to US 127 is limited to intersections with side streets; most of these are signalized. Several shopping centers in the corridor, including the new Poplar Creek Plaza, contribute to the congestion problem, as do several closely spaced signalized intersections. Congestion on US 127 would be much worse, however, with less access control.

Lack of access management is a contributing factor to the congestion on Versailles Road (US 60). Along with the signalized intersections, there are numerous unsignalized driveway entrances and other access points between US 421/US 460 and KY 676 that exacerbate the congestion.

Other congested areas include Louisville Road (US 60) from US 127 to Cardwell Lane; Capital Avenue at East Main Street and Second Street; Holmes Street near the State Office Building; and the downtown area, particularly Clinton, Ann and Main streets. These tend to be congested briefly during the morning and afternoon peak 30-minute periods, but operate satisfactorily otherwise.

Some congested areas do not show up in the LOS analysis because they tend to be concentrated at specific intersections (the LOS analysis is *segment-based*). Cardwell Lane at Louisville Road is that way, as is Old Lawrenceburg Road (KY 420) at US 127. Congestion along these roads is a function of the operations at the intersection with a principal arterial.

Another congested location is Schenkel Lane between Wilkinson Boulevard (US 421) and Comanche Trail. Schenkel Lane is a collector road that serves a large residential area in northeast Frankfort. This includes the subdivision of Indian Hills. Comanche Trail parallels Wilkinson Boulevard and intersects Schenkel Lane about 200 feet east of Wilkinson Boulevard. Comanche Trail serves a mixture of commercial and residential development on both sides of Schenkel Lane. Development along this portion of Comanche Trail is relatively dense for the area. During peak hours, there is recurring congestion along Schenkel Lane which often extends beyond Comanche Trail. The proximity of Comanche Trail to Wilkinson Boulevard compounds the problem as spillback between intersections sometimes occurs on Schenkel Lane during peak periods.

Land Use-Transportation Relationship

Peak hour congestion is compounded by the relationship between land use and transportation, especially along some principal arterials. In the US 127 South corridor, adjacent land use is heavily oriented toward commercial retail. There are several shopping centers in the corridor, including the new Poplar Creek Plaza, Franklin Square, and Century Plaza. Not only do these areas serve to "capture" a lot of weekday commuter pass-by traffic, they also serve as primary trip destinations, particularly on weekends.

The Versailles Road (US 60 East) corridor is not quite as intensely developed as US 127. However, development follows more of a linear ("strip") pattern here as opposed to the cluster pattern along US 127. Lack of access management along Versailles Road reduces the capacity of the road, thus worsening the congestion.

Safety Deficiencies

High accident locations were discussed in a previous section of this chapter. The analysis of accidents showed that, overall, safety deficiencies were related mostly to congestion. That is, high accident locations were concentrated in areas where traffic volumes were highest and where there is a lot of turning activity – at intersections and along sections with numerous driveways. This was confirmed through examination of actual accident records at high accident locations.

OTHER TRANSPORTATION MODES

Transportation in Frankfort is dominated by private passenger automobiles and trucks. However, some alternative modes exist, as discussed below:

Transit

Public transportation in Frankfort is provided primarily by *Frankfort Transit*, which offers fixed route bus service. The three routes are concentrated along principal corridors – US 60 West/US 127 South (West Route), US 60 East (East Route), and Wilkinson Boulevard/Holmes Street (North Route). All three routes converge downtown. Transit service coverage is highlighted on the map presented in **Figure III-8**.

Frankfort Transit provides regular weekday service and abbreviated weekend service. Paratransit service also is provided on a one-way fixed fee basis. Wheelchair lifts are available on all three regular routes.

Ridership is typical of a small urban area; that is, primarily the transportation disadvantaged (elderly, low income, etc.). State employees do make up some of the ridership, as each route has a stop at a major state government site. This implies that transit is a preferred alternative for some state workers. The potential for increased ridership will improve if state office locations are consolidated and moved downtown.

Taxi

Taxi service is provided by two private companies in Frankfort – Capital City Cab and Frankfort Taxi Service. Capital City Cab offers 7-day, 24-hour on-call service. Frankfort Taxi Service offers 7-day service from 6:00 a.m. to 11:00 p.m.

Aviation

The Capital City Airport is a very busy general aviation airport located off Louisville Road (US 60), one mile southwest of Frankfort. The airport has a 5,005-foot long, 100-foot wide runway and is equipped with runway lights and navigational aids. The airport also offers the following aviation services:

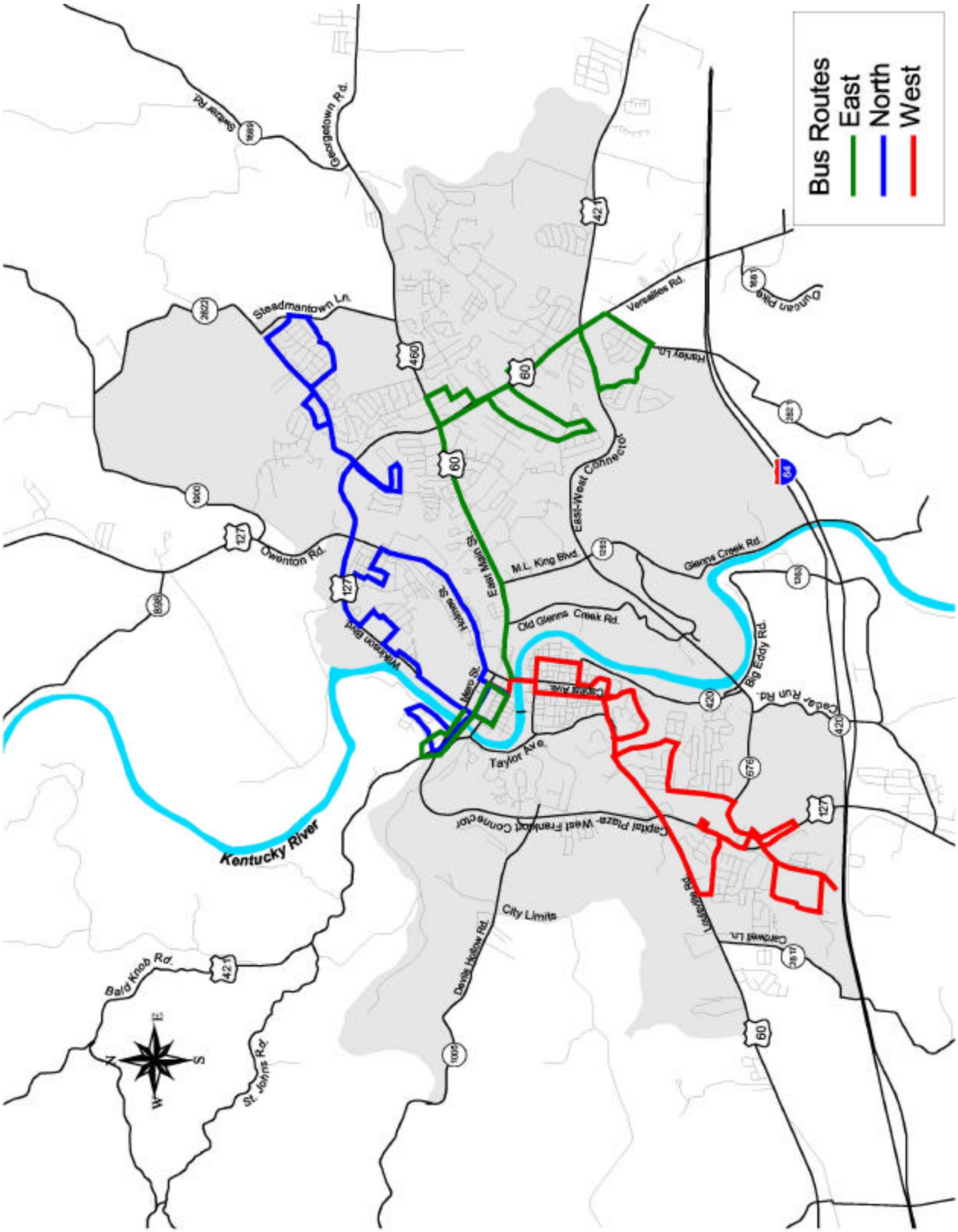

Figure III- 8. Existing Transit Service

- Fuel sales
- Major airframe repair
- Major powerplant repair
- Air taxi service
- Aircraft rental
- Flight instruction
- Car rental
- Vending
- Tie downs and hangars

Capital City Airport plays an important role in accommodating Frankfort business, particularly in the conduct of aerial inspections and the transport of business executives. The airport also is used heavily by the Department of Military Affairs and the Kentucky State Police. In recent years, there have been about 60 based aircraft and over 87,000 total annual aircraft operations, of which 54,000 were military operations.

CHAPTER IV – FORECASTS

For the Frankfort Urban Area Transportation Study, the Year 2020 was established as the horizon year for which the transportation plan was to be developed. Year 2020 conditions then would be predicted from which future transportation needs could be identified. Some of those needs exist already and simply will increase in magnitude over time. Other needs don't exist today, but will surface at some point between now and 2020. The Frankfort Long Range Transportation Plan is the result of a systematic process to identify those needs and develop strategies to sufficiently meet them.

Population and employment are two variables commonly used in urban transportation studies to forecast traffic. A computer travel demand model is a valuable tool that uses these and other variables to forecast traffic volumes on the roadway system. Such a tool, the Frankfort Urban Area Traffic Model, was developed for this study. Using this model, Year 2020 traffic forecasts were developed, from which future needs of the transportation system were identified. The model also was used to compare the effectiveness of alternative transportation improvements so that the best and most cost effective projects would be incorporated into the Long Range Transportation Plan.

Socioeconomic Data Forecasts

The accuracy of the traffic forecasts is highly dependent on the accuracy of the data that go into the model. These data include population and employment, two socioeconomic variables that are integral to the trip generation model.

As shown previously (Chapter III, Figure III-1), the transportation study area extends well beyond the Frankfort City Limits. The study area does not include northern Franklin County. However, most of the population and employment in the county are contained within the study area (roughly 95 percent). It was determined that the population and employment outside the study area but still within the county would not have a significant impact on the transportation study.

1998 Base Year Estimates

The first step in developing population and employment forecasts was to estimate these numbers for the Base Year, 1998. The Bluegrass Area Development District (BGADD) assisted in this process, collecting population and employment data for the study area. The area was divided into traffic analysis zones, or TAZs. This scheme is presented in **Figure IV-1**.

The number of dwelling units in each TAZ was counted. The zonal population was estimated by applying average occupancy rates developed from the 1990 Census to the number of dwelling units. Occupancy rates varied by section of town, ranging from 1.48 to 2.96 persons per dwelling unit. Population estimates also included group quarters – persons living in college dormitories, regional jails, nursing homes, etc.

Each business within the study area was contacted to determine the number of employees. For purposes of predicting trip generation, the employment data by TAZ were classified in two ways: 1) either as retail or non-retail; and 2) either as commercial, industrial, or public. The number of state employees both residing and working within each TAZ also was determined.

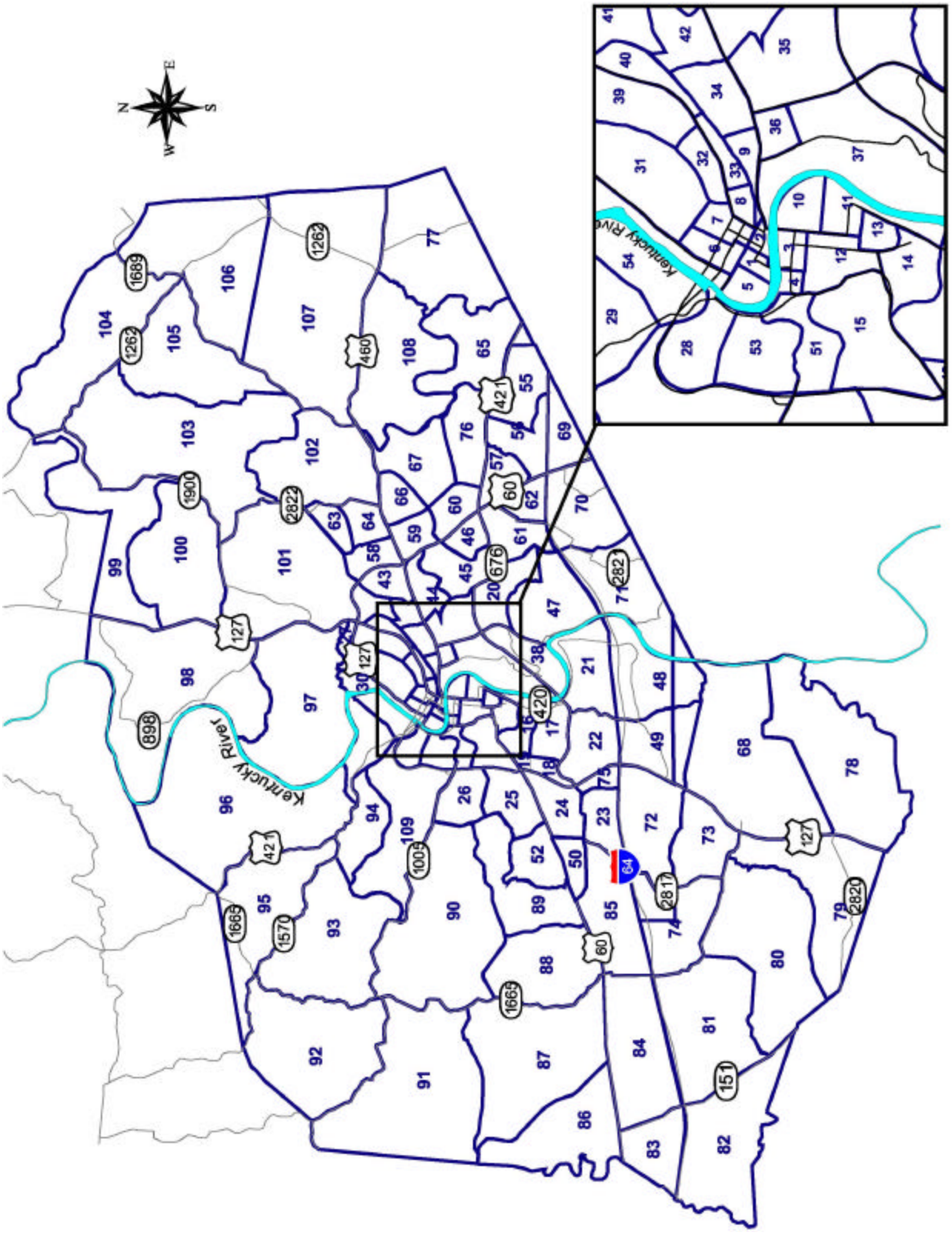

Figure IV- 1. Traffic Analysis Zones

The 1998 Base Year study area population and employment are presented in **Table IV-1**. The 1998 study area population was estimated to be 44,274, which included 18,357 dwelling units. The Kentucky State Data Center at the University of Louisville estimates that the Franklin County population in 1998 was 46,438. Thus, the study area encompasses approximately 95 percent of the total population in the county.

Total employment was estimated to be 33,630. There were 12,681 state government employees working in Frankfort, 6,594 of whom lived within the study area. The remaining 6,087 lived either outside Franklin County or within Franklin County but outside the study area.

2020 Socioeconomic Forecasts

Year 2020 population forecasts for the study area were provided initially by the BGADD, then were revised by the study team. These forecasts were based on the "High Growth" series population projections for Franklin County by the Kentucky State Data Center. The projections then were adjusted to include changing population-to-dwelling unit ratios and revised estimates for new dwelling units in Franklin County by 2020. Estimates for dwelling unit increases were consistent with the current Frankfort/Franklin County Comprehensive Plan. The Year 2020 projected study area population was 47,589 and included 21,837 dwelling units.

Employment forecasts were provided initially by the BGADD and were based on data obtained from the Bureau of Economic Analysis (BEA). The BGADD also obtained input from the Personnel Cabinet and the Governor's Office of Policy and Management. The forecasts were revised with respect to work locations of state government employees and included the relocation of some state employees from presently leased office space to new government buildings in the downtown area. Employment forecasts also were revised to include new industrial development on TAZ 70, located in southeast Franklin County off US 60.

Year 2020 population and employment projections by TAZ for the Frankfort Study Area are presented in **Table IV-2**. In addition to the estimated population of 47,589, is it projected that there will be 39,632 employed persons in the study area. Also it is assumed that there will be no growth in state government employment between 1998 and 2020.

Population and Employment Changes

The projected changes in population and employment from 1998 to 2020 are summarized in **Table IV-3**. While dwelling units are expected to increase by almost 18 percent, the corresponding increase in population is estimated at less than seven percent. The difference is attributable to an anticipated declining household occupancy rate over the next 20 years.

Employment is projected to increase by 16 percent during this same time frame. The primary sources of increase are expected to be in industrial and commercial employment. As stated previously, it is assumed that state government employment will remain constant.

The most noticeable change is expected to occur in the downtown area, where the population is anticipated to decline by 16 percent between now and 2020. This will occur as some currently residential areas are converted to commercial and public uses over the next 20 years. Furthermore, with the construction of the new Transportation Building on Mero Street, the renovation of the State Office Building, and potential construction of additional state government buildings, there is an anticipated increase in downtown area employment by over 30 percent. There is projected to be a net increase in traffic within the downtown area as a result of the employment increase. This growth will reverse a trend of declining downtown area traffic that has occurred since the 1960's due to transportation projects such as Interstate 64 and the East-West Connector that improved mobility within the urban area.

Table IV- 1. 1998 Study Area Population and Employment Data

	Population			Employment						
TAZ	DU's	Pop.	State Emp.	Total	Retail	Non-Retail	Industrial	Comm.	Public	KY Gov't.
1	69	102	15	498	101	397	0	320	178	87
2	56	83	12	533	14	519	0	319	214	195
3	143	237	35	328	60	268	0	113	215	23
4	64	106	16	64	9	55	0	31	33	0
5	99	147	22	761	26	735	0	337	424	239
6	0	0	0	2,066	24	2,042	0	201	1,865	1,687
7	68	101	15	207	25	182	1	91	115	36
8	5	11	2	1,212	11	1,201	0	189	1,023	1,019
9	105	295	44	47	1	46	0	47	0	0
10	267	443	66	90	11	79	0	39	51	0
11	285	473	70	80	1	79	0	20	60	0
12	428	710	106	344	10	334	0	263	81	6
13	66	140	21	943	2	941	0	19	924	909
14	124	263	39	8	0	8	0	8	0	0
15	91	193	29	124	48	76	0	59	65	65
16	593	1,257	187	303	56	247	0	249	54	52
17	486	1,030	153	88	0	88	4	9	75	0
18	26	55	8	748	351	397	0	433	315	315
19	37	78	12	303	122	181	0	153	150	150
20	0	0	0	191	0	191	0	0	191	191
21	61	181	27	4	0	4	0	4	0	0
22	14	30	4	721	627	94	0	721	0	0
23	382	810	121	1,823	63	1,760	0	1,647	176	0
24	993	2,105	314	820	304	516	0	400	420	385
25	58	123	18	1,579	40	1,539	0	283	1,296	937
26	224	475	71	32	19	13	0	30	2	0
27	0	0	0	282	6	276	0	6	276	276
28	59	125	19	11	0	11	6	5	0	0
29	18	45	7	42	4	38	0	4	38	0
30	21	47	7	1,664	47	1,617	130	265	1,269	1,260
31	336	746	111	680	29	651	0	121	559	389
32	287	637	95	50	27	23	0	45	5	0
33	68	151	22	481	7	474	65	284	132	132
34	108	803	120	844	0	844	0	24	820	0
35	111	562	84	573	3	570	0	7	566	562
36	0	0	0	2,020	15	2,005	0	15	2,005	1,942
37	106	298	44	16	0	16	0	16	0	0
38	3	8	1	199	6	193	0	9	190	190
39	557	1,237	184	114	20	94	0	78	36	0
40	76	169	25	142	37	105	0	102	40	0
41	202	467	69	3	3	0	0	3	0	0
42	201	565	84	174	50	124	0	133	41	41
43	769	1,776	265	62	4	58	0	56	6	6
44	565	1,588	236	808	358	450	0	509	299	90
45	498	1,399	208	101	57	44	0	83	18	0

	Population			Employment						
TAZ	DU's	Pop.	State Emp.	Total	Retail	Non-Retail	Industrial	Comm.	Public	KY Gov't.
46	284	665	99	633	324	309	4	397	232	147
47	14	39	6	70	0	70	70	0	0	0
48	72	213	32	2	0	2	0	2	0	0
49	163	482	72	733	81	652	112	401	220	150
50	226	567	84	26	6	20	0	20	6	0
51	60	127	19	16	9	7	0	16	0	0
52	100	212	32	273	62	211	0	94	179	85
53	137	290	43	22	10	12	3	19	0	0
54	268	673	100	20	0	20	0	8	12	0
55	206	550	82	12	0	12	4	8	0	0
56	13	35	5	1,670	15	1,655	1,451	186	33	0
57	65	174	26	1,246	187	1,059	515	310	421	415
58	474	1,095	163	765	88	677	0	165	600	408
59	431	1,009	150	667	411	256	1	580	86	68
60	193	452	67	730	507	223	0	720	10	10
61	437	1,023	152	169	56	113	15	64	90	90
62	6	16	2	48	29	19	0	48	0	0
63	696	1,608	239	6	1	5	0	6	0	0
64	121	280	42	186	0	186	0	0	186	7
65	158	422	63	1	0	1	0	1	0	0
66	251	587	87	157	1	156	0	154	3	0
67	235	550	82	77	1	76	0	70	7	0
68	141	417	62	119	0	119	0	119	0	0
69	8	21	3	2	0	2	0	2	0	0
70	25	67	10	932	0	932	765	26	141	69
71	56	150	22	4	0	4	0	4	0	0
72	118	349	52	548	180	368	122	383	43	38
73	217	642	96	202	0	202	200	2	0	0
74	330	977	145	52	19	33	0	41	11	0
75	0	0	0	1,082	1,034	48	0	1,082	0	0
76	144	337	50	6	2	4	0	6	0	0
77	10	27	4	0	0	0	0	0	0	0
78	161	477	71	25	4	21	0	21	4	0
79	532	1,575	235	27	11	16	0	27	0	0
80	104	308	46	17	4	13	0	13	4	0
81	188	472	70	2	0	2	0	2	0	0
82	20	50	7	61	10	51	47	14	0	0
83	80	201	30	10	4	6	0	10	0	0
84	107	269	40	19	2	17	0	19	0	0
85	64	161	24	25	12	13	0	25	0	0
86	92	231	34	77	0	77	0	1	76	10
87	90	226	34	16	12	4	3	13	0	0
88	34	85	13	11	0	11	0	11	0	0
89	189	474	71	0	0	0	0	0	0	0
90	142	356	53	7	1	6	0	7	0	0
91	45	113	17	0	0	0	0	0	0	0
92	26	65	10	0	0	0	0	0	0	0

	Population			Employment						
TAZ	DU's	Pop.	State Emp.	Total	Retail	Non-Retail	Industrial	Comm.	Public	KY Gov't.
93	89	223	33	4	0	4	0	2	2	0
94	33	83	12	0	0	0	0	0	0	0
95	90	226	34	0	0	0	0	0	0	0
96	194	487	73	2	0	2	0	2	0	0
97	29	76	11	31	0	31	0	14	17	0
98	70	183	27	13	0	13	0	3	10	0
99	70	183	27	1	0	1	0	0	1	0
100	189	493	73	6	6	0	0	6	0	0
101	692	1,599	238	101	61	40	0	97	4	0
102	48	125	19	414	23	391	320	89	5	0
103	66	172	26	12	12	0	0	12	0	0
104	39	102	15	3	3	0	0	3	0	0
105	42	110	16	4	0	4	0	0	4	0
106	30	78	12	0	0	0	0	0	0	0
107	105	274	41	8	0	8	0	6	2	0
108	35	91	14	7	0	7	0	7	0	0
109	274	581	87	68	12	56	28	40	0	0
Totals	18,357	44,274	6,594	33,630	5,798	27,832	3,866	13,128	16,636	12,681

Footnotes:

TAZ – Traffic Analysis Zone

State Emp. – Kentucky State Government employees residing in each TAZ

Comm. – Commercial Employment

Total Employment = Retail + Non-Retail

Total Employment = Industrial + Commercial + Public

KY Gov't – Kentucky State Government Employment; KY Gov't employees are included as Non-Retail and Public Employment

Table IV- 2. 2020 Study Area Population and Employment Data

	Population			Employment			
TAZ	DU's	Pop	State Emp.	Total	Retail	Non-Retail	KY Gov't.
1	69	92	13	498	101	397	0
2	56	75	10	533	14	519	0
3	143	214	30	328	60	268	16
4	64	96	13	64	9	55	0
5	99	132	18	761	26	735	239
6	0	0	0	2,066	24	2,042	1,687
7	68	91	13	1,545	25	1,520	1,436
8	5	10	1	1,212	11	1,201	1,011
9	105	266	37	47	1	46	0
10	257	384	53	90	11	79	0
11	285	426	59	80	1	79	0
12	428	639	89	344	10	334	6
13	66	126	17	943	2	941	909
14	124	237	33	8	0	8	0
15	173	330	46	136	48	88	65
16	593	1,131	157	303	56	247	6
17	486	927	128	88	0	88	0
18	26	50	7	748	351	397	10
19	37	71	10	303	122	181	0
20	0	0	0	391	0	391	315
21	61	163	23	4	0	4	0
22	164	313	43	1,235	1,137	98	0
23	754	1,439	199	1,923	113	1,810	0
24	1,073	2,047	284	820	304	516	175
25	58	111	15	1,584	45	1,539	461
26	374	714	99	32	19	13	0
27	0	0	0	282	6	276	230
28	209	399	55	11	0	11	0
29	18	41	6	47	4	43	0
30	21	42	6	1,664	47	1,617	1,255
31	336	671	93	725	29	696	22
32	287	573	79	50	27	23	0
33	68	136	19	1,681	7	1,674	1,332
34	108	773	107	849	0	849	0
35	111	531	74	623	3	620	562
36	0	0	0	2,020	15	2,005	1,942
37	156	395	55	26	0	26	0
38	3	8	1	221	6	215	190
39	557	1,113	154	114	20	94	0
40	76	152	21	142	37	105	0
41	309	642	89	8	8	0	0
42	201	508	70	174	50	124	4
43	769	1,599	222	62	4	58	1
44	597	1,510	209	808	358	450	10
45	498	1,259	175	101	57	44	0

	Population			Employment			
TAZ	DU's	Pop	State Emp.	Total	Retail	Non-Retail	KY Gov't.
46	284	598	83	633	324	309	47
47	14	35	5	70	0	70	0
48	72	192	27	2	0	2	0
49	208	554	77	781	91	690	0
50	226	511	71	26	6	20	0
51	143	273	38	16	9	7	0
52	100	191	26	283	62	221	85
53	137	261	36	22	10	12	0
54	268	605	84	20	0	20	0
55	556	1,336	185	12	0	12	0
56	13	31	4	1,670	15	1,655	0
57	65	156	22	1,299	187	1,112	415
58	474	985	137	765	88	677	6
59	431	908	126	667	411	256	68
60	253	533	74	730	507	223	1
61	437	920	128	169	56	113	90
62	36	87	12	622	587	35	0
63	696	1,447	201	6	1	5	0
64	121	252	35	186	0	186	7
65	198	476	66	1	0	1	0
66	401	845	117	257	51	206	0
67	435	916	127	77	1	76	0
68	261	695	96	119	0	119	0
69	8	19	3	2	0	2	0
70	25	60	8	2,233	0	2,233	30
71	156	375	52	4	0	4	0
72	168	448	62	803	230	573	38
73	257	685	95	202	0	202	0
74	369	983	136	52	19	33	0
75	0	0	0	1,202	1,154	48	0
76	344	724	100	6	2	4	0
77	10	24	3	0	0	0	0
78	161	429	59	25	4	21	0
79	682	1,817	252	32	16	16	0
80	104	277	38	17	4	13	0
81	213	481	67	2	0	2	0
82	20	45	6	61	10	51	0
83	80	181	25	10	4	6	0
84	107	242	33	19	2	17	0
85	164	370	51	25	12	13	10
86	92	208	29	77	0	77	0
87	90	203	28	16	12	4	0
88	34	77	11	11	0	11	0
89	389	879	122	0	0	0	0
90	142	321	44	7	1	6	0
91	45	102	14	0	0	0	0
92	26	59	8	0	0	0	0

	Population			Employment			
TAZ	DU's	Pop	State Emp.	Total	Retail	Non-Retail	KY Gov't.
93	89	201	28	4	0	4	0
94	33	75	10	0	0	0	0
95	90	203	28	0	0	0	0
96	194	438	61	2	0	2	0
97	29	68	9	31	0	31	0
98	95	223	31	13	0	13	0
99	70	164	23	1	0	1	0
100	189	444	62	11	11	0	0
101	771	1,603	222	106	66	40	0
102	103	242	34	414	23	391	0
103	66	155	21	17	17	0	0
104	39	92	13	8	8	0	0
105	42	99	14	4	0	4	0
106	30	70	10	0	0	0	0
107	281	660	91	8	0	8	0
108	35	82	11	7	0	7	0
109	274	523	72	73	17	56	0
Totals	21,837	47,589	6,594	39,632	7,186	32,446	12,681

Footnotes:

TAZ – Traffic Analysis Zone

State Emp. – Kentucky State Government employees residing in each TAZ

Comm. – Commercial Employment

Total Employment = Retail + Non-Retail

Industrial, Commercial and Public employment categories were not used in the trip generation model and thus were excluded from Table IV-2.

KY Gov't – Kentucky State Government Employment; KY Gov't employees are included as Non-Retail Employment

Table IV- 3. 1998 - 2020 Population and Employment Changes

	Study Area				Downtown Area	
	DU's	Population	Employment	State Emp.	Population	Employment
1998	18,357	44,274	33,630	12,681	3,637	7,704
2020	21,631	47,208	39,142	12,681	3,258	10,242
Difference	3,274	2,934	5,512	0	-379	2,538
Pct. Change	17.8%	6.6%	16.4%	0.0%	-10.4%	32.9%

Note: "Downtown" for this purpose was generally defined as the total areas of North and South Frankfort. North Frankfort is bounded on the west and south sides by the Kentucky River, on the north side by Fort Hill, and extends eastward along Holmes Street roughly to Meager Avenue. South Frankfort is bounded on the north and east sides by the Kentucky River, on the west side by US 60 (Louisville Road), and on the south side by the State Capitol and Lafayette Drive. Quantitatively, "downtown" was considered to be the sum of population and employment data in TAZs 1 through 13, 32 and 33.

Transportation Model Development

The Frankfort Urban Area Traffic Model was used in this study to predict future travel demand and to evaluate the impact of alternative transportation improvement projects. The model was updated from a previous version developed by the Kentucky Transportation Cabinet in 1988. The traditional modeling approach was followed: trip generation, trip distribution and trip assignment. Due to the size of the Frankfort urban area and the relatively minor role that other transportation modes play in the overall transportation system, this was an automobile model only. Thus, there was no mode choice component of the model. The MinUTP modeling package was used as the developmental tool.

Travel within the study area was divided into three trip categories:

1. Internal-Internal (I-I) Trips – trips with both the origin and destination within the study area;

2. External-Internal (E-I) Trips – trips with either origin or destination inside the study area and the other terminus outside the study area; and

3. External-External (E-E) Trips – trips that pass through the study area and have both the origin and destination outside the study area.

There were no current travel data that were applicable to the Frankfort model. All trips, therefore, were synthesized mathematically using relationships derived from past studies in similar small urban areas. Using these relationships, production and attraction equations were derived for three internal trip purposes:

1. Home Based Work (HBW) – trips with one end at home and the other end at work;

2. Home Based Other (HBO) – all other trips with one end at home; and

3. Non-Home Based (NHB) – trips with neither end at home.

The gravity model was used to distribute internal trips (both I-I trips and E-I trips). The gravity model basically assumes that the number of trips between any two traffic zones is directly proportional to the amount of activity or "gravity" (productions and attractions) between the two zones and inversely proportional to the distance (and therefore travel time) separating the zones.

An initial internal trip rate of 2.4 daily trips per person was used in the model development process. This trip rate was carried forward from previous small urban area studies in Kentucky, dating back to the 1960's. However, a number of current studies point to a more mobile society today; that is, people make more trips today than they did in the 1960's, 1970's, and even in the 1980's. The internal trip rate was increased during the model calibration process and ultimately an internal trip rate of 3.6 daily trips per person produced the best results.

Also during the model development process, it was determined that trip rates were different for state government employees. This group was extracted from the total number of employees in the study area and an employee trip rate of 4.5 trips per day was used. This trip rate was derived from special studies of state government buildings in Frankfort that were undertaken as part of this study.

The 1998 base year model was calibrated to existing traffic counts. That is, for the base year, the model was used to "predict" traffic on specific network links and was compared to actual counts on those same links. A model is considered to be calibrated when the difference between predicted volumes and actual counts falls within acceptable limits. The root mean square error (RMSE) was used as a calibration measure. Generally, a RMSE of 30 percent or less is considered to be acceptable. After adjustments to the individual model components were made, a final RMSE of 22.92 percent was obtained for the Frankfort model.

Planned and Programmed Transportation Improvements

Beginning with the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, states were required to take an approach to transportation planning that included an emphasis on enhancing transportation system efficiency, monitoring and improving performance, and ensuring that future transportation investments reflect the impacts on the economy, the environment, and quality-of-life. With the passage of the Transportation Equity Act for the 21st Century (TEA-21) in 1998, the statewide transportation planning process established in ISTEA was continued and confirmed as the primary mechanism for cooperative transportation decision making in Kentucky.

Kentucky's statewide planning process has both a short-range component and a long-range component. The *Statewide Transportation Plan* presents a long-range, 20-year vision of statewide needs and transportation improvements. The long range planning process identifies all current and projected needs, but considers those needs beyond anticipated funding as "Unscheduled Needs."

The current *Statewide Transportation Plan (FY 1995 – 2014)* was finalized in January 1995. Presently, at the writing of this report, there is a new draft *Statewide Transportation Plan (FY 1999 – 2018)* that has been circulated for public review and comment. It is anticipated that this new Plan will be finalized in the Spring of 2000.

Planned projects in the Statewide Transportation Plan are financially constrained. That is, the estimated total cost of planned projects does not exceed anticipated revenues to be allocated for transportation projects over the 20-year period.

The short-range component of Kentucky's statewide planning process actually has two parts. The *Six Year Highway Plan* details the spending of state and federal monies for construction, maintenance and planning activities over the next six years. The Plan matches anticipated annual funding against estimated project costs. The current version of the Plan is for Fiscal Years 1999 – 2004. However, a new *Six Year Highway Plan* is expected to be approved by the Kentucky General Assembly in Spring 2000.

The other short-range component is the *Statewide Transportation Improvement Program* (STIP). It lists projects to be advanced in the next three years with the appropriate federal agencies. The STIP is a subset of the *Six Year Highway Plan* and, like the *Six Year Plan*, is fiscally constrained. Kentucky's current STIP was completed in November 1998.

For Franklin County, there are only a few major construction projects contained in the current *Six Year Highway Plan FY 1999 – 2004*. Those are:

- US 60 (Louisville Road) – widen from two to five lanes from the existing four-lane section to Evergreen Road, 3.7 miles;
- US 421 – widen from two to four lanes from US 60 (Versailles Road) to Duckers Station Road, 2.6 miles; and
- US 460 (Georgetown Road) – widen from two to four lanes from the end of the existing four-lane section to Redding Road, 1.7 miles.

In the long-range *Statewide Transportation Plan (FY 1995 – 2014)*, there are two major projects in Franklin County. These are:

- Interstate 64 – widen from four to six lanes from US 127 to US 60, 4.74 miles; and
- US 127 – widen from four to six lanes from Interstate 64 to US 60.

A map containing short-term *Six Year Highway Plan* and long-term *Statewide Transportation Plan* projects is presented in **Figure IV-2**.

Future Traffic Forecasts

Year 2020 traffic forecasts for the Frankfort study area are presented in **Figure IV-3**. The forecasts were developed using the Frankfort Urban Area Traffic Model. The transportation network was assumed to be that which exists today plus those Franklin County projects contained in the *Six Year Highway Plan FY 1999 – 2004* and the *Statewide Transportation Plan (FY 1995 – 2014)*. Those roads anticipated to experience the heaviest traffic volumes include Interstate 64 (62,000 vehicles per day), US 127 (54,000 vehicles per day), and US 60 Versailles Road (50,000 vehicles per day).

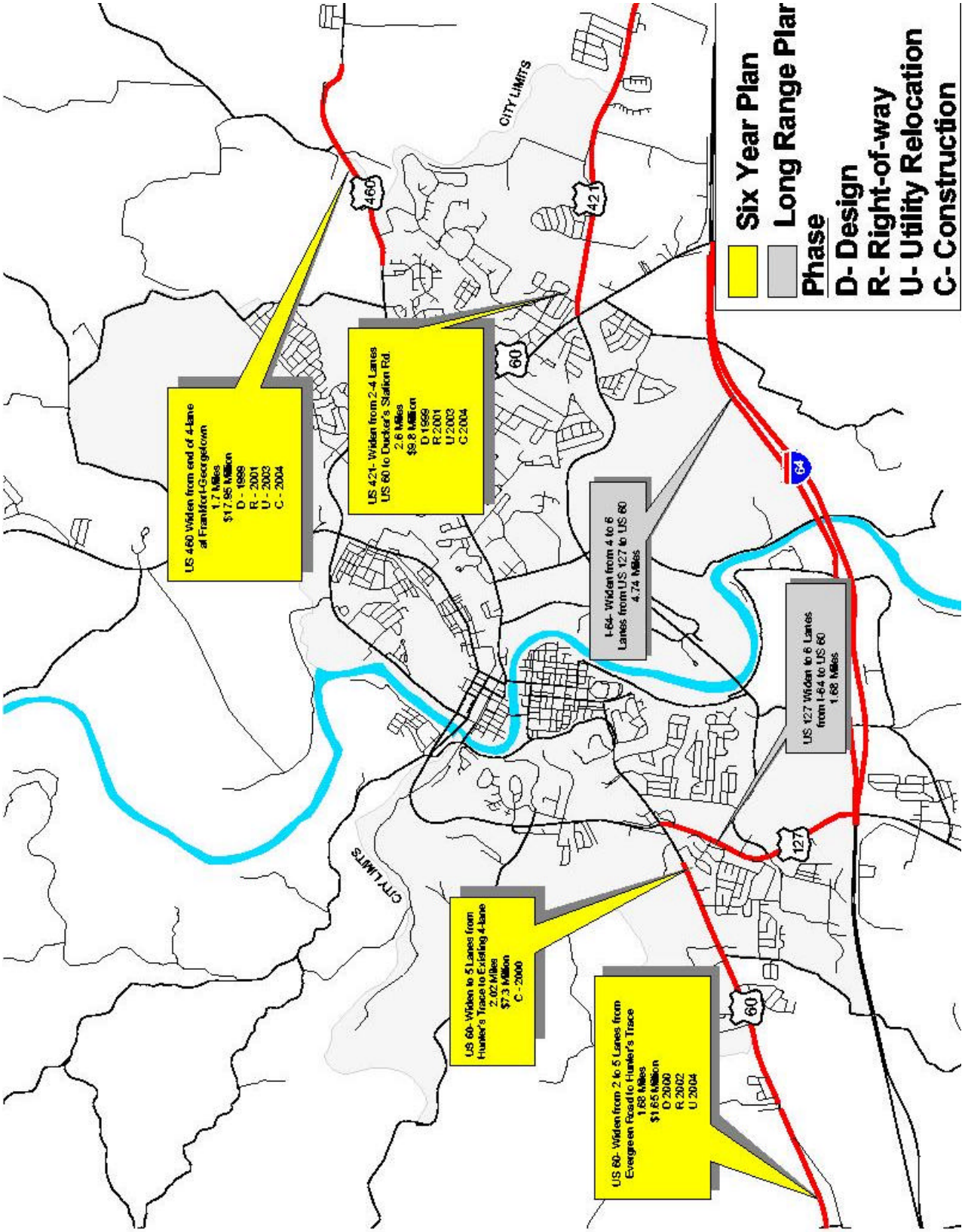

Figure IV- 2. Planned and Programmed Improvements

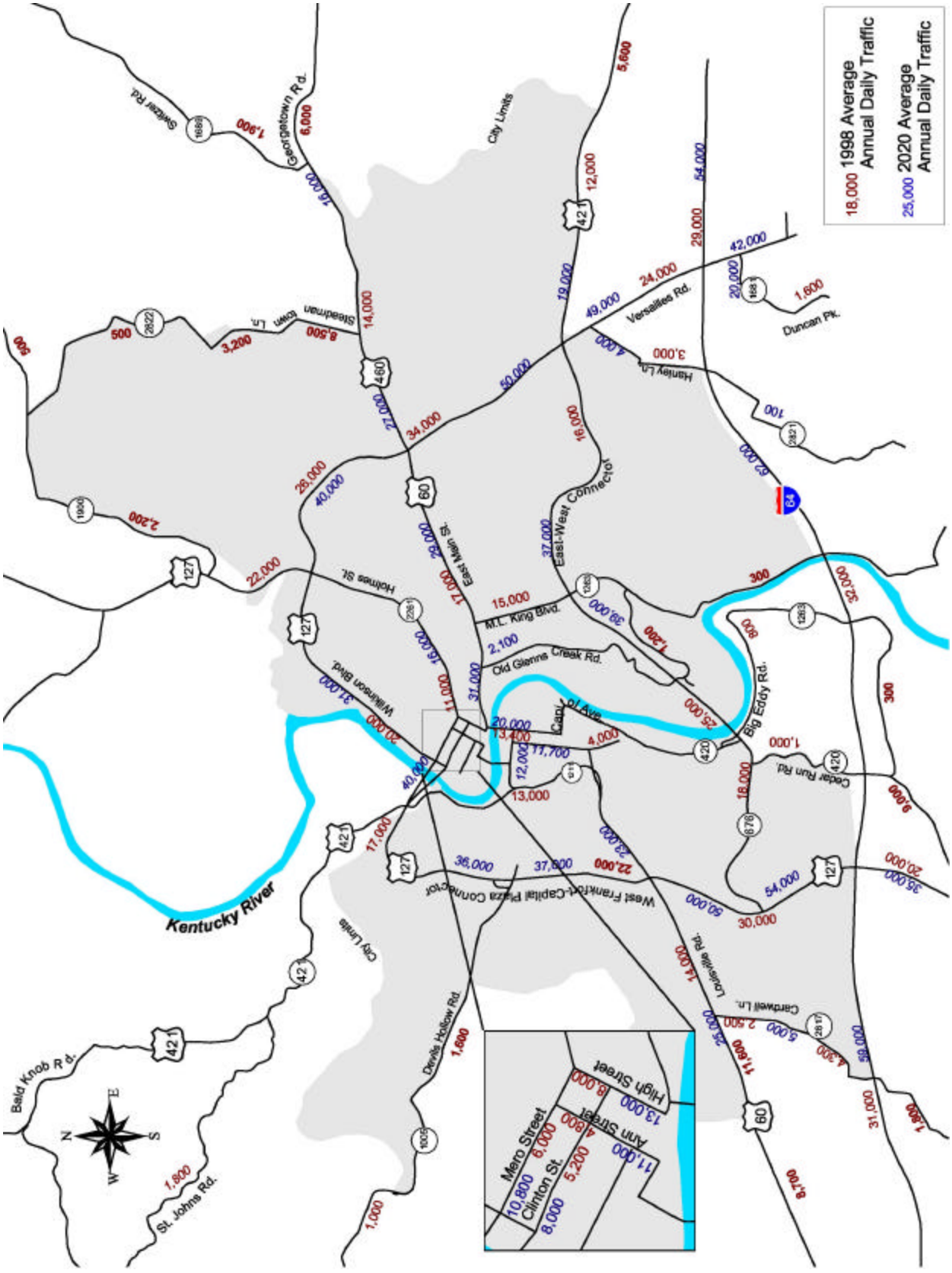

Figure IV- 3. Year 2020 Projected Traffic Volumes

CHAPTER V – DOWNTOWN TRANSPORTATION STUDY

The downtown area is of great importance to Frankfort and Franklin County – historically, culturally and economically. Both the original and current State Capitol buildings are located within the downtown area, as are the Capital Plaza Tower, Frankfort Civic Center, City Hall, Franklin County Courthouse, Federal Building, State Office Building, Kentucky History Center, Capital Annex, and the Central Business District. The downtown area is shown in **Figure V-1**.

Historically, downtown traffic issues have been very significant. As far back as forty years ago, downtown traffic congestion was documented as a major problem. Literally, all roads led to downtown, where the three bridges crossing the Kentucky River were located. Today, newer roads such as Interstate 64, the East-West Connector, and the West Frankfort-Capital Plaza Connector provide alternative river crossings. Thus, downtown traffic congestion today is not the issue it once was.

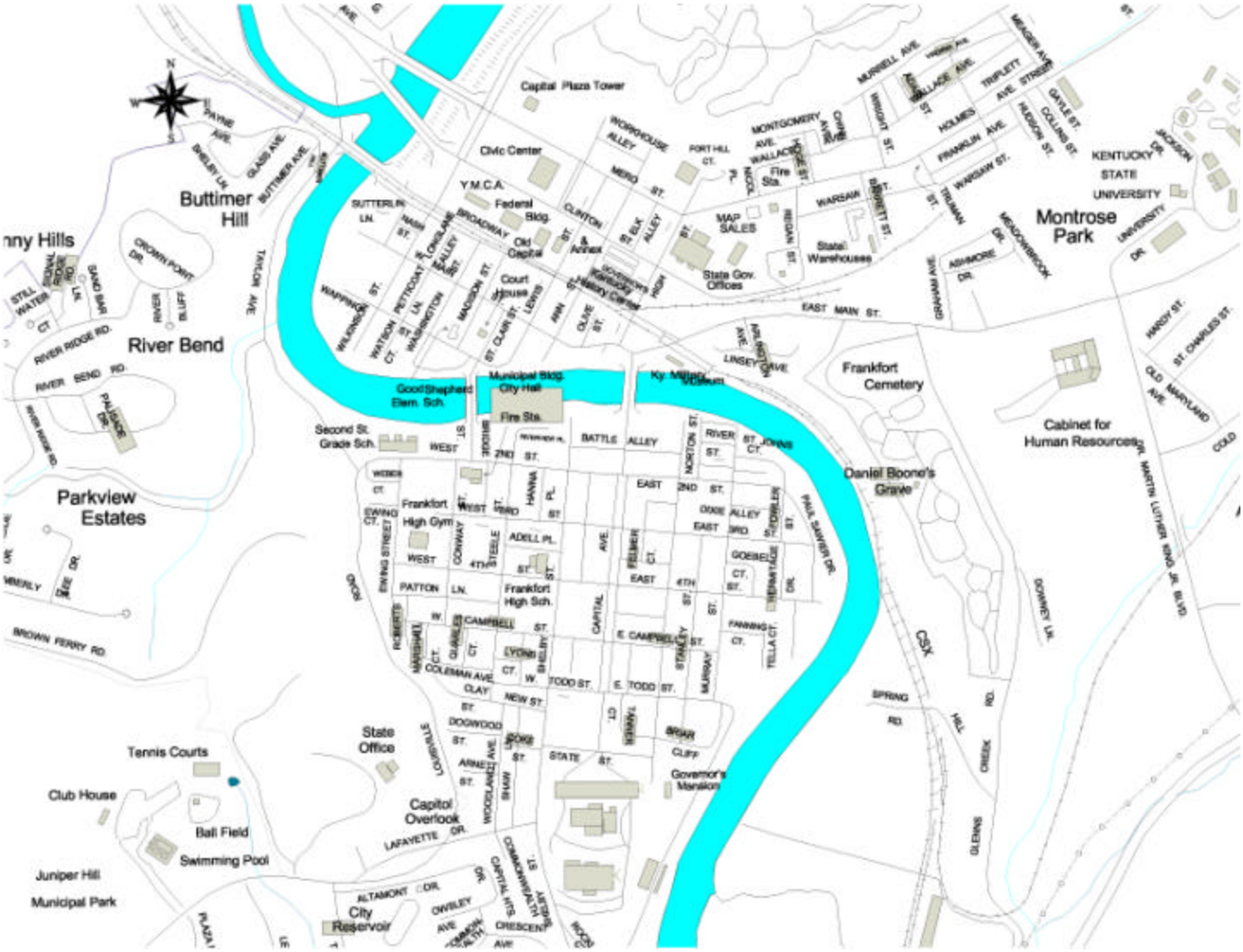

Figure V- 1. Downtown Frankfort

DOWNTOWN TRAFFIC ISSUES

New downtown issues have arisen, however. As state government looks to consolidate office space, the traffic impact of locating new government buildings downtown has surfaced as a major issue. Another is downtown traffic circulation; specifically, the effects of converting Main Street to two-way operation west of Ann Street and if the St. Clair Mall were re-opened to traffic. These latest issues have arisen due to concerns over the economic vitality of downtown Frankfort and attempts to boost commerce.

As part of the Frankfort Urban Area Transportation Study, additional studies were conducted in the downtown area to address these specific traffic issues. These detailed studies were used to develop primarily short-term operational improvement projects that will improve downtown traffic circulation.

ANALYSIS OF NEW STATE GOVERNMENT BUILDINGS

A long-term objective of the State is to consolidate physical office locations of state government employees in Frankfort. Presently the State leases office space throughout Frankfort for a number of agencies. Detailed analyses were undertaken to determine the traffic impacts of locating new buildings for two state agencies – the Transportation Cabinet and the Natural Resources and Environmental Protection Cabinet – in the downtown area.

Alternatives Analyses

A total of three new buildings were considered for location in the downtown area. Those were:

- Transportation Cabinet - 420,000 gross square feet and 1,200 employees;
- Natural Resources and Environmental Protection Cabinet – 300,000 gross square feet and 1,000 employees; and
- Kentucky Higher Education Assistance Authority – 75,000 gross square feet and 300 employees.

The Transportation Cabinet presently occupies the State Office Building, which contains 881 Cabinet employees. A new Transportation Building is to be constructed that will house 1,200 employees. Once the new building is occupied, the State Office Building will be renovated to hold approximately 1,000 employees from other state agencies. Thus, the new Transportation Building ultimately could bring 1,300 additional employees into downtown Frankfort. A commitment has been made by the State to construct the new building on Mero Street. It should be noted that the total number of state government employees in Frankfort was assumed to stay constant through the Year 2020. Thus, the introduction of "new" employees into the downtown area actually represents a shift of employees from other parts of Frankfort into the more concentrated downtown area.

A new office building has been considered for the Natural Resources and Environmental Protection Cabinet. Currently, this agency is located in the Capital Plaza Tower downtown and in other buildings scattered throughout town. A new Natural Resources Building would serve to consolidate and centralize the agency. The Capital Plaza Tower then would be renovated and filled with employees from other state agencies. No commitment has been made to date for a new Natural Resources Building.

A new building also is being considered for the Kentucky Higher Education Assistance Authority (K.H.E.A.A.). The K.H.E.A.A. presently is located off US 127 in southwest Frankfort, away from the downtown area. No commitment has been made at this point for the location of a new K.H.E.A.A. Building.

The detailed studies incorporated both existing (1998) and future (2020) A.M. and P.M. peak traffic periods. An examination of traffic conditions downtown confirmed that state government traffic is very peaked; that is, the

heaviest traffic periods occur for about 30 minutes during the morning rush hour and for another 30 minutes during the afternoon rush hour.

A combination of tools was used in the analyses. The Frankfort Urban Area Traffic Model was updated to the Year 2020 and was used to provide long range daily traffic forecasts. It was determined that, in the downtown area, trip interchanges will increase from 83,000 trips per day in 1998 to over 100,000 in 2020. Trip interchanges include the total of all trips into, out of, or within the downtown area on a daily basis. It should be noted that future population growth projections for the downtown Frankfort area are low and that state government employee totals are likely to remain constant over the next 20 years. Thus, the 20 percent increase in trip interchanges during this period will be primarily as a result of the shift in employment toward the downtown area.

The traffic simulation model CORSIM was used in the detailed analyses of future peak hour traffic conditions. A methodology was developed in which future daily traffic forecasts were converted to 2020 A.M. and P.M. peak period forecasts. The CORSIM model was used then to simulate the projected traffic conditions, assess the capability of the transportation network to accommodate the projected traffic, and test alternative improvements.

Three alternatives were investigated to determine traffic impacts for new state government buildings. These were:

Alternative 1. Holmes Street Corridor

The Transportation Cabinet, Natural Resources Cabinet, and K.H.E.A.A. buildings would be located along Holmes Street near its intersection with High and Mero streets. It would be necessary to create either a one-way couplet or widen Holmes Street in order to accommodate traffic generated from the new buildings.

Two basic roadway schemes were studied with various building combinations on either side of Holmes Street. The first scheme was a high-type four-lane urban section along existing Holmes Street from the High Street intersection to Wilkinson Boulevard, approximately 1.6 miles. The second scheme was a one-way couplet of Holmes Street and an extension of Clinton Street, ultimately joining at either Collins Street or Spring Street, and then becoming a four-lane section to Wilkinson Boulevard.

Under this alternative, the one-way couplet scheme proved to be most efficient in terms of traffic operations, with all of the buildings located on the south side of Holmes Street. This scheme also lends itself easily to phased construction as the new buildings come on-line. It was determined that the increased traffic could be accommodated by making some traffic operational improvements to the downtown street system in conjunction with the construction of the Clinton Street extension and reconstruction of Holmes Street. Included in the operational improvements is the removal of about 40 parking spaces on Mero and Clinton streets to provide three through lanes of traffic in each direction.

Cost estimates (in 1998 dollars) ranged from $19.1 million to $25.8 million, depending upon the extent Holmes Street would need to be constructed. Additionally, it was estimated that necessary drainage improvements in the Holmes Street corridor would add another $3.8 million to the total cost.

A downtown traffic signal system was recommended under this scenario to integrate traffic operations downtown and provide coordination among traffic signals to enhance traffic flow. Estimated cost for the system is approximately $500,000. A couple of additional minor intersection improvements were recommended as well.

Alternative 2. Carpenter Farm

This site actually is not downtown. It is located in the southeast corner of the East-West Connector intersection with Martin Luther King, Jr. Boulevard/Glenn's Creek Road. Currently this site contains the State Laboratory, a large branch of the Commonwealth Credit Union, and the new facility for the Public Service Commission. This location was considered because of its financial feasibility and thus became a viable alternative to downtown sites.

Accessibility and cheaper land cost make the Carpenter Farm site a viable alternative to downtown options. Access would be provided to the East-West Connector (KY 676) via Sower Boulevard, a four-lane access road. Location of the Transportation Building and potentially the Natural Resources and K.H.E.A.A. buildings would require additional access to the site to accommodate traffic, to provide for emergency services, and handle future traffic growth. A new access road into the site from Glenn's Creek Road would cost about $5.1 million.

Analysis of Year 2020 traffic conditions revealed that introduction of a new Transportation Building or any major traffic generator on the Carpenter Farm site would cause the East-West Connector intersection with Martin Luther King, Jr. Boulevard/Glenn's Creek Road to be over capacity during peak periods. The impacts would not be confined to this particular location, either. Traffic on the East-West Connector would increase from 23,000 vehicles per day at present to 35,000 to 40,000 vehicles per day in 2020. Part of this traffic growth would be from growth in population and employment throughout Frankfort.

The traffic growth would bring about the need to widen the East-West Connector to six lanes by 2020. Also this would include significant improvements to intersections with US 60, Martin Luther King, Jr. Boulevard, and US 127, as well as improvements to the bridge over the Kentucky River. The estimated total cost to widen the road to six lanes (from US 60 to US 127) is $22.5 million. This does not include the cost of widening the modular bridge over the Kentucky River.

Alternative 3. Mero Street

A third site was considered on the north side of Mero Street, between High Street and St. Clair Street. Only the Transportation Cabinet and K.H.E.A.A. buildings were considered in the analyses; no new Natural Resources Building was taken into account. In April, 1999, the Governor's Office announced this to be the preferred site for the new Transportation Cabinet Building. No commitment has been made yet for the K.H.E.A.A. Building at this location.

The CORSIM computer simulation analysis demonstrated that improvements could be made to the downtown street system that would enable traffic operations at acceptable levels of service for Year 2020 A.M. and P.M. peak periods. Multiple access points are proposed for the new Transportation Building and parking garage that would serve to "spread" the traffic and minimize the demand on any single access point. Likewise, this spreading would serve to dissipate traffic throughout the downtown street system and minimize the likelihood of traffic converging on isolated "choke" points. Those infrastructure improvements identified that would enable the downtown system to function efficiently under this scenario include:

- Re-constructing the Holmes Street- Mero Street- High Street Intersection to permit smoother flow of traffic through the intersection and access to a new parking structure;

- Widening St. Clair Street northbound between Clinton Street and Mero Street to provide two through lanes and a parking lane (for St. Clair Street residents), and removing parking on the southbound section to provide two driving lanes;

- Making improvements to the existing roadway which provides access from Wilkinson

Boulevard north of the Capital Plaza Tower, which serves the two parking structures adjacent to the Tower, to better serve the proposed new parking structure;

- Improving Ann Street northbound from Mero Street to the proposed new parking structure;
- Removing some of the on-street parking (roughly 40 total spaces) on Mero Street and Clinton Street to provide three lanes of traffic or additional turn lanes;
- Reconfiguring the Wilkinson Blvd./Clinton Street intersection to increase the southbound left turn capacity;
- Installing new traffic signals at Ann Street and Mero Street, St. Clair Street and Clinton Street, and St. Clair Street and Mero Street; and
- Interconnecting the downtown traffic signal system and installing a master controller to regulate the directional traffic flow during both peak hours and special events.

The total estimated cost for these improvements is $2.5 million. This includes improvements to the access drive through the Capital Plaza Tower parking garage. Detailed descriptions and cost estimates for the individual improvements are contained in Chapter VI – Operational Improvement Plan.

DOWNTOWN TRAFFIC CIRCULATION

The street system in downtown Frankfort follows a basic grid pattern. There are two one-way street pairs, as well as Main Street and Broadway, that circulate much of the traffic through the downtown area. This is shown in **Figure V-2**. Clinton and Mero streets facilitate east-west circulation from points north and west (via the West Frankfort-Capital Plaza Connector and Wilkinson Boulevard) to an area that includes the Civic Center, Capital Plaza, State Office Building, Kentucky History Center, and Federal Building. Ann and High streets facilitate north-south flow, especially to and from the area to the north along Holmes Street, east along East Main Street, and south to the downtown area and Capital Avenue Bridge.

There has been an interest in reverting traffic flow on Main Street back to two-way operation, from Ann Street to Wilkinson Street. The perception is that downtown businesses suffer from a diminished exposure to pass-by traffic due to one-way flow.

West of Ann Street, Main Street is maintained by the City of Frankfort. The decision to continue one-way operation or convert to two-way operation is largely that of the City. In the event that the City decides to make the change, the only involvement of the Kentucky Transportation Cabinet would be some required coordination in conjunction with the signal changes at Ann Street.

History

Before the construction of I-64, and later the East-West Connector (KY 676) and West Frankfort-Capital Plaza Connector, cross-town traffic was forced through downtown Frankfort, where three bridges crossed the Kentucky River – the Memorial Bridge (Capital Avenue), Bridge Street Bridge ("Singing Bridge"), and Broadway Bridge (which has since been closed). This led to heavy peak period congestion, which was documented as early as 1959 in the Frankfort Major Thoroughfare Plan[1].

Though the portion of Main Street west of Ann Street was not considered as a primary route, traffic volumes were still significant. The 1964

[1] *Frankfort Major Thoroughfare Plan*, prepared for the Department of Economic Development, Commonwealth of Kentucky, prepared by Hammer and Company Associates, Atlanta, Georgia, June 1959.

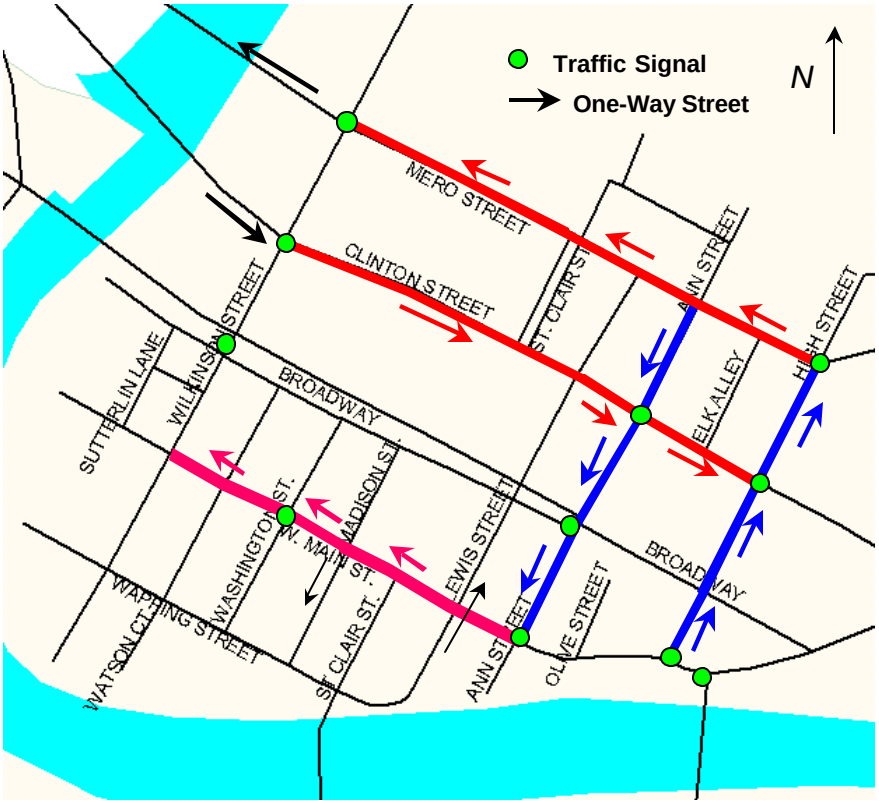

Figure V- 2. Downtown Traffic Circulation

study[2] cites average daily traffic volumes to be around 7,000 vehicles per day. It was with good reason, then, that this section of Main Street was converted to one-way operation sometime around 1970. With two travel lanes in the westbound direction, plus parking on both sides of the street, Main Street could facilitate traffic flow, provide parking, and accommodate deliveries in the heart of the central business district.

Both the 1959 and 1964 studies recommended the extension of Wapping Street from St. Clair Street to Ann Street. Doing so would have formed a natural one-way couplet with Main Street if Wapping Street were converted to eastbound one-way flow. Unfortunately, this opportunity now is blocked by a relatively new parking structure and, for all practical purposes, should be considered as lost.

Assessment Of One-Way Vs. Two-Way Operations

Downtown Frankfort does not experience the traffic pressure that it once did. On Main Street, average traffic volumes now are about 5,400 vehicles per day. With westbound one-way flow, interruptions are limited primarily to delivery trucks and parallel parking maneuvers, which temporarily reduce flow to one lane or even block it (see **Figure V-3**).

Figure V-3. Deliveries and Parking

[2] *Urban Transportation Needs, Frankfort, Kentucky*, Kentucky Department of Highways, Division of Planning, October 1964, revised January 1965, and June 1965.

There has been some support in Frankfort for converting Main Street back to two-way operations. With other major roadways now crossing the Kentucky River outside the central business district, through traffic and its associated congestion have been removed from downtown. As stated previously, the movement behind the return to two-way flow stems from an interest in downtown revitalization and from a perception that one-way flow limits the exposure of passing vehicles to businesses situated along Main Street.

Without the Wapping Street extension to complete a one-way couplet, downtown circulation under the present scenario can be difficult and confusing to the unfamiliar driver. Narrow cross-streets such as Lewis and Madison streets connect Main Street to the parallel Broadway and Wapping Street, but the unsuspecting motorist making a wrong turn onto Main Street can easily feel "trapped" in the downtown area. Also, much of the available downtown parking is located off-street and on side streets, necessitating circuitous travel downtown.

A traffic simulation model was developed to evaluate the impacts of proposed new state government office buildings along Holmes and Mero streets. An attempt was made to use this model to evaluate one-way vs. two-way flow scenarios for Main Street. Incorporated into the scenarios was the option to re-open the St. Clair Mall to traffic. Unfortunately, due to the limited detail of the simulation model in the central business district, no conclusive quantitative results could be drawn from these analyses.

The comparison of one-way vs. two-way operations is primarily subjective. A detailed list of "Pros" and Cons" was prepared and discussed at the July 27, 1999 meeting of the study Citizens Advisory Committee. The list also was presented at a public meeting later that evening. The advantages and disadvantages of one-way and two-way flow are listed:

One-Way Flow - Pros

- Smoother traffic flow
- No left turn conflicts
- Better truck loading and unloading
- Retains existing parking
- More pedestrian friendly
- More bicycle friendly

One-Way Flow - Cons

- Circuitous travel patterns
- Significant alley traffic
- Limited storefront exposure

Two-Way Flow - Pros

- Increased storefront exposure
- Reduces alley traffic
- More direct travel

Two-Way Flow - Cons

- Increased left turn conflicts
- Increased lane blockage conflicts (trucks)
- Extensive parking removal along Main Street
- Impacts of left turn lane construction
- More dangerous for pedestrians and bicycles

Relative weights were not assigned to each benefit and disbenefit. However, those items considered to be key are discussed.

Parking

Delivery trucks along Main Street are a common sight throughout the day. Most establishments are limited to deliveries through the front door from Main Street. Delivery trucks commonly park in one of the two through travel lanes, reducing flow to one lane. Conversion to two-way flow would necessitate removal of parking on Main Street to accommodate delivery vehicles; otherwise, the only travel lane would be blocked during deliveries or parking maneuvers, creating a very undesirable situation.

As shown in **Figure V-4**, there are a total of 83 parking spaces along both sides of Main Street

between Ann Street and Wilkinson Street – 78 standard parking spaces, 3 handicapped and 2 truck loading/unloading spaces. Most of the commercial businesses along Main are located between Ann and Madison streets. Even if parking were removed to permit deliveries only along this section, potentially 41 standard spaces and 2 handicapped spaces still could be lost.

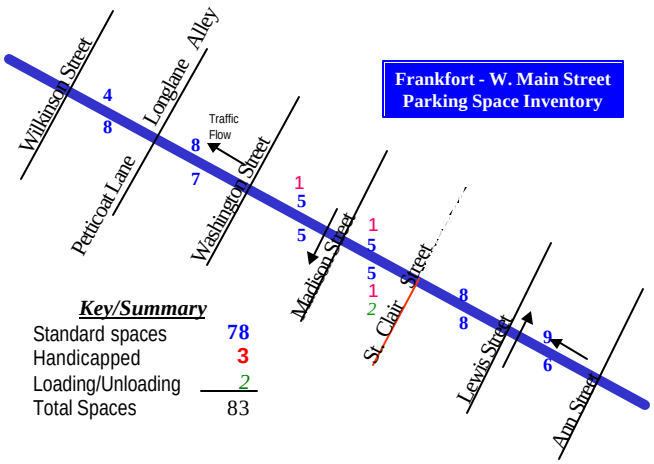

Figure V-4. West Main Street Parking Inventory

Lane Blockage

Lane blockage due to delivery trucks was mentioned already. Other reasons for temporary lane blockage that have been observed include transit stops, parallel parking maneuvers, and private auto passenger loading/unloading. The impacts of lane blockages tend to be minimized by the two-lane, one-way operation because drivers generally can maneuver around stopped vehicles with little difficulty. Retaining parking while reverting to two-way flow would increase the amount of time that blockage due to all of these factors would occur.

Left Turn Conflicts

Presently there are none as there is no opposing traffic flow. However, under two-way operations, westbound left turns onto St. Clair, Washington and Madison streets, and eastbound left turns onto Washington and Lewis streets would be opposed, creating conflicts and delays. This is assuming that no exclusive left turn lanes are added at Washington and Madison streets (due to right-of-way constraints). A separate left turn lane would be required to accommodate left turns onto St. Clair Street (toward the Singing Bridge). Furthermore, potential re-opening of the St. Clair Mall to traffic almost certainly would create a heavy left turn movement from Main Street, generating the need for another separate left turn lane. This would have significant impacts on parking and right-of-way acquisition.

Pedestrian and Bicycle Safety

Pedestrian activity is vital to the economic success of a downtown area. The present one-way traffic flow scheme is safer for pedestrians because there are fewer pedestrian-vehicle conflict points than for two-way flow. Bicycle traffic downtown is minimal. However, bicycle safety for one-way flow conditions is greater for the same reason.

Traffic Circulation

One benefit for reverting to two-way flow on Main Street would be traffic circulation. One-way streets work best as bi-directional pairs – Clinton/Mero streets and High/Ann streets are good examples. Main Street becomes one-way westbound at Ann Street, but has no one-way eastbound mate. Broadway and Wapping Street are both adjacent parallel streets, but both are two-way. Broadway is divided down the middle by railroad tracks and Wapping Street terminates abruptly at St. Clair Street. As stated before, earlier transportation plans recommended the extension of Wapping Street eastward to Ann Street, but this option is no longer viable.

Exacerbating the problem are poor connections between Wapping Street, West Main Street and Broadway. Narrow, one-way streets such as Lewis and Madison streets are really nothing more than alleys and serve to inhibit downtown circulation (see **Figure V-5**). Two-way flow would place less reliance on these “cross-alleys” to complete the necessary circulatory patterns.

Figure V-5. One-Way "Cross-Alley"

Discussion And Recommendations

There are more reasons for keeping Main Street as one-way than there are for changing to two-way. Further, the reasons for continuing with the one-way operation seem to be more compelling. The most significant is loss of parking. If Main Street were converted to two-way operation, curbside, storefront parking would have to be removed in order to provide truck loading/unloading zones and left turn lanes. Otherwise, these operations would completely block the flow of traffic during deliveries. An alternative would be to prohibit truck deliveries on Main Street during business hours. This would be inconvenient and costly for many businesses, however, and would not completely eliminate peak time deliveries (express delivery service such as Federal Express and UPS, for example).

Undoubtedly, downtown traffic flow is smoother with a system of one-way streets, primarily due to the elimination of opposing left turn movements. If Main Street were converted to two-way operation, at certain times of the day traffic flow along Main Street would become seriously congested. There would be a danger of losing business if frustrated patrons stopping doing business downtown due to unacceptable congestion and delay.

Downtown Frankfort traffic circulation is less than ideal. However, major infrastructure improvements are virtually impossible due to cost prohibitions and/or environmental constraints (i.e. historic structures). Minor operational improvements can be made in the way of signing and pavement markings. The present system is more efficient than a system with a two-way Main Street, in spite of its current limitations.

The following recommendations are offered to improve downtown traffic circulation:

1. Maintain the current one-way operation of Main Street from Ann Street to Wilkinson Street.
2. Install easily recognizable signs along Main Street that identify off-street public parking.
3. Install overhead signs along Main Street that identify cross streets and whether or not they are one-way.
4. Maintain vegetation (i.e. trees) along Main Street so that signs and other traffic control devices are not obstructed.
5. Consider special downtown “pull-through” signs and trailblazer pavement markings to form a clockwise circulation loop consisting of Main Street, Wilkinson and/or Washington streets, Broadway and Ann Street. “Pull-through” signs use arrows to direct the driver through the downtown area on Main Street and back around via Broadway. Trailblazer markings on the pavement, similar to colored lines on a hospital corridor floor, would serve the same purpose. If trailblazer markings are used, posted signs also should be used to explain the markings. Together the pull-through and trailblazer signs provide guidance and assurance to unfamiliar motorists. All special signs and markings would have to conform to the Manual on Uniform Traffic Control Devices[3].

[3] *Manual on Uniform Traffic Control Devices*, U.S. Department of Transportation, Federal Highway Administration, Washington, D.C., 1988.

CHAPTER VI – OPERATIONAL IMPROVEMENT PLAN

Ultimately the Frankfort Urban Area Transportation Study has produced a Long Range Transportation Plan (LRTP) that includes prioritized recommended transportation improvements. These projects have been developed in response to both existing and projected future deficiencies in the Frankfort transportation system.

The Operational Improvement Plan is the short-term component of the LRTP. It contains a prioritized project list that is based on present system deficiencies. In contrast to long-term, capacity expansion projects, the operational projects are smaller in scale and less costly. Their focus is better, safer, and more efficient utilization of the existing transportation system. Many of these projects can be implemented relatively quickly.

Operational Improvement Projects

Capacity and safety typically are the basis for operational improvement projects. These improvements provide an incremental benefit at specific locations that enhance capacity, safety, or both.

Operational improvements characteristically are very cost-effective; that is, when capacity and safety benefits are quantified, they far outweigh the cost. Unfortunately, these benefits are reduced over time as traffic grows. At some point, major improvements are needed to provide the desirable overall level of service.

Many of the projects in the Operational Improvement Plan were developed in response to the detailed downtown studies that were conducted. Special improvements will be necessary in order for the street system to function adequately when the new Transportation Building is constructed on Mero Street. Also, improvements are recommended to enhance traffic circulation in the downtown area.

A list of operational improvement projects is presented in **Table VI-1**. Included are the location, scope of the improvement, and estimated cost (in present-day dollars). The locations of these projects are shown in **Figure VI-1**. Those projects are discussed in detail in the following text:

1. Wilkinson Boulevard at Clinton Street – Reconfigure Intersection

This project is mainly to accommodate additional traffic that will be generated by the new Transportation Building. Minor improvements can be made to two Wilkinson Boulevard intersections that will improve traffic flow, as shown in **Figure VI-2**. At Clinton Street, it is recommended that the southbound THROUGH (inside) lane be converted to a combined LEFT TURN/THROUGH lane. This will accommodate a heavier left turn movement, especially during the morning peak hour. Modifications to the signal phasing scheme will be necessary in order to prohibit permissive left turns on the southbound approach.

Table VI-1. Operational Improvement Projects

No.	Location	Description	Estimated Cost	Group
1	Wilkinson Blvd./Clinton St.	Convert SB inside Thru lane to combined Thru/Left Turn lane; will provide Left + Left/Thru configuration on this approach)	$1,000 (striping, overhead sign)	I
2	Wilkinson Blvd./Mero Street	Convert SB outside Thru lane to combined Thru/Right Turn lane; will provide Thru/Right + Right configuration on this approach	$1,000 (striping, overhead sign)	II
3	Clinton St./St. Clair St.	Construct EB left turn lane	$50,000	I
4	Holmes St./Mero St./High St.	Reconstruct intersection	$250,000	I
5	St. Clair St. – Clinton St. to Mero St.	Widen NB side to provide two lanes	$200,000	I
6	Ann St. – Mero St. to proposed parking structure	Reconstruct (*Note: This is assumed to be part of the construction of the new Transportation Building, including the cost*)	$200,000	I
7	Clinton St. – Wilkinson Blvd. to High St.	Remove parking, re-stripe for three lanes	$10,000	I
8	Mero St. – High St. to Wilkinson Blvd.	Remove parking, re-stripe for three lanes	$10,000	I
9	Clinton St./St. Clair St.	New traffic signal and interconnect	$50,000	I
10	Mero St./Ann St.	New traffic signal and interconnect	$50,000	I
11	Mero St./St. Clair St.	New traffic signal and interconnect	$50,000	I
12	High Street/Broadway	New traffic signal and interconnect	$50,000	II
13	Capital Plaza Tower parking garage	Improve through access drive	$230,000	I
14	Downtown Frankfort	New traffic signal system	$500,000	II
15	Downtown Frankfort	Directional signing and markings	$15,000	II
16	US 127 at Springhill Drive	Close median opening	$5,000	II
17	E. Main St. at Schenkel Ln.	New traffic signal	$50,000	II
18	Broadway/Ann Street	Striping/signing	$5,000	I
19	KY 151 at I-64	Relocate entrance to Huntington Woods Subdivision	$10,000*	II
20	Schenkel Lane at Comanche Trail	Extend Right Turn lane 200 feet New traffic signal	$25,000 $50,000	II

* State's cost; developer to bear the cost of modifications to the subdivision internal street system.

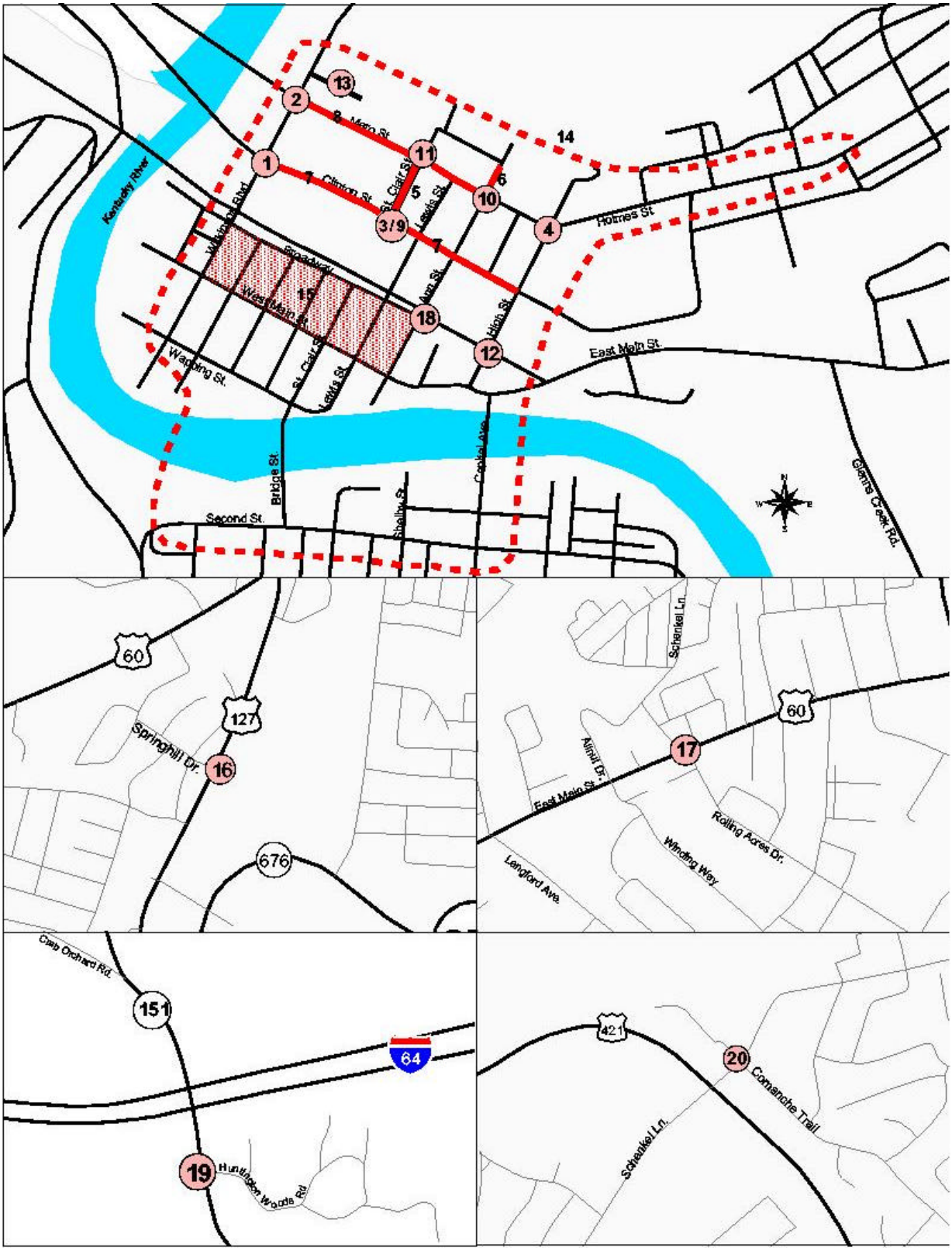

Figure VI- 1. Operational Improvement Projects

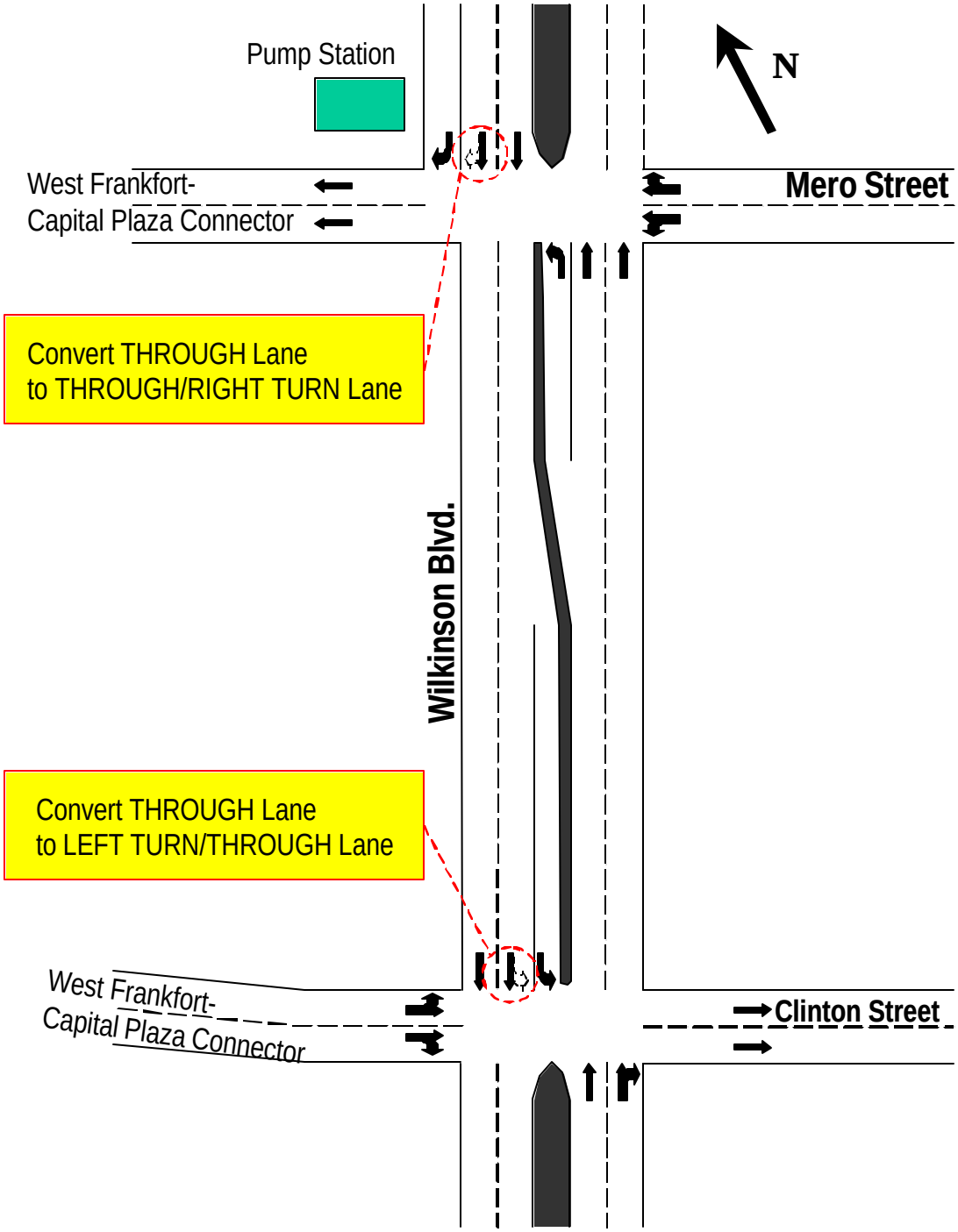

Figure VI- 2. Wilkinson Boulevard Intersection Improvements

2. Wilkinson Boulevard at Mero Street – Reconfigure Intersection

Presently, long queues occur during the peak periods (especially in the afternoon) along southbound Wilkinson Boulevard at Mero Street. The queues are associated with heavy right turns onto the West Frankfort-Capital Plaza Connector. An adjacent pump station, shown in **Figure IV-3**, prohibits the construction of a second right turn lane.

Figure VI- 3. Wilkinson Boulevard Pump Station

An option would be to convert the outside southbound THROUGH lane to a THROUGH/RIGHT TURN lane. This option has been considered previously by the Transportation Cabinet. There are safety concerns about large trucks making this right turn movement and either tracking inside from the outer RIGHT TURN lane or swinging wide from the inside RIGHT TURN lane. However, observations of traffic during peak periods has revealed very few large trucks making this movement.

3. Clinton Street at St. Clair Street – Construct Left Turn Lane

With the opening of the new Transportation Building, there will be a heavy left turn movement from Clinton Street to St. Clair Street, particularly during the morning peak period. There is sufficient pavement width already to provide a separate left turn lane, but the heavy demand will justify dual left turn lanes. The recommendation is to construct a second left turn lane on Clinton Street.

4. Holmes Street-Mero Street-High Street – Reconstruct Intersection

The parking garage for the new Transportation Building will connect with High Street near the old U.S. Post Office building. Thus it will be necessary to reconstruct this intersection to improve its operational efficiency so that it can accommodate the demand. Presently this is a five-legged intersection, although one-way High and Mero streets reduce the number of approaches to four. The Holmes Street approach is skewed in relation to all other approaches, creating an unusual intersection. One of the current approaches is the driveway through the parking lot adjacent to the State Office Building. It is recommended that this exit be closed and State Office Building traffic rerouted either to Clinton Street or Holmes Street. Depending on the specifics of the Transportation Building access, this intersection should be reconfigured so that the geometry does not restrict the intersection efficiency.

5. St. Clair Street Widening

St. Clair Street will become a primary entrance into the new Transportation Building and will include direct access to the new parking garage. This will require St. Clair Street to be four lanes from Clinton Street to Mero Street, which will necessitate widening to effectively add one more lane to the existing pavement width. Parking presently located along the west side of St. Clair Street will have to be relocated. Also, St. Clair Street presently is median divided and the northbound and southbound lanes are not at the same elevation. Finally, any impacts to residences fronting the northbound lane must be mitigated.

As part of this project, opportunities should be explored to improve the connection of the Capital Plaza area to the Central Business District. An enhanced pedestrian/bicycle way along the St.

Clair corridor would accomplish this. St. Clair Street today is discontinuous, being interrupted by the Old Capitol Building. A pedestrian/bicycle facility could provide this linkage without having any negative impact to the Old Capitol. However, there are some present elevation differences that will have to be overcome with ramps, steps, etc.

6. Ann Street Widening

Ann Street also will provide direct access into the new Transportation Building. Depending on the location of the building footprint, Ann Street is assumed to be the "front door" to the building. It will be necessary to improve the portion of Ann Street north of Mero Street. Conceptually, the improvement will provide one ingress lane and two egress lanes. It is assumed that this improvement will be built and paid for as part of the new building construction.

7, 8. Clinton and Mero Streets – Remove Parking

Clinton and Mero streets will require an additional lane of capacity with the construction of the new Transportation Building. Sufficient curb-to-curb pavement width exists already. It is recommended that the existing parallel parking along Clinton and Mero streets be removed and that those streets be re-striped for three through lanes. This would result in approximately 40 parking spaces that either would be lost or would have to be relocated.

9. Clinton Street at St. Clair Street – New Traffic Signal

Concurrent with the construction of the new Transportation Building, a new traffic signal is recommended at the intersection of Clinton and St. Clair streets. Interconnect with a master downtown signal system should be provided. The new signal should satisfy signal warrants as specified in the Manual on Uniform Traffic Control Devices[1] (MUTCD).

10. Mero Street at Ann Street – New Traffic Signal

Concurrent with the construction of the new Transportation Building, a new traffic signal is recommended at the intersection of Mero and Ann streets. Interconnect with a master downtown signal system should be provided. The new signal should satisfy signal warrants as specified in the MUTCD.

11. Mero Street at St. Clair Street – New Traffic Signal

Concurrent with the construction of the new Transportation Building, a new traffic signal is recommended at the intersection of Mero Street and St. Clair Street. Interconnect with a master downtown signal system should be provided. The new signal should satisfy signal warrants as specified in the MUTCD.

12. High Street at Broadway – New Traffic Signal

Presently this intersection is not signalized, with STOP-controlled approaches on Broadway only. During the morning peak, there is a heavy right turn movement from westbound Broadway onto High Street. In fact, the movement is so heavy that the queue backs up on Broadway all the way to Main Street, then backs up for several hundred feet on Main Street. This heavy movement is due primarily to state employees headed for the State Office Building and Capital Plaza area.

This condition will worsen with the construction of the new Transportation Building. Furthermore, with the construction of the Kentucky History Center at this location, traffic flow on Broadway

[1] *Manual on Uniform Traffic Control Devices*, U.S. Department of Transportation, Federal Highway Administration, Washington, D.C., 1988.

is increasing. It is recommended that a traffic signal be installed at this intersection. Interconnect with a master downtown traffic signal system should be provided. The new signal should satisfy signal warrants as specified in the MUTCD.

13. Capital Plaza Tower Parking Garage Access Drive Improvements

There is a driveway which passes through the parking garage for the Capital Plaza Tower and connects the garage to Wilkinson Boulevard and St. Clair Street. This driveway can be used for access to the new Transportation Building parking garage on Mero Street, with some improvements. This access point will eliminate a substantial amount of traffic from the Wilkinson Boulevard / Mero Street intersection. Recommended improvements include relocating overhead duct work inside the parking garage and eliminating a grade change at the east end of the driveway, where it would enter the new Transportation Building parking garage.

14. Downtown Frankfort Traffic Signal System

A computerized traffic signal system should be installed in downtown Frankfort that will coordinate operations among signals and facilitate progressive traffic flow. This system will benefit the existing downtown transportation system as well as accommodate traffic growth caused by any new state office buildings. The computer simulation model demonstrated the effectiveness of such a system in minimizing delays and queue build-up. As new traffic signals are introduced, they can be brought on-line in the system.

15. Downtown Signing and Markings

The special downtown traffic studies identified the need for improved traffic circulation through the downtown area. As new traffic generators such as the Kentucky History Center (which opened in April, 1999) and the Transportation Building are introduced downtown, this need will increase. It is recommended that special trailblazer and pull-through signs (with arrows) be erected to assist motorists in circulating through downtown and to direct patrons to off-street parking facilities. Also, special trailblazer pavement markings could be developed (similar to colored lines on a hospital floor) to assist. These special markings must conform to the MUTCD and no specific plans have been developed at this point.

16. US 127 at Springhill Drive

One of the high accident locations identified is the intersection of US 127 at Springhill Drive. US 127 is four-lane, median-divided at this location. The posted speed limit is 45 mph, but being on a downgrade, speeds are commonly greater. It is recommended that the existing median break be closed at this intersection. This would eliminate left turning movements across high-speed approaches. Springhill Drive is connected directly to US 127, but also indirectly to US 127 via Old US 127, which forms a short service road. A signalized intersection exists merely a few hundred feet to the south at Old US 127 and US 127, directly across from the Century Plaza Shopping Center. Eliminating this median opening would not deny access to left turning vehicles; it would merely relocate this movement a few hundred feet southward where there is a signal.

17. East Main Street at Schenkel Lane – New Traffic Signal

East Main Street at Schenkel Lane is identified as a high accident location. This intersection actually is an offset intersection; Schenkel Lane and Rolling Acres Drive intersect on opposite sides of East Main Street, approximately 100 feet apart. It is recommended that the existing traffic signal at Rolling Acres Drive be modified. Signal heads should be erected at Schenkel Lane also, with a connection to the same controller. Schenkel Lane and Rolling Acres Drive then would operate simultaneously as one intersection. This may impact efficiency along

East Main Street slightly, but will improve the accident situation.

18. Broadway at Ann Street – Striping and Signing

The railroad tracks running along Broadway create on offset intersection at Broadway and Ann Street. It is recommended that supplemental pavement striping and overhead directional signs be installed to direct traffic along Broadway.

19. KY 151 at Huntington Woods – Relocate Subdivision Entrance

Presently a safety problem exists on the section of KY 151, south of Interstate 64, between the ramps and the entrance to Huntington Woods subdivision. The problem is related to the proximity between the ramps and the subdivision entrance, which is about 250 feet. Traffic destined for Huntington Woods eastbound on I-64 must exit the interstate, then weave across KY 151 over this short distance to make a left-hand turn into the subdivision. This traffic mixes with the through traffic and other traffic turning into and out of the highway commercial businesses located at the interchange. It is recommended that the entrance to Huntington Woods be relocated to the south, away from I-64, to improve traffic safety and operations in this area.

20. Schenkel Lane at Comanche Trail – Intersection Improvements

Presently there is a peak hour congestion problem along Schenkel Lane between Wilkinson Boulevard and Comanche Trail. The root of the problem lies within the land use-transportation relationship; the Comanche Trail intersection is too close to Wilkinson Boulevard (about 200 feet) and the functional areas of the two intersections overlap. With all of the development in this immediate area, there is considerable turning traffic at Comanche Trail. Relocating Comanche Trail farther from Wilkinson Boulevard is not feasible.

A two-staged approach is recommended. The first is to extend the westbound right turn lane on Schenkel Lane approximately 200 feet beyond Comanche Trail. This will provide additional capacity and storage for Schenkel Lane, especially the westbound right turn lane, which serves a heavy demand during the morning peak.

Should conditions worsen after extension of the turn lane, installation of a traffic signal is recommended at Comanche Trail. Because of the proximity to the signal at Wilkinson Boulevard, the new signal must be coordinated very closely with the Wilkinson Boulevard signal. A diamond interchange-type signal phasing plan will be necessary to coordinate traffic flow between the two and to prevent queue spillback onto Wilkinson Boulevard.

Other Global Measures

A review of accident data suggests safety problems related to heavy peak hour commuting patterns on major arterials, especially US 60 (Versailles Road) and US 127. Specifically, rear-end accidents from stop-and-go driving and right-angle accidents associated with turning patterns at intersections. A policy-level recommendation is made to periodically check and optimize traffic signal timing plans on major arterials in order to facilitate smooth, progressive traffic flow.

Along East Main Street and Versailles Road are a proliferation of driveways and intersections which contribute to inefficient traffic flow and high accident frequencies. This condition is illustrated in **Figure VI-4**. Land use is such that practically all parcels having frontage on US 60 have direct access. The continuous two-way left turn lane (TWLTL) on Versailles Road compounds the safety problem.

Figure VI- 4. Multiple Access Points

East Main Street, particularly the section from Langford Avenue to Myrtle Avenue, suffers from a poor delineation of access points. That is, businesses fronting East Main Street have continuous access along the entire length of the property, with little or no delineation of the roadway edge, as shown in **Figure VI-5**. For an unsignalized intersection or driveway, every access point represents up to 36 potential conflict points, as seen in **Figure VI-6**. Every parking space in front of a business along this section is an access point and thus represents up to 36 conflict points. It is no wonder, then, why accident experience is non-proportionally high for sections of East Main Street and Versailles Road.

Figure VI- 5. Poor Roadway Edge Delineation

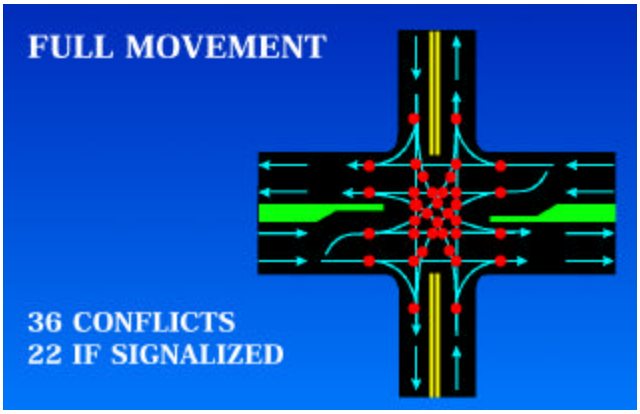

Figure VI- 6. Potential Conflict Points

A global recommendation is made that access management principles be applied wherever practical and feasible. Use of shared driveways and interconnection of adjacent parcels are examples of low-cost access management measures that would reduce conflict points. Replacing the flush median with a raised, channelized median is a more aggressive, costlier strategy, but one that would have a substantial impact. No specific projects or cost estimates are given here, as these should be determined individually.

Prioritization

In Table VI-1, projects are categorized as either Group I or Group II projects. Group I projects are those that are in direct response to construction of the new Transportation Building on Mero Street. Their timing should be concurrent with construction of that facility. Group II projects can provide immediate benefits and should be constructed as funding becomes available.

CHAPTER VII – FUTURE TRANSPORTATION NEEDS

The Year 2020 Frankfort traffic model was used to develop future traffic forecasts for the Frankfort Urban Area. The forecasts were made assuming that projects in the current Six Year Highway Plan would be constructed. As discussed in Chapter IV, it was assumed that the total number of state government employees would remain constant between now and 2020, but that there would be a change in the distribution of those employees with the construction and modification of state government office buildings.

System Deficiencies

System capacity deficiencies based on projected year 2020 traffic volumes are illustrated in **Figure VII-1**. The map shows Year 2020 daily traffic volumes and levels of service for principal roads in the network, along with 1998 traffic volumes for the sake of comparison. Generally, traffic volumes are expected to increase between 50 and 100 percent over the next 20 years.

Specifically, US 127 (Lawrenceburg Road) and US 60 East (Versailles Road) will continue to be the most heavily traveled arterials in Frankfort. Traffic volumes on US 127 are projected to increase from 30,000-35,000 vehicles per day (vpd) today to 54,000 vpd in 2020. Daily traffic volumes will be around 37,000 vpd on the West Frankfort–Capital Plaza Connector, north of US 60 (Louisville Road). The entire US 127 corridor, including the connector, will be either at capacity (LOS E) or over capacity (LOS F) by Year 2020 if no additional improvements are made.

The US 60 East (Versailles Road) corridor will suffer a similar fate by Year 2020. Traffic volumes are projected to increase from 24,000-34,000 vpd in 1998 to 50,000 vpd in 2020. Traffic conditions are projected to be over capacity from Interstate 64 to US 421/US 460. Between I-64 and the Woodford County Line, the roadway will operate at or very near capacity, at least during peak traffic periods.

Traffic volumes on the East-West Connector (KY 676) are projected to increase from 18,000-25,000 vpd in 1998 to 39,000 vpd in 2020. This would cause the Connector to be over capacity at LOS F during peak periods of the day.

Other principal facilities projected to be operating over capacity by Year 2020 include Wilkinson Boulevard (up to 40,000 vpd), US 60 East Main Street (up to 31,000 vpd), and Holmes Street (up to 16,000 vpd).

By 2020, the main deficiencies of the Frankfort transportation network will be revealed in its inability to accommodate the demand for north-south movement on either side of the urban area – US 127 on the west side and US 60 (connecting to US 127/US 421) on the east side. These two corridors experience the heaviest travel demand today and will continue to do so in the future. Deficiencies also are projected in the system's ability to accommodate east-west flow, via the East-West Connector, East Main Street (US 60), Wilkinson Boulevard and Holmes Street. Widening of Interstate 64 is planned, per the Statewide Transportation Plan. However, this project will provide little benefit toward improving the capacity to handle traffic flow within the urban area.

Development of Alternatives

Short-term deficiencies, needs and recommended solutions were developed and discussed in previous chapters of this report: Chapter V – Downtown Transportation Study and Chapter VI – Operational Improvement Plan. Those improvements are basically low-cost projects that can be implemented over a short time frame.

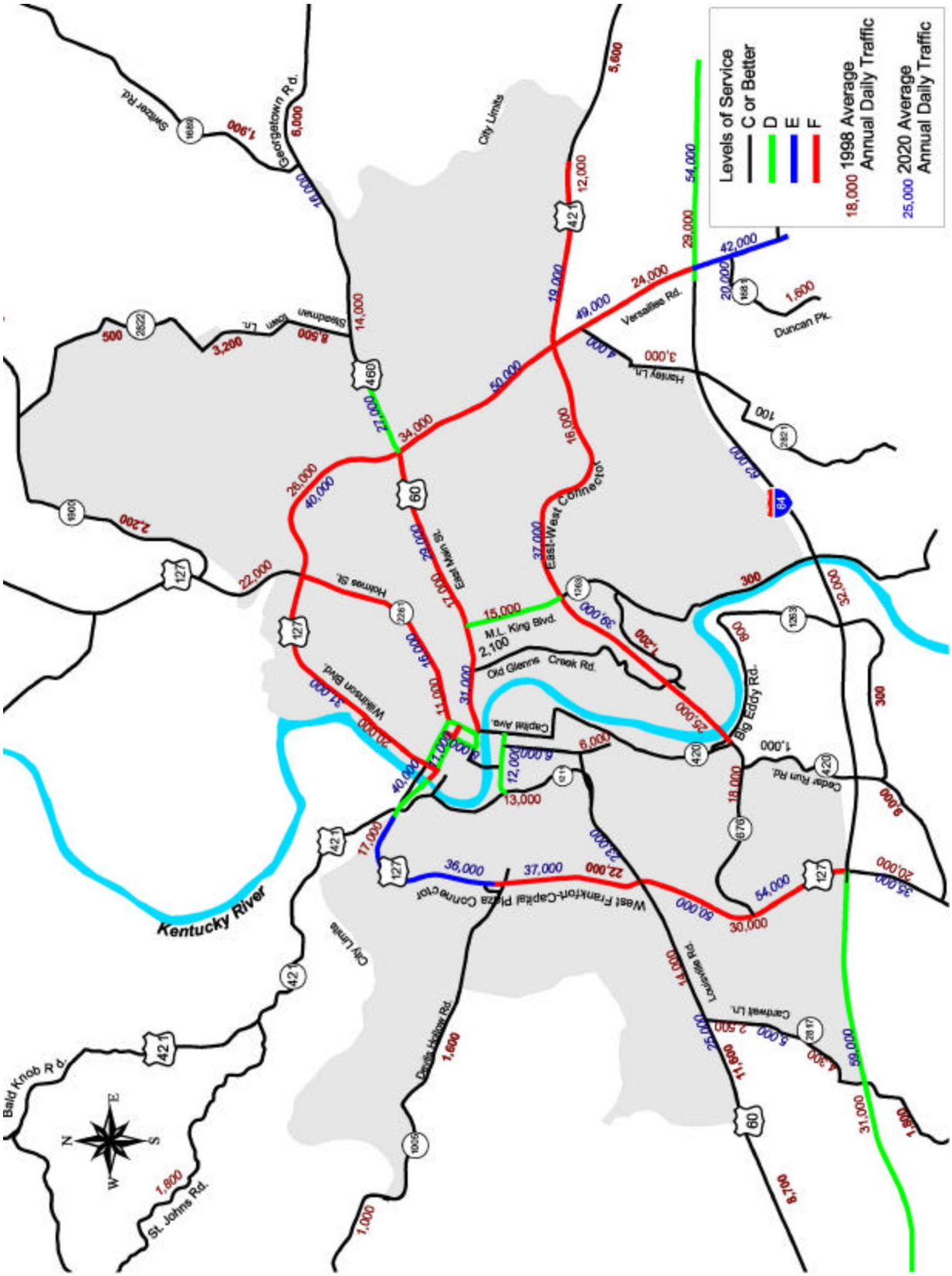

Figure VII- 1. Year 2020 System Deficiencies

In this chapter, the development of long-term, major roadway improvements are discussed. Alternative improvement projects in the form of major capacity expansion (lane addition) projects or construction of new roads were evaluated. Because automobile travel so heavily dominates transportation in Frankfort, no other alternatives were considered feasible as major transportation improvements. Major alternative improvement projects that were considered and evaluated are discussed below.

US 127/West Frankfort-Capital Plaza Connector

The study has demonstrated that additional through lanes are needed, from Interstate 64 all the way to Wilkinson Boulevard. Presently this is a four-lane principal arterial that would require expansion to six lanes. Even at six lanes the roadway will be at or near capacity (50,900 to 59,600 vpd over the southern section); however, widening this facility to eight lanes would not be economically feasible.

The estimated construction cost for this improvement is $22.2 million in present dollars - $10.5 million for the section from Interstate 64 to US 60 Louisville Road and $11.7 million for the West Frankfort - Capital Plaza Connector. It must be pointed out that the estimated cost for the connector does not include widening the bridge over the Kentucky River. More detailed studies of this bridge will be necessary to estimate the cost and assess the feasibility.

US 60 (Versailles Road)

On the east side of Frankfort, US 60 (Versailles Road) is the other principal arterial in Frankfort with the heaviest traffic demand, both present and future. Currently, this four-lane road carries up to 34,000 vpd, and Year 2020 projections are for up to 52,000 vpd. Without improvements, it will be over capacity (LOS F) by 2020. Widening Versailles Road to six lanes from I-64 to US 421/US 460 would enable operation at LOS D. The estimated cost for this capacity expansion is $10.9 million in current dollars.

Interstate 64

Interstate 64, part of the National Highway System, is also an integral part of the Kentucky's highway network. Currently I-64 carries 29,000 - 32,000 vpd through this part of Franklin County and is projected to carry 62,000 vpd by 2020. The Statewide Transportation Plan contains a project to add lanes on I-64 between US 127 and US 60 at an estimated cost of $80 million. The driving need for this improvement goes beyond localized capacity; that is, I-64 is integral to a long-range vision in Kentucky that will make key Interstates six-lane from border to border.

New Cardwell Lane Parallel Connector

Future capacity needs in the US 127 corridor cannot be overcome simply by widening US 127 to six lanes. The demand will exceed that incremental improvement. Two improvement options were studied: 1) widening Cardwell Lane to four lanes following its current alignment; and 2) constructing a new north-south road parallel to, but west of existing Cardwell Lane. The new connector road would terminate at US 60 near the State Game Farm on the north end and would tie into Jones Lane on the south end. Also, each of those options was considered with and without a new interchange at I-64, in the general vicinity of the existing Cardwell Lane underpass structure.

In terms of providing additional capacity in the US 127 corridor, the new alignment will provide the greatest benefit, attracting 10,600 to 13,100 vpd in 2020 between I-64 and Louisville Road. This would be for a four-lane facility with partial control of access and includes an interchange with I-64. This new connector road was included in the *1994 Frankfort/Franklin County Comprehensive Plan*. The estimated cost for this project is $23.9 million.

While a new road would have less impact on residents in the area, there will be issues that need to be resolved and possibly mitigated.

Included in these is an historic farm located on the south side of US 60.

East-West Connector (KY 676)

The East-West Connector (KY 676), without any improvement to it or the rest of the transportation system, will be pressed to accommodate 37,000 - 39,000 vpd by 2020. This would result in the facility being over capacity. Widening the road to six lanes would provide sufficient additional capacity. The estimated cost for this project is $22.9 million. This cost does not include capacity expansion of the modular bridge in the Kentucky River Valley, which will require a more detailed study.

The feasibility of this project is questionable, especially when considering added cost of improving the bridge structure. Moreover, I-64 offers a parallel east-west alternative. With I-64 being part of the National Highway System, it will certainly take precedence over the East-West Connector. The possibility that both projects would be constructed by 2020 is considered remote.

New East Connector Road

Given that there is and will continue to be a high travel demand in the Versailles Road Corridor, and given that improving the East-West Connector may not be feasible, alternative means to increasing capacity in the Versailles Road Corridor were investigated. A new East Connector Road was identified that would serve as an alternative to both Versailles Road and part of the East-West Connector. The East Connector would tie into the East-West Connector (KY 676) at Martin Luther King Jr. Boulevard and would require improvement to a portion of Glenn's Creek Road.

In its initial concept, the New Connector was to include a full interchange with I-64, west of Versailles Road, and would terminate at Franklin County Industrial Parks II and III. However, due to concerns by residents in the Hanley Lane area, the ultimate concept was modified to terminate at I-64 with a half interchange. As a four-lane road, this new facility would carry over 13,000 vpd, providing much-needed relief to US 60 and the East-West Connector. The estimated cost is $21.5 million.

Wilkinson Boulevard

Without improvement, Wilkinson Boulevard is projected to carry over 31,000 vpd by 2020. Simply put, there are no east-west alternatives on the north side of Frankfort. With continued commercial and industrial growth in the corridor, Wilkinson Boulevard will be over capacity. Widening this facility to six lanes from US 60/US 460 to the West Frankfort-Capital Plaza Connector would provide an adequate level of service through Year 2020. The estimated cost for this project is $27.9 million.

Limestone Drive Extension

This project involves the extension of Limestone Drive, which currently terminates at the East-West Connector near US 127. The street would be extended southward, east of the Franklin Square Shopping Center, and would tie into US 127 across from the new Poplar Creek Plaza Shopping Center. The project would provide localized additional capacity to US 127 and would increase accessibility to this commercial area. As a four-lane road, it is projected to carry almost 20,000 vpd. This project is included in the *1994 Frankfort/Franklin County Comprehensive Plan*. Its estimated cost is $2.9 million.

Holmes Street

Without improvement, Holmes Street is projected to carry 16,000 vpd by 2020. Much of this traffic growth will occur from the relocation of state government employees to the downtown area, southwest of Holmes Street. Once this occurs, there will be a need to provide additional capacity to Holmes Street from High and Mero streets to the Thornhill Bypass. This can be done in two phases, if necessary, to coincide with timing of new state government building construction. An improved two-lane section with

a continuous middle left-turn lane could be constructed as an interim measure. Ultimately, the projected demand will justify a four-lane divided facility. This could include a one-way couplet with an extension to Clinton Street at the west end, depending on potential new state government buildings in the corridor. The estimated cost of the ultimate four-lane roadway is $27.5 million.

Duncan Pike

Franklin County Industrial Park III, west of Industrial Park II, has opened with approximately 500 acres. Assuming full development of these two industrial parks by 2020, traffic volumes along Duncan Pike are projected to reach 20,000 vpd. Much of this traffic will be truck traffic, accentuating the need for additional capacity.

Based on this projected demand, there is the need to widen Duncan Pike to four lanes for approximately one-half mile. This project will improve access to Industrial Parks II and III and will provide the additional capacity needed to accommodate the heavy traffic demand. The estimated cost for this project is $1.0 million.

Other Considerations

Consideration also was given to widening (adding lanes to) East Main Street between downtown and Versailles Road. This project was deemed as infeasible due to anticipated high costs and relocations of both homes and businesses. Additionally, there is a constructability issue as east Main Street approaches downtown along a hillside and on a steep downgrade. Furthermore, it is believed that improvements to other parallel facilities such as Holmes Street will divert traffic from East Main Street, relieving traffic congestion.

Summary of Alternatives

The alternatives and relevant data for each are summarized and referenced by location on the map in **Figure VII-2**. Each project includes a text box containing information about the alternative. For all existing roads, the first line depicts the No-Build condition with projected Year 2020 average daily traffic volumes and level of service. Subsequent lines describe the type of improvement recommended for that project, the number of lanes, and the resulting level of service.

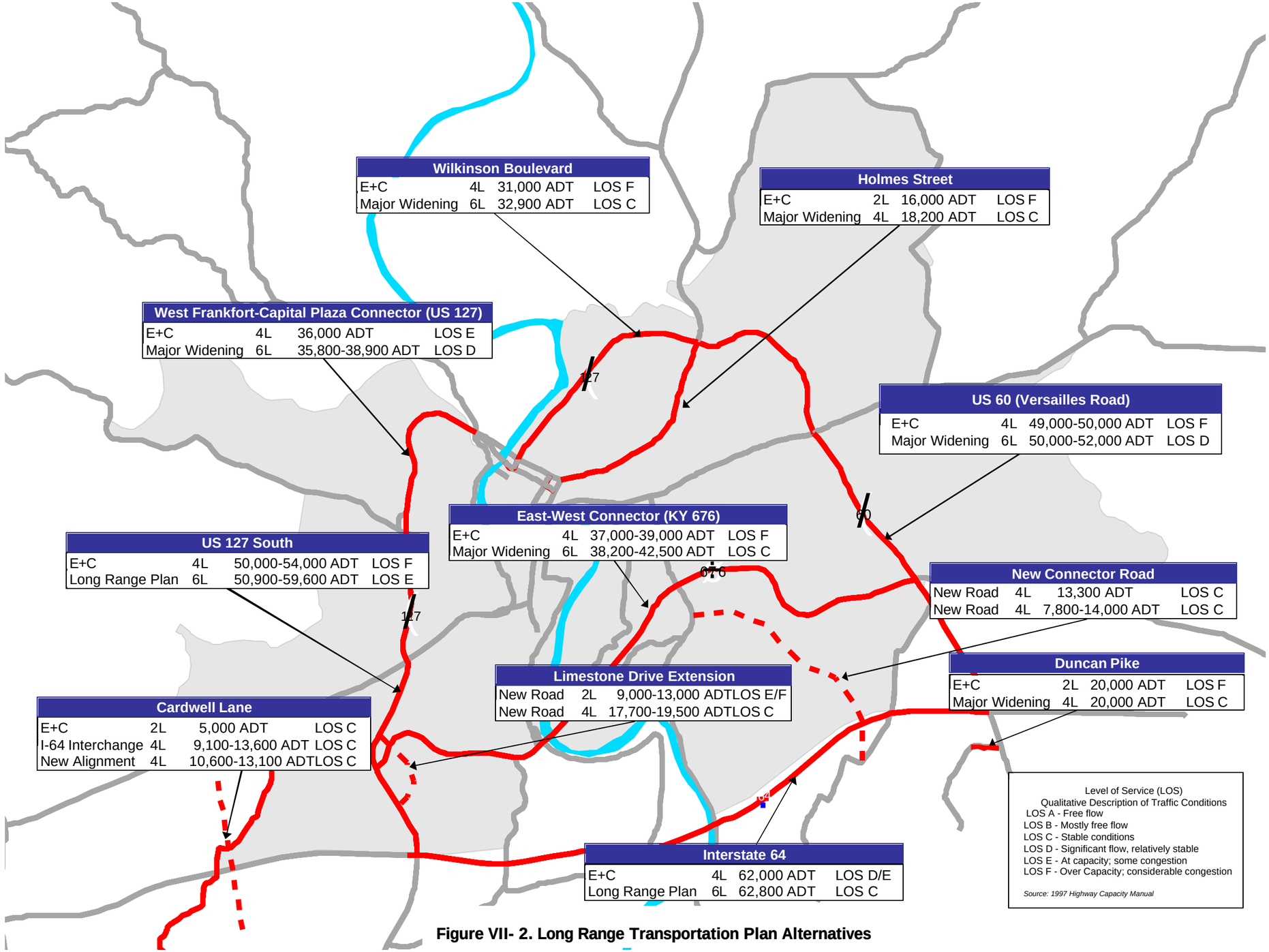

Figure VII- 2. Long Range Transportation Plan Alternatives

CHAPTER VIII – RECOMMENDED IMPROVEMENTS

The value of any transportation plan lies in its ability to provide transportation improvements to serve the future movement of people and goods while striking a balance with the needs of residents, visitors, and those travelers who must pass through the region. The recommendations are based on an analysis of projected land use, traffic demands, programmed improvements, and cost analyses. The result must be a balance of transportation projects which accommodates future travel demands in a safe, convenient, and responsive manner, and is adaptable to different patterns of development.

The recommended transportation improvements contained in this plan are the result of a process which identified future travel demands and subsequently analyzed the ability of the existing transportation system to meet those demands. Where the existing system was found to be deficient, improvements to the network, either as new facilities or increased capacity, were examined to determine if adequate service could be developed. Due to the limitations of the topography in Franklin County and the distribution of future population and employment development, the ability to provide alternative transportation links was somewhat limited.

After testing numerous alternatives and discussing them with the Citizens Advisory Committee, it was clearly the consensus of the group that refinements to the existing system should have the highest priority. In addition, two new proposed facilities should be included in the long-range plan, but at a lower priority.

Year 2020 Transportation Plan

The relative value of any plan is the ability to implement the recommendations contained in the plan. As there are existing mechanisms in Kentucky to program projects and establish priorities, these processes have to be utilized to the maximum in order to develop a viable plan.

The Year 2020 Frankfort Urban Area Transportation Plan has four elements. Those are:

1. Projects in the Kentucky Six Year Highway Plan;
2. Projects in the 20-year Statewide Transportation Plan;
3. Recommended Improvements developed as a result of the Frankfort Urban Area Transportation Study; and
4. Operational Improvement Plan.

Six Year Highway Plan (Committed)

Those projects contained in the Transportation Cabinet's Six Year Highway Plan are treated as committed due to the fact that the Kentucky General Assembly adopts the program by legislative action. There are four projects in the FY 1999 – 2004 Six Year Plan:

1. US 60 (Louisville Road) – Widen to four lanes from Evergreen Road to Hunter's Trace;
2. US 60 (Louisville Road) – Widen to five lanes from Hunter's Trace to existing four lanes; and
3. US 421 – Widen from US 60 to Ducker's Station Road.
4. US 460 – Widen to four lanes from end of 4-lane in Frankfort to Redding Road.

Statewide Transportation Plan

The Transportation Cabinet develops the twenty-year Statewide Transportation Plan, which is updated every four years. This document provides a backlog of transportation needs from

which to draw projects into the Six Year Plan. The current draft plan (FY 1999 – 2018) contains only one long-range project not contained in the Six Year Plan:

- Interstate 64 – Major widening to six lanes from US 127 to US 60.

Recommended Long Range Transportation Improvements

There were a number of projects vital to the future growth of Frankfort and Franklin County identified as needed in addition to those projects already contained in either the Six Year Plan or the Statewide Transportation Plan. These projects were unanimously adopted by the Citizens Advisory Committee at its meeting on December 14, 1999.

A three-tiered priority system was developed. Priority I projects are those considered to be most urgently needed to sustain the functionality of the Frankfort transportation system. They will provide much needed additional capacity to alleviate current traffic congestion. Priority II projects enhance the mobility of the system by providing alternate travel routes to existing corridors. Their urgency is less than Priority I projects, but they are vitally important to supporting Frankfort's growth and viability. Priority III projects will meet future demands for additional capacity resulting from growth in the Frankfort area.

The Recommended Long-Range Transportation Improvements for the Frankfort Urban Area are presented in **Figure VIII-1**. They are:

Priority I Projects

- US 127 – Widen to six lanes from I-64 to US 60 (Louisville Road);
- US 60 – Widen to six lanes from I-64 to US 460 ("Spaghetti Junction");
- Duncan Pike – Widen to four lanes from US 60 to the Industrial Park; and
- Holmes Street – Phase 1 improvement; widen to three lanes from High Street to the Thornhill Bypass (US 421).

Priority II Projects

- Cardwell Lane – New four-lane location west of the existing road from Jones Lane to US 60. The project also includes a full interchange with Interstate 64;
- Limestone Drive – Widen existing roadway to four lanes and extend behind Franklin Square Shopping Center to US 127; and
- New Connector Road on four lanes from a new partial interchange with I-64 near Hanley Lane to Glenns Creek Road/Martin Luther King Boulevard at the East-West Connector (KY 676). *(Note: It was the strong consensus of the Citizens Advisory Committee that the interchange should serve only the New Connector Road to the north.)*

Priority III Projects

- West Frankfort-Capital Plaza Connector (US 127) – Widen to six lanes from US 60 to Wilkinson Boulevard;
- US 421 (Wilkinson Boulevard) – Widen to six lanes from the West Frankfort Connector to US 460 (Spaghetti Junction); and
- Holmes Street – Phase 2 improvement; widen to four lanes or implement a one-way couplet and widening project from High Street to the Thornhill Bypass (US 421).

The Recommended Long-Range Transportation Improvements, including priorities and estimated cost in present dollars, are summarized in **Table VIII-1**.

Table VIII-1. Recommended Long-Range Transportation Improvement Projects

Priority	Project	Description	Cost ($ million)
I	US 127	Widen to 6 lanes from I-64 to US 60	$10.5
I	US 60 (Versailles Road)	Widen to 6 lanes from I-64 to US 460	$10.9
I	Duncan Pike	Widen to 4 lanes from US 60 to Ind. Park	$1.0
I	Holmes Street	Widen to 3 lanes from High St. to US 421	$9.0
II	Cardwell Lane	New alignment w/interchange at I-64	$23.9
II	Limestone Drive	Widen to 4 lanes & extend to US 127	$2.9
II	New East Connector	Four lane construction from I-64 to KY 676	$21.1
III	West Frankfort-Capital Plaza Connector (US 127)	Widen to 6 lanes from US 60 to US 421	$11.7
III	Wilkinson Blvd.	Widen to 6 lanes from Capital Plaza to US 460	$27.9
III	Holmes Street	Widen or convert to one way couplet	$18.5
III	Interstate 64	Widen to 6 lanes from US 60 to US 127	$80.0
		Total Cost	**$217.4**

Operational Improvement Plan

Traffic operational improvements can provide immediate and relatively inexpensive benefits to traffic flow. These improvements can also reduce potential conflicts, which lead to fewer accidents and reductions in accident severity. A detailed discussion of traffic operational improvements is contained in Chapter VI.

Other Transportation Modes

While this plan is a highway plan, other transportation modes should not be ignored as improvements are implemented. In fact, it is encouraged that opportunities to enhance pedestrian, bicycle and other travel modes should be aggressively pursued. One such example is the recommendation from *Chapter VI – Downtown Transportation Study*, to enhance the pedestrian and bicycle connectivity between the new Transportation Building (on Mero Street), the Capital Plaza area, and the Central Business District via the St. Clair Mall. Another potential opportunity is the conversion of an abandoned rail line to a pedestrian and bicycle facility under the Kentucky Rails-to-Trails Program. The Pinsley Railroad line runs from the Kentucky History Center downtown, along the Holmes Street corridor and through the Indian Hills Subdivision, to Elkhorn Creek. The line connects a number of traffic generators and would provide both primary and recreational trip opportunities.

Plan Implementation

The success of the *Year 2020 Frankfort Urban Area Transportation Plan* will lie in the ability to implement its projects – short-term operational projects and major long-term improvement

projects. The short-term projects can be implemented quickly, depending on funding availability, and should be pursued aggressively. The long-term, major projects must go through the statewide transportation planning process.

Ideally, all Phase I projects should be included in either the Six Year Plan or the State Transportation Plan. Additionally, all Phase II and III projects should be placed on the Unscheduled Needs List and should be considered for future versions of the State Transportation Plan. Inclusion in the State Transportation Plan or Unscheduled Needs List does not guarantee funding nor commit to a schedule, but does demonstrate a formal acknowledgement of the need for the project.

Obviously, the challenge comes in getting projects from the list of recommended long-range improvements into the Six Year Plan and the Statewide Transportation Plan. Frankfort area projects must compete with other projects from all over the state. Thus, the community must be unified and proactive in the political and legislative process that implements Kentucky's statewide transportation planning process.

Summary

The projects contained in this proposed program provide the core highway system needed in the Frankfort Urban Area to accommodate the anticipated population, employment, and traffic growth through the year 2020. The total cost of all the committed and recommended improvements is more than $217 million. This total includes $80 million for upgrading Interstate 64 through the urban area, and while it is a much needed project, it serves primarily traffic traveling through the area and should not be counted against Frankfort's program.

Obviously, actual implementation of any part of the program is dependent on the availability of funds from both state and local governments, as well as private developers. In addition the timing of projects will depend on actual growth patterns and the resultant traffic demands on various segments of the system.

It will be necessary to regularly evaluate both the traffic patterns and traffic volumes in order to make adjustments in project schedules, and ensure that Frankfort's traffic system provides the level of service desired of the Capital City. As part of a continuous planning process, it is recommended that this transportation plan be re-evaluated in the future on a regular basis.