K-150

CORRIDOR STUDY

DECEMBER 1986

JOINT LAND USE STUDY

AND

RECOMMENDED CORRIDOR DEVELOPMENT PLAN FOR HIGHWAY K-150

Prepared by representatives from
Leawood, Olathe, Overland Park
and Johnson County

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K-150 CORRIDOR STUDY

Executive Summary

Johnson County, the Cities of Leawood, Olathe, and Overland Park, the consulting firm of Johnson, Brickell, Mulcahy and Associates, Inc., have completed a comprehensive plan for the future development of the K-150 Corridor study area. The report recommends a plan for the improvement of K-150 which emphasizes a consistent highway configuration and character throughout the corridor. A land use plan for the arrangement and intensity of future development in the corridor is also included.

The major goal of the study is to forecast ultimate development along the corridor and design future roadway improvements to accommodate both the traffic associated with the development of the Corridor and through traffic. These tasks have been accomplished and are described in detail within the report. The land use plan presents a development scenario with a mix of land uses and intensities to provide for the diverse and interrelated economic and residential needs of the communities involved.

The proposed highway improvement plan provides for the ultimate development of the Corridor and for the phased improvements as development occurs. The recommended major components of the study include:

- The creation of complementary office and research parks to encourage high technology firms to locate here.
- A mixture of residential, commercial, office and industrial land uses within the Corridor. This mixture should provide for the economic and residential base to ensure the vitality of the Corridor.
- The establishment of a land use pattern for the diversification of the tax base and the creation of nearby employment opportunities.
- The improvement of the transportation system to accommodate future traffic levels and the provision of mass transit.
- The provision for a parallel access road (reverse frontage road) system to relieve heavy traffic loads along K-150 and to provide a boundary and buffer for the different land uses proposed.
- The preservation of the natural environment, including Tomahawk Creek floodplain running through the middle of the Corridor, and the designation of a major open space system.

This study has been a successful effort in accomplishing the established tasks, but it only begins the process of coordinating the development within the Corridor to ensure that adequate public improvements match the timing of private development. The groundwork has been laid for the coordination of development and roadway improvements between the three cities and Johnson County. However, much work remains to define the scope and to detail the extent of the cooperative effort.

The recommendations prepared for the report establish procedures for the coordination of the land uses and highway improvements proposed which are outlined below:

1. Adopt a joint resolution endorsing the K-150 Corridor Study recommendations for the future land uses, right-of-way requirements and highway design.

2. Prepare an agreement to coordinate land uses and street improvements at common boundaries.

3. Designate a technical study team to determine the specific roadway alignment and design for K-150.

4. Prepare a joint proposal for potential funding opportunities for the improvement of K-150.

5. Develop guidelines for the establishment of a consistent landscaping treatment for K-150.

6. Establish a policy for the preservation of open space, including significant natural features and floodplain areas within the Corridor.

A RESOLUTION RELATING TO A JOINT PLANNING EFFORT FOR THE KANSAS HIGHWAY 150 (135TH STREET) CORRIDOR IN JOHNSON COUNTY, AND THE DEVELOPMENT OF IMPROVEMENT PLANS FOR THE ROADWAY.

WHEREAS, the planned development of the Kansas Highway 150 Corridor, by responsible governmental units will have a positive impact on the future of the citizens of Johnson County; and

WHEREAS, Kansas Highway 150 is an official highway of the State of Kansas; and

WHEREAS, Kansas Highway 150 connects Kansas Highways 7, 69, 169 and Interstate 35; and

WHEREAS, the Cities of Leawood, Olathe and Overland Park deem that the improvement of Kansas Highway 150 is necessary for the health, safety and welfare of the residents of Johnson County and those motorists using the roadway; and

WHEREAS, the adoption of a coordinated long-range development plan anticipating the growth of the Corridor can provide for an efficient pattern of compatible land uses and a high quality urban environment;

THEREFORE, BE IT RESOLVED that the K-150 Advisory Task Force representing the Cities of Leawood, Olathe, Overland Park and Johnson County do hereby recommend that the Governing Bodies of the Cities involved take the following action:

1. Adopt a joint resolution endorsing the K-150 Corridor Study recommendations for the future land uses, right-of-way requirements and highway designs.
2. Prepare an agreement to coordinate land uses and street improvements at common boundaries.
3. Designate a technical study team to determine the specific roadway alignment and design for K-150.
4. Prepare a joint proposal for potential funding opportunities for the improvement of K-150.
5. Develop guidelines for the establishment of a consistent landscaping treatment for K-150.
6. Establish a policy for the preservation of open space, including significant natural features and floodplain areas within the Corridor.

ADOPTED by a majority vote of the K-150 Advisory Task Force this 21st day of February, 1986.

Thomas Lance, Chairman

RESOLUTION NO. 770 (City of Leawood)

RESOLUTION NO. 1996 (City of Overland Park)

RESOLUTION NO. 86-1081 (Olathe)

A RESOLUTION RELATING TO A JOINT PLANNING EFFORT FOR THE KANSAS HIGHWAY 150 (135TH STREET) CORRIDOR IN JOHNSON COUNTY, AND THE DEVELOPMENT OF IMPROVEMENT PLANS FOR THE ROADWAY.

WHEREAS, the planned development of the Kansas Highway 150 Corridor by responsible governmental units will have a positive impact on the future citizens of Johnson County; and

WHEREAS, Kansas Highway 150 is an official highway of the State of Kansas; and

WHEREAS, Kansas Highway 150 connects Kansas Highways 7, 69, 169, and Interstate 35; and

WHEREAS, the Cities of Leawood, Olathe and Overland Park deem that the improvement of Kansas Highway 150 is necessary for the health, safety and welfare of the residents of Johnson County and those motorists using the roadway; and

WHEREAS, the governing bodies in the cities involved did authorize the joint planning effort between the affected cities and Johnson County; and

WHEREAS, the governing bodies involved did appropriate funds for this joint planning effort; and

WHEREAS, the governing bodies involved participated in the planning study through the Task Force and staff involvement; and

WHEREAS, the Task Force has unanimously recommended adoption of the joint resolution;

NOW, THEREFORE, BE IT RESOLVED that the governing bodies of the affected cities do hereby adopt this joint resolution endorsing the K150 Corridor Study.

APPROVED BY COUNCIL: 4-7-86
Date

Attest:
Leawood City Clerk

Leawood Presiding Officer

APPROVED BY COUNCIL: 4-21-86
Date

Attest:
Overland Park City Clerk

Mayor of Overland Park

APPROVED BY COUNCIL: 7/15/86
Date

Attest:
Olathe City Clerk

Mayor of Olathe

K-150 CORRIDOR STUDY

Introduction

Kansas Highway 150 (K-150) has long been recognized as a potential growth corridor for southern Johnson County and the Kansas City metropolitan area. The state highway is a largely uninterrupted traffic route which connects Olathe, Overland Park, and Leawood to the southern part of Kansas City, Missouri. As growth moved southward in Johnson County, city and county officials became aware of the need for a long-range development plan to ensure proper and efficient development, and to avoid the development problems experienced in other parts of the County when growth occurred before a guiding plan. From that need, this study materialized. It represents a unique approach in taking a comprehensive look at a development corridor which must, by its nature, involve a multi-jurisdictional plan. The corridor is relatively free from existing development thus offering the potential to plan the future development pattern and circulation system before development pressure increases.

The purpose of the study is to establish consistent guidelines and policies for the coordinated and planned development of the K-150 corridor. There has been a cooperative effort among the three cities and the county in developing the land uses, development policies, and highway improvement plan for the K-150 study area.

The plan and policies developed should be general and flexible enough to provide a consistent framework for development along the corridor yet allow the cities to foster their own individual style and character of development. The plan should also provide guidance and direction to area landowners and developers by alerting them to the type and extent of development allowed.

Another purpose of the study is to prepare a proposal for the improvement of K-150. The Task Force staff analyzed the planned land uses and intensities in order to determine the improvements necessary to accommodate projectd traffic increases. The next step involves the presentation of the proposal to the Kansas Department of Transportation for state funding of the improvements to the roadway. A coordinated and concerted effort by the three cities and the county to acquire funding reflects the importance given to the improvement of this major transportation facility.

The basic goal of the corridor study is to prepare an integrated development plan for K-150 that satisfies the individual needs and priorities of Leawood, Olathe, and Overland Park, and that provides a high quality urban environment.

The integrated corridor development plan for K-150 consists of a future land use plan and a highway improvement plan designed to accommodate the projected traffic levels within the study area. The determination of appropriate land uses has involved the analysis of a number of factors such as

environmental constraints, utility service availability, existing land use decisions and future land use needs in the study area. An underlying assumption is that the highway improvements and land use decisions are interrelated and interdependent factors of the corridor development plan.

The following objectives were discussed and determined appropriate to set the scope and focus of the study.

A. Develop an appropriate future land use plan for the corridor.

   1. Provide for the coordination of land uses at the adjacent municipal boundaries.

   2. Provide guidelines for an urban design treatment which is functional and visually pleasing.

B. Develop a highway improvement plan for K-150 designed to meet future projected traffic volumes.

   1. Determine a consistent street character and configuration for K-150.

   2. Prepare a coordinated plan for access locations and limitations along the corridor.

   3. Determine the amount of right-of-way required for the ultimate improvement of the proposed transportation system.

   4. Develop a coordinated funding program with Johnson County and Kansas Department of Transportation assistance for the scheduling of proposed improvements to K-150.

C. Discuss the coordination of utility service expansion plans with the utility district jurisdictions serving the corridor.

D. Develop an implementation plan for the timing of improvements and the management of the land use plan.

Background

In March of 1984, the cities of Leawood, Olathe, and Overland Park joined with Johnson County in initiating a cooperative planning study of the K-150 corridor. An Advisory Task Force comprised of appointed and elected officials from the four jurisdictions was then established to provide direction and guidance for the study. The planning and transportation staff from the cities and county comprised the study team for the project and provided the research and support function for the study. The consulting firm of Johnson, Brickell, Mulcahy and Associates provided transportation planning services.

An inventory of existing conditions was prepared, including topography and slope information, flood plain and forest cover data, water lines and district boundaries, sewer lines and districts, traffic counts, land use and zoning, master plan designations

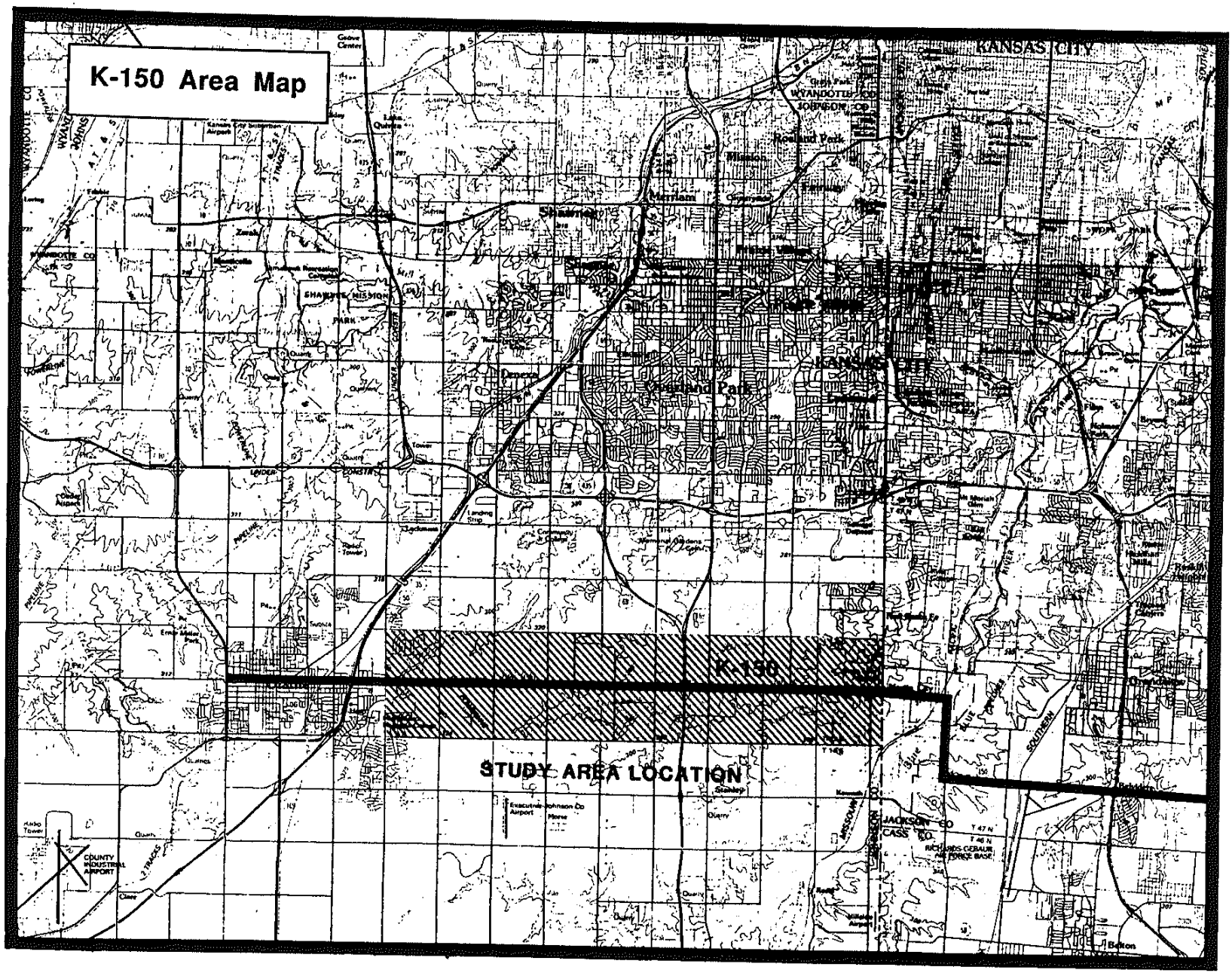
and ownership information. The inventory data was then analyzed to determine the constraints and opportunities existing within the study area and the land use pattern currently established.

Several meetings were held with commercial, industrial and residential developers who discussed the potential for development within the corridor and the possible form that development might take. Timing of future development within the corridor was also discussed and concerns about roadway improvements and access restrictions were expressed. Meetings were also held with state and local transportation officials from Kansas and Missouri concerning potential funding opportunities for K-150 and for coordination of plans for the improvement of M-150 in Missouri.

A public hearing was held in November 1984 with the owners of undeveloped land along K-150 to inform them of the study and to request input regarding their concerns and proposals for land use on their properties. Approximately 70 people attended the meeting and several concerns were expressed regarding traffic congestion and safety, proposed land uses, funding opportunities for K-150, timing of development, and improvement to the arterial street system through the study area.

Based upon the inventory analysis and input received, a preliminary land use plan for the study area was prepared with anticipated levels of intensity and density for the land uses proposed. These land uses and the levels of intensity were then used to calculate the total square footage and dwelling units associated with the ultimate development scenario as proposed. The numbers generated for the ultimate development situation were used by the traffic consultant to determine the potential impact that ultimate development will have on the street network and what transportation improvements will be necessary to accommodate the projected traffic levels.

The proposed land use plan and the recommended configuration for K-150 was reviewed by the Advisory Task Force and their suggestions and recommendations were incorporated into the final report presented to the individual cities for adoption.



K-150 Corridor Study

FIGURE 1

N 11/25/85

EXISTING CONDITIONS

Study Location

The focus of this study is the K-150 Corridor from State Line Road in Leawood to Mur-Len Road in Olathe. As depicted in Figure 1, the study corridor includes the land within one mile on either side of K-150 from 127th Street on the north to 143rd Street on the south. The corridor is nine (9) miles in length and covers approximately 18 square miles, or 11,782 acres of land. The study area includes 4 square miles or 2,560 acres in Olathe, 4.4 square miles or 2,822 acres in Leawood, and 10 square miles or 6,400 acres in Overland Park.

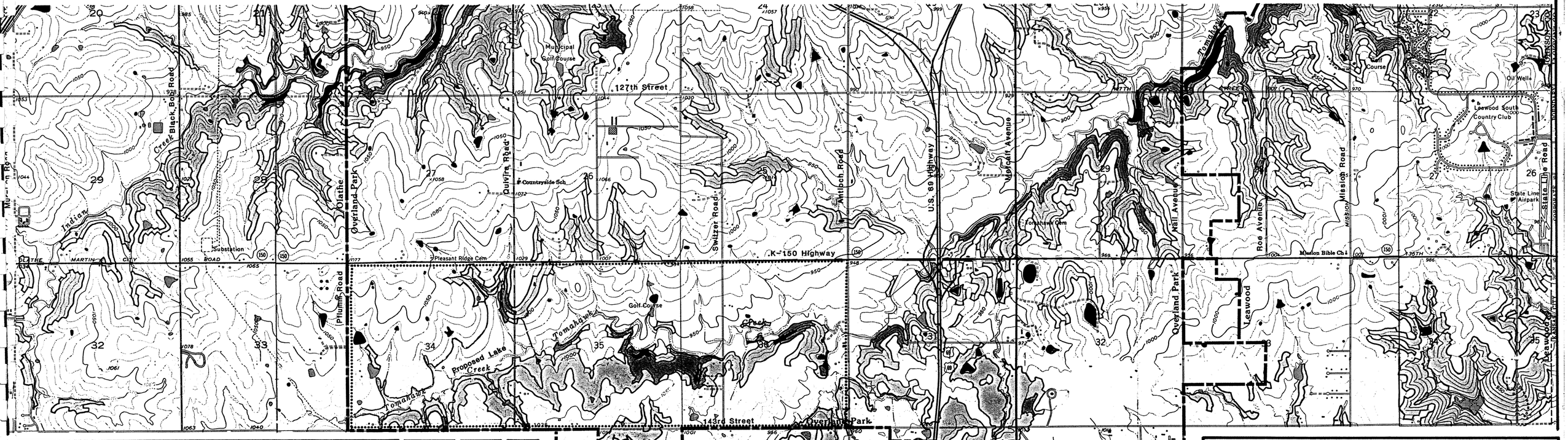
The corridor area is located in east-central Johnson County, on the southern edge of development within Overland Park and Leawood, and on the eastern edge of development within Olathe. K-150 extends from Highway K-7 in Olathe east to State Line Road into Kansas City, Missouri, where it is designated as Highway M-150. M-150 continues east through the Martin City area to Highway 71, and eventually connects with U.S. Route 50 in Lone Jack, Missouri.

Topography/Slope

The topography of the study area is characterized by gently rolling hills and a few steep slopes located along the Indian Creek and Tomahawk Creek stream banks. Land elevations range from a high of around 1,080 feet above sea level along the ridge line near Pflumm Road and K-150, to roughly 870 feet in the Tomahawk Creek streambed near Nall Avenue and 127th Street.

Most of the land within the study area is relatively level and has less than a 7 percent slope as shown on Figure 2, Slope Analysis. Steeper slopes are found along the Indian Creek channel in the northwest portion of the study area in Olathe. These slopes range from 7 to 12 percent with a small portion of the creek bank having a slope greater than 12 percent. Slopes of 7 to 20 percent generally exist along the course of Tomahawk Creek through the southern and northeasterly section of the study area within Overland Park. Several areas along the Tomahawk Creek bank have slopes exceeding 20 percent. The area along Tomahawk Creek from the K-150 and Highway 69 intersection northeast to 127th Street and Nall Avenue has the greatest amount of land with a 7 to 12 percent slope adjacent to K-150, and has the most land shown with 12 to 20 percent and greater slopes. An area around the Kenneth Road and K-150 intersection in Leawood has slopes between 7 to 12 percent.

Analysis of the slope map and of the topography of the study area indicates that there are few areas along K-150 where development would be restricted due to slope problems. The majority of the area has slopes of less than 7 percent, which is well suited for all types of development. Some land use restrictions may be applicable for the land with slopes of 7 to 12 percent, and land use restrictions are necessary for land with 12 to 20 percent slopes. In addition, the land



legend

- 0-7% SLOPES
- 7-12% SLOPES
- 12-20% SLOPES
- 20+% SLOPES

K150 CORRIDOR

SLOPE ANALYSIS

date	scale	north
11/25/85	1" = 1,665'	
Figure 2		

slope analysis k150 corridor study

where the highest percentage of slope exists has other environmental constraints. Specifically, these lands are within the 100-year flood plain of the major drainage channels in the area and are also usually covered by mature forests.

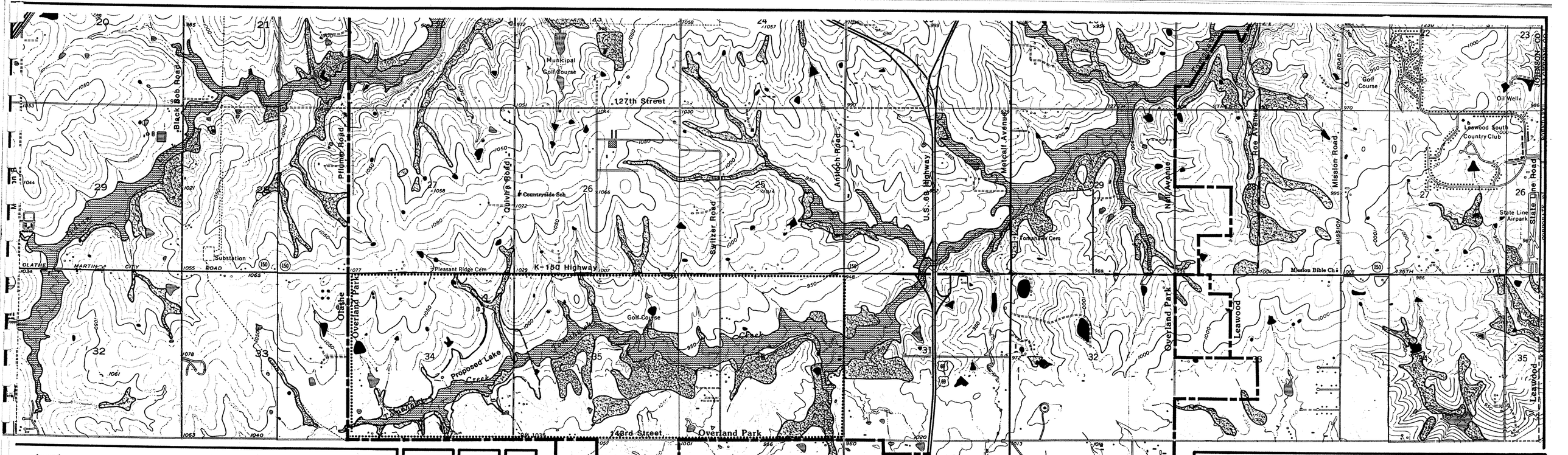
Flood Plains/Forest Cover

The study area contains portions of three watersheds: Indian Creek, Tomahawk Creek, and Blue River. The Flood Plains/Forest Cover map, Figure 3, identifies the 100-year flood plains and forest cover within the study area. At the extreme western edge of the study area, Indian Creek and its 100-year flood plain crosses K-150 (135th Street) just east of Mur-Len Road. A large portion of the land along the creek channel both north and south of K-150 are included within the 100-year flood plain. In addition, there exists a fairly large forest area along both sides of Black Bob Road around the 12900 to 13100 blocks.

Tomahawk Creek and its associated flood plain is located through the south central and northeasterly portions of the study area. Tomahawk Creek crosses K-150 at the Highway 69 Interchange where an improved bridge crossing currently exists. The largest area covered by flood plain and forest cover is located south of and parallel to K-150 around the 13700 to 14100 blocks, between Quivira Road and Highway 69. Another fairly extensive area of Tomahawk Creek flood plain exists between Metcalf Avenue and Nall Avenue around the 12900 to 13100 blocks.

This area also has some forest cover south of and within the flood plain. There is a major area of tree cover located on either side of Roe between the 13100 to 13300 blocks, and a minor stand of tree cover exists around the Kenneth Road and K-150 intersection. The only land immediately adjacent to K-150 with any significant forest cover is a 7.5 acre area at the northwest corner of Roe Avenue and K-150.

Upon review of the maps and information regarding flood plains and forest cover, it appears that the study area is moderately impacted by 100-year flood plains. Flood plains impact the land adjacent to the K-150 Corridor at very few locations and should not be a major hindrance to improvements to the highway. Land uses within and adjacent to the flood plains within the remaining study area should be carefully planned and monitored so they do not conflict with the main purpose of handling surface water runoff. Areas of significant forest cover should be designated with appropriate land uses that can take advantage of the natural landscaping to the greatest extent possible. In summary, the hydrology and forest cover of the study area should not present any insurmountable constraints for the K-150 Corridor area.



legend

- 100 YEAR FLOOD PLAIN
- FOREST COVER

K150 CORRIDOR — FLOOD PLAIN/FOREST COVER

date	scale	north
11/25/85	1"=1,666'	
Figure 3		

flood plain/forest cover k150 corridor study

Water Lines and Districts

Water service within the study area is provided by three separate districts: Water District No. 1 of Johnson County, Rural Water District No. 2, and the City of Olathe Utilities Department. The service areas of these agencies are shown on Figure 4, Water Lines and Districts Map.

Water District No. 1 of Johnson County services those portions of Overland Park and Leawood generally located north of K-150 between Antioch Road and State Line and south of K-150 between Nall Avenue and Mission Road. At this time and within this area of the K-150 Corridor, only the developed portion of Leawood has water service available.

Water District No. 1 of Johnson County has recently expanded its facilities to increase its capacity from 55 million gallons per day to 80 million gallons per day. A 25 million gallon per day expansion to the treatment plant was completed and put in service in 1983. A river intake and pretreatment facilities on the Missouri River, with an ultimate capacity of 100 million gallons per day (currently equipped for 25 MGD), was completed in the summer of 1984. Water mains to transmit water from the treatment plant to the District's service area were also constructed.

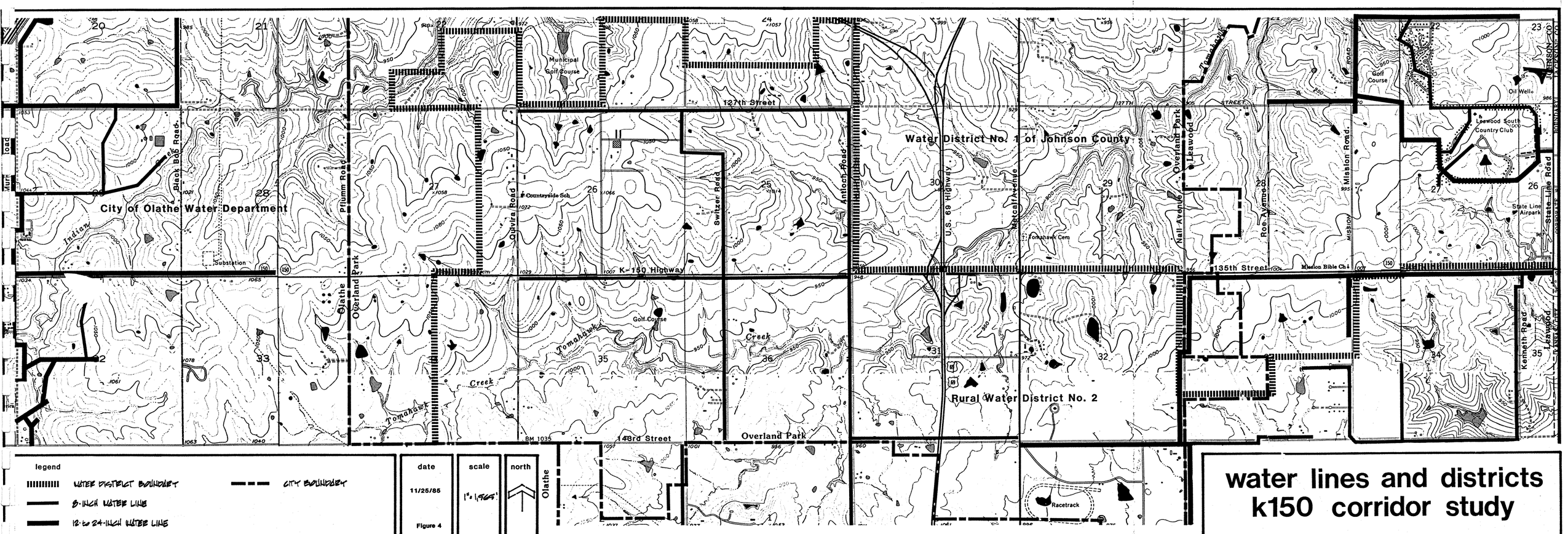
Rural Water District No. 2 serves the remaining portion of Leawood and Overland Park within the study area except for a portion of Overland Park west of Quivira Road. Water lines are generally in place and water service is available.

Rural Water District No. 2 has recently increased its capacity from one million to three million gallons per day through an agreement with the Kansas City, Missouri Water District. This increased capacity resulted from the connection of a 16-inch main line to a 20-inch line at 135th Street and Wornall Avenue. A booster station at K-150 and Kenneth Road will help provide this additional water capacity to the service area. Rural Water District No. 2 also plans to expand its booster stations and main line systems at later dates to meet the areas projected water demand.

The City of Olathe Utilites Department services the study area within the City of Olathe, and a portion of Overland Park not included within other service areas. Water service is currently available only to the Olathe portion of the study area, since water lines have not been installed in the Overland Park area.

The City of Olathe Utilities Department has also recently increased its capacity from 10 million to 36 million gallons per day through an agreement with the Water District No. 1 of Johnson County. A booster station has been built where the water transmission main from Johnson County Water District No. 1 ties into the City of Olathe system on Renner Road north of 119th Street. It is anticipated that this additional capacity will meet the demands of their service area for many years in the future.

Water service generally is available throughout the study area, and water lines exist within the majority of the Corridor. There



water lines and districts k150 corridor study

are a few areas where water lines do not exist, and where scattered residential development has occurred causing some public safety concerns. These large lot, single-family residences may not have adequate fire protection since public water service is not available. However, development has not occurred in large enough numbers to cause concern widespread enough to limit development. There are some portions of Olathe in the study area that are served by existing undersized water lines. These lines are being replaced with new lines as development takes place in that part of the corridor.

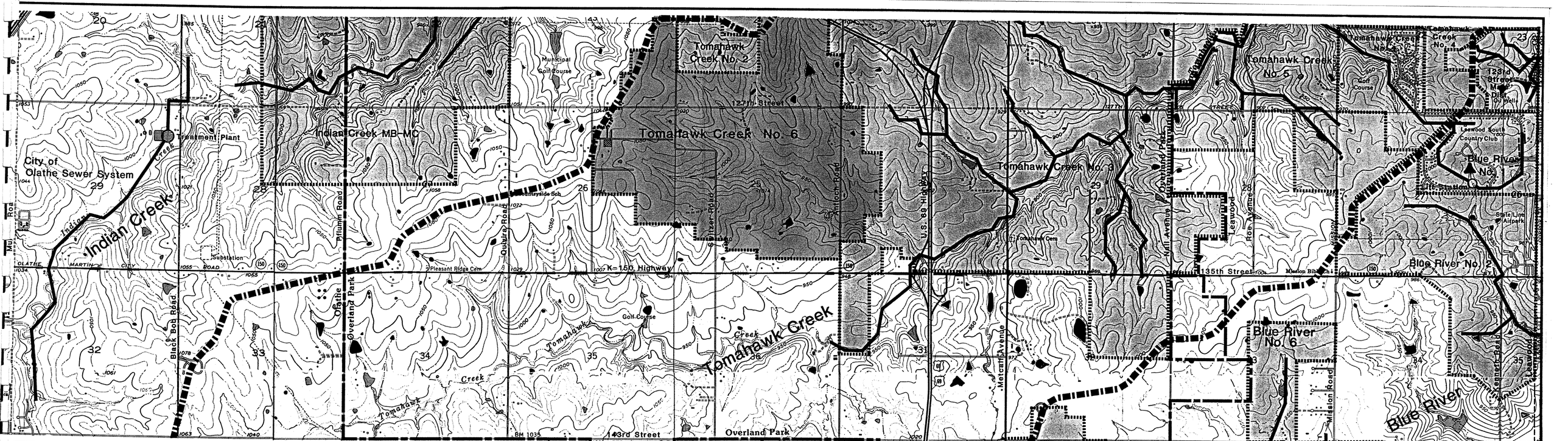
Sanitary Sewer Lines and Districts

There are three main sanitary sewer districts serving the study area with wastewater collection and treatment under the jurisdiction of the Unified Wastewater Districts of Johnson County: Indian Creek, Tomahawk Creek, and Blue River. The Sanitary Sewer Lines and District map as contained in Figure 5 depicts the existing districts within the study corridor.

The City of Olathe Sewer System currently operates within the Indian Creek watershed serving the western edge of the study area between Mur-Len Road and Black Bob Road. The treatment plant for the Olathe System is located on the west side of Black Bob Road just south of 127th Street. In the future, the Olathe-Black Bob plant will be closed and sanitary sewer service in this area will be provided by the Indian Creek Middle Basin treatment plant at College Boulevard and Overland Parkway. Based upon an agreement between Olathe and the Wastewater District, Olathe will construct a separate interceptor line to the plant for future sewer treatment. In addition, the Indian Creek Middle Basin District services a small portion of the study area between Quivira Road and Black Bob Road one-half mile north of K-150.

The majority of the study area is in the Tomahawk Creek watershed. A large amount of area south of K-150 and west of Nall Avenue within the Tomahawk watershed is outside an existing sewer district, and, therefore, does not have sanitary sewer service available. Tomahawk Creek District No. 3 serves the study area generally bounded on the west by Antioch, to the south by K-150, and to the east by Nall. Main lines have been constructed within the district, but lateral districts must be formed before service can be provided. This district sends the sewage to the Lower Indian Creek Treatment plant at Mission Road and I-435 for treatment.

Tomahawk Creek District No. 6 has recently been created and sewers are being designed for the area. The boundaries are roughly Antioch Road, K-150, Nieman Road and 123rd Street. Sewer service should be available within a year, with treatment being provided at Lower Indian Creek plant. Tomahawk Creek Districts Nos. 1 and 5 serve the northeast portion of the study area in Leawood. These districts are also served by the Lower Indian Creek Treatment plant at Mission Road and I-435.



legend

- RIDGELINES/MAJOR SEWER DISTRICTS
- AREAS W/I JO. CO. SEWER DISTRICTS
- SEWER DISTRICT BOUNDARY
- CITY BOUNDARY
- MAIN LINE

date	scale	north
11/25/85	1" = 1,000'	
Figure 5		

sanitary sewers
k150 corridor study

The remaining portion of the study area, approximately 940 acres in the City of Leawood, is within the Blue River watershed and is covered by three subdistricts: Blue River No. 5 in the northeast corner of the corridor; Blue River No. 2, east of Mission Road on both sides of K-150 to State Line Road; and Blue River No. 6 located south of K-150 and west of Mission Road. Blue River No. 5 pumps sewage to Lower Indian Creek plant for treatment. Blue River No. 2 sends the sewage to Kansas City, Missouri for treatment. Blue River No. 6 processes the sewage at the Blue River treatment plant at 151st Street and Kenneth Road.

There is a portion of land in Leawood within the K-150 Corridor that is not currently included within any sewer district. The property is located on both sides of K-150 between Roe Avenue and Mission Road and is included within both the Tomahawk Creek and the Blue River watersheds.

The few residences and developments that are located within the corridor and are not within a sewer service area utilize septic systems or holding tanks. Both Olathe and Leawood follow the same standard as Johnson County which requires one acre of lot area for septic tanks. Overland Park requires five acres of lot area for septic tanks in the majority of the City. However, a new Residential Estates District allows septic systems on one acre lots subject to restrictions.

Upon review of the sanitary sewer lines and districts map, it appears as if approximately one-half of the study area is not within any district boundaries. There are portions of every main sewer district which do not have lateral districts created or sewer service available. The Tomahawk Creek watershed contains the largest area where main sewer lines do not exist. The Tomahawk Creek District processes the sewage at the Lower Indian Creek Treatment plant in Leawood. This plant is approaching capacity and a large area of the watershed remains unserved. The Unified Wastewater District of Johnson County is in the process of studying this situation and developing alternative solutions. It would be a fair statement to say that the Lower Indian Creek plant capacity is critical to future development within a large portion of the study area in Tomahawk Basin.

Sewer service currently exists at both the extreme eastern and western ends of the study area. Development is currently occurring on the western edge of the Corridor in the City of Olathe. Since there have been no development requests in the majority of the Tomahawk Creek Watershed, sanitary sewers have not been extended into most of the area. One of the most important factors of any development plan is the ability to provide sewers and the timing of utility service extensions, especially sanitary sewers. An important consideration of determining a land use plan is the capacity available to an area and the timing, or phasing, of sewer line extensions to service a particular area.

Existing Traffic Data

Traffic counts were supplied by the cities involved in the study and by the State of Missouri Highway Department and the Kansas Department of Transportation. Traffic volumes shown are for vehicles per 24 hours and two-way traffic. The counts were conducted in 1982 and 1984. See Figure 6, the Traffic Volumes map for count locations.

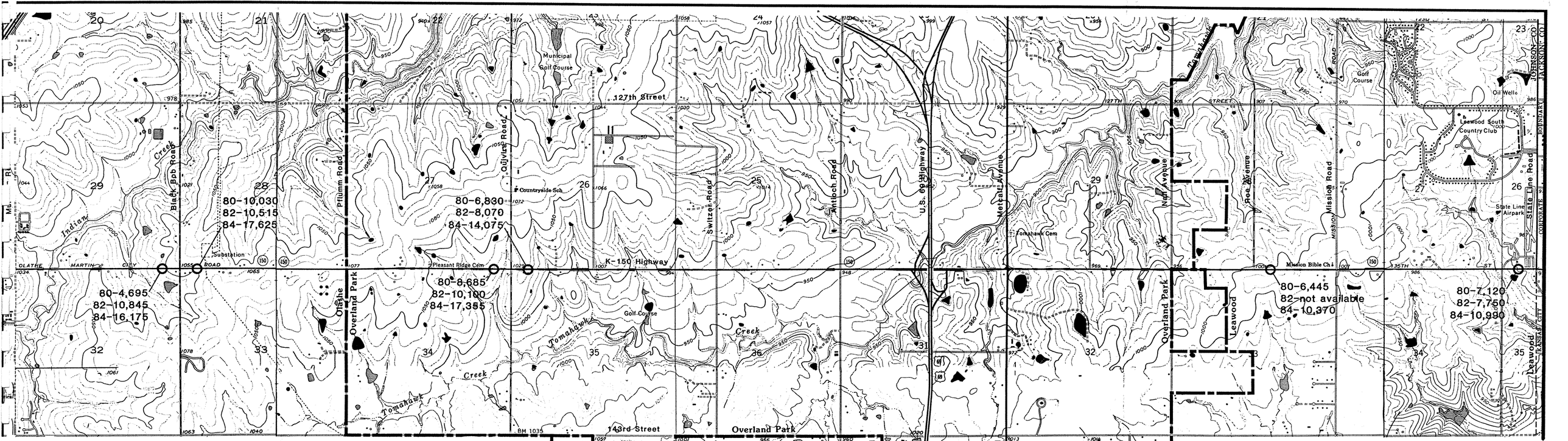
As the Traffic Volumes map depicts, a wide range of volumes is currently shown along the K-150 Corridor. Within the corridor, traffic counts range from 10,400 vehicles per day (vpd) just east of Roe Avenue in Leawood, to 17,600 in Olathe, just east of Black Bob Road. Traffic counts in Overland Park at Antioch Road show approximately 10,000 vpd, and at Quivira Road, 17,400 vehicles. Traffic counts beyond the corridor study limits show a volume of 6,100 vpd along K-150 just east of State Line Road, and 25,200 in Olathe east of I-35. The 1984 traffic counts are approximately 40% higher than corresponding 1982 counts. However, due to the large number of detours and road improvement projects that year, these counts probably do not reflect a normal traffic count for K-150.

Traffic patterns suggest that traffic volumes increase from east to west along the corridor towards the existing development in Olathe. Some of the traffic counts are approaching the capacity of the existing roadway at this time, without any extensive development along the majority of the corridor. What this points to is that the current function of the roadway is to serve through traffic volumes. The major emphasis of this study is to design a transportation system that allows development to take place along the corridor and accommodates through traffic with the least interference possible.

Highway K-150 is currently classified as a major thoroughfare through the study area and functions as an important cross-county transportation route through southern Johnson County. The existing roadway for K-150 reflects a rural highway configuration with two paved travel lanes, gravel shoulders and grass drainage swales within the 120 feet of right-of-way. Widening improvements have been made along the road at the U.S. 69 interchange, Quivira Road intersection, and around the Mur-Len Road intersection.

The K-150 roadway improvements around the U.S. interchange consist of a dual-lane divided cross-section through the interchange including the underpass of Highway 69 and the bridge over Tomahawk Creek. This roadway cross-section should be adequate to handle the existing and projected traffic on K-150 for the short term.

Interim improvements have been made to the Quivira Road/K-150 intersection consisting of signalization and widening to accommodate separate left-turn movements from each of the street approaches and allow through traffic to continue uninterrupted through the intersection. Improvements to K-150 at the Mur-Len Road intersection have taken place in conjunction with development occurring on the



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○ TRAFFIC COUNT LOCATION

80-6,445 1st NUMBER - YEAR OF COUNT
2nd NUMBER - TRAFFIC COUNT

date	scale	north
11/25/85	1"=1,450'	

Figure 6

traffic volumes
k150 corridor study

northeast corner of the intersection. K-150 has been widened to four lanes with deceleration lanes into the shopping center and left turn lanes at the intersection of Mur-Len Road.

The transition of improvements to K-150 at Mur-Len Road will require special attention and design to ensure that the traffic will flow smoothly. The geometrics of the ultimate improvements to K-150 will have to be coordinated and consistent with the design at the Mur-Len intersection or modifications will be necessary to the existing K-150 at Mur-Len Road and west to I-35.

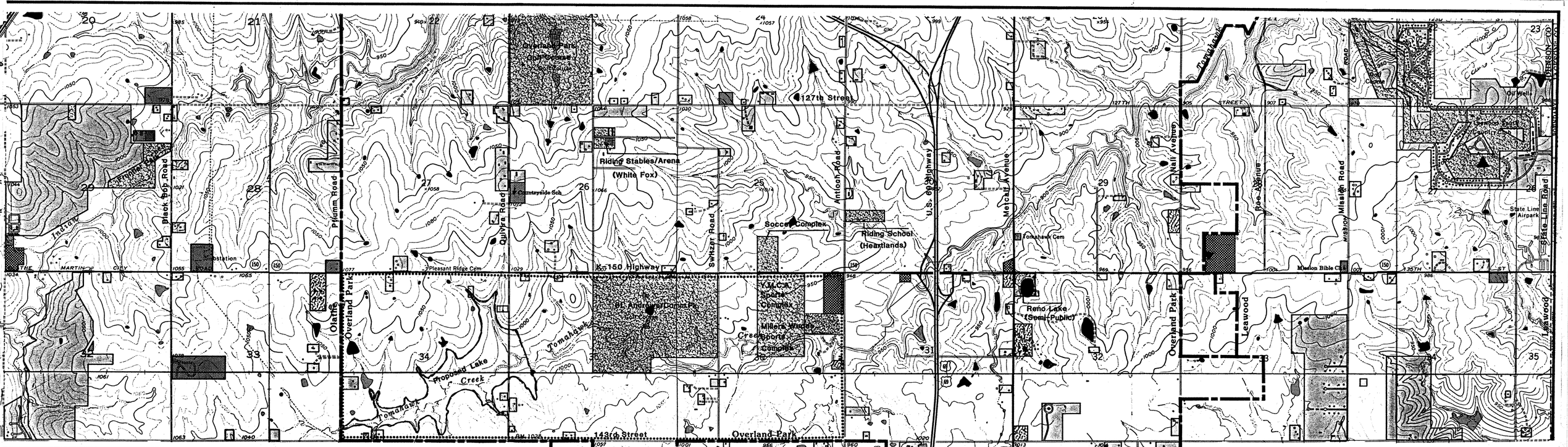
Another consideration in developing a highway plan should be coordination with the Missouri Highway Department and Kansas City, Missouri, Development and Transportation Departments as to the improvement of K-150/M-150 around State Line Road. That the highway does continue into Missouri will influence the type of facility planned and its ultimate configuration. Discussions which have been held with Missouri officials indicate that they are planning an expressway facility for M-150 east of the state line similar in conceptual design to that presented in this report. Kansas City, Missouri Development Department is recommending a 300-foot reservation area from developers requesting development approvals along the corridor. Continuing discussion should be held with Kansas and Missouri highway officials and Mid-American Regional Council transportation planners so that improvement plans can be coordinated.

Existing Land Use and Zoning

Land Use:

In order to make accurate projections of future land uses, existing land development patterns should be examined. These existing uses have been plotted and are shown on Figure 7, the Existing Land Use Map. As this map depicts, the majority of the land within the study corridor is undeveloped and vacant agricultural land. Overall, the existing land use development pattern reveals relatively large residential tracts situated on either end of the corridor and several recreational facilities located near the center of the corridor. The remaining development consists of a few single-family homes, a few minor retail establishments, and several public facilities and industrial/utility uses.

Individually, each city within the study area reflects a different development pattern. On the western edge of the corridor in Olathe, extensive residential development has taken place on both sides of K-150 between Mur-Len Road and Black Bob Road. The residential development on the south is located adjacent to K-150, but the development to the north of K-150 is set back approximately one-fourth mile from the highway. A commercial center has recently been developed on the northeast corner of Mur-Len Road and K-150. These developments are extensions of existing land uses expanding north and east in Olathe. An electrical substation is located just east of



legend

- VACANT/AGRICULTURAL
- PARK/RECREATION
- RESIDENTIAL
- COMMUNITY FACILITIES/UTILITIES
- COMMERCIAL
- INDUSTRIAL

K150 CORRIDOR — EXISTING LAND USE

date	scale	north
11/25/85	1" = 1,765'	
Figure 7		

existing land use
k150 corridor study

Black Bob Road on the north side of K-150, with transmission lines extending southeast of K-150 to Pflumm Road and 143rd Street and northeast to Pflumm Road and 127th Street. In addition, two pipeline companies have storage facilities located near the intersection of K-150 and Pflumm Road.

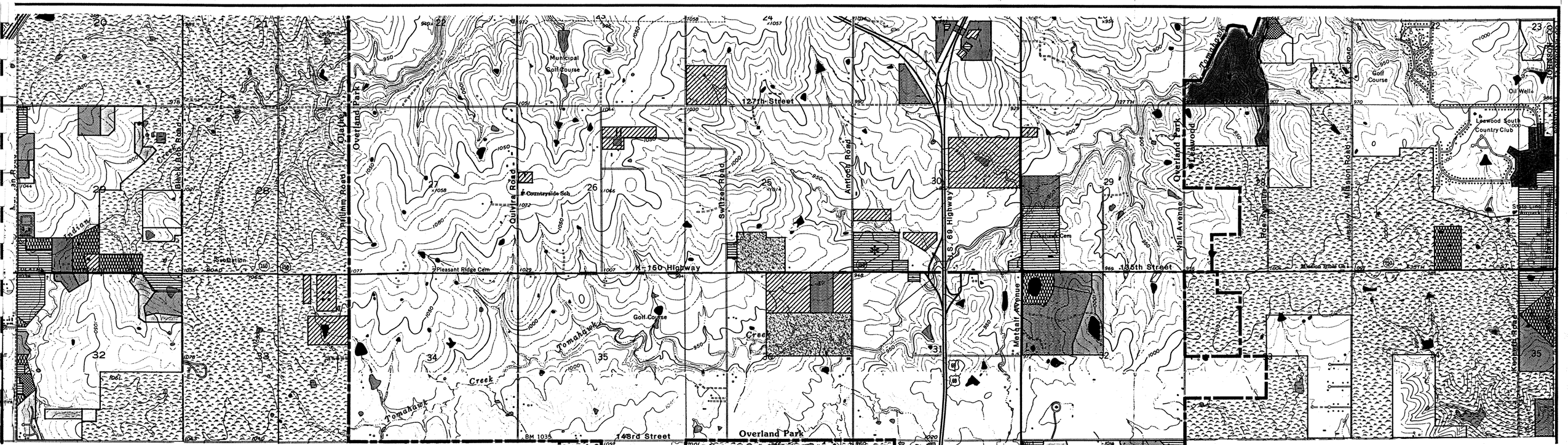
East of Pflumm Road, within Overland Park, a few single-family residences have developed along K-150 to Nieman Road. The Pleasant Ridge Cemetery is located on the north side of K-150 between Pflumm Road and Quivira Road, and a church and an elementary school are located north of K-150 on the east side of Quivira Road. On the south side of K-150 between Nieman Road and Switzer Road, is the St. Andrews Golf Course and the City of Overland Park Community Park and Farmstead. Between Switzer Road and Antioch Road is a large sports complex operated by the YMCA on the south side of K-150 and south of that is Millers Woods, a private softball/baseball recreational facility. North of K-150 is an indoor soccer club building. On the southwest corner of Antioch Road and K-150 is a nursery. A gas station facility is located just west of U.S. 69 on the south side of K-150. An abandoned service station and a storage yard are located on the northwest and southwest corners of Metcalf Avenue and K-150.

A landscaping nursery is located on the north side of K-150 between Nall Avenue and Roe Avenue in the City of Leawood. A church is located on the northwest corner of Mission Road and K-150. Several residential tracts have developed south of K-150 along Mission Road, and a large residential development surrounding the Leawood South Country Club is located southwest of State Line and 127th Street.

Zoning:

As can be seen on Figure 8, the Existing Zoning Map, the K-150 Corridor is designated as a mixed use corridor with a variety of uses. Commercial and office development and zoning have been requested and are being planned along the corridor at major intersections. A major recreational area exists within the middle of the corridor, and substantial residential development has taken place and is planned on either end of the study area, where sewer availability exists.

The majority of the land within the corridor is zoned Agricultural (Olathe and Leawood) or Single-Family Residential (Overland Park) representing the undeveloped nature of the corridor. Commercial and office zoning generally exists along K-150 east from Mur-Len Road to Black Bob Road in Olathe. Recreational zoning is located along K-150 between Switzer Road and Antioch Road, and commercial zoning exists along the north side of K-150 from Antioch Road to U.S. 69 and at the intersection of Metcalf Avenue and K-150. Along Metcalf Avenue, both north and south of K-150, light industrial zoning exists on two parcels. Commercial and office zoning is located east of Mission Road on the north side of K-150 and at the Kenneth Road and K-150 intersection in Leawood.



legend

AG	RP-4	C-2, CP-2 * C-P	
R-1, RP-1	RP-5	M-1	
R-2, RP-2	C-0, CP-0	SPECIAL USE PERMIT	
R-3, RP-3	C-1, CP-1	PBC	

date	scale	north
11/25/85	1"=1,650'	
Figure 8		

existing zoning
k150 corridor study

There is relatively little existing development along K-150 at this time, and a land use pattern has not yet been established. Few constraints to ultimate development of the corridor exist in terms of future land uses and right-of-way acquisition. From an existing land use perspective, Mur-Len Road, Antioch Road, Metcalf Avenue and Kenneth Road/State Line Road intersections with K-150 appear to be the major commercial locations.

There are relatively few existing land uses along the corridor which will influence or affect the future development of the corridor. The largest concentration of land uses is the major recreational area located between Nieman Road and Antioch Road generally on the south side of K-150.

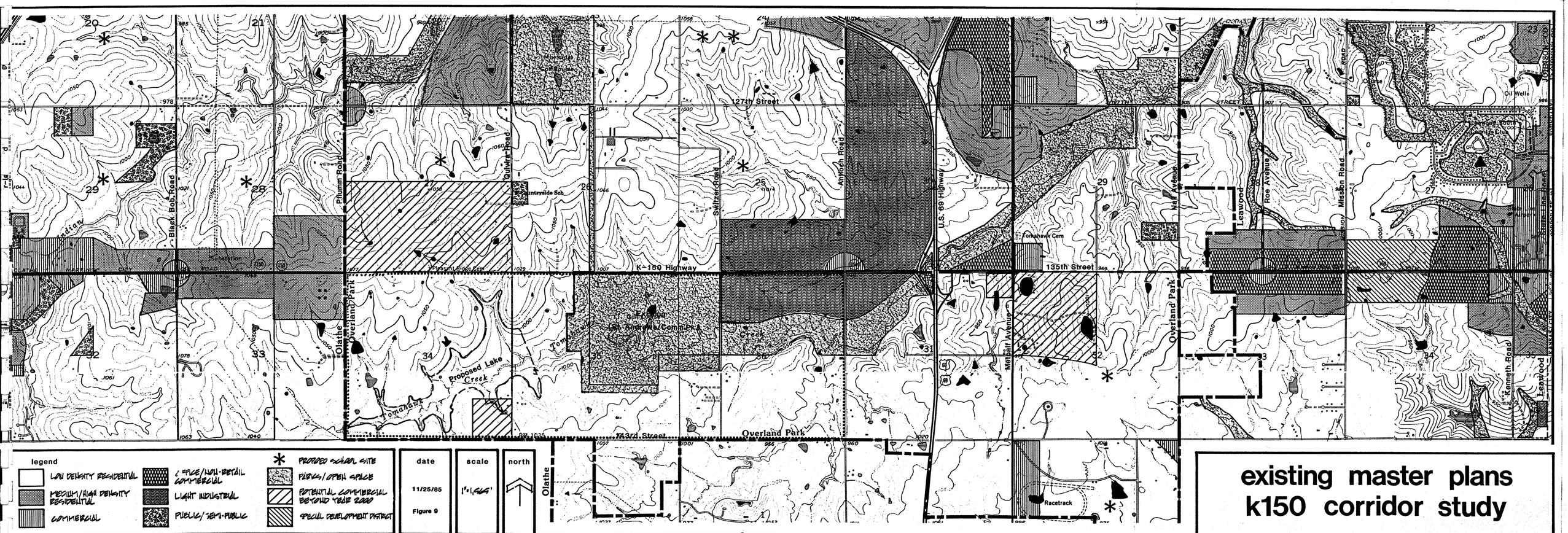
Master Plan/Comprehensive Plan Designations

Each of the cities within the study area has adopted master plans including plans depicting the future land uses for the properties involved within this study. The Master Plan/Comprehensive Plan Designations map is a compilation of Olathe, Overland Park and Leawood Future Development Plan designations as they currently are shown. This map is shown as Figure 9.

The City of Olathe has designated the land along K-150 as a mixture of commercial and medium/high-density residential development. The commercial designations are centered around the Mur-Len Road and Black Bob Road intersections. The remaining property within the study area is mainly designated for low-density residential development with a few public/semi-public and school/park sites centrally located within the development areas. The Master Plan designation along the Pflumm Road boundary with Overland Park is medium/high-density residential approximately 1,700 feet north and south of K-150 and low-density residential beyond that to 127th Street and 143rd Street, north and south of K-150, respectively.

Overland Park's Future Development Plan designates the majority of the land within the study area as future land needs beyond the Year 2000 and classifies property into two broad categories: residential and nonresidential. Almost all of the undeveloped land south of K-150 and approximately the western half of the land north of K-150 is included within these categories. Specifically, a large future nonresidential area is designated from K-150 one-half mile north from Pflumm Road to Quivira Road. Another large future nonresidential designation occurs south of K-150 between Metcalf Avenue and Lamar Avenue. The remaining land within this "beyond 2000" area is mainly designated for residential use with two park sites proposed within these areas.

South of K-150 and east of Nieman Road, a golf course and community park are designated as open space, along with a corridor approximately 1,000 feet wide following Tomahawk Creek northeast to 127th Street and Lamar Avenue. A large area in the center of the study area in Overland Park is designated as light-industrial located along both sides of



existing master plans k150 corridor study

K-150 east of Switzer Road to U.S. 69 and between Antioch Road and U.S. 69 to 127th Street and north. A potential commercial center is shown within this area at Antioch Road and K-150. Commercial and office development are shown for the northeast and northwest corners of K-150 and Metcalf Avenue. Another commercial area is shown for the southwest corner of 127th Street and Metcalf Avenue, surrounded by medium/high-density residential. The remaining land north of K-150 and east of Metcalf Avenue is generally low-density residential.

Leawood has designated the K-150 Corridor for non-retail uses and as a special development district for approximately 800 to 1,000 feet on both sides of K-150 from the border with Overland Park to just west of Kenneth Road. The Roe Avenue/K-150 intersection has been designated commercial, as well as land surrounding K-150 approximately 600 feet west of Kenneth Road to State Line Road and north one-half mile. Medium-density residential land buffers the non-retail and commercial land from the agricultural and rural density residential land to the south, and the low-density residential land to the north within the study corridor. In addition, there is an extensive system of open space in the form of greenway corridors proposed within the study area.

The combined proposed land uses currently designated by the cities of Olathe, Overland Park, and Leawood provide for a variety of uses along the K-150 Corridor. The land use occupying the most area within the study area is low-density residential, which will have a key role in the development of the future land use plan. Based upon the existing development adjacent to the Corridor and the land uses proposed in the existing Master Plans, low-density residential development appears to be very appropriate as the major land use within the Corridor setting. It is worth noting at this point that 127th Street and 143rd Street are generally not shown as commercial locations, especially west of U.S. 69, and that K-150 is shown as the location for almost all of the intensive residential development.

Land uses adjacent to K-150 become more intense and reflect the nature of an arterial highway. Commercial uses are currently proposed at five major locations along K-150: Mur-Len Road, Black Bob Road, Quivira Road, Metcalf Avenue, and State Line Road. Minor commercial locations are shown at Antioch Road and Roe Avenue. The remaining portions of the K-150 frontage are shown as office, multifamily, single-family, light-industrial and park and open space. Taken together, it is quite a mixture of land uses, but not unusual for a nine-mile stretch of highway.

Several areas on the existing maps have the potential for conflicting land uses including the Pflumm Road boundary north of K-150 where commercial development is designated across the street from single-family development; west of Antioch Road and north of K-150 where light industrial development is shown adjacent to single-family residential; the boundary east of Nall Avenue where non-retail development is designated adjacent to single-family residential; and the southeast quadrant of

the U.S. 69 and K-150 intersection where single-family abuts office and commercial development and U.S. 69.

Ownership Patterns

Ownership patterns along the K-150 Corridor reflect the rural, undeveloped nature of the area with large, undivided parcels characterizing the majority of the frontage. There is only one residential subdivision located adjacent to K-150, Briarwood, located on the south side of K-150 between Black Bob Road and Mur-Len Road in Olathe. The majority of the properties along K-150 have frontages of 1,320 feet or ¼-mile, or greater. The average size of parcels with frontage along K-150 in approximately 40-80 acres, with a few parcels of 320 acres, and several smaller parcels from 5 to 20 acres.

A common dividing line separating properties appears to be located one half-mile back from K-150 both north and south. This location seems to be fairly consistent along the entire length of K-150, except where the property has been subdivided for residential lots. There is also a common division between properties at a quarter-mile distance north and south of K-150, but it is not quite as consistent and occurs occasionally within several sections.

It appears that the ownership pattern along K-150 is primarily one of large parcels, with a few smaller properties located along its frontage. This ownership pattern should serve to assist the effort to provide consistent access standards and hopefully facilitate the use of rear lot frontage roads, located at least one quarter-mile back from K-150. Locating the reverse frontage roads one-half mile back from K-150 would place the access road too far from the proposed commercial and office uses it would serve, and the separation of land use function of the reverse frontage roads would not be served. Using the one-fourth mile distance for the location of the reverse frontage roads should provide a consistent and workable guide for the cities to use.

ANALYSIS

The following chapter offers an analysis of the information collected on land use and utilities. It also provides a discussion of urban design issues and an explanation and discussion of the traffic analysis performed. In a land use and transportation study such as this, it is difficult to confine the discussion of certain issues to separate sections given the great amount of overlap of those elements. For example, the concept of the reverse frontage roads or access roads is a proper subject of the land use, urban design and transportation sections of the report. With that in mind, this and other issues have been addressed throughout the report as the discussion has warranted.

Land Use

Several factors were examined to determine the proposed land use plan for the study area. One was the existing land use pattern in the area. All existing uses and structures were platted and reviewed with respect to type of use, extent of development, and location of structures in relation to major highways. By reviewing the existing land uses, development patterns could be studied and potential constraints to future development patterns identified and analyzed.

The existing land uses along K-150 within the study area should not substantially affect or control the future development plan approved as a part of this study. There are relatively few existing uses along the corridor and they do not encompass large amounts of land. The only exception to this observation is the large concentration of recreational uses in the central portion of the study area south of K-150. The St. Andrews Golf Course, Overland Park Community Park and Farmstead, Miller's Woods and the Y.M.C.A. complex comprise the majority of the land between Antioch and Nieman and set the pattern of recreational land uses in that area.

Another factor that was considered in determining land uses was the zoning that exists in the area for projects that have not yet developed. Zoning approvals that had been granted previously were analyzed as to whether or not the locations were appropriate for the development proposed. There are only a few areas within the study area that have existing zoning, and these locations are dispersed along K-150 at the major intersections, mainly with commercial zoning proposals. Most of the remaining land within the study area is undeveloped and reflects agricultural or single-family residential zoning.

There does not appear to be any existing zoning in the study area that is in conflict with the development concept of K-150 as proposed. The majority of the areas zoned are at intersections or locations which this study proposes for commercial or other non-residential uses.

The Future Development Plans of the cities in the study area were reviewed and the proposed land use patterns and potential areas of conflict were noted. Where there were areas of

potential conflict between land uses, alternative land use arrangements were considered. The ultimate land uses proposed for the Corridor were based upon the goal of minimizing land use conflicts and providing compatible and complementing uses wherever possible. In some cases where more intensive nonresidential uses were proposed adjacent to low-density residential uses, a buffer area of medium-density residential uses were used to protect the lower-density residential neighborhoods. In other cases, proposed open space areas or access roads were used to separate potentially incompatible land uses from each other.

Several meetings were held with representatives of the development community regarding the potential development of the corridor. Items discussed included the timing and future uses in this area. Land owners and developers in the area were also heard from at a public input meeting held to discuss the K-150 Corridor planning effort. Several land owners and developers have submitted proposed development plans for their properties which have also been considered by the respective staff members of the city where the property is located.

The individual cities prepared their portions of the proposed land use plans, and they were combined into a comprehensive map and reviewed and analyzed for compatibility at the common city boundaries. Once the land use arrangement was found acceptable, levels of intensity and density were established to determine the proposed square footages of nonresidential development and residential dwelling units associated with the plan. These figures were then used by the traffic consultant to determine the impact of the proposed development scenario upon the area street system. The resultant traffic impact was then reviewed and additional changes to the land use plan were made in an attempt to reduce the volume of traffic generated by the potential development.

Development within the study area is currently characterized by residential and commercial development on the western end of the corridor, residential development on the eastern end, with recreational uses in the central portion of the area. There are a few minor commercial and industrial establishments located along K-150 and several single-family homes and farm houses scattered throughout the study area. Based upon the development pattern in the area surrounding the corridor, residential development can be expected to continue in the areas with sewers available, with subdivision activity likely to approach from the north and west. Nonresidential development will probably not occur from any one specific direction along the corridor, but sporadically with the most likely locations at the intersections. In the event that development approval is requested prior to the improvement of K-150, any right-of-way required to provide for the ultimate improvement for K-150 or other roadways should be dedicated prior to development approval. This dedication will ensure that the necessary right-of-way will be available when the roadway construction begins.

In addition to acquiring the necessary right-of-way for K-150, another important aspect of the K-150 Corridor plan is the reverse frontage road system. For the system to function properly and serve the purpose of providing consistent access to development along K-150, the right-of-way must be acquired for the frontage roads as projects are approved in the area. In addition, the alignment of the reverse frontage roads across municipal boundaries must be established and maintained to assure the vital continuation of the system.

If properties develop along K-150 between the major north-south arterials without access to the arterials, temporary access from K-150 may have to be approved until access from the frontage road can be provided. A policy for temporary access approval should be arranged with the Kansas Department of Transportation.

Urban Design

Urban design considerations are timely because relatively little development has occurred and, therefore, the shape and character of the area can be designed to create an environment which will foster the lifestyle and sense of pride that is an integral part of Johnson County living.

The following urban design categories should be considered within the context of the K-150 Corridor development.

Open Space

- County, city and neighborhood open space systems should function as one system.

- Distinctive natural features should be retained and used to provide physical separations, visual interest and scale.

- Existing open space systems should be preserved and reinforced with connecting links.

Circulation

- Roadways should be used to organize and define communities and their neighborhoods.

- Pleasant walking environments should be provided.

- Alternate transportation systems should be explored and developed as part of the circulation system where appropriate.

During the deliberations and discussions of the study team and task force, the issue of providing for both the through-traffic and access functions of K-150 has arisen as an important consideration. One commonly used method of preserving the through-traffic function of a highway is to restrict access to certain locations and provide frontage roads as the means of access to individual properties with highway frontage. Often in

urban situations with heavy traffic volumes, the point where frontage roads intersect with the arterial highways becomes a location of major traffic congestion. An alternative frontage road design has been utilized for the K-150 Corridor which locates the frontage roads to the rear of the properties adjacent to K-150 approximately one-quarter mile in distance. Figure 10 portrays the two frontage road scenarios. An advantage of the "reverse" frontage road system is that the intersection of the frontage road with the arterial streets is moved away from K-150 and thereby eliminates a potentially congested "double intersection" situation. The reverse frontage roads also serve to define and separate land use areas and functions within the Corridor.

Figure 11 depicts a conceptual arrangement of the proposed circulation and access system within a typical section of the Corridor. The intensive land uses at the arterial intersections along K-150 could have limited access from K-150 but the major access focus would be from the north-south arterial and collector street system and from the reverse frontage roads located to the back of the development. The frontage road system would ultimately be continued to form an access road system running parallel to K-150 throughout the Corridor serving as a collector road within the overall area circulation pattern.

Figure 12 presents a potential development scenario along a portion of the corridor showing possible land uses with the frontage road and access system in place. As the diagram illustrates, the reverse frontage road serves to separate the land uses planned, as well as provide for the major access needs to those uses. A wall and/or landscape buffer would appear to be appropriate along the frontage road to screen the residential development from the commercial traffic.

Views

- Views within the built environment are important in visually perceiving the organization of physical development. Views of unique urban character should be preserved or enchanced.

- Street alignments and setting of buildings in residential developments should be designed to avoid long views of back yards, service areas, and parking lots.

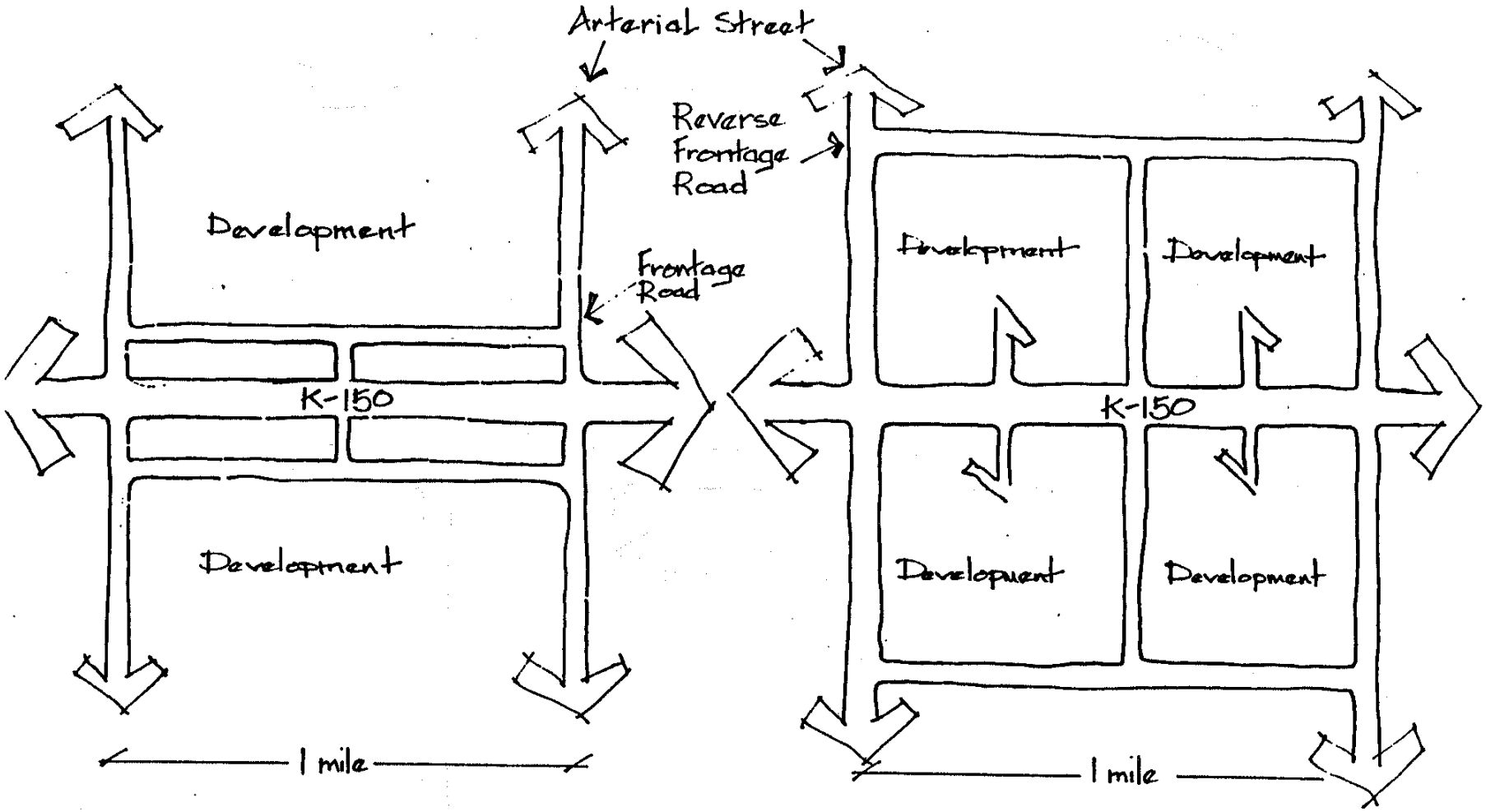
- Signage and street graphics should be in character with the surrounding environment and tastefully designed so as not to dominate significant views.

Urban Form

- New development should preserve or enhance the natural environment and character of the development area.

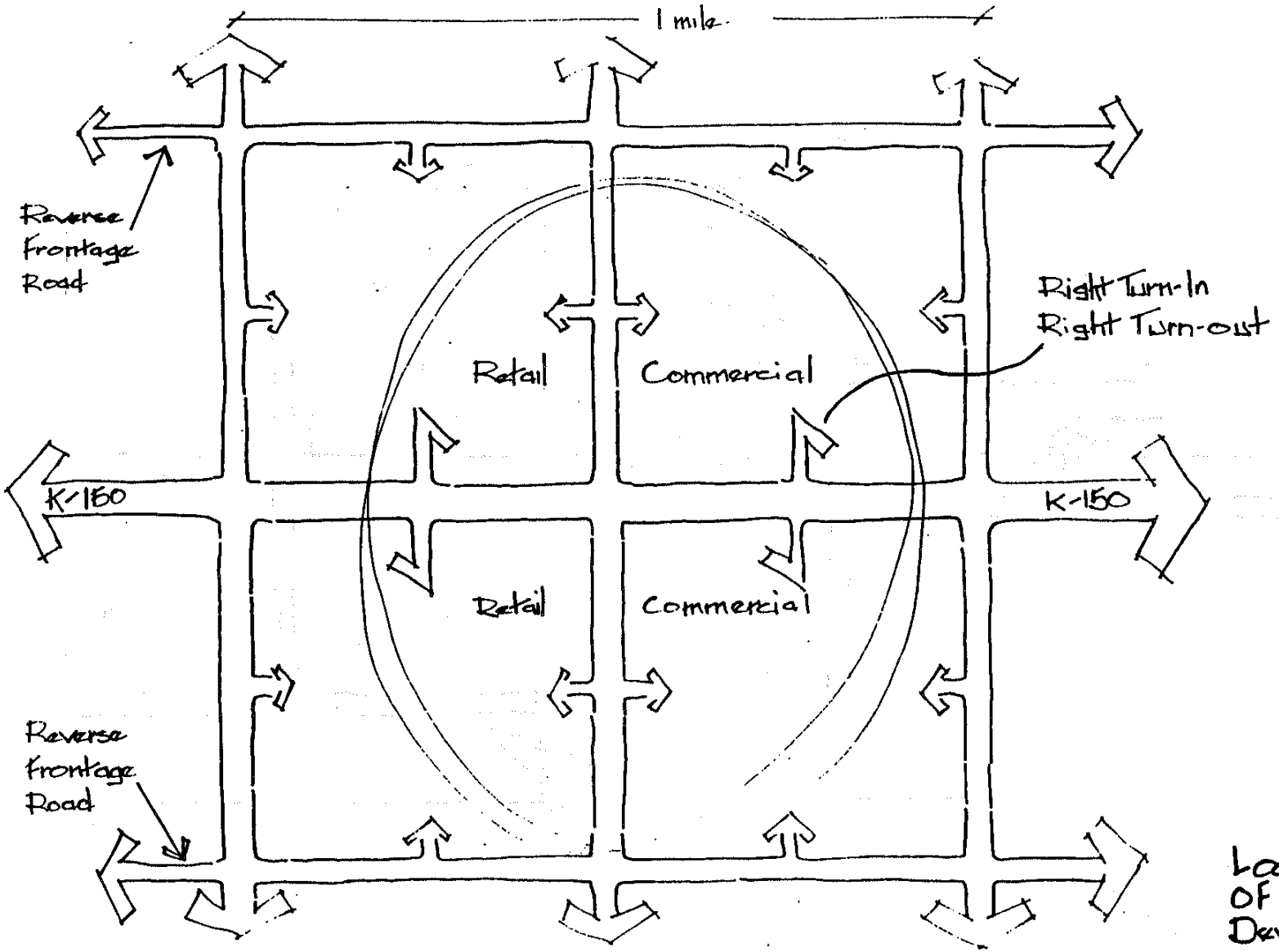
- Building design should respect significant land forms either by being subservient to or enhancing them in a carefully designed manner.

- When building on a ridgeline, building form should not break or detract from the natural lines of the hilltop.



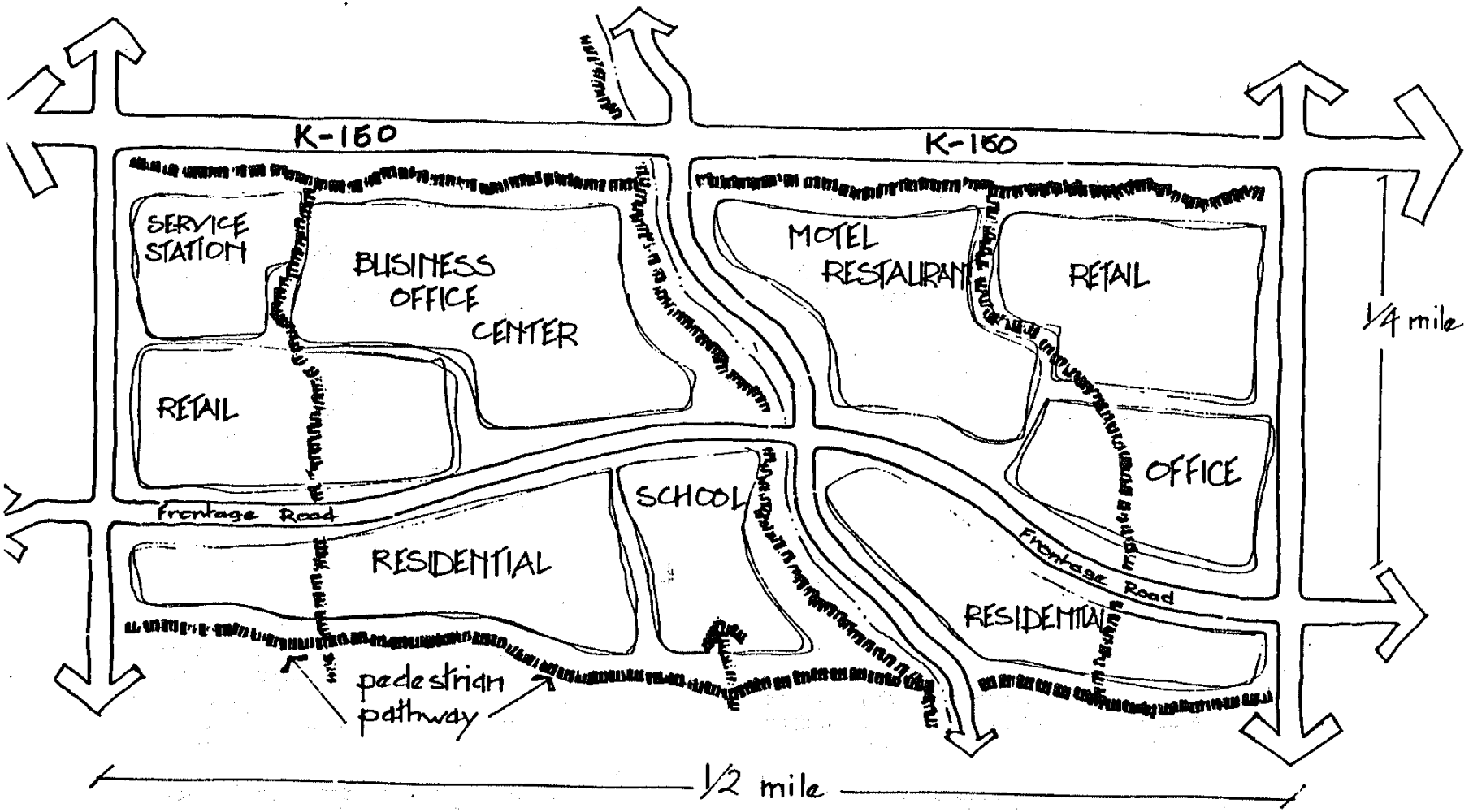
Frontage Roads

Figure 10



Location Of Developme

Figure 11



Types of Development

Figure 12

Urban Form (cont'd)

- Whenever possible, natural streams or other natural features should be incorporated into the building or site plan as special elements.

- Special design considerations should be given to buildings in highly visible locations.

- Buildings in most cases should be landscaped with low-level plantings and shade trees to soften the impact of the architecture and provide a human scale.

Transportation

The analysis and planning of the transportation system is central to the development of any future plan for K-150. Past, as well as future growth is, to a large extent, dependent upon sufficient transportation facilities. For the most part, the growth of Johnson County has followed the development of the major highway system. I-35, extending southwest from the Kansas City metropolitan area, is a prime example of the corridor effect upon suburban expansion. The substantial developments of the College Boulevard and I-435 corridors are further evidence of how growth patterns occur in relationship to the construction or expansion of major transportation facilities.

As the stated purpose of this study emphasizes, the planning of future developments along K-150 will be a primary concern of all three suburban cities. The planning of this growth requires that there be a balance between the public and private interests in development. The ultimate configuration of K-150 will affect the value of those properties adjoining it, as well as the benefits and costs to the taxpayers in terms of the right-of-way expenses, construction expenses, and the less definable characteristics of convenience and safety for motorists.

For these reasons the Task Force, in preparing the plan for K-150, has been concerned with the future design of the street and the ultimate right-of-way to be required. Although it would be inappropriate to term the current transportation planning efforts completed for the K-150 Corridor as a design study, many roadway design related elements were addressed such as lane widths and the number required, the provision of roadway drainage, the presence of shoulders, curbing, and sidewalks, and the type of access control. These items, as well as others, have been considered in the context of estimating right-of-way requirements. Land development and travel demand are highly dependent upon one another and cannot be separated in any analytic process. In one sense, the land use surrounding a major street will define the ultimate traffic load placed on the roadway. Also, the vehicle capacity of the roadway can determine the nature and extent of the land uses which may be placed along it.

In order to find a balance between land development and the transportation system required to serve it, certain general assumptions must be made. A particularly important

assumption involves the manner in which the travel demand will be satisfied. Because of the relatively low density of the employment centers and residential areas of Johnson County, it has been assumed that public transportation will continue to serve a minor role in providing for the transportation requirements of the general populace. As such, today's patterns, characterized by the use of the privately owned automobile, have been assumed to remain stable over the planning period and will account for over ninety percent of the person movements along and through the study corridor.

The Computer Model

The urban transportation planning profession has long been concerned with the relationship between land use and travel demand characteristics and has developed a number of processes to respond to this type of issue. In an attempt to predict the future traffic patterns based on projected land uses, a process of systematically "modeling" the traffic system is used. The model developed for this study was constructed to estimate P.M. peak hour vehicle trip patterns occurring within the K-150 study corridor after the projected development within the area is completed. The weekday peak hour condition was selected because it approximates the traffic demand which would be used to guide roadway design decisions made when the ultimate development scenario would be realized within the planning target date. Because the primary objective of the traffic analysis is to determine the ultimate right-of-way requirements, it was not considered crucial to estimate when this ultimate development scenario would be realized. However, based upon past development patterns and timing in the area, an estimate of the target date would place it approximately in the year 2025, or a 40-year time frame.

In order to accomplish this modeling process, a series of separate analytical steps are carried out in succession. First, study area limits are defined and a traffic zone system is developed to provide a geographical base corresponding to the land use data and the street and highway system to be evaluated. This information is then coded into a data file to be used by the planning software.

The next major step in the modeling process is to estimate the trip generation characteristics associated with the land use for each zone. When this task is completed and the total trip productions and attractions have been balanced for the entire study area, the trips are distributed among the zones based on an empirically derived equation typically termed the "gravity model". Once the trips have been distributed, travel paths are determined based primarily on the shortest travel times between each zone pair. By summing all the trips assigned to each street segment, traffic volumes are estimated for the street network.

The model can be modified to reflect different types and amounts of land uses, as well as different widths of selected streets. The resulting "model" will indicate how well certain street widths will be able to handle certain future volumes of traffic, or how

nearly the volumes come to the streets' ultimate capacities. With the advent of computers, this process has become substantially faster, more accurate, and more flexible.

The computer model used in this study was TMODEL-EX developed by Professional Solutions, Inc., of Vashon, Washington. The program has been purchased by the City of Olathe and will operate on computers owned by each of the participating agencies involved in the study.

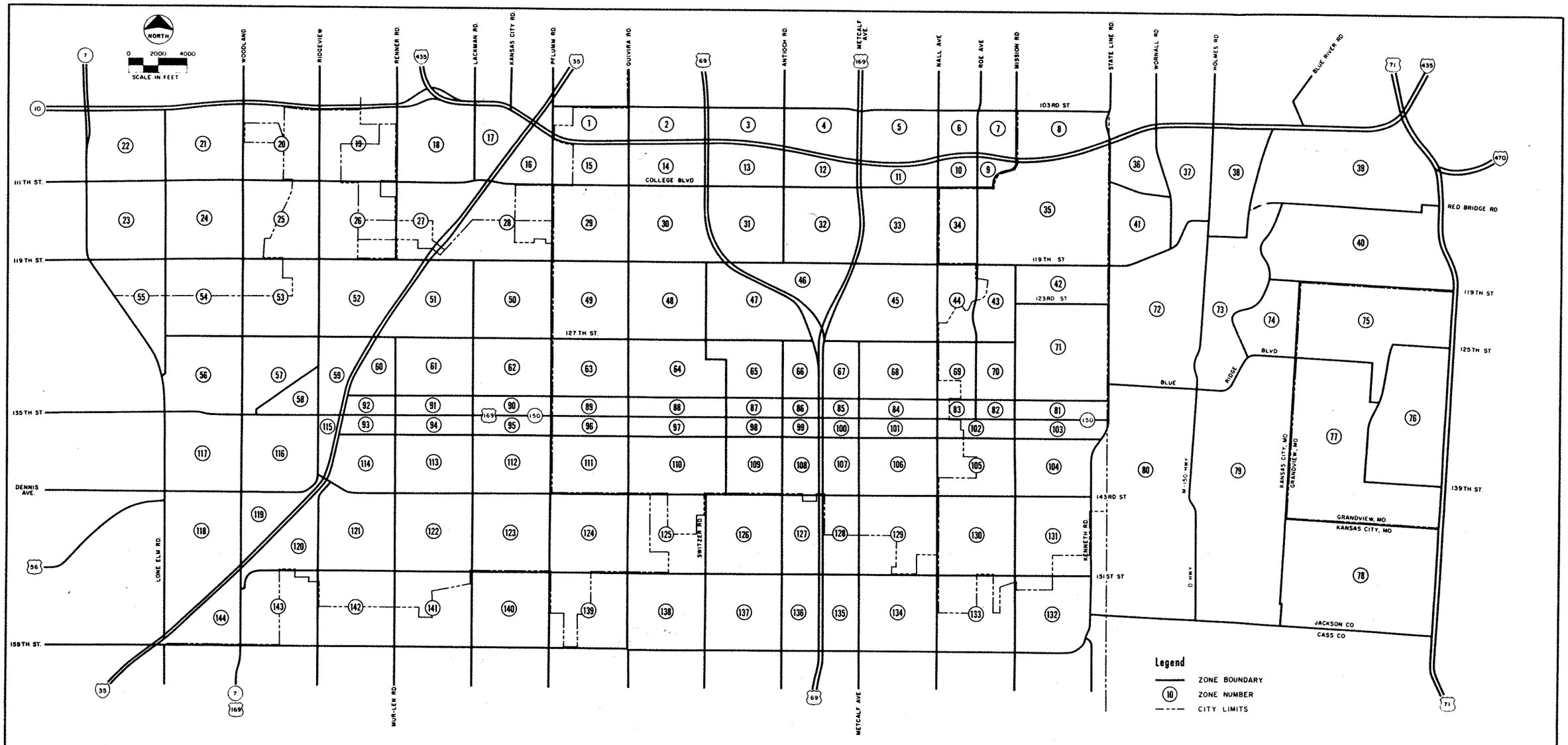
Study Areas

For the K-150 study, an estimation of the traffic volumes was needed along the K-150 Corridor including that area south of 127th Street and north of 143rd Street from Mur-Len Road in Olathe to State Line Road. Due to computer memory constraints, the TMODEL-EX program limits the size of the study network. Therefore, the study area was divided into two interrelated networks, a primary study area and secondary area. The primary study area includes the K-150 Corridor and is bordered to the north by K-10 and 103rd Street, to the south by 159th Street, to the west by K-7 and Lone Elm Road, and to the east by U.S. 71. The secondary study area includes the remainder of the Kansas City metropolitan area. To model the traffic network, TMODEL-EX requires the study area to be redefined into zones. Each traffic zone represents a portion of the study area where its land uses, either existing or proposed, will determine trip productions (origins) and attractions (destinations) for that zone. Zones defined for the primary study area are shown on Figure 13 (Part 1 of the Zone Map), while secondary study area zones are shown on Figure 14 (Part 2 of the Zone Map).

In defining the transportation system for this study, the model was designed to provide the most detailed and realistic results possible for the K-150 Corridor area. No attempt was made to generate results applicable to areas outside the primary study area. The sizes of zones in the study area reflect these considerations. Approximately 120 zones typically one square mile in size were assigned in the primary study area, while approximately forty significantly larger zones were established for the secondary area. Adjacent to K-150 between Mur-Len and State Line Road are zones typically one-quarter mile deep with one mile of frontage which were developed to provide more control in estimating the travel demand on K-150 and the frontage road systems.

Street Network

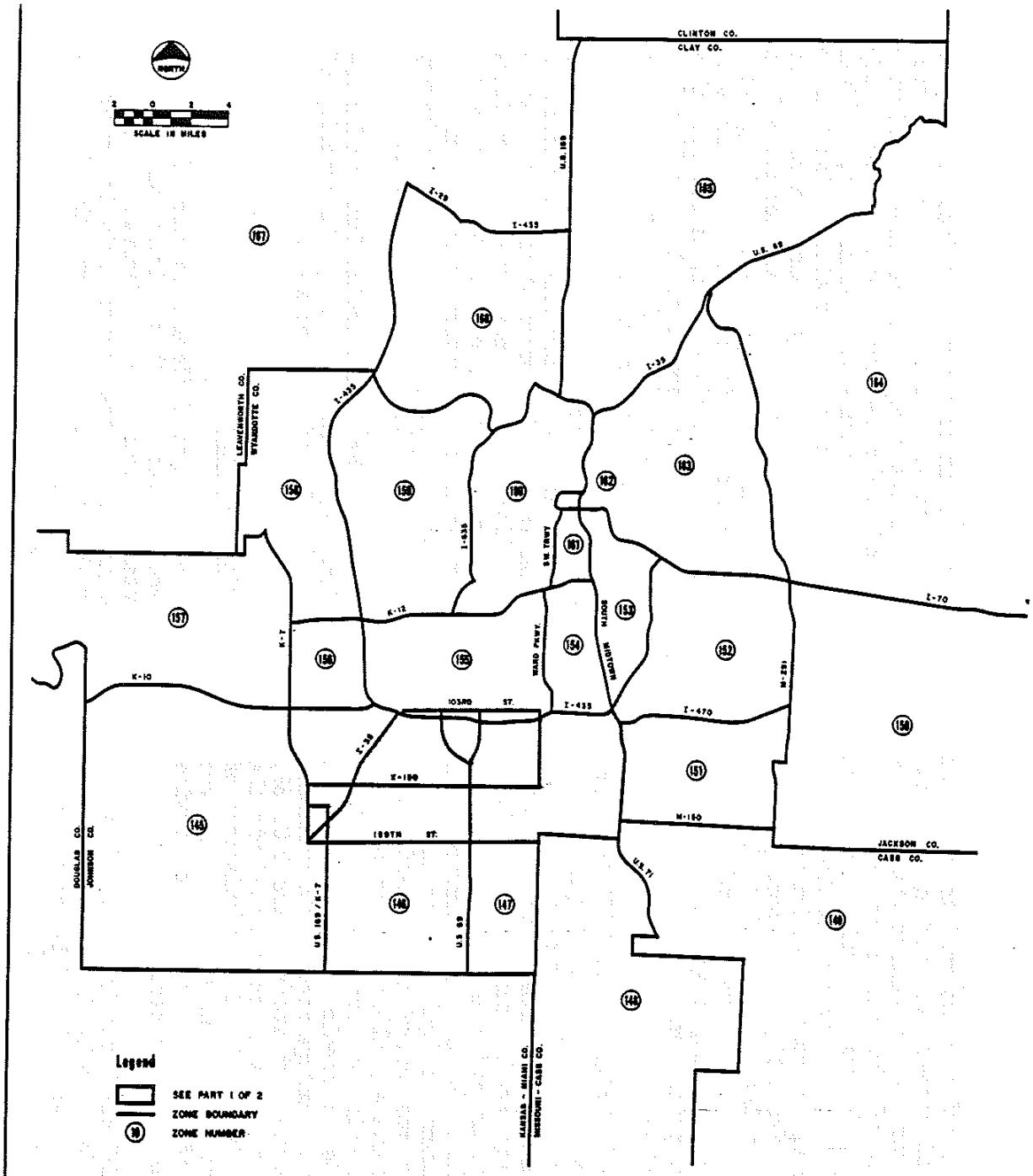
Another important technical assumption made during the course of developing the computer model involved the basic traffic network design; that is, the location and characteristics of the thoroughfare system when the area is completely developed. Arterial facilities were modeled as four-lane segments (two lanes each way) and freeways were modeled typically as six-lane roadways (three lanes each way) corresponding to existing and proposed cross-sections.



Zone Map
Part 1 of 2
K-150 Corridor Study

JBM JOHNSON, BRICKELL, MULCAHY and Associates, Inc.
Consulting Engineers

Figure 13



Zone Map

Part 2 of 2

K-150 Corridor Study

JBM JOHNSON, BRICKELL, MULCAHY and Associates, Inc. Consulting Engineers

Figure 14

Because the model was designed to represent the completed street and highway network, assumptions were made regarding the ultimate configuration of the street network. For example, interchanges are being considered along I-435 at Nall Avenue, Antioch Road, with another vendor contract at Quivira Road. Since these facilities will hopefully be constructed, nodes were included at these points to represent the interchange of traffic. Arterial facilities were included at the mile points and collectors at the half-mile points.

As part of the design of the K-150 Corridor, frontage roads approximately a quarter-mile north and south of K-150 have been included in the street system modeled by TMODEL-EX. These frontage roads ideally would filter local traffic through the corridor, provide access to the K-150 commercial corridor, and create a definitive boundary for land use transition to residential uses. K-150 would be left to serve a smaller fraction of these short-length trips and could be designed for higher speeds to handle trips of moderate length. These frontage roads would intersect all major north-south roads except U.S. 69, which would continue to be accessed via the interchange with K-150. Due to existence of park land and open space, the south frontage road west of U.S. 69 would not provide continuous east-west access.

The use of TMODEL-EX requires the definition of a link/node network. Links represent the roadway system and, for this study, were assigned along arterials and freeways. Nodes represent intersections and interchanges, or zone centroids. The links and nodes for each part of the study area are shown in Figures 15 and 16 for the primary and secondary study areas, respectively. Certain major links provided access and traffic distribution between the two study areas. Links in the primary study area are characteristically a mile or less in length, due to the greater amount of detail in this area, while links in the secondary study area may be several miles in length. Node connectors load traffic from the zone centroids to the links and may represent the collector street system.

The volume of traffic (in vehicles per hour) that a link can adequately accommodate is determined by the number of lanes provided by that link. For instance, arterial capacities were based on a value of 1,600 vehicles per hour per lane. Therefore, a one-way arterial link with two lanes would be coded as having a capacity of 3,200 vehicles per hour.

As with links, intersection lane configurations may be represented by the capacity of traffic allowed to enter a node.

Trip Generation

Zones generate different volumes of traffic based on the overall magnitude and type of internal land uses. Generally, traffic engineers use the report "Trip Generation," by the Institute of Transportation Engineers (ITE) to provide trip generation rates based on various land uses.

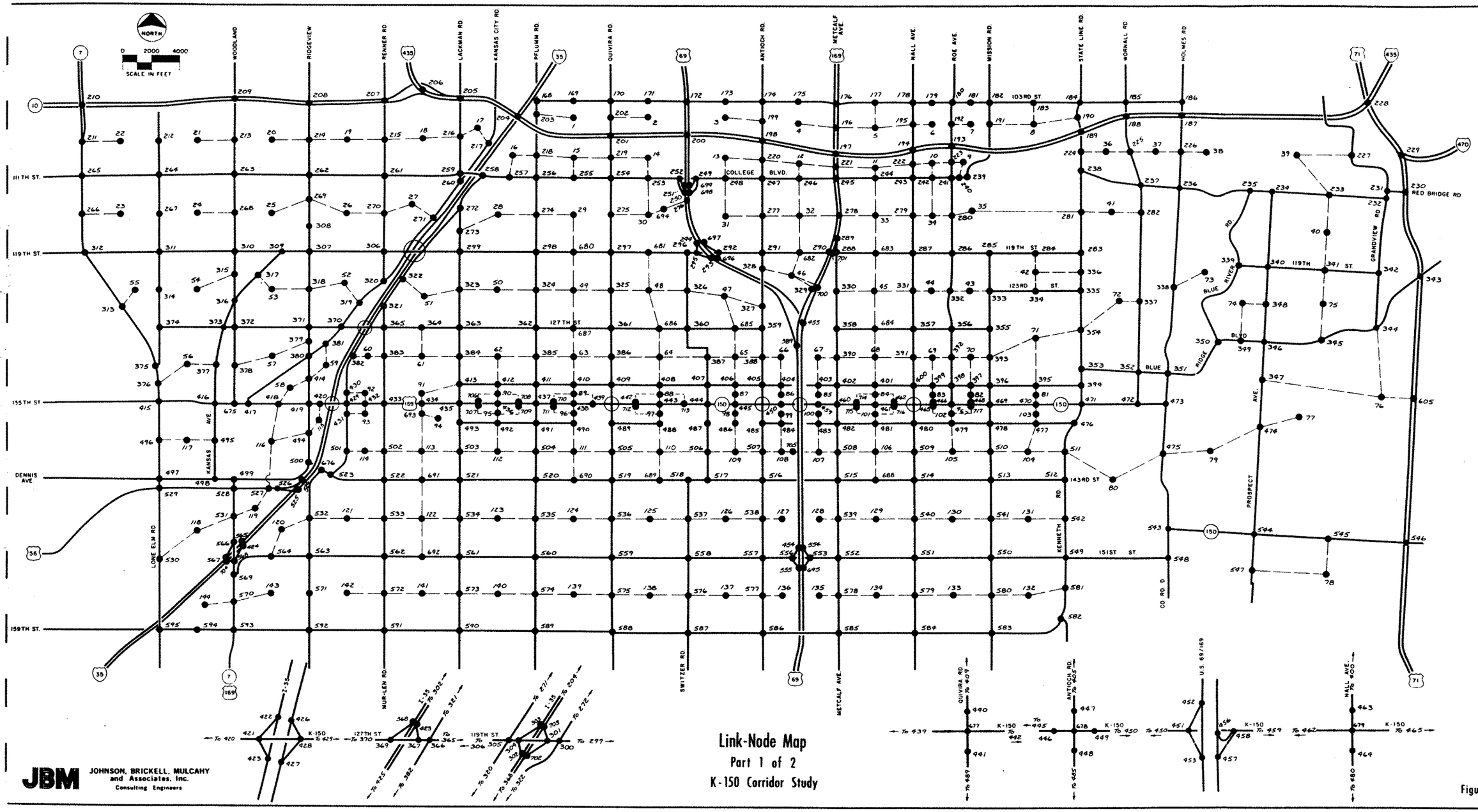


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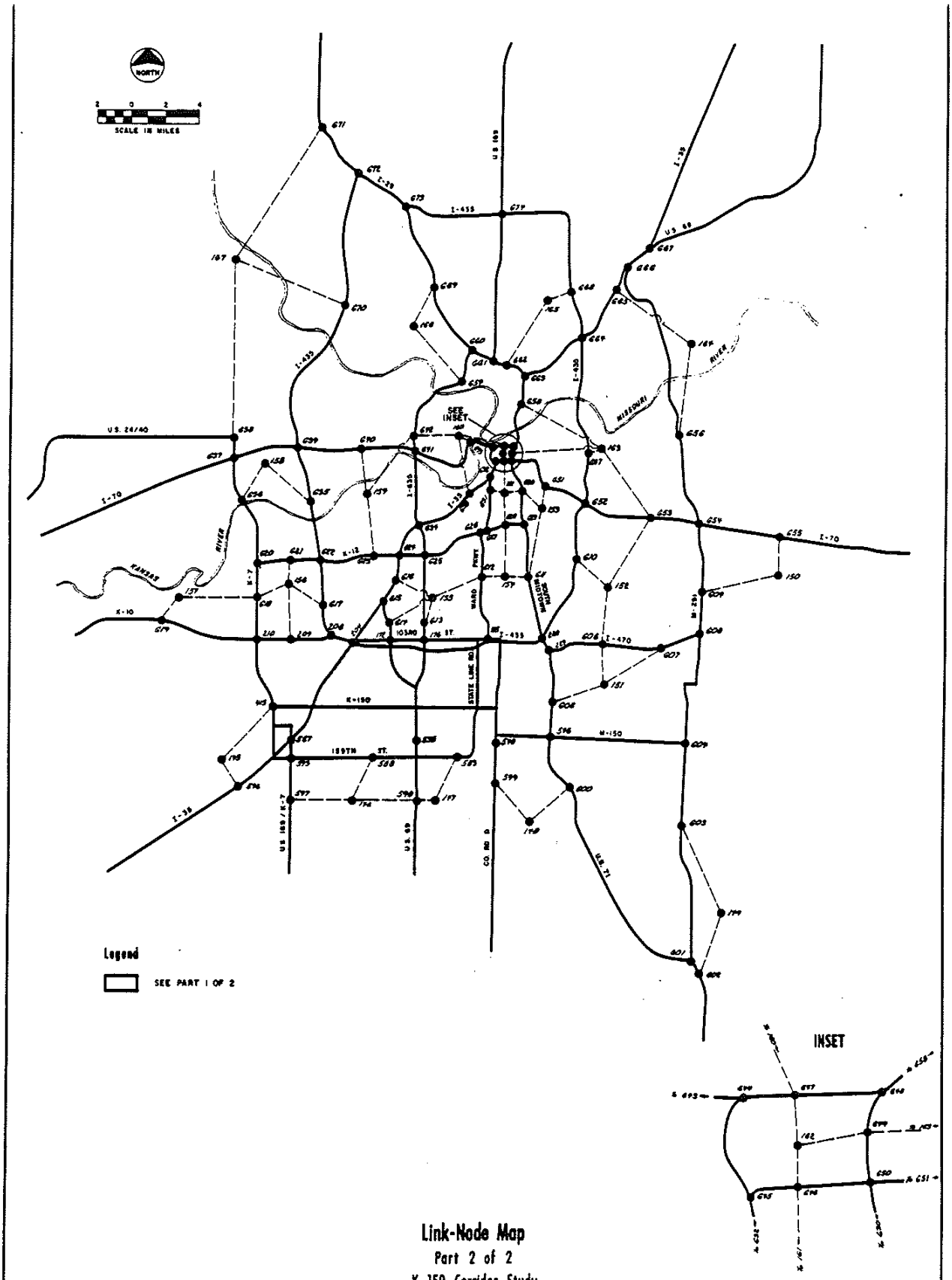
Figure 15



Link-Node Map
Part 2 of 2
K-150 Corridor Study

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Figure 16

Each of the arterial designs (Alternates A, B, C, and D) included at-grade intersections at mile points representing the north-south arterials. The freeway alternative included no at-grade intersections with K-150. The frontage road system was initially coded as a five-lane section as well as the north-south street at the half-mile point between K-150 and the frontage roads. The north-south street at the quarter-mile points were coded as three-lane facilities.

Comparisons of the traffic assignments associated with each of these design alternates show that the traffic patterns and volumes projected for the K-150 Corridor street systems are sensitive to the alternate selected. Increased capacities or increased speeds on street segments of one assignment may result in increased volumes when compared with the same street segments of other design scenarios. As a result, the freeway design of K-150 indicated higher traffic volumes than the arterial designs of K-150. Likewise, the eight-lane scenario also showed higher traffic volumes than the six-lane designs.

As previously indicated, the volumes generated by the assignment program reflected p.m. peak hour traffic. To estimate average daily traffic volumes, the peak hour volumes generated from the traffic assignments were multiplied by a factor of 9.5. This figure reflects a mix of trip generation values utilized for the future development and existing traffic counts taken on K-150. In other words, it has been estimated that the p.m. peak hour volumes represent approximately 10.5 percent of the average daily traffic volumes. Figure 17 shows the projected average daily traffic for the K-150 corridor study area street system. These figures are derived from the six-lane arterial assignments and represent estimated traffic flow after total development of the primary study area.

Generally, K-150 traffic between Holmes Road and I-35 is projected at between 40,000 and 50,000 vehicles per day west of U.S. 69 and is typically between 35,000 and 40,000 east of U.S. 69. An exception to this occurs between Metcalf and Antioch, where the projected volumes exceed 60,000 vehicles a day. This is partially due to the lack of access across U.S. 69 at 127th Street or at the frontage roads. As a result, traffic must converge to K-150, cross under U.S. 69 and diverge on the other side. Furthermore, traffic volumes on Metcalf and Antioch north and south of K-150 generally exceed typical volumes due to this convergence effect. Also contributing to this condition is the large quantity of office and commercial space planned for the area surrounding the U.S. 69 and K-150 interchange extending from 127th Street to 139th Street.

Frontage road traffic north of K-150 generally varies between 11,000 and 15,000 vehicles per day except between Quivira Road and Black Bob Road, where daily traffic exceeds 20,000 vehicles. Again, these higher volumes are largely due to significant traffic volumes from north of the corridor utilizing the frontage road system to gain access to the commercial development proposed for that area.

The cities and counties within the primary study area provided land use data for their respective zones. This land use data reflected the ultimate residential, commercial, office, and/or industrial development projected for each zone and served as the basis for estimating trip totals within the primary study area.

Trip totals were also provided for zones within the secondary study area. Home-based work, home-based non-work, and non-home-based productions and attractions were derived from regional transportation planning studies previously conducted by the Mid-America Regional Council (MARC). After balancing the productions and attractions to the ITE Trip Generation based trip totals, these trip values were entered into the program. These values were then used by the computer in the remainder of the assignment process.

Assignment

As in any computer model, assumptions must be made to limit input variables. For the K-150 Corridor Study, a scenario was developed that would represent the trip generation potential corresponding to the ultimate commercial, industrial and residential development foreseen by the respective planning staffs for the study area. Furthermore, the traffic assignment would represent the p.m. peak hour traffic on the system after the entire primary study area was fully developed as envisioned. Other assumptions involve design considerations, traffic capacities, and computer modeling considerations.

Numerous analyses were conducted on the traffic assignment output to test for validity and accuracy. These checks included traces of the travel time trees, determination of trip length frequencies, and reviewing the coding of the link/node and land use characteristics.

To test different design scenarios for K-150, alterations and modifications were made to the links representing K-150 between Mur-Len and State Line Road. The designs tested for K-150 included the following alternatives:

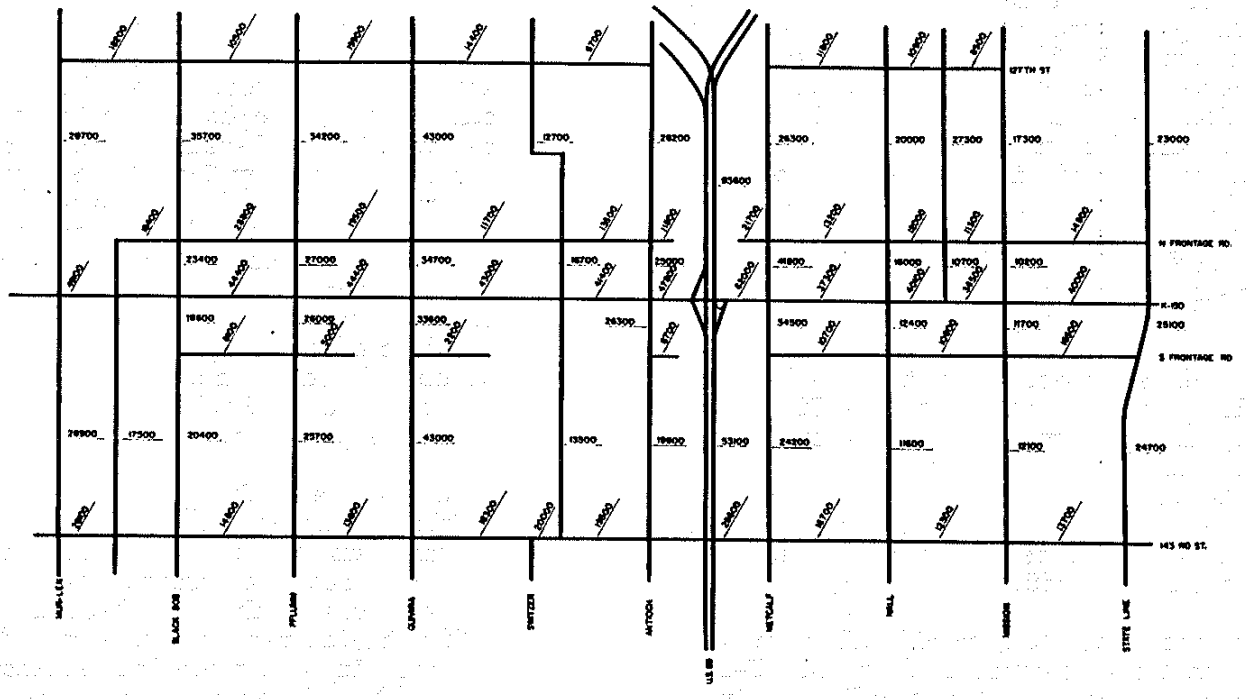
Alternate A. Six lane arterial with full at-grade access at half-mile points.

Alternate B. Six-lane arterial with right-turn-in/right-turn-out access at half-mile points.

Alternate C. Six-lane arterial with full at-grade access at half-mile points and right-turn-in/right-turn-out access at quarter-mile points.

Alternate D. Eight-lane arterial with full at-grade access at half-mile points and right-turn-in/right-turn-out access at quarter-mile points.

Alternate E. Six-lane freeway (no at-grade access.



Projected Average Daily Traffic Volumes
K-150 Corridor Study

JBM JOHNSON, BRICKELL, MULCAHY and Associates, Inc.
Consulting Engineers

Figure 17

Frontage road traffic volumes south of K-150 vary due to land use restraints. Because of parks and green spaces, the south frontage road west of U.S. 69 is segmented and does not provide for continuous east-west access between Antioch Road and Black Bob Road. As a result, traffic volumes are below 10,000 vehicles per day and, in some places, considerably lower. East of U.S. 69, the south frontage road does provide through access from Metcalf Avenue to State Line Road, and is projected to serve between 10,000 and 17,000 vehicles per day.

Traffic volumes posted for the north-south arterials which intersect K-150 were typically in the range of 20,000 to 35,000 vehicles per day. A notable exception to this is Quivira Road which shows volumes over 40,000 vehicles per day north and south of K-150. Over 90,000 per day were loaded onto U.S. 69 north of K-150.

Although not addressed specifically in the traffic analysis conducted from the K-150 Corridor Study, anticipated traffic loadings on 127th Street and 143rd Street have also been shown on Figure 17. Traffic volumes along 127th are typically 15,000 vehicles per day or less with abutting land uses almost wholly low density residential. Along 143rd Street, volumes range from roughly 15,000 to 25,000 vehicles per day west of Metcalf Avenue and between 13,000 and 17,000 vehicles per day east of Metcalf Avenue to State Line Road.

Capacity Analysis

Capacity analysis was conducted at major intersection locations for each of the final design alternatives. The planning analysis methodology, as explained in Chapter 9 of the Transportation Research Board's Special Report 209, Highway Capacity Manual, involves summing the critical lane volumes at signalized intersections and provides an assessment of whether or not the intersection capacity will be exceeded for a given set of demand volumes and street geometry. Since the specifics of the proposed signal operation is not considered in the planning analysis, no assessment of vehicle delay or level of service is possible.

In accordance with Highway Capacity Manual guidelines, intersections with critical lane volumes sums below 1,200 vehicles per hour were projected to operate below capacity. Intersections with sums between 1,200 and 1,400 vehicles per hour were considered to be near capacity and those intersections exceeding 1,400 vehicles per hour were considered to be over capacity.

After reviewing each assignment, the freeway design (Alternate E) and the arterial design, which would provide full at-grade access only at mile points, were eliminated from further consideration due primarily to the inability of these designs to provide adequate access to the abutting land. Turning movements at interchanges and intersections could not be

accommodated. The following table illustrates the results of the capacity analysis at selected K-150 intersections for the remaining alternatives.

CAPACITY ANALYSIS RESULTS
BY ASSIGNMENT

Intersection	Alternate A	Alternate C	Alternate D
Mur-Len and K-150	16% Over	13% Over	1% Over
Black Bob and K-150	Near	Near	Under
Pflumm and K-150	Near	Near	Near
Quivira and K-150	9% Over	17% Over	14% Over
Switzer and K-150	Near	Near	Under
Antioch and K-150	1% Over	Near	Under
SB US 69 Ramp and K-150	3% Over	3% Over	8% Over
NB US 69 Ramp and K-150	Near	9% Over	1% Over
Metcalf and K-150	19% Over	12% Over	13% Over
Mission and K-150	Under	Under	Under
Nall and K-150	Under	Under	Under
State Line and K-150	Under	Under	Under

The statistics presented above indicate that under average traffic conditions as assumed by the Highway Capacity Manual, the projected demand at the intersections of Mur-Len Road, Quivira Road, the U.S. 69 ramps, and Metcalf Avenue may exceed the available capacity regardless of design alternatives selected. However, approximately fifteen percent additional capacity beyond that which is utilized by the Highway Capacity Manual can be realized through stringent application of higher level design criteria and utilization of state-of-the-art traffic control techniques.

Naturally, the quarter-mile access schemes (Alternates C and D) do provide additional and more direct access to properties abutting K-150, and the benefits of distributing this traffic is more pronounced at the intersections at the half-mile points than at the mile points shown in the table. At the intersections located at the half-mile points, inbound right turns tend to be reduced as do outbound right turns.

Alternate D, the eight-lane arterial scenario, has all intersections projected to operate within fifteen percent. However, a portion of the additional capacity provided is consumed by additional attracted demand.

UTILITIES AND ENVIRONMENTAL FACTORS

Sanitary Sewers

The major issue regarding sanitary sewer service in the Corridor is the lack of sewers in a majority of the area. Beyond that issue is the question of the ability to provide service for future development. Future sanitary sewer service in the Tomahawk Creek Basin is crucial to the location and timing of potential development in the basin. As previously mentioned, the County is actively studying alternative options for treating the sanitary waste within the Tomahawk Creek Basin. The County's consultant for the study has identified four alternatives for detailed cost estimates and is proceeding with their analysis. The results of the study should be presented to the County Board of Commissioners in early 1986. The alternatives under study propose to expand the existing treatment plant in Lower Indian Creek Basin and/or build a new facility adjacent to the

existing plant, or build a new treatment plant at a location in the Upper Tomahawk Creek Basin in the vicinity of U.S. 69 and K-150. If a treatment plant is proposed for a location within the K-150 Corridor, the surrounding land uses may need to be reevaluated to reduce any negative impacts that could be associated with that plant. The proposed location of the treatment plant is currently designated for nonresidential land uses which should not cause any adverse impacts apparent at this time. However, the study results should be monitored and any decisions made about the location of treatment plants and sanitary sewer service should be incorporated into the development and implementation plans for the K-150 Corridor.

Water Service

No major water service problems exist or are anticipated in the study area at this time. The three water suppliers in the study area have expansion programs in progress and should be able to provide water service to future development within the corridor. However, with three separate water purveyors providing service within the study area, close coordination and cooperation between them and and the cities involved is necessary for the development of the Corridor. Plans should be drafted to deal with the coordination of water lines and service areas, and with potential drought and peak load water shortages.

Problems that currently exist within the study area include lack of water service to several homes scattered around the area, and the lack of adequate water pressure within a subdivision located just to the north of the Corridor. The lack of water service to the few homesites and farm houses within the area have caused some concern for public safety with regards to the ability to fight fires in the area. The situation does not seem to be critical or extensive and will eventually be corrected when development of the area proceeds and water lines are extended. Portions of the Corridor may be without water service for some time prior to development, though, especially the areas outside of established planned sanitary sewer districts. For the most part, the lack of water service should not be a major problem for future development of the K-150 study area.

The lack of adequate water pressure has been reported within the Nottingham Forest subdivision adjacent to the study area to the north which is served by Rural Water District #2. The problem should be improved by water storage and facility improvements planned by Rural Water District #2.

Hydrology

A majority of the study area is within the Tomahawk Creek Watershed, which extends through the middle of the Corridor along a southwest to northeast alignment. Tomahawk Creek is presently a relatively minor natural water course flowing mainly through undeveloped land within the study area. As development occurs within the Corridor, increased runoff will contribute to potential flooding problems for land located along the Creek. The cities involved in the study are concerned about stormwater management and

stormwater from developed land during periods of heavy rains, typically through on-site detention of stormwater.

During the K-150 discussions, the idea of a coordinated stormwater management system with a large retention area was considered as an alternative to requiring separate on-site detention on individual parcels. In addition to the stormwater retention benefits, exceptional recreational opportunities could also be provided by the creation of a large body of water as proposed.

Following the preliminary discussions held by the K-150 study team, the staff from Overland Park became keenly interested in the idea of a recreational lake and studied further potential locations along Tomahawk Creek for a reservoir. A proposed location was selected between Quivira Road and Pflumm Road south of K-150 to 143rd Street for a lake of approximately 180 acres. A preliminary hydrologic analysis was conducted by the Corps of Engineers on the proposed reservoir that showed that discharge rates and flow levels downstream of the reservoir during a storm could be substantially reduced with the proposed lake and dam in place. A preliminary feasibility and cost study has been performed for the proposed lake and the relocation of Quivira Road in the area. The study has determined that a lake of the size contemplated would be feasible in this location within the Tomahawk Creek watershed.

Overland Park staff has prepared a conceptual plan for a recreational complex encompassing three square miles from Pflumm to Antioch and K-150 south to 143rd Street. As currently envisioned, the 1,920-acre park would expand upon the existing recreational uses in the area and focus the development around the proposed reservoir. Recreational uses include a botanical garden and arboretum, fine arts and performing arts center, aquarium center, marina complex, an additional golf course, historical/cultural theme park, agricultural exhibits, picnic and camping facilities, multiuse sports fields and courts area, including tennis, softball, soccer, football, track and field uses, indoor recreation center and swimming complex, nature park and visitors centers. A variety of transportation modes within the park are planned from mass transit opportunities to a comprehensive pedestrian/bicycle system. In addition, two separate areas are designated as enterprise zones to be used for private developments of a compatible and supportive nature to the recreational use of the proposed park. Hotels, restaurants, convention center and commercial recreation facilities are the types of uses that are anticipated in these enterprise areas. Detailed plans and studies will be prepared for this major recreational complex as the project proceeds.

RECOMMENDATIONS

Land Use

The proposed land use plan presented in this study represents the collective thinking, judgment, and decisions made by the Advisory Task Force with input and assistance by the staff study team and land owners and developers in the corridor. One of the major purposes of the study was to design a future land use plan which considered the entire corridor as an integral development area, as well as three separate municipal jurisdictions.

Using accepted standards of land use arrangements and planning principles and an understanding of current development trends and past development decisions, the land use plan was developed and carefully scrutinized. The following planning assumptions and criteria were used in determining the land uses proposed for the K-150 study corridor:

a. The predominant land use proposed for the study corridor is low-density residential.

b. Higher-density residential uses and nonresidential uses are proposed to be located along K-150 and U.S. Highway 69 within the study area.

c. Land uses have been transitioned from higher intensity to lower intensities from the thoroughfares to the interior of the sections.

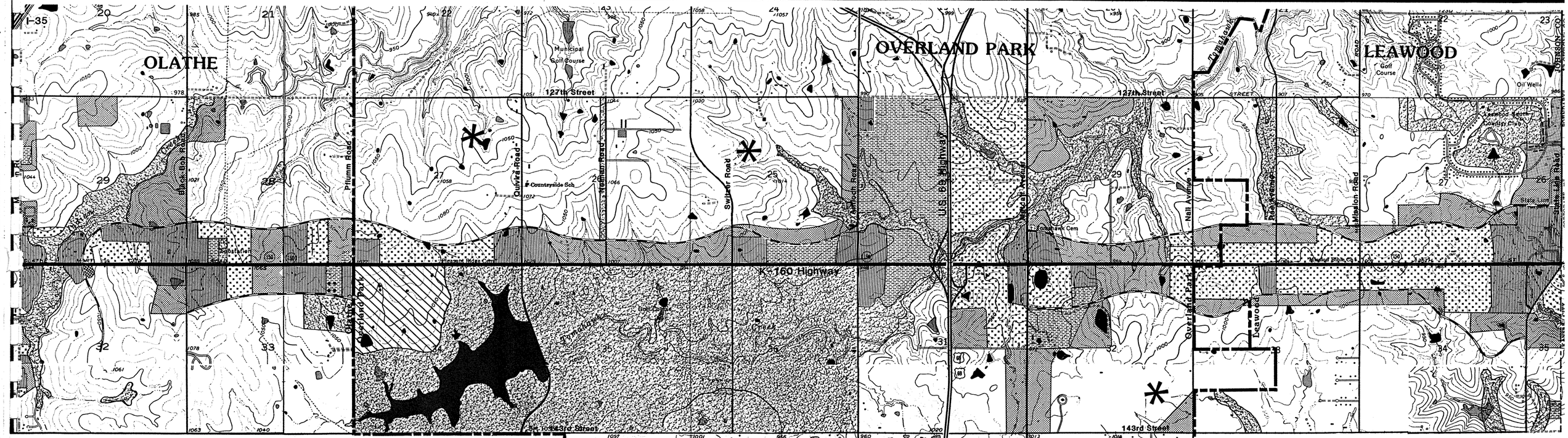
d. The reverse frontage roads have been utilized as access to intensive land uses along K-150 and as a separation between land uses.

e. Commercial and office uses are located at major intersection areas.

f. The 100-year floor plain areas have been preserved and designated as open space on the land use plan and used as a land use separation element.

g. Land uses have been coordinated at city boundaries to provide compatible land uses and appropriate transition for development along the borders.

The proposed land use plan shown in Figure 18 includes the following land use categories: low-density residential, medium-density residential, office, commercial, light industrial, park and open space, and special development district. The following table depicts the total acreage designated for each land use category and the number of dwelling units or square footage of floor area anticipated from the proposed plan. The average intensity and density of the land use categories are also shown.



Legend

- LOW DENSITY RESIDENTIAL
- MEDIUM DENSITY RESIDENTIAL
- COMMERCIAL
- OFFICE
- LIGHT INDUSTRIAL
- PARK/OPEN SPACE
- SPECIAL DEVELOPMENT DISTRICT
- SPECIAL USE PERMIT
- PROPOSED PARK SITE

DATE	SCALE	NORTH
11/25/85	1":1,565	▲
Figure 18		

future land use plan k150 corridor study

PROPOSED DEVELOPMENT IN THE K-150 CORRIDOR

Average Density/ Intensity	Land Use Category	Acres	Total Dwelling Units
3.58 DU/ac	Low-Density Residential	5,837	20,758
9.49 DU/ac	Medium-Density Residential	1,527	14,156
			Total Square Footage
.20 FAR	Office	905	8,955,893
.20 FAR	Commercial	719	6,793,269
.24 FAR	Industrial	464	4,976,467
.15 FAR	Special Development District	394	2,577,273
	Parks/Open Space	1,936	
	TOTAL	11,782	

The land uses shown on the proposed plan have been coordinated at the common municipal boundaries within the study area to avoid problems with conflicting land uses. Land uses designated on the plan provide for similar uses on either side of the two boundary lines, Pflumm Road and Nall Avenue. Specifically, the Pflumm Road boundary between Olathe and Overland Park provides for commercial and office uses around the K-150 and Pflumm intersection, single-family and park and open space uses are designated for the remaining portion of Pflumm Road. At the Leawood-Overland Park boundary of Nall Avenue, office and non-retail land uses are proposed at the K-150 intersection with multifamily uses surrounding these uses to the reverse frontage roads. The remaining land along Nall Avenue is designated single-family residential with the only exception being the northwest corner of 143rd Street and Nall Avenue being multifamily residential.

The development of the corridor with the land uses as proposed should provide for complementing uses to avoid potential land use conflicts at the municipal boundaries. To ensure the development of compatible land uses along city boundaries, the three cities should adopt the land use plan proposed and incorporate it into their Master Plans. In addition, to provide for the coordination of development plans along the adjacent borders, the cities should establish a procedure to allow review and comment on developments adjacent to the boundaries. This review will allow the cities to coordinate development of land uses, the location of the reverse frontage roads, and individual access points across the boundary streets. The preliminary plans for the developments as proposed should be routed to the planning departments for review and input prior to approval.

Urban design considerations have been taken into account in the designation of land uses on the proposed plan and the location of open space areas and the circulation system. The plan designates the major natural features within the study area, Indian Creek, Tomahawk Creek and their associated stream beds and draws, as components of an interconnected open space and trail system. These areas help provide open spaces for the future urban environment, prevent development encroachment

upon the natural flood way areas, and provide natural physical separations between proposed land uses. The existing open space systems are being preserved and connecting links provided to reinforce the surrounding open space/trail system.

The proposed reverse frontage roads have been designed to help relieve traffic loadings and reduce access movements to properties developing along K-150. These corridor-wide interconnecting roadways are located approximately ¼-mile north and south of K-150 and provide a separation and definition for the proposed land uses and neighborhoods. The proposed roads serve as a separation and boundary between higher intensity nonresidential and multifamily land uses along the K-150 corridor and the low-density residential land uses designated for the rest of the study area. Attention should be given to buffering provided along the frontage roads where low-density residential uses are proposed across from higher density uses. Berms, walls, and dense landscaping screens should be used to provide a proper transition buffer from potential negative impacts of adjacent developments such as traffic, litter, and noise.

One of the design elements that could be utilized along K-150 to provide a sense of identity for the corridor would be the use of a coordinated landscaping requirement. The cities could agree on a plan to require similar landscaping treatments within the median and parkway planting areas which could serve to give the highway some continuity and tie the corridor development together. The plan would not require each city to use the same type of landscaping material with identical treatments, but to provide the framework and guidelines for establishing a coordinated landscaping treatment that would have an integrated overall effect. Having a consistent landscaping treatment along the corridor would provide for visual relief and a sense of identity for the highway. It would also avoid the potential problem of conflicting landscaping treatments or the lack of any thorough landscaping requirement at all.

Transportation

K-150 (135th Street) is currently a two-lane rural highway with at-grade intersections at the mile corners. Direct access to residences and businesses is currently provided along the length of the study route. These developments, however, are isolated and of small magnitude where they do exist as the roadside features remain predominantly rural in nature. The current posted speed limit is 55 miles per hour within the study limits. Existing traffic volumes on K-150 ranges from roughly 18,000 vehicles per day near Black Bob Road to 6,000 vehicles per day at State Line Road.

Development pressure has already been exerted in Olathe as commercial development is moving from Mur-Len Road to Black Bob Road with significant residential developments also occurring from 127th Street and extending south of K-150. Interest in the K-150 corridor has also escalated in Leawood and Overland Park. Significant mixed use

development proposals have recently been approved on both sides of State Line Road south of K-150. This development activity has, in large part, prompted the K-150 corridor study. It has been recognized that on some sections of K-150, current traffic volumes are approaching the level where the service level provided by the existing roadway will become increasingly sensitive to developments which depend heavily on K-150 to fulfill their access requirements. Traffic management actions have already been instituted with the interim widening and signalization of the intersection of K-150 and Quivira Road. Further low capital improvement projects are likely in the near term in order to extend the functional life of K-150 as a two-lane highway. This area of concern, however, is not a primary subject of analysis in this study.

The technical transportation planning activities completed as a part of this study have focused on defining the roadway requirements which need to be recognized today to insure that the ultimate configuration of K-150 can be economically constructed even as development of the area nears completion. As such, ultimate travel demand has been projected for the corridor and an assessment has been completed of alternate roadway designs involving K-150.

As explained earlier, an assumption was made for this study that travel patterns and primary modes of transportation in this part of the metropolitan area were going to remain the same as they currently exist. Therefore, the projected traffic levels in the Corridor were going to be based upon little, if any, use of mass transit.

The following paragraphs briefly summarize the findings, conclusions, and recommendations of the Task Force with respect to the transportation system element of the K-150 Corridor Study.

Summary of Analysis

Based on land use plans presented for the K-150 corridor traffic volumes on K-150 will typically range between 40,000 to 50,000 vehicles per day when development of the corridor has been completed. Due to the lack of alternate access across U.S. 69, daily volumes on K-150 are projected to exceed 60,000 vehicles around the U.S. 69 interchange area.

One of the first considerations in planning for the future K-150 was to determine the proper balance between mobility and access for the facility. Freeway and principal arterial systems both have traffic movement as its primary function. However, the provision of land access is also a secondary function of the principal arterial. While the definition of primary arterial seemed appropriate for K-150, its location of three to four miles south of I-435 and the relatively high traffic demand projected for the facility indicated that a circumferential freeway was something to be considered. In order to assist in resolving this question, several design alternates featuring various degrees of access control were evaluated. A description of these alternates appears below.

K-150 Design Alternates

Alternate A. Six lane arterial with full at-grade access at half-mile points.

Alternate B. Six-lane arterial with right-turn-in/right-turn-out access at half-mile points.

Alternate C. Six-lane arterial with full at-grade access at half-mile points and right-turn-in/ right-turn-out access at quarter-mile points.

Alternate D. Eight-lane arterial with full at-grade access at half-mile points and right-turn-in/ right-turn-out access at quarter-mile points.

Alternate E. Six-lane freeway with interchanges at mile points (no at-grade access).

Common to each design is a reverse frontage road system which would be set back approximately one-quarter mile from the centerline of K-150.

Each of the arterial designs (Alternates A, B, C, and D) included at-grade intersections at mile points representing the north-south arterials. The freeway alternative included no at-grade intersections with K-150. The frontage road system was initially assumed as a five-lane section as well as the north-south street located at the half-mile point between K-150 and the frontage roads. The north-south street located at the quarter-mile points were coded as three-lane facilities.

Traffic assignments were developed for each of the design alternates and capacity analysis was subsequently performed. The results of this analysis indicated excessive turning movements occurring at the mile points for the two alternates providing the least land access, Alternate B and Alternate E. The other arterial configurations tested produced similar results and indicated that several intersections would operate at capacity regardless of the alternate selected. These intersections were Mur-Len Road, Quivira Road, the U.S. 69 ramps and Metcalf Avenue.

The most important result of this analysis was the reinforcement of the concept of K-150 continuing to serve as a primary arterial, that is, continuing to possess dual functions of providing for traffic movement first and access to abutting properties second. This is not to say that an outer freeway is not necessary, but that K-150 should not serve this function and that planning and location of such a facility should be established independently of the arterial system.

Recommended Street Facilities

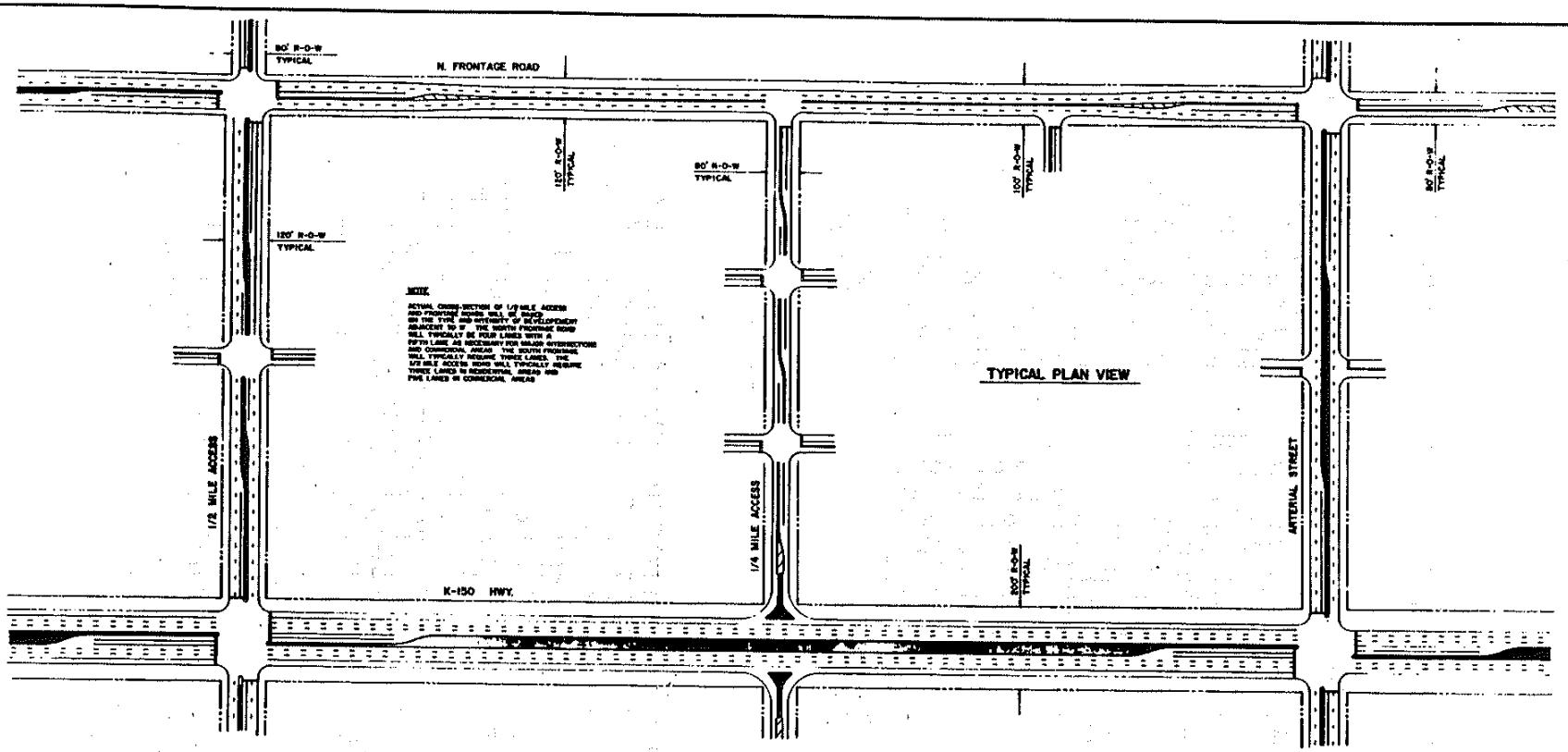
Of the five major design scenarios tested, the recommended configuration for K-150 is closely representd by Alternate C, a six-lane divided principal arterial facility with full at-grade access at half-mile points, as well

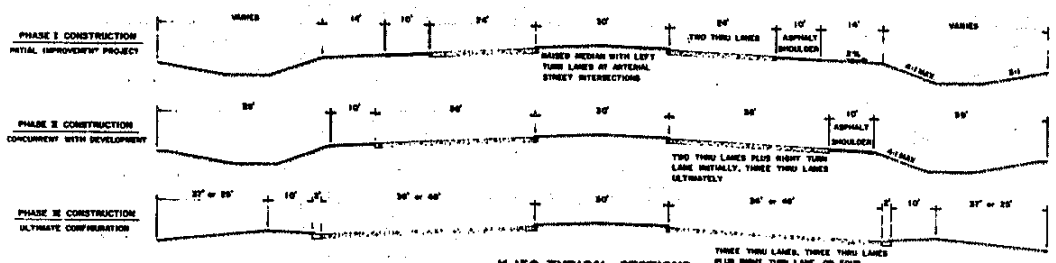
as at-grade right-turn-in and right-turn-out access at the quarter mile points. A frontage road system set behind the first tier of development, would typically be in place to enhance accessibility and provide a land use demarcation. The north-south roads at the quarter mile and half-mile points would generally connect K-150 and the frontage roads where used. Figure 19 shows a plan view of one-half mile of frontage along K-150, as well as recommended cross section of K-150.

This design configuration has been recommended because it allows direct access to K-150, but will carry significant traffic volumes at higher speeds than other arterial streets in the area. By way of comparison, the balance between mobility and access represented by this recommendation has been struck at a point which emphasizes mobility to a greater degree than do the design guidelines chosen for College Boulevard where full at-grade access is available at three to five locations per mile. The standard spacing of full at-grade access and resultant traffic signal spacing recommended for K-150 is two per mile. This distinction is consistent with the length of trips which are or will be served by each facility. The frontage roads and north-south access street system will provide a significant portion of the local access needs for the K-150 corridor.

West of Metcalf Avenue, it is anticipated that specific segments of K-150 will need a fourth lane to adequately service the project travel demand if and when the corridor is totally developed as assumed in this study. Locations where this need appears most critical are at the U.S. 69 ramps and at Quivira Road and to a lesser extent at Mur-Len Road and Metcalf Avenue. The general recommendation to respond to this situation is to ultimately extend right turning lanes developed at intersection approaches to create the fourth lane as necessary. More detailed analysis of the U.S. 69 interchange is warranted due to the higher costs associated with structures and at Quivira Road where some form of grade separation may also become ultimately required. One potential option which could be explored would be the extension of the north frontage road across U.S. 69 to provide relief for the 69/K-150 interchange area and high traffic volumes. This connection could provide substantial relief for the congestion predicted at that location upon ultimate development of the Corridor.

The access roads and frontage roads would have variable design roadway widths. Typically, the quarter-mile access roads would be three lanes wide and the half-mile access roads would vary from three lanes to five lanes, depending upon adjacent land uses. The north frontage roads would also vary from three to five lanes while the south frontage roads should not require more than three lanes. The actual cross-section of the access roads and frontage roads will be based upon the type and intensity of development adjacent to it, and the traffic volumes projected for that area.





K-150 TYPICAL SECTIONS
200' RIGHT OF WAY

SUMMARY OF REQUIREMENTS

ROUTE SECTION	NUMBER OF LANES	RIGHT OF WAY	FULL ACCESS	PARTIAL ACCESS
K-150	6-8	200'	AT ARTERIALS AND 1/2 MILE ACCESS ROADS ONLY	AT 1/4 MILE ACCESS ROADS ONLY
FRONTAGE ROAD	3-5	80'-120'	VARIABLE	LOCAL DRIVEWAY CRITERIA
1/2 MILE ACCESS	3-5	80'-120'	TYP. ONE AT MID-POINT BETWEEN K-150 AND FRONTAGE RD MIN. SPACING OF 600 FT.	LOCAL DRIVEWAY CRITERIA
1/4 MILE ACCESS	3	80'	TYP. TWO MAX. BETWEEN K-150 AND FRONTAGE RD. MIN. SPACING OF 400 FT.	N/A

* DEPENDANT ON DESIGN CROSS-SECTION OF FRONTAGE RD.

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Consulting Engineers

Proposed Access Development Plan
K-150 Corridor Study

Figure 19

The right-of-way requirements for K-150 and the associated access and frontage road systems are also shown in Figure 19. The recommendations are also summarized in the following table in more detail relative to location.

Route Section	Right-of-Way
K-150	200 feet
North Frontage Road	
East of Quivira	80 feet
West of Quivira	120 feet
South Frontage Road	80 feet
Half Mile Access	120 feet
Quarter Mile Access	80 feet

One possible scenario for phasing in the improvements on K-150 has been depicted in Figure 19. This suggestion shows the ultimate development of K-150 occurring in three distinct phases. Phase I construction would consist of the initial improvement of K-150 from its present condition to a four-lane divided arterial. Hopefully, this improvement would be in place prior to the occurrence of significant development abutting K-150. The second phase of construction would occur over time as the corridor develops. A third lane would be added and function as right turn lanes along the frontage as it develops and would be converted to through lanes as development of the area approaches completion. The last step of construction would convert the open drainage section to an enclosed system and add the fourth lane where necessary.

If in the future the modes of transportation change and mass transit becomes more acceptable, the right-of-way designed for the ultimate improvement of K-150 could accommodate mass transit. Some form of mass transit improvement could be utilized within the parkway area on either side of the proposed roadway improvements.

Potential Funding Opportunities

Since K-150 is a state highway, the state of Kansas is currently responsible for the maintenance and improvement of the highway. However, the Kansas Department of Transportation has stated that improvement of K-150 Highway is not on their current list of improvement projects and that the funding potential for the highway is not bright. The current highway appropriations received by the State are used to preserve existing roadways and not to build new routes or expand existing roads. One potential funding source contemplated by the state is an economic development program designed to improve state highways which would enhance the economic development of an area.

K-150 is designated as a Federal Aid Urban (FAU) route within the cities in the study area and thereby on the federal highway funding system. This designation allows the funds received from that system to be used for improvement projects for the highway. However, the number of roads included in the FAU system which are eligible for the funds far exceed the amount of money available. It is doubtful that enough money could be obtained from this source to provide for the K-150 improvement even if it were the cities' top priority improvement project.

Another funding option exists in the established arterial improvement policies established by the three cities involved in the study. K-150 is designated as a major thoroughfare on the street systems of the communities and therefore comes under the classification of an arterial street for purposes of assessing costs for its improvement to arterial standards. The standard improvement requirement used by the localities is generally to improve or establish an escrow account equal to the improvement costs associated with one-half of the approved street width along the property requesting development approval. Specifically, Leawood requires the improvement or payment for the improvement of arterials based upon one-half of a 41-foot roadway. Additional improvement required for particular roadways are handled as a city-wide capital improvement. Olathe requires the payment of $90.00 per front foot of property adjacent to the arterial street for the improvement of the highway. This figure is reviewed annually and adjusted accordingly based upon current cost figures. Overland Park requires $80.00 a front foot for arterial street improvement for residential property and $100.00 a front foot on commercial property. These costs are excluding costs for right-of-way acquisition.

Another option exists in the establishment of an improvement district for the arterial street construction. This method assesses all property owners adjacent to the street for the cost of the improvement to the street which is constructed under the supervision of the city in which the street is located. The decision as to the source and type of funding for the improvement of K-150 needs further discussion and review to determine the most effective and appropriate method available. A concerted effort by the jurisdictions involved in the study will be needed to facilitate the improvements recommended by this study.

Utility Service

Water. With three water purveyors servicing the study area, close coordination among them regarding sizing and timing of improvements is necessary. Johnson County Water District No. 1, Rural Water District No. 2, and the City of Olathe Utilities Department should draft plans to coordinate the improvements to the water service system in the corridor to ensure an adequate supply of water and level of service to future customers. The existing water pressure problems experienced in some portions of the study area should be studied to determine the cause and the improvements that are needed to solve the situation. Any improvements which are necessary should be studied to determine the cause and the improvements that are needed to solve the situation. Any improvements which are necessary should be scheduled and phased as development occurs in the corridor and water lines are extended to service the area.

Sanitary Sewers. The main issue regarding sewers in the corridor is the ability and capacity to treat sanitary waste in the Tomahawk Creek Basin. The Johnson County Wastewater District study of alternative treatment solutions for Tomahawk Creek Basin

should be completed in early 1986. The study results and alternatives chosen should be reviewed by the jurisdictions affected and an analysis of the impacts should be conducted. The recommendations adopted by the Johnson County Board of Commissioners concerning the method and location of treatment facilities within the basin and, more importantly for this study, within the K-150 Corridor, will be critical to the land use arrangement and timing of development. Once the decision is made as to the location of additional treatment facilities in the corridor, the land use plan for the corridor should be reviewed to determine the impact of the facility and the necessity to revise the plan. Coordination between the cities in the corridor and the wastewater district is necessary to provide compatible land use arrangements and share information regarding timing of development and improvements.

IMPLEMENTATION STRATEGIES

The following list of implementation strategies summarize the recommendations presented in the study and provide direction for future actions to implement these recommendations.

The cities of Leawood, Olathe, and Overland Park and Johnson County shall:

1. Adopt a joint resolution endorsing the K-150 Corridor Study recommendations for the future land uses, right-of-way requirements and highway design.
2. Prepare an agreement to coordinate land use and street improvement plans at common boundaries.
3. Designate a technical team to conduct further study for the specific roadway alignment and design of K-150.
4. Prepare a proposal for potential funding opportunities for the improvement of K-150.
5. Develop guidelines for the establishment of a consistent landscaping treatment for K-150.
6. Establish a policy for the preservation of significant natural features and floodplain areas within the Corridor.