

Kansas Department of Transportation  
**Break/Modification in-Access Study**  
**On**  
**I-435 and US-69 in Overland Park**

Projects:  
435-46 K-7451-01  
435-46 K-8262-01  
69-46 K-8251-01

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## Introduction

**This break/modification-in-access study has been prepared to document a request for an access break and access modifications on interstate I-435 and US-69 in Johnson County. KDOT would like the Federal Highway Administration (FHWA) to approve the engineering and operational acceptability of the proposed “ultimate condition” (orange and blue projects combined) interchange modifications.** This study has been completed in accordance with federal guidelines listed in the Federal Register, Volume 63, Number 28, dated February 11, 1998, for additional interchanges to the interstate system. This break/modification-in-access request will cover federal requirements one through eight as stated in Federal Register for additional interchanges to the interstate system. KDOT is submitting this study for determination of engineering and operational acceptability.

## Study Area

### 1. Project Description

The Kansas Department of Transportation (KDOT) and the Federal Highway Administration (FHWA) are proposing to reconstruct the existing Interstate Highway 435 and U.S. Highway 69 with new interchange configurations, bridges and roadways in Johnson County, Kansas. The proposed action is located in the city limits of Overland Park and Lenexa, Kansas. The proposed action includes adding additional lane capacity, reconfigured interchanges, and a new interchange. The reconfigured and reconstructed facility will meet current Interstate Standards. The I-435 project commences on I-435 at Metcalf Avenue (US 169) and continues west to I-35. The US 69 project commences on US 69 north of 95th Street and continues south to just east of Antioch Road. The project length on I-435 is 4.2 miles (6.8 kilometers) long and on US 69 is 4.4 miles (7.1 kilometers) long.

The proposed action has been divided into two parts for implementation purposes:

- the I-435 Improvements from Metcalf Avenue to US 69 which includes the new Antioch Road Interchange and the 103rd Street interchange improvements; and
- the US 69 Reconstruction which includes improvements to I-435 from US 69 west to I 35, and to US 69 from just north of 95th Street south to Antioch Road.

The I-435/Antioch Road Interchange is shown in orange on Figure 1, Overall Project – Project Layout, with the US 69 reconstruction shown in blue. The Orange project is programmed to commence construction in 2005. The Blue project is not scheduled for construction at this time, but will go forward with right-of-way acquisition scheduled to commence in 2006. Both the Blue and Orange Projects are shown in more detail on Figures 2 through 11 inclusive.

### **I-435 / ANTIOCH ROAD INTERCHANGE (“Orange Project”)**

This component of the project will include the construction of new through lanes, auxiliary lanes and shoulders on I-435 from Metcalf Avenue to just west of US 69. The existing eastbound I-435 bridge over Metcalf Avenue will be widened and re-decked, while the existing westbound bridge will be re-decked. Traffic flow will be improved by the addition of new lanes. Auxiliary lanes with full depth shoulders will be constructed between Metcalf Avenue and Antioch Road. A new urban, tight diamond interchange is proposed on I-435 at Antioch Road. Antioch Road, a four-lane arterial, will be reconstructed on new alignment between the Indian Creek Bridge (north) and Indian Creek Parkway (south). The existing Antioch Road bridges over Indian Creek and I-435 will be replaced. Braided ramps will be constructed between the new Antioch interchange and the I-435/US 69 interchange. An expanded collector-distributor (C-D) road system, which includes braided ramps, will be constructed between the new Antioch interchange and the I-435/US 69 interchange.

Reconstruction of the I-435/US 69 Interchange includes a new, two-lane Collector-Distributor (C-D) road beginning north of the southbound 103rd Street exit ramp. The existing southbound US 69 to eastbound I-435 loop ramp will be replaced with a new flyover directional ramp. Additionally, a continuous auxiliary lane will be constructed between the existing southbound 95th Street entrance ramp and the new two-lane C-D road.

In the northwest quadrant of the I-435/US 69 interchange, the southbound US 69 to westbound I-435 directional ramp, which connects to the C-D road/flyover ramp and westbound I-435, will be reconstructed. The existing westbound C-D Road will be reconfigured/reconstructed to tie in with this directional ramp. Reconstruction of 103rd Street will be completed through the ramp terminals including the partial reconstruction of the northbound US 69/103rd Street ramp terminal.

### **US 69 AND I-435 (Quivira Road to I-35) RECONSTRUCTION (“Blue Project”)**

US 69 will be upgraded from a four-lane open grass median section to an urban, six-lane divided section beginning north of 95th Street and continuing south to Antioch Road. The 119th Street diamond interchange will be rebuilt. A modified Single Point Urban Interchange (SPUI) is proposed at College Boulevard, replacing the existing folded diamond interchange. College Boulevard will be reconstructed from Nieman Road to Indian Creek Parkway, widening the existing six lane section to provide eight through lanes. Switzer Road will be relocated to the west to accommodate the new College Blvd. interchange. A new C-D road system, including braided ramps with 119th Street, will begin between College Boulevard and 119th Street. A new flyover ramp for the northbound US 69 to westbound I-435 traffic will replace the existing loop in the northeast quadrant. The directional movements in the SW and NE quadrants will be realigned to tie in with new C-D roads along US 69 and I-435.

The east half of the folded diamond at 103rd Street will be reconstructed to incorporate the new northbound C-D road. The existing interchange at 95th Street will be reconfigured to a standard diamond interchange to eliminate the entrance loop ramp and exit ramp to Switzer Road in the southeast quadrant. The existing 95th Street bridge will be left in place.

Interstate 435 will be fully reconstructed from I-35 to just east of the Quivira Road interchange. The reconstructed section will be widened from six lanes with a safety barrier divider to an eight lane section. Beginning at the east end of the reconstruction section to just east of the I-435/US 69 Interchange, I-435 will be widened to an eight-lane section, to match the section constructed with the "Orange Project". Auxiliary lanes will be provided along both eastbound and westbound I-435 from I-35 to Quivira. The diamond interchange at Quivira Road will be reconstructed to include braided ramps eastbound along I-435. Quivira Road will be reconstructed and widened through the new diamond interchange. New C-D roads will be constructed between Quivira Road and the I-435/US 69 interchange.

## **2. LOS "E" LOCATIONS**

The addition of the proposed interchange at I-435 and Antioch Road, combined with the enhanced interchanges along US-69 and I-435 and the additional mainline capacity improvements proposed, have a minimal impact on traffic volumes entering and exiting the freeways (US-69 and I-435) at the study interchanges. The capacity enhancements along I-435 and US-69, combined with the additional interchange on I-435 at Antioch, are projected to release a latent demand along the freeway facilities.

Many of the existing freeway segments currently operate at LOS E or F. The freeway segments approaching (LOS E) or exceeding (LOS F) capacity have been listed below. These analysis results are based on density (expressed in vehicles/lane/mile) along the freeway segments or collector-distributor roadways.

- Westbound I-435, from Metcalf to US-69
- Eastbound I-435, from US-69 to Metcalf
- Southbound US-69, from 95th Street to I-435
- Northbound US-69, from 119th to I-435
- Northbound US-69, from 103rd to 95th Street
- Westbound I-435 Collector-Distributor Road, from I-435 to the Northbound US-69 Exit

The operations along I-435 and US-69 are significantly improved with the proposed Build conditions. There are, however, some areas in which the proposed Build conditions will operate at LOS E in year 2027. Those segments include:

- Eastbound I-435, Metcalf Exit to Metcalf Entrance
- Westbound I-435, Antioch Exit to US-69 Exit
- Westbound I-435, US-69 Entrance to Quivira Entrance

None of the freeway segments are projected to operate over capacity in the future conditions. Details of the analysis results summarized above are located in the *Interstate 435/US-69 Vicinity Interchange Analyses* dated November 2003.

A review of the three locations with the LOS E in year 2027 determined that no feasible alternative would improve the operation of these locations. The following discussion includes a description of the alternative and why it was deemed unfeasible.

1. *Eastbound I-435, Metcalf Exit to Metcalf Entrance* – the only option to correct the LOS E at this location was to add an additional lane to eastbound I-435, which would have extended the project and required the reconstruction of the existing Metcalf Ave. bridges.

2. *Westbound I-435, Antioch Exit to US-69 Exit* – we investigated moving the gore for the Antioch Exit farther east and discovered that moving it 92 m (300 feet) would yield a satisfactory LOS on this segment based on the analysis model and not compromise the LOS on the segment to the east (Metcalf Entrance to Antioch Exit). This conclusion was reached despite the fact that traffic volumes in each lane would be expected to be the same. Given the belief that traffic operations would be essentially the same whether the gore was moved or not, it was preferred to maintain the 92 m (300 feet) in the more heavily used weave section between the Metcalf Entrance and Antioch Exit. Therefore, the gore location was left at its original location.

3. *Westbound I-435, US-69 Entrance to Quivira Entrance* - the US-69 entrance ramp acceleration lane was extended as far as practicable in an attempt to enhance the LOS; however, even extending the acceleration lane did not show the analysis achieving a LOS D. The resulting LOS is close to the LOS D/E threshold. To achieve a LOS D would require extending this acceleration lane beyond the gore of the Quivira Entrance; thereby triggering extensive and expensive design features in the segment between the Quivira Entrance and I-35 Exit. While not studied and drafted in detail, such features would likely need to include CD roads and grade separation, e.g., braided ramps, that could easily extend farther into the I-435 interchange with I-35.

#### **4. Traffic Analysis**

The traffic analysis was completed based on the ultimate project improvements (orange and blue improvements completed). Some isolated locations were analyzed for the interim conditions (orange constructed but no blue improvements).

*(Please refer to the document titled "Interstate 435/US69 Vicinity Traffic Analysis," dated November 2003.*

### **Purpose and Need for the Project**

#### **1. PROJECT PURPOSE**

The purpose of the I-435/US 69 Improvement Project is to:

- Relieve congestion on the I-435/US 69 Corridors;
- Improve roadway deficiencies on I-435 by replacing pavement where necessary; widening, redecking and replacing bridges; and replacing the short median barrier with the taller glare barrier;

- Improve roadway deficiencies on US 69 by replacing pavement, replacing bridges, and addressing the narrow median by adding concrete safety barrier;
- Improve operating conditions on I-435 and the US 69 corridors as well as on the existing local surface streets;
- Provide lane continuity on I-435 by extending the 8-lane section just east of Metcalf Avenue west to I-35; and
- Provide enhanced access to major employment centers along the I-435 and US 69 Corridors. It should be noted that significant development growth has taken place in this area of Overland Park and more is anticipated. Based on statistics developed for the I-435/Antioch Road Interchange System Enhancement Application in December of 1999, it is estimated there are currently more than 92,000 persons employed at more than 4,650 firms within the southern Johnson County area. The area is considered to be at 64 percent of its ultimate development capacity, based on land use projection and zoning which is already in place.

## **2. PROJECT NEED**

### **a. Background**

The I-435/US 69 study area (the area generally shown in green on Figure ea1) is within the core area of economic activity in both Johnson County as well as the State of Kansas. In a five-year period from 1993 to 1997, the number of business establishments in the study area grew by 16 percent while employment grew by 21 percent. According to the Mid-America Regional Council's Long-Range Transportation Plan, over the next twenty years, Johnson County is likely to experience the greatest share of the Kansas City region's growth in both overall population and employment.

The City of Overland Park became interested in an interchange at Antioch Road and I-435 to serve growing business development and to relieve congestion on other nearby interchanges and the local arterial class roadways in the 1980s. That interest led to extensive study of the area by the City. The following reports were developed to study and document the need for an interchange at this location:

- Preliminary Design Report, April, 1987
- Addendum to Preliminary Design Report, June, 1989
- Break-In-Access Study, May, 1996
- Antioch Break-In-Access Study, December 1999

In 1998, the City of Overland Park was successful in obtaining congressional funding of \$7.56 million for the construction of an I-435/Antioch Road Interchange. These funds are solely for the purpose of this improvement project and cannot be transferred to other projects.

During this same time, traffic was continuing to grow rapidly on I-435. This rapid traffic growth rate, as well as deteriorating pavement conditions, required that KDOT reconstruct and widen I-435 from a six-lane facility to an eight-lane facility. Interstate 435 between Metcalf Avenue and State Line Road was reconstructed by KDOT in the 1990s.

The traffic growth in this area of Overland Park was not limited to the I-435 Corridor. Interstate 35 and US 69 were also seeing traffic growth that was causing congestion and operational problems. In 1997, because of the traffic problems in these two corridors and the difficulties that would be inherent in addressing them, in 1997, the Kansas Department of Transportation began a Major Investment Study (MIS) of these two corridors. The MIS was completed in 2000 and recommended capacity and traffic flow improvements. The areas identified for improvements were as follows:

- “high-priority” interchange locations – US 69/I-435, I-35/I-635, I-35/I-435 and US 69/I-35;
- the widening of US 69 to a six-lane facility with additional auxiliary lanes;
- the implementation of a Collector-Distributor system on both I-35 and US 69 in key locations;
- ramp metering and Intelligent Transportation System (ITS) improvements along the I-35 and US 69 Corridors, implemented in coordination with the recommendations of the Kansas City ITS Early Deployment Study; and
- I-35 Commuter Rail upgrades and expanded bus service improvements.

In 2000, KDOT announced that the I-435/Antioch Road Interchange, Phase I of the I-435/US 69 Interchange, and the design portion of the US 69 Corridor, had been selected as System Enhancement Projects. As the System Enhancement projects were being selected, KDOT was also putting together the Interstate Major Modification program. The Interstate Major Modification program included the widening of I-435 between US 69 and Metcalf Avenue. Interrelationship of all of these projects caused KDOT to combine the three projects into the I-435/US 69 Improvement Project for analysis and environmental documentation purposes.

## **b. Congestion**

### **Interstate 435**

As a part of the Antioch Road Break-In-Access Study (1999), a Highway Capacity Manual analysis was completed on the interchange area. The existing scenario (base condition) included 1997 A.M. traffic counts using the existing network. That analysis found an A.M. Peak Hour Freeway Mainline Level of Service of F between US 69 and Metcalf Avenue.

Further, the Break-In-Access Study noted that serious congestion conditions existed at the following locations:

- US 69 and College Boulevard Interchange;
- I-435 and Metcalf Avenue Interchange;
- US 69/103<sup>rd</sup> Street Interchange; and
- Local arterial network including such over-capacity arterial corridors as College Boulevard and 103<sup>rd</sup> Street.

Additionally, there is considerable congestion along I-435 due to present weave condition between Quivira and US 69.

### **US Route 69**

The I-35/US 69 MIS reviewed traffic operations on the US 69 Corridor. The study found that most segments and freeway elements of US 69 (northbound and southbound), between 119<sup>th</sup> Street and 87<sup>th</sup> Street, were operating over capacity at a level of service (LOS) E or F in the peak hour.

Additionally, US 69 presently has several difficult weave sections between College Boulevard and 103<sup>rd</sup> Street Interchanges.

## **c. Roadway Deficiency**

### **Interstate 435**

Currently, I-435 has an existing short median barrier that should be replaced with a taller 51-inch (130 centimeter) glare barrier to meet KDOT design criteria. There are four bridges that will require deck rehabilitation/replacement and three bridges that will need complete replacement. The existing pavement conditions from Quivira Road to I-35 are considered poor along I-435 and require continual maintenance by KDOT. KDOT annually measures the condition of highway pavement surfaces. Data elements include roughness, cracking, and rutting on asphalt



surfaces and roughness, joint distress, and faulting on concrete surfaces. The roughness and distress data are combined into a three level index called performance level, which is used to identify areas requiring pavement replacement or maintenance. Substantial maintenance work was conducted on sections of pavement along I-435, west of Quivira Road during 2003.

### **US Route 69**

Since the time when US Route 69 was originally constructed, few systematic improvements have been implemented. From 87<sup>th</sup> Street to College Boulevard, the pavement condition was rated “fair” at the time that the MIS was prepared. Currently there are locations with a narrow median on US 69 that should be replaced with a tall glare barrier.

#### **d. Safety**

Many of the freeway segments on I-435 and US-69 experience crash rates that are above the statewide average for similar facilities. A summary of the existing crash rates is detailed below for several of the freeway segments. The table includes the statewide average crash rate for similar facilities and the critical crash rate. The critical crash rate is the statistically relevant crash rate and is used to identify an unusually high crash rate.

#### ***Interstate 435***

A crash analysis was completed and the results presented in the following table.

**I-435 Mainline Accident Experience<sup>1</sup>  
(I-35 Junction East to Metcalf Avenue)**

<b>Section</b>	<b>Accident Rate<sup>2</sup></b>	<b>Statewide Average for Similar Roadway Type</b>	<b>Critical Crash Rate</b>	<b>Percent of Average</b>
I-35 to Quivira	1.66	0.66	0.76	251%
Quivira to US 69	1.59	0.66	0.77	241%
US 69 to Metcalf	1.46	0.66	0.73	221%

<sup>1</sup> Provided by the Kansas Department of Transportation, Bureau of Transportation Planning, Geometric and Accident Data Unit.

<sup>2</sup> Overall Accidents per million miles of travel

#### ***US Route 69***

The section of US 69 from 103<sup>rd</sup> Street to 119<sup>th</sup> Street had percentages of statewide accident rate averages that were significantly higher than the statewide accident rate for similar roadway types.

Further, US 69 from 95<sup>th</sup> Street to I-435 has a 40-foot median and all interchanges between I-35 and 119<sup>th</sup> Street on US 69 have operationally deficient elements

**US 69 Mainline Accident Experience  
(From the I-35/US 69 MIS)**

Section	Accident Rate	Statewide Average for Similar Roadway Type	Critical Crash Rate	Percent of Average
103rd Street to I-435	3.19	1.23	1.49	259%
I-435 to College Blvd.	1.88	1.23	1.49	153%
College Blvd. to 119th	1.66	1.23	1.44	135%
103rd to 95th	1.27	1.23	1.40	103

**e. Lane Continuity**

At this time, I-435 is an eight-lane facility from Metcalf Avenue east to the Kansas/Missouri State Line, a distance of 3.3 miles (5.3 kilometers). The eight-lane section continues in Missouri, to the I-435, I-470 U.S. Route 71 Interchange, a distance of four miles (6.4 kilometers). Currently the eight-lane section ends at Metcalf Avenue, which is a local access interchange. To provide lane continuity, the eight-lane section should be continued west from Metcalf Avenue to US 69 and eventually on I-35.

**Federal Regulations**

Federal regulations require eight points to be considered when an access break is requested for the interstate system as noted in Federal Register Volume 63, Number 28, dated February 11, 1998. Listed below are the requirements followed by a brief commentary of reference addressing each point:

- 1) *The existing interchanges and/or local roads and streets in the corridor can neither provide the necessary access nor be improved to satisfactorily accommodate the design year traffic demands while at the same time providing the access intended by the proposal.*

The existing interchange locations are heavily loaded as a result of increasing traffic in the area. These interchanges have limited abilities to absorb additional traffic volumes as the area continues to develop. The proposed interchange addition and modifications on I-435

and US-69 will provide both a relief to the existing interchanges and needed capacity to accommodate planned developments and traffic volumes in the area.

- 2) *All reasonable alternatives for design options, location and transportation system management type improvements (such as ramp metering, mass transit, and HOV facilities) have been assessed and provided for if currently justified, or provisions are included accommodating such facilities if a failure need is identified.*

The proposed interchange concept evolved through a Major Investment Study (MIS) conducted by the Kansas Department of Transportation. While the proposed configuration will support ramp metering and mass transit vehicles, it was determined through the MIS that these accommodations will not be sufficient to support the traveling public.

- 3) *The proposed access point does not have a significant adverse impact on the safety and operation of the Interstate facility based on an analysis of current and future traffic. The operational analysis for existing conditions shall, particularly in urbanized areas, include an analysis to the extent necessary to assure their ability to collect and distribute traffic to and from the interchange with new or revised access points.*

The "Interstate 435/US-69 Vicinity Traffic Analysis" prepared for KDOT and the City of Overland Park, by TranSystems, summarizes the analysis findings for the freeway segments and cross-street intersections for both the Build and No-Build conditions. Both the freeways and cross-streets are predominately projected to operate at acceptable levels of service. The analysis shows that the Build condition would be an improvement over the No-Build condition. The Build condition has five intersections operating at LOS E, compared to the No-Build condition that has 13 intersections operating at LOS F (based on the HCM analysis methods).

*Please refer to the Traffic Analysis and Technical Appendix submitted with this report for additional information on data inputs.*

- 4) *The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" for special purposes access for transit vehicles, for HOV's or into park and ride lots may be considered on a case basis. The proposed access will be designed to meet or exceed current standards for Federal-aid projects on the Interstate System.*

The proposed interchange enhancements on I-435 and US-69 will be a "full interchange" with no restrictions on access to either the interstate or adjacent interchanges. These modifications are proposed to be full interchanges which do not create restrictions to the adjacent interchanges. The proposed interchange projects will meet all current design standards.

- 5) *The proposal considers and is consistent with local and regional land use and transportation plans. Prior to final approval, all requests for new or revised access must be consistent with the metropolitan and/or statewide transportation plan, as appropriate and applicable provisions of 23 CFR part 450 and the transportation conformity requirements of 40 CFR parts 51 and 93.*

The proposed interchange enhancements on I-435 and US-69 are included in the Long Range Transportation Plan for the Mid-America Regional Council (MARC), the presiding Metropolitan Planning Organization for the area.

- 6) *In areas where the potential exists for future multiple interchange additions, all requests for new or revised access are supported by a comprehensive Interstate network study with recommendations that address all proposed and desired access within the context of a long-term plan.*

While no additional new interchanges are anticipated in the area other than the I-435 and Antioch interchange, a comprehensive level of service analysis was conducted to include a total of six existing interchanges in close proximity to the proposed interchange. These interchanges include:

- I-435 and Quivira – approximately 1.25 miles east of the I-35 interchange.
- US-69 and I-435 – approximately 2.25 miles east of I-35 and two miles west of the US-169 interchanges.
- US-69 and 95<sup>th</sup> Street – approximately 1.5 miles north of the I-435 interchange.
- US-69 and 103<sup>rd</sup> Street – approximately one half mile north of the I-435 interchange.
- US-69 and College Blvd. – approximately one half mile south of the I-435 interchange.
- US-69 and 119<sup>th</sup> Street – approximately 1.25 miles south of the I-435 interchange.

- 7) *The request for a new or revised access generated by new or expanded development demonstrates appropriate coordination between the development and related or otherwise required transportation system improvements.*

In addition to being included in MARC's Long Range Transportation Plan, the proposed interchange has been included in the City of Overland Park's Major Street Plan for a number of years. The Antioch interchange was envisioned with the development of the Corporate Woods office park located adjacent to the proposed interchange on the south side of I-435 between Antioch Road and US-69.

- 8) *The request for new or revised access contains information relative to the planning requirements and the status of the environmental processing of the proposal.*

The proposed interchange projects on I-435 and US-69 were included in a Major Investment Study and illustrated in numerous public meetings throughout that process.

## **Analysis of Traffic Projections**

The volume projections are given in the “Interstate I-435/US-69 Vicinity Traffic Analysis” prepared by TranSystems dated November 2003. The “Interstate I-435/US-69 Vicinity Traffic Analysis” is included with this study. The volume projections were made using a combination of the Mid-America Regional Council’s (MARC’s) travel demand forecasting model and the Overland Park Traffic Model with additional adjustments from KDOT.

## **Operational Analysis**

Level of Service calculations were completed for the “No Build” conditions for the 2007 letting year and the 2027 design year traffic projections and simultaneous peak hour conversions. The “Build” calculations were completed for the 2027 design year traffic projections and peak hour conversions. These calculations were completed for the study area and include basic freeway, ramps, and weave analysis and can be referenced in the “Interstate I-435/US-69 Vicinity Traffic Analysis”.

## **Conclusion**

The comparison of the results in the analysis from the No-Build to Build shows no operational degradation within the study area along I-435 and US-69. The operations along I-435 and US-69 are significantly improved with the proposed Build conditions. There are some locations in which the proposed Build conditions will operate at LOS E. Those segments include:

- Eastbound I-435, Metcalf Exit to Metcalf Entrance
- Westbound I-435, Antioch Exit to US-69 Exit
- Westbound I-435, US-69 Entrance to Quivira Entrance

None of the freeway segments studied is projected to operate at LOS F under the proposed conditions.

The analysis indicates a significant operational enhancement throughout the study area if the proposed improvements are constructed. The at-grade intersections are also projected to operate at an enhanced level in the Build Condition compared to No-Build Condition.

**INTERSTATE 435/US-69 VICINITY  
TRAFFIC ANALYSES  
Johnson County, Kansas**

*prepared for*

**Kansas Department of Transportation  
City of Overland Park, Kansas**

*prepared by*

**TRANSYSTEMS**  
CORPORATION 

**November 2003**

## **Introduction**

The following sections outline the traffic volume projections and traffic analysis results for the proposed I-435/Antioch interchange project located in Johnson County, Kansas. The volume projections presented in this report have been reviewed and approved by the Kansas Department of Transportation (KDOT). Similarly, the methodologies used in the analyses have been reviewed by KDOT.

## **Volume Projections**

The volume projections were made using a combination of the Mid-America Regional Council's (MARC's) travel demand forecasting model and the Overland Park Traffic Model with additional adjustments from KDOT. While the Overland Park traffic model provides for accurate projections at intersections, the model is limited both by its horizon year (2020) and information regarding changes in regional travel patterns that may impact the freeways. As such, the MARC model was used as the primary tool for projecting freeway and ramp volumes while the Overland Park model was used for the study intersections. These projections were then adjusted by KDOT.

The existing Average Daily Traffic, A.M. Peak Hour and P.M. Peak Hour Traffic Volumes were documented in 2001 and have been summarized on Figures 1 through 5. Projections for the study intersections were provided for both the estimated opening day (year 2007) and design year (2027) for No-Build and Build conditions. The No-Build conditions include general capacity improvements to I-435 and US-69 (an additional through lane in each direction), however they do not include the proposed interchange at I-435 and Antioch Road. The traffic volume projections have been included on the attached Figures 6 through 29, including Average Daily Traffic (ADT) and the A.M. and P.M. peak hours for the significant at-grade intersections and freeway elements in the study area.

- Figure 1 Existing ADT
- Figure 2 Existing A.M. Peak Hour Traffic Volumes – Turning Movements
- Figure 3 Existing P.M. Peak Hour Traffic Volumes – Turning Movements
- Figure 4 Existing A.M. Peak Hour Traffic Volumes – Freeways
- Figure 5 Existing P.M. Peak Hour Traffic Volumes – Freeways
- Figure 6 2007 No-Build ADT
- Figure 7 2027 No-Build ADT
- Figure 8 2007 Build ADT
- Figure 9 2027 BuildADT
- Figure 10 2007 No-Build A.M. Peak Hour Traffic Volumes – Turning Movements
- Figure 11 2007 No-Build P.M. Peak Hour Traffic Volumes – Turning Movements
- Figure 12 2007 No-Build A.M. Peak Hour Traffic Volumes – Freeways
- Figure 13 2007 No-Build A.M. Peak Hour Traffic Volumes – Freeways
- Figure 14 2027 No-Build A.M. Peak Hour Traffic Volumes – Turning Movements
- Figure 15 2027 No-Build P.M. Peak Hour Traffic Volumes – Turning Movements
- Figure 16 2027 No-Build A.M. Peak Hour Traffic Volumes – Freeways

- Figure 17 2027 No-Build A.M. Peak Hour Traffic Volumes – Freeways
- Figure 18 2007 Build A.M. Peak Hour Traffic Volumes – Turning Movements
- Figure 19 2007 Build P.M. Peak Hour Traffic Volumes – Turning Movements
- Figure 20 2007 Build A.M. Peak Hour Traffic Volumes – Freeways
- Figure 21 2007 Build A.M. Peak Hour Traffic Volumes – Freeway (Detail)
- Figure 22 2007 Build P.M. Peak Hour Traffic Volumes – Freeways
- Figure 23 2007 Build P.M. Peak Hour Traffic Volumes – Freeway (Detail)
- Figure 24 2027 Build A.M. Peak Hour Traffic Volumes – Turning Movements
- Figure 25 2027 Build P.M. Peak Hour Traffic Volumes – Turning Movements
- Figure 26 2027 Build A.M. Peak Hour Traffic Volumes – Freeways
- Figure 27 2027 Build A.M. Peak Hour Traffic Volumes – Freeway (Detail)
- Figure 28 2027 Build P.M. Peak Hour Traffic Volumes – Freeways
- Figure 29 2027 Build P.M. Peak Hour Traffic Volumes – Freeway (Detail)

These figures have been included in Appendix A.

## **Analysis Results**

The analysis results have focused on the proposed design for the I-435/Antioch interchange and the surrounding improvements on I-435 and US-69. The analysis of the proposed improvements focused on the ultimate design of the project and included both intersection analyses and freeway analyses. The results of the analyses are summarized in the following tables and sections and a technical appendix will be made available with the corresponding analysis worksheets.

### ***Intersection Analyses***

The intersection analyses included both isolated intersection analysis using the Highway Capacity Manual (HCM) methodologies and CORSIM, a microscopic traffic simulation package. The results of these analyses are included in the following tables (Tables 1 through 8).

It is important to point out that while the CORSIM analysis tends to indicate the improvements associated with coordinated traffic signals, it is the general recommendation to follow the HCM results for the design of storage lanes.



**Table 1 - Signalized Intersection Level of Service Analysis  
2007 No-Build Volumes - A.M. Peak Hour**

Intersection	HCM		CORSIM	
	LOS <sup>1</sup>	Delay <sup>2</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>
95th Street and Blue Jacket	C	27.5	C	24.7
95th Street and Southbound US-69	B	19.4	B	12.1
95th Street and Switzer	C	23.0	B	17.8
103rd Street and Southbound US-69	B	15.9	B	16.7
103rd Street and Northbound US-69	B	16.2	B	14.0
103rd Street and Mastin	C	26.4	B	18.0
College Boulevard and Neiman	F	>120	D	37.4
College Boulevard and Southbound US-69	F	>120	C	31.7
College Boulevard and Northbound US-69	F	114.9	B	19.0
College Boulevard and Mastin	F	>120	D	46.0
College Boulevard and Indian Creek Parkway	E	77.5	B	16.6
119th Street and Switzer	C	32.0	C	33.3
119th Street and Mastin	F	>120	C	26.6
119th Street and Southbound US-69	F	>120	C	31.2
119th Street and Northbound US-69	F	85.8	D	52.7
Quivira Road and 106th Street	C	28.3	C	21.8
Quivira Road and Westbound I-435	D	50.1	C	20.8
Quivira Road and Eastbound I-435	D	54.1	C	21.7
Antioch Road and Indian Creek Parkway	C	32.8	C	27.2
Metcalf Avenue and Westbound I-435	E	71.8	C	26.4
Metcalf Avenue and Eastbound I-435	F	107.1	C	20.9

1 - Level of Service

2 - Seconds per Vehicle

**Table 2 - Signalized Intersection Level of Service Analysis  
2007 No-Build Volumes - P.M. Peak Hour**

Intersection	HCM		CORSIM	
	LOS <sup>1</sup>	Delay <sup>2</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>
95th Street and Blue Jacket	C	21.1	B	18.9
95th Street and Southbound US-69	C	25.7	B	10.6
95th Street and Switzer	C	24.2	B	19.1
103rd Street and Southbound US-69	B	17.7	B	15.2
103rd Street and Northbound US-69	B	16.8	B	12.6
103rd Street and Mastin	D	53.8	C	27.2
College Boulevard and Neiman	E	61.7	C	22.8
College Boulevard and Southbound US-69	A	6.5	A	7.3
College Boulevard and Northbound US-69	A	4.3	A	7.6
College Boulevard and Mastin	F	94.2	C	32.9
College Boulevard and Indian Creek Parkway	E	62.1	C	20.9
119th Street and Switzer	C	32.0	C	24.4
119th Street and Mastin	F	>120	C	31.0
119th Street and Southbound US-69	F	>120	D	38.2
119th Street and Northbound US-69	F	84.1	D	53.1
Quivira Road and 106th Street	C	23.3	C	25.4
Quivira Road and Westbound I-435	E	66.9	C	23.1
Quivira Road and Eastbound I-435	F	81.9	C	29.3
Antioch Road and Indian Creek Parkway	D	40.2	C	27.1
Metcalf Avenue and Westbound I-435	F	111.5	C	26.0
Metcalf Avenue and Eastbound I-435	F	100.6	C	31.2

1 - Level of Service

2 - Seconds per Vehicle

**Table 3 - Signalized Intersection Level of Service Analysis  
2027 No-Build Volumes - A.M. Peak Hour**

Intersection	HCM		CORSIM	
	LOS <sup>1</sup>	Delay <sup>2</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>
95th Street and Blue Jacket	C	26.5	C	23.5
95th Street and Southbound US-69	B	18.9	B	11.8
95th Street and Switzer	C	23.2	C	21.5
103rd Street and Southbound US-69	B	17.9	B	18.6
103rd Street and Northbound US-69	B	15.2	B	12.3
103rd Street and Mastin	C	31.5	C	20.8
College Boulevard and Neiman	F	>120	E	58.9
College Boulevard and Southbound US-69	F	>120	D	38.6
College Boulevard and Northbound US-69	F	>120	D	36.2
College Boulevard and Mastin	F	>120	D	36.0
College Boulevard and Indian Creek Parkway	F	87.6	C	23.8
119th Street and Switzer	F	>120	C	29.4
119th Street and Mastin	E	60.9	D	36.8
119th Street and Southbound US-69	F	>120	C	27.8
119th Street and Northbound US-69	F	>120	E	56.7
Quivira Road and 106th Street	D	53.8	D	39.1
Quivira Road and Westbound I-435	F	>120	D	49.3
Quivira Road and Eastbound I-435	F	93.8	C	26.6
Antioch Road and Indian Creek Parkway	D	46.3	C	30.1
Metcalf Avenue and Westbound I-435	D	49.7	C	23.4
Metcalf Avenue and Eastbound I-435	F	108.4	C	25.7

1 - Level of Service  
2 - Seconds per Vehicle

**Table 4 - Signalized Intersection Level of Service Analysis  
2027 No-Build Volumes - P.M. Peak Hour**

Intersection	HCM		CORSIM	
	LOS <sup>1</sup>	Delay <sup>2</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>
95th Street and Blue Jacket	C	22.7	B	19.5
95th Street and Southbound US-69	C	21.8	B	10.5
95th Street and Switzer	C	29.8	B	17.6
103rd Street and Southbound US-69	C	30.2	B	18.0
103rd Street and Northbound US-69	C	24.7	B	15.9
103rd Street and Mastin	D	51.1	C	25.8
College Boulevard and Neiman	F	>120	C	30.3
College Boulevard and Southbound US-69	D	41.9	C	34.3
College Boulevard and Northbound US-69	A	7.5	A	5.9
College Boulevard and Mastin	F	>120	D	49.5
College Boulevard and Indian Creek Parkway	F	>120	B	15.0
119th Street and Switzer	F	>120	D	42.8
119th Street and Mastin	F	>120	D	42.1
119th Street and Southbound US-69	F	>120	E	55.7
119th Street and Northbound US-69	F	>120	D	49.3
Quivira Road and 106th Street	C	28.8	C	30.9
Quivira Road and Westbound I-435	F	>120	D	49.2
Quivira Road and Eastbound I-435	F	>120	D	43.2
Antioch Road and Indian Creek Parkway	D	48.7	C	33.3
Metcalf Avenue and Westbound I-435	F	117.8	C	25.9
Metcalf Avenue and Eastbound I-435	F	117.7	D	51.5

1 - Level of Service  
2 - Seconds per Vehicle

**Table 5 - Signalized Intersection Level of Service Analysis  
Year 2007 Build Conditions - A.M. Peak Hour**

Intersection	HCM		CORSIM	
	LOS <sup>1</sup>	Delay <sup>2</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>
95th Street and Blue Jacket	C	22.6	B	15.7
95th Street and Southbound US-69	B	16.1	B	11.9
95th Street and Northbound US-69	B	16.1	B	11.5
95th Street and Switzer	B	18.1	B	14.2
103rd Street and Southbound US-69	B	16.3	B	12.4
103rd Street and Northbound US-69	B	17.4	B	13.5
103rd Street and Mastin	C	23.9	B	16.8
College Boulevard and Nieman	D	42.1	C	23.8
College Boulevard and Switzer/109th Street	B	13.7	A	9.4
College Boulevard and US-69	E	59.3	D	35.8
College Boulevard and Mastin	C	26.1	C	23.6
College Boulevard and Indian Creek Parkway	B	15.4	B	13.6
119th Street and Switzer	C	29.0	C	26.2
119th Street and Mastin	B	14.4	B	12.3
119th Street and Southbound US-69	B	17.5	B	15.6
119th Street and Northbound US-69	B	13.5	B	16.1
Quivira Road and 106th Street	C	32.1	C	22.1
Quivira Road and Westbound I-435	C	27.5	B	18.6
Quivira Road and Eastbound I-435	C	21.7	B	15.1
Antioch Road and Westbound I-435	C	32.2	C	24.5
Antioch Road and Eastbound I-435	C	20.4	B	12.5
Antioch Road and Indian Creek Parkway	C	31.3	C	25.7
Metcalf Avenue and Westbound I-435	D	44.6	C	23.5
Metcalf Avenue and Eastbound I-435	F	85.1	B	16.8

1 - Level of Service  
2 - Seconds per Vehicle

**Table 6 - Signalized Intersection Level of Service Analysis  
Year 2007 Build Conditions - P.M. Peak Hour**

Intersection	HCM		CORSIM	
	LOS <sup>1</sup>	Delay <sup>2</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>
95th Street and Blue Jacket	C	20.0	B	14.7
95th Street and Southbound US-69	C	23.6	A	8.5
95th Street and Northbound US-69	C	22.0	B	13.7
95th Street and Switzer	D	38.6	C	21.8
103rd Street and Southbound US-69	B	12.3	B	11.0
103rd Street and Northbound US-69	B	15.9	B	12.8
103rd Street and Mastin	D	39.9	C	24.7
College Boulevard and Nieman	B	15.5	B	13.4
College Boulevard and Switzer/109th Street	C	21.9	B	12.1
College Boulevard and US-69	C	23.2	C	27.2
College Boulevard and Mastin	C	34.9	C	22.7
College Boulevard and Indian Creek Parkway	C	34.3	C	21.1
119th Street and Switzer	B	18.7	B	17.7
119th Street and Mastin	D	39.3	C	20.7
119th Street and Southbound US-69	B	18.6	B	16.0
119th Street and Northbound US-69	B	18.4	B	15.5
Quivira Road and 106th Street	C	23.0	B	19.3
Quivira Road and Westbound I-435	C	26.8	B	17.6
Quivira Road and Eastbound I-435	C	28.5	B	16.6
Antioch Road and Westbound I-435	C	29.8	B	18.4
Antioch Road and Eastbound I-435	D	36.3	A	9.1
Antioch Road and Indian Creek Parkway	C	34.4	C	27.4
Metcalf Avenue and Westbound I-435	F	93.8	C	25.4
Metcalf Avenue and Eastbound I-435	E	74.4	C	23.6

1 - Level of Service  
2 - Seconds per Vehicle

**Table 7 - Signalized Intersection Level of Service Analysis  
Year 2027 Build Conditions - A.M. Peak Hour**

Intersection	HCM		CORSIM	
	LOS <sup>1</sup>	Delay <sup>2</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>
95th Street and Blue Jacket	C	21.9	B	14.9
95th Street and Southbound US-69	B	16.6	B	10.3
95th Street and Northbound US-69	C	22.0	B	15.9
95th Street and Switzer	C	20.7	B	16.3
103rd Street and Southbound US-69	B	14.3	B	12.6
103rd Street and Northbound US-69	B	18.1	B	13.7
103rd Street and Mastin	C	25.3	B	18.1
College Boulevard and Nieman	E	69.2	C	24.6
College Boulevard and Switzer/109th Street	E	55.7	B	19.1
College Boulevard and US-69	F	>120	D	51.3
College Boulevard and Mastin	E	56.0	C	21.7
College Boulevard and Indian Creek Parkway	C	20.9	B	17.6
119th Street and Switzer	D	38.0	C	29.9
119th Street and Mastin	B	13.8	B	11.7
119th Street and Southbound US-69	C	20.8	B	17.4
119th Street and Northbound US-69	B	13.3	B	14.3
Quivira Road and 106th Street	D	43.0	C	26.3
Quivira Road and Westbound I-435	D	50.9	C	25.0
Quivira Road and Eastbound I-435	C	26.0	C	25.7
Antioch Road and Westbound I-435	C	34.7	C	22.3
Antioch Road and Eastbound I-435	D	47.5	B	13.8
Antioch Road and Indian Creek Parkway	C	33.0	C	26.9
Metcalf Avenue and Westbound I-435	E	78.6	C	27.4
Metcalf Avenue and Eastbound I-435	E	70.5	B	15.3

1 - Level of Service  
2 - Seconds per Vehicle

**Table 8 - Signalized Intersection Level of Service Analysis  
Year 2027 Build Conditions – P.M. Peak Hour**

Intersection	HCM		CORSIM	
	LOS <sup>1</sup>	Delay <sup>2</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>
95th Street and Blue Jacket	C	25.4	B	19.0
95th Street and Southbound US-69	C	25.7	B	11.8
95th Street and Northbound US-69	B	18.3	B	11.8
95th Street and Switzer	D	43.2	C	24.5
103rd Street and Southbound US-69	C	28.6	B	15.8
103rd Street and Northbound US-69	C	21.8	B	13.9
103rd Street and Mastin	D	44.9	C	25.8
College Boulevard and Nieman	B	18.3	B	15.5
College Boulevard and Switzer/109th Street	D	44.5	C	24.2
College Boulevard and US-69	C	29.1	C	30.1
College Boulevard and Mastin	F	93.6	C	26.6
College Boulevard and Indian Creek Parkway	F	>120	D	40.7
119th Street and Switzer	D	38.1	C	28.9
119th Street and Mastin	E	69.3	C	26.4
119th Street and Southbound US-69	C	26.1	B	19.5
119th Street and Northbound US-69	C	21.5	B	19.5
Quivira Road and 106th Street	C	25.7	C	22.1
Quivira Road and Westbound I-435	E	64.3	C	24.4
Quivira Road and Eastbound I-435	E	58.1	C	26.0
Antioch Road and Westbound I-435	D	43.3	C	24.2
Antioch Road and Eastbound I-435	D	46.4	B	13.4
Antioch Road and Indian Creek Parkway	D	41.9	C	28.0
Metcalf Avenue and Westbound I-435	F	>120	C	28.5
Metcalf Avenue and Eastbound I-435	F	90.1	C	32.9

1 – Level of Service  
2 – Seconds per Vehicle



Using the conservative analysis tools in the Highway Capacity Manual (HCM), some of the intersections are projected to operate at LOS E or F in the Build and No-Build conditions. However, the CORSIM analyses indicate the potential for all of the study intersections to operate at acceptable levels of service under the Build condition.

The Build condition is also shown to be an improvement over the No-Build condition. The Build condition has five intersections operating at LOS F and five intersections operating at LOS E, compared to the No-Build condition that has 13 intersections operating at LOS F (based on the HCM analysis methods).

The ramps were evaluated to determine if adequate distance was being provided to not only store the projected traffic volumes, but also to provide for deceleration from either the adjacent freeway main line or collector-distributor system. The storage lengths on the ramps under the current design are sufficient to provide both for the deceleration of vehicles and the storage of vehicles on the ramps.

### ***Freeway Analyses***

The freeway analyses were also conducted using CORSIM, since the proposed freeway configuration has a level of complexity that exceeds the limitations of the HCM analysis tools. The results of the freeway analyses are included in Appendix B for both the No-Build and Build Scenarios. As mentioned in the earlier section on the traffic volume projections, the No-Build analyses did assume an additional through lane in each direction on both US-69 and I-435.

Many of the freeway segments are projected to operate at LOS E or F under the various No-Build scenarios. By year 2027 the following segments are projected to operate at LOS E or F in one or both of the peak hours, even with the additional through lanes added to I-435 and US-69. These analyses are based on density (expressed in vehicles/lane/mile) along the freeway segments or collector-distributor roadways.

- Eastbound I-435, from Quivira Road to Metcalf Avenue
- Westbound I-435, from Metcalf Avenue to US-69
- Westbound I-435, from Quivira Road to I-35
- Southbound US-69, from 87th Street to 119th Street
- Northbound US-69, from Blue Valley Parkway to 95th Street
- Eastbound I-435 Collector-Distributor System, from the I-435 Exit to the Southbound US-69 Exit
- Eastbound I-435 Collector-Distributor System, from Southbound US-69 Entrance to I-435
- Westbound I-435 Collector-Distributor System, from I-435 to the Northbound US-69 Exit
- Westbound I-435 Collector-Distributor System, from Southbound US-69 Exit to I-435

The operations along I-435 and US-69 are significantly improved with the proposed Build conditions. There are, however, some areas in which the proposed Build conditions will operate at LOS E. Those segments include:

- Eastbound I-435, Metcalf Exit to Metcalf Entrance
- Westbound I-435, Antioch Exit to US-69 Exit
- Westbound I-435, US-69 Entrance to Quivira Entrance

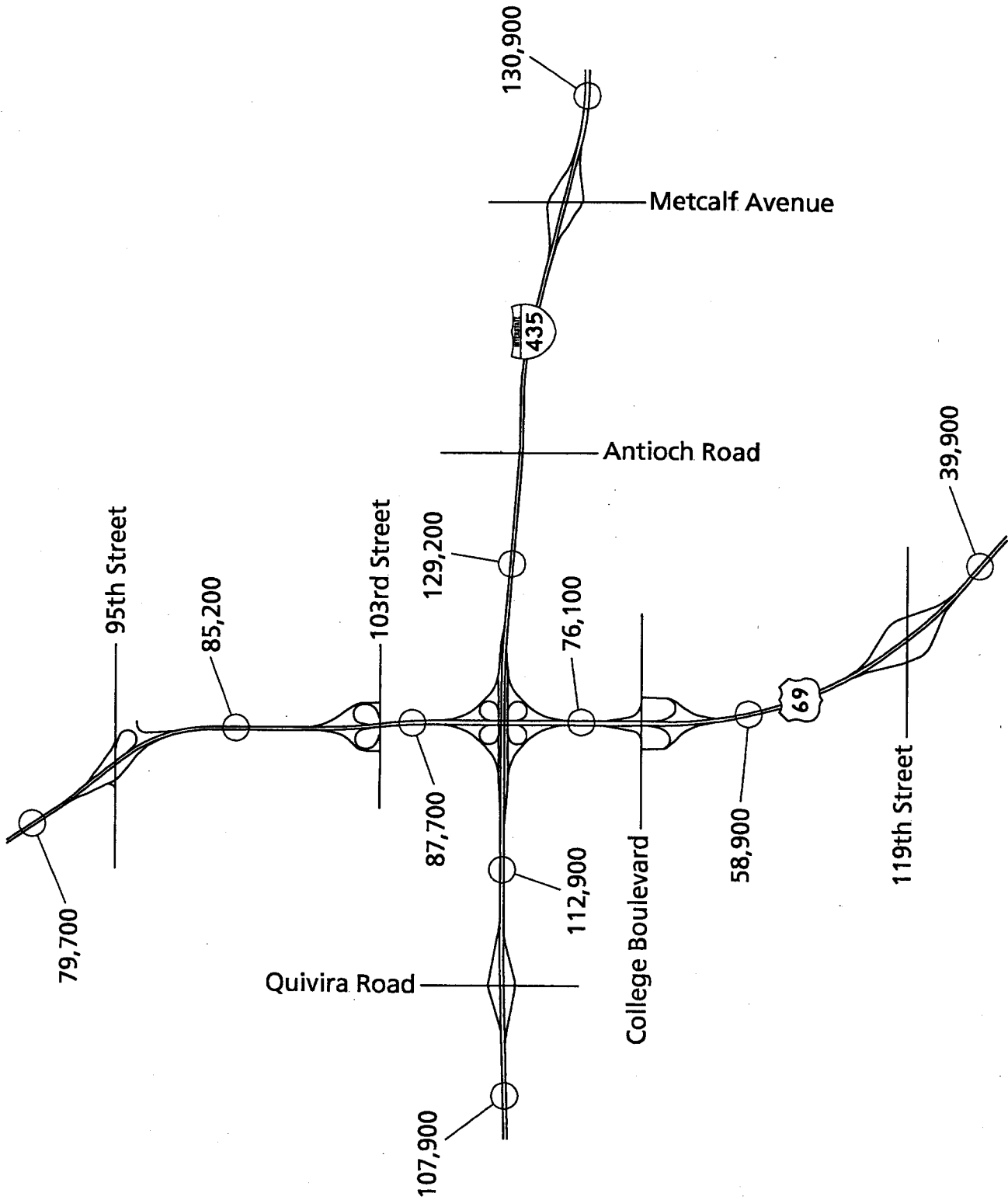
None of the freeway segments studied is projected to operate at LOS F under the proposed Build conditions.

## **Summary**

The proposed improvements are projected to provide significant operational benefits when compared to the No-Build conditions, providing acceptable levels of service on the vast majority of the freeway segments. The at-grade intersections are projected to operate superior to the No-Build Conditions as well, with the potential for signal coordination to provide acceptable levels of service at all intersections.

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Figure 28	2027 Build P.M. Peak Hour Traffic Volumes – Freeways
Figure 29	2027 Build P.M. Peak Hour Traffic Volumes – Freeway (Detail)



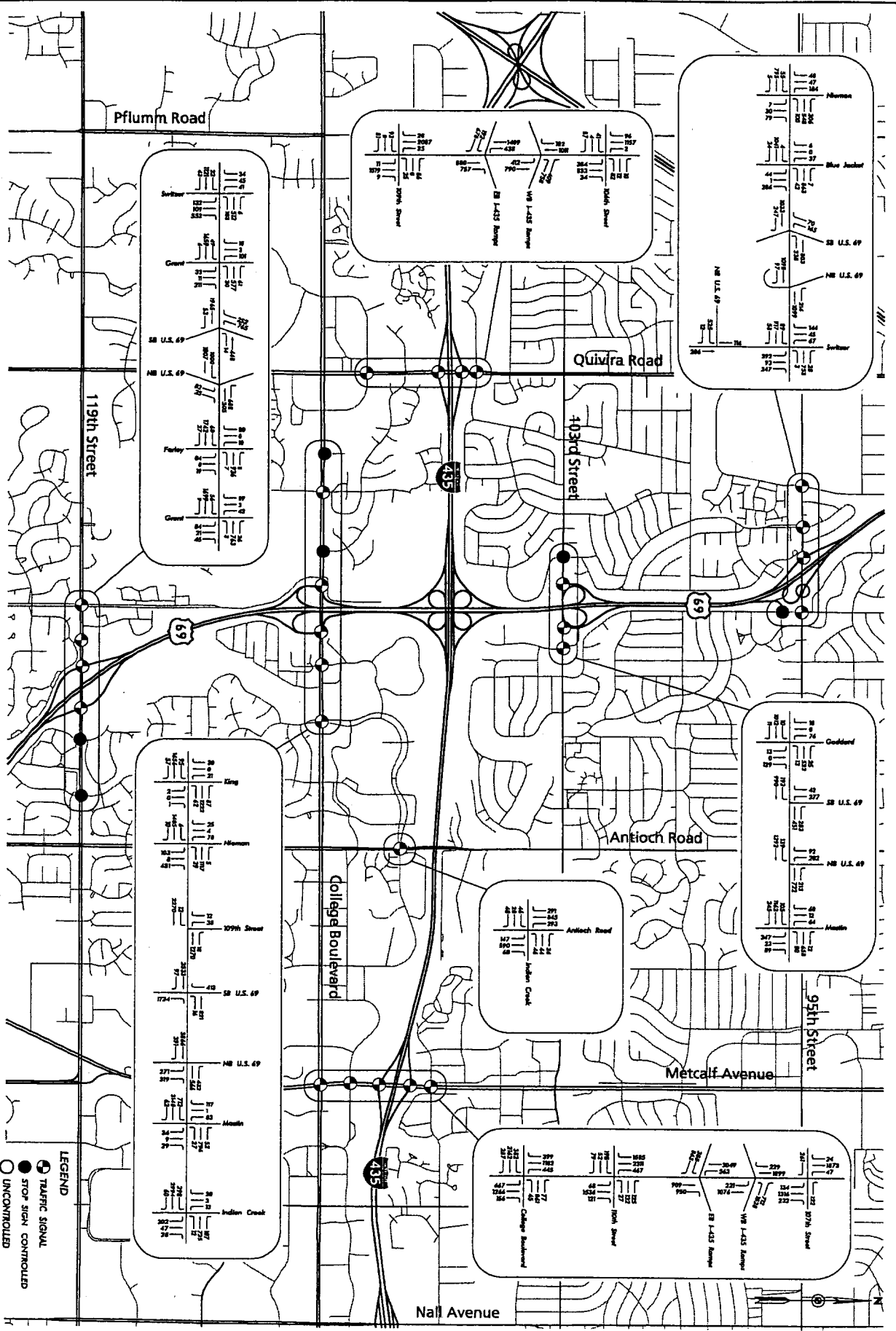
**I-435 and US 69**  
Overland Park, Kansas

**EXISTING ADT**

June 2003  
No Scale

**Figure 1**

06/10/2003



**LEGEND**  
 ● TRAFFIC SIGNAL  
 ○ STOP SIGN CONTROLLED  
 ○ UNCONTROLLED



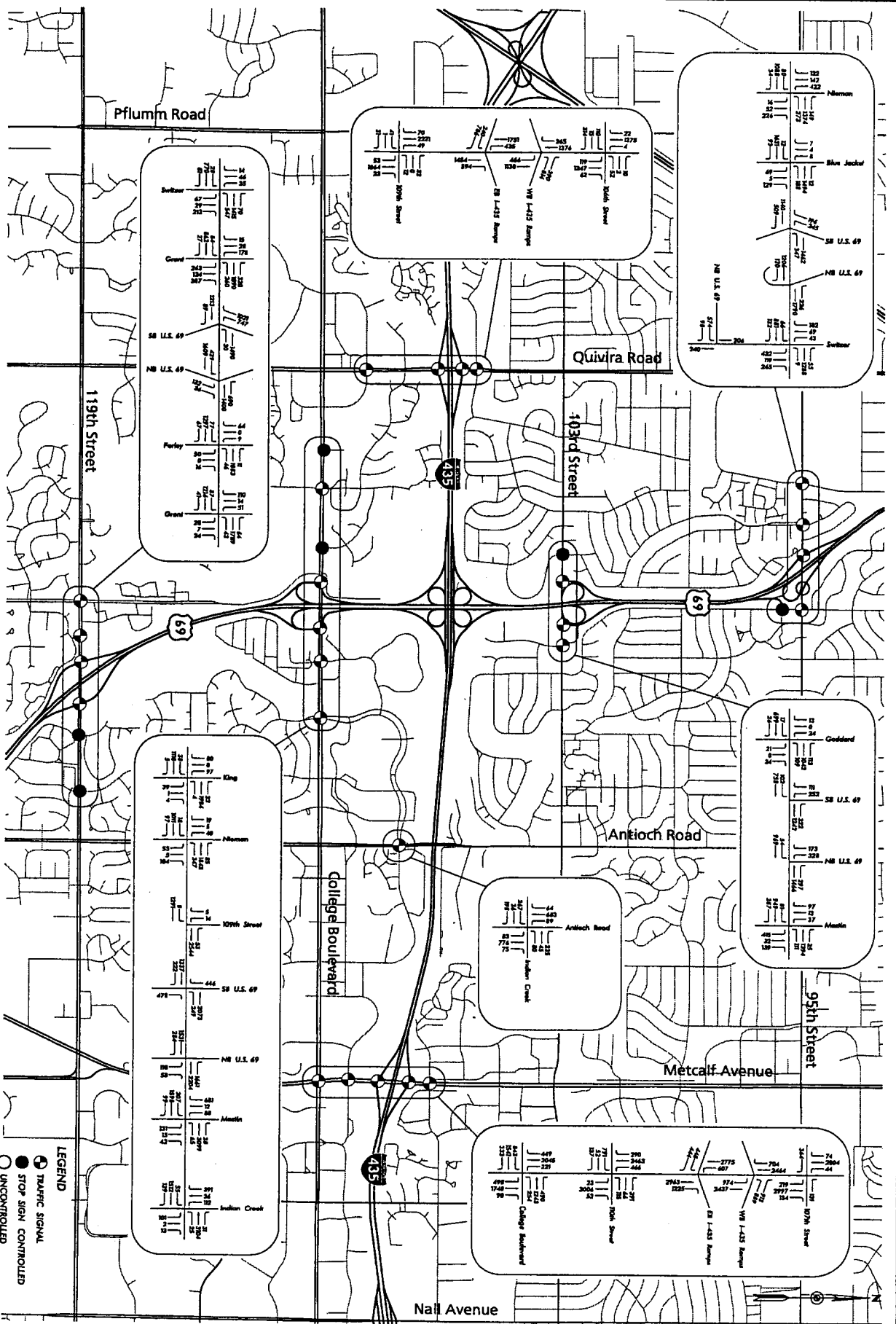
**I-435 and US 69  
Overland Park, Kansas**

**EXISTING A.M. PEAK HOUR  
TRAFFIC VOLUMES  
TURNING MOVEMENTS**

June 2003  
Scale 2000'

Figure 2

06/10/2003

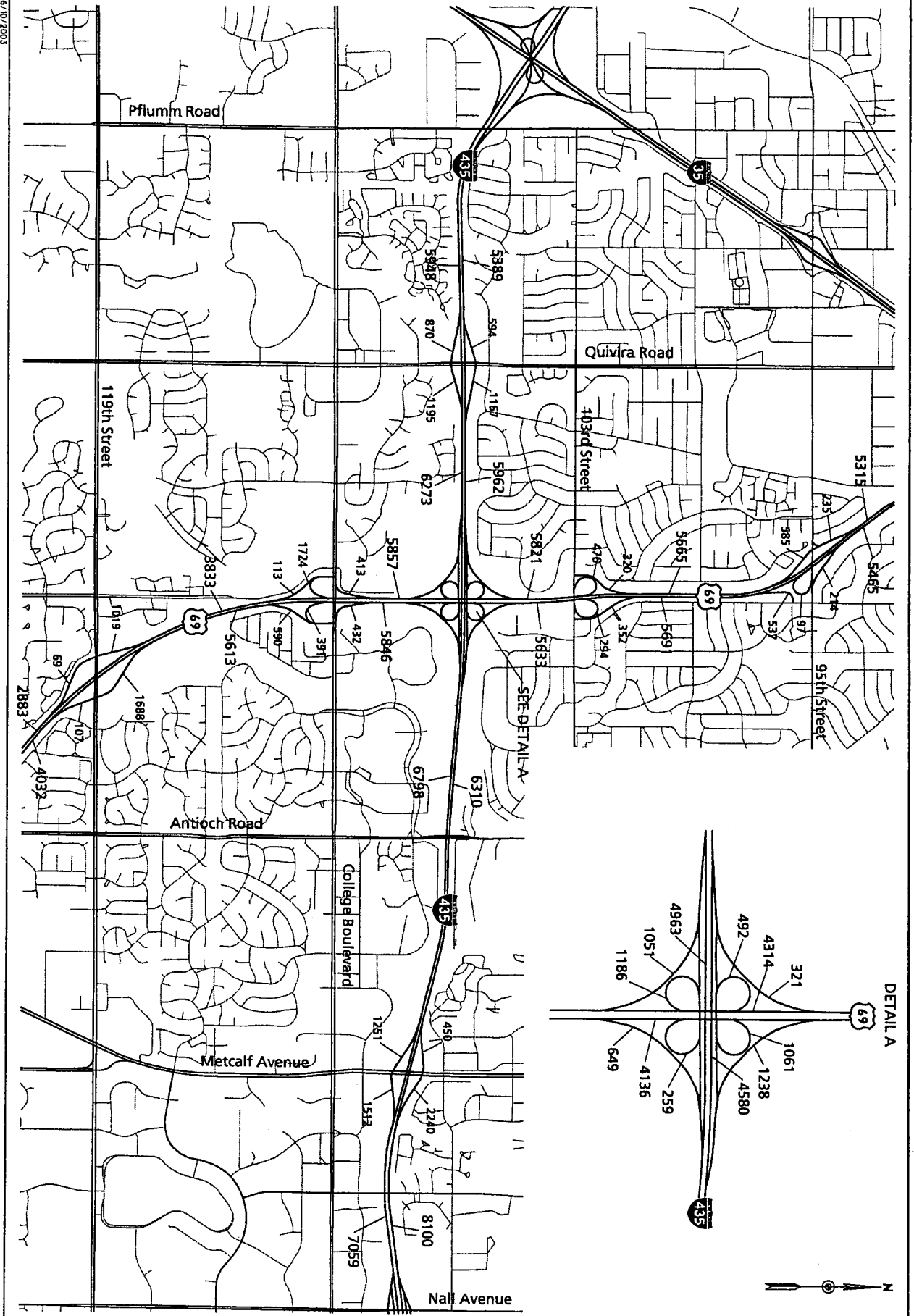


**I-435 and US 69  
Overland Park, Kansas**

**EXISTING P.M. PEAK HOUR  
TRAFFIC VOLUMES  
TURNING MOVEMENTS**

June 2003  
Scale 2000'

Figure 3

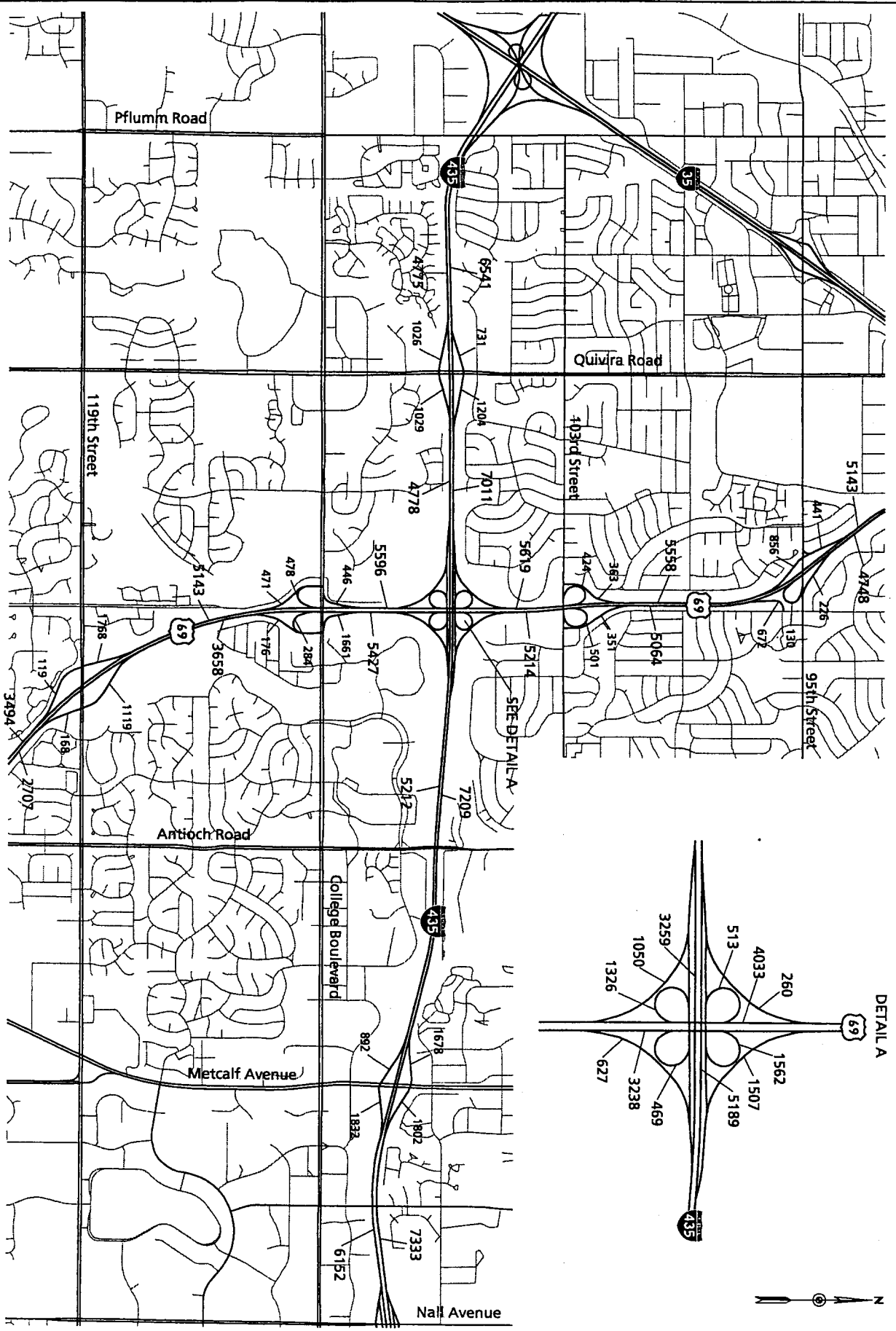


**I-435 and US 69**  
Overland Park, Kansas

EXISTING A.M. PEAK HOUR  
TRAFFIC VOLUMES  
FREEWAYS

June  
2003  
Scale 2000'

Figure 4



**I-435 and US 69**  
Overland Park, Kansas

EXISTING P.M. PEAK HOUR  
TRAFFIC VOLUMES  
FREEWAYS

June 2003  
Scale 2000'

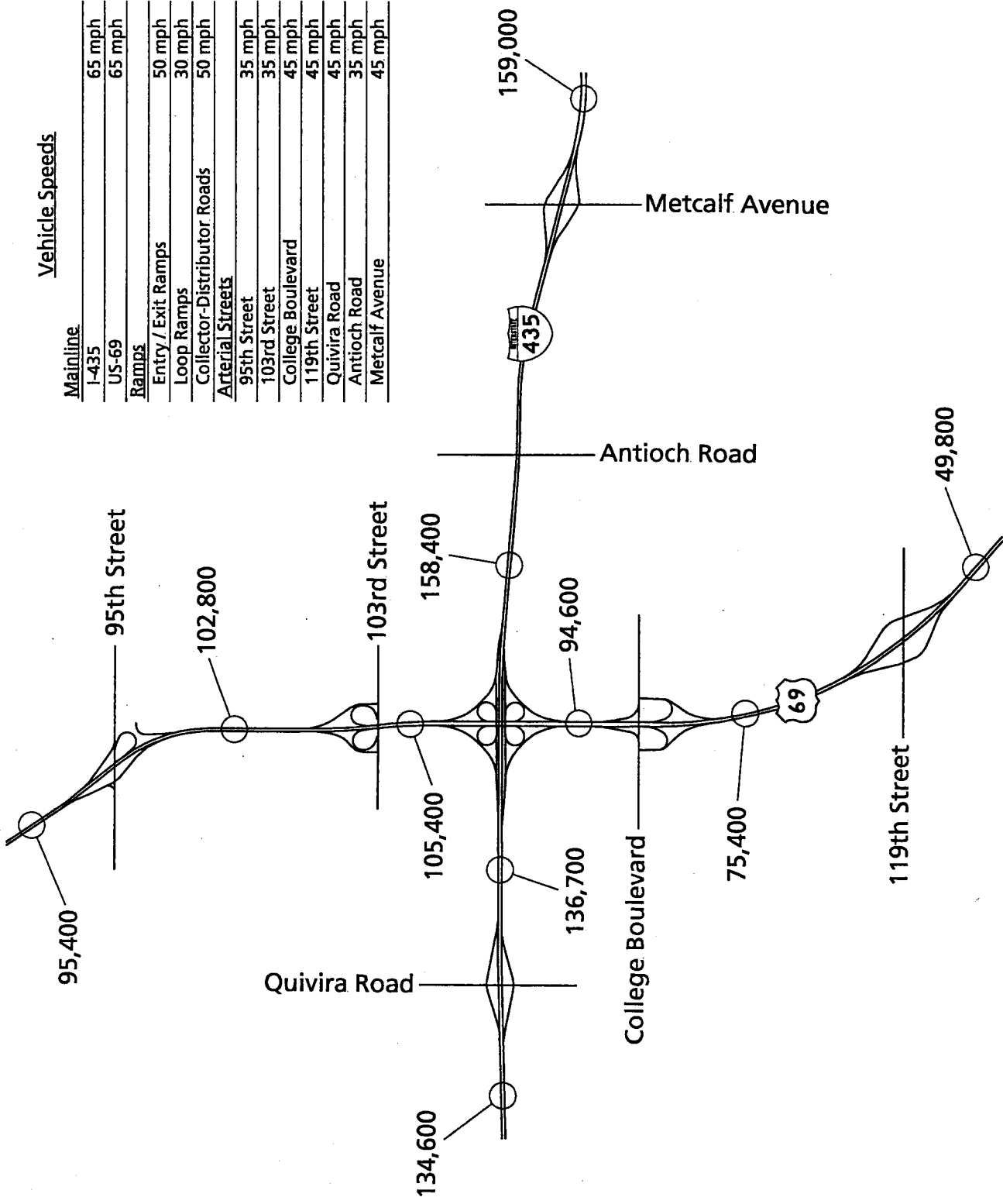
Figure 5





Vehicle Speeds

Mainline	
I-435	65 mph
US-69	65 mph
Ramps	
Entry / Exit Ramps	50 mph
Loop Ramps	30 mph
Collector-Distributor Roads	50 mph
Arterial Streets	
95th Street	35 mph
103rd Street	35 mph
College Boulevard	45 mph
119th Street	45 mph
Quivira Road	45 mph
Antioch Road	35 mph
Metcalf Avenue	45 mph



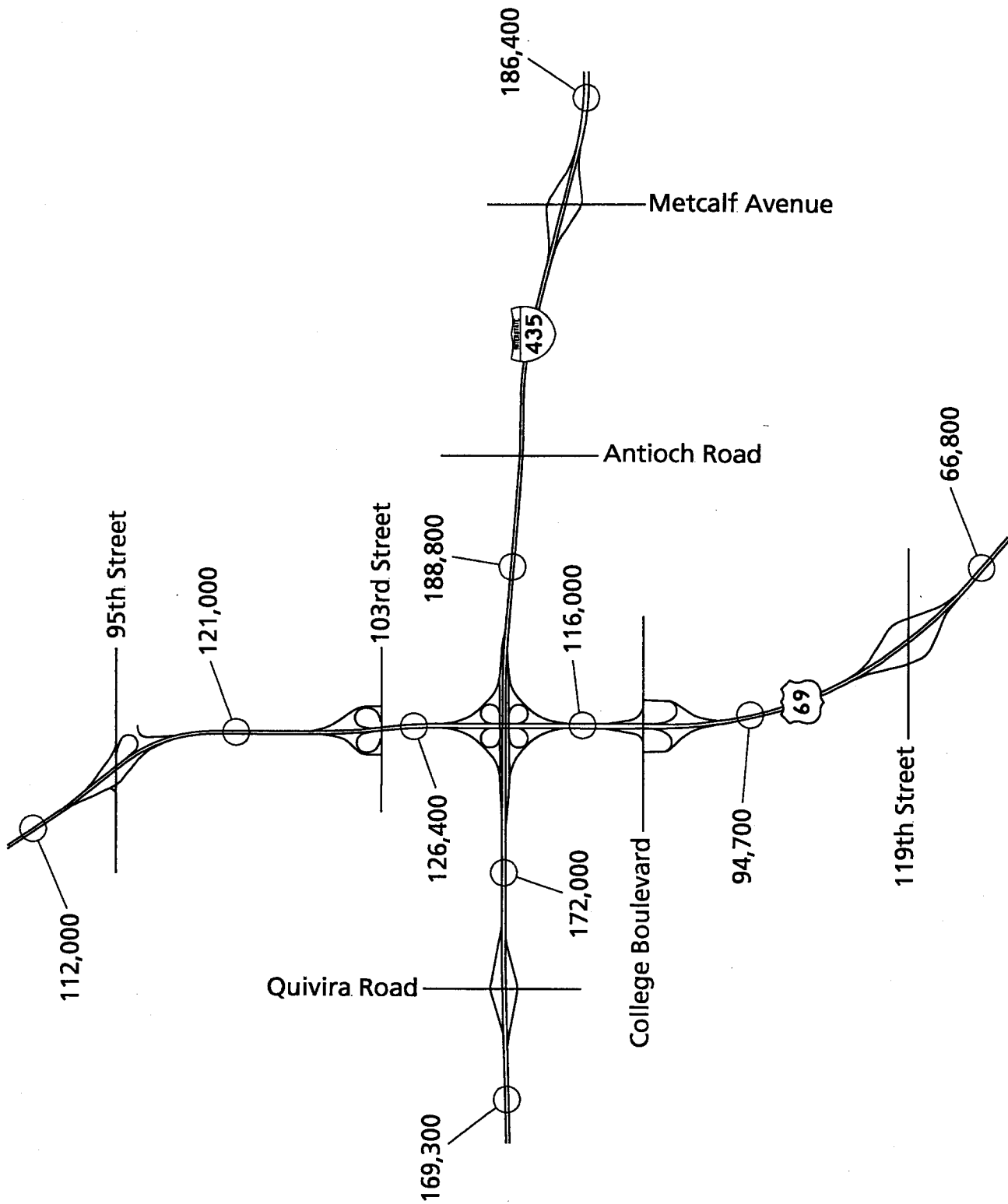
**I-435 and US 69**  
Overland Park, Kansas

**2007 NO-BUILD ADT**

June  
2003

No Scale

Figure 6



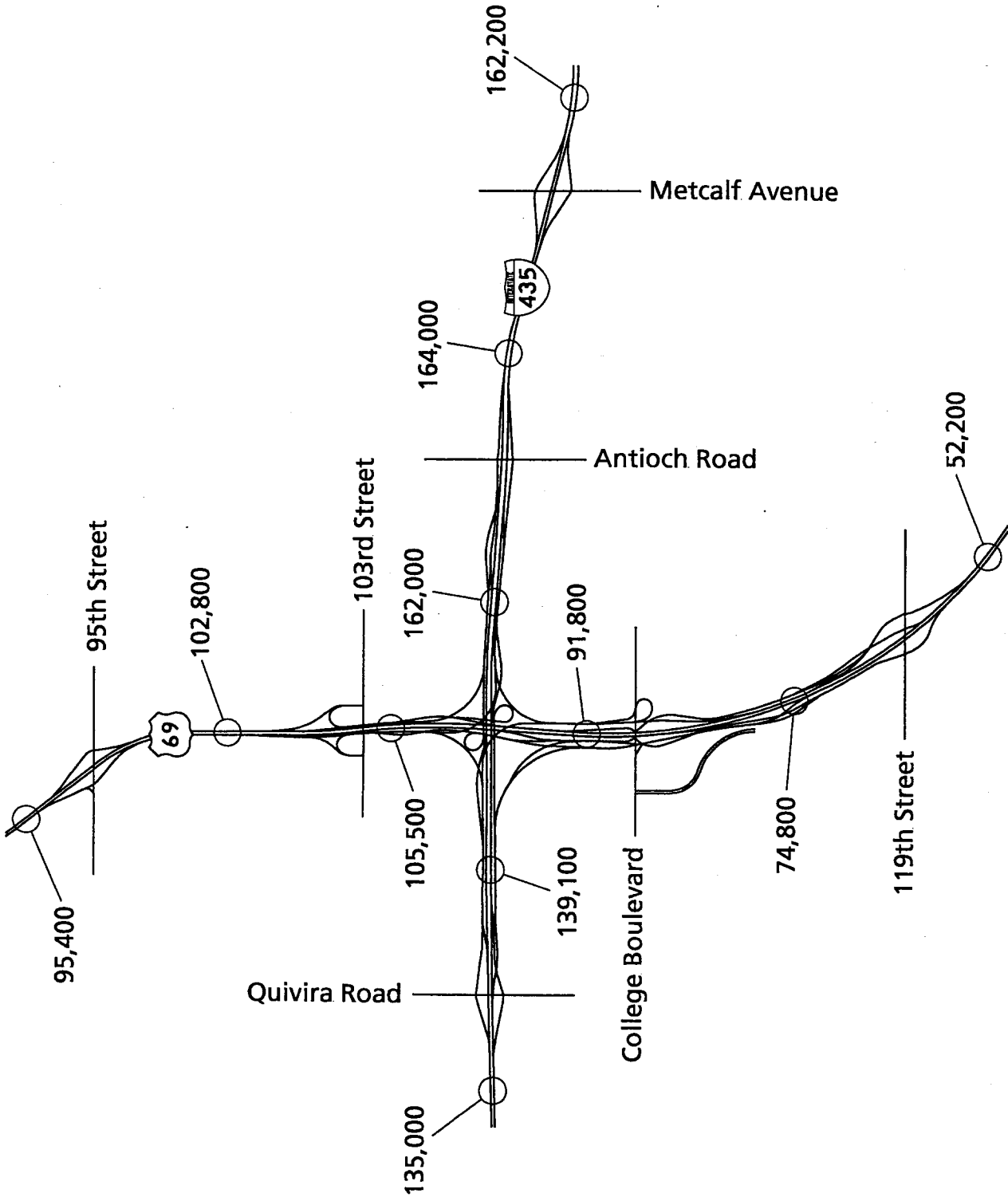
2027 NO-BUILD ADT  
WITH CAPACITY ADDED  
TO I-435 / US 69

I-435 and US 69  
Overland Park, Kansas



June  
2003  
No Scale

Figure 7

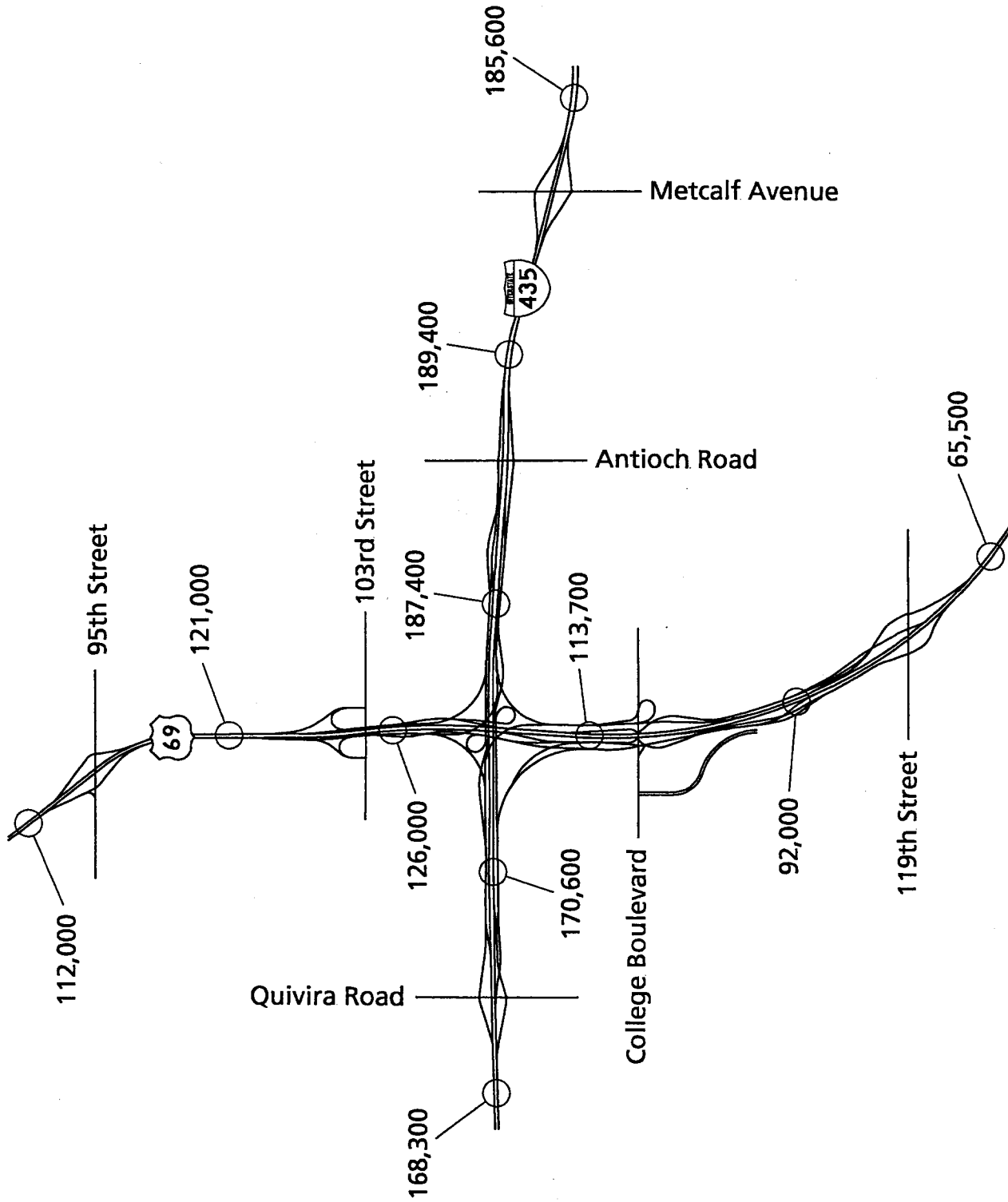


**I-435 and US 69**  
Overland Park, Kansas

**2007 BUILD-ADT**

June  
2003  
No Scale

**Figure 8**



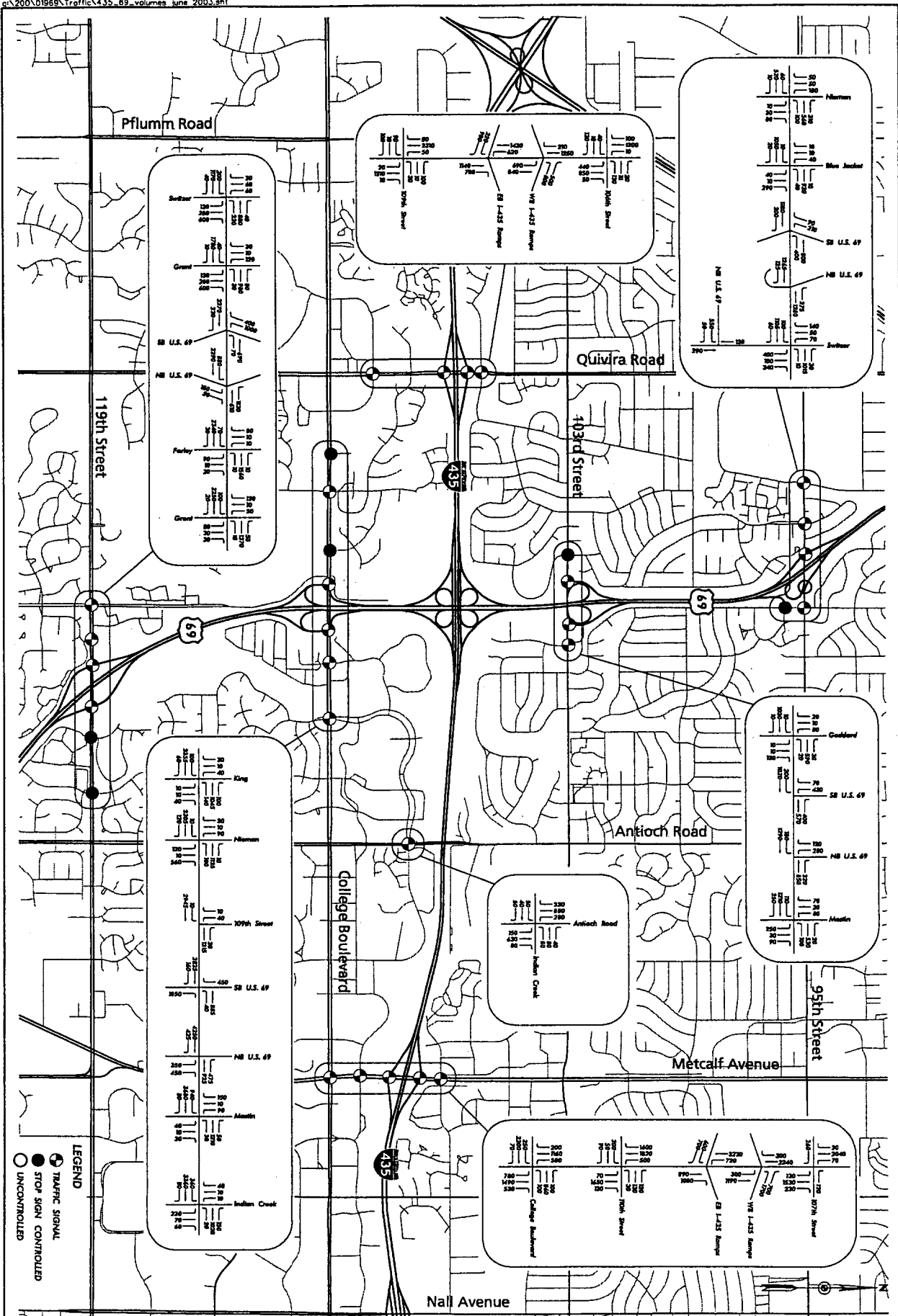
**I-435 and US 69**  
Overland Park, Kansas

**2027 BUILD-ADT**

June 2003  
No. Scale

Figure 9

05/10/2003

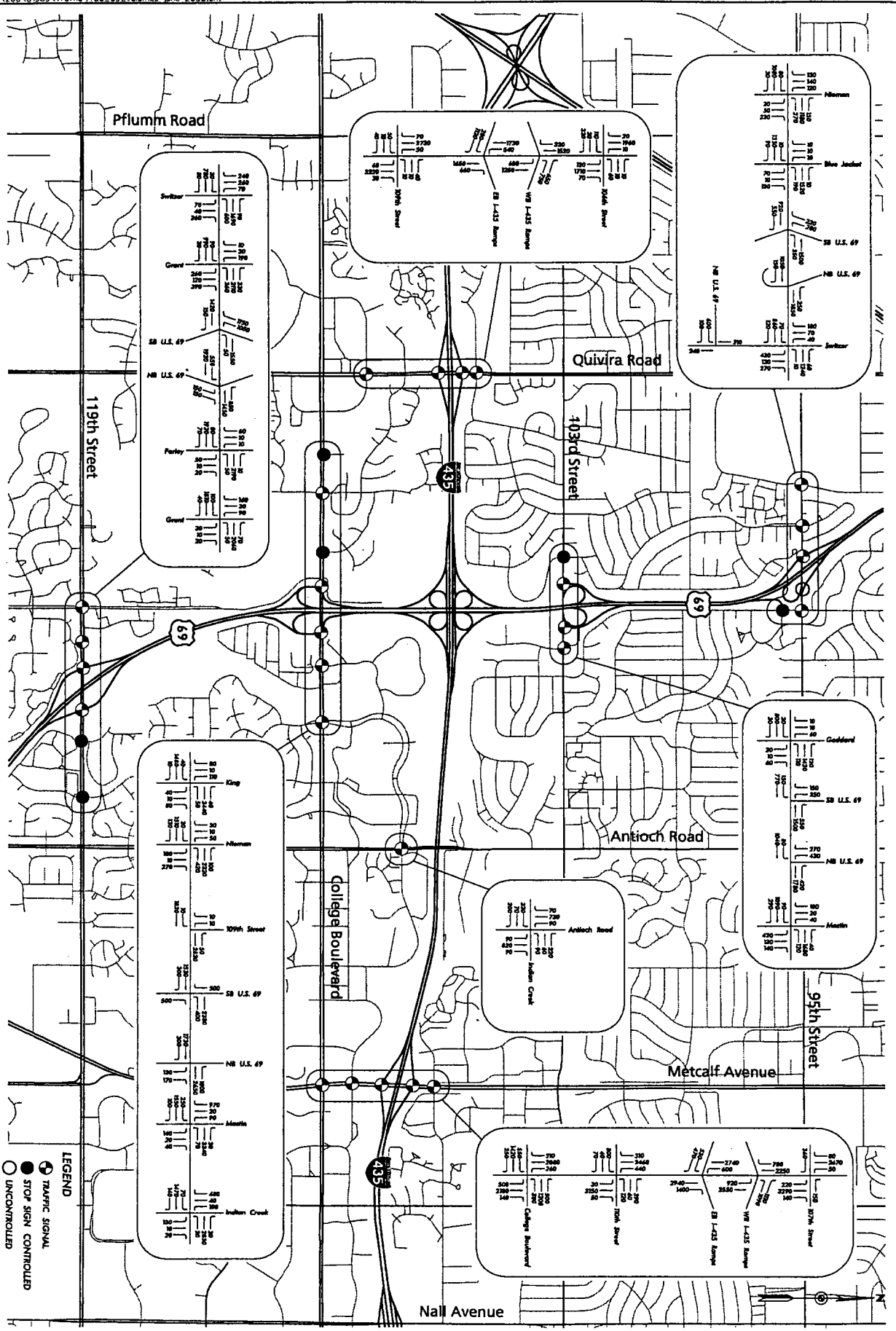


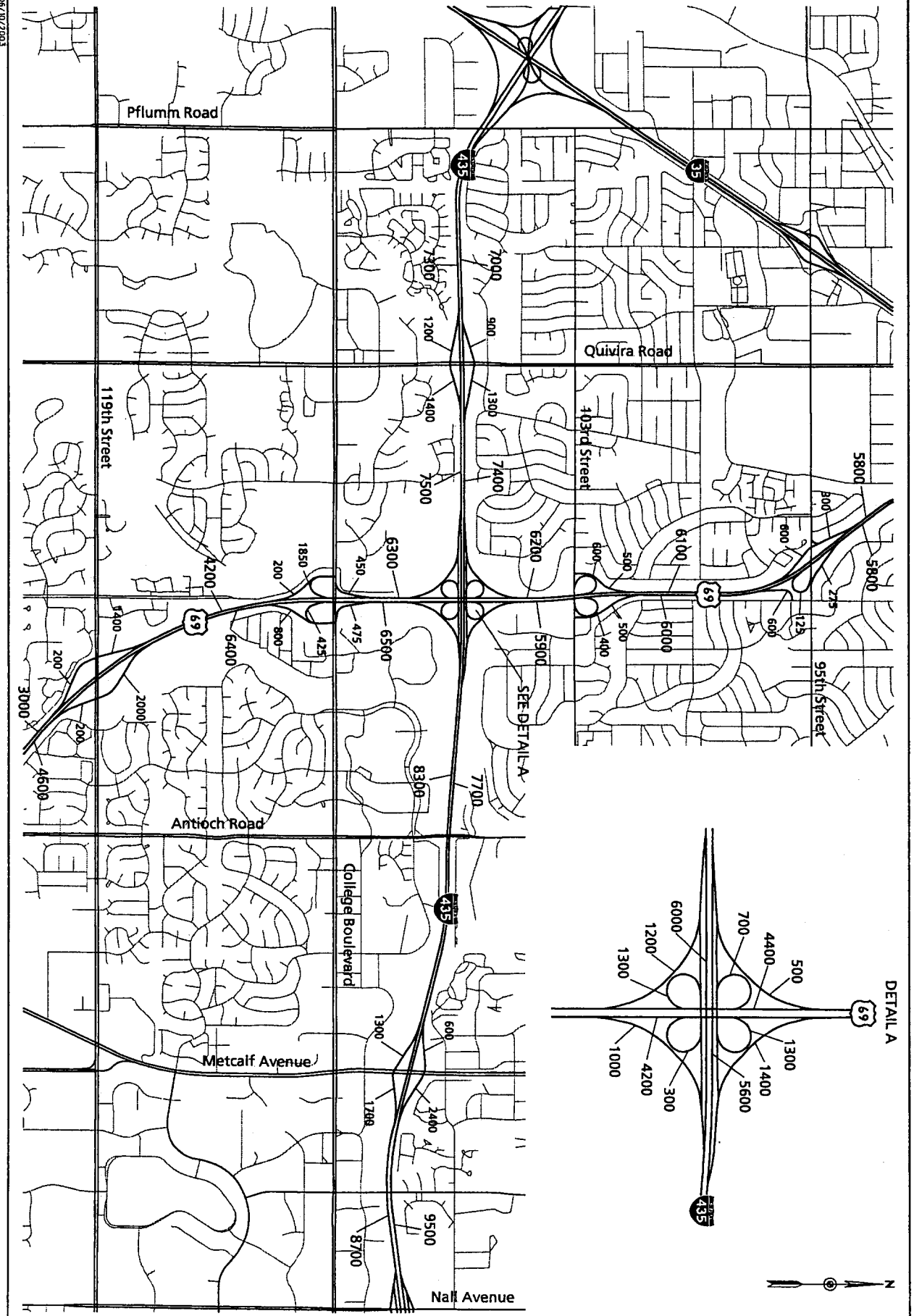
**I-435 and US 69**  
Overland Park, Kansas

2007 NO-BUILD  
A.M. PEAK HOUR  
TRAFFIC VOLUMES  
TURNING MOVEMENTS

June  
2003  
Scale 2000'

Figure 10



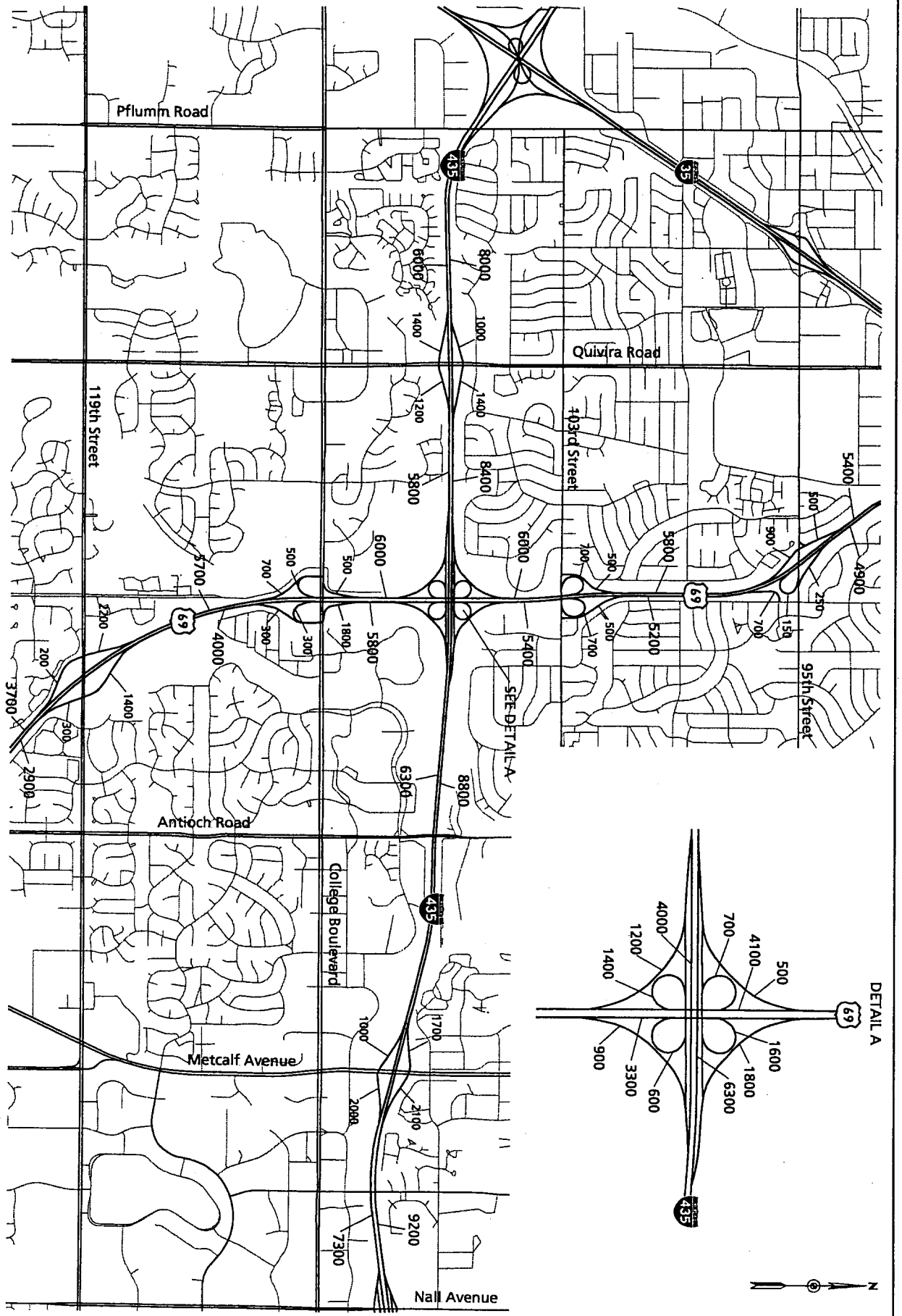


**I-435 and US 69**  
Overland Park, Kansas

2007 NO-BUILD  
A.M. PEAK HOUR  
TRAFFIC VOLUMES  
FREEWAYS

June 2003  
Scale 2000'

Figure 12



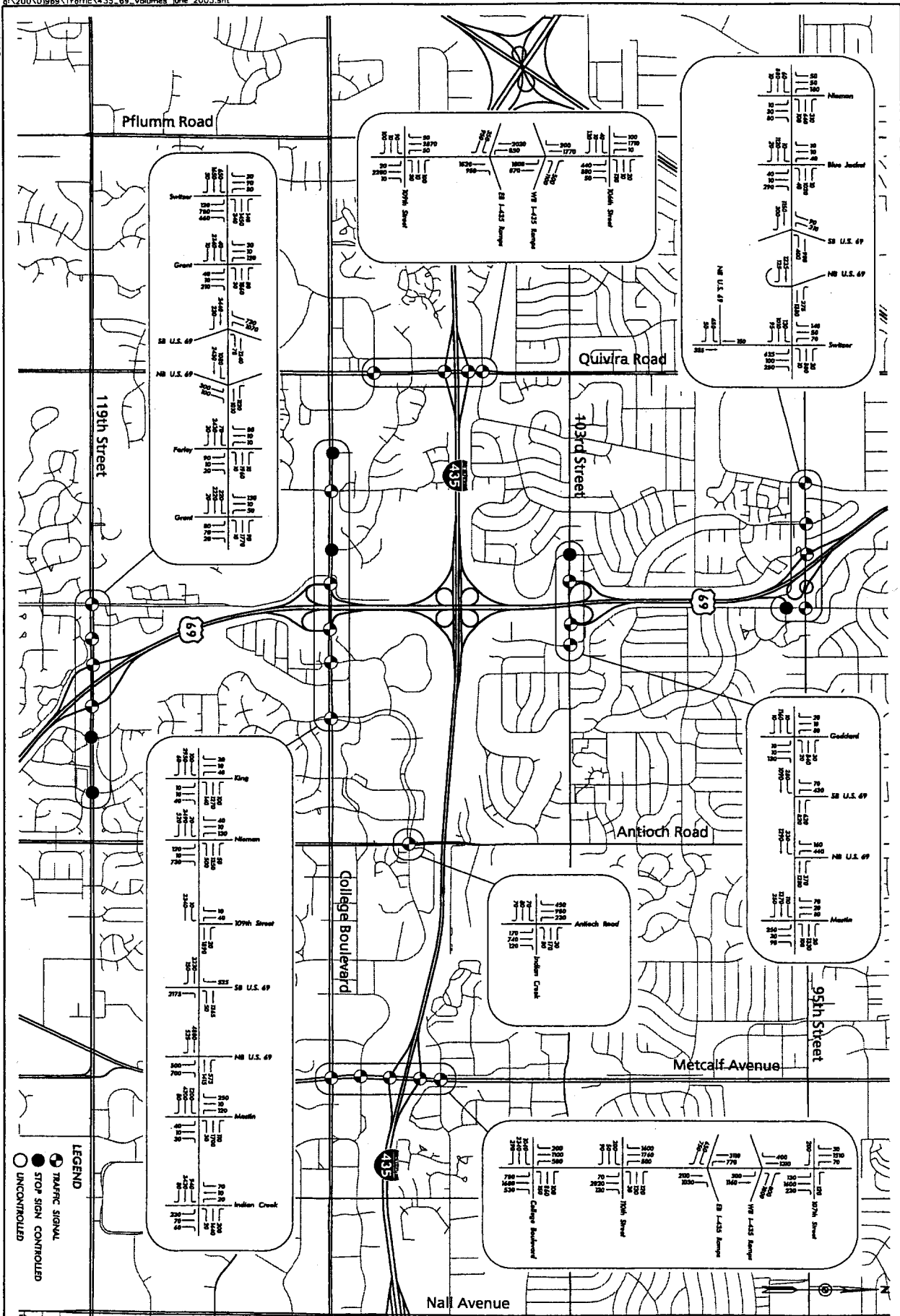
### I-435 and US 69 Overland Park, Kansas

2007 NO-BUILD  
P.M. PEAK HOUR  
TRAFFIC VOLUMES  
FREEWAYS

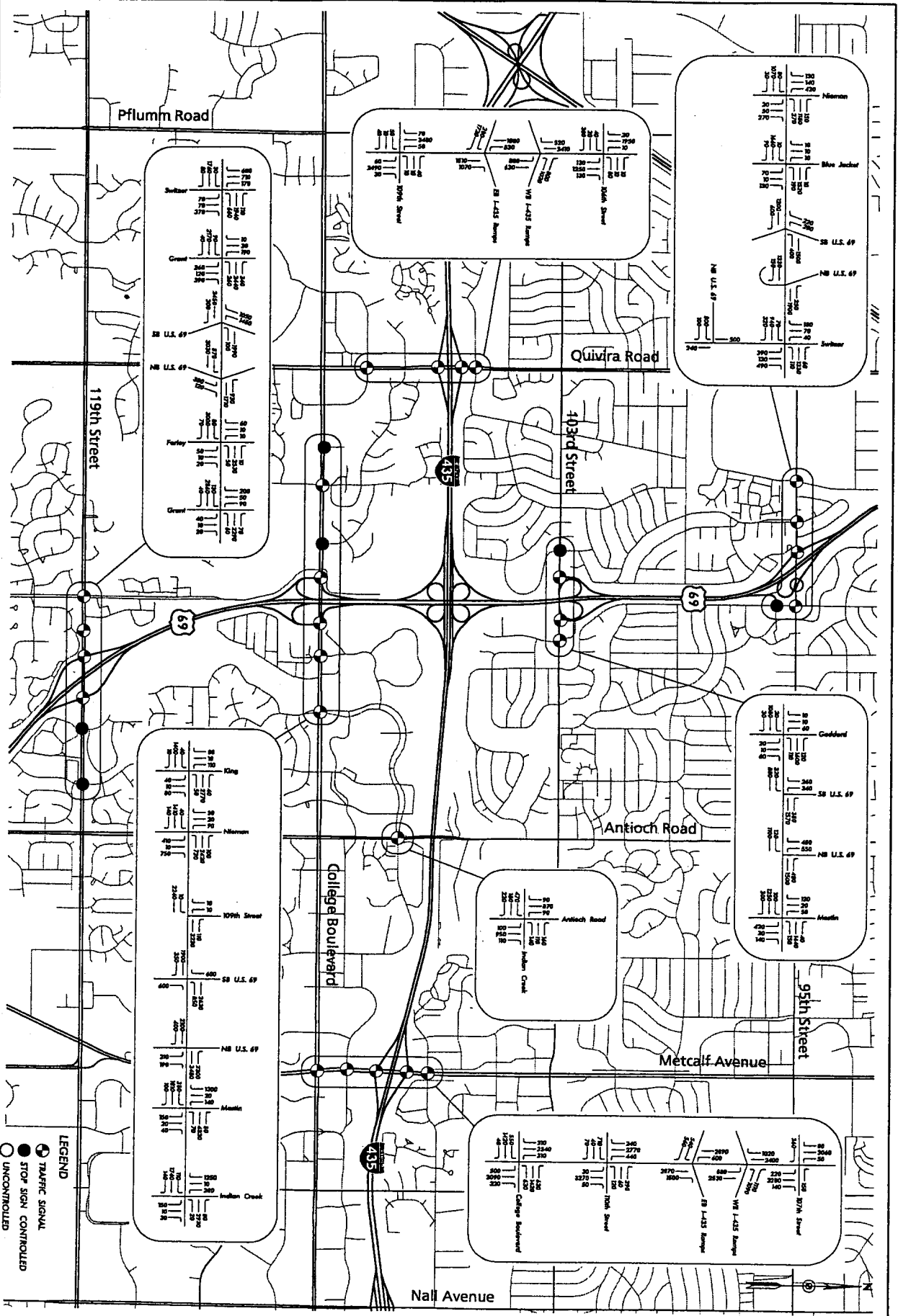
June  
2003  
Scale 2000'

Figure 13





06/10/2003



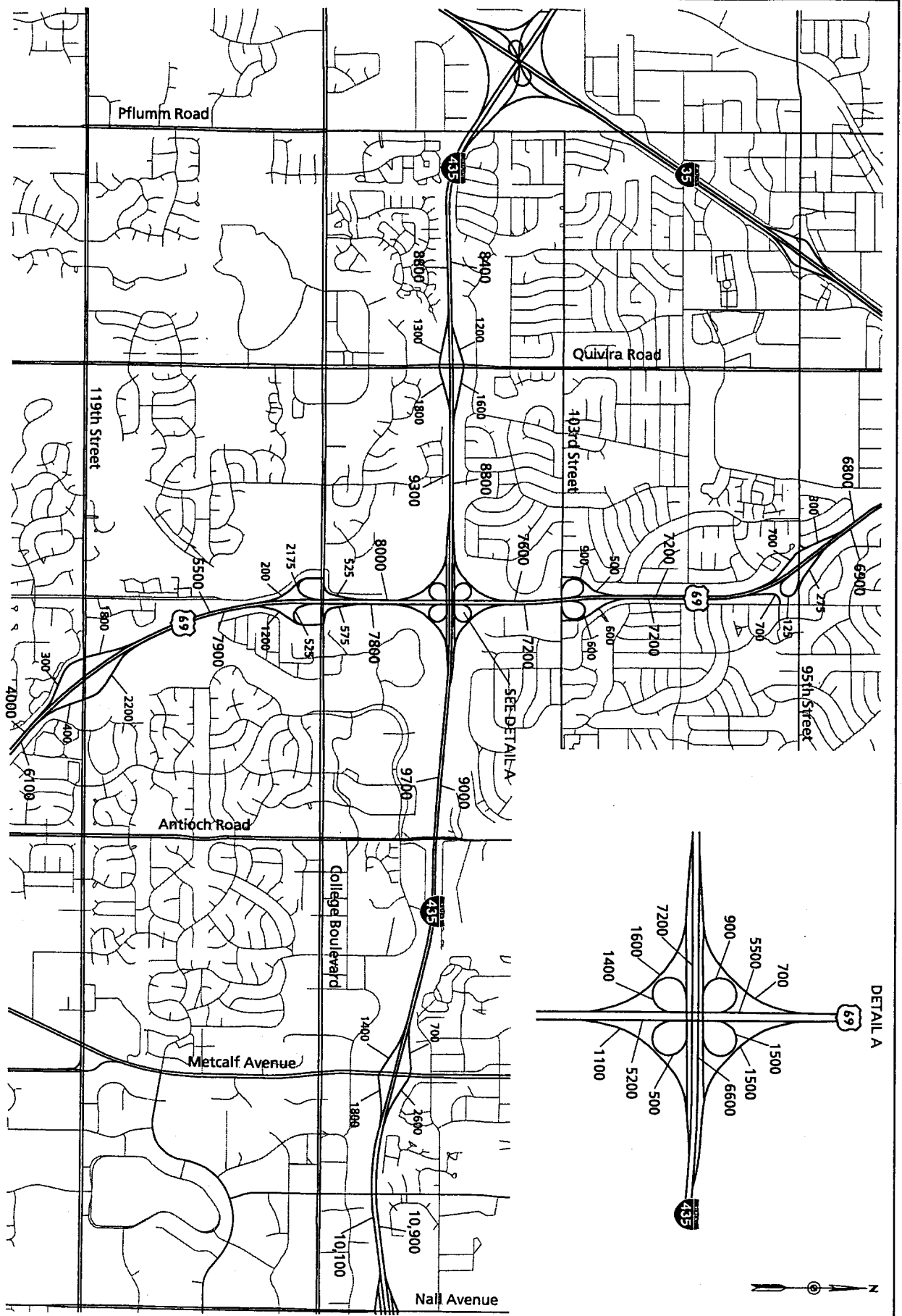
I-435 and US 69  
Overland Park, Kansas

2027 NO-BUILD P.M. PEAK HOUR  
TRAFFIC VOLUMES  
TURNING MOVEMENTS  
WITH CAPACITY ADDED TO I-435 / US 69

June 2003  
Scale 2000'

Figure 15

06/10/2003

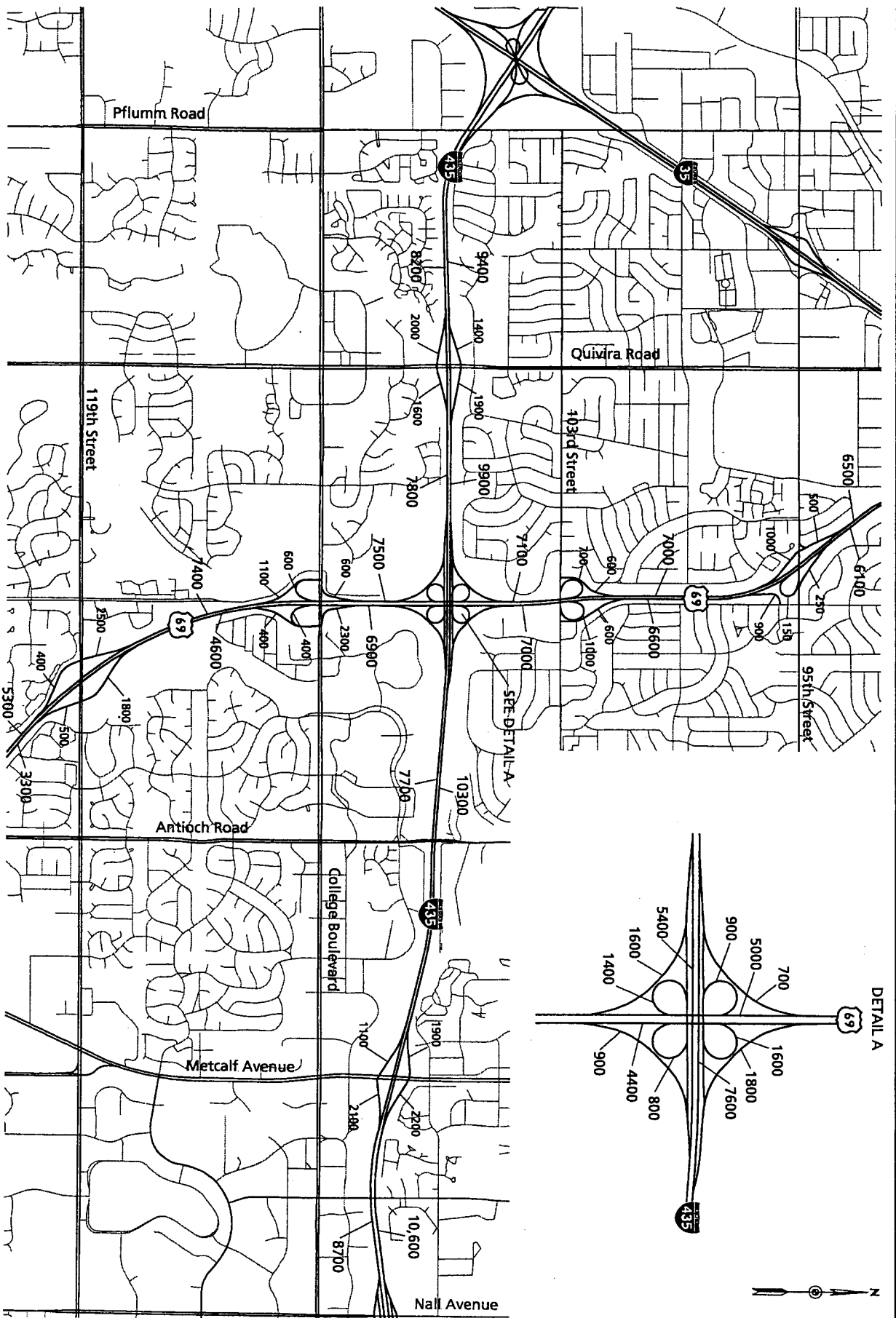


**I-435 and US 69**  
Overland Park, Kansas

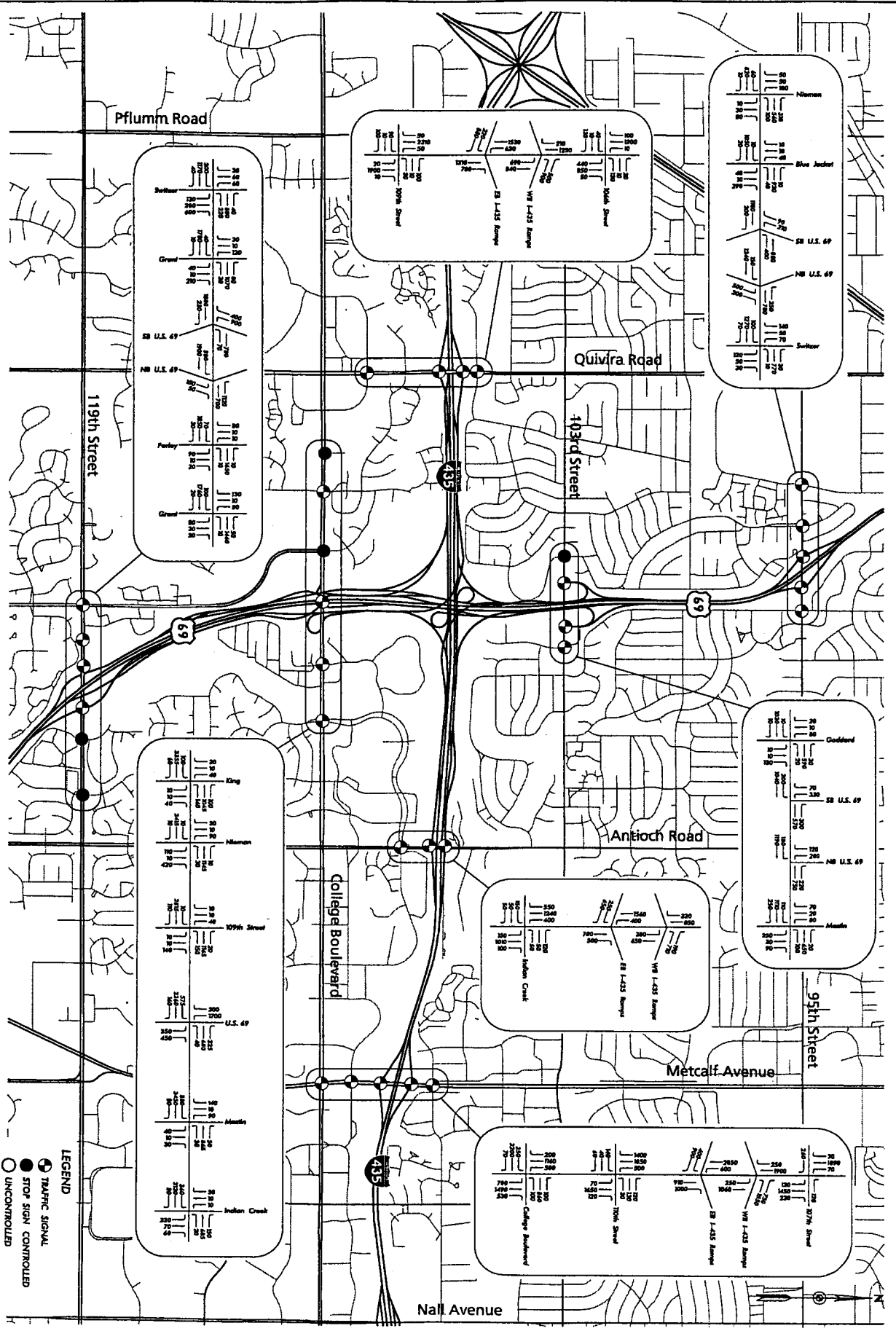
2027 NO-BUILD A.M. PEAK HOUR  
TRAFFIC VOLUMES (FREEWAYS)  
WITH CAPACITY ADDED TO I-435 / US 69

June 2003  
Scale 2000'

Figure 16



06/10/2003

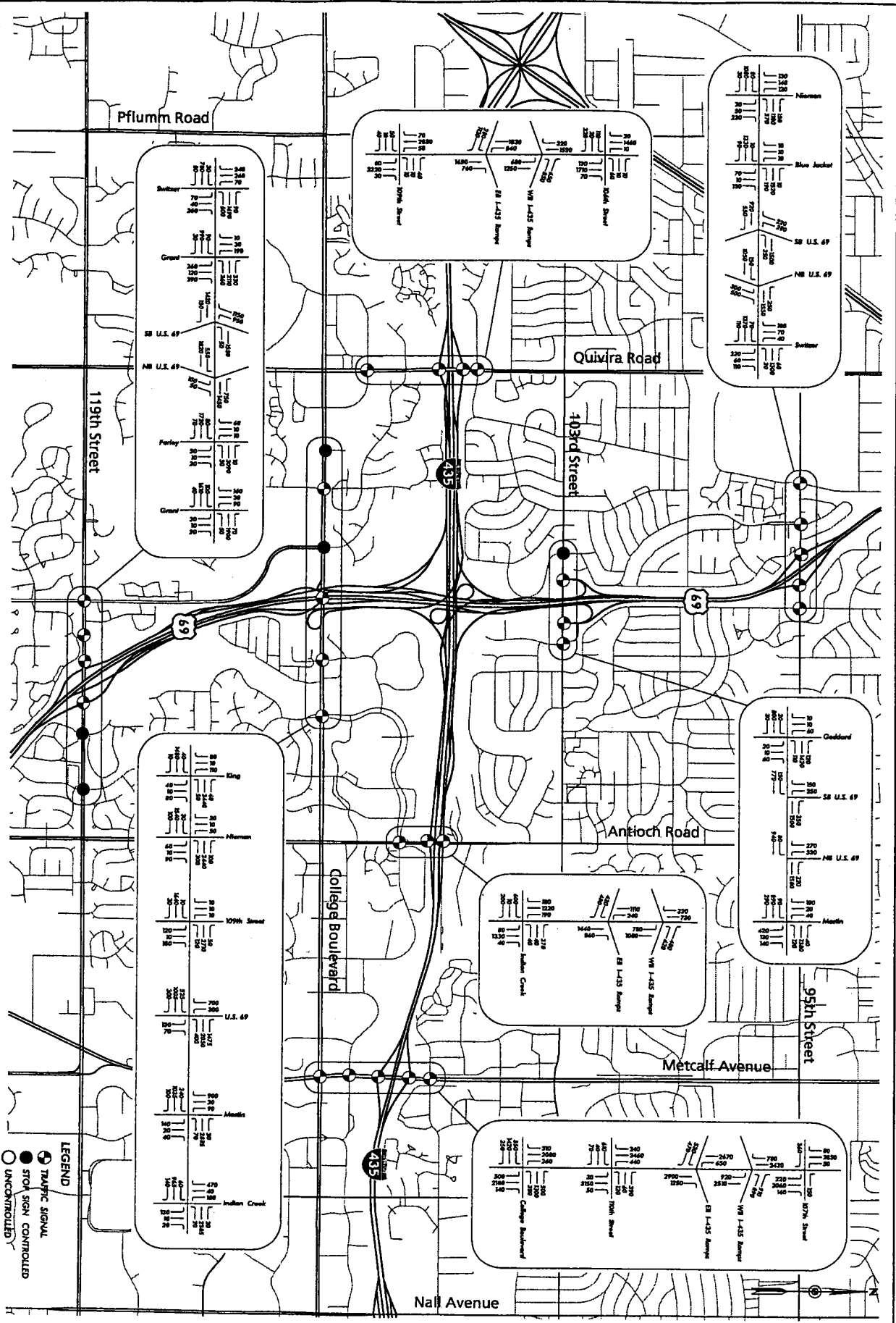


**I-435 and US 69  
Overland Park, Kansas**

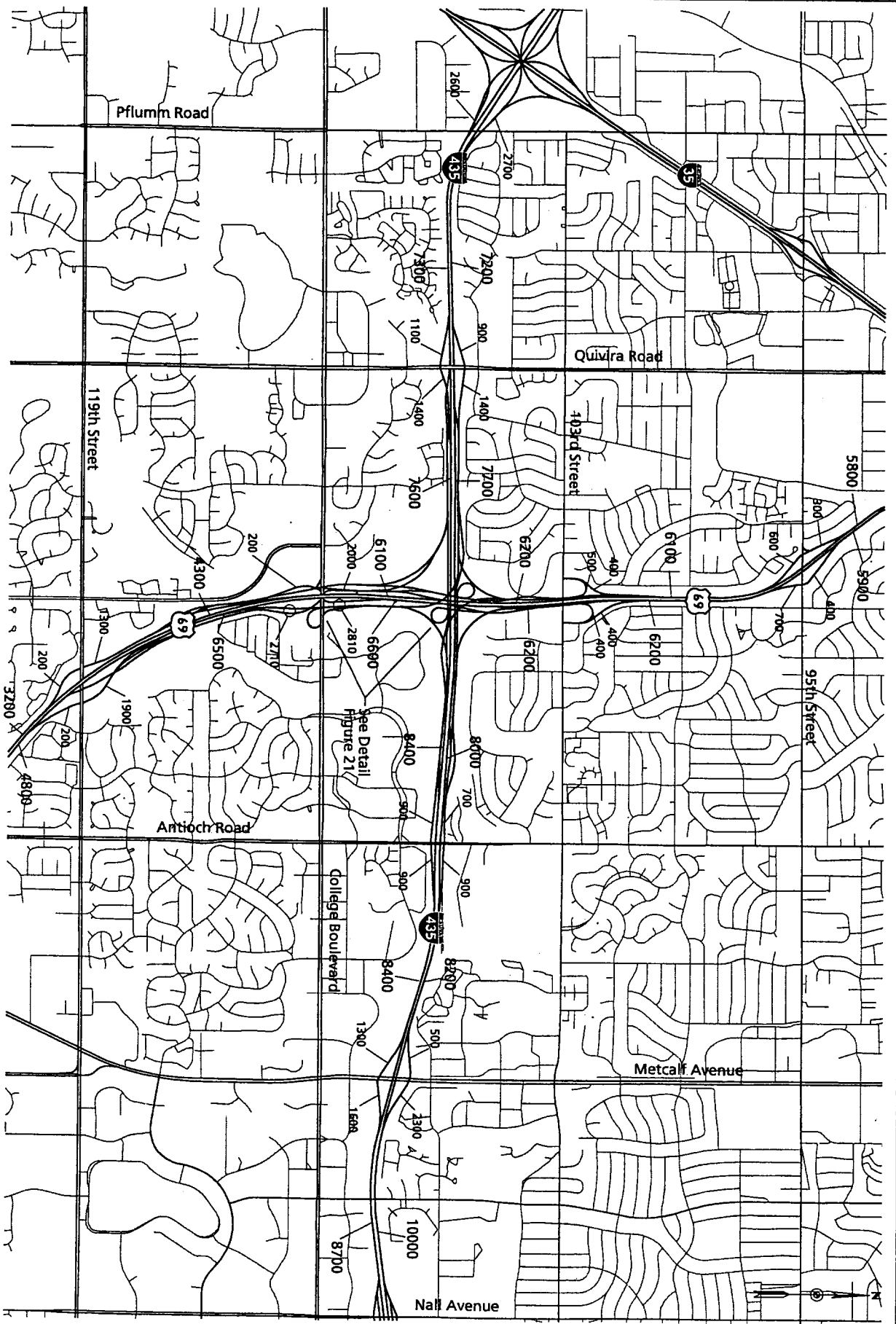
**2007 A.M. PEAK HOUR  
TRAFFIC VOLUMES  
TURNING MOVEMENTS**

June 2003  
Scale 2000'

Figure 18



12/07/2003



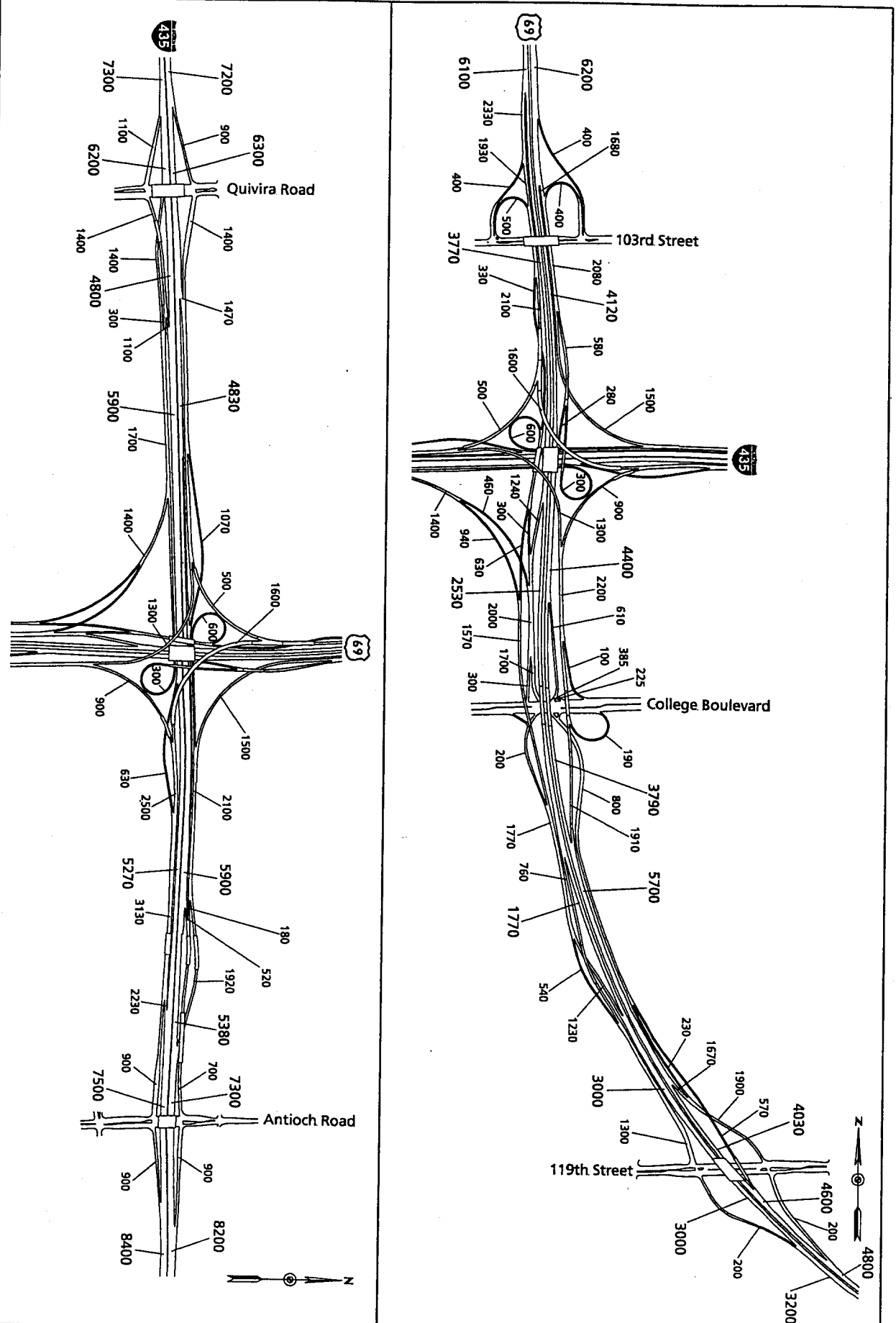
**I-435 and US 69**  
Overland Park, Kansas

**2007 A.M. PEAK HOUR**  
TRAFFIC VOLUMES  
FREEWAYS

June  
2003  
Scale 2000'

Figure 20

12/07/2003



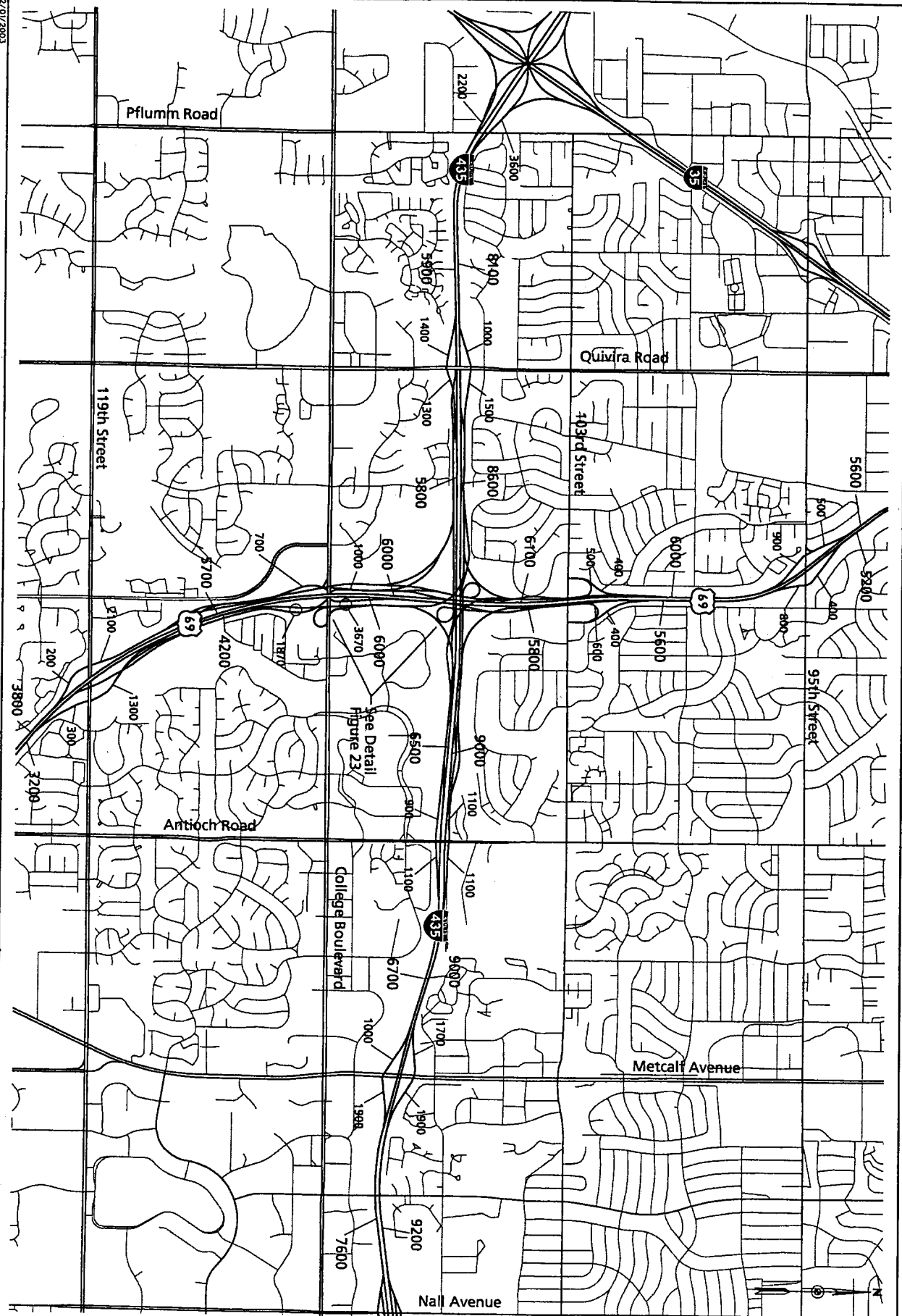
I-435 and US 69  
Overland Park, Kansas

2007 A.M. PEAK HOUR  
TRAFFIC VOLUMES  
FREEWAYS (Detail)

June  
2003  
Not to Scale

Figure 21



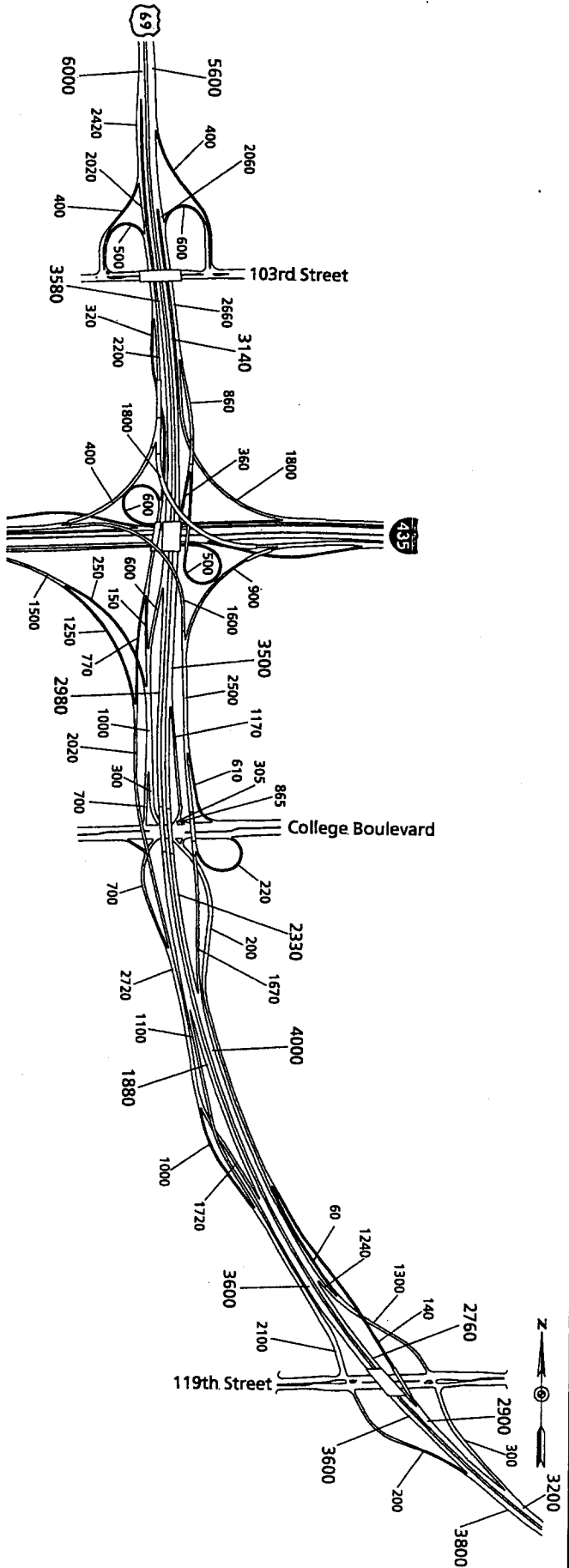
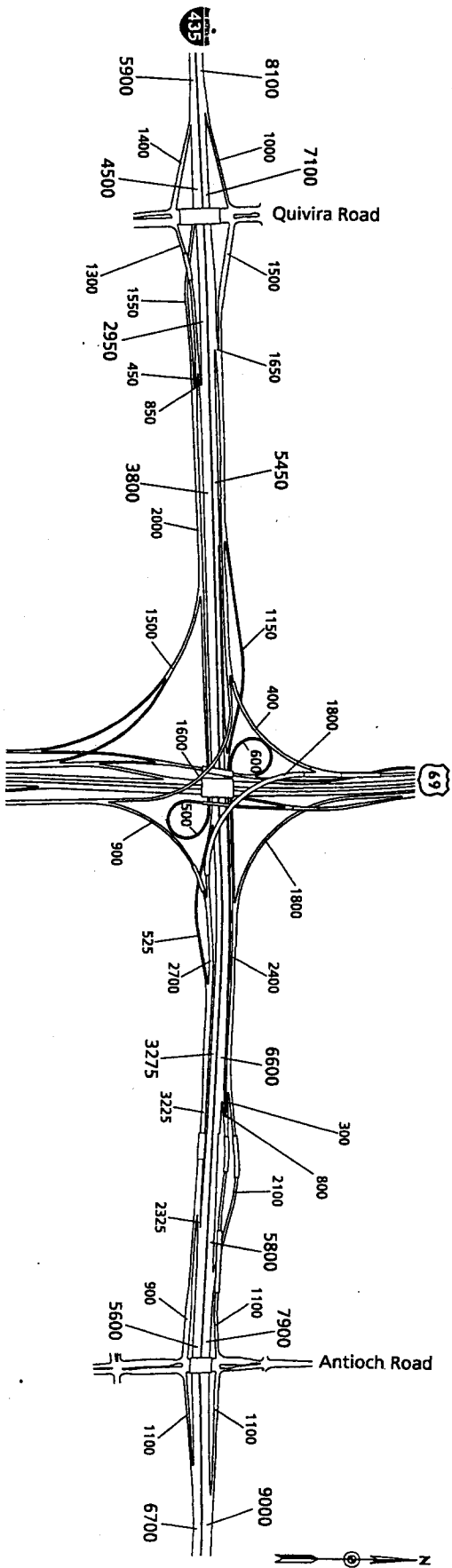


I-435 and US 69  
Overland Park, Kansas

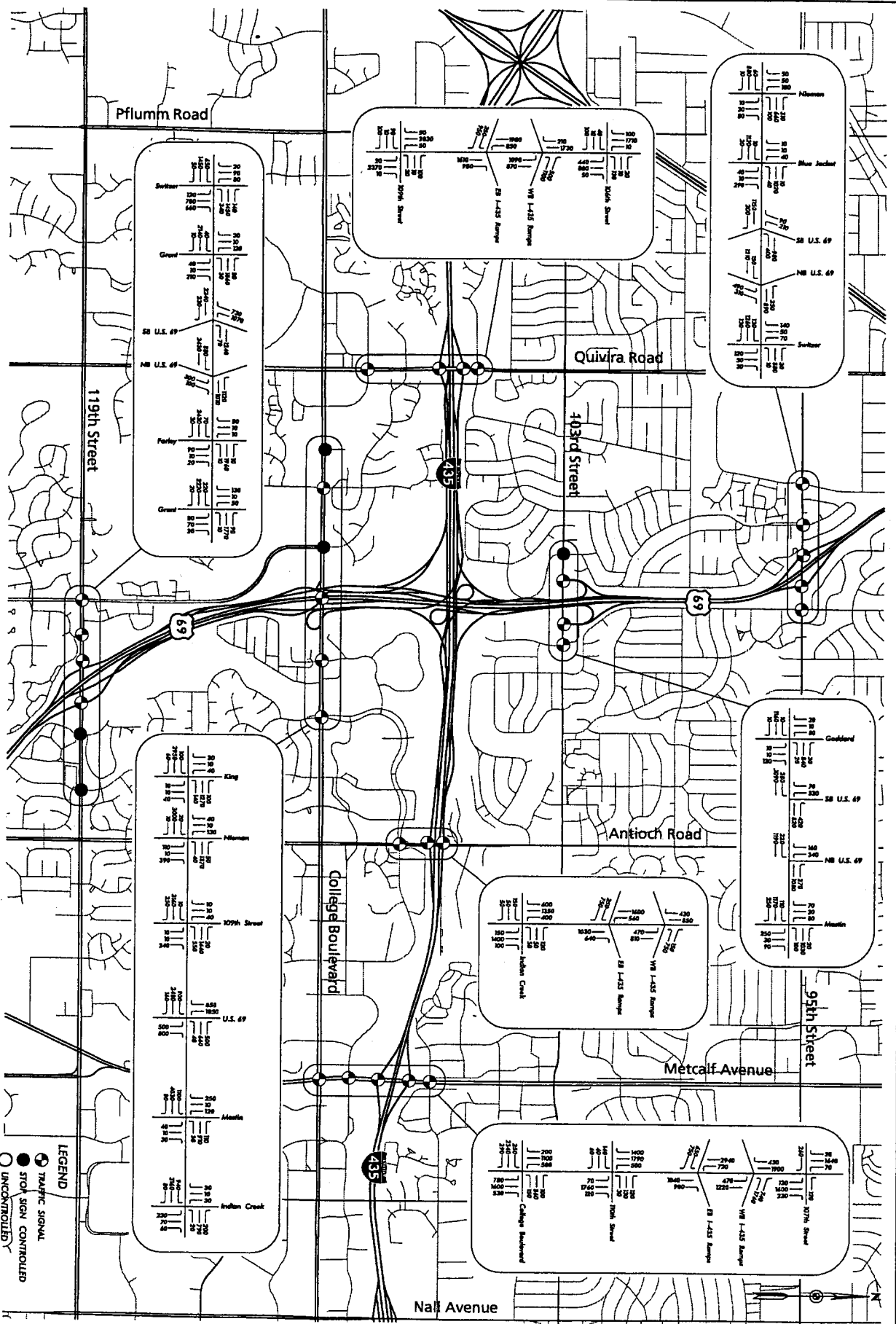
2007 P.M. PEAK HOUR  
TRAFFIC VOLUMES  
FREEWAYS

June  
2003  
Scale 2000'

Figure 22



06/10/2003

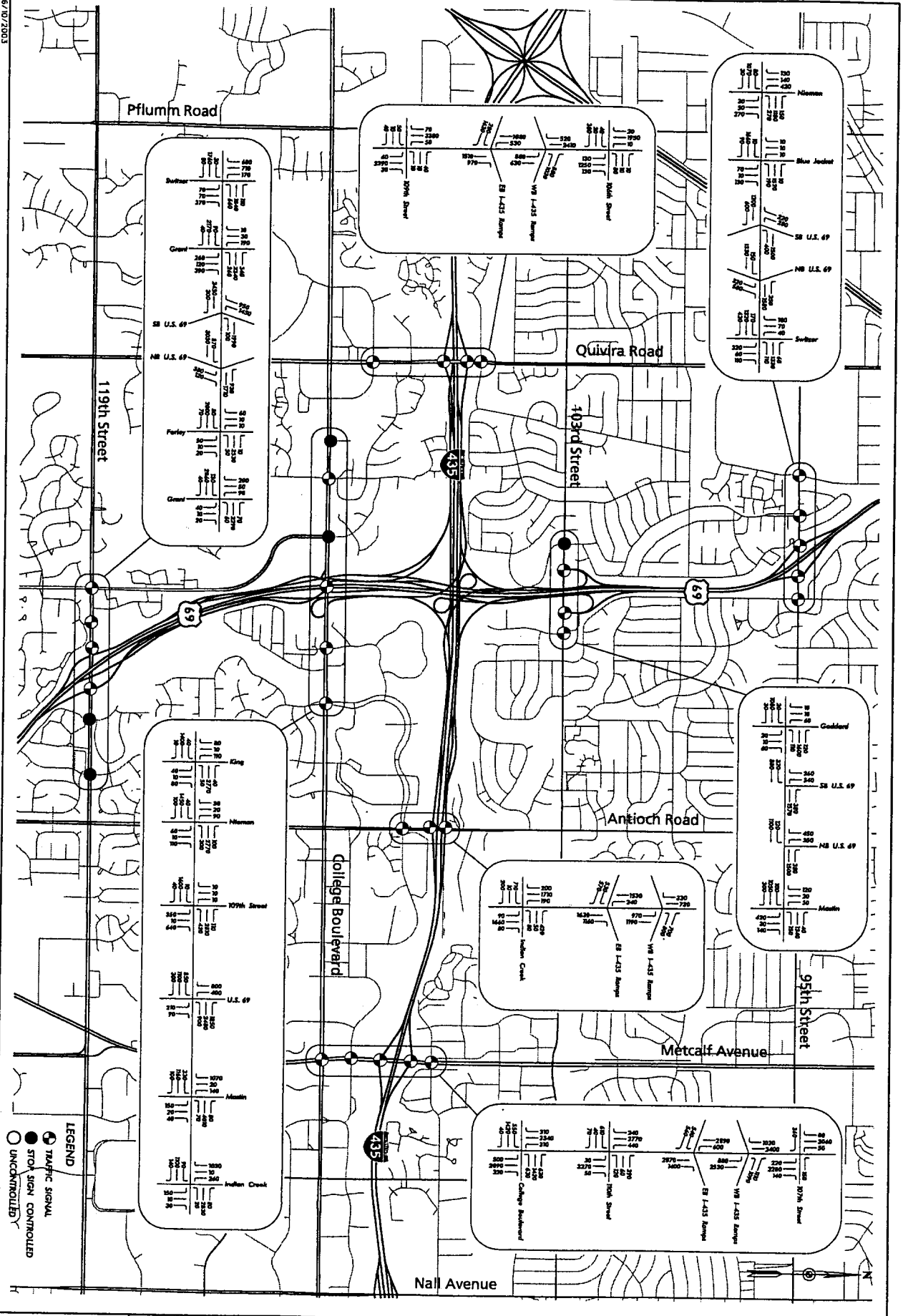


**I-435 and US 69**  
Overland Park, Kansas

2027 A.M. PEAK HOUR  
TRAFFIC VOLUMES  
TURNING MOVEMENTS

June 2003  
Scale 2000'

Figure 24



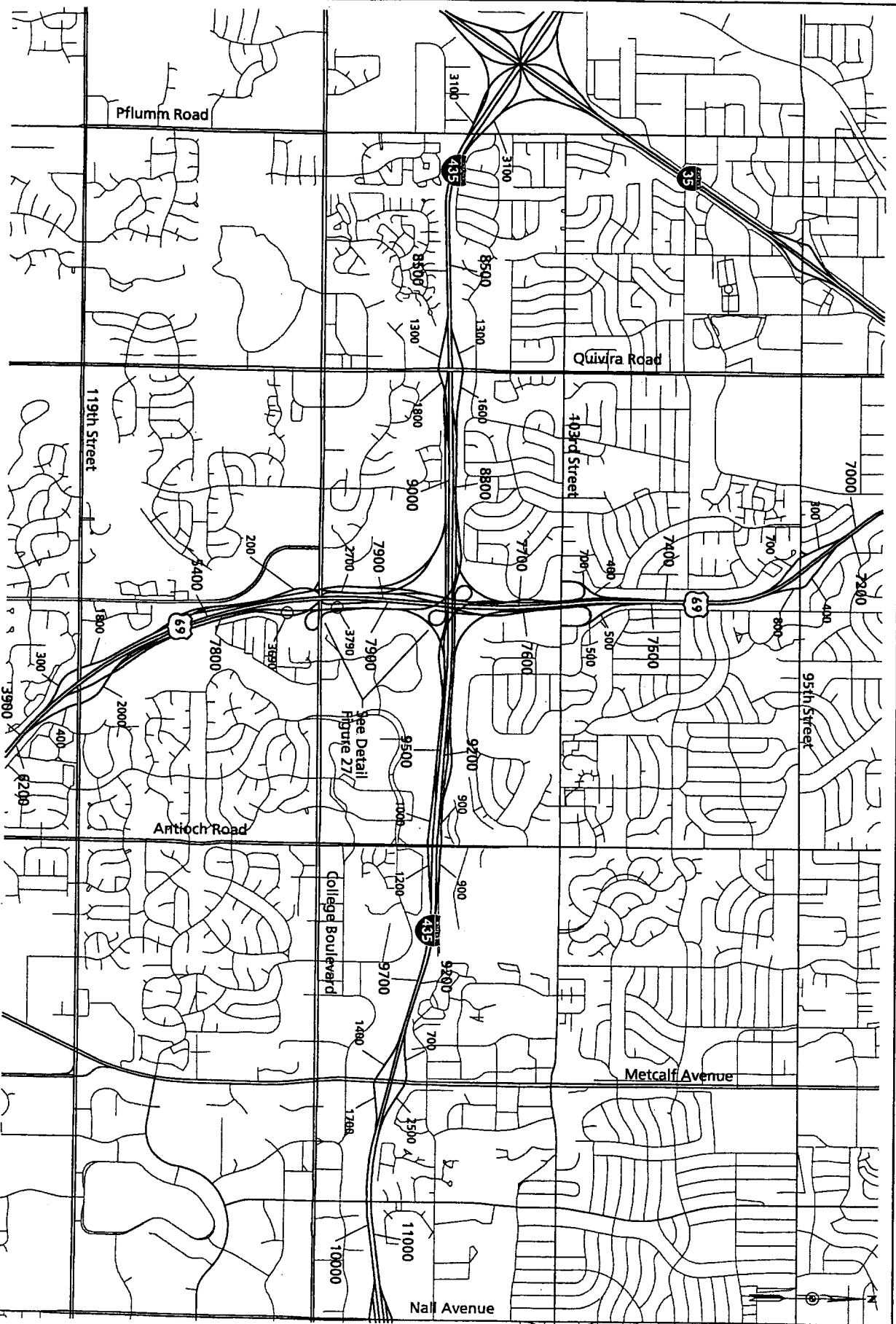
I-435 and US 69  
Overland Park, Kansas

2027 P.M. PEAK HOUR  
TRAFFIC VOLUMES  
TURNING MOVEMENTS

June 2003  
Scale 2000'

Figure 25

12/07/2003

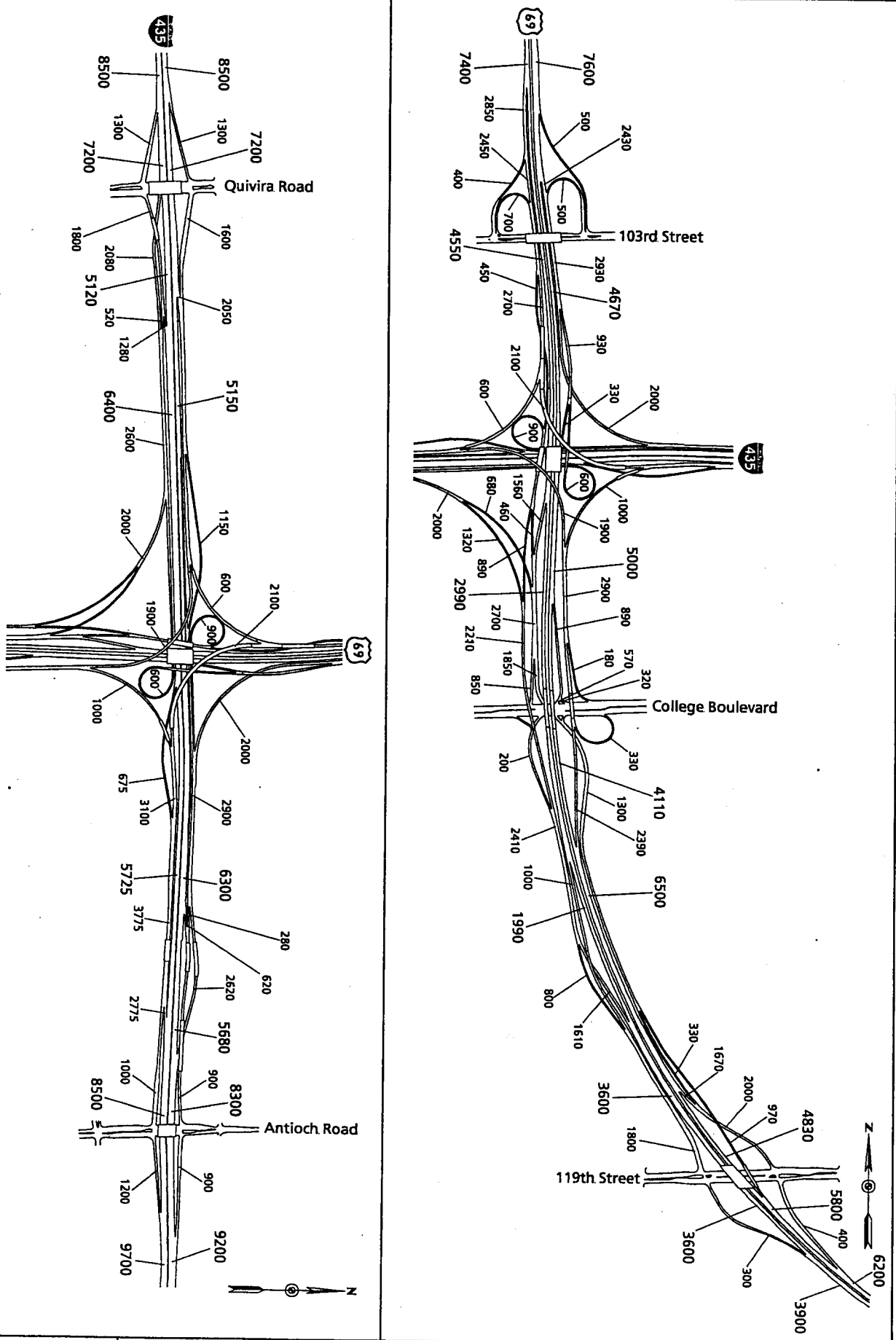


I-435 and US 69  
Overland Park, Kansas

2027 A.M. PEAK HOUR  
TRAFFIC VOLUMES  
FREEWAYS

June  
2003  
Scale 2000'

Figure 26



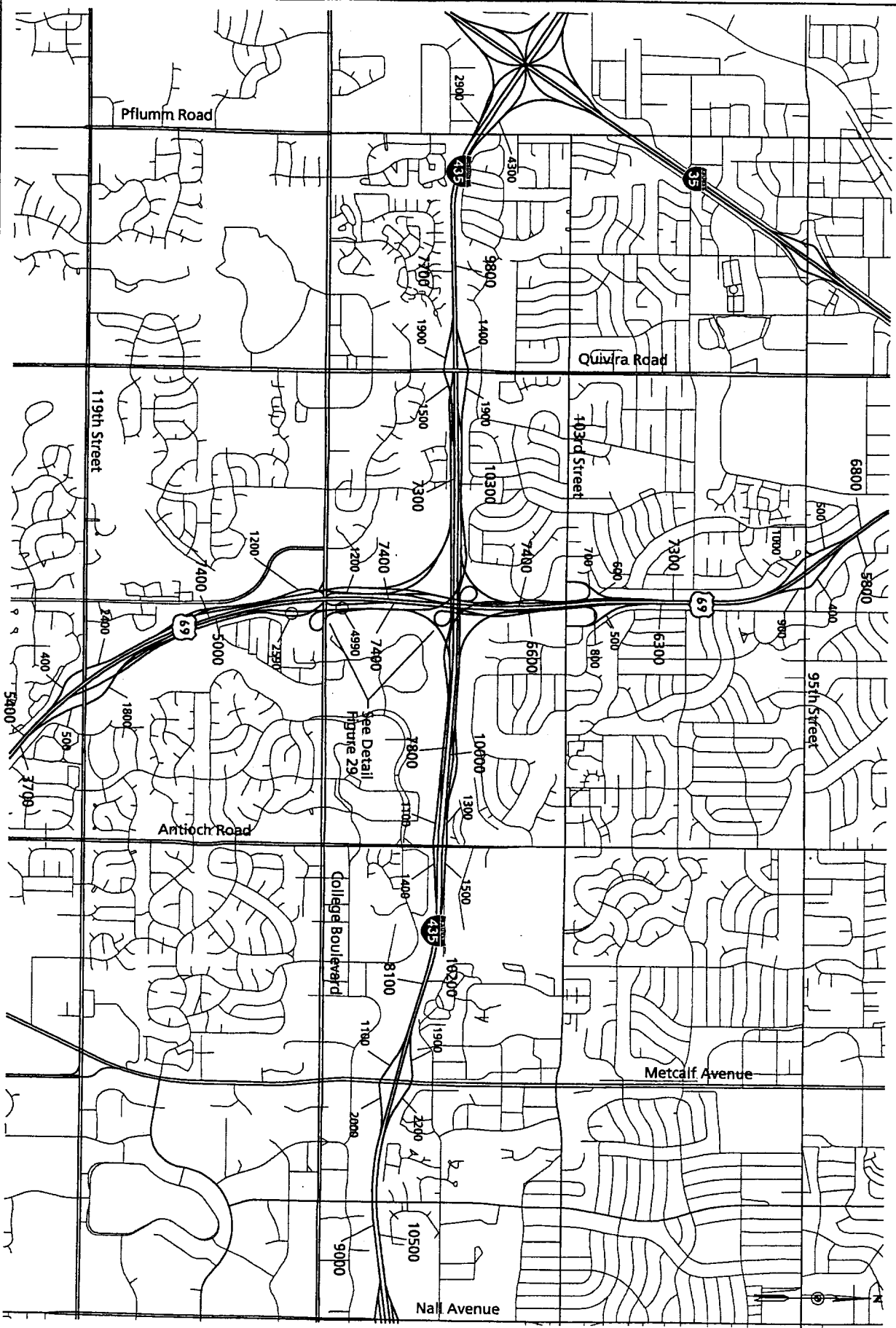
I-435 and US 69  
Overland Park, Kansas

2027 A.M. PEAK HOUR  
TRAFFIC VOLUMES  
FREEWAYS (Detail)

June  
2003  
Not to Scale

Figure 27

12/01/2003



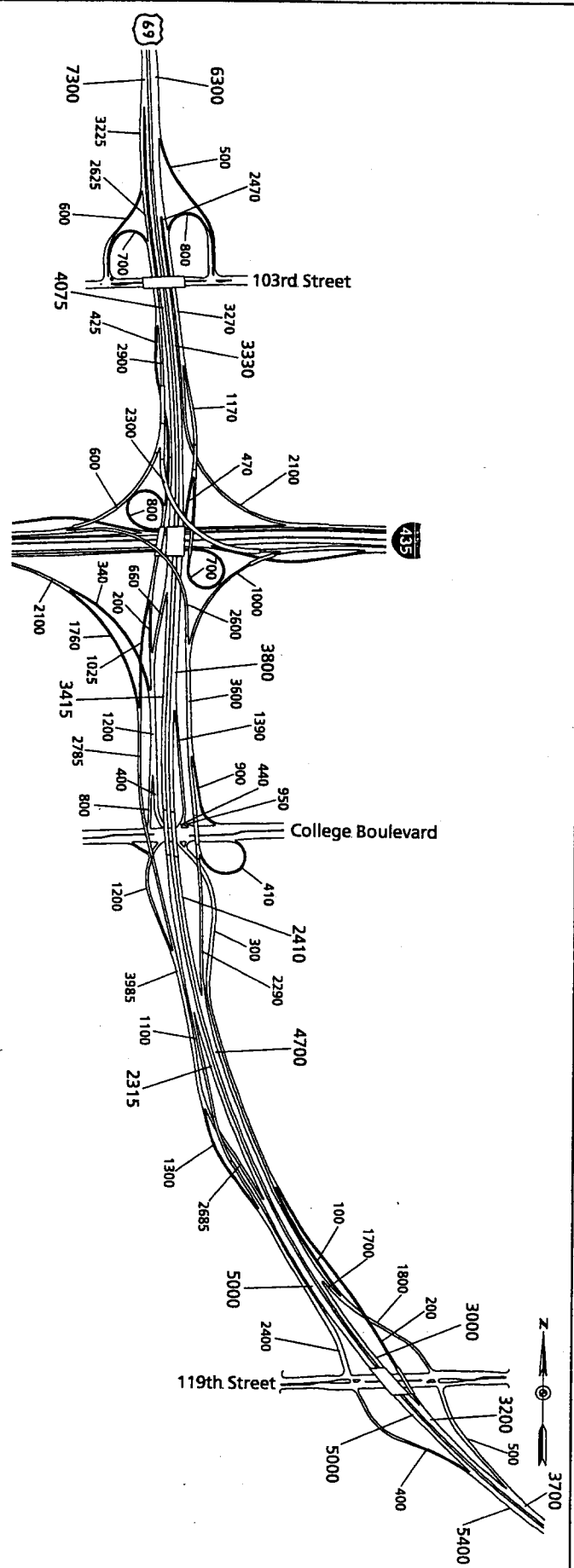
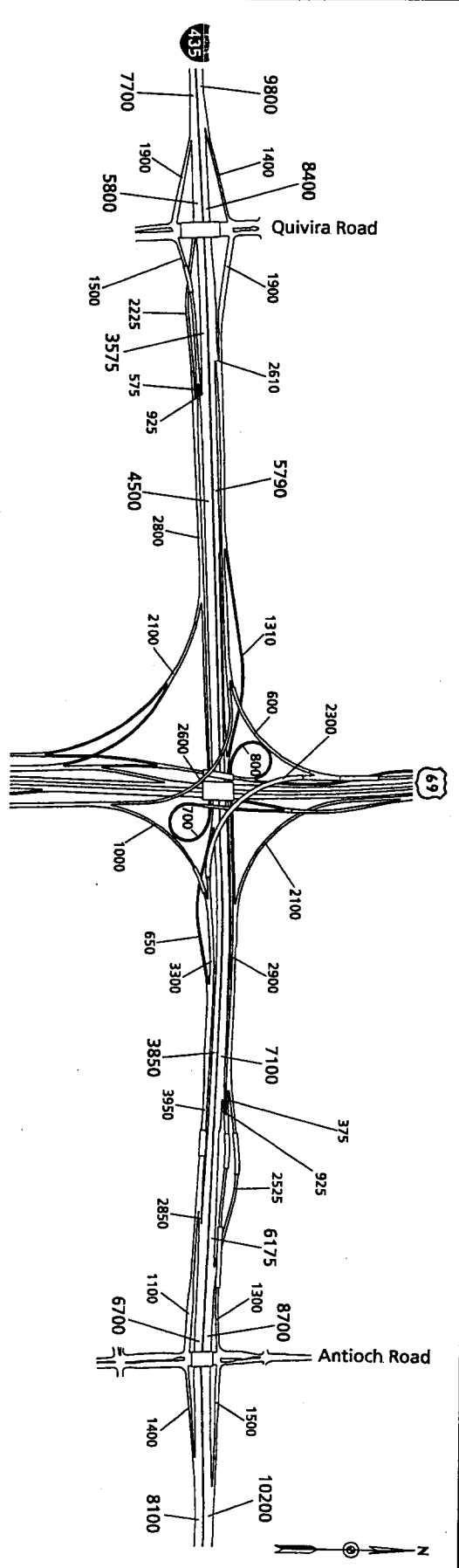
I-435 and US 69  
Overland Park, Kansas

2027 P.M. PEAK HOUR  
TRAFFIC VOLUMES  
FREEWAYS

June  
2003  
Scale 2000'

Figure 28

06/10/2003



**I-435 and US 69**  
Overland Park, Kansas

**2027 P.M. PEAK HOUR**  
TRAFFIC VOLUMES  
FREEWAYS (Detail)

June 2003  
Not to Scale

Figure 29