

# **SOUTHSIDE DRIVE WIDENING**

## **From New Cut Road to Strawberry Lane**

### **FEASIBILITY REPORT**



**Prepared for:**



**Louisville /Jefferson County  
Metro Government  
Department of Public Works**

**Prepared by:**



**OCTOBER 2005**



October 24, 2005

Ms. Mache Readus-Wright  
Engineering Project Manager  
Louisville Metro Government  
Department of Public Works  
444 South Fifth Street  
Louisville, Kentucky 40202

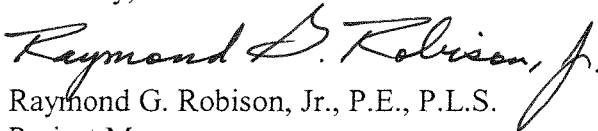
Subject: Preliminary Design for Southside Drive Widening  
From New Cut Road to Strawberry Lane

Dear Ms. Readus-Wright:

Transmitted with this letter are five copies of the Final Feasibility Report for the Southside Drive Widening Study. The Feasibility Report is contained in two bound documents – the main report in 8.5" x 11" format and the report Supplement that contains oversized engineering drawings in 11" x 17" format as Appendices N through Q. The Final Feasibility Report is very similar to the draft document submitted in May 2005 with some minor text and formatting edits.

We have enjoyed working with Louisville Metro Government on this project, and hope to continue working with you and the Kentucky Department of Highways on the final design phase at the appropriate time. Please call us if we can be of service.

Sincerely,

A handwritten signature in cursive script that reads "Raymond G. Robison, Jr.".

Raymond G. Robison, Jr., P.E., P.L.S.  
Project Manager  
Associate

Attachments

File: q:\L080401\corresp\ssdrfinalreportltr.doc

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**From New Cut Road to Strawberry Lane**  
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October 2005

# Southside Drive Widening Feasibility Report

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# Southside Drive Widening Feasibility Report

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# Southside Drive Widening Feasibility Report

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# **SOUTHSIDE DRIVE WIDENING From New Cut Road to Strawberry Lane**

## **FEASIBILITY REPORT**

### **SCOPE OF THIS REPORT**

The Southside Drive Widening Feasibility Study examines the feasibility of widening and improving Southside Drive from New Cut Road to Strawberry Lane. The findings of the study are documented in this report and the bound Supplement to this report that contains a portion of the report appendices consisting of oversize drawings in 11" x 17" format.

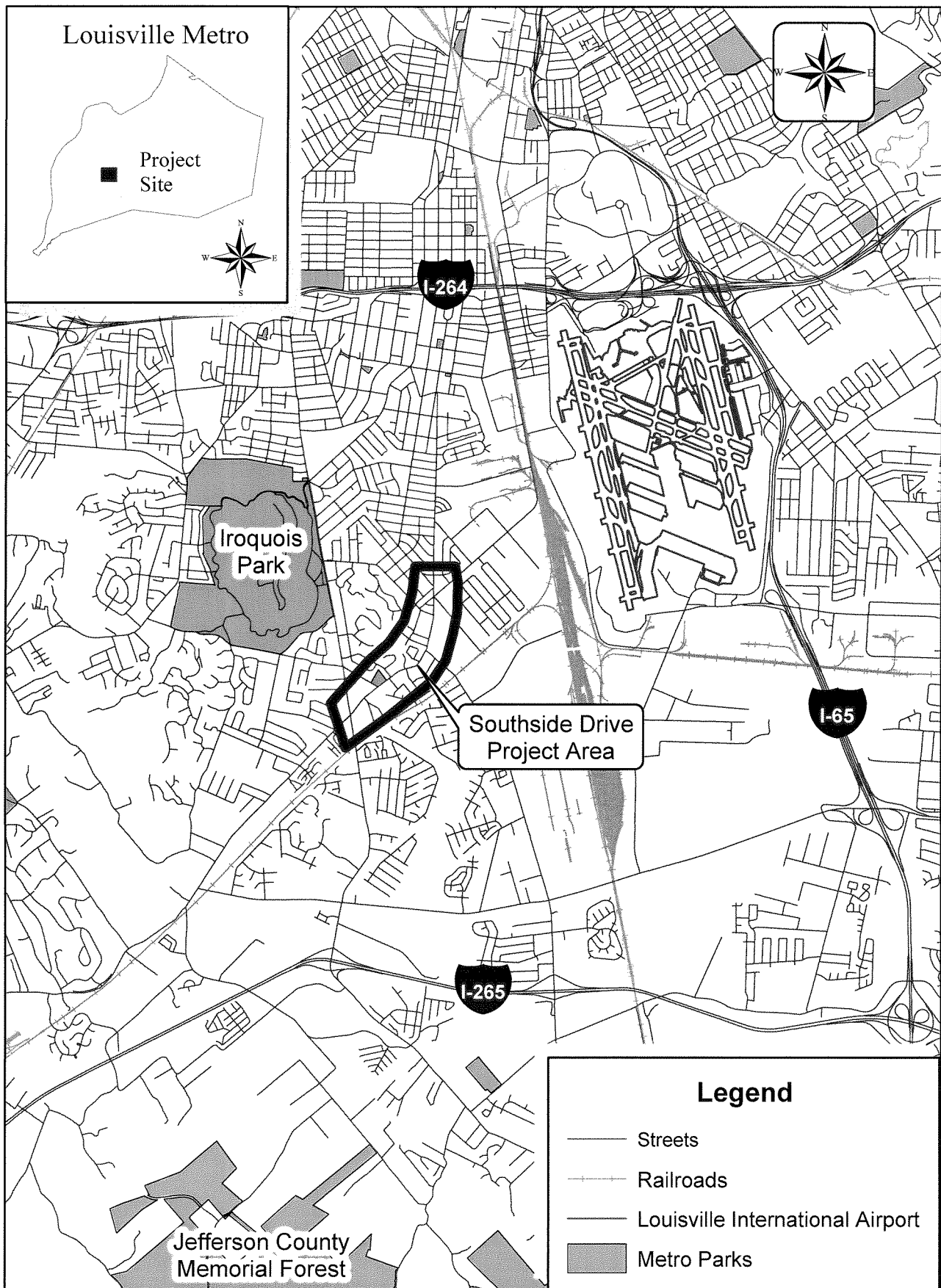
This report was prepared under a professional services contract between Louisville/Jefferson County Metro Government, by and through its Department of Public Works, and Skees Engineering, Inc., dated September 29, 2004 and as adopted by the Louisville Metro Council on October 28, 2004.

As shown in Figure 1, Southside Drive is an urban minor arterial roadway located within the urbanized area of the city of Louisville in Jefferson County, Kentucky. The roadway is primarily a north-south roadway located midway between Louisville's inner interstate beltway, the Watterson Expressway (I-264), and the outer interstate beltway, the Gene Snyder Freeway (I-265). Southside Drive is situated roughly midway between the major landmarks of Iroquois Park to the west and Louisville International Airport to the east.

This first phase of the project consists of preliminary engineering and environmental studies necessary to develop a preliminary alignment or alignments that meet, to the extent possible, future highway capacity demands within the corridor and the anticipated goals of the stakeholders in the project corridor and surrounding neighborhoods. This report provides:

- An overview of the existing corridor conditions and key features
- Discussion of recent roadway improvements in the Southside Drive area
- A history of previous roadway improvements along Southside Drive
- Traffic projections and the results of the highway capacity analysis for the current year conditions and the design year conditions (both Build and No-Build alternatives considered)
- Summary of the meeting held with government officials
- Proposed typical section
- Alignment alternatives studied
- Results of the environmental overview
- Preliminary design alternative plan, profile and cross section sheets
- Discussion of maintenance of traffic and construction phasing
- Construction cost estimates, right-of-way acquisition cost estimates and utility relocation cost estimates for sections of Southside Drive south and north of National Turnpike

# Project Location Map



0 0.5 1 2 Miles

**SKEES**  
ENGINEERING, INC.

**LOJIC**  
Louisville/Jefferson County Information Consortium

Figure 1



## EXISTING CORRIDOR CONDITIONS

### Neighborhoods:

Figure 2 provides a more detailed view of the Southside Drive corridor on a U.S. Geological Survey topographical map composite. As shown on the map, Southside Drive arcs around the base of Kenwood Hill on the south and east sides. The area surrounding the project corridor is a highly urbanized area with a significant number of residential subdivisions. Four officially recognized neighborhoods overlay the project corridor with Auburndale neighborhood to the west, Kenwood Hill neighborhood in the center, and Southside and Southland Park neighborhoods to the northwest and northeast respectively. The boundaries of the neighborhoods are shown on Figure 3.

### Political Subdivisions:

Louisville Metro Government is politically subdivided into 26 Council Districts. Districts 13, 21, 24 and 25 lie in the vicinity of the project corridor. The boundaries of the districts are shown on Figure 3.

### Existing Roadway Network:

Besides Southside Drive, major roadways within the project corridor in order from a west to east direction include New Cut Road at the project beginning, Palatka Road, National Turnpike and Strawberry Lane. The intersections of Southside Drive with each of those major roadways are signalized. New Cut Road is a major north-south roadway connecting Southern Parkway and Taylor Boulevard from the north to Outer Loop, Gene Snyder Freeway and beyond to the south. Palatka Road serves as a connector road from Southside Drive to New Cut Road on the north side. National Turnpike (KY 1020) is a primary north-south roadway that connects Southside Drive on the north to Outer Loop, Gene Snyder Freeway and beyond to the south. Strawberry Lane, at the project ending, serves residential and industrial areas in the direction toward Louisville International Airport. Southeast of the project, Third Street Road serves as the continuation of Southside Drive. In fact, portions of Southside Drive from New Cut Road to National Turnpike have been called Old Third Street Road. Several local roads and subdivision streets intersect Southside Drive within the project limits including, in a southwest to northeast direction, Lillian Way, Woodmore Avenue, Meadowood Court, Alvina Way, Hillview Drive, Hatcher Avenue, East Kenwood Drive, Kenneth Court, Roberts Avenue and Thalia Avenue. In addition, there are several two-lane entrances that serve a school, apartment complexes, churches and a drive-in movie theatre. At times, these sites can generate significant amounts of vehicular traffic.

### Land Use in the Corridor

Southside Drive within the project limits contains a diverse mix of residential, commercial and institutional properties. Annotated aerial photographs that show the current corridor conditions are provided on 11" x 17" sheets as Appendix N in the Supplement to this report.

Near New Cut Road on the north side of Southside Drive, there exists a small commercial area consisting of a gas station and a funeral home. Across the street, Our Lady of Mt. Carmel School, church and rectory anchors the southeast corner. Immediately north, Lillian Way provides access to a 51-home single-family residential subdivision. Lillian Way is the only means of ingress and egress for the residents. Immediately across from Lillian Way is the Blue Pines Apartment complex. Just north of the Blue Pines complex is the larger Venus Place Apartments that has a brick wall with metal lattice along the right-of-way line. North of Venus Place Apartments is an unnamed apartment complex containing two buildings that front on Southside Drive. Across the street from the apartments is a two-lane asphalt entrance that leads to the Seventh Day Adventist Church and New Heights Baptist Church.

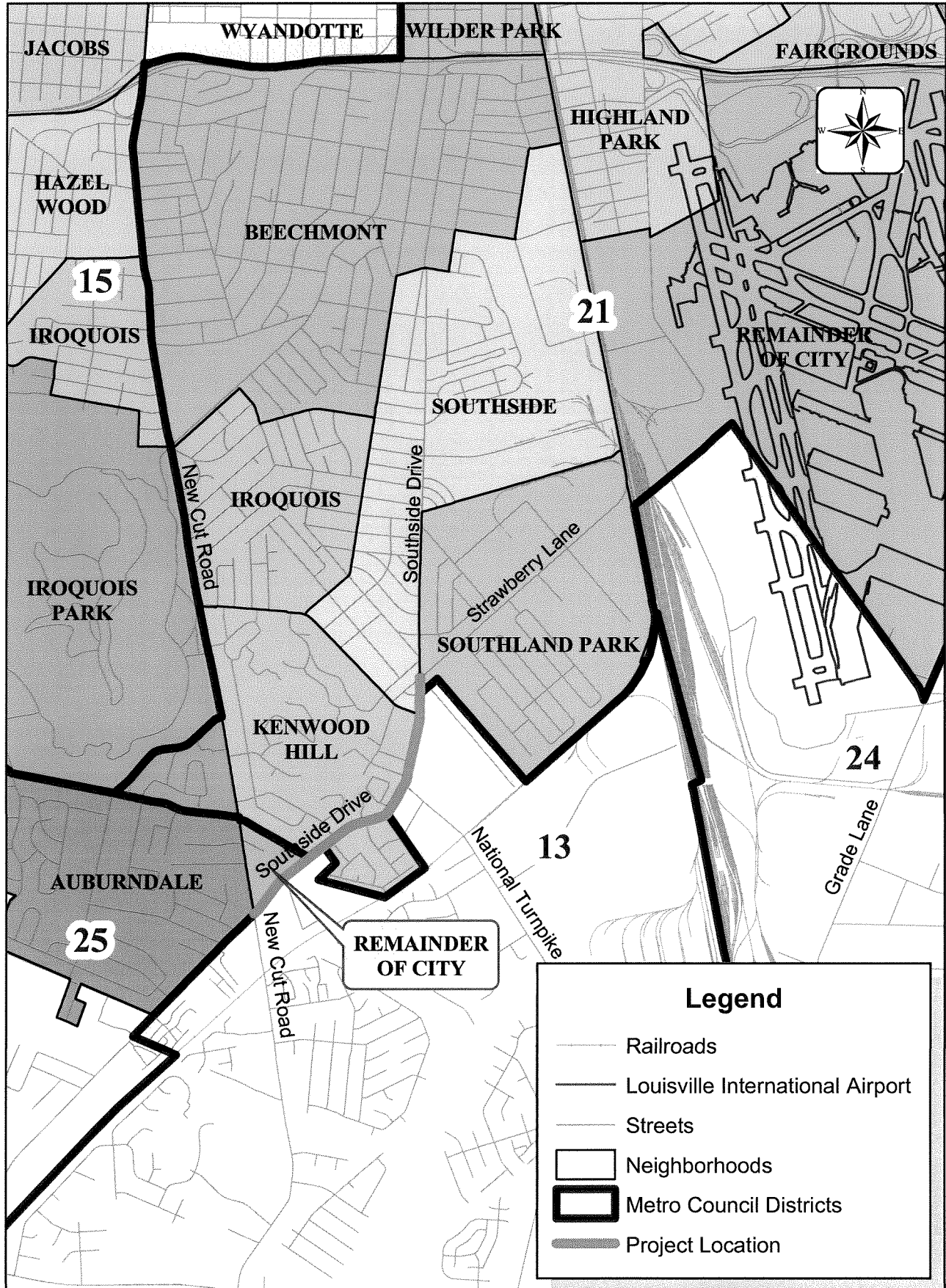
The map is a detailed topographic representation of a section of Louisville, Kentucky. It features contour lines indicating elevation, with peaks reaching up to 761 feet. A network of roads is shown, including major thoroughfares like New Cut Road and South Side Drive. Several schools are marked, such as Kenwood Middle School, Our Lady of Mt. Carmel School, and Faith Temple School. The U.S. Naval Ordnance Plant is a prominent industrial feature in the upper right. Residential areas like Kenwood and Anburndale are labeled, along with a drive-in theater and sewage disposal sites. The map is annotated with 'BEGIN PROJECT' and 'END PROJECT' to define a specific area of interest. The city of Louisville is labeled at the bottom left, and the National Road is visible on the right side.

SOUTHSIDE DRIVE WIDENING  
JEFFERSON COUNTY, KENTUCKY



FIGURE 2

# Project Area



North of the churches entrance is a string of six individual residential properties that face toward Southside Drive and one underground building that houses the First Vietnamese Baptist Church.

Auburndale Park anchors the northwest corner of Southside Drive at Palatka Road. Auburndale Park is a publicly owned park that sits on the site of the former Auburndale School. It contains two fenced tennis courts, a playground area and a small parking lot. Auburndale Park, being a publicly owned park, qualifies as a Section 4(f) site. No right-of-way can be acquired from this site unless there are no other prudent and feasible alternatives.

North of Auburndale Park is another large single-family residential subdivision that gains access to Southside Drive via Woodmore Avenue. Woodmore Avenue connects to New Cut Road and a network of other roadways in the neighborhood. East of Southside Drive, Woodmore Avenue serves an 80-home single-family residential subdivision. This subdivision has one indirect alternative exit to the subdivision to the north near the CSXT Railroad via Aurora Drive. The Woodmore Avenue approaches are offset approximately 75 feet on either side of Southside Drive. This is an undesirable condition that has the potential for creating overlapping left turns that can gridlock travel along the existing two-lane Southside Drive. Single-family residences line both sides of Southside Drive from Woodmore Avenue to the next crossroad at Meadowood Court (west of Southside Drive) and Alvina Way (east of Southside Drive). One of the residences on the west side is an early, prefabricated Lustron House that is potentially eligible for the National Register of Historic Places. More information about this site and the other potentially historic sites can be found in the Overview of Environmental Assessment document included in this report as Appendix B. Meadowood Court is a dead-end street that serves 16, four-plex apartment buildings. Alvina Way provides access to 70 single-family residences in the Kenwood Terrace subdivision. This is the subdivision that has the one indirect alternative exit to the Woodmore Avenue subdivision to the south near the CSXT Railroad via Aurora Drive.

North of the Kenwood Terrace Subdivision lies the St. Mark's Lutheran Church campus that contains a modern church building (constructed in 1953), a rectory building and the original church building (constructed in 1911). The rectory building and the original church building have both been identified as potentially meeting the criteria for listing on the National Register of Historic Places. If subsequently determined to be eligible for National Register listing, these two sites would need to be avoided, similar to the Auburndale Park site. The exact boundaries of the sites would need to be determined during a subsequent stage of the project through consultation with the State Historic Preservation Officer (SHPO).

Across from St. Mark's campus is a row of four, four-plex apartment buildings that face Southside Drive near a substandard horizontal curve of Southside Drive. This substandard horizontal curve marks the point where commercial properties again begin to prevail. On the west side between the curve and National Turnpike, there are three single-family residential structures, two businesses (consisting of an animal hospital and drugstore) and a two-lane entrance to the Southview Square Apartments complex that contains three very large apartment buildings situated behind the Southside Drive first tier parcels. On the east side of the road, there are three active commercial sites (consisting of a specialty food market, a printer and a restaurant), and one commercial site on the corner of National Turnpike that is currently undeveloped.

A bank anchors the corner north of National Turnpike followed by an automobile body shop, a check cashing service, a pet shop and a bowling alley. The Ken Bowl bowling alley has been identified as



being an architecturally distinctive roadside attraction representative of the automobile culture of the 1950s and 1960s, and as potentially being eligible for the National Register. The west side of Southside Drive in this area contains an auto parts and machine shop, an auto service business, four residential structures and the Epiphany United Methodist Church. North of Epiphany Church is a fraternal lodge building, followed by two single-family residential structures, the northern of which is potentially eligible under NRHP Criterion C as having a distinctive design. A tire store completes the block leading up to East Kenwood Drive. Across from the tire store is the two-lane entrance to the Kenwood Drive-in theatre that sits behind the Southside Drive first tier parcels.

On the west side north of East Kenwood Drive is a row of six businesses that include a dry cleaner, a cosmetic supply business, a hardware store, a printing company, a liquor store and a pizza maker. Each of these businesses has very limited parking in front of their stores. On the east side north of East Kenwood Drive is a similar row of commercial businesses that includes a pizza maker and cash advance store, an automobile service center, parking for a small strip mall, a bar and grill restaurant, and another automobile service business. North of the Strawberry Lane intersection, there is a restaurant on the west corner and a gasoline fueling station on the east corner. Roberts Avenue creates a five-point intersection at the Strawberry Lane intersection. There is a sports-theme grill and bar restaurant on the east corner of the Roberts Avenue / Strawberry Lane intersection.

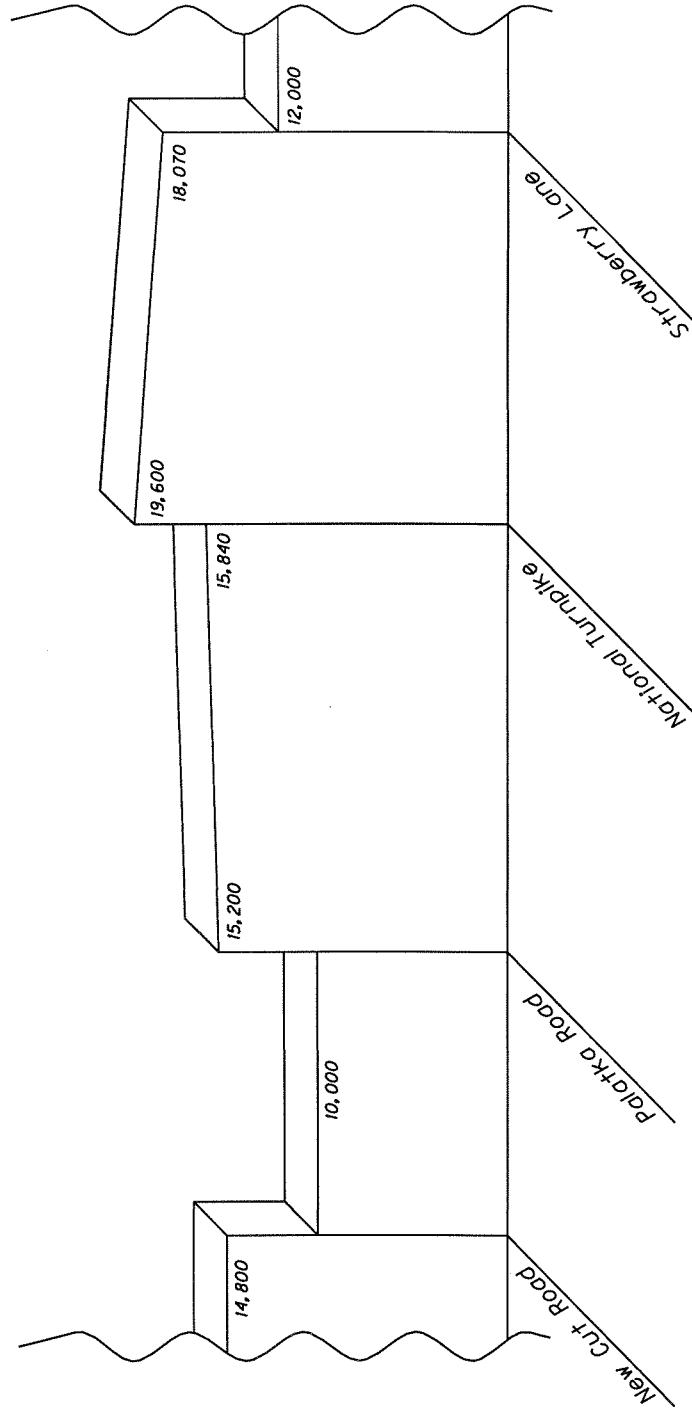
#### Existing Traffic Conditions

The Kentuckiana Regional Planning and Development Agency (KIPDA) provided current year (2004) traffic counts. The traffic data as received from KIPDA is included as Appendix A in this report. The counts showed, as expected, a variation in current year average daily traffic volumes along the length of the project from 10,000 ADT on the south end to 19,600 ADT on the north end. Figure 4 provides a graphic representation of the variation in current traffic volumes along Southside Drive.

Highway Capacity Software was used to calculate the current level of service provided by existing Southside Drive. Calculations were prepared for both general terrain segments and for signalized intersections. The results of the current conditions analysis revealed the following:

	<u>Current Year (2004)</u>	
	<u>Current Year (2004) Level of Service</u>	
	<u>A.M.</u>	<u>P.M.</u>
<u>General Terrain Segments</u>		
New Cut Road to Palatka Road	C	C
Palatka Road to National Turnpike	C	D
National Turnpike to Strawberry Lane	D	E
<u>Intersections</u>		
New Cut Road	D	D
Palatka Road	B	B
National Turnpike (after the current reconstruction)	F	F
Strawberry Lane	C	D

Drawings showing the level of service for the general terrain segments and intersections in the current year are provided in Appendix C in this document. The intersection level of service values stated above



Southside Drive Widening  
From New Cut Road To Strawberry Lane  
Jefferson County  
Average Daily Traffic  
For Both Directions Together

2004

are for performance of the overall intersection. The intersection diagrams in Appendix C provide the individual level of service for each through or turning movement.

## **RECENT HIGHWAY SYSTEM IMPROVEMENTS IN THE AREA**

The impetus for this feasibility study is the recent completion of roadway widening of New Cut Road on the western end of Southside Drive and the currently ongoing reconstruction of National Turnpike near the midpoint of the study corridor that is scheduled to be completed in 2006. When complete, both New Cut Road and National Turnpike will be five-lane urban roadways. The higher traffic capacity provided by these two improved north-south highway arteries is expected to draw increased development and traffic to the Southside Drive area. Since Southside Drive serves as the east-west connection between New Cut Road and National Turnpike and also serves as the north-south extension of National Turnpike in the direction toward downtown Louisville, it is logical to assume that Southside Drive will experience increased traffic demands in the near future.

Southside Drive (identified as KY 907 south of National Turnpike and KY 1020 north of National Turnpike) is part of the state-maintained roadway system. Although widening of Southside Drive has been included in the State's long-range improvement project list for many years, no immediate funding was available for this study until Louisville Metro Government set aside \$25,000 to match funding provided by the Kentuckiana Planning and Development Agency (KIPDA). Therefore, Louisville Metro Government is the lead agency for this phase of the project.

## **A HISTORY OF ROADWAY IMPROVEMENTS IN THE SOUTHSIDE DRIVE CORRIDOR**

### Original Roadway

According to the Cultural Historic Planning Overview Survey Report prepared for this project, Southside Drive first appears on the 1879 atlas of Jefferson County. In the past, portions of Southside Drive have been referred to as Old Third Street Road.

### 1936 Plans

The oldest set of archived highway drawings found in the microfilm records of the Kentucky Department of Highways, District 5 Office during the research for this project was labeled "Old Third Street Road", dated 1936 and archive coded as "PWA 1231-R". The project limits ranged from the Louisville Corporate Limits at that time to a point just south of National Turnpike, a distance of 7,700 feet. The plans are faded, but appear to show steel-reinforced concrete edge widening on both sides of an existing 17-foot wide pavement. The type of existing pavement was not indicated. The concrete widening varied in width from 1.5 to just over 3 feet to provide a 20-foot overall width with an 8-inch concrete "shoulder" along each edge. The concrete was overlaid by an asphalt binder and a "Modified Topeka Surface". The plans appeared to be solely for resurfacing and did not show much detail beyond a stationed centerline and curve data.

### 1950 Plans

A similar set of plans as the 1936 set was found with “1950” handwritten on the layout sheet. These plans for Old Third Street Road and New Cut Road, with archive code “RHA 4-B”, pick up where the 1936 plans left off south of National Turnpike with the same resurfacing design south to New Cut Road. Similar to the 1936 plans, the 1950 plans appeared to be solely for resurfacing and did not show much detail beyond a stationed centerline and curve data.

### Second 1950s Plan Set

A partial set of archived plans “RS 56-298-2” was obtained during Skees Engineering’s work on the National Turnpike project. That plan set with “50” labeled in the margins covered the entire limits of the current Southside Drive study area and included Strawberry Lane. This plan set appears to follow the previously discussed 1950 set since the typical section shows the existing 20-foot paved width plus the 8-inch concrete header curbs. The plans show Class “I” asphalt surfacing of the pavement and three-foot shoulders on each side. These surfacing plans are more detailed than the previous set and show dimensioned right-of-way lines.

### New Cut Road Project

As-built plans dated February 25, 1981 for New Cut Road widening with an October 20, 1978 letting date were obtained primarily for the portion of that project that widened approximately 650 feet of “Third Street Road” at New Cut Road. The typical sections show that approximately 200 feet of the pavement nearest to New Cut Road was entirely replaced to a 36-foot width with a 9-inch Portland cement concrete pavement on 4 inches of dense graded aggregate. The concrete was overlaid with 2 inches of asphalt concrete surface Type “B” and a 5/8” sand asphalt surface above that. Standard integral curbs were specified on the west side only, with a 6-foot earth shoulder and 8-foot ditch on 4:1 slope along the east edge. Beyond the 200 feet, the existing pavement was retained, widened, and overlaid with the same 2 5/8” asphalt layers. Detailed right-of-way information was provided in this plan set.

### Southside Drive Widening in the Early 1980s

As-built plans dated August 18, 1982 for Southside Drive (KY 907) with a January 23, 1981 letting date were obtained. These Grade, Drain and Surfacing Plans covered from approximately 500 feet south of National Turnpike to approximately 350 feet north of Strawberry Lane. The plans provided for widening and asphalt overlay of the existing pavement to provide three 12-foot lanes. Standard curb and gutter and storm sewer were constructed on the west side only. Near Strawberry Lane the storm sewer system becomes a combined storm and sanitary sewer system. Two right-turn lanes were constructed as part of the three-laning project for northbound traffic on Southside Drive turning right to National Turnpike and also to Strawberry Lane. In this project, most of the widening was toward the west. The pavement design under this contract included 4 inches of dense graded aggregate base under 10 inches of asphalt base under a 1-inch asphalt surface.

### Current National Turnpike Project

The National Turnpike improvement project that is currently underway at the time that this report is being written will provide a five-lane urban roadway section from Outer Loop to Southside Drive. In addition, the National Turnpike project provides for widening of the Southside Drive crossroad for approximately 800 feet to the east of National Turnpike to create 500-foot long dual left-turn lanes from southbound Southside Drive to southbound National Turnpike. The purpose of that widening is to



improve the level of service at the intersection by reducing the long traffic back-ups that occur due to the heavy volume of left-turning traffic, often made worse when CSXT Railroad trains cross National Turnpike downstream at-grade. All of the widening for the second left-turn lane is being done on the east side. Standard curb and gutter and sidewalk are also being added to the east side throughout the limits of construction.

Some 400 feet of widening along Southside Drive is also being constructed west of National Turnpike. A short left-turn lane is being added in the median width created to align with the dual left-turn lanes on the opposite side of the intersection. In addition, a turning roadway with a corner island is being constructed for the northbound right-turn lane.

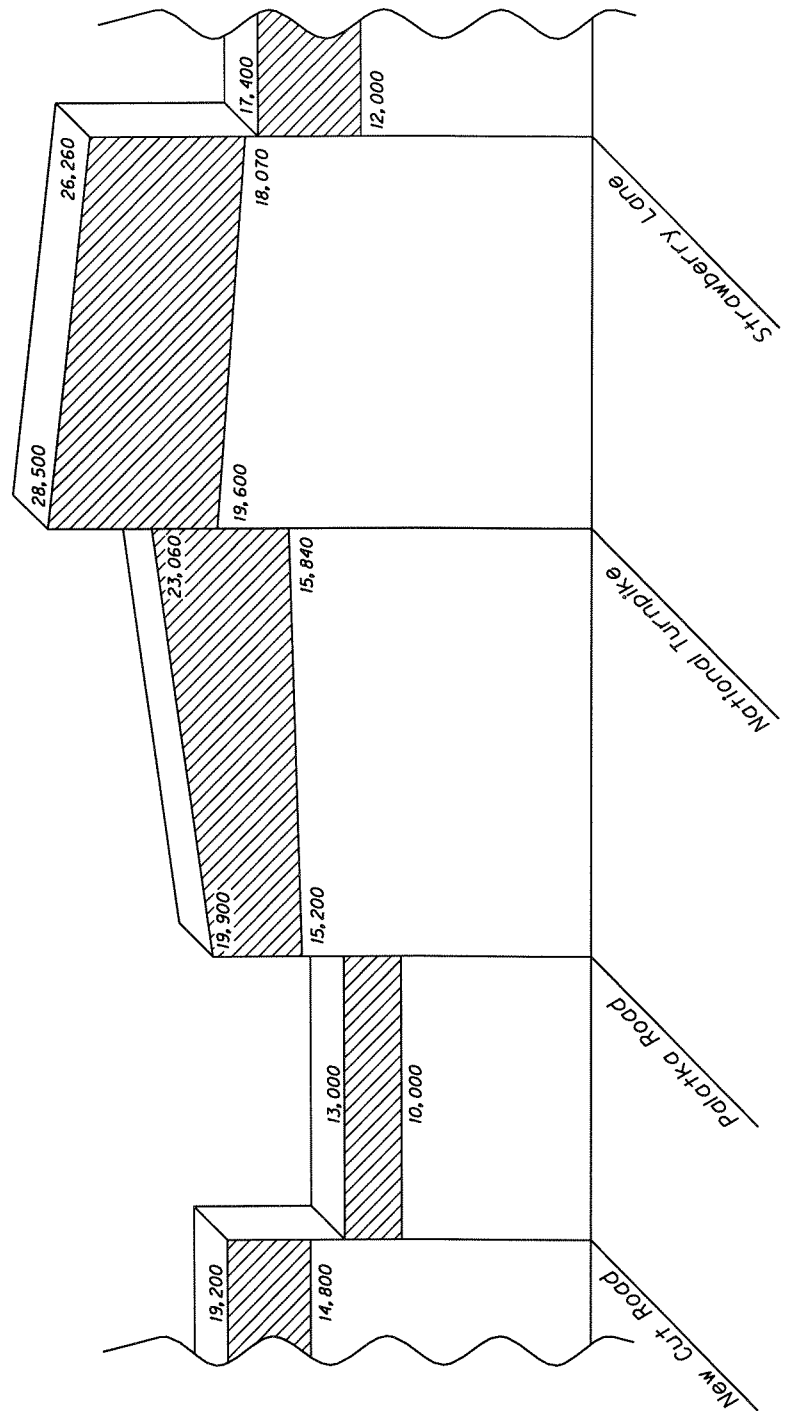
The existing pavement was surface-milled, overlaid and widened for this project. 100 mm (4 inches) dense graded aggregate base, 275 mm (10.8 inches) asphalt base and 40 mm (1.5 inches) of asphalt surface overlay was used for Southside Drive widening under the National Turnpike project.

## **PLANNED CAPITAL IMPROVEMENT PROJECTS**

This project and other transportation improvement projects in the Southside Drive corridor are listed in the long-range transportation plan as maintained by KIPDA. Review of the Draft Horizon 2030: PROPOSED Kentucky Project Listing revealed three nearby projects. 1) Southside Drive from New Cut Road to National Turnpike (KIPDA I.D. No. 465) is forecast as being widened from two lanes to five lanes with considerations for pedestrian and bicycle facilities and open to the public in 2011. 2) KY 907 (Valley Station Road or Third Street Road) west of New Cut Road (KIPDA I.D. No. 481) is forecast for widening from two to five lanes with completion around 2020. KY 1142 (Palatka Road) is programmed for widening from 2 lanes to 3 lanes from St. Andrews Church Road to Southside Drive by 2020 (KIPDA I.D. No. 454). Any reconstruction of Southside Drive should be designed to work with and facilitate these other projects.

## **FORECAST TRAFFIC CONDITIONS IN THE DESIGN YEAR**

A 25-year period was selected to set the design year for the Southside Drive project. KIPDA provided morning design hour volumes, evening design hour volumes and average daily traffic projections for the design year of 2029 using their regional traffic model. The traffic projections provided by KIPDA can be found in Appendix A. A graphical comparison of the average daily traffic (ADT) for the current year (2004) and the design year (2029) is provided as Figure 5. Average daily traffic is projected to increase from 30 percent to 45 percent along Southside Drive over the 25-year period, with the higher increases occurring near the National Turnpike intersection. To determine the justification for reconstruction and to create a baseline to compare to any build alternatives, the forecast traffic data was used to analyze traffic conditions that would exist in the year 2029 if no changes were made to Southside Drive after the current National Turnpike project is completed. The results of the Highway Capacity Analysis for the design year using the forecast traffic volumes and assuming no changes to the existing roadway revealed the following:



Southside Drive Widening  
 From New Cut Road To Strawberry Lane  
 Jefferson County  
 Average Daily Traffic  
 For Both Directions Together

Figure 5



	<u>Design Year (2029)</u>	
	<u>Level of Service Under a No-Build Scenario</u>	
	<u>A.M.</u>	<u>P.M.</u>
<u>General Terrain Segments</u>		
New Cut Road to Palatka Road	D	D
Palatka Road to National Turnpike	D	E
National Turnpike to Strawberry Lane	D	F
<u>Intersections</u>		
New Cut Road	E	F
Palatka Road	B	E
National Turnpike (after the current reconstruction)	F	F
Strawberry Lane	D	F

Drawings showing the level of service for the general terrain segments and intersections in the design year under a No-Build Condition are provided in Appendix D in this document. The intersection level of service values stated above are for performance of the overall intersection. The intersection diagrams in Appendix D provide the individual level of service for each through or turning movement.

## PROJECT GOALS AND OBJECTIVES

A list of goals and objectives for the project were developed prior to the start of preliminary engineering to help guide the development of the widening alternatives. Those goals and objectives included:

- Improve safety by eliminating the deep, hazardous roadside ditches
- Improve safety by eliminating roadside obstacles such as culvert headwalls
- Maintain the integrity of Auburndale Park by avoiding the existing trees along Auburndale Park frontage and by using the existing, winding sidewalk in the park as part of the pedestrian walking system
- Provide bike lanes throughout the project limits to serve bicyclists
- Maintain the existing sidewalk connectivity, and expand the sidewalk system to those segments of the project that presently are not served by sidewalks
- Retain as many of the established businesses and residences as possible
- Increase the capacity of the roadway and intersections to provide an appropriate level of service for roadway users in the design year
- Increase safety and enhance capacity by providing safe refuge for motorists turning left and right into numerous crossroads and driveways
- Strive to improve storm-water drainage and eliminate areas of standing water
- Whenever possible, avoid sites that may be potentially eligible for listing on the National Register of Historic Places
- Whenever possible, consolidate entrances to provide a higher level of access management and operational safety
- Realign existing offset crossroad intersections to a common four-way intersection to eliminate overlapping left turns and to improve vehicle and pedestrian safety on Southside Drive and its crossroads
- Minimize disruption and traffic delays during construction to the extent possible

## DESIGN CRITERIA

### Functional Classification

Functional classification is the grouping of highways by the character of service that they provide. Southside Drive, within the limits of the study area, has been functionally classified as an urban minor arterial roadway. An urban minor arterial interconnects with and augments the urban principal arterial system. Urban minor arterial roadways place more emphasis on land access and offer lower traffic mobility than urban principal arterials.

### Design Speed

*Common Geometric Practices, Urban Roadways (Other Than Freeways)*, Exhibit 500-04 of the Kentucky Department of Highways Design Manual (2) indicates a range from 30 to 60-miles per hour is appropriate for an urban arterial street. A 35-miles per hour design speed, commensurate with the posted speed on the existing roadway was selected for the project.

### Typical Section

Due to the urban characteristics of the project corridor, an urban roadway typical section with curb and gutter, sidewalks and bike lanes was developed for design.

- Lane Width: Based on *Common Geometric Practices, Urban Roadways (Other Than Freeways)*, Exhibit 500-04 of the Kentucky Department of Highways Design Manual (2), lane width for this project should range from 11 feet for interrupted flow conditions to 12 feet for uninterrupted flow conditions. A 12-foot lane width was selected for design to be compatible with the lane widths used in two previous Southside Drive roadway-widening projects on each end of the corridor.
- Median: The AASHTO Green Book (1) states that "...left-turn lanes should be provided at driveways and street intersections along major arterial and collector roads wherever left turns are permitted" and "...provision of left-turn lanes has been found to reduce crash rates anywhere from 20 to 65 percent." Due to the extensive number of crossroads and driveway entrances throughout the length of Southside Drive, a 14-foot wide paved flush median with a two-way left-turn lane was included in each typical section. At intersections, the two-way left-turn lane format would change to a dedicated left-turn lane using appropriate striping.
- Bike Lanes: It is a recently established policy of Louisville Metro Government to include bike lanes on all new and reconstructed roadways. Four-foot bike lanes in each direction have been provided between the outer motor vehicle lane and the gutter pan.
- Sidewalks: Currently, sidewalks are in place on the west side of Southside Drive at varying offsets from the existing edge of pavement. In the commercial areas, parking lots occasionally serve as the pedestrian walkway. The length of Southside Drive that is being reconstructed as part of the National Turnpike project will have sidewalks constructed on the east side. In the proposed design, sidewalks are included on both sides of the road at a point three feet from the face of curb. The geometric criteria allow a sidewalk width range of from four to eight feet. A sidewalk width of five feet was selected, again to be compatible with previously constructed projects in the area. In certain areas, such as within the limits of Auburndale Park and at locations where there are mature trees that might be saved, existing sidewalks at variable offsets from the roadway may be used in lieu of the proposed sidewalk at the uniform offset. The decision regarding whether to use alternative sidewalk locations would be made on a case-by-case basis during subsequent design phases.

- **Berm Width:** The berm width, defined as the distance from the face of curb to two feet behind the back of sidewalk, is typically around ten feet. A wider 14-foot berm width was selected for design (three feet between the face of curb and sidewalk and six feet from the back of sidewalk to the proposed right-of-way line) to provide space for relocated utilities. Utility companies might otherwise have to acquire permanent easements along the same space to relocate and maintain their facilities.

The three-lane and five-lane typical sections developed using the above criteria are shown in Figure 6.

#### Maximum Grade

For the level terrain conditions found on the project, a maximum grade of 7 percent is recommended.

#### Maximum Superelevation Rate

Chapter 7 of the AASHTO Green Book (1) states that “curves on low-speed curbed arterial streets are often not superelevated” (or banked in layman’s terms) due to the effect on adjacent developed property. However, it is desirable to provide some superelevation to reduce the side friction factor for motorists traveling through horizontal curves. Consequently, a 4 percent maximum superelevation rate was used for preliminary design due to Southside Drive’s low design speed and urban conditions. Adjustment of the superelevation rates shown in the preliminary plans may be warranted during a subsequent design phase in certain areas that exhibit substantial lateral encroachment by the roadway on adjacent properties through superelevated sections.

#### Minimum Stopping Sight Distance

For a 35-miles per hour design speed, 250 feet of stopping sight distance is required, both horizontal and vertical conditions considered.

## **DESIGN METHODOLOGY**

### Development of Base Mapping

Digital mapping data from the Louisville and Jefferson County Information Consortium (LOJIC) was converted into a Microstation CAD environment and used as base mapping for the engineering studies for the project. Significant planimetric features and surface utilities that were identified during a walk-through type survey were drafted and labeled on the map background. This included house numbers, type of building construction and use classification, business names, roadway pavement types, etc. Less significant items such as signs, mailboxes, utility meters, etc. that did not have a significant effect on alignment design were not identified or mapped at this preliminary stage of the project. Subsurface utility information that was obtained from utility company record drawings and from Kentucky Department of Highways archived drawings was also drafted on the base map. The base mapping in the vicinity of the ongoing National Turnpike project construction was edited to reflect the post-construction condition of Southside Drive and National Turnpike.

Property lines, property owner names and source of title were added to the base mapping using information already residing in the LOJIC system. Since the property line information used was rough, existing right-of-way lines along Southside Drive were adjusted to the widths specified in archived roadway plans and in some areas subdivision plats. For locations where detailed roadway plans or plats were not available, record drawings from utility companies were used to establish the approximate right-

# TYPICAL SECTIONS SOUTHSIDE DRIVE

URBAN MINOR ARTERIAL CLASS ROADWAY  
35 mph DESIGN SPEED  
FLAT TERRAIN  
CONTROL OF ACCESS BY PERMIT

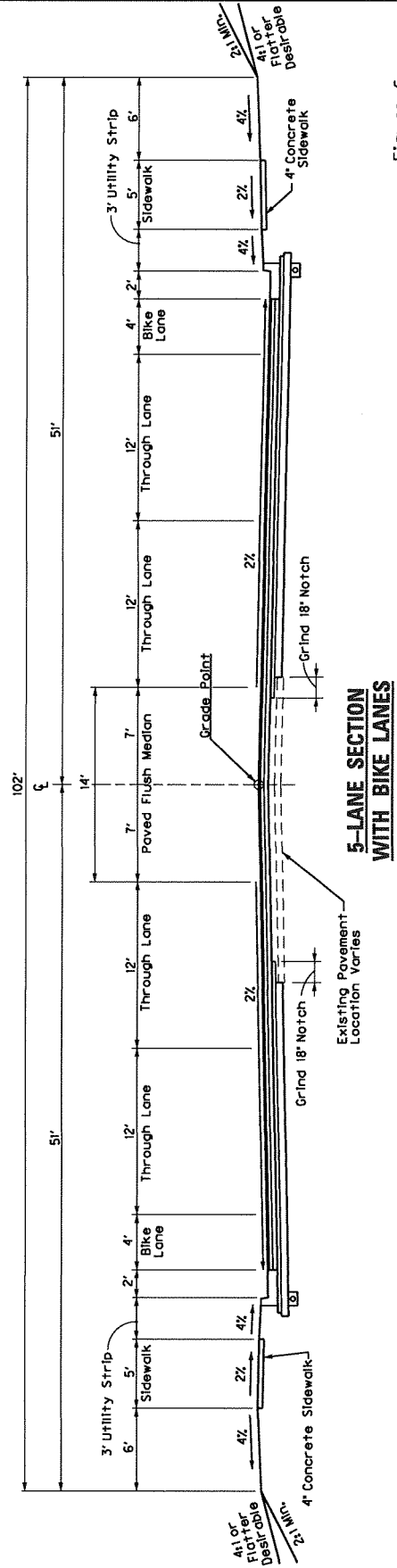
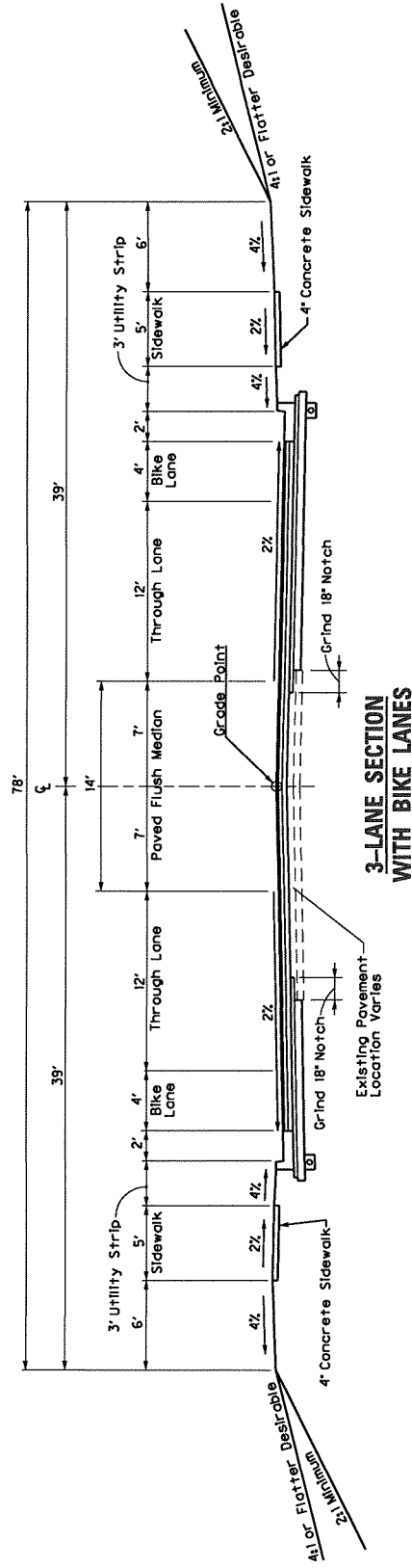


Figure 6

of-way lines. A system of numbering all first tier property parcels on each side of Southside Drive was established. Parcels were numbered consecutively from New Cut Road to Strawberry Lane on each side with left side parcels displaying an “L” suffix and right side parcels displaying an “R” suffix.

Field surveying was used to supplement the base mapping at two key locations – at Auburndale Park and at St. Mark’s Lutheran Church chapel. At Auburndale Park, the large trees along the Southside Drive frontage were located along with property corner evidence for the park. At St. Marks’, evidence of property lines was located to try to better define the existing right-of-way and the limits of the St. Mark property in that area. The results of the field survey were incorporated into the base mapping.

### Environmental Overview

A key element of a roadway-widening project is having an understanding of the environmental issues that can have a profound effect on the transportation design decision-making process in a project corridor. Redwing Ecological Services, Inc. (Redwing), working as subconsultant to Skees Engineering, Inc., was in responsible charge of the preparation of an environmental overview for the Southside Drive corridor as part of the feasibility study phase. Cultural Resource Analysts, Inc. (CRAI) and Fuller, Mossbarger, Scott and May, Inc. (FMSM) contributed to the environmental assessment as subconsultants to Redwing. CRAI conducted the Cultural Historic Planning Overview Survey and the Archaeological Overview and File Search efforts. FMSM conducted a preliminary review of the hazardous materials and underground storage tank sites on the project. FMSM also conducted the air quality and noise evaluations.

Although the project was performed under the supervision of Louisville/Jefferson County Metro Government, the environmental overview work was performed to State and Federal standards so that the project could continue to qualify for Federal funds. Consequently, the environmental studies were performed according to the policies and methodologies of the Kentucky Department of Highways, Division of Environmental Analysis that were in effect at the outset of the contract.

An early goal of the environmental overview was to identify significant environmental features on all first tier properties that have frontage on Southside Drive that merited varying degrees of avoidance during development of the preliminary roadway designs. A subsequent goal was the evaluation of the effects that the proposed roadway alignment alternatives would have on the environment, and to compare the relative effects of one alignment alternative versus another. The environmental overview document prepared for this project presents an overview of the social, economic and environmental impacts of the proposed project based on site reconnaissance, document research and early agency coordination.

The environmental overview focuses on potential impacts in the following categories:

- Air quality
- Noise
- Ecology
- Archaeology
- Socioeconomic
- Historic properties
- Section 4(f) sites
- Section 6(f) sites
- Hazardous waste and underground storage tanks

The environmental overview will be the basis for determining the extent of additional environmental investigations, if any, which would be required to gain categorical exclusion status or a Finding of No Significant Impact during subsequent stages of the project. The results of the environmental overview are not repeated here but are presented in their entirety in the Overview of Environmental Assessment report compiled by Redwing Ecological Services, Inc. and provided as Appendix B in this report.

Key features identified by those working on the environmental overview were added to the base mapping and labeled. The enhanced base mapping that displays the significant environmental features identified during the environmental overview are provided on 11" x 17" sheets as Appendix O in the Supplement to this report.

### Traffic Analysis

The Kentuckiana Planning and Development Agency (KIPDA) provided current year traffic volumes and design year traffic projections for this project from their metropolitan traffic system model. The year 2029, a point 25 years in the future from when the "current year" traffic data was generated, was selected as the design year.

Highway Capacity Software, based on the principles in the *Highway Capacity Manual*, was used to analyze current year and design year traffic conditions. Level of service analysis was performed for general terrain segments and for the four signalized intersections to document current conditions, to forecast design year conditions likely to occur if no changes are made to the current roadway, and to forecast the expected service levels under various reconstruction alternatives.

### Preliminary Alignment Alternatives

Preliminary alignment designs were developed on the modified LOJIC base mapping background. Both three-lane and five-lane preliminary roadway models were developed using InRoads terrain and roadway modeling software. The terrain model was developed using LOJIC contour and break-line data.

Due to the lateral constraints imposed by adjacent development, alignments greatly removed from existing Southside Drive were considered impractical and not worth study. All proposed alignments were assumed to follow very closely to the existing roadway alignment and to require urban curb and gutter type typical sections to minimize lateral damages to adjacent properties. Each alignment alternative was also designed to carefully avoid, to the extent possible, significant environmental features such as Section 4(f) sites and sites potentially eligible for the National Register of Historic Places.

*A Policy on Geometric Design of Highways and Streets*, 2001, Fourth Edition (1), published by the American Association of State Highway and Transportation Officials (AASHTO), often simply referred to as the "Green Book", was used as the primary design guidance for development of the preliminary design alternatives. The Kentucky Department of Highway's *Highway Design Manual* and other industry publications were also referenced as needed.

The proposed designs developed as part of this study are representative of the best alignments that can be developed using sound engineering judgment and given the information available at this stage of the project. However, additional manipulation and refinement of the selected alignment is recommended at the time that detailed mapping for the project is available. Decisions to acquire certain buildings very



close to the proposed right-of-way, for example, may then permit curves to be flattened, turn lanes to be added, alignments to be shifted away from other structures, etc.

#### Cost Estimates

Preliminary construction cost estimates, right-of-way acquisition cost estimates and utility relocation cost estimates were prepared for each alignment alternative. Cost estimates were itemized for roadway segments south and north of National Turnpike in case roadway improvements are sequenced to take advantage of limited funds.

### **PRELIMINARY ALIGNMENT ALTERNATIVES**

#### 5-Lane Alternative

The 5-Lane Alternative was the first alternative to be developed, since it was likely to generate the most extensive lateral damages and be the more difficult alternative to engineer. Plan sheets, profile sheets, R/W Summary sheets and cross section sheets for the 5-Lane Alternative are provided as Appendix Q in the Supplement to this report. The ranges of stations assigned to the 5-Lane Alternative were established to match the stationing used in the early 1980s plans plus a “5” prefix to help identify the alternative as being the 5-Lane Alternative. The Ken Bowl tangent was selected as the tangent where the stations would match exactly.

Layout of the 5-Lane Alternative was started at the most significant environmental site, Auburndale Park. Since Auburndale Park is a Section 4(f) resource, no right-of-way taking is permitted on it as long as there exists a feasible and prudent alternative. Initially, the proposed centerline was set to be parallel to the existing Park tangent, but that layout would have required the taking of several residences on the opposite side of the street northeast of the park. Instead, the tangent along Auburndale Park was set to be 53 feet from the northeast corner of the park and 53 feet from the brick wall along the Venus Place Apartments. This alignment stays as close as possible to the intensively developed west side without encroaching on the existing west right-of-way line by the apartments. It also generally aligns the proposed west edge of pavement with the existing west edge of pavement along Auburndale Park to avoid removal of or damage to the established trees along the park frontage. The sidewalk on the west side across the park frontage is omitted in favor of using the existing meandering sidewalk within the park property. This provides more grassed area along Southside Drive immediately adjacent to the southbound bike lane and a more parkway-like feel for Southside Drive motorists. It may be possible to shift the alignment slightly closer to the Park during subsequent design phases once more detailed mapping is available and consultation can be made with an arborist working for the Parks Department. Two residential structures at 7303 and 7251 Southside Drive would be acquired along the Auburndale Park tangent.

Working back toward New Cut Road, the tangent across New Cut Road was set by reestablishing the Third Street Road tangent used in the 1978 plans. This centerline west of New Cut Road was projected across New Cut Road. The AASHTO Green Book (1) advises, “where left-turn volumes exceed 300 vehicles per hour, a double left-turn lane should be considered”. Current year morning traffic and both morning and evening design hour traffic for the design year for the southwest to south left-turn exceeds 300 vehicles per hour. Therefore, the Mt. Carmel/Ratterman tangent and first curve were set to provide two northbound lanes, dual left-turn lanes and one southbound shared through and right-turn lane while at the same time avoiding the Mt. Carmel School building and encroachment on the Ratterman Funeral

Home front driveway area that appears to be needed for operation of that business. A separate southbound right-turn lane at New Cut Road is not shown, but would enhance intersection performance if added. Centerline radii for the first and second curves were set at 2,000 feet and 1,000 feet respectively.

At Palatka Road, the currently skewed intersection approach is realigned to provide a more right-angle intersection for eastbound traffic in accordance with AASHTO intersection design recommendations. All widening for this intersection must be done on the side away from Auburndale Park. Fortunately, the southwest corner is undeveloped, providing room for construction of dual left-turn lanes from Palatka Road to Southside Drive. Dual left-turn lanes increase the level of service for this intersection and also provide for initial construction away from the existing traveled way that would facilitate the maintenance of traffic through the intersection during construction. The intersection layout shown is conceptual; the exact layout of the intersection would be studied more in-depth and detailed in a subsequent design stage.

The design development for the 5-Lane Alternative skips ahead to the Captain D's tangent south of National Turnpike. On the Captain D's tangent, the centerline is set 37 feet west of the east face of curb that is being constructed as part of the National Turnpike widening project, currently under construction. All new construction will be done toward the west. This saves and reuses most of the new storm sewer, curb, sidewalk and pavement that is being constructed and avoids additional right-of-way acquisition from three east-side parcels that had right-of-way acquisition under the National Turnpike project. Using this alignment also creates a more desirable and flatter angle of approach to the currently substandard horizontal curve near St. Mark's Church. Since the National Turnpike design used 13.45 feet from the face of curb to the proposed east right-of-way, it is not likely that any additional right-of-way would be acquired from these parcels to provide an even 14 feet. Short retaining walls are used at the back of sidewalk location along the Rite Aid parking lot to reduce lateral damages.

Working south, the Alvina Way / Meadowood Court tangent was set to be 51 feet from the existing west right-of-way line in front of the row of five four-plex apartment buildings. This maximizes use of the dedicated wide right-of-way on the west side and minimizes the right-of-way taking from St. Mark's Church property. Retaining walls at the back-of-sidewalk location will be used to mitigate lateral damages in front of the apartment buildings. Flattening the substandard horizontal curve to meet current design criteria requires the acquisition of the northernmost of the four-plex apartment buildings (#7150) and two residential structures at 7146 and 7138 Southside Drive. The minimum radius horizontal curve for a 35 miles per hour design speed (420 feet) causes right-of-way encroachment into the northernmost apartment building, requiring its removal. Consequently, the centerline radius was increased to the largest possible radius that would shift the centerline away from the St. Mark's site while also permitting the second apartment building to remain in place. Increasing this radius to the maximum extent possible pulls the proposed roadway entirely away from the 1911 St. Mark's Lutheran Church Parish House, a building potentially eligible for the National Register of Historic Places, and substantially away from the adjacent rectory building, also potentially eligible. Although some right-of-way is acquired from the St. Mark's property for the 5-Lane Alternative, the area of taking is limited to a triangular strip of land along the southwest frontage in front of the 1953 church building, a building that has not been identified as having historic significance. Since an absolute determination of the historic significance of these structures will not be determined until a subsequent stage of the project, and since the exact boundaries of any National Register eligible property is assumed not to extend to include the entire parcel, it is hoped that the design as proposed will be acceptable. If the historic boundary were later determined to

be the entire St. Mark's parcel, a westward shift of the centerline would be required along with the acquisition of one or more additional apartment buildings.

Another option for the St. Mark's tract may be the trade of existing right-of-way for proposed right-of-way. The westward alignment shift creates existing right-of-way that is wider than what is needed for the proposed road in front of the oldest of the St. Mark's buildings. This surplus right-of-way might be traded for needed right-of-way along the more "modern" southern portion of the parcel, thus providing a larger front yard for the more likely historic structure. It should also be noted that the arc of the proposed roadway is concentric with the arc of the three St. Mark's buildings. Flattening of the substandard curve and removal of the existing guardrail that is a minor roadside hazard and a view obstruction should permit a reduction in driver attention to potential roadway hazards and provide a greater opportunity for appreciation of the road frontage, including the St. Mark's buildings.

A 700-foot horizontal curve was selected for the curve connecting the Park tangent to the Alvina / Meadowood tangent. Short retaining walls located at the back of the sidewalk are proposed for the inside of the curve to preserve more of the front yards of the residences between Woodmore Avenue and Alvina Way. Per the recommendation of the Green Book, the offset intersections of Woodmore Avenue are realigned to a 15-degree skew to eliminate the potential for overlapping left turns and to create a safer intersection for motorists and pedestrians. The Meadowood Court / Alvina Way intersection is also realigned at a 15-degree skew for the same reasons. Realignment of these intersections provides a secondary benefit of facilitating the initial stage of roadway construction and easing the maintenance of traffic at the intersections. The combination of mainline widening and Woodmore Avenue realignment requires the removal of the garage structure at 7247 Southside Drive. It is possible that the garage might be reconstructed with only one entrance from Woodmore Avenue, thus allowing the residence to function in a way similar to the existing condition.

Jumping ahead to the segment of Southside Drive north of National Turnpike, all of the proposed widening is toward the east side. This continues the design approach that was used for the National Turnpike project where widening for the dual left-turn lanes was also to the east. From National Turnpike to Strawberry Lane, the roadway was widened primarily to the west in the early 1980s. The right-turn lane at Strawberry Lane was the only segment widened to the east at that time. Most of the buildings on the west side in this area or their minimal parking lots are situated virtually at the existing right-of-way, and even the slightest widening to the west would create extensive right-of-way damages, major utility relocations and reconstruction of the entire edge including the existing storm sewer of up to 42-inch diameter. Widening to the west side would also involve approximately twice the number of buildings compared to widening to the east side.

On the Ken Bowl tangent, the proposed centerline was set at 37 feet from the existing west face of curb. Although the existing ten-foot distance from face of curb to the existing right-of-way line is narrower than the 14 feet shown in the proposed design, that border area is assumed to be adequate since it has been functional in its current condition for 25 years. A 600-foot radius was used just north of National Turnpike to mimic the radius used previously. Although the eastward widening along this tangent does not directly acquire any structures, the widening may cause proximity damages and loss of the best and highest use for some of the parcels. The widening causes the proposed roadway to be generally higher than the adjacent parcels, and some steep entrance grades may be necessary.

Five lanes are provided on each approach to the National Turnpike intersection. This includes on the Southside Drive north approach two northbound lanes, dual left-turn lanes and one southbound lane. The opposite south approach provides two lanes northbound, one left-turn lane and two southbound lanes. The exclusive right-turn lane would be eliminated and the island reduced in size. Current year evening design hour volumes and design year evening design hour volumes for the left-turn movement from National Turnpike to Southside Drive exceed 300 vehicles per hour, making dual left-turn lanes desirable. Fortunately, the two southbound lanes on the Southside Drive south approach permit the currently unused median lane on the National Turnpike approach to be used as part of a dual left-turn lane arrangement, thereby increasing the level of service for the intersection. Although not shown in the 5-Lane Alternative, providing a second southbound lane across the National Turnpike intersection on the west side would further increase the level of service for the Southside Drive southbound direction and the intersection as a whole.

For the northernmost tangent leading to Strawberry Lane, the centerline was set 37 feet from the west face of curb as was done on the Ken Bowl tangent and for the same reasons. The widening causes the encroachment of the proposed right-of-way into the two commercial buildings at 6905 and 6903 Southside Drive, causing their removal. A 968-foot horizontal curve was used for connecting to the Ken Bowl tangent to be concentric with the existing west face of curb.

Near Strawberry Lane, there is an existing horizontal counterclockwise kink in the alignment that is used to aim the proposed design back toward the existing roadway north of Strawberry Lane. At Strawberry Lane, the outer northbound lane is dropped in a "right-lane must turn right" condition. This reduces the number of lanes that need to transition to the existing three-lane condition on the north side of the intersection to one. The additional lane is transitioned for 286 feet across the width of the two parcels north of Strawberry Lane. The two designated bike lanes are assumed to end at the intersection. The 5-lane widening provides room for two southbound lanes and one left-turn lane on the intersection's north approach, doubling the available lanes at the traffic signal and thereby increasing the level of service of the southbound Southside Drive movement and the intersection as a whole. No changes are proposed for the three-lane Thalia Avenue approach.

One of the predominant traffic movements at the Strawberry Lane intersection is westbound Strawberry Lane to southbound Southside Drive. This movement experiences significant observed delays during the afternoon peak. Traffic data provided by KIPDA show 360 vehicles per hour as the evening peak hour volume in the current year that is projected to increase to a 520 design hour volume in the design year. Fortunately, the 5-Lane Alternative provides two southbound lanes on Southside Drive that in turn permit dual left-turn lanes from Strawberry Lane. Consequently, Strawberry lane is shown to be widened to the northwest one lane width across the first two parcels to provide room for dual left-turn lanes. Alternative widening of Strawberry Lane to the southeast would require taking the restaurant on the southeast corner and the relocation of substantial overhead utility lines.

The Southside Drive intersection at Strawberry Lane is one of the few remaining five-point intersections in the metropolitan area. Five-point intersections are not desirable from an operational and safety standpoint. Options for removing dead-end Roberts Avenue from the existing intersection were briefly studied. Those options included construction of a connection for Roberts Avenue to the northeast to Downes Terrace. Although feasible, this option is likely to raise objections from the residents of the neighborhood to the northeast. Based on observations of the signing in the neighborhood, there appears to already be conflicts between the residents and the industrial properties served by the neighborhood

streets, particularly in regards to truck traffic. Other options include a variety of new construction connections from Roberts Avenue southwest to either Southside Drive or National Turnpike. Any southwest alternative would involve crossing two or more properties, the largest of which is the Kenwood Drive-in property. If the Kenwood Drive-in property is ever redeveloped or subdivided for other uses, a connection from the industrial properties on Roberts Avenue to National Turnpike would be recommended to remove truck traffic from the residential section of Roberts Avenue. The shortest, least expensive and most promising alternative appears to be a connection from Roberts Avenue to Southside Drive approximately 500 feet south of the Strawberry Lane intersection. The connector roadway would pass northwest of the collection of businesses at 6919 to 6915 Southside Drive and southeast of the business at 6905 that would be removed as part of the 5-Lane Alternative. A cul-de-sac could be constructed in the lot created by the removal of the business at 6903. The connecting roadway and cul-de-sac are shown dashed on the 5-Lane Alternative plan. Given that Roberts Avenue does not draw too much green time from the existing traffic signal, the best solution may be to make no changes. Additional study of the Roberts Avenue situation is recommended during subsequent stages of the project once a strategy for Southside Drive is established.

At the start of the 5-lane design, the proposed profile grade was initially set to allow asphalt overlay of the existing pavement. Full-depth widening and asphalt overlay of the existing pavement has been used successfully three times in the past on three different sections of Southside Drive. However, review of the initially modeled cross sections determined that deviation from an overlay condition and lowering of the profile grade was needed from New Cut Road to near Alvina Way to reduce the lateral damages to adjacent properties. Throughout the length of the current National Turnpike widening and north to Strawberry Lane, the profile grade has been set for full-depth widening and milling and overlay of the existing asphalt surface to permit adjustment to the lane striping. Pavement coring and subgrade testing is recommended during subsequent stages of the project to determine the suitability of each section of the existing pavement for widening and overlay.

### 3-Lane Alternative

Plan sheets, profile sheets, R/W Summary sheets and cross section sheets for the 3-Lane Alternative are provided as Appendix P in the Supplement to this report. The centerline station range assigned to the 3-Lane Alternative was established to match the stationing used in the early 1980s plans plus a "3" prefix to help identify the alternative as being the 3-Lane Alternative. The Ken Bowl tangent was again selected as the tangent where the stations would match exactly. By this method, it is easy to compare Station 300+00 on the 3-Lane Alternative to Station 500+00 on the 5-Lane Alternative as being at virtually the same point along the existing roadway. For initial modeling of the 3-Lane Alternative, the 5-Lane Alternative profile grade was used, with the same asphalt overlay in previously reconstructed areas and pavement replacement elsewhere.

Design of the 3-Lane Alternative was based on the premise of providing at least three lanes, but no fewer than the number of lanes that exist in the current condition. In addition, bike lanes were added for both directions. A major disadvantage of a three-lane design is that the right-turning traffic that normally operates in the outer through lane in a 5-lane design is now merged with the through traffic into one lane. There is no option for through traffic to bypass vehicles slowed or stopped for right turns. This has a major detrimental effect on the level of service for the general terrain segments and the intersections in particular. Consequently, right-turn lanes were added at several crossroad locations on the three-lane alternative for several reasons – 1) to enhance capacity by removing a significant number of turning vehicles from the through lanes, 2) to reduce the incidence of accidents and to thereby

improve safety by separating slower right-turning vehicles from the higher speed through vehicles, and 3) to provide a wider initial construction width to facilitate the maintenance of traffic during construction. Much of the right-turn lane pavement eliminates the need for temporary pavement that is placed during construction for use as a temporary roadway and then later removed when no longer needed.

The 3-Lane Alternative design also began at Auburndale Park. Highway capacity analysis was used to determine that adding a right-turn lane from southbound Southside Drive to westbound Palatka Road would improve operation of the southbound approach for evening peak conditions in the design year from a level of service “F” to a “B” and an “E” to a “B” for the overall intersection. A 225-foot long right-turn lane was calculated to be a sufficient length to allow right-turns to proceed past a queue of southbound vehicles stopped for the traffic signal. The addition of a right-turn lane creates the same westward centerline offset that is needed for the 5-Lane Alternative at the Palatka Road intersection. However, use of the 5-Lane Alternative Auburndale Park tangent would have also caused the acquisition of the two residences taken by the 5-Lane Alternative. A revised 3-lane centerline design was developed that uses a very flat curve of radius 4,000 feet across the Auburndale Park frontage that bends the roadway around the park and away from the two residences at 7303 and 7251 Southside Drive. This curved alignment still avoids taking right-of-way from Auburndale Park and avoids the established trees along the park frontage.

Back at New Cut Road, the previously developed centerline for Third Street Road on the southwest side of New Cut Road was retained and projected across the intersection. A 2,000-foot horizontal curve was used to turn the centerline on the northeast approach. One northbound lane, dual left-turn lanes, one southbound lane and one southbound right-turn lane were provided on the Southside Drive northeast approach to the intersection for this alternative. Highway capacity calculations determined that providing a right-turn lane improves the southbound approach level of service from an “F” to an “E” during the evening peak hour with a similar improvement for the overall intersection.

As noted in the AASHTO Green Book (1), “At signalized intersections, the storage length needed depends on the signal cycle length, the signal phasing arrangement, and the rate of arrivals and departures of left-turning vehicles...and usually should be based on one and one-half to two times the average number of vehicles that would store per cycle.” Using this guidance, a storage length of 250 feet was calculated as being needed for the dual left-turn lanes. Northeast of the storage length, the two-lane median width transitions down to the normal single-lane median. As with the 5-Lane Alternative, the alignment in this area was set to avoid the Mt. Carmel School building and encroachment on the Ratterman Funeral Home front driveway area. The centerline curve radius near Lillian Way was set to be the same as that used in the other alternative, thus avoiding right-of-way acquisition on the west side by the apartment buildings. A 225-foot right-turn deceleration lane with 100-foot taper was added for the approach to Lillian Way. This right-turn lane was then extended a short distance back across the main entrance to Our Lady of Mt. Carmel so that right-turning motorists at the entrance could benefit at least from the full taper length.

At Palatka Road, the currently skewed intersection is realigned in a manner similar to that used for the 5-Lane Alternative. The major difference for the 3-Lane Alternative is that dual left-turn lanes are not feasible on the Palatka Road approach since two northbound lanes on Southside Drive would not be available. The construction limits of the eastbound lane have been shortened so that only the first tier

property requires right-of-way acquisition. Details of the intersection design would be determined during subsequent stages of the project.

The 3-Lane design skips ahead to the Captain D's tangent. The Southside Drive right-turn lane to National Turnpike that is currently under construction is retained in the three-lane design, making the proposed centerline in this area identical to the 5-Lane Alternative centerline. The overall width of the roadway is one lane narrower in the southbound direction. A retaining wall is used at the back of sidewalk along the Rite Aid frontage to reduce the parking lot damages. The single-family residence at 7146 Southside Drive could not be avoided in the proposed design and will need to be removed.

On the Meadowood Court / Alvina Way tangent, the existing wide dedicated right-of-way was used to full advantage. Right-turn deceleration lanes were provided for both Alvina Way and Meadowood Court, and these offset crossroad approaches were realigned to one intersection for operational and safety reasons. The centerline for this Southside Drive tangent was set parallel to the existing west right-of-way and in such a way as to have the proposed west right-of-way line coincide with the existing west right-of-way line. Retaining walls will be needed at the behind-the-sidewalk location to minimize the lateral damages to the row of apartment buildings. As with the 5-Lane Alternative, there is a triangular sliver of right-of-way to be acquired from the St. Mark's Church property; but this sliver also lies in the southern portion of the tract in front of the modern (1953) church building. This land should be considered less historically significant than the frontage for the two older structures to the north. The 3-Lane Alternative totally avoids the existing right-of-way line in front of the original 1911 church building, and a trade of extra existing right-of-way for the needed proposed right-of-way might be feasible.

A right-turn deceleration lane was provided for southbound Southside Drive at Woodmore Avenue. A similar lane was not provided for Woodmore Avenue on the east side of Southside Drive since that would have required the acquisition of the residence at 7251 Southside Drive. If it is determined later that proximity damages to this residence cause the building to be acquired and removed, a northbound right-turn deceleration lane should be added for this turning movement as well. A variety of horizontal curves were tried for the connection of the tangent at Woodmore Avenue to the Alvina / Meadowood tangent. In order to reduce the encroachment on the east-side residences between Woodmore Avenue and Alvina Way, and to more effectively use the existing dedicated right-of-way on the west side of Southside Drive, a 1,300-foot radius was selected. This is the smallest radius that can be used at this location without causing right-of-way taking on the west side near house number 7244. Retaining walls at the back-of-sidewalk location would be employed to reduce the lateral damages to the residences on the east side from Woodmore Avenue to Alvina Way. The Woodmore Avenue crossroad approaches would be realigned in a manner similar to that used on the 5-Lane Alternative and for the same traffic operation and safety reasons. The garage structure on the northeast corner of Woodmore Avenue intersection at 7247 Southside Drive would be removed due to right-of-way takings from two sides and access management concerns of having two entrances in an intersection radius; but a replacement garage might be feasible on this site with a single entrance to Woodmore Avenue.

Moving ahead to the portion of Southside Drive north of National Turnpike, all widening is to the east side for the same reasons cited for the 5-Lane Alternative. Given that the segment of Southside Drive from National Turnpike to Strawberry Lane was already widened in the early 1980s to three lanes, the widening for the 3-Lane Alternative is confined to only widening a sufficient amount to provide two four-foot bike lanes. The proposed design also retains the dual left-turn lanes that are being added as

part of the National Turnpike reconstruction and the right-turn lane at Strawberry Lane that was constructed as part of the 1980s project.

At the National Turnpike intersection, there are virtually no changes from the layout that is being constructed as part of the National Turnpike reconstruction. The same lane configuration will continue, including the median transition on the south approach. Dual left-turns from National Turnpike will not be possible in this alternative due to having only a single southbound lane on Southside Drive. The “painted-out” median lane would remain on National Turnpike.

Dual left-turn lanes from Strawberry Lane are also not feasible under this design alternative since there is only one southbound lane available for left-turning vehicles. The two bike lanes are assumed to end at the Strawberry Lane intersection, so the proposed widening for the 3-Lane Alternative ends on the south side of the Strawberry Lane intersection. Relocation of Roberts Avenue to eliminate the fifth approach to the Strawberry Lane intersection is also possible as part of the 3-Lane Alternative. The suggested connecting roadway and cul-de-sac are shown dashed on the plan view.

## SUMMARY OF ACQUISITIONS

	<u>Parcels Affected</u>	<u>Commercial Buildings Acquired</u>	<u>Residential Buildings Acquired</u>
<u>3-Lane Alternative:</u>			
South of National Turnpike	46	2 (a)	2 (b)
North of National Turnpike	11	1 (c)	0
<u>5-Lane Alternative:</u>			
South of National Turnpike	44	2 (d)	4 (e)
North of National Turnpike	17	2 (f)	0

- (a) # 5447 (PNC Bank ATM on Southside Dr.) and # 5469 (former BP gas station) New Cut Rd
- (b) Residences at # 7146 Southside Drive and # 7247 (garage)
- (c) # 6903 Southside Drive (Kenwood Service Center)
- (d) # 7138 (at Auburndale Animal Hosp.) and # 7150 (4-plex Meadowood Apts.) Southside Dr.
- (e) Residences at # 7146, # 7247 (garage), # 7251 and # 7303 Southside Drive
- (f) # 6903 (Kenwood Service Center) and # 6905 (Rubbies Barbeque & Brew) Southside Drive

## MEETING WITH ELECTED OFFICIALS

A project meeting was conducted in the City Hall building on March 24, 2005 by Department of Public Works staff to brief elected officials on the progress of the Southside Drive Widening study. Three District councilpersons attended the meeting – Mr. Ron Weston (District 13), Mr. Dan Johnson (District 21) and Mr. Doug Hawkins (District 25). At the time of the meeting, the 5-Lane Alternative had been designed and the 3-Lane Alternative design was in-progress. Staff of Skees Engineering briefly presented impacts created by each alternative and discussed differences between the two alternatives. Mr. Johnson expressed a preference for the 3-Lane Alternative. Mr. Weston and Mr. Hawkins preferred any widening alternative that could be completed quickly with available funds and opened to public use.



Subsequent to the March 24 meeting, the 3-Lane Alternative design was further refined to avoid taking one four-plex apartment building. Right-turn lanes were added at several intersections to improve the level of service for the 3-Lane Alternative.

## RESULTS OF HIGHWAY CAPACITY ANALYSIS FOR THE BUILD ALTERNATIVES

### 3-Lane Alternative

The results of the Highway Capacity Analysis for the design year using the forecast traffic volumes and the proposed design shown on the 3-Lane Alternative plans in Appendix P revealed the following:

	<u>Design Year (2029)</u>	
	<u>Level of Service for the 3-Lane Alternative</u>	
	<u>A.M.</u>	<u>P.M.</u>
<u>General Terrain Segments</u>		
New Cut Road to Palatka Road	D	D
Palatka Road to National Turnpike	D	E
National Turnpike to Strawberry Lane	D	F
<u>Intersections</u>		
New Cut Road	C	E
Palatka Road	B	B
National Turnpike (after the current reconstruction)	E	F
Strawberry Lane	D	F

Drawings showing the level of service for the general terrain segments and intersections in the design year for the 3-Lane Alternative Build Condition are provided in Appendix E in this document. The intersection level of service values stated above are for performance of the overall intersection. The intersection diagrams in Appendix E provide the individual level of service for each through or turning movement.

### 5-Lane Alternative

The results of the Highway Capacity Analysis for the design year using the forecast traffic volumes and the proposed design shown on the 5-Lane Alternative plans in Appendix Q revealed the following:

	<u>Design Year (2029)</u>	
	<u>Level of Service for the 5-Lane Alternative</u>	
	<u>A.M.</u>	<u>P.M.</u>
<u>General Terrain Segments</u>		
New Cut Road to Palatka Road	B	B
Palatka Road to National Turnpike	B	C
National Turnpike to Strawberry Lane	B	D
<u>Intersections</u>		
New Cut Road	D	F
Palatka Road	A	B
National Turnpike (after the current reconstruction)	E	F
Strawberry Lane	D	E

Drawings showing the level of service for the general terrain segments and intersections in the design year for the 5-Lane Alternative Build Condition are provided in Appendix F in this document. The intersection level of service values stated above are for performance of the overall intersection. The intersection diagrams in Appendix F provide the individual level of service for each through or turning movement. It should be noted that the New Cut Road intersection level of service for the 5-Lane Alternative is lower than the intersection level of service for the 3-Lane Alternative. This is due to the right-turn lane that was included on the 3-Lane Alternative but was not included on the 5-Lane Alternative. If the 5-Lane Alternative were selected for further design, addition of a right-turn lane would provide a similar increase in the level of service for the intersection.

## **MAINTENANCE OF TRAFFIC**

### General Discussion

There is no readily available State-maintained detour route for Southside Drive in close proximity to the existing roadway that would permit closure of one or more traffic directions on Southside Drive, although local residents familiar with the local roadway system might choose alternative routes to avoid traffic congestion in the construction area. In addition, many of the businesses that operate along Southside Drive are dependent upon having access from both directions. Therefore, two lanes of traffic, one lane in each direction, would be maintained as much as possible during construction. Construction of Southside Drive would generally take place during daylight hours with no time limitation on work performed outside of the existing traveled roadway. Lane closures of the existing roadway for making connections, surfacing, striping, etc. would probably be limited to off-peak hours only. For both alternatives, closure of the outer northbound lane of New Cut Road is likely during off-peak times for work along the existing edge of pavement and to connect new storm sewer runs to the existing box culvert under New Cut Road.

Access to the numerous crossroads would need to be maintained during construction. South of National Turnpike, Palatka Road, Woodmore Avenue and Alvina Way have alternative exits. It might be feasible

to temporarily close these streets to accelerate construction on their approaches and reduce the duration of construction for the residents. North of National Turnpike, all of the cross streets on the west side of Southside Drive have alternate exits. Even Strawberry Lane has two connecting streets that might be used as detour routes for limited duration.

#### 5-Lane Alternative

The general eastward shift of the proposed construction from New Cut Road to Alvina Way dictates that the initial stage of construction takes place on the right side. Throughout this roadway segment, at least two lanes of the northbound direction can be constructed along with all or half of the median lane without interruption to the two existing traffic lanes. The right-side storm sewer and crossdrain connections would be installed first. This will help dewater the area for the subsequent roadway excavation, subgrade preparation, curb construction and paving up to just below the surface course. Construction in the vicinity of the crossroads will need to be done part-width in phases to be able to maintain access to the subdivisions and churches. A slight realignment or widening of the crossroad approaches facilitates this part-width construction. Quantities for temporary paving to provide temporary connections across the work area to the existing pavement will be necessary. Completion of the sidewalk system on the right side will provide an alternative path for pedestrian use when the existing west-side sidewalk is in the work zone.

Once construction on the right side is completed sufficiently for temporary traffic, temporary striping for two-way traffic would be applied to the asphalt course immediately below the final course, and temporary two-way traffic will be shifted to the newly constructed northbound lanes. Once the shift is complete, reconstruction or asphalt overlay of the area of the existing pavement proceeds. This work will include installation of the left-side storm sewer and may include extension of crossdrains started in the initial phase that had been stubbed-off at the existing edge of pavement. Construction will proceed to completion on the left side including the Palatka Road approach, and final surfacing and final striping can be applied. Southbound traffic can then be shifted to its final position, and the median and northbound lanes overlaid and striped for the ultimate condition using a series of lane closures.

From Alvina Way to National Turnpike, the initial work area shifts to the left side to flatten the St. Mark's curve. In this area, the process described above will be reversed, with the left side being completed first, followed by the right side.

North of National Turnpike to Strawberry Lane, the initial phase work returns to the right side. Two lanes of widening would be completed in the initial phase. Northbound lane diversions during non-peak hours may be necessary when working immediately adjacent to the existing pavement. The existing median lane would be used as the temporary northbound lane during these lane closures. Unlike the work south of National Turnpike, southbound traffic would remain in its current location. Any milling, asphalt overlay and striping of the existing pavement would be performed using a series of lane closures during non-peak hours.

Widening of Strawberry Lane could be performed at the same time as the Southside Drive widening, but the dual left-turn lanes could not be put into operation until both southbound lanes of Southside Drive were completed and ready for traffic. The additional pavement could be cordoned off with channelization devices until ready for use.

### 3-Lane Alternative

Construction of the 3-Lane Alternative poses greater challenges than the 5-Lane Alternative due to the narrower width of initial construction available in the first phase. From New Cut Road to Woodmore Avenue, initial construction will take place on the right side. Near New Cut Road, one of the three existing lanes at the intersection will need to be removed from service during non-peak hours for use as a staging area to complete work on the proposed northbound lane. The right-turn lane approaching Lillian Way provides valuable additional pavement width. A wedge of temporary pavement just north of Lillian Way may be necessary to take full advantage of the right-turn lane as part of the traveled way in the second phase.

North of Woodmore Avenue to Alvina Way, the initial construction is first on the left and then on the right where right-turn lane pavement provides a valuable extra width for manipulating traffic. Temporary pavement wedges would be needed on the southwest corner of the Woodmore Avenue intersection and on the southwest corner of the Meadwood Court intersection to effectively transition the traffic to the existing pavement during the second stage. Lengthening the southbound right-turn lane at Woodmore Avenue would also facilitate the construction at Sta. 296+00 where the proposed lanes are the narrowest and coincide with the existing pavement.

North of Meadowood Court, the initial construction takes place on the left or west side. This segment should be the segment completed first on the project so that the substandard horizontal curve can be eliminated as early as possible. A leftward traffic shift in this area combines with the temporary pavement to the south to move the traffic farther away from the second stage work area on the right side. The work near the National Turnpike intersection will be completed using a series of lane closures.

North of National Turnpike, all of the widening is to the right or east side. Similar to the 5-Lane Alternative, northbound lane shifts during non-peak hours may be necessary when working immediately adjacent to the existing pavement. The existing median lane would be used as the temporary northbound lane during these lane closures. Southbound traffic would remain in its current location, and any milling, asphalt overlay and striping of the existing pavement would be performed using a series of lane closures during non-peak hours. Without dual southbound lanes on Southside Drive, widening of Strawberry Lane is not feasible, so Southside Drive widening stops at the south side of the intersection.

## **DRAINAGE DESIGN**

Drainage design will probably be one of the most challenging aspects for subsequent phases of the project due to the flat roadway profile, the extensive drainage area that reaches up to the top of Kenwood Hill on the west side, the limited number of stormwater outfall locations and the congested development on the downgrade side of the corridor that limits open channel and storm sewer outfall options. Availability of the three final drainage folders for the New Cut Road project, the National Turnpike widening project and the Southside Drive widening project from National Turnpike to Strawberry Lane should prove to be valuable sources of information for the previously designed storm sewer systems. Those Kentucky Department of Highways drainage folders should be recovered and pertinent sections copied during subsequent design phases. In addition, the archives of the Metropolitan Sewer District (MSD) should be reviewed for previously completed stormwater capital improvement projects. At least two such projects have been performed in the Southside Drive corridor. One upstream

project was completed in the Hatcher Avenue area west of Southside Drive. Another MSD project was observed on the east or downgrade side of Woodmore Avenue.

Given the large drainage area west of Southside Drive, the precise boundary of this drainage area will be very important. LOJIC mapping helps to some extent in determining drainage area boundaries, but a site visit by a drainage engineer to determine the flow direction of crossdrain and entrance pipes in the neighborhoods will be needed during subsequent design phases to avoid either over-sizing or under-sizing the Southside Drive stormwater drainage system. Field surveying or dye testing during rainfall events may be necessary to determine flow directions for very flat ditches and pipes.

Archived plans and a site visit were used to note the locations of the existing stormwater outfalls. The area from New Cut Road to Palatka Road, including approximately half of the Auburndale Park, drains southwest along Southside Drive in roadside ditches to New Cut Road. There, an existing 10' x 5' box culvert conveys the runoff longitudinally underneath the outer northbound lane of New Cut Road for approximately 300 feet to a drainage channel that runs along the south side of the Our Lady of Mt. Carmel property. This channel turns east to a structure that conveys the drainage under CSXT Railroad.

The next drainage outfall lies approximately 400 feet northeast of Palatka Road at the northeast corner of Auburndale Park. The existing 6.5' x 3' box culvert under Southside Drive drains to a 36-inch corrugated metal pipe that passes under several garages and outbuildings along the rear of the properties along the southwest side of Woodmore Avenue. The invert of the pipe is completely eroded away. The reason for the large disparity between the two structures is not clear, but it is clear that the discharge allocated to this outfall site will need to be carefully controlled. Some form of stormwater detention may be necessary at this outfall.

The next outfall is along the northeast property line of St. Mark's Lutheran Church. A 24-inch reinforced concrete pipe passes under Southside Drive, and additional runoff is added via open channels on the southeast side of the roadway. Not far beyond the right-of-way, the channel enters a closed 24-inch pipe system that outlets near Gerber Avenue. Some form of stormwater detention may also be necessary at this outfall.

The next primary outfall is along National Turnpike. Approximately 300 feet of the roadway drainage on the east side of Southside Drive is captured and conveyed via the recently installed National Turnpike storm sewer under CSXT Railroad and on to Northern Ditch. Expanding this outfall to capture and convey more runoff may be difficult due to the adverse grade along Southside Drive.

The next outfall at approximately 100 feet north of Hatcher Avenue collects an extensive amount of runoff. The 58" x 36" pipe arch at the site of a former box culvert is the outlet for the west side storm sewer system that collects all of the runoff for 900 feet to the south and 800 feet to the north near East Kenwood Drive. East side roadway drainage will also be piped into the pipe arch once the National Turnpike reconstruction is complete.

From East Kenwood Drive north to Strawberry Lane, the roadway gutter inlets on each side of Southside Drive drain into a combined storm and sanitary sewer system that flows north. It would be desirable to separate this stormwater drainage from the combined sewer system by routing it to the northwest side of Strawberry Lane and then northeast along Strawberry Lane to its stormwater outfall. A rerouting of this type would be more feasible under the 5-Lane Alternative since some amount of

storm sewer construction would be done along Strawberry Lane as part of the dual left-turn lane widening. The last drainage outfall is a closed storm sewer crossing approximately 400 feet north of the Strawberry Lane intersection. Plans show this outfall to be a 42-inch pipe that drains to the east to an open channel. The outlet of this pipe was covered in debris at the time of the site visit.

A storm sewer node map was prepared for the wider 5-Lane Alternative that showed the locations, flow direction and sizes of existing storm sewers on the project. Proposed curb inlets, lateral pipe connections and yard drain inlets were added to the node map based on a review of the profile and superelevation along the proposed route. Proposed storm sewers paths were developed considering the locations and sizes of the existing storm sewer outfalls and the constructability of storm sewer routes, considering the staged location of traffic during construction. Current drainage area boundaries were respected in development of the storm sewer layout. However, during the detailed design phase, some trading of drainage areas may become necessary to prevent surcharge of some of the more limiting outfalls. No hydraulic calculations were performed for this conceptual stage of the project. Rather, engineering judgment, based on a site visit and experience with similar urban roadway widening projects was used to estimate the sizes of storm sewer runs for conceptual cost estimating purposes.

Given the severely limited size of several of the existing drainage outfalls, the need for stormwater detention upstream of the storm sewer system is a distinct possibility. Given the general lack of space for surface detention sites in the extensively urbanized corridor, in-line detention in the storm sewer system by providing oversized pipe chambers with throttled outlets is a distinct possibility. The need for detention systems cannot be determined without a detailed hydraulic analysis of the existing and proposed conditions. Construction of storm sewer outfalls through adjacent neighborhoods that are large enough to accept the additional runoff created by the addition of impervious roadway pavement may be necessary in certain locations.

For cost estimating purposes, storm sewer quantities for the 5-Lane Alternative were adjusted downward by the reduced width of the roadway to generate quantities for the 3-Lane Alternative. A certain amount of oversized pipe was established to budget for in-line detention for both design alternatives.

## **CONCEPTUAL PAVEMENT DESIGNS**

Geotechnical exploration and engineering performed for the National Turnpike project was used as the best source of guidance for development of a conceptual pavement design for Southside Drive, primarily for use in preparation of the construction cost estimates. The National Turnpike Geotechnical Report dated March 4, 1997 recommended that “due to the poor drainage, high water table and soft foundation soils, a rigid pavement is recommended for this project to assist in bridging over soft areas.” Unlike National Turnpike that lies almost entirely in a floodplain, Southside Drive rests at a higher elevation near the base of Kenwood Hill and should not have the same severe pavement design conditions. Although there were no borings performed along Southside Drive during the National Turnpike work, the three borings closest to Southside Drive showed generally higher California Bearing Ratios (CBRs) than the borings along the remainder of the alignment. The silty-clay soil was classified as A-6 soil using the AASHTO Classification method and CL soil using the Unified Classification method. The CBRs ranged from 5 to 7 as compared to the CBR of 1 that was used for the National Turnpike overall pavement design.

Conceptual pavement designs were prepared for the sections south and north of National Turnpike due to the difference in projected traffic south and north of the intersection. A slightly lower truck percentage was also assumed for the section south of National Turnpike. Maximum asphalt designs, as opposed to maximum aggregate designs, were developed to minimize the depth of excavation adjacent to the existing roadway. This was not meant to preclude the possibility of a rigid pavement design. A Portland cement concrete pavement design could be developed for the project. Rigid pavement generally requires large block-shaped areas outside of the existing pavement for placement and curing time. Chemically stabilized roadbed might also be employed to increase the subgrade CBR and permit a thinner pavement design. Chemically stabilized roadbed was assumed not to be used for development of the conceptual stage pavement designs for cost estimating purposes.

## **COST ESTIMATES**

### Right-of-Way Acquisition

BTM Associates, Inc. prepared the right-of-way acquisition cost estimates for the two design alternatives using appraisal techniques customarily applied to Kentucky Department of Highways projects. The right-of-way costs estimated are bare costs for 2005 with no factor applied for inflation or a budgetary cushion. A ten percent administrative management expense has been added to budget for management of the right-of-way appraisers and buyers. Skees Engineering added the costs for two billboards to the spreadsheets, subdivided the estimates into sections south and north of National Turnpike and added the administrative budget line. The results of the right-of-way cost estimates are:

#### 3-Lane Alternative:

South of National Turnpike	\$ 599,000
North of National Turnpike	<u>\$ 586,000</u>
Total:	\$1,185,000

#### 5-Lane Alternative:

South of National Turnpike	\$1,035,000
North of National Turnpike	<u>\$ 976,000</u>
Total:	\$2,011,000

The Right of Way Acquisition Cost Estimate sheets, itemized by parcel for the alternatives and project sections noted above, are included as Appendix G in this report. The term "MAR" used in the spreadsheet means "minor acquisition review". Minor acquisition review is used for acquisitions where the cost is less than \$10,000 and there is no element of damage possible or other circumstances that would require that an appraisal be obtained. The only approval needed for a minor acquisition review is the District R/W Supervisor. Parcels that do not qualify for a minor acquisition review will require an appraisal; the cost of each appraisal is included in the right-of-way estimate.

### Utility Relocation

Skees Engineering, Inc. developed a spreadsheet format for listing each of the anticipated utilities and the expected relocation items. Project funds would be required to pay for relocation of facilities owned and managed by the Louisville / Jefferson County Metropolitan Sewer District and the Louisville Water Company and any other utilities that have facilities being relocated that are presently within privately owned easements. Utility companies with facilities located within the existing street rights-of-way

would be responsible for paying for any relocation. AT&T has a fiber optic cable in conduit that is located in National Turnpike and in Southside Drive North. The line and manholes are located within the existing rights-of-way. 2004 average unit prices provided by the District 5 Utility Section were used to develop the utility relocation cost estimates; an escalation of 4.7% was used to adjust for 2005 prices. The results of the utility relocation cost estimates are:

3-Lane Alternative:

South of National Turnpike	\$0.6 million
North of National Turnpike	\$0.2 million
Total:	\$0.8 million

5-Lane Alternative:

South of National Turnpike	\$0.6 million
North of National Turnpike	\$0.3 million
Total:	\$0.9 million

The utility relocation cost estimates for the two subsections of the two build alternatives are provided as Appendix H in this report.

Construction

Estimated quantities were calculated and construction cost estimates were prepared for each of the two design alternatives. In addition, the construction cost estimates were subdivided for Southside Drive roadway segments south and north of National Turnpike. Bid items for typical urban roadway widening projects were listed using the format established for Kentucky Department of Highways projects. Roadway lighting and landscaping were not included in the cost estimates. Kentucky Department of Highways Average Unit Bid Prices for 2004 were generally used to determine the cost for individual items. Some bid items such as Roadway Excavation had their unit prices adjusted upward to better reflect the higher unit cost of construction for urban conditions. The estimated construction cost for the design alternatives are:

3-Lane Alternative:

South of National Turnpike	\$3.9 million
North of National Turnpike	\$1.0 million
Total:	\$4.9 million

5-Lane Alternative:

South of National Turnpike	\$4.0 million
North of National Turnpike	\$1.6 million
Total:	\$5.6 million

The conceptual stage construction cost estimates for the two alternatives, each with two subsections, are included in this report as Appendix I.



### Total Estimated Costs

The total estimated costs for the two build alternatives are summarized below:

<u>3-Lane Alternative:</u>	<u>Right-of-Way</u>	<u>Utility Relocation</u>	<u>Construction</u>	<u>Total</u>
South of National Turnpike	\$0.6 million	\$0.6 million	\$3.9 million	\$5.1 million
North of National Turnpike	\$0.6 million	\$0.2 million	\$1.0 million	\$1.8 million

<u>5-Lane Alternative:</u>	<u>Right-of-Way</u>	<u>Utility Relocation</u>	<u>Construction</u>	<u>Total</u>
South of National Turnpike	\$1.0 million	\$0.6 million	\$4.0 million	\$5.6 million
North of National Turnpike	\$1.0 million	\$0.3 million	\$1.6 million	\$2.9 million

## **FEASIBILITY AND RECOMMENDATIONS**

Practically anything is feasible given enough time and money. Limited transportation funds and the relative priorities of this project compared to all transportation projects across the community will dictate the practicality of proceeding with further design and construction of a Southside Drive widening project.

The No-Build Alternative is feasible for Southside Drive, but increased congestion and a diminishing level of service are to be expected year by year. Operation along the general terrain segments will diminish one level of service letter grade by the design year. Each of the three major intersections will operate at level of service "F" in the design year under the No-Build Alternative. In addition, improvement to pedestrian and bicycle mobility are not addressed in the No-Build option.

Comparing the two build alternatives, the 5-Lane Alternative would provide a better overall level of service than the 3-Lane Alternative, but at a higher cost. The 5-Lane Alternative provides a small improvement for the level of service for the intersections, but a dramatic increase in the level of service for the general terrain segments.

The feasibility of constructing a 3-lane initial and 5-lane ultimate roadway between New Cut Road and National Turnpike was briefly considered, in case funding was limited. This concept does not seem to be prudent for Southside Drive since most of the initial paving required to maintain traffic is off to one side. Once the new pavement was in place and subject to two-way temporary traffic, existing pavement removal or overlay of the existing pavement would be fairly straightforward, and most of the project cost would have already been expended up front in right-of-way acquisition and utility relocation. In other words, the hard part and expensive part would already be complete, and it would be hard to justify not providing a complete full-width roadway while the construction mess was already there.

The National Turnpike intersection should be studied further to determine if an additional southbound lane on Southside Drive or dual right-turn lanes from National Turnpike to Southside Drive would improve the design year level of service for the intersection. This additional study is recommended for either of the build alternatives.

Public input needs to be sought before making a decision regarding which, if any, of the alternatives should be programmed for construction. The nature of the proposed designs could also change dramatically as a result of public comment.

Of all of the build segments, one stands out as probably not being the best use of limited public funds. Construction of the 3-Lane Alternative North Segment from National Turnpike to Strawberry Lane would only widen Southside Drive a sufficient amount to provide bike lanes on each side of the roadway. This alternative would not provide any improvement to vehicular traffic level of service. The cost of this segment versus the benefit to be derived does not seem to be justified, and no further design work is recommended for the 3-Lane Alternative segment north of National Turnpike.

Any of the other three segments, or some modification of those designs, would be feasible to design and construct.

If a decision is made to not proceed with widening of Southside Drive at this time, there remain certain actions that could be taken to facilitate design and construction of the project in the future. One of these actions would be to exercise building siting, right-of-way reservation and access management controls as the first tier properties are sold and redeveloped over the years. Effective use of the planning and zoning approval process could make great strides toward reducing the right-of-way acquisition costs in the future, especially for the roadway section from National Turnpike to Strawberry Lane.

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