Draft Report

First and Brook Street Study

Submitted to

Louisville Metro Public Works

Submitted by

ENTRAN, PLC

Submitted

February 2010

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Introduction

Louisville Metro Public Works contracted ENTRAN to perform a feasibility study to explore the likely impacts associated with converting First Street and Brook Street south of downtown Louisville from one-way to two-way traffic. Through a collaborative effort with the public, local government agencies, and surrounding neighborhood groups, the goal of this study was to determine what modifications would be required to accommodate two-way traffic flow along both streets. The evaluation of the potential two-way scenario focused primarily on the traffic impacts for the surrounding area.

It has been argued that converting two-way streets to one-way traffic flow decades ago was an effort to move traffic out of downtowns; some one-way street opponents claim that this traffic never returned, resulting in the decline of quality of life within downtown neighborhoods. One-way streets make for efficient movers of traffic, but can often introduce safety concerns for motorists, bicyclists and pedestrians because they tend to provide for higher travel speeds than two-way streets. The counter-argument is that two-way streets introduce more conflict points for bicyclists and pedestrians as they are forced to contend with traffic coming from more than one direction. Rather than crossing the street at locations where traffic is coming from a single direction, pedestrians are faced with traffic from two directions.

To some people, the benefits of two-way streets are numerous. They tend to have slower travel speeds than one-way streets, they reduce confusion for motorists unfamiliar with the area, they provide better access to both businesses and residential areas, and in some circumstances they can reduce the traffic load on other one-way streets. Two-way streets also have numerous disadvantages. These disadvantages include a potential loss of vehicular capacity and on-street parking. The loss of on-street parking may result from the need to provide turning lanes at intersections or even the need to provide an additional travel lane.

Traffic impacts are just one of many factors that must be taken into consideration when it comes to determining feasibility for converting one-way streets to two-way traffic. Downtown streets serve as more than just traffic movers - they provide access to businesses, residential areas, and local attractions. It has been argued that one-way streets in some cases hinder opportunities for economic development as certain businesses have a formal policy against locating on one-way streets. Thus, city leaders must look at the big picture when faced with this decision.

Study Purpose

The First and Brook Street Study was undertaken to evaluate the feasibility of and potential impacts associated with converting portions of First Street and Brook Street through the Old Louisville Neighborhood to two-way traffic. First Street and Brook Street are currently a one-way couplet between Broadway and Hill Street (a length of 1.35 miles). They are located in the South of Broadway (Sobro), Old Louisville and Limerick neighborhoods. The couplet provides access to I-65, the Central Business District, the University of Louisville, and businesses and residences within the neighborhoods.

The outcome of this study will be a source of input in the decision making process to convert the streets. The results themselves will not be the sole determinant in whether or not the streets are converted to two-way. As part of the study, an estimation of the traffic diversion that is likely to occur if First and Brook Streets are converted was determined.

The focus area for the study is shown in **Figure 1**. The area extends from Broadway at the north end to Hill Street at the south end and from Fourth Street to the west to Preston Street to the east.

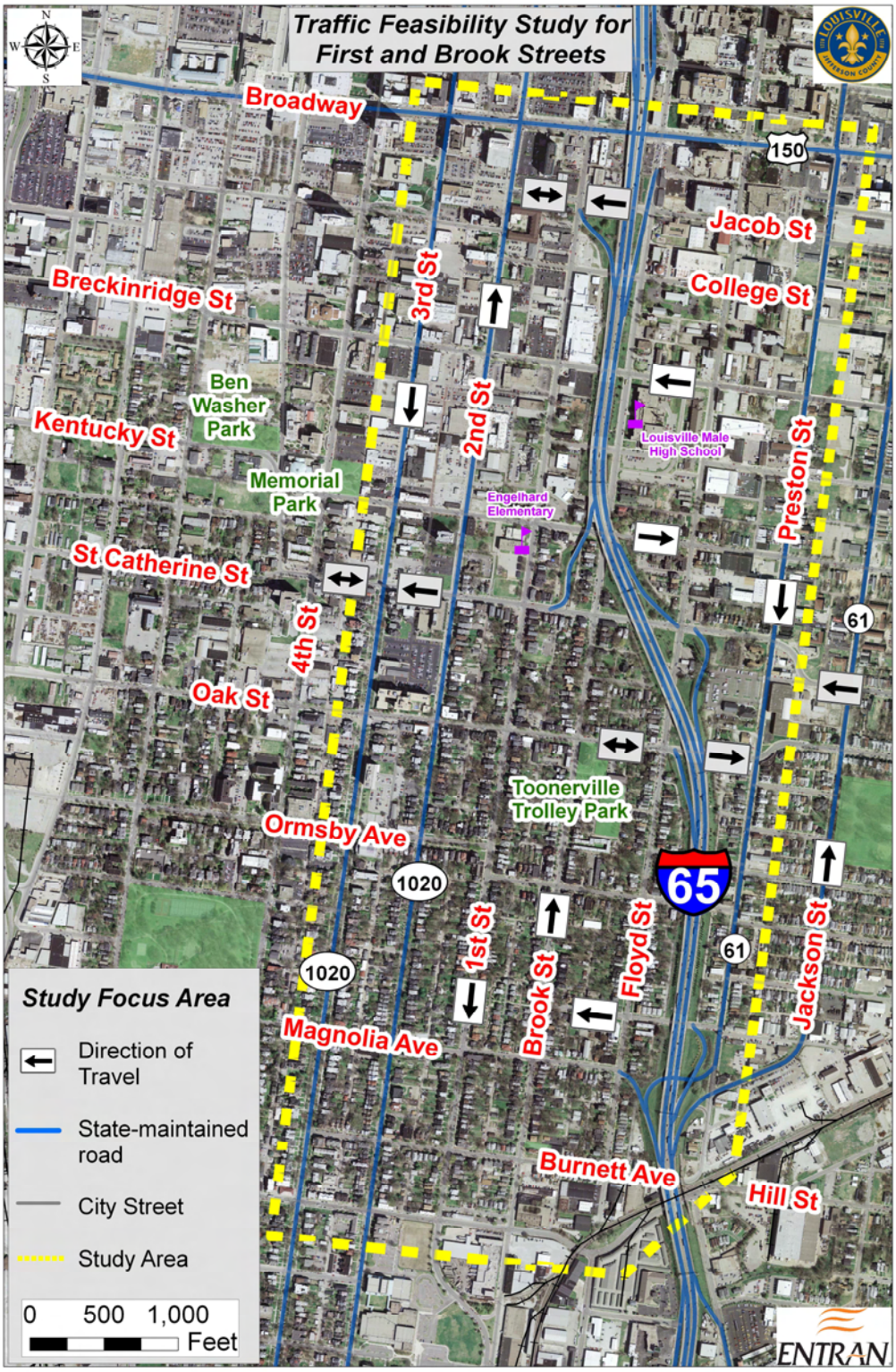

Figure 1: Study Area

Existing Conditions

Conditions of the study area's existing transportation network are examined in the following section. The information compiled includes traffic data, street characteristics, crash history, and on-street parking within the study area. Data for this section were collected from Louisville Metro Public Works, the Kentucky Transportation Cabinet (KYTC) Highway Information System (HIS) database, and field review.

Data Collection

Much of the data necessary to conduct the study were readily available or could be collected through site visits. Traffic signal timing data and hourly turning movement counts within the study area were provided by Louisville Metro Public Works. Historical daily traffic volumes for roadways in and surrounding the study area are shown in **Figure 2** (north-south streets) and **Figure 3** (east-west streets).

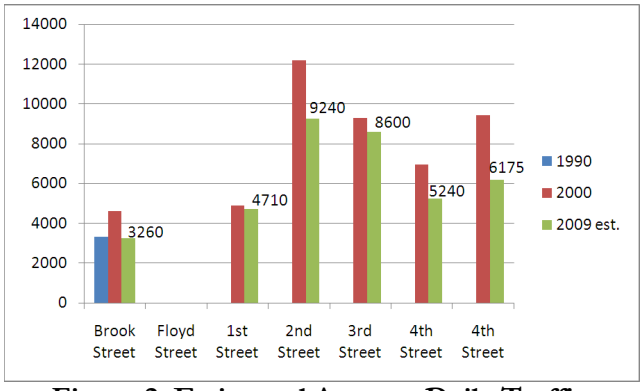

Figure 2. Estimated Average Daily Traffic Volumes for North-South Streets

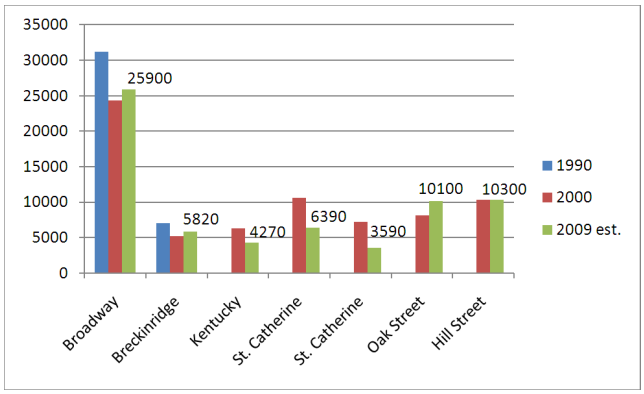

Figure 3. Estimated Average Daily Traffic Volumes for East-West Streets

In general, average daily traffic volumes have been decreasing through Old Louisville. One possible explanation is that the Central Avenue and 9th Street extension projects that have been implemented since 2000 have absorbed some of the traffic that may have been traveling through Old Louisville in the past.

Figure 4 shows the estimated peak hour volumes along First and Brook Streets. The peak hour traffic data represent typical traffic volumes experienced on any given weekday during the typical "rush" hours, which generally occur between 7:00 and 9:00 A.M. and 4:00 and 6:00 P.M. The highest volumes along each street occur immediately south of Broadway, where ramps provide access from First Street to southbound I-65 and from northbound I-65 to Brook Street. These segments experience over 1,500 vehicles per hour (VPH) during the respective peak periods.

South of the I-65 ramps, traffic volumes are significantly lower along both streets. Peak hour volumes along First Street are higher during the P.M. peak, corresponding with commuter traffic leaving downtown Louisville at the end of the work day. Traffic volumes on First Street during the morning peak hours range from 235 to approximately 590 VPH and from 725 to 1,000 VPH during the P.M. peak hour.

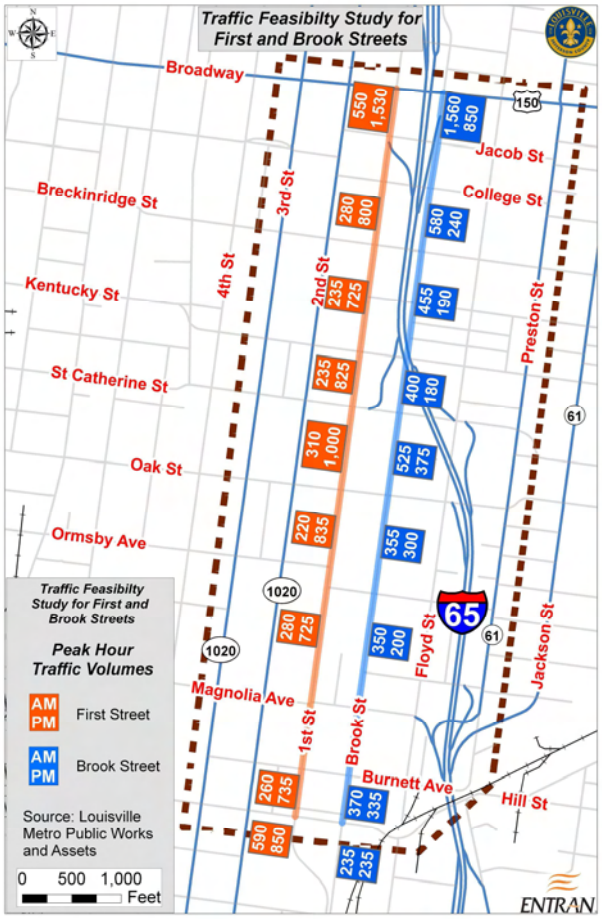

Figure 4. Existing Peak Hour Traffic Volumes on First Street and Brook Street

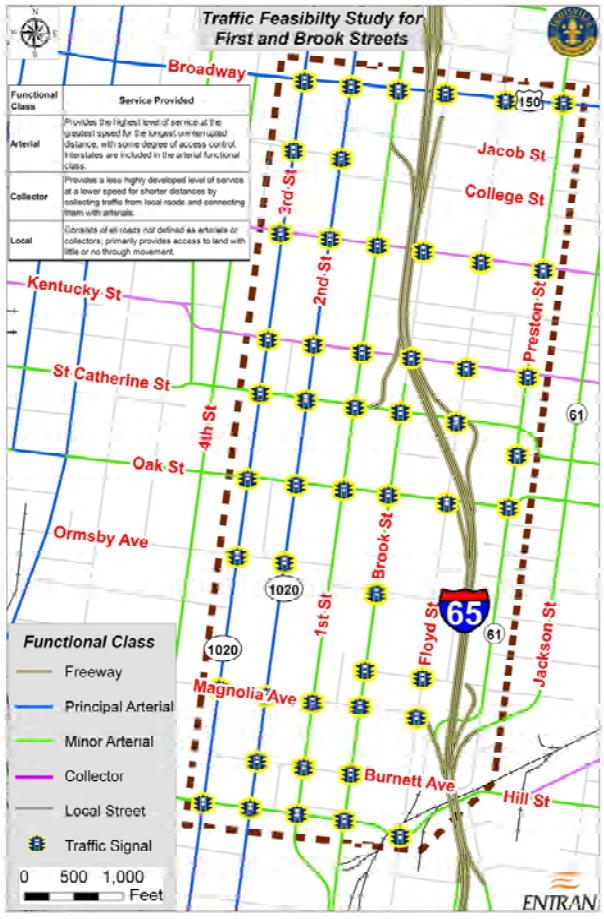

Figure 5. Roadway Functional Classification

Brook Street traffic volumes are generally lower than those on First Street. The A.M. peak hour volumes range from 235 to 580 VPH and the P.M peak hour from 180 to 375 VPH. The A.M. volumes are higher, corresponding with commuter traffic heading towards downtown Louisville.

Figure 5 shows the functional classification and location of traffic signals within the study area. First and Brook streets are currently classified as Urban Minor Arterials.

Figure 6 displays the existing street widths for First and Brook Streets. First Street is 42 feet wide from College to Magnolia Avenue. The street narrows to 36 feet between Magnolia Avenue and Hill Street. Brook Street is 42 feet wide between College Street and Woodbine Street. From Woodbine Street south to Hill Street, the width of Brook Street is reduced to 36 feet.

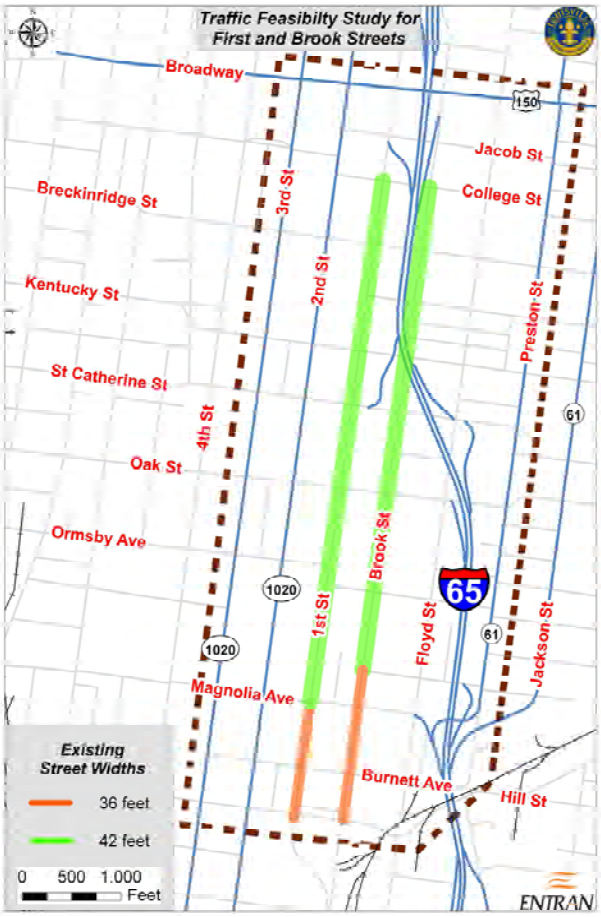

Figure 6. Existing Street Widths

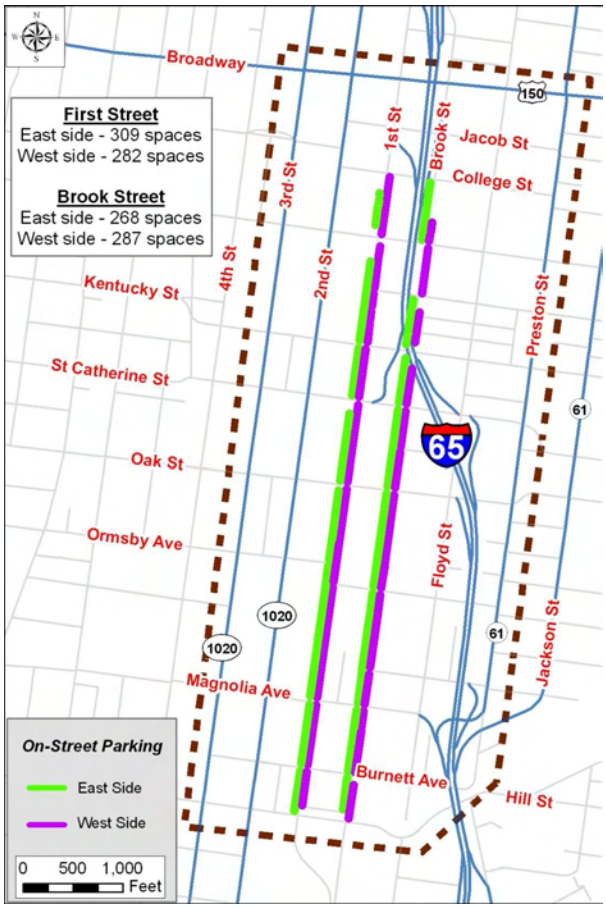

Figure 7. Existing On-Street Parking

Figure 7 summarizes the inventoried parking data. On-street parking is present along the majority of both First and Brook Streets. Some peak hour restrictions exist, such as along First Street north of Kentucky Street near the elementary school. Individual on-street parking spots are not marked with striping. However, total on-street parking was estimated by assuming a typical parking space length of 18 to 20 feet to coincide with the generally smaller vehicles found parked on both streets during site visits. Based on this assumption, it was estimated that First Street has 590 existing spaces, while Brook Street has approximately 555 spaces.

A field survey was conducted to estimate the occupancy rate for the parking lanes during peak hours. It was found that the on-street parking is heavily utilized, particularly at night, with an average occupancy rate of approximately 70 percent for First and Brook Streets within the study area.

Currently, one bus route, operated by the Transit Authority of River City (TARC), travels through and stops within the study area. Route number 2, the Second Street Route, provides bus service along First Street. Average headways along this route are between 30 and 35 minutes during the peak hours, 50 minutes during the mid-day and 60 minutes after 6:30pm. TARC reports the average travel time between the Broadway and Hill Street intersections is six minutes with an average travel speed of 14 mph.

A specialized tool was utilized to evaluate the quality of service provided by First and Brook Streets that considers the implications of the facility design and operation on the auto driver, the bus passenger, the bicyclist, and the pedestrian. The tool is called the Multimodal Level of Service (MMLOS) analysis method for urban streets. It consists of a set of procedures that predict the traveler's perception of the quality of service that an urban roadway provides to them. Level of Service (LOS) provides an indication of the quality of conditions in the form of a letter grade. LOS ranges from A to F, with A representing the "best" quality of service and F representing the "worst" quality of service. The results from the MMLOS analysis are in **Table 1** below. Note that the existing transit LOS for Brook Street is not applicable due to the absence of transit bus routes along that particular roadway segment.

The MMLOS along First Street between Breckinridge Street to Hill Street is fairly consistent. The worst-performing mode is transit operations, with an existing LOS D. The existing transit LOS for Brook Street is not applicable due to the absence of transit bus routes along that particular roadway segment.

Louisville Metro Public Works provided crash records for all crashes within the study area between January 1, 2005 and June 30, 2009. A summary of the reported crashes that occurred between Hill Street and College Street from January 1, 2005 to June 30, 2009 with identifiable locations is provided in **Table 2**. The general locations where these crashes occurred are shown graphically on **Figure 8**.

There were 133 reported crashes on Brook Street, with 36 (27 percent) resulting in injuries. The injury percentage on Brook Street is also higher than average as statewide injury crashes make up less than 23 percent of all crashes. A total of 196 crashes were reported on First Street, with 44 (22 percent) resulting in injuries. A single fatal crash was reported on each street.

Table 1. Existing Multimodal Level of Service

	First Street	Brook Street
Breckinridge		
Auto	B	B
Transit	D	N/A
Bicycle	A	A
Pedestrian	A	A
Kentucky		
Auto	B	B
Transit	D	N/A
Bicycle	A	A
Pedestrian	A	A
St. Catherine		
Auto	B	B
Transit	D	N/A
Bicycle	B	C
Pedestrian	A	A
Woodbine Street		
Auto	B	B
Transit	D	N/A
Bicycle	B	C
Pedestrian	A	A
Magnolia Ave.		
Auto	B	B
Transit	D	N/A
Bicycle	C	C
Pedestrian	A	A
Hill Street		

Figure 8. Crash History by Location

The Kentucky Transportation Research Center publishes statewide crash statistics annually and these statistics can be used to assist in identifying locations with higher than expected crash rates. While there is no distinction in the published statistics between one-way and two-way streets, it appears that both First Street and Brook Street have higher crash rates than would be expected on urban streets elsewhere in Kentucky.

The statewide average crash rate for urban minor arterials is 242 crashes per 100 million vehicles miles (MVM) traveled. Within Jefferson County, the average crash rate for all roadways over the study time period was approximately 404 crashes per 100 MVM. Based on the daily traffic estimates available from KYTC, the crash rate on the study portion of Brook Street is approximately 1,997 crashes per 100 MVM and the rate on First Street is 2,021 crashes per 100 MVM.

Table 2. Crash History by Location

Street	Segment		Intersection Crashes			Mid-Block Crashes			Total Crashes
		Length (mi)	All Crashes	Injury Crashes	Fatal Crashes	All Crashes	Injury Crashes	Fatal Crashes	
Brook Street	Hill to Magnolia	0.22	24	5	0	7	2	0	31
	Magnolia to Oak	0.41	29	11	1	16	0	0	45
	Oak to St. Catherine	0.16	17	6	0	6	0	0	23
	St. Catherine to Kentucky	0.11	10	7	0	1	1	0	11
	Kentucky to Breckinridge	0.21	6	0	0	7	1	0	13
	Breckinridge to College	0.12	8	2	0	2	1	0	10
	Total	**1.23**	**94**	**31**	**1**	**39**	**5**	**0**	**133**
First Street	College to Breckinridge	0.12	25	6	1	2	0	0	27
	Breckinridge to Kentucky	0.21	15	3	0	5	2	0	20
	Kentucky to St. Catherine	0.11	50	17	0	3	1	0	53
	St. Catherine to Oak	0.16	10	2	0	9	1	0	19
	Oak to Magnolia	0.41	17	1	0	16	2	0	33
	Magnolia to Hill	0.22	31	6	0	13	3	0	44
	Total	**1.23**	**148**	**35**	**1**	**48**	**9**	**0**	**196**

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Community Involvement

Public involvement is an integral part of any traffic study. This effort gives stakeholders and the general public a sense of ownership to a study and the solutions that result. It fosters better communication and coordination among all parties involved. Involving the community also expands the universe of alternatives examined and ensures that the most appropriate solution is found.

Project Advisory Panel

A Project Advisory Panel (PAP) was formed for this study. The consultant worked with Louisville Metro in establishing the PAP, to include elected officials, members of both neighborhood associations surrounding the study area, Toonerville and Old Louisville, as well as community business owners, and governmental agencies.

Three PAP meetings were held throughout the study. Meeting summaries are located in the **Appendix**. The first meeting served as a kick-off, introducing the study team to the PAP and providing the PAP members an opportunity to discuss issues as they relate to the existing street system. The second meeting discussed the existing conditions in detail and introduced concepts relative to how two-way traffic might be implemented along First and Brook Streets. This included a discussion of other cities that have undertaken two-way conversion projects, including Charleston, South Carolina and Cincinnati, Ohio. The final PAP meeting provided a summary of the modifications necessary to accommodate two-way traffic flow and the results from the study.

Public Meetings

Two public meetings were held over the course of the study. The first public meeting was held on September 29, 2009. The focus of the initial meeting was listening, where the study team met with residents and business owners within the community to discuss relevant issues and hear their concerns. An automated polling system was used in an exercise to develop concepts about the project that reflect the community values and provide an overarching framework for the community outreach process. The attendees were first polled to determine in which study area zone they each lived, worked, and/or owned property. **Tables 5** and **6** present a summary of the results of the polling exercise.

Table 5. Public Meeting #1 Polling Results – Do You Think Converting First and Brook Streets to Two-Way is a Good Idea?

	Own and/or Live		Live		Own property on First or Brook Street	
	In Favor	Opposed	In Favor	Opposed	In Favor	Opposed
First Street Zone	**26**	**12**	10	**11**	10	**9**
Brook Street Zone			12	1	11	1
Floyd Street Zone	**2**	**4**	0	0	0	0
Preston Street Zone			0	0	0	0
Second Street Zone			1	**4**	0	0
Third Street Zone			1	0	0	0
South of Study	**4**	**2**	0	0	0	0
North of Study			0	0	0	0
Other			4	2	4	0

Table 6. Public Meeting #1 Polling Results – How Do You Use the Street?

		Daily or Several Times A Week				
	Live	Park	Commute	Drive	Bike	Would Bike
First Street Zone	23	8	19	22	4	9
Brook Street Zone	13	10	12	13	1	1
Second Street Zone	7	0	6	7	1	1
Third Street Zone	1	0	1	1	0	0
Other	8	3	5	6	0	0
	52	21	43	49	6	11
Percent of Total		40%	83%	94%	12%	21%

Table 5 disaggregates whether respondents were in favor of or in opposition to the potential conversion. Those who live and work along Brook Street voted heavily in favor of the two-way street conversion. However, the First Street residents were split fairly evenly on the conversion. Also interesting during the polling exercise, it was discovered that those individuals that were opposed to the conversion most valued increased bicycle safety, reduced through truck traffic, and avoiding loss of parking.

The second public meeting was held on December 1, 2009. The presentation included design options that were considered, and a comparison of the one-way and two-way scenarios from the traffic simulation models. The automated polling system was utilized again to gauge the overall response from the community to the study and results. **Table 7** shows the polling results from the second meeting. Based on the results of this limited polling, the First Street residents were still split in their decision.

Table 7. Public Meeting #2 Polling Results

	Where do you live?		Property Owners by where they live	
	Convert to two-way	Leave as is	Convert to two-way	Leave as is
First Street*	7	8	6	6
Brook Street	5	1	5	0
Floyd Street	0	0	0	0
Preston Street	0	0	0	0
Second Street	2	4	0	0
Third Street	1	3	0	1
South of the Study Area	1	0	0	0
North of the Study Area	0	0	0	0
Other	2	0	2	0
Totals	**18**	**16**	**13**	**7**

* One property owner who lived on First Street abstained from voting

Two-way Scenario

This section discusses the development of the two-way traffic scenario and the analysis of the scenario.

Methodology

In creating a two-way traffic scenario for First and Brook Streets, three key objectives were utilized:

- Maintain or improve safety for all users
- Maximize transportation efficiency (not necessarily speed)
- Use existing street width without widening

Due to the complex I-65 interchange ramp geometry on the north end of the study area and the higher peak hour traffic volumes immediately south of Broadway, converting First and Brook Streets north of the I-65 exit and entrance ramps is not considered feasible. Therefore, the two-way section for First and Brook Streets would terminate at College Street, the first two-way street south of Broadway.

Some general guidelines were used in determining the likely geometry of new two-way streets. The elimination of on-street parking was not considered feasible. A minimal number of on-street parking spaces were to be removed only if necessary to accommodate a needed turn lane at an intersection. **Figure 9** illustrates the need for the removal of parking spaces.

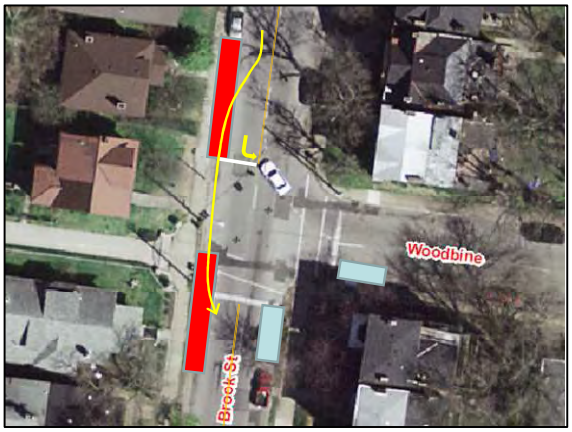

Figure 9. Necessary Parking Removal

Locations where left-turn lanes are to be expected if the two-way conversion takes place are shown in **Figure 10**. Left turn lanes would be added at six intersections along each street. Elsewhere, it was assumed that no additional lanes would be provided.

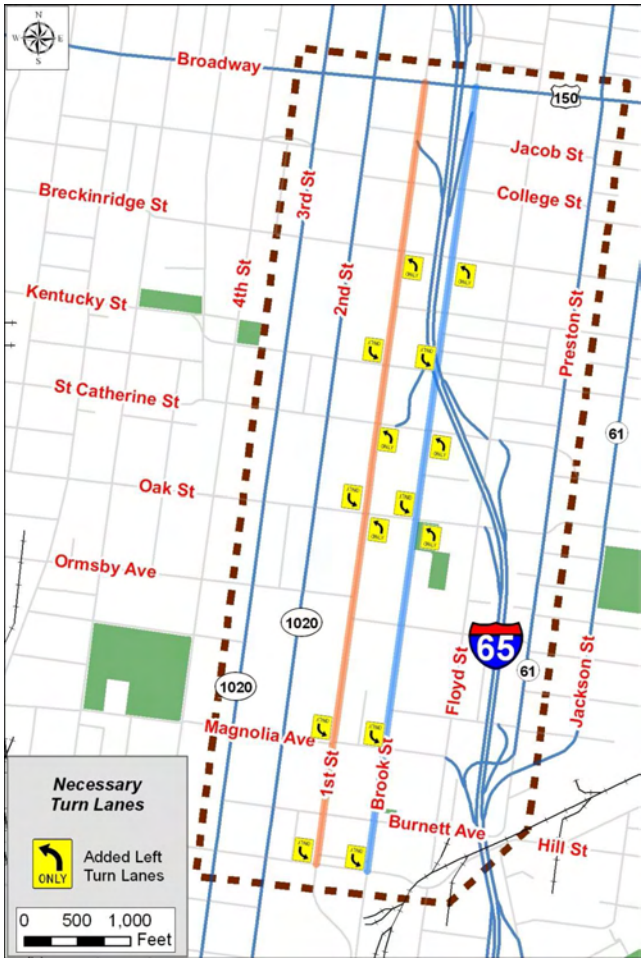

Figure 10. Locations of Proposed Left-Turn Lanes

Both one-way streets currently have two travel lanes, and it was assumed that one travel lane would be provided in each direction. Finally, no existing turning options would be eliminated under a two-way scenario.

The estimated loss of on-street parking is summarized in **Table 3**.

Table 3. Estimated On-Street Parking Loss

Segment	First Street	Brook Street
Hill to Burnett	5	4
Burnett to Magnolia	6	6
Magnolia to Ormsby	5	5
Ormsby to Oak	7	5
Oak to St. Catherine	8	8
St. Catherine to Kentucky	6	6
Kentucky to Breckinridge	6	3
Breckinridge to College	8	4
Total	**51**	**41**

Typical roadway sections of the two-way conversion for the 36- and 42-foot-wide streets are shown in **Figures 11** and **12**. The 36-foot section does not have the width to accommodate a bike lane, therefore the installation of "Share the Road" signs are necessary. The 42-foot section can provide adequate space for a 6-foot bike lane in one direction of travel.

The Multimodal Level of Service (MMLOS) analysis was also performed on the two-way street scenario for First and Brook Street. **Table 4** shows the results from this task.

In comparing the one-way street MMLOS analysis, First Street's auto LOS worsens slightly, but still performs at an acceptable level. This was directly influenced by the narrowing of the travel lanes in order to accommodate a bike lane.

Transit LOS remains unchanged because the service schedule is the same. However, there were preliminary discussions that the bus service could be altered along First Street if a street conversion occurred.

The bicycle LOS improved along the directions of the streets that bike lanes would be added. However, the directions of the streets without bike lanes remain at poor LOS.

The pedestrian LOS remains constant for the two-way street analysis. The acceptable levels continue because the sidewalks and buffer distance are unaffected with the street conversion.

Table 4. Two-Way Multimodal Level of Service

	First Street		Brook Street	
	NB	SB	NB	SB
Breckinridge				
Auto	D	C	B	B
Transit	D	D	N/A	N/A
Bicycle	E	A	A	D
Pedestrian	A	A	B	B
Kentucky				
Auto	D	B	B	B
Transit	D	D	N/A	N/A
Bicycle	E	A	A	E
Pedestrian	A	B	B	B
St. Catherine				
Auto	D	D	B	B
Transit	D	D	N/A	N/A
Bicycle	D	A	B	E
Pedestrian	A	A	B	A
Woodbine St.				
Auto	B	B	B	B
Transit	D	D	N/A	N/A
Bicycle	A	B	E	D
Pedestrian	B	A	B	B
Magnolia Ave.				
Auto	C	D	B	B
Transit	D	D	N/A	N/A
Bicycle	A	E	D	C
Pedestrian	A	A	B	B
Hill St				

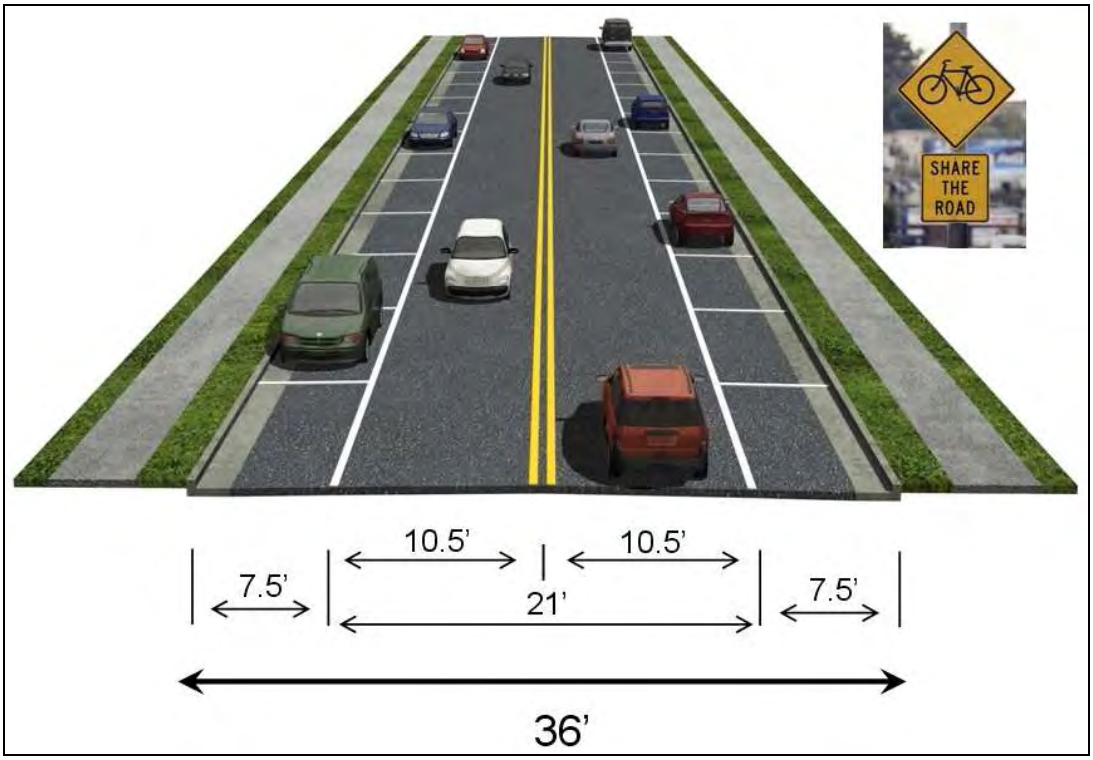

Figure 11. Two-way Typical Section for 36' Street Width

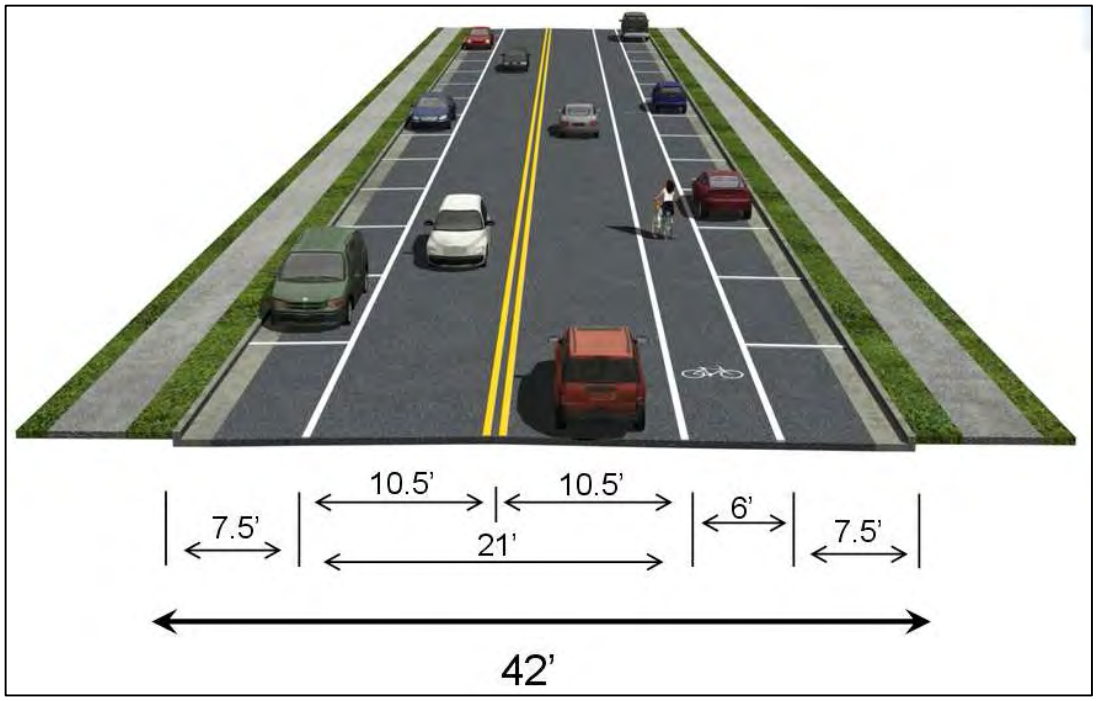

Figure 12. Two-way Typical Section for 42' Street Width

Traffic Simulation Model

A downtown Louisville traffic simulation model was previously created for other Louisville Metro Government studies. The model was created using the TransModeler simulation modeling software, developed by Caliper Corporation. The limits of the model for this study are identical to the study area map as shown in **Figure 13**.

As the previous traffic model was utilized as the foundation for this two-way street analysis, a thorough re-calibration was completed for the study area so that it reflected existing peak hour traffic conditions. Calibration measures included turning volumes, travel times and queue lengths.

Demand for new travel patterns were obtained by utilizing KIPDA's TransCad regional travel demand model. The estimated diversion from the model was then used to be consistent in the two-way simulation model.

Results

Results from the two-way model scenario showed a decrease in traffic volumes along First and Brook Streets between 10 and 20 percent. The adjacent streets absorb the majority of this traffic, with no individual street taking a significant amount. It was also found that I-65 traffic increases slightly with the two-way conversion. The peak hour travel times and speeds are graphed below in **Figures 14** through **17**.

The majority of the streets within the study area would experience minor impacts to the average travel times during the peak periods; likewise, the same can be stated for the average travel speeds for the study area roadways. Slightly higher travel times indicate a diminutive increase in delay within the study area roadways.

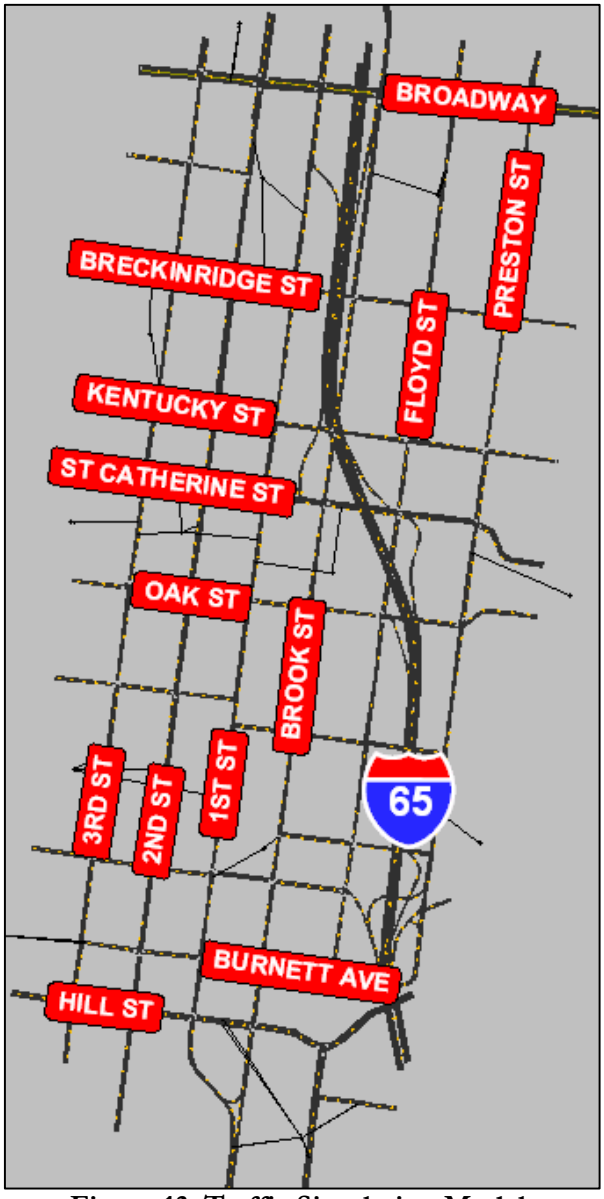

Figure 13. Traffic Simulation Model

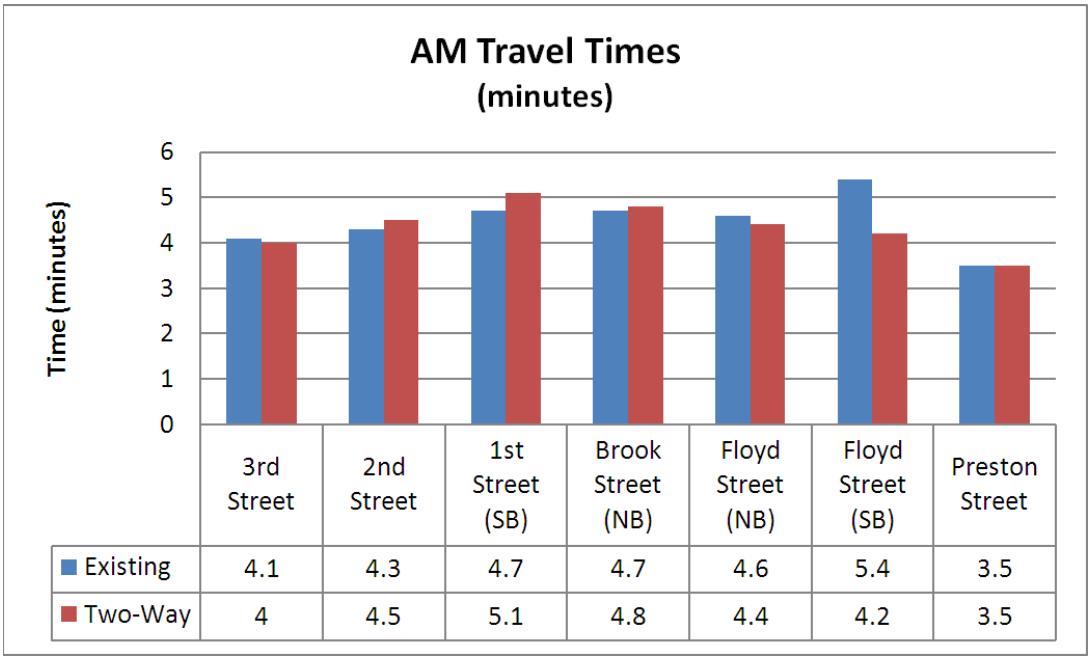

Figure 14. Existing vs. Two-Way AM Travel Times

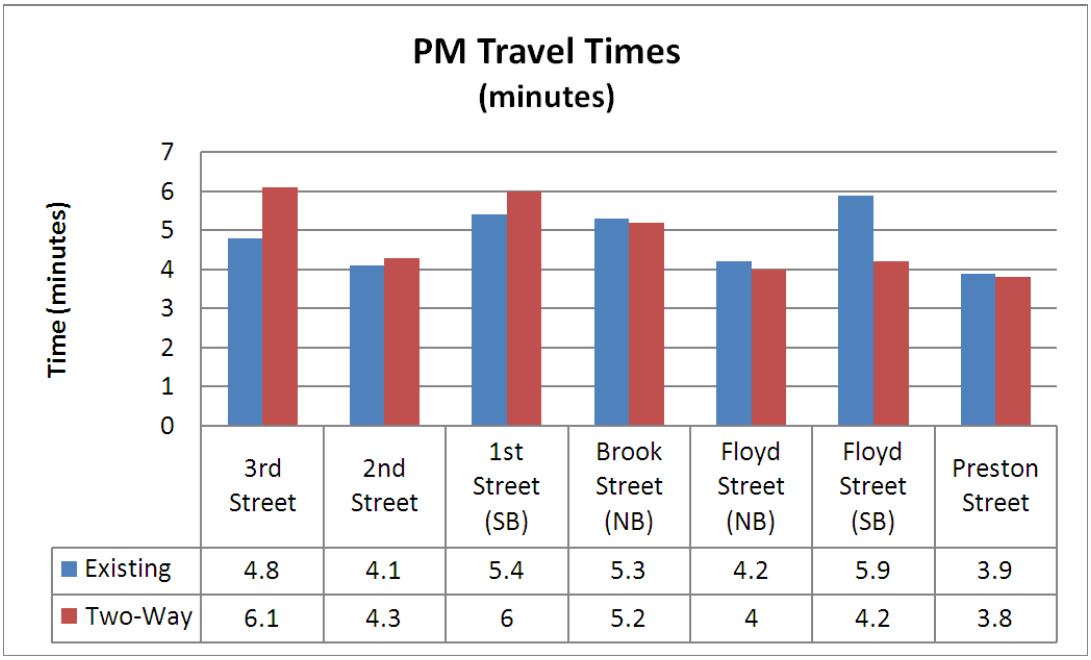

Figure 15. Existing vs. Two-Way PM Travel Times

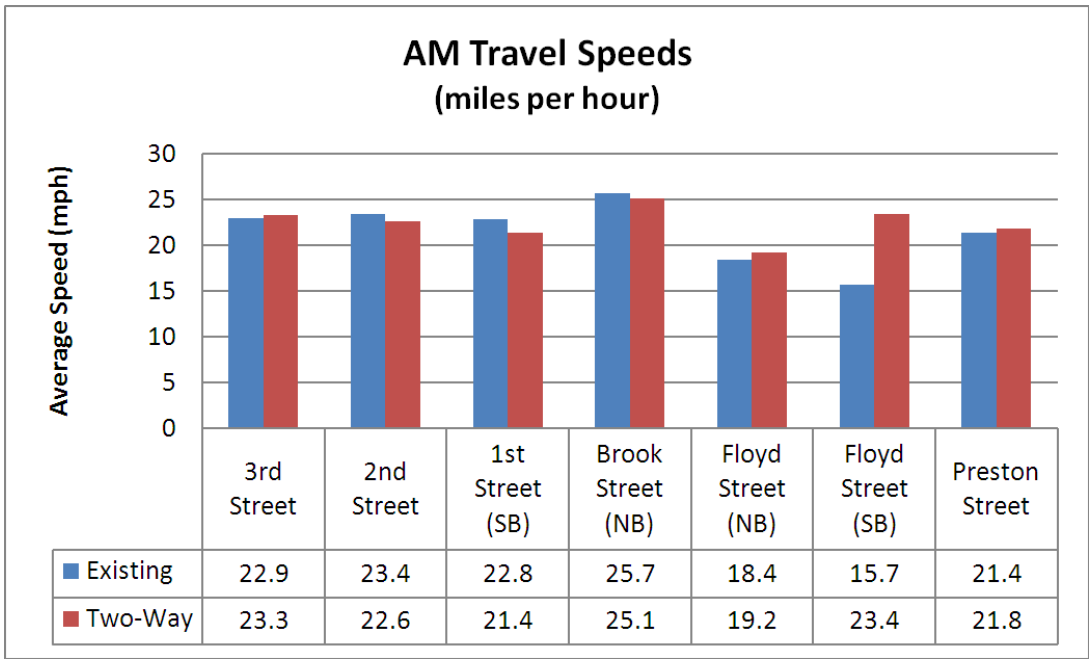

Figure 16. Existing vs. Two-Way AM Travel Speeds

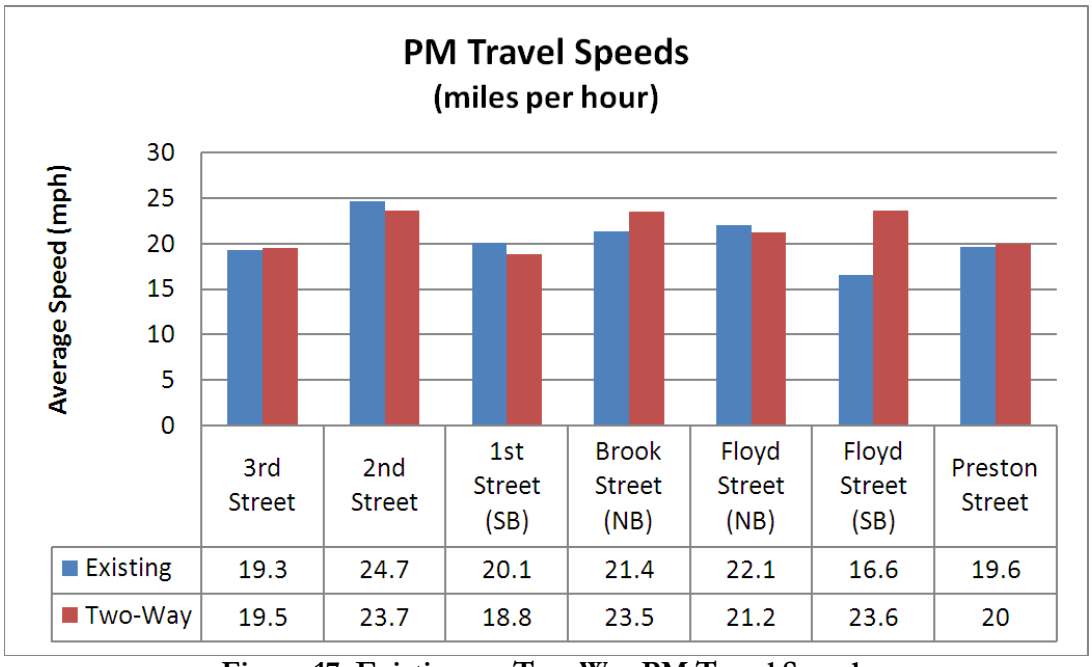

Figure 17. Existing vs. Two-Way PM Travel Speeds

Conclusions

This section summarizes the findings from the First and Brook Street Traffic Feasibility Study and discusses the next steps that must be completed before a conversion to two-way traffic can be implemented.

There are widely varying opinions on whether two-way streets are preferable to one-way streets. While much of the information found on the internet is debatable, there are some generally accepted characteristics.

Generally speaking, two-way streets have slower travel speeds, reduce confusion for motorists unfamiliar with the area, provide better access to both businesses and residential areas, and in some circumstances reduce the traffic demand on other one-way streets. Two-way street conversions often result in some loss of vehicular capacity and on-street parking. The loss of on-street parking is a result of the need to provide turning lanes at intersections or even the need to provide an additional travel lane.

The issue of safety is widely argued among experts. Some suggest two-way streets increase the number of conflict points with which pedestrians must contend. Rather than crossing the street at locations where traffic is coming from a single direction, pedestrians are faced with traffic from two directions. Others suggest that the circuitous travel required in a one-way street network increases the potential exposure for pedestrian conflicts.

Traffic impacts alone should not be the deciding factor when it comes to converting one-way streets to two-way traffic. Thus, municipal governments must look at the big picture when faced with this decision. There is not necessarily a right or wrong answer, but public input is certainly a critical component of the decision making process.

Based on a desire by some members of the community, a single two-way alternative was developed with the goal of minimizing delay and right-of-way needs. The objective was to maximize mobility and roadway capacity within the existing roadway width while maintaining parking. The evaluation of the Two-Way Scenario suggests that converting First Street and Brooks Street to two-way will provide adequate traffic performance, assuming some parking is removed to provide turn lanes and steps are taken to retime some traffic signals to ensure progression. This conclusion is based on currently available information and does not include any significant, local development that may result in increased travel demand along these routes.

Next Steps

Louisville Metro Government's policy regarding the conversion of one-way streets to two-way traffic consists of a three-step process. The first step includes a written request from one or more residents to request the change. The second requirement, fulfilled by the completion of the First and Brook Street Study, is to evaluate the street(s) in question through a comprehensive traffic study to ensure two-way traffic flow is feasible. The final step is a petition process that must demonstrate a minimum of 75-percent of the property owners on the "Affected Street(s)" are in support of the changes. The Old Louisville Neighborhood Association must gather the necessary signatures to fulfill the petition requirements. If the requirements are met, Metro Council must give final approval before traffic flow changes can be made to First Street and Brook Street.

Appendix

First and Brook Streets Traffic Feasibility Study
Project Advisory Panel Meeting #1 – Summary
August 5, 2009

The first meeting of the Project Advisory Panel (PAP) for the First and Brooks Streets Traffic Feasibility Study was held at the Old Louisville Information Center on August 5, 2009. The following individuals were in attendance.

Name	Organization
Bob Bajandas	Old Louisville Neighborhood Council
Christopher White	2nd Street Neighborhood Association
Dan Borsch	BurgerBoy @ Brook
Don Driskell	Old Louisville Neighborhood Council
Donna Sanders	Metro Council
George Unseld	Metro Council
Herb Fink	Old Louisville Neighborhood Council
Joan Stewart	Old Louisville Neighborhood Council
Ken Plotnik	Toonerville and Old Louisville Chamber
Marcus Riggs	3rd Street Association
Nancy Woodcock	Tonnerville
Phil DiBlasi	Toonerville Neighborhood
Dirk Gowin	Metro Public Works & Assets
Pat Johnson	Metro Public Works & Assets
Brian Aldridge	ENTRAN
Tom Creasey	ENTRAN
John Ripy	Community Decisions

After introductions, Tom Creasey discussed the agenda and the purpose of the meeting. He discussed ENTRAN's scope of work and how ENTRAN will work with Louisville Metro to develop a potential two-way street scenario for First and Brook streets that will be evaluated in the study. He stressed that ENTRAN's role was to evaluate the potential scenario with a focus on the facts, that the outcome of the study will be a source of input in the decision making process. The results themselves will not be the sole determinant in whether or not the streets are converted to two-way.

Brian Aldridge discussed the technical parts of the study. The study area will extend from Broadway at the north end to Hill Street at the south end. It will extend from Fourth Street to the west to Preston Street to the east. Brian pointed out that I-65 ramps will limit the extent of one-way conversion opportunities. The two-way section for First Street likely would terminate at College Street, and the two-way section for Brook Street would terminate either at College Street or Breckinridge Street.

Brian said that the typical curb-to-curb street width is 42 feet for most of the sections, but is reduced to 36 feet at the south end. He showed typical cross-sections for each and how the individual components – travel lanes, bike lanes and parking lanes – could (or could not) be accommodated under either scenario.

Brian discussed the conversion of Oak and St. Catherine streets to two-way in 2002. He pointed out that there was an apparent diversion of traffic away from Oak and St. Catherine, but it is difficult to determine if the decrease was due to diversion, an overall reduction in travel through the area, or a combination of the two. The group was suspicious of the traffic volumes shown for Magnolia Street; it believes that traffic volumes on that street are higher than the 2005 traffic count results that were presented. Phil DiBlasi suggested that maybe fewer people are using Old Louisville streets to avoid other congested streets.

Ken Plotnik stated that the study should include a literature search on one-way street conversions. He cited two specifically – one in Charleston, S.C. and one in Pensacola, FL. He believes that the group should be looking at what other cities have done. Ken also believes that the study should address other issues, such as quality of life and the effect that two-way conversion would have on property values. Tom Creasey explained to the group that ENTRAN's contract with Metro has a clearly defined scope of services; some of these issues would be addressed to the extent they can under the contract, while other issues fall outside ENTRAN's scope of work. Joan Stewart added that there will be a lot of vocal people at the public meetings and that issues other than traffic will be important.

Brian discussed the schedule and the remaining public activities. The following dates were set:

- Project Advisory Panel Meeting No. 2 – September 15, 2009
- Public Meeting No. 1 – September 29, 2009
- Project Advisory Panel Meeting No. 3 – October 27, 2009 (tentative)
- Public Meeting No. 1 – November 10, 2009 (tentative)

A comment was made regarding bike lanes. Before the bike lane was added to Third Street, there was hardly any bicycle traffic. Now that a bike lane has been added, it gets used a lot.

John Ripy led the group through a polling exercise designed to demonstrate the Structured Public Involvement protocol and gauge the overall feeling of the panel about issues related to the project. Issues that were evaluated included:

- Property values
- Personal safety
- Noise
- Pedestrian Safety

- Business viability
- Neighborhood mobility
- Truck traffic
- Truck deliveries
- Traffic speed
- Walkability
- Wayfinding
- Alleyway ingress/egress
- Effects on tourism, historic prosperities

The meeting concluded at approximately 8:15 PM.

First and Brook Streets Traffic Feasibility Study
Project Advisory Panel Meeting #2 - Summary
September 15, 2009

The second meeting of the Project Advisory Panel (PAP) for the First and Brook Street Traffic Feasibility Study was held at the Old Louisville Information Center on September 15, 2009. The following individuals were in attendance.

Name	Organization
Bob Bajandas	Old Louisville Neighborhood Council
Dan Borsch	BurgerBoy @ Brook
Don Driskell	Old Louisville Neighborhood Council
Jon Cieremans	2nd Street Neighborhood Association
Herb Fink	Old Louisville Neighborhood Council
Joan Stewart	Old Louisville Neighborhood Council
Ken Plotnik	Toonerville and Old Louisville Chamber
Nancy Woodcock	Toonerville Neighborhood
Phil DiBlasi	Toonerville Neighborhood
Pat Johnson	Metro Public Works & Assets
Jason Yeager	Metro Public Works & Assets
Brian Aldridge	ENTRAN
Tom Creasey	ENTRAN
Ashley Williams	ENTRAN
Ted Grossardt	Community Decisions
John Ripy	Community Decisions

After introductions, Tom Creasey discussed the agenda and the purpose of the meeting. He noted that an electronic (Adobe Acrobat PDF) version of the meeting presentation will be made available to the PAP. A question was asked concerning the summary from the first PAP meeting as some attendees had not received a copy of the summary. Pat Johnson indicated the summary would be resent to the entire committee.

Brian Aldridge continued the presentation noting that the study purpose had been modified slightly to better reflect the scope of work. The revised purpose is as follows:

The purpose of the First and Brook Street Study is to determine if portions of First Street and Brook Street through the Old Louisville Neighborhood can be converted from one-way to two-way operation while maintaining safe and efficient traffic operations.

After some discussion, it was generally agreed upon that this statement reflects the purpose of the study. However, the purpose statement remained open for further discussion.

Brian continued the presentation reiterating some of the discussion points from the first PAP meeting. The northern limits of the two-way conversion were discussed, and Brian stated that First Street and Brook Street north of College Street are not currently under consideration for conversion to two-way traffic because of impacts associated with the I-65 ramps south of Broadway (First Street has an entrance ramp to southbound I-65 and Brook Street has an exit ramp from northbound I-65). A question was asked about the similarity of the First Street entrance ramp to the Oak Street entrance ramp at Floyd Street. Brian responded that it was more than just a ramp issue on First Street south of Broadway as the higher traffic volumes along that segment make two-way traffic particularly problematic.

There was some discussion concerning the format for the first public meeting, to be held on September 29 at the Memorial Auditorium. It was decided that a single session with presentation beginning at 6:00 P.M. would be conducted. Exhibits will be on display before and after the meeting and study team members will be available to answer questions. Announcements of the public meeting would be provided in the Old Louisville Journal and all neighborhood chairs (11 active associations) will receive notices before the 29th; additional publications (LEO, Courier-Journal, etc.) will be explored by PAP members.

Brian presented some advantages and disadvantages associated with both one-way and two-way streets. He stated that one-way streets are typically considered to have higher capacities than one-way streets, but provide less direct access to residences and businesses than two-way streets. One-way streets have also been found to have lower accident rates for both vehicles and pedestrians, but as traffic speeds tend to be higher the severity of crashes may be worse on one-way streets. The PAP felt that the latter point should be more explicitly stated and it was asked if there was any research to support that statement. Brian added that there has been much research in terms of the chance of a pedestrian surviving an automobile collision based on the speed of the vehicle and said that information would be presented at the next PAP meeting.

Advantages of two-way streets included more direct access and less driver confusion and certain "quality of life" aspects including traffic calming, more of a "neighborhood feel", and improved visibility. Potential disadvantages included the reduced traffic capacity on one-way streets and turning movements may be more difficult to accommodate at intersections.

There was discussion concerning how some slides were worded. Some PAP members felt that some of the information was presented with a bias and asked if certain points and slide titles could be revised to remove any possible perception of bias. Brian made some of the changes during the presentation, and added that other pieces of information would be reworded to avoid the issue. There was some discussion concerning two slides that showed possible conflict points for different intersection types for pedestrians and vehicles. Tom Creasey stated that these slides would not be presented at the public meeting to avoid confusion on what the graphics indicate.

Brian presented some examples of two-way conversions that have taken place or are in the process of being implemented in other cities across the country. These included

Cincinnati, OH; Charleston, SC; Lubbock, TX; and Dayton, OH. The first three are examples of conversions that have been implemented, and the Dayton example is a planned implementation. More information on the Downtown Dayton Study is available here:

http://www.downtowndayton.org

In the Cincinnati and Lubbock examples, crash rates were found to increase. A study was completed in 2003 detailing the Cincinnati conversion, but has not been made available to the public. The Lubbock study, which stated the benefits have lead to the consideration of other two-way conversions, is available from the Institute of Transportation Engineers (ITE) Journal.

In Charleston, discussions with a city traffic engineer suggest that traffic volumes have remained relatively unchanged as one-way couplets were converted to two-way streets, and crash rates were believed to have decreased. The City has determined these projects to be successful and is pursuing an additional two-way conversion along the Spring Street and Cannon Street one-way couplet in the near future. No formal before and after studies have been conducted for the past Charleston conversions, but the last project to be implemented was the Ashley-Rutledge one-way couplet and the feasibility study is available here:

http://www.charlestoncity.info/shared/docs/0/ashley_rutledge_report.pdf

There was some discussion about how this information would be presented to the public. Tom Creasey stated this information would only be summarized for the public meeting presentation as there would not be enough time to go into each in detail.

Brian presented some existing conditions information for First Street and Brook Street. He noted that the likely proposed typical section for a two-way conversion had been modified since the first PAP meeting based on discussions with Metro Public Works and Assets. A five-foot wide bicycle lane had been previously discussed with two 11-foot wide travel lanes. The revised street section now includes a six-foot wide bicycle lane (one northbound bicycle lane on Brook Street and a southbound lane on First Street) with two 10.5-foot wide travel lanes. A question was asked concerning Metro's policy on adding bicycle lanes. Pat Johnson responded that the planned repaving of First and Brook Street would include bicycle lanes regardless of whether the two-way conversion is implemented.

Brian showed two graphics demonstrating that in general, average daily traffic volumes have been decreasing through Old Louisville. He added that the Central Avenue and 9th Street extension projects have been implemented since 2000 and have absorbed some of the traffic that may have been traveling through Old Louisville in the past. Two additional graphics were shown that depicted the hourly volumes collected by the Kentucky Transportation Cabinet along First Street and Brook Street north of St. Catherine in 2008. The First Street counts showed a definite peak between 5:00 and 6:00 P.M. and the Brook Street counts showed a peak between 8:00 and 9:00 A.M. A question was asked concerning the capacity on both streets. Pat Johnson noted that the theoretical capacity at an

intersection is 1,900 vehicles per hour per lane (vphpl) assuming the lane receives 100-percent of the green phase at the signal (in other words, the lane flows continuously for an hour). He said most of the signals have an approximate split of 50/50 green time for the north-south and east-west approaches. When the yellow (clearance) interval and all-red phases are factored in, a single lane along either street would have a capacity of around 700 to 800 vehicles per hour. The hourly counts along both streets are lower than that, suggesting adequate capacity.

Brian presented travel time data collected along the streets during the peak hours of travel and "spot speeds" that were collected during the early evening after the peak hour. The average speed was found to be approximately 36 miles per hour (mph) and the maximum was 46 mph. One PAP member noted that the worst speeding problems are overnight and discussed examples of traffic crashes where vehicles exited the roadway or were overturned, likely due to excessive travel speeds.

Brian went on to discuss on-street parking and provided an example of where and why some on-street parking may be removed to better accommodate turning movements at intersections. The example provided was somewhat confusing as it included a one-way street intersecting with Brook Street. It was decided a better example should be presented to the public.

The crash history along both streets was discussed. Examination of crashes that occurred between Hill Street and College Street from January 1, 2005 to June 30, 2009 indicates both First Street and Brook Street have higher crash rates than would be expected on urban streets elsewhere in Kentucky. A total of 196 crashes were reported on First Street, with 22-percent resulting in injuries. There were 133 reported crashes on Brook Street, with 27-percent resulting in injuries. The injury percentage on Brook Street is also higher than average as statewide injury crashes make up less than 23-percent of all crashes. A single fatal crash was reported on each street.

There are currently no transit routes operating along Brook Street, and the Transit Authority of River City operates Route 2 with service on First and Second Street. It currently operates at 30-35 minute headways during the peak periods, 50 minute headways during the mid-day, and 60 minute headways after 6:30 P.M. TARC provided travel time information along the First Street portion of the route, indicating it takes approximately six minutes for a bus to travel between Broadway and Hill Street. Two pedestrian and one bicycle crash was reported on First Street and two pedestrian and four bicycle crashes were reported on Brook Street.

Brian discussed the traffic simulation model that has been developed to replicate existing conditions and will be used to estimate traffic conditions for the two-way scenario. He said a number of performance measures will be used to estimate traffic performance at the intersection, street, and area-wide level. A question was asked about the possibility of providing additional scenarios (including different traffic assumptions) other than the final two-way scenario. Tom Creasey stated that the development of the final scenario would be

an ongoing process until an optimal alternative is found, and sharing information for various other options would not be possible.

One final issue concerning the conversion of First and Brook Street to two-way traffic was discussed. When incidents occur on I-65 that adversely affect the flow of traffic, much of the traffic diverts to adjacent surface streets. Brian mentioned recently driving through Old Louisville one evening when I-65 was severely congested and finding First Street and Third Street also congested. If First were two-way and the capacity was reduced, traffic that would have used First Street would likely seek alternative routes.

Ted Grossardt with Community Decisions discussed the proposed polling exercise for the first public meeting. He suggested the questions to be asked will include many of the issues the PAP discussed at the first PAP meeting. The public meeting will be prefaced by stating the purpose of the study and what the study cannot address, such as many of the quality of life issues the PAP feels are important. A list of the questions will be provided to the PAP before the public meeting.

The meeting concluded at approximately 8:45 P.M.

First and Brook Streets Traffic Feasibility Study
Project Advisory Panel Meeting #3 - Summary
November 11, 2009

The third meeting of the Project Advisory Panel (PAP) for the First and Brook Street Traffic Feasibility Study was held at the Old Louisville Information Center on November 11, 2009. The following individuals were in attendance.

Name	Organization
Bob Bajandas	Old Louisville Neighborhood Council
Don Driskell	Old Louisville Neighborhood Council
Herb Fink	Old Louisville Neighborhood Council
Ken Plotnik	Toonerville and Old Louisville Chamber
Nancy Woodcock	Toonerville Neighborhood
Phil DiBlasi	Toonerville Neighborhood
JoAnn Lockhart	2nd Street Neighborhood Association
Zane Lockhart	2nd Street Neighborhood Association
Pat Johnson	Metro Public Works & Assets
Jason Yeager	Metro Public Works & Assets
Brian Aldridge	ENTRAN
Tom Creasey	ENTRAN
Ashley Williams	ENTRAN
Keiron Bailey	Community Decisions
Ted Grossardt	Community Decisions
John Ripy	Community Decisions

After introductions, Tom Creasey discussed the agenda and the purpose of the meeting. As with the first two PAP meetings, Tom noted that an electronic (Adobe Acrobat PDF) version of the meeting presentation will be made available (see attached).

Ted Grossardt presented a summary of the polling conducted at the first public meeting in late September. Scores for the "values" questions were disaggregated by where the respondents live and work. Ted noted that respondents who live within the Brook Street zone were strongly in favor of converting First and Brook Street to two-way traffic while the respondents living in the First Street zone were more evenly split. He also said that, in general, respondents who were opposed to the two-way conversion valued increasing bicyclist safety most, followed by reducing through truck traffic and avoiding a loss of on-street parking.

Some other items of interest were gleaned from the polling results. Of those respondents living in the Brook Street zone (13 respondents), only one rides a bike on First or Brook

Street and one respondent said they would bike more if bicycle lanes were provided. Ten of the Brook Street respondents said they park daily or several times per week on First or Brook Street. Of the 23 respondents who indicated they live in the First Street zone, eight said they park on First or Brook Street daily or several times each week. These "parkers" largely indicated they were opposed to the conversion of First and Brook Street to two-way traffic. All of the First Street respondents who said they would ride a bicycle more frequently if bicycle lanes were provided were in favor of the conversion.

Brian Aldridge continued the presentation by discussing the development of the two-way alternative. He briefly discussed the goals that were kept in mind while working through the specific operational issues for converting First Street and Brook Street to two-way traffic flow. He stated that safety was the first priority and that any changes to the street system would focus on safety for all users. It was also important to promote an efficient transportation network. Brian noted that efficiency and speed are not necessarily the same thing, and the two-way alternative would ideally promote more consistent travel speeds with reasonable levels of congestion and delay. Finally, he said minimizing the loss of on-street parking was an important goal that was considered.

The two-way traffic simulation model was developed through an iterative process, beginning with estimating the anticipated two-way traffic volumes during the AM and PM peak hours of travel. This step was completed through the use of the Kentuckiana Regional Planning and Development Agency (KIPDA) regional travel demand model. This mathematical model seeks to minimize travel times for all daily trips that travel through the network. Brian stated that multiple variations of travel speeds and capacities along the converted segments of First and Brook were modeled using the KIPDA model. These model runs indicated that daily traffic volumes were likely to decrease between 10 and 20 percent compared to existing conditions, with approximately 20 percent being the worst case. Brian went on to say that the adjacent streets absorbed most of the diverted traffic with no single street taking all the diverted traffic. Traffic along I-65 even increased slightly.

This information was used to modify the peak hour volumes throughout the study area simulation network. With the peak hour traffic estimated, the simulation models were run with both First and Brook converted to two-way flow and few other improvements. These model runs provided feedback on where turn lanes or signal timing modifications were necessary. These modifications were incorporated into subsequent versions of the simulation models, and the process was repeated until the results from the models appeared satisfactory. At this point, performance measures were extracted from the model runs for comparison.

Brian then discussed the network changes required to safely accommodate two-way traffic on First and Brook Street. With respect to the two-way segment termini, the following changes were discussed:

1. First Street at College Street: No left turn would be allowed from northbound First Street onto westbound College Street. The eastern (left) southbound lane

approaching College Street would be a left-turn only and the western (right) lane would be a through and right.

2. Brook Street at College Street: No turn restrictions are required at this intersection.
3. First Street at Hill Street: Approximately two to three parking spaces would be permanently removed from the west side of First Street north of Hill Street to provide enough width for three lanes on the approach to the intersection. The eastern (left) southbound lane approaching Hill Street would be a left-turn only and the western (right) lane would be a through and right.
4. Brook Street at Hill Street: No turn restrictions are required at this intersection. A short left-turn lane is provided on the southbound approach, and the right lane is a right-turn only. The western (left) northbound lane approaching Hill Street would be a left-turn only and the eastern (right) lane would be a through and right.

The only other intersection that warranted special consideration was First Street at St. Catherine. The southbound I-65 exit ramp splits into a free-flowing right lane and a stop-controlled lane as it approaches the one-way (westbound) St. Catherine. The free-flow right currently serves only traffic traveling through the First Street intersection on westbound St. Catherine. The stop-controlled lane serves traffic that wishes to turn left onto southbound First Street. The free-flow right lane is separated by a concrete barrier to prevent the weaving of traffic approaching the First Street intersection. The configuration of the exit ramp and its proximity to the First Street intersection would make it infeasible to accommodate a right turn from westbound St. Catherine; therefore, only traffic in the free-flow right lane from the southbound I-65 exit would be allowed to turn right onto northbound First Street.

Left-turn lanes are required six intersections along each street, including the following:

1. Hill Street (southbound)
2. Magnolia Avenue (southbound)
3. Oak Street (northbound and southbound)
4. Kentucky Street (southbound)
5. Breckenridge Street (northbound)

The left-turn lanes, combined with removing some on-street parking spaces to better accommodate right-turn radii at intersections, would result in the loss of approximately 51 parking spaces on First Street and 41 spaces on Brook Street. Brian noted that approximately 1,150 spaces were estimated available along both streets based on the total length of parking used on each street divided by a nominal length per space. While some of those 1,150 spaces are likely not "legal" spaces, the removal of 91 spaces equates to approximately eight percent of the on-street parking.

The only other changes included in the simulation models were to adjust traffic signal timings at intersections along Oak Street. Brian presented some of the preliminary output from the simulation models based on the changes discussed. He noted that in most cases, average travel times were slightly longer under two-way traffic than existing and average travel speeds were slightly lower. However, these differences were mostly negligible with increases/decreases of ten percent or less. Intersection delays for each of the affected

intersections along First and Brook were also presented for the AM and PM peak hours of travel. Similar to the average travel times, in most cases the average amount of delay at each intersection was slightly higher in the two-way scenarios than existing. Again, in most cases this increased level of delay was insignificant, particularly as the typical delay values were quite small. Brian noted that the values presented may change slightly as some model tweaks may be performed prior to the public meeting.

The second public meeting for the study will be held at the Memorial Hall Auditorium on December 1, 2009. This meeting will follow the same format as the September 29 public meeting.

The meeting concluded at approximately 7:45 P.M.