

**CITY OF MISSION, KANSAS**  
**COMMUNITY DEVELOPMENT COMMITTEE**

**WEDNESDAY, JANUARY 4, 2017**

**6:30 p.m.**

**Mission City Hall**

**PUBLIC COMMENTS**

**PUBLIC PRESENTATIONS / INFORMATIONAL ONLY**

**ACTION ITEMS**

**DISCUSSION ITEMS**

1. Update on Plan Review and Inspection Services - Laura Smith (page 3)

Late this fall, Johnson County notified the City that effective December 31, 2016 they would no longer be providing plan review and building inspection services. Staff has been exploring options with several entities (both public and private), and has determined that the Institute for Building and Technology Safety (IBTS) is best equipped to take over plan review and inspection services on an interim basis. Based on the Council authorization provided at the December 21, 2016 meeting, the contract with IBTS has been executed and we have started meeting to begin the transition process.

2. Communication Plan for Traffic/Pedestrian Safety Changes on Johnson Drive Speed Limit - Emily Randel (no attachments)

During the December Committee meetings, the Council wanted staff to prepare a communication and roll-out plan for the traffic and pedestrian safety measures that will be coming to Johnson Drive. The reduction in the speed limit, signing for "compact car" parking only, and the addition of the flashing LED lights to the pedestrian beacons will all be implemented in the coming weeks. Staff will review the plan and provide the opportunity for feedback and modification prior to the roll-out.

3. Review of Traffic Signals at Various Locations - Laura Smith (page 21)

The City Council will discuss the installation of traffic signals at the intersection of Woodson / Johnson Drive as well as the addition of a protected left turn arrow for southbound traffic on Broadmoor turning east onto Martway.

**OTHER**

**Arcie Rothrock, Chairperson**  
**Suzie Gibbs, Vice-Chairperson**  
***Mission City Hall, 6090 Woodson***  
***913-676-8350***

<b>City of Mission</b>	Item Number:	1.
<b>DISCUSSION ITEM SUMMARY</b>	Date:	December 29, 2016
<b>ADMINISTRATION</b>	From:	Laura Smith

Discussion items allow the committee the opportunity to freely discuss the issue at hand.

**RE:** Update on Plan Review and Inspection Services

**DETAILS:** Late this fall, Johnson County notified the City that effective December 31, 2016 they would no longer be providing plan review and building inspection services to us. Since that time, staff has been exploring options to use another 3rd party entity to provide these services.

Because of the short time frame within which to explore options and discuss alternatives, staff asked the Council to authorize the Mayor and City Administrator to execute any and all necessary agreements to provide plan review and inspection services in the short-term (90 to 120 days). Any long-term agreement or service delivery recommendation will come back for Council approval.

Staff talked with several entities (both public and private) regarding the services, and has determined that the Institute for Building and Technology Safety (IBTS) is best equipped to take over plan review and inspection services on an interim basis. Based on the Council authorization provided at the December 21, 2016 meeting, the contract with IBTS has been executed and we have started meeting to begin the transition process.

During the Committee meeting, we will provide a more formal introduction to IBTS, and the specific services they will be providing for the City. Our goal is to facilitate this switch in a manner whereby our customers will notice no, or very little difference, in level of service. Many of our internal processes will not change, and we will continue to collect permit fees based on the existing fee schedule. We are still evaluating our options for a longer term solution and may alter our partnerships again at the end of this period of time.

**CFAA IMPACTS/CONSIDERATIONS:**

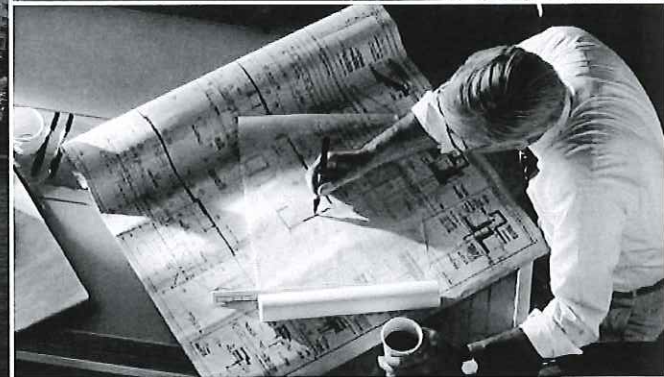
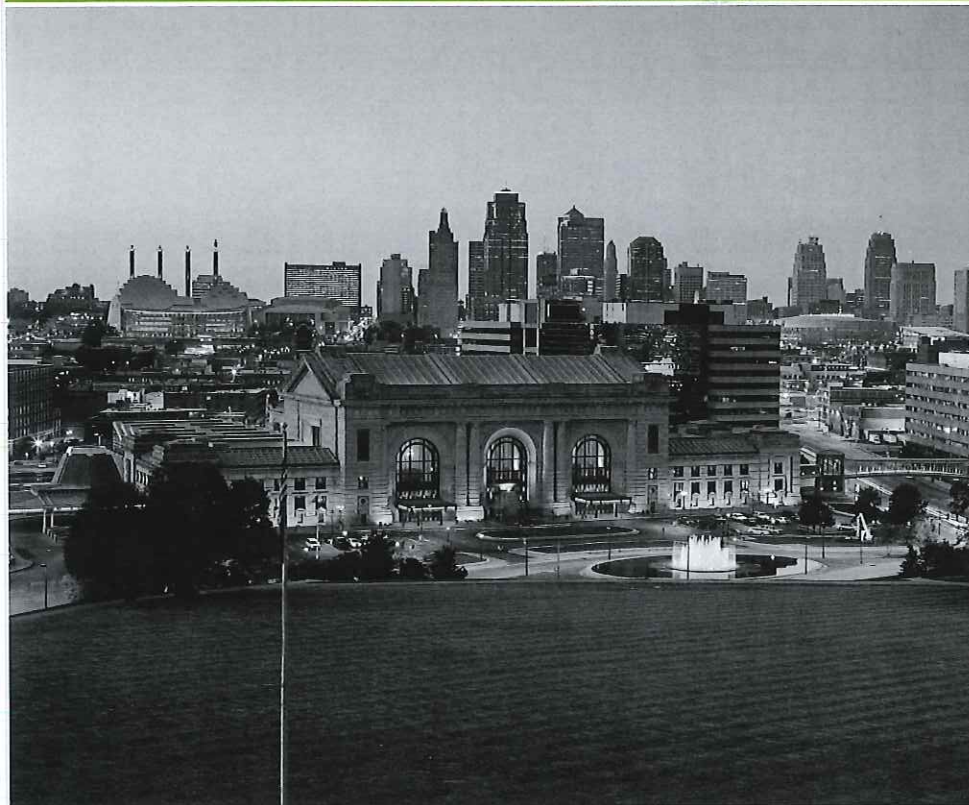
Related Statute/City Ordinance:	n/a
Line Item Code/Description:	n/a
Available Budget:	n/a



**MARC**  
MID-AMERICA REGIONAL COUNCIL

## REGIONAL GOVERNMENT SOLUTIONS

*Offering services and solutions specifically designed for your jurisdiction.*



The Mid-America Regional Council (MARC) and the Institute for Building Technology and Safety (IBTS) have teamed up to provide as-needed building department services to jurisdictions. Using boots-on-the-ground staff, our solutions will streamline government projects, reduce risk for non-compliance, and free up valuable budgetary resources.

As a nonprofit organization, IBTS continually strives to offer practical, efficient solutions to local governments. Drawing on years of experience providing governments with regional solutions, IBTS offers professional, on-time services with the ultimate mission of benefitting and serving the public.

IBTS provides augmentation and development/implementation services in addition to complete background operation of building departments. Solutions are delivered in a flexible manner designed to meet the constantly evolving needs of local governments.

# The SOLUTIONS

## BUILDING DEPARTMENT SERVICES

- Residential, commercial, and industrial
- Permits, plan reviews, inspections, certificates of occupancy
- Online permits, payments, reports, and automated notifications
- Contractor's portal
- Automated text message and email plan review letter notifications

## FLOOD PLAIN SERVICES

- Floodplain administration
- Base flood elevation determinations
- Permitting coordination
- Documentation control and archival with permits
- Ordinance reviews and harmonization with other codes

## ACCESSIBILITY & FIRE CODE SERVICES

- Plan reviews
- Inspections
- Automated inspection reporting
- Ordinance reviews and harmonization with other codes

## STORMWATER SERVICES

- Plan reviews
- Inspections
- Automated inspection reporting
- Ordinance reviews and harmonization with other codes

## ENERGY & SUSTAINABILITY SERVICES

- Green, LEED®, & ENERGY STAR® Rating certifications
- Strategic planning and goal setting
- Facility-focused energy management solutions
- Envelope and air barrier inspections
- Solar PV QA inspections

## PLANNING DEPARTMENT SERVICES

- Zoning and subdivision plan review
- Code enforcement inspections
- Ordinance reviews and harmonization with other codes



## BOOTS-ON-THE-GROUND STAFF

Our regional government solutions are made possible by boots-on-the-ground staff. These professionals are ICC Certified with years of experience that operate locally both within and across jurisdictions. They include:

- Operations managers
- Inspectors
- Building officials
- Permit technicians
- Plan reviewers
- Master code professionals



## PLAN REVIEWS

- Residential, commercial, and industrial plan reviews
- Guaranteed turn-around times
- Automated text message and email plan review letter notifications

## INSPECTIONS

- Residential, commercial, and industrial construction inspections
- Next-day inspections
- Automated text message and email inspection reports
- Online inspection requests

## ADMINISTRATION

- Ordinance writing, reviews, and revision recommendations
- Building department streamlining and efficiencies
- Cross-ordinance harmonization
- Fee structure reviews

## FIT® PERMITTING SOFTWARE

- Complete online building permit software
- Online contractor's portal
- Online applications, payments, drawing submittals, reviews, and inspections requests
- Automated notification via text message and emails of:
  - Plan reviews
  - Permit issuance
  - Inspection reports
  - Certificate of occupancy issuance
- Document management system
- Automated fee calculation
- Data consistency

## CONTACT

For more information, please call Curt Skoog at 816-679-0608 or email us at [lgs.info@ibts.org](mailto:lgs.info@ibts.org).



# SHARED BUILDING DEPARTMENT SERVICES

Case Study on an Innovative Public-Nonprofit Partnership Model:  
Analysis of the Effectiveness of the IBTS and MARC Shared  
Building Department Services Partnership in Selected Missouri  
and Kansas Jurisdictions

July 2015



**ICMA**

Funded by the Institute for Building Technology and Safety (IBTS)  
and written by the International City/County Management Association (ICMA)

# SHARED BUILDING DEPARTMENT SERVICES

## Case Study on an Innovative Public-Nonprofit Partnership Model: Analysis of the Effectiveness of the IBTS and MARC Shared Building Department Services Partnership in Selected Missouri and Kansas Jurisdictions

### Introduction

Collaborative service delivery approaches and innovative public-public and public-private partnerships to provide more efficient and cost-effective services to citizens are a popular trend with local governments today. With increasing demand from citizens for an expanding array of services and higher-quality services coupled with reduced financial and staff resources, these alternative service delivery options are the way forward for most local governments.

There are numerous types of collaborative service delivery options, including horizontal public-public partnerships (such as between two local governments), vertical public-public partnerships (such as counties providing services to constituent municipalities), public-nonprofit partnerships, and public-private partnerships.<sup>1</sup> The focus of this report and an example of a model of a public-nonprofit partnership is the shared services program provided by the non-profit organization the Institute for Building Technology and Safety (IBTS) through Mid-America Regional Council (MARC) for building department services to several Kansas and Missouri jurisdictions.

The purpose of this case study is to determine the effectiveness of this partnership model and to provide lessons learned for shared services arrangements both generally and in the specific case of the IBTS model.

### Partners

IBTS is an NGO that provides government entities at all levels with professional building code compliance services, including building department services, staff

augmentation and auditing. They have been providing technical assistance and thought leadership on a wide range of public building regulatory and administrative services since 1999.

MARC is a nonprofit council of city and county governments and the metropolitan planning organization for the bi-state Kansas City region. Governed by a Board of Directors made up of local elected officials, MARC serves nine counties and 119 cities. MARC provides a variety of shared services to its member jurisdictions to advance social, economic and environmental progress in the region.

### IBTS/MARC Shared Building Department Services Master Agreement

Under the IBTS/MARC Master Services Agreement, MARC member jurisdictions may sign an individual Services Agreement with IBTS and MARC. The program provides as-needed building department services at no cost to jurisdictions. Fees are charged directly to residents and customers, and the overall service fee includes a small administrative fee to help jurisdictions recover the cost of overseeing the agreement. Jurisdictions can choose from ten services:

- Building code department services
- Flood plain services
- Accessibility code services
- Fire code review & inspection services
- Storm water services
- GOVMotus™ permitting software, an e-service for customers and residents to directly apply for submit permit applications and pay permit fees
- Energy management & green building services
- Planning & zoning services
- Property maintenance service

This model allows flexibility for jurisdictions to pick and choose what they need, and they can opt into

<sup>1</sup> International City/County Management Association (ICMA), the Alliance for Innovation, and the Center for Urban Innovation at Arizona State University, "The Collaborative Service Delivery Matrix: A Decision Tool to Assist Local Governments," ICMA, 2014, <http://icma.org/Documents/Document/Document/306983>.

more or less services after the agreement is in place. IBTS and MARC provide the on-the-ground staff and technical expertise to jurisdictions that enable greater efficiencies in building department services delivery, ensure compliance and realize cost savings. Each individual jurisdiction negotiates the agreement with IBTS under the provisions of the Master Service Agreement, which sets the overall deliverable timeline expectations, fees and fee schedules, and implementer and implementing partner responsibilities.

**Case Study Interview and Questionnaire**

**Overview and Methodology**

The International City/County Management Association (ICMA) is the premiere association of local government professionals and aims to create excellence in local governance by developing and fostering professional management to build better communities. ICMA was contracted by IBTS to conduct a case study on the effectiveness of this partnership model using the IBTS/MARC example.

ICMA developed a pre-interview questionnaire and conducted in-depth phone interviews with a point of contact at each of the five selected jurisdictions. MARC, the implementing partner, also filled out the questionnaire and was interviewed. The interviewees

were primarily the main overseer of the partnership from the jurisdiction, which ranged from the mayor to the head of the Planning and Zoning Department. Guided by a defined protocol, ICMA used conversational interviewing to fully explore the interviewee’s perspectives and experiences. All of the interviews were recorded and later reviewed for the compilation of this report. The researcher sought permission prior to attributing any quotes to an individual or organization. The below report compiles and summarizes the key information obtained from the questionnaire and interview process.

**Sample**

IBTS provided the five jurisdictions selected as representative of the 13 jurisdictions who were using the IBTS/MARC Service Agreement for shared building department services as of April 2015. The sample was selected based on the length of the agreement, array of services and population size to ensure an adequate sample.

For the full list of jurisdictions currently or previously participating, please see Table 1 below. Jurisdictions interviewed have been underlined in the table.

Based on an analysis of this data, there is a moderate negative correlation between the population size of the jurisdiction and the number of services opted into ( $r = -0.53, n = 15$ ). This indicates that the smaller

**Table 1** IBTS/MARC Service Agreement Jurisdictions as of April 2015

<b>Jurisdiction</b>	<b>Contract Start Date</b>	<b>Number of Services Opted into (10 total)</b>	<b>Population size (2013 Census data)</b>
<u>Bates City, MO</u>	9/25/2014	9	216
<u>Wood Heights, MO</u>	11/20/2013	9	702
<u>Buckner, MO</u>	12/18/2014	9	3,072
<u>Orrick, MO</u>	6/1/2015	9	821
<u>Tracy, MO</u>	2/18/2015	8	219
<u>Edwardsville, KS</u>	12/19/2013	7	4,355
<u>Peculiar, MO</u>	7/21/2014	6	4,797
<u>Homestead, MO</u>	11/18/2014	4	180
<u>Crystal Lake, MO</u>	2/20/2014	4	353
<u>Lone Jack, MO</u>	1/16/2015	1	1,072
<u>Raytown, MO</u>	3/4/2015	1	29,510
<u>Johnson County, KS</u>	12/3/2014	1	566,933
<u>Clay County, MO</u>	Work Order	1	230,473



the population size, the more likely jurisdictions are to sign up for a number of building department service options. Larger jurisdictions are more likely to only opt into one specific service.

There is also a slight positive correlation ( $r = 0.33$ ,  $n = 14$ ) between the length of time that the service agreement has been in place and the amount of services that jurisdictions have opted into. However, the interviews revealed that, in most instances, the number of services did not change from the start of the agreement until now.

**Pre-Interview Questionnaire**

ICMA developed a pre-interview questionnaire for the five jurisdictions and MARC to complete prior to the phone interviews. The questionnaire covered key motivation factors for entering the shared services agreement, deciding factors for using this particular arrangement, barriers to implementation, and benefits from using this agreement.

**Motivation:** The questionnaire requested that jurisdictions choose their main motivating factor(s) for pursuing a shared services arrangement for building department services. The main factor for three jurisdictions was an increased pool of relevant expertise (50%), as demonstrated in Chart 1 below.

**History of Shared Services:** All of the jurisdictions reported that they had not used shared services arrangements previously on the questionnaire. However, the interviews revealed that nearly all had

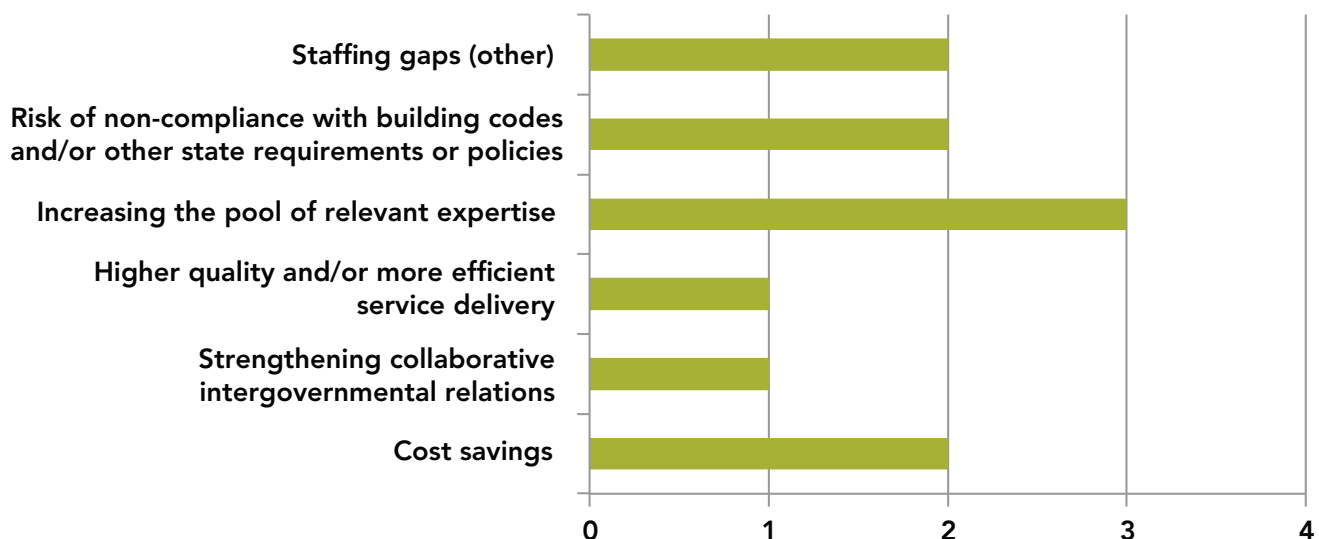
used a horizontal or vertical public-public shared service or one provided through MARC previously, and several had tried this option for building department services.

**Deciding Factors:** Jurisdictions also noted which factor(s) they considered when deciding on the type of shared services arrangement to pursue for shared building department services. Labor intensity, or the amount of labor required to do the work, was a deciding factor for half of the jurisdictions (50%) followed by asset specificity, or the degree to which the service requires investment in special infrastructure or technical expertise (33%).

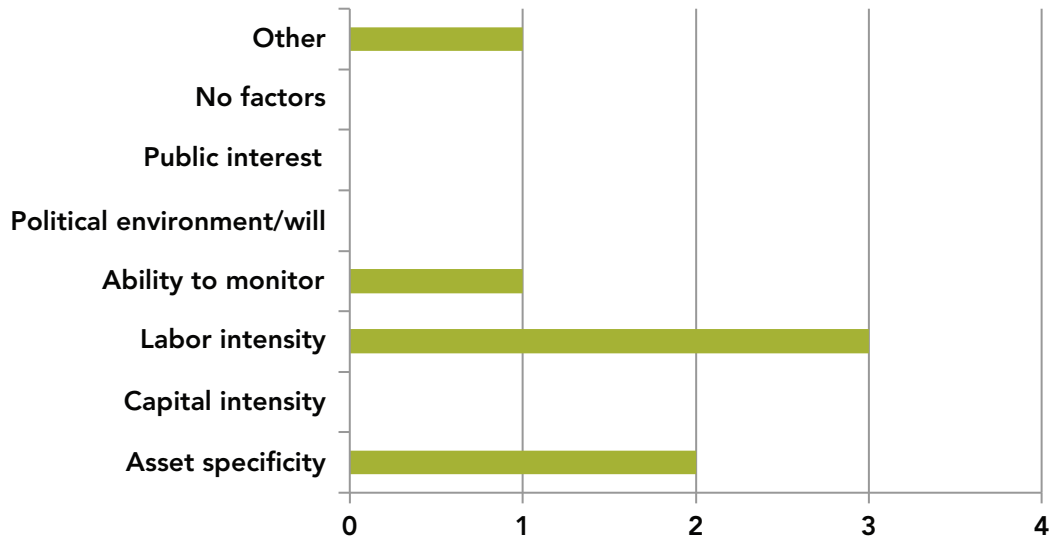
**Barriers to Implementation:** Two jurisdictions (40%) noted the cost of service as an obstacle as the change from the municipality’s fee structure to IBTS’s fee structure was difficult for some customers, who considered them high for their small community. Another jurisdiction (17%) mentioned public opinion of the regional building official community was an obstacle at the inception of the program. Two jurisdictions (40%) did not encounter any obstacles.

**Factors Impacting Planning, Negotiation and/or Implementation of the Service Agreement:** The jurisdictions and MARC also selected which factors had a positive, negative or neutral impact on the planning, negotiation and/or implementation of the service agreement. The two factors that had the most positive

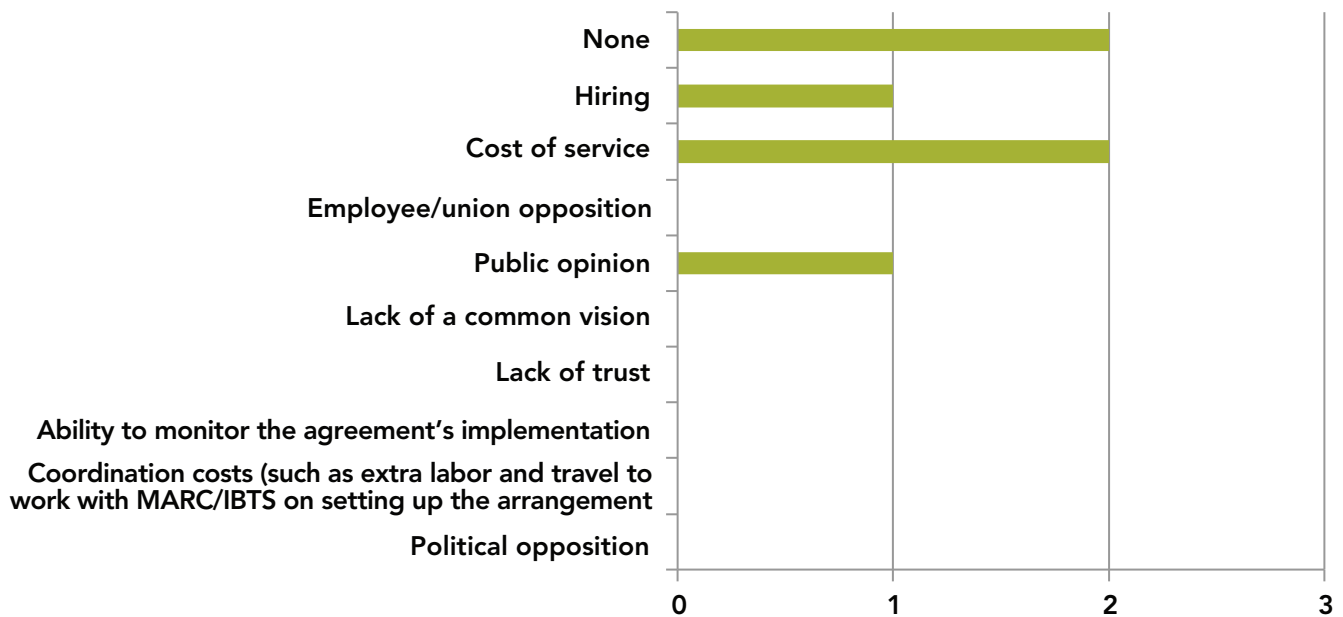
**Chart 1** Motivating Factor(s) for Jurisdictions and MARC to pursue a Shared Services Arrangement for Building Department Services (n=6)



**Chart 2** Deciding Factor(s) for Jurisdictions and MARC to pursue this type of Shared Services Arrangement for Building Department Services (n=6)



**Chart 3** Barriers to Implementation for Jurisdictions and MARC (n=6)

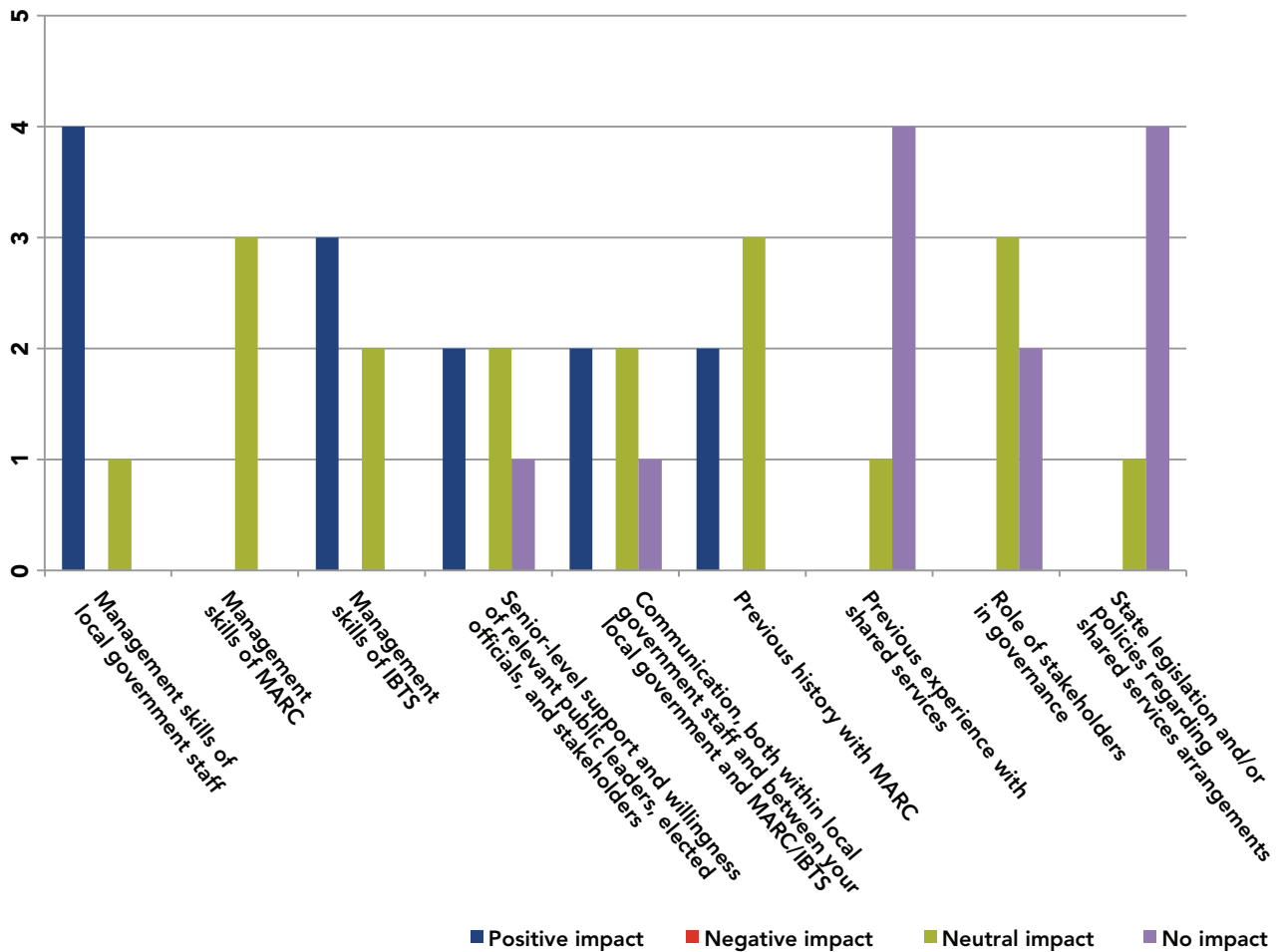


impact were the management skills of local government staff (80%) and of IBTS (60%). There were no factors with a negative impact recorded. See Chart 4 on the next page for a detailed breakdown of questionnaire responses.

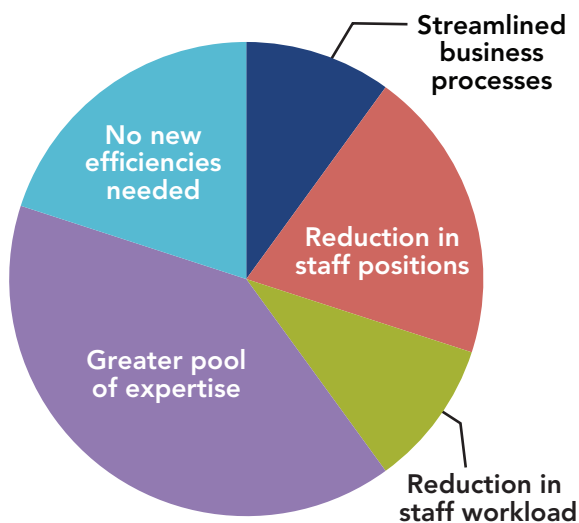
**Benefits:** The majority of jurisdictions reported that the key benefit from the service agreement program

was a greater pool of expertise (67%), followed by reduction in staff positions (33%). Thirty-three percent of interviewed jurisdictions also noted that no new efficiencies were realized as a result of the program, but those jurisdictions did identify some cost savings in the interview. One jurisdiction also noted streamlined business processes as a benefit, while another cited reduction in staff workload.

**Chart 4** Factors Impacting Planning, Negotiation and/or Implementation of the Service Agreement for Jurisdictions and MARC (n=6)



**Chart 5** Benefits and New Efficiencies Realized as a Result of the Service Agreement for Jurisdictions and MARC (n=6)



**Interviews:** The pre-interview questionnaire yielded useful information that was enabled the interviewer to further delve into key areas during the case study interviews, especially in the areas of benefits realized and factors impacting implementation.

### A Solution for Every Type of Jurisdiction

By conducting the case study interviews and questionnaire, it became apparent that the IBTS/MARC Service Agreement model was not the traditional “one size fits all” approach. Communities could use the agreement as a way to outsource their building department services entirely, pick and choose the services needed due to staffing or other gaps, and/or to supplement their current capacity in times of peak development work. On the following pages, community profiles of the jurisdictions selected for in-depth interviews are featured based on their size and the type of solution they have opted to select.

## Smaller jurisdictions

*Smaller jurisdictions (less than 1,000) tended to use nearly all of IBTS's available service options to maximize efficiencies and enable access to a pool of expertise and staff that would otherwise not be available to them.*

- Bates City, Missouri
- Wood Heights, Missouri

### Bates City, Missouri

Bates City, Missouri, is a small local government with a close-knit community and very few staff. With no full-time employees in the city's planning and zoning committee, options for obtaining the type of building code and department services expertise needed by the city were limited. Bates City has some history with vertical public-public service delivery partnerships with Lafayette County on mapping services, as well as some of the MARC-provided member services. The mayor of Bates City learned about the IBTS/MARC Master Services program through MARC's outreach and spearheaded the initiative within the city to enter into the agreement.

The main motivations for the jurisdiction pursuing the agreement were cost savings and increasing their pool of relevant expertise, as the labor intensity required to provide adequate building department services to citizens exceeded the city's capacity. The city signed the service agreement in

### BATES CITY, MO PROFILE

**Total population served (2013 Census):** 216

**Total land area served (in sq. mi.):** 1.07

**Median household income:** \$48,750

**Signed contract with IBTS/MARC:** September 2014

**Services opted into:** 9 of 10

- Building code department services
- Flood plain services
- Accessibility code services
- Fire code review & inspection services
- Storm water services
- GOVmotus™ permitting software
- Energy management & green building services
- Planning & zoning services
- Property maintenance services

**Website:** [www.batescity.net](http://www.batescity.net)

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“The advantages are obvious because we don't have staff to handle those situations— it's now being taken care of in a professional manner.”

—City Employee, Bates City, MO

September 2014 and implementation by IBTS began almost immediately.

### Implementation

Bates City selected all of the services available except for wastewater, which the city does not provide. The negotiated services agreement was presented to the Bates City Board and, with some discussion, was approved. With a relatively small group of stakeholders involved, Bates City did not encounter any communications or other challenges with the community or administration. The mayor directly oversees the program with assistance from the city clerk.

### Satisfaction

Bates City reported satisfaction with both the quality and timeliness of the agreement and cited that they would recommend this to another jurisdiction. The advantages for the city were streamlined business processes, reduction in staff positions and a greater pool of expertise. In addition, IBTS's fees were actually lower than the city's for the building department services, an unexpected perk for citizens.

In the interview, Bates City also expressed interest in engaging in more shared service delivery options in the future. The recommendation from City Clerk Carol Branson for other jurisdictions considering shared services was to “ask lots of questions.”

### Conclusion

Bates City has opted into all of the applicable services offered by IBTS and has maximized their pool of needed expertise at no additional cost to the city. The city also lowered its service fees to citizens while still recouping their full administrative costs. Through this agreement, Bates City has improved building department service delivery while also realizing cost savings.

## Wood Heights, Missouri

Wood Heights, Missouri, previously had been part of a vertical public-public partnership with Ray County to provide building department services. When the partnership encountered obstacles including limited resources to share between the two jurisdictions, the mayor of Wood Heights began to explore other options. With a small community, a full-time building inspector was not a cost-effective solution. MARC approached Wood Heights as an ideal community to benefit from the service agreement.

### Implementation

The mayor of Wood Heights worked with the city's Planning and Zoning Board to finalize the service agreement and opted into all services except wastewater, which the city does not provide. The city's motivations to enter into the agreement were primarily cost savings, increasing the pool of relevant expertise and risk of non-compliance with building codes and/or other state requirements or policies. The city signed the service agreement in November 2013 and implementation began within two months.

### Challenges

The mayor of Wood Heights oversees the majority of implementation for the service agreement. While implementation has gone smoothly from the adminis-

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“[Wood Heights] basically got a city inspector to inspect homes, dwellings, new building permits for nothing.... I don't think we could have had a better person... [than] Roger Kroh to work with us.”

—Robert Pettegrew  
Mayor, Wood Heights

tration's perspective, there have been some challenges with citizens on the fee structure and resistance to change. Unlike Bates City, the fees under the service agreement have been relatively high for Wood Heights citizens. To help Bates City residents transition into this new structure, the IBTS building inspector, Roger Kroh, took the necessary time to build relationships with residents and customers.

### Satisfaction

Wood Heights cited overall satisfaction with the service agreement and expressed that the city's expectations for the agreement had been met, especially with the performance of the current building inspector. Mayor Robert Pettegrew noted that he would recommend the agreement to other local governments, especially those who face similar challenges with enforcing building code compliance. The main advantages for Wood Heights were an increased pool of up-to-date technical expertise and reduction in staff needs and workload.

### Conclusion

Wood Heights, like Bates City, is using the service agreement to cover a wide array of services that the small jurisdiction would otherwise not be able to provide. However, the change from the municipality's fee structure to IBTS's fee structure has been an obstacle for some customers. A future consideration would be to look at readjusting the fee structure for smaller communities due to lower usage. Overall, Wood Heights was very satisfied with the agreement.

## WOOD HEIGHTS, MO PROFILE

**Total population served (2013 Census):** 702

**Total land area served (in sq. mi.):** 2.28

**Median household income:** \$56,875

**Signed contract with IBTS/MARC:** November 2013

**Services opted into:** 9 of 10

- Building code department services
- Flood plain services
- Accessibility code services
- Fire code review & inspection services
- Storm water services
- GOVmotus™ permitting software
- Energy management & green building services
- Planning & zoning services
- Property maintenance services

## Medium-sized jurisdictions

*Medium-sized jurisdictions (1,000–10,000 citizens) typically opted into several service options to fill gaps in staffing and in-house capabilities and also provide more expertise to reduce liability of non-compliance with building codes.*

- Edwardsville, Kansas

### Edwardsville, Kansas

Edwardsville, Kansas was facing a challenge—they needed to make some changes to meet the certification requirements for building inspectors, but the solution could not cost the city as much as a full-time, salaried inspector. The city considered a horizontal public-public partnership with another city, but the city’s previous experiences had shown that responsiveness and long-term costs often made such arrangements unsustainable. Thus, Edwardsville was interested in other options for building department services. The City Manager discovered IBTS’s shared services agreement model at an ICMA conference in 2012 and, seeing its potential benefits for the region, spearheaded bringing IBTS to MARC to present to a group of potential pilot cities.

While MARC was negotiating the larger, umbrella Master Services Agreement, Edwardsville signed an initial contract for an individual project building inspection. When the MARC/IBTS Services Agreement was finalized, Edwardsville transferred to an agreement under the larger Master Services Agreement. During this time, Edwardsville’s part-time building

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“To think we can just continually do what we did, even pre-2000s. I think the writing was on the wall that we have to do something different.... Cities, whether it’s through a shared agreement like this or through other means, are going to have to figure out how we provide services in a cooperative manner if we want to really provide the level of service that’s being asked of us.”

—Michael Webb  
City Manager, Edwardsville, KS

inspector retired but due to this agreement, there were no issues in transition and continued service delivery.

### Implementation

The city opted into most of the services provided by IBTS other than those not provided or not needed by the city, which were planning and zoning, property maintenance and wastewater review services. Their motivations for signing the agreement were higher quality and/or more efficient service delivery, increasing the pool of relevant expertise and risk of non-compliance with building codes. The deciding factor for using this arrangement was asset specificity and labor intensity. When signing both the initial contract and the later service agreement, the city administration worked with the Planning Commission, which had relationships with the building industry in the area. City Council was also consulted and, after adjusting and amending the originally proposed agreement to address some concerns about the fee and fee schedule, passed the agreement without significant obstacles. The City Manager and Administrative Assistant oversee the implementation of the agreement.

### Challenges

Although the internal administrative process was relatively smooth, working out initial “kinks” took approximately a year due to back-and-forth between IBTS and the city and onboarding initial IBTS personnel. After signing the agreement, implementation was

## EDWARDSVILLE, KS PROFILE

**Total population served (2013 Census):** 4,355

**Total land area served (in sq. mi.):** 9.04

**Median household income:** \$58,205

**Signed contract with IBTS/MARC:** Original contract with IBTS initiated 2012, transitioned under Master Services Agreement starting December 2013

**Services opted into:** 7 of 10

- Building code department services
- Flood plain services
- Accessibility code services
- Fire code review & inspection services
- Storm water services
- GOVmotus™ permitting software
- Energy management & green building services

**Website:** [www.edwardsvilleks.org](http://www.edwardsvilleks.org)

almost immediate and the transition to the umbrella service agreement was quick. Building on lessons learned during this process, IBTS focused on staffing up in the region and contracted a regional coordinator as well as hiring a building inspector who had been working in the region. The inspector having local context and understanding has been helpful, although smaller and medium-size jurisdictions can lose some of the personal contact with their customers while using this type of agreement.

Another challenge was the introduction of a new permitting software service, which took approximately a year to finish customizing and launch. The software, IBTS's GOVmotus™, can be a challenging adjustment in communities where the building community conducts their business in-person rather than electronically as it can create extra work for city staff. The IBTS Regional Coordinator, Curt Skoog, and the city have been working together to address this challenge.

For some customers, another obstacle has been the cost of the fees. However, a benefit of using this agreement is that the fees are set per service, whereas previously, the cost of the service was on a time and labor basis. This meant that sometimes customers received estimates that differed greatly from the final cost, which is no longer an issue.

### **Satisfaction**

Overall, Edwardsville was satisfied and reported that expectations have been met through implementation. The key advantage for the city was the increased pool of expertise. Given the highly technical nature of the building inspector position, the City Manager noted that the cost of not only hiring and maintaining a full-time inspector, but also the costs of providing the necessary continuing education and then providing incentives to retain that individual, were prohibitive. This agreement model puts the responsibility for having a qualified building inspector with up-to-date credentials and knowledge in the hands of IBTS. The fee structure also allows the city to cover their administrative costs.

The City Manager reported that he would recommend this agreement to other jurisdictions and also shared services overall, noting that shared service arrangements were the way of the future for cities. The city also spearheaded the Midwest Public Risk, an insurance pool for local governments in the region for property liability coverage.

### **Conclusion**

Edwardsville originally used the service agreement to cover an immediate need but then expanded to

cover all of the services that the city did not have in-house capacity to provide. As the first city to use the service agreement in the region, Edwardsville unsurprisingly encountered implementation challenges. However, through time and the concerted efforts of both the city and IBTS, these have been primarily addressed which will be lessons learned for implementation of future shared services arrangements. Overall, the city noted that it was satisfied with the agreement.

## **Larger jurisdictions**

*Larger jurisdictions (10,000+) tended to use one service to cover staffing gaps or supplement existing capacity in highly technical fields.*

- Clay County, Missouri
- Johnson County, Kansas

### **Clay County, Missouri**

Clay County was facing an impending staffing gap when their building inspector resigned. As a large jurisdiction, it was important to ensure that service quality and responsiveness did not suffer while searching for a replacement.

### **Implementation**

Clay County's building inspector was actually contracted by IBTS for the MARC/IBTS Master Service Agreement, so the logical next step was to use the service agreement as a stopgap measure to continue providing high-quality services during the time when the county was searching for the inspector's replacement. In addition, Clay County selected the IBTS model due to the labor intensity of their building department services and their ability to monitor the implementation of the agreement.

## **CLAY COUNTY, MO PROFILE**

**Total population served (2014 Census):** 233,682

**Total land area served (in sq. mi.):** 397

**Median household income:** \$60,936

**Signed contract with IBTS/MARC:** July 2014; ended December 2014 (Work Order)

**Services opted into:** 1 of 10

- Building code department services

**Website:** [www.claycountymo.gov](http://www.claycountymo.gov)

---

“[IBTS] takes care of it. You allow your builders to contact them directly for inspections or plan review, so it’s a real nice, clean relationship. It definitely helped us out.”

—Matthew Tapp, Director, Planning

Clay County worked with the county management administration and ultimately, the county commission to negotiate and approve the final agreement. The Planning and Zoning Director spearheaded and managed the implementation of the agreement. Implementation was quick after signing the agreement, and Clay County did not note any communication or other challenges within the administration or the public. Once a replacement building inspector was recruited, Clay County ended the service agreement as the services were no longer needed.

### Challenges

Clay County encountered a challenge over the amount of time between inspection and the inspection report, as well as the level of service quality, in transitioning from a full-time inspector to the service agreement. However, the issues were not significant enough to detract from overall satisfaction.

### Satisfaction

The Planning and Zoning Director remarked that, overall, he and the county were satisfied and their expectations had been met through the service agreement. He even commented that Clay County might look at the service agreement option again for any large, complicated projects that might occur. The primary advantage, other than covering a staffing gap, was that the responsibility for the entire service was transferred to IBTS, yielding time savings for staff. The director advised that jurisdictions considering shared services ensure that the services provided are still high quality.

### Conclusion

Clay County effectively used the service agreement to cover a temporary staffing need. While some challenges in implementation had to be overcome that are a lesson learned for IBTS in the future, this agreement provided a means to continue providing timely, high-quality services while recruitment for a replacement inspector was underway.

## Johnson County, Kansas

Johnson County, like many jurisdictions, had to cut staff in 2009 due to a downturn in the development market. However, there has been an increase in development demand in more recent years that current wastewater department staffing levels could not meet. Given the difficulty of recruiting qualified wastewater staff and the need to meet demands quickly, Johnson County began to look at other options to reduce staff workloads. The county learned of the service agreement through MARC and determined that the agreement was the right option to supplement their current staff.

### Implementation

The primary motivating factor for Johnson County to pursue a shared services arrangement was inadequate staff to meet development demand, and the deciding factor to enter into this arrangement with IBTS was asset specificity. As the only service the county needed was wastewater plan review, this was the only service it opted into. The wastewater department head worked with the County Manager to negotiate and approve the agreement. Due to internal delays, the contract took time to finalize but there were no significant delays in implementation.

The county also coordinated with a constituent city, Overland Park, which has a significant level of development. The county did not encounter any communication issues with customers. The General Manager of Johnson County Wastewater spearheaded the agreement and the New Development Engineering Manager oversees implementation.

### Challenges

The county encountered challenges in implementation due to a learning curve for IBTS to become familiar with their process and systems. The county noted that greater communication and more time spent upfront between IBTS and the jurisdiction on learning the local context and establishing expectations for deliverables,

## JOHNSON COUNTY, KS PROFILE

**Total population served (2014 Census):** 574,272

**Total land area served (in sq. mi.):** 473.38

**Median household income:** \$74,717

**Signed contract with IBTS/MARC:** December 2014

**Services opted into:** 1 of 10

- Wastewater plan review services

**Website:** <http://www.jocogov.org>



---

“They’ve been very good about wanting to know exactly how we do what we do and why... and not coming in and saying ‘you guys should do this.’ ... Them really wanting to develop the understanding of what we do and why has been really good.”

—Jennifer Harder  
New Development Engineering  
Manager, Johnson County

such as reporting, would have benefited the process, in addition to some delays from IBTS personnel changes. Currently, IBTS and the county are working together to find solutions for reducing project review times. Both IBTS and the county continue to learn from the experience.

### **Satisfaction**

Johnson County was satisfied with the agreement, especially IBTS personnel. The primary benefits for the county were human resources and recruitment cost savings, and they cited that they would recommend this agreement and shared services arrangement generally to other jurisdictions.

### **Conclusion**

Johnson County has leveraged the service agreement to supplement existing wastewater staff to meet increasing demand. Although the partnership took some time to fully develop and there are lessons learned in communications, the county has since been able to benefit from human resources and recruitment cost savings as a result of using the service agreement.

## Implementing Partner

### **Mid-America Regional Council (MARC)**

The Mid-America Regional Council (MARC) is a regional planning council and provides a number of shared services, including a cooperative purchasing program and a 9-1-1 system. One of the MARC

constituent jurisdictions—Edwardsville, Kansas—heard about IBTS’s shared building services model and brought it to MARC as a potential solution for several jurisdictions under MARC. This was MARC’s first time working with IBTS. The main motivation for MARC to enter into this agreement was strengthening collaborative intergovernmental relations.

### **Implementation**

After confirming initial interest, MARC, with assistance from Edwardsville, conducted outreach and convened a forum of local building officials for a presentation by IBTS of the service agreement. MARC and IBTS negotiated several iterations before the final Master Services Agreement was realized in September 2013. The first jurisdiction (Wood Heights, MO) signed their agreement in November 2013. MARC’s Program Director of Local Government Services oversees the agreement and is responsible for promotion and outreach around the agreement.

### **Challenges**

One challenge for MARC was initial public opinion among the regional building official community. However, IBTS took steps, such as hiring a regional coordinator, to mitigate the concern that this program would replace building department jobs. A lesson learned for future managers for similar shared services partnerships is to plan ahead for the amount of time it will take to gain a critical mass of jurisdictions to opt into the service agreement. In time, these issues were overcome, but more time spent personally engaging jurisdictions at the front end, discussing the benefits of this service, may make for a more efficient process in the end.

### **Satisfaction**

MARC cited that they were satisfied with the agreement, would recommend the IBTS Master Agreement to other councils of governments (COGs) and Regional Planning Organizations (RPOs) and that MARC will

## **MARC PROFILE**

**Total population served (2010 Census):** 2,086,771  
across 119 cities and 9 counties in Kansas & Missouri  
in the Kansas City Metropolitan Region

**Total land area served (in sq. mi.):** 4,358

**Signed contract with IBTS/MARC:** September 2013

**Website:** [www.marc.gov](http://www.marc.gov)

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“[The agreement] helps us enhance what we currently offer; we found that entering into an agreement with IBTS was a win-win for both IBTS and MARC.”

—Georgia Nesselrode  
Program Director of Local  
Government Services, MARC

continue to consider other shared service arrangements in the future depending on their needs. The key benefits were an increased pool of expertise and enhancing their current suite of services for members. MARC also shared their lessons learned through this process, which were to have patience with the consensus-building process and that achieving efficiency required exploring, finding commonalities and working together towards how best to implement a shared services arrangement. This type of agreement requires a lot of relationship- and trust-building for the implementer (IBTS) and implementing partner (MARC).

### Conclusion

MARC found the program to be very beneficial for all parties, especially member jurisdictions. Some key takeaways were taking steps early on to mitigate negative perceptions among the building community and personal engagement to sell the program for the COG from the outset. However, the program gained significant momentum recently and has been very successful.

## Key Takeaways

The case study and interview process found that, overall, jurisdictions and the implementing partner all found the IBTS/MARC Service Agreement satisfactory and most had realized some form of cost savings or other benefit. Other key points are highlighted below.

- **Motivation:** The key motivation for most jurisdictions to enter a shared services arrangement for building department services is an increased pool of relevant expertise. The majority of jurisdictions using the service agreement reported a greater pool of expertise as a benefit, indicating that the expectations for the agreement were met.
- **Service Options:** For all of the jurisdictions participating in the program, including those not interviewed, the most commonly contracted service option of the ten options was building department services (85%) and the least contracted was wastewater service plan review (8%).
- **Size Factor:**
  - Smaller jurisdictions (less than 1,000) seemed to use nearly all of IBTS’s available service options to maximize efficiencies and enable access to a pool of expertise and staff that would otherwise not be available to them.
  - Medium-sized jurisdictions (1,000-10,000 citizens) opted into several service options to fill gaps in staffing and in-house capabilities and also provide more expertise to reduce liability of non-compliance with building codes.
  - Larger jurisdictions (10,000+) typically used just one service to quickly cover staffing gaps in highly technical fields. This service can also be very useful to supplement current building department capacity in any size of jurisdiction, especially during peak development seasons.
- **Shared Services:** A key issue with horizontal or vertical public-public partnerships cited by jurisdictions was high demand from both municipalities at the same time for the same service, so each sought out another option that provided more consistent and timely responses. This indicates that horizontal or vertical public-public partnerships for building department and similar services may be less effective than services with more predictable schedules, such as waste collection, and public-nonprofit or public-private partnerships may better serve this highly technical need.
- **Implementing Partner Role:** MARC played a key role in the outreach and communication for the service agreement opportunity. Most jurisdictions learned about the MARC/IBTS Service Agreement opportunity through MARC directly.
- **Key Stakeholders:** Key stakeholders involved were primarily local government internal stakeholders such as city and county boards. No formal public outreach efforts were conducted in any of the jurisdictions interviewed, and, other than an initially poor public reaction from the regional building community at large, no significant communication challenges were mentioned. The primary staff person managing the agreement for the jurisdictions was the mayor or relevant department head.

- **Lessons Learned and Practices to Replicate:** The list below covers some key lessons learned and best practices from the program to replicate in future shared services arrangements.
  - *Communications* — To ensure smooth implementation, frequent communication at the outset of a shared services agreement negotiation that includes detailed expectations, particularly of deliverables, is critical. It is also key for the implementer to spend time at the beginning learning and understanding the local context, system and processes.
  - *Fee Model* — Discussions on fee model and potentially different schedules depending on development needs should take place during the conversation about the Master Services Agreement and communicated to stakeholder jurisdictions. Communications and outreach materials for potential jurisdictions to help explain the reason for the fee schedule by either the implementer or implementing partner are also recommended.
  - *Public relations with relevant stakeholders* — Early communication with the regional building community and solutions such as hiring regional liaisons should be initiated early in the process to mitigate potential fears of outsourcing jobs.
  - *Relationship-building* — Relationship- and trust-building on the part of the implementer, implementing partner and jurisdiction are key to ensuring the success of any shared services arrangement.
- *Plan ahead* — For implementing partners, it is important to know in advance that it will take time to gain a critical mass of jurisdictions to opt into the service agreement, but also to work at personal engagement in the early stages to market the agreement to jurisdictions.
- **Benefits:** The primary benefit to jurisdictions was a greater pool of technical expertise and also removing the burden of responsibility for service provision from the jurisdiction to the implementer. This yielded human resources cost savings in most jurisdictions. None of the jurisdictions or MARC recorded any performance measurements, but two noted that they would likely analyze performance measurement improvements or cost savings in the future.
- **Future Shared Services:** Only one of the five jurisdictions indicated that they did not envision the jurisdiction entering into another shared services arrangement in the future, and this was due to lack of information about what other shared services arrangements were available. This positive outlook by case study participants on shared services indicates that, overall, the IBTS Service Agreement with MARC has been very successful. As the first shared services arrangement that most of the jurisdictions had used that was not vertical or horizontal public-public, the Service Agreement also increased awareness in the region of the variety of shared services arrangements and the benefits of public-nonprofit partnerships.



**ICMA**

<b>City of Mission</b>	Item Number:	3.
<b>DISCUSSION ITEM SUMMARY</b>	Date:	December 29, 2016
<b>ADMINISTRATION</b>	From:	Laura Smith

Discussion items allow the committee the opportunity to freely discuss the issue at hand.

**RE:** Review of Traffic Signals at Various Locations

**DETAILS:** The City Council requested discussion on the installation of a traffic signal at the intersection of Woodson/Johnson Drive as well as the addition of a protected left turn arrow for southbound traffic on Broadmoor turning east on Martway.

The traffic signal at the intersection of Woodson/Johnson Drive was removed as a part of the Johnson Drive street rehabilitation project because it did not meet the warrants conducted by the traffic engineers. Because of the federal funds committed to the Johnson Drive project, returning the signal to that intersection when unwarranted would have cost the City approximately \$2 million in grant funds. A copy of the traffic study completed in connection with the Johnson Drive project is included in the packet.

Council has also expressed a desire over the last 18-24 months to install a protected left turn arrow for southbound traffic on Broadmoor at Martway. Again, the traffic engineering studies conducted as a part of the Mission Crossing development project did not support the modification of the signal in this manner. The traffic study from 2011 is included in the packet.

**CFAA IMPACTS/CONSIDERATIONS:** N/A

Related Statute/City Ordinance:	n/a
Line Item Code/Description:	n/a
Available Budget:	n/a

**MISSION CROSSING DEVELOPMENT**

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**61<sup>ST</sup> STREET & METCALF AVENUE**  
**MISSION, KANSAS**

**TRAFFIC IMPACT STUDY**

**FEBRUARY 2011**

**OA Project No. 010-2745**

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## 1.0 INTRODUCTION & OBJECTIVE

This study was completed for the City of Mission to document the traffic impacts of a proposed development at the northeast corner of 61st Street and Metcalf Avenue in Mission, Kansas. This study describes existing traffic and roadway conditions as well as the traffic impacts of the proposed development. Roadway modifications that may be needed to accommodate the increased traffic generated by this development are evaluated. Existing conditions are compared to the traffic conditions that would be anticipated with the completion of the proposed project.

The City of Mission developed a West Gateway Form Based Code for roadway templates and is overseeing design of Bus Improvements in this area. This study will consider both when analyzing and comparing existing and existing plus development scenarios and geometrics. Applicable portions of the code and Bus Improvement design can be found in the **Appendix** for reference. Specific areas of interest include parking, street and turn lane geometrics as well as possible future signalization.

Analysis was completed for bordering streets of the development as well as proposed drives connecting to surrounding streets. Analysis has also been completed for the AM and PM typical weekday peak hours. The report has been completed based on a meeting held with the City of Mission and Davidson Architects and Engineers, who was representing the developer (Lane4). The study is consistent with standard traffic engineering principles. The location of the proposed development is shown in **Figure 1**.

## 2.0 DESCRIPTION OF PROPOSED DEVELOPMENT

The most recent site plan of the proposed development consists of a fast food restaurant with drive-through window, an assisted living center and two specialty retail buildings. The proposed development site is bound by Martway Street on the north, 61<sup>st</sup> Street (and a Target retail store) to the south, Broadmoor Street to the east and Metcalf Avenue to the west. Access to the site is proposed via three access drives, one each to the north, east and south. See **Figure 2** for a site plan for the proposed development.

## 3.0 EXISTING ROADWAY CONDITIONS

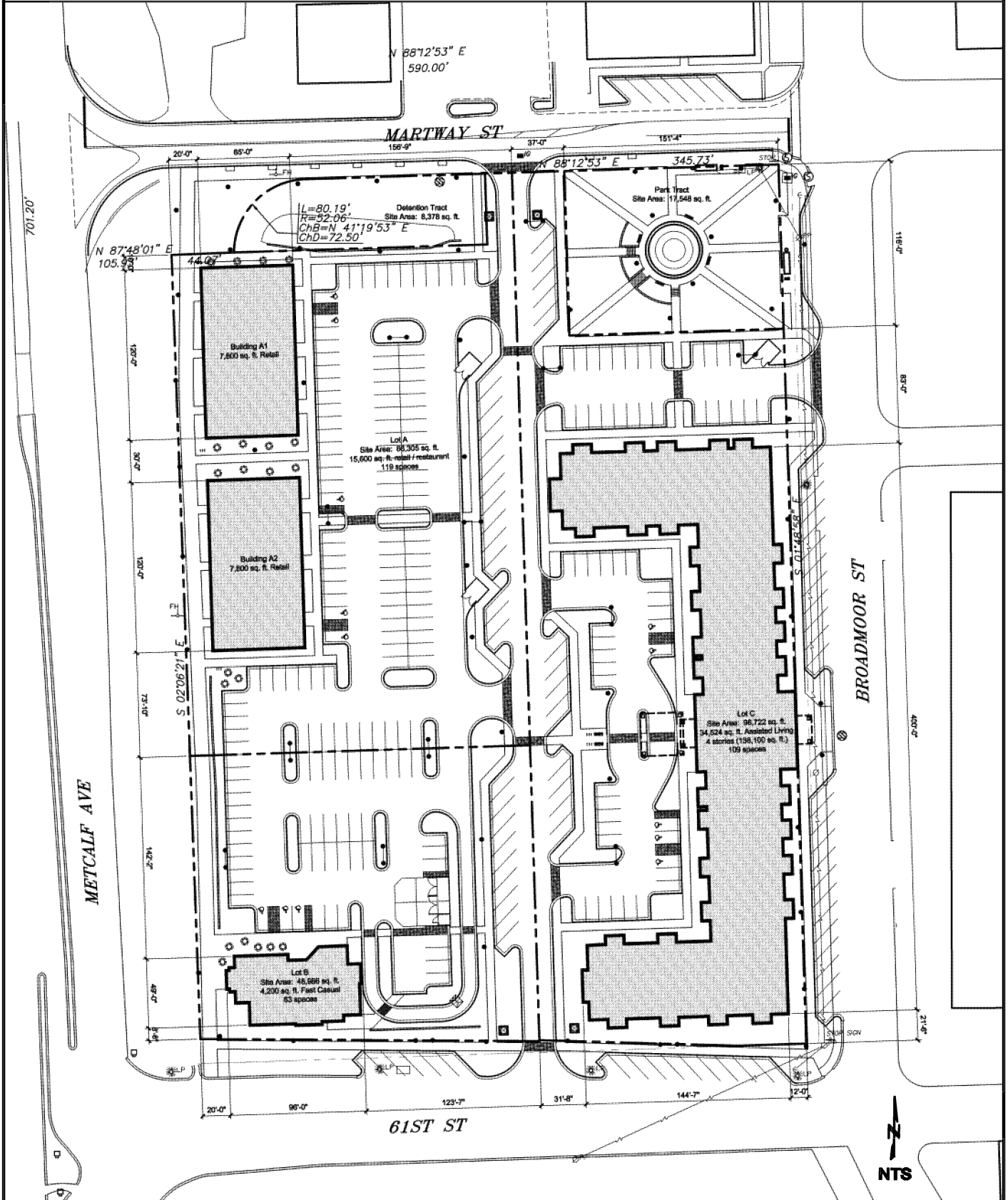
Metcalf Avenue is a divided north-south 4-lane arterial with a posted speed limit of 45 mph. It is classified as a major arterial with right-in/right-out access at Martway and limited access at 61<sup>st</sup> Street. Martway Street is an east-west, 2-lane roadway with a 30 mph speed limit. Broadmoor Street is a 3-lane north south collector with a two-way-left center turn lane. It has a posted speed limit of 30 mph. 61<sup>st</sup> Street is an east-west, two lane collector with a speed limit of 25 and serves as the primary entrance and exit for Target. Peak hour turning movement traffic counts were collected on Tuesday and Wednesday, January 4<sup>th</sup> and 5<sup>th</sup>, 2011. PM traffic volumes for the Broadmoor and Martway intersection were obtained from a memo completed for the City of Mission, Kansas by TranSystems in September 2009. These counts have been balanced for all scenarios in this report. The peak hour existing traffic volumes are illustrated in **Figure 3**.



Mission Crossing Development  
Mission, Kansas



Mission Crossing Development  
Mission, Kansas



Site Plan

FIGURE  
2

## 4.0 EXISTING TRAFFIC CONDITIONS

The existing traffic and roadway conditions in the vicinity of the development site provide a baseline in which to compare the impact of the proposed development on the surrounding roadway network. The existing intersection lane configurations and traffic control are illustrated in **Figure 4**.

### 4.1 Signal Warrant Analysis

The *Manual on Uniform Traffic Control Devices* (MUTCD – 2009 Edition) provides eight signal warrants for evaluation of signalization at intersections. Typically, traffic signalization is warranted based on a complete review of traffic information including volumes, pedestrians, accident experience, and traffic progression. The preliminary need for signalization at the study's unsignalized intersections was evaluated based on the Peak Hour Warrant (Warrant 3) contained in the MUTCD. When analyzing the need for a signal, the warrants separate intersections into three categories based on lane configurations of the respective major and minor roads:

- One Lane & One Lane
- Two or More Lanes & One Lane
- Two or More Lanes & Two Lanes

In the existing conditions scenario, the Martway & Broadmoor intersection was put in the “two or more lanes & two lanes”. The 61<sup>st</sup> & Broadmoor intersection was analyzed in the “two or more lanes & one lane” category. These warrant criteria were determined based on both lane configuration and traffic volume at the intersections.

Based on Warrant 3, the criteria for signalization are nearly met for the Broadmoor and Martway intersection during the PM peak hour. This intersection was analyzed as unsignalized for capacity analysis purposes, as that is the current form of traffic control. Signalization is not recommended at this intersection in existing conditions because the warrant is not met and overall operations seem to be acceptable.

Two other intersections with higher traffic volumes and occasional delay are the Martway & Metcalf and 61<sup>st</sup> & Broadmoor intersections in the PM peak hour. These intersections were evaluated as unsignalized in the study. The signal warrant is not met in these locations and due to the proximity of the 61<sup>st</sup> Street signal, it is recommended to leave them unsignalized. Signal warrant analysis sheets for AM and PM traffic are included in the **Appendix**.

### 4.2 Capacity and Parking Analysis

Signalized intersection capacity analyses were performed using SYNCHRO, version 7.0, based on the Highway Capacity Manual (HCM) delay methodology. Unsignalized capacity analyses were performed in accordance with Chapter 17 of the HCM using the Highway Capacity Software (HCS+), version 5.2. For simplicity, the amount of delay is equated to a grade or Level of Service (LOS) based on thresholds of driver acceptance. A letter grade between A and F is assigned, where LOS A represents the best

operation. **Table 1** represents the LOS associated with intersection control delay, in seconds per vehicle (sec/veh), for signalized and unsignalized intersections.

**Table 1: Intersection Level of Service Criteria**

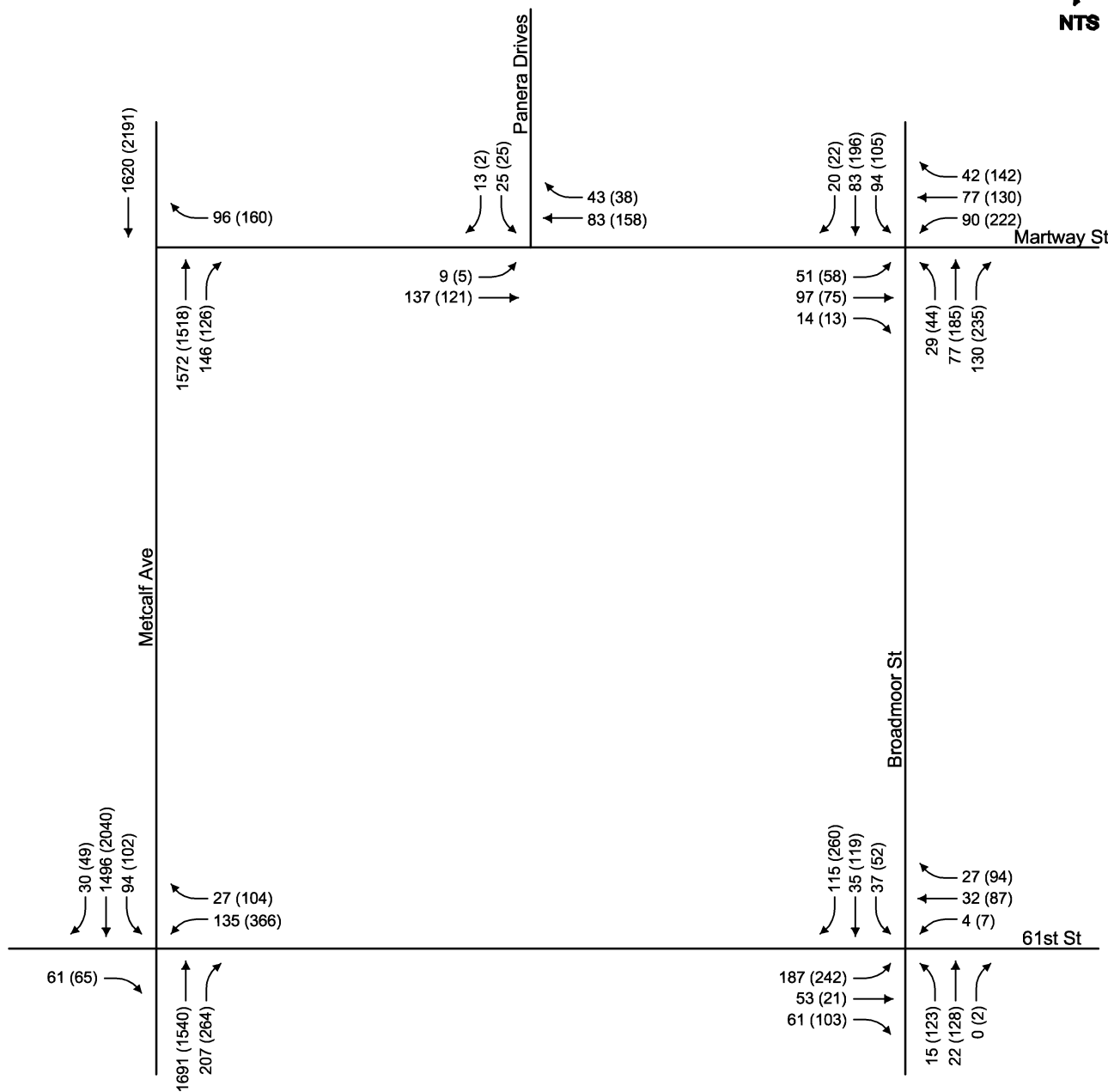
<b>Level-of-Service Criteria</b>		
<b>Level of Service (LOS)</b>	<b><u>Stop Control</u> Approach Delay sec/veh</b>	<b><u>Signal Control</u> Control Delay sec/veh</b>
A	≤ 10	≤ 10
B	>10 and ≤ 15	>10 and ≤ 20
C	>15 and ≤ 25	>20 and ≤ 35
D	>25 and ≤ 35	>35 and ≤ 55
E	>35 and ≤ 50	>55 and ≤ 80
F	>50	>80

All movements at intersections are currently operating at LOS C or better for AM and PM peak hour periods, with the exception of Metcalf & Martway and Martway & Broadmoor in the PM peak hour. It is not uncommon for unsignalized intersections to experience a longer delay during the peak periods.

Additionally, 61<sup>st</sup> and Metcalf may experience delay due to higher traffic volumes and Metcalf Avenue progression during the PM peak hour. A LOS E may be expected in the existing PM peak hour. The 61<sup>st</sup> and Metcalf signal has a long cycle length to service high volumes on Metcalf and this may contribute to extra delay and queuing at 61<sup>st</sup> Street.

Traffic entering and exiting the Target retail store at the 61<sup>st</sup> Street and Broadmoor Street intersection may also experience delay. **Figure 5** further details level of service in existing conditions for each movement. Capacity analysis sheets including delay times are included in the **Appendix**.

Mission Crossing Development  
Mission, Kansas



LEGEND

XX (XX) - AM PM Peak Hour Volumes

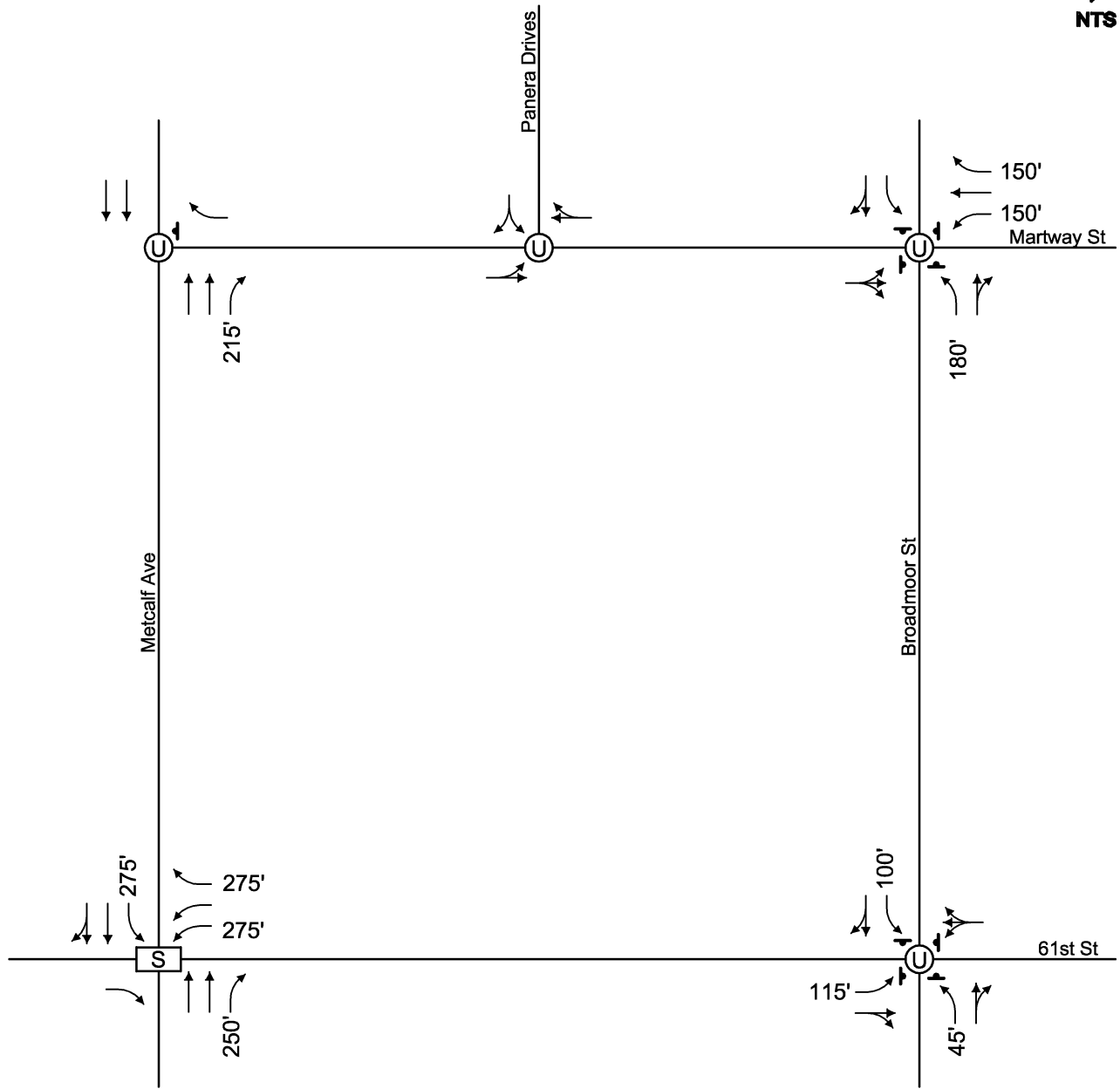


Existing Peak Hour Volumes

FIGURE

3

Mission Crossing Development  
Mission, Kansas



**LEGEND**

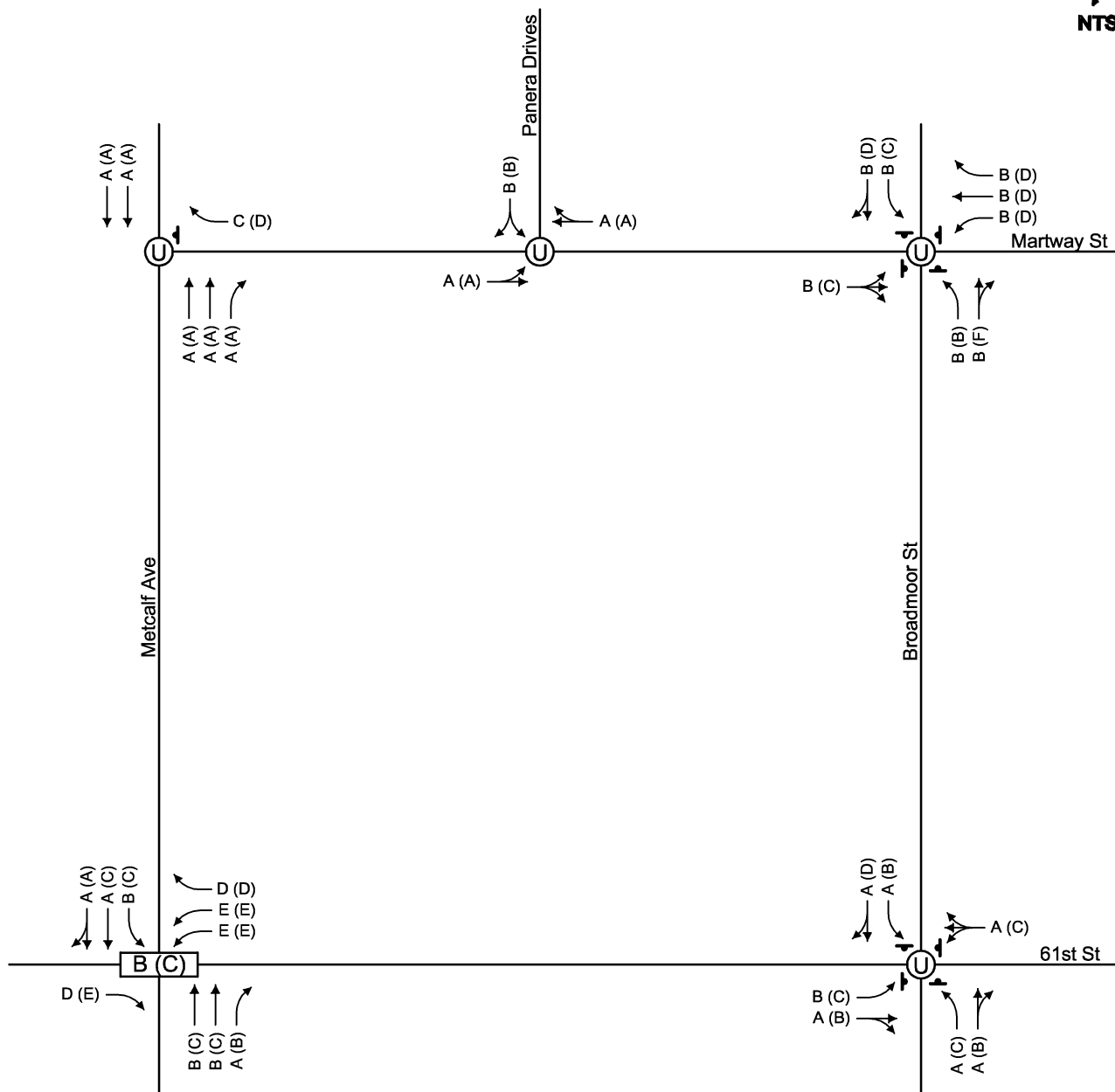
- ⊙ Unsignalized Intersection
- ⬇ Stop Sign
- ⊠ Signalized Intersection
- ↪ XX' Turn Bay Storage Length



Existing Lane Configurations & Traffic Control

FIGURE  
4

Mission Crossing Development  
Mission, Kansas



**LEGEND**

- Ⓢ Unsignalized Intersection
- Ⓢ Stop Sign
- X (X) AM (PM) Level of Service
- AM (PM) Intersection Level of Service



Existing Level of Service

FIGURE  
5

## 5.0 EXISTING + DEVELOPMENT CONDITIONS

The proposed development consists of a 4,200 square foot fast food restaurant with drive-through window, a 4-story-136,100 square foot assisted living center and two 7,800 square foot specialty retail center buildings. In this scenario the trips from the proposed development were added to the existing traffic volumes. This scenario represents the anticipated traffic volumes after demolition of the existing building on the property and completion of the proposed buildings. The existing buildings are currently vacant and are not generating any trips.

### 5.1 Trip Generation and Distribution

Trip generation characteristics expected for the site are shown in **Figure 6**. These characteristics are based on trip generation data included in the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (8<sup>th</sup> Edition). Specific land uses selected for trip generation purposes were obtained from the ITE manual. A land use of Fast Food Restaurant with Drive-Through Window, Assisted Living Center and Specialty Retail Center were selected for the respective buildings. See **Table 2** below for a summary of expected daily trips on an average weekday.

**Table 2 – Trip Generation (Mission Crossing)**

Daily Trip Generation - Mission Crossing Development									
ITE		Trip Gen.			Daily	Trip Distribution		Daily Trips	
Code/Page	Land Use	Size		Avg. Rate/Eq.	Trips	Enter	Exit	Enter	Exit
934/1821	Fast Food	4,200	SF	Average	2,084	50%	50%	1,042	1,042
814/1387	Specialty Retail	15,600	SF	Average	692	50%	50%	346	346
254/499	Asst Living	80	BEDS	Average	261	50%	50%	131	130
<b>Total</b>					<b>2,084</b>			<b>1,519</b>	<b>1,518</b>
AM Peak Hour Trip Generation									
ITE		Trip Gen.			AM Peak	Trip Distribution		AM Peak Hour Trips	
Code/Page	Land Use	Size		Avg. Rate/Eq.	Hour Trips	Enter	Exit	Enter	Exit
934/1822	Fast Food	4,200	SF	Average	208	51%	49%	106	102
814/1387*	Specialty Retail	15,600	SF	Average	69	50%	50%	35	34
254/509	Asst Living	80	BEDS	Average	12	65%	35%	8	4
<b>Total</b>					<b>289</b>			<b>149</b>	<b>140</b>
PM Peak Hour Trip Generation									
ITE		Trip Gen.			PM Peak	Trip Distribution		PM Peak Hour Trips	
Code/Page	Land Use	Size		Avg. Rate/Eq.	Hour Trips	Enter	Exit	Enter	Exit
934/1823	Fast Food	4,200	SF	Average	143	52%	48%	74	69
814/1388	Specialty Retail	15,600	SF	Average	59	44%	56%	26	33
254/510	Asst Living	80	BEDS	Average	18	44%	56%	8	10
<b>Total</b>					<b>220</b>			<b>108</b>	<b>112</b>

\*10% of Daily Trips used for AM Peak, No AM Peak rate provided in ITE Manual



## **5.2 Access**

Access to the new development is proposed via three (3) drives from all adjacent streets to the proposed development except Metcalf Avenue. All drives will be full access entrances. Site access to Martway Street is proposed to line up across from the existing development drive to the north. Both the Martway Street access and 61<sup>st</sup> Street access will be roughly 340' east of Metcalf's centerline. The proposed access drive to Broadmoor Street will be centered approximately 200' south of Martway Street's radius return (250' south of Martway's centerline).

Currently the development drives proposed single entering and exiting lanes. From analysis, a single exit lane at all three drives should suffice, as they are expected to experience minimal queuing during peak hours. See **Figures 2 and 8** for proposed improvements and existing plus development traffic control and lane configurations.

## **5.3 Sight Distance**

Sight distance was considered when determining driveway location to ensure that proposed streets/drives meet sight distance guidelines as outlined in the American Association of State Highway and Transportation Officials (AASHTO) "*A Policy on Geometric Design of Highways and Streets 2004*".

AASHTO provides guidance for intersection sight distance based on intersection control and turning type. AASHTO cases represent intersections with stop control on the minor road (Case B), which is the scenario for this proposed development. For access to Martway Street, sight distance measured over 200' in both the east and west direction. Sight distance at the proposed access to Broadmoor Street measured roughly 200' feet to the north and over 340' to the south. The proposed access at 61<sup>st</sup> Street measured over 235' in both directions. Sight distances at all existing and proposed drives were found to be at or above AASHTO's recommended distance of 200'.

## **5.4 Signal Warrant Analysis**

Section 4.1 discusses the signal warrant analysis methods used.

In the existing plus developed scenario, the Martway and Broadmoor Street intersection was again analyzed in the MUTCD's "two or more lanes & two lanes" category. With the anticipated increase in traffic volume from the development, the intersection is anticipated to meet signal warrant in the PM peak hour. For the purpose of this impact study, this intersection was analyzed with an actuated/uncoordinated signal, as well as four-way stop-controlled for the existing plus developed traffic condition. To further compare operation and traffic control, preliminary timing, phasing and splits were developed and used in Synchro models in the signalized condition. These values were determined based on existing plus developed peak hour traffic volumes and proposed future geometrics at the intersection.

The 61<sup>st</sup> and Broadmoor intersection nearly meets a signal warrant in the MUTCD "two or more lanes & one lane" category. However; based on an expected LOS C, lane configurations along these streets, and proximity to the existing signalized intersection

at 61<sup>st</sup> and Metcalf Avenue, it is not recommended to signalize this intersection. For the purpose of this study, the 61<sup>st</sup> Street and Broadmoor Street intersection was analyzed as unsignalized in all scenarios.

Warrant and intersection analysis sheets are included in the *Appendix*.

### **5.5 Capacity & Lane Configuration Analysis**

Capacity analysis was performed using the methodologies described in Section 4.2.

The signalized intersection of 61<sup>st</sup> Street and Metcalf Avenue is expected to operate at a LOS C or better during the AM peak hour and LOS D during the PM peak. Similar to current conditions, delay on 61<sup>st</sup> Street (particularly for westbound left turning vehicles) may increase during peak times due to Metcalf Avenue progression. A LOS E may occur for east and westbound motorists on 61<sup>st</sup> Street, similar to existing conditions. Signal timing was not optimized for this analysis; however, operations may improve after optimizing or adjusting timings for anticipated volume increases.

Based on meeting the warrant for signalization and degradation of expected traffic operations it is recommended to be signalized. Regardless, for this study as mentioned above, the Martway and Broadmoor intersection was analyzed as both signalized and four-way stop controlled.

When modeled as a stop controlled intersection, an overall level of service D may result in the PM peak hour, with northbound traffic on Broadmoor experiencing a LOS as low as F for northbound movements. Modeled as signalized with preliminary timings, an intersection LOS C was determined for the PM peak hour. Final signal timings for implementation were not completed; operations may improve even further from this study after final design. AM peak hour conditions may improve slightly but most improvement in operations would be during the PM peak hour. For a comparison between having this intersection signalized versus stop controlled in the PM peak hour, see **Table 3** below.

**Table 3 – Martway & Broadmoor LOS Comparison**

<i>PM Overall Intersection:</i>	<i>LOS</i>	<i>DELAY (sec)</i>
<i>4-Way Stop</i>	D	34.4
<i>Signalized</i>	C	23.6

All unsignalized intersections are expected to operate at a LOS C or better during peak hours, with the exception of westbound traffic at Martway and Metcalf during both peak hours. It is not uncommon for minor, stop-controlled side street approaches to operate at a lower level of service during peak traffic periods. Turning movements from the proposed development drives are expected to operate at a LOS C or better during all peak periods. Figure 9 further details level of service for each movement. Capacity analysis result sheets are included in the Appendix.

Future improvements to this area (separate from the development) include adding a left turn lane for eastbound traffic on Martway Street at Broadmoor. This was taken into account for the existing plus developed scenario analysis. Additionally, a short left turn lane for westbound traffic entering the development from Martway Street will be added. Martway Street will transition back to a two-lane roadway west of the proposed site entrance. An increase of Martway Street's westbound left-turning vehicles onto Broadmoor also warrants a small extension to that turn lane. (These improvements were accounted for in the existing plus developed scenario).

In addition to a section of Martway becoming a three lane template, it is recommended to have Broadmoor Street, between Martway and 61<sup>st</sup> Streets, remain a three-lane roadway template, with a majority of the center lane reserved for two-way left turning movements. This is contrary to the 2007 Form Based Code for the West Gateway Study Area, which proposes a two-lane roadway template with parking on either side; however, this alternative has positive aspects.

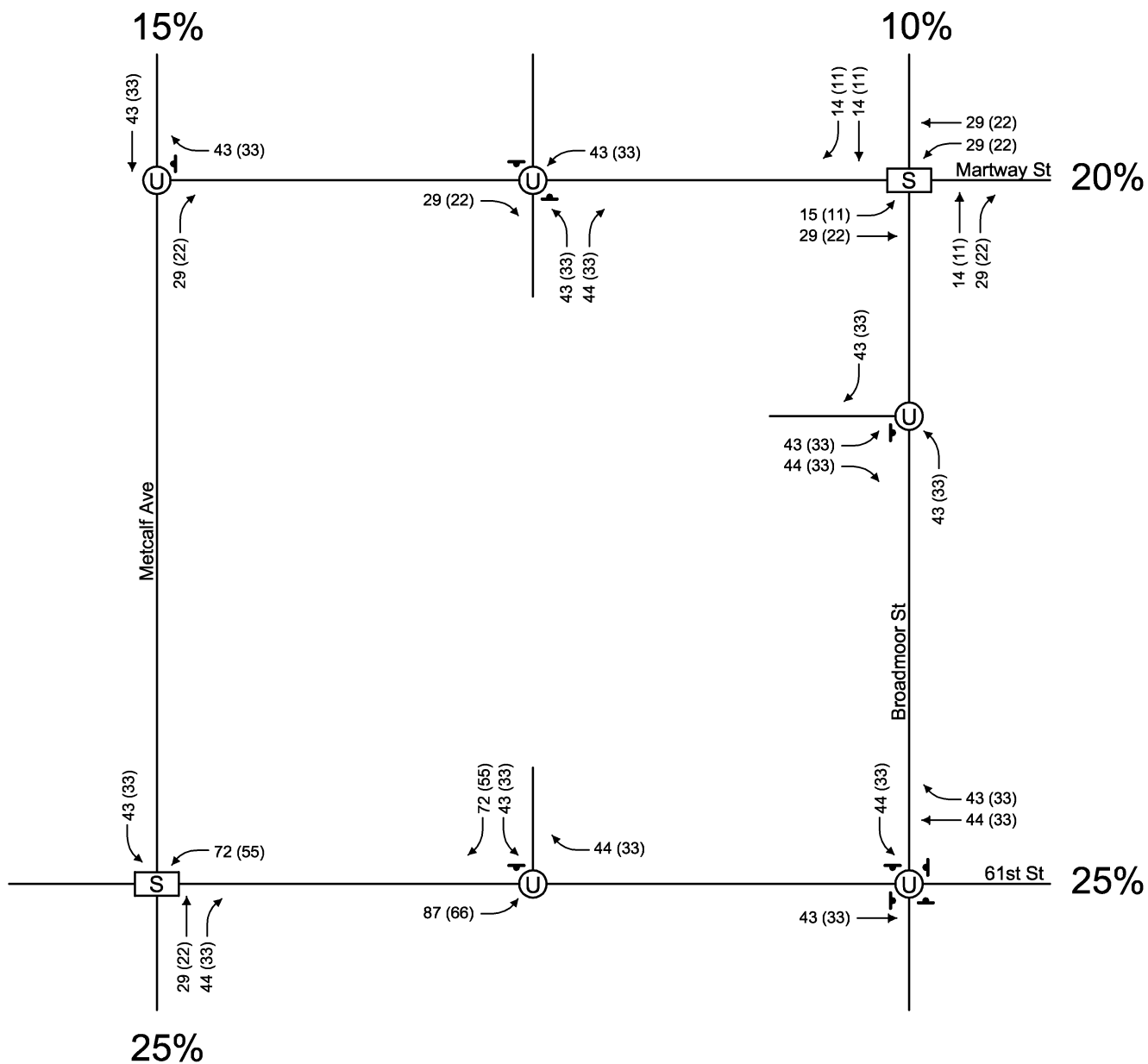
One advantage of utilizing a three-lane section on Broadmoor Street is that the street appears to be wide enough in present condition that a two-way left-turn lane could be striped. In this location specifically, another benefit of using a three-lane section with a two-way left turn lane is that left turning vehicles can be removed from through traffic, reducing the potential for rear-end accidents, queuing and delay. This is of particular concern not only for traffic entering the proposed development adjacent to the west side of Broadmoor Street, but the existing post office to the east. In addition to a two-way left turn lane, angled parking can be located on the west side of Broadmoor Street. This parking (proposed by others) and recommended turn lane lengths, is depicted in **Figures 2 and 8** respectively.

## **5.6 Parking Analysis**

Based on **Figure 2**, both onsite and angled street parking are proposed for this development. It is recommended that parking on the north side of 61<sup>st</sup> Street near Broadmoor, as well as angled parking on Broadmoor Street north of 61<sup>st</sup> Street, be at least 60' from the intersection radius return. With parking set back from the intersection, this will allow southbound thru and right turning vehicles to develop a three-vehicle queue without interfering with vehicles backing out of parking stalls.

Similar to parking on Broadmoor, setting angled parking on 61<sup>st</sup> Street back 60' from the intersection radius return removes parking from the intersection's area of influence. The area of influence for an intersection includes locations where accidents have higher potential to occur due to a variety of traffic movements. If traffic volumes and LOS degrade further than expected after development, a short right turn lane for southbound traffic on Broadmoor may help improve operations.

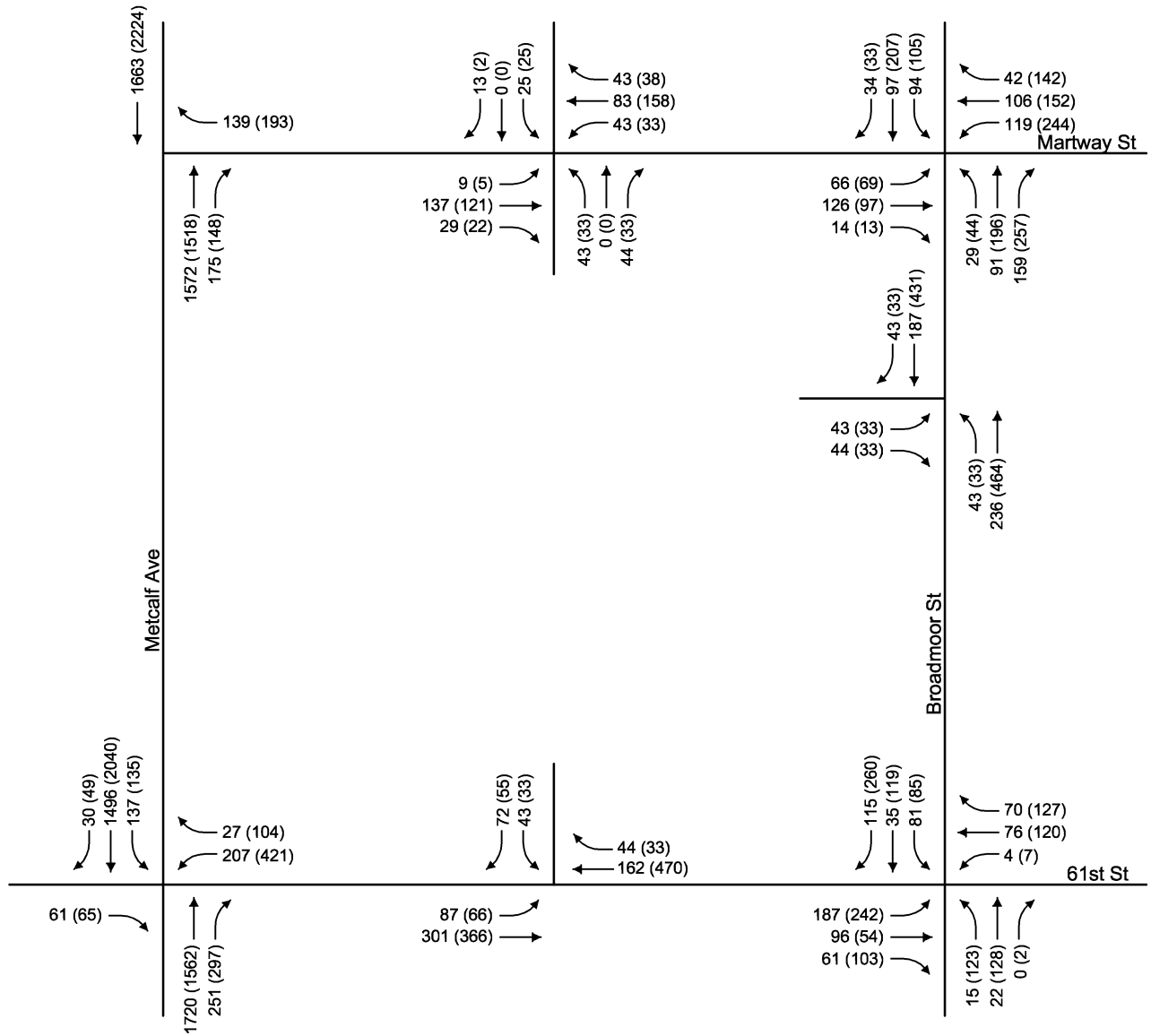
Mission Crossing Development  
Mission, Kansas



**LEGEND**

- ⊙ Unsignalized Intersection
- ⬇ Stop Sign
- ⊠ Signalized Intersection
- 87 (66) → Trip Distribution Movements

Mission Crossing Development  
Mission, Kansas



LEGEND

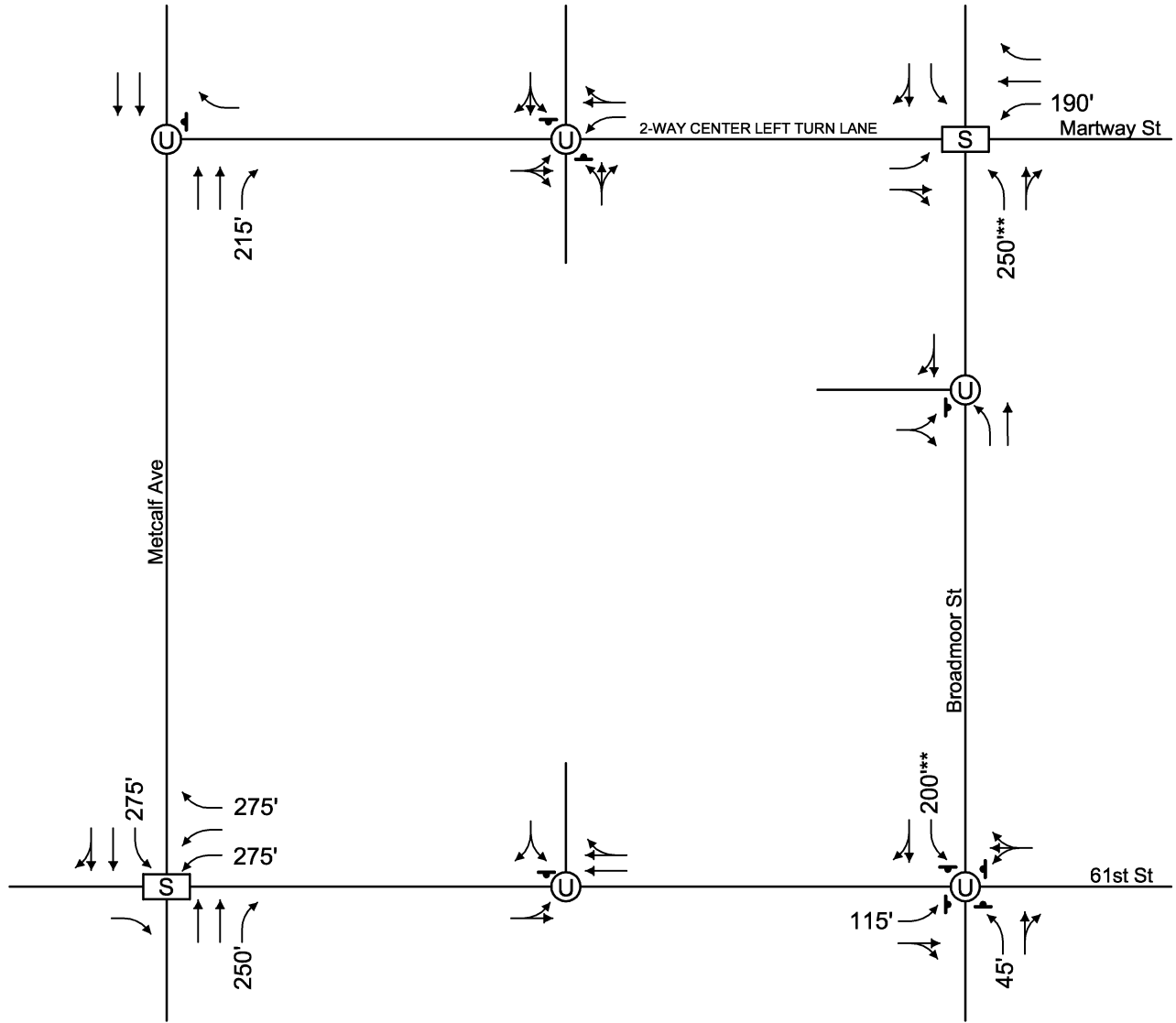
XX (XX) - AM (PM) Peak Hour Volumes



Existing Plus Development  
Peak Hour Volumes

FIGURE  
7

Mission Crossing Development  
Mission, Kansas



\*Select turn lanes may already be at maximum length in current conditions.

\*\*Northbound left turn lane should be 250'. Southbound left turn lane should be 200' to accommodate post office traffic. The distance between NB and SB turn lanes should be reserved for two-way left turning movements.

**LEGEND**

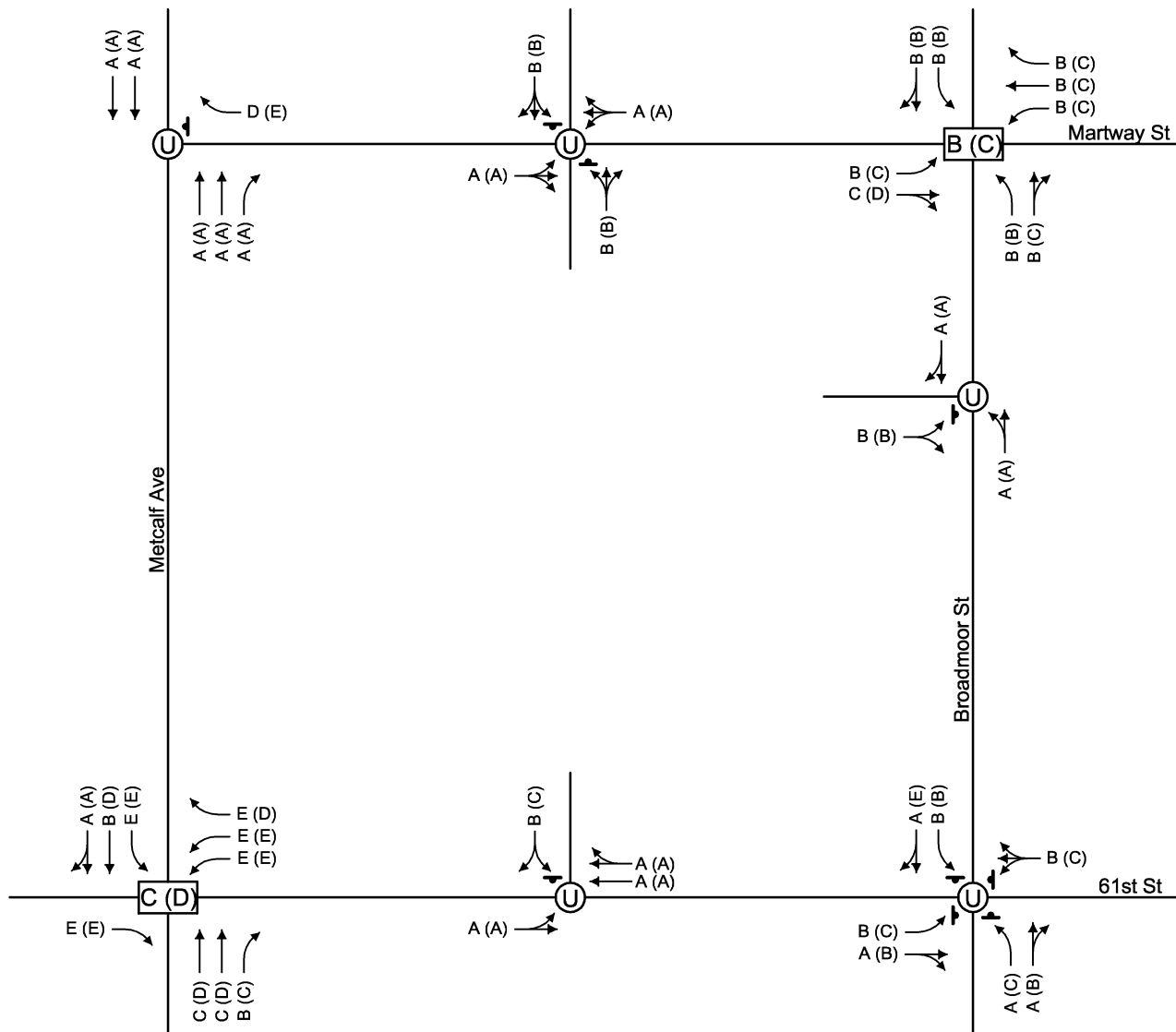
- ⊙ Unsignalized Intersection
- ⊥ Stop Sign
- ⊠ Signalized Intersection
- ↪ XX' Recommended Turn Bay Storage Length\*



Existing Plus Development  
Lane Configurations & Traffic Control

FIGURE  
8

Mission Crossing Development  
Mission, Kansas



**LEGEND**

- ⊙ Unsignalized Intersection
- ↓ Stop Sign
- ⊠ Signalized Intersection
- X (X) AM (PM) Level of Service

## 6.0 RECOMMENDATIONS & CONCLUSIONS

Based on the City of Mission's requirements, field review, operations analysis and proposed area improvements, the following conclusions and recommendations are made regarding the proposed development:

### Existing Condition

- The Martway and Broadmoor intersection signal analysis shows signalization is nearly warranted in the PM peak hour for the existing conditions scenario. However, installation of a signal is not recommended because overall operations are acceptable and reconstruction of the intersection is currently in the planning and design phase.
- Broadmoor Street should remain a three-lane roadway template with the center lane used for two-way left turns. This will allow better access to the post office on the east side of Broadmoor Street and may reduce potential for rear-end collisions.
- Levels of Service for existing conditions are acceptable and no significant changes are recommended at this time.

### Existing + Developed Condition

- All unsignalized intersections are expected to operate at an LOS of C or better during AM and PM peak hours except the Martway and Metcalf intersection.
- The Martway and Broadmoor intersection was analyzed as both signalized and four-way stop controlled. In signalized and stop-controlled scenarios, LOS C and D can be expected in the PM peak respectively. See **Table 3** for a comparison.
- PM peak hour traffic volumes at the Martway and Broadmoor intersection appear to warrant signalization by MUTCD criteria. Degradation of operations in the PM peak hour, in conjunction with previously mentioned area improvements, warrant completion of signalization.
- The westbound left turn lane at Martway and Broadmoor should be extended to 190' to accommodate anticipated increased traffic volumes.
- The 61<sup>st</sup> & Metcalf intersection is expected to operate at a Level of Service C or better during the AM and PM peak hours with a LOS E for 61<sup>st</sup> Street traffic.
- Broadmoor Street, from 61<sup>st</sup> Street to Martway Street, should be a three-lane roadway with the center lane utilized for two-way left turning vehicles.
- Broadmoor Street, from 61<sup>st</sup> to Martway, should remain a three-lane roadway template with the center lane used for two-way left turns in the existing plus development scenario. This will allow better access to the post office on the east side of Broadmoor Street and may reduce potential for rear-end collisions.
- Angled parking along the north side of 61<sup>st</sup> Street and west side of Broadmoor Street should be set 60 feet from the 61<sup>st</sup> & Broadmoor intersection radius returns to avoid being in the intersection's area of influence. A short southbound right turn lane may help intersection operations should they worsen significantly after development. See Figure 2 for this proposed parking.



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## APPENDIX:

- Supplemental Materials
  - Bus Rapid Transit Schematic Designs (2)
  - 2007 Form Based Code (Broadmoor St.)
  - Data Collection
- Existing Conditions
  - Signal Warrants
  - Capacity Analyses
- Existing + Developed Conditions
  - Signal Warrants
  - Capacity Analyses

# MEMO

	Overnight
	Regular Mail
	Hand Delivery
<b>X</b>	Other: e-mail

**TO:** City of Mission  
**FROM:** Todd Fredericksen, PE, PTOE  
**RE:** Johnson Drive and Woodson Road Signal Warrant Analysis  
**DATE:** July 21, 2011  
**PROJECT #:** 010-2745  
**PHASE:** 150

This memo addresses a request from the City of Mission, Kansas for Olsson Associates to review existing traffic volumes at the intersection of Johnson Drive and Woodson Road to determine if the intersection still meets warrants for signalization.

### Field Review and Data Collection

Johnson Drive is a four-lane undivided roadway in the section between Lamar Avenue and Nall Avenue with a posted speed limit of 30 mph. Woodson Road is a two-lane local roadway with a posted speed limit of 30 mph. The intersection is currently signalized with pedestrian crosswalks.

Machine 24-hour traffic counts were collected during a typical weekday beginning at 12:00 PM on Wednesday, June 22<sup>nd</sup>, 2011 and ending at 11:00 AM on Friday, June 24<sup>th</sup>, 2011. In addition to machine 24-hour counts, AM and PM peak hour manual turning movement counts were completed on Wednesday, June 22<sup>nd</sup>, 2011 from 6:00 AM to 8:00 AM and 4:00 PM to 6:00 PM. The weekday peak hour counts provide a basis for evaluating the traffic operations of the intersection during typical conditions. Based on data collected, the average daily traffic (ADT) is approximately 14,427 vehicles/day along Johnson Drive and 1,400 vehicles/day along Woodson Road.

### Traffic Signal Warrants

A traffic signal may be justified if traffic conditions meet any of eight signal warrants described in the 2009 Manual on Uniform Traffic Control Devices (MUTCD). The MUTCD provides criteria for conducting an engineering study to determine whether a traffic signal is appropriate at any particular intersection. Those criteria are embodied in the eight traffic signal warrants as follows:

*Warrant 1, Eight-Hour Vehicular Volume*

The Minimum Vehicular Volume, Condition A, is intended for application where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal. The Interruption of Continuous Traffic, Condition B, is intended for application where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street. If neither Condition A nor B is met, Warrant 1 also allows for re-evaluation of the warrant using 80% of the traffic volumes when the posted speed limit or 85<sup>th</sup>-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the build-up area of an isolated community having a population of less than 10,000. To meet Warrant 1 requires that at a minimum, one of either condition A, B, or A and B must be met.

*Warrant 2, Four-Hour Vehicular Volume*

The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

*Warrant 3, Peak Hour*

The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

*Warrant 4, Pedestrian Volume*

The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

*Warrant 5, School Crossing*

The School Crossing signal warrant is intended for application where the fact that school children cross the major street is the principal reason to consider installing a traffic control signal.

*Warrant 6, Coordinated Signal System*

Progressive movement in a coordinated signal system sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles.

*Warrant 7, Crash Experience*

The Crash Experience signal warrant conditions are intended for application where the severity and frequency of crashes are the principal reason to consider installing a traffic control signal.

*Warrant 8, Roadway Network*

Installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a roadway network.

Based on data collected, Warrants 1, 2, 3, and 4 were evaluated for this study. The results of the warrant analysis using the 8 highest hours of traffic volumes, 4 highest hours of traffic volumes and peak hour of traffic volumes during a 24-hour period indicate that the current traffic volumes at Johnson Drive and Woodson Road **do not** warrant a signal. Additionally data collected for pedestrian volumes crossing the main street in the AM and PM peak hour periods did not total higher than the requirement of 133 pedestrians presented in Warrant 4, which is the lowest threshold pedestrian volume necessary to warrant a signal. See the attached **Appendix** for warrant analysis results.

Traffic Control / Operational Analysis

The results of the warrant analysis indicate that the existing traffic volumes during a typical 24-hour period at Johnson Drive and Woodson Road no longer meet the warrants for signalization. Before recommending removal of the signal the traffic operations at the intersection should be evaluated based on the proposed traffic control methods. As an unsignalized intersection, based on the traffic volumes, it is recommended for the intersection to be two-way stop controlled with stop signs on Woodson Road.

Analysis of the current signalized operation was compared to the recommended two-way stop control for both the AM and PM peak hours using turning movement count information completed Wednesday, June 22<sup>nd</sup>, 2011. For simplicity, the amount of delay is equated to a grade or Level of Service (LOS) based on thresholds of driver acceptance. A letter grade between A and F is assigned, where LOS A represents the best operation. **Table 1** represents the LOS associated with intersection control delay, in seconds per vehicle (sec/veh), for signalized and unsignalized intersections.

**Table 1: Intersection Level of Service Summary**

Level-of-Service Criteria		
Level of Service (LOS)	<u>Stop Control</u> Approach Delay sec/veh	<u>Signal Control</u> Control Delay sec/veh
A	≤ 10	≤ 10
B	>10 and ≤ 15	>10 and ≤ 20
C	>15 and ≤ 25	>20 and ≤ 35
D	>25 and ≤ 35	>35 and ≤ 55
E	>35 and ≤ 50	>55 and ≤ 80
F	>50	>80

Level of Service (LOS), delay, and queue length were evaluated for each intersection. Existing LOS for the intersection of Johnson Drive and Woodson Road is based on signal timings of nearby intersections and reasonable cycle lengths and splits.

**Table 2** details level of service for as a signalized and unsignalized intersection.

**Table 2: Existing Signalized Intersection Analysis**

Intersection		AM Peak Hour	PM Peak Hour
Johnson Drive and Woodson Road Signalized	Eastbound	A (5.9)	A (8.1)
	Westbound	A (5.4)	A (9.1)
	Northbound	C (33.3)	C (29.4)
	Southbound	C (33.2)	C (29.6)
Johnson Drive and Woodson Road Unsignalized	Eastbound	A (8.2)	A (9.6)
	Westbound	A (8.8)	A (9.0)
	Northbound	C (22.0)	F (56.9)
	Southbound	C (18.3)	F (58.5)

\*LOS (Delay in Seconds)

The eastbound and westbound movements currently operate at a LOS 'A' during the AM and PM peak hours. The northbound and southbound movements operate at LOS 'C' during both peak periods. Configuring the intersection as two-way stop controlled, the eastbound and westbound main line traffic would be expected to operate at a LOS 'A' in the AM and PM peak hours. For the AM peak hour, LOS for northbound and southbound traffic stays constant at a LOS 'C'. During the PM peak hour, LOS for northbound and southbound traffic and is expected to operate at LOS 'F'. Queuing during the PM peak hour period is estimated at 5 cars in the southbound direction, while delay could increase from 33 to 59 seconds. This decrease in the LOS is not uncommon for side street stop controlled intersections along major roadways such as Johnson Drive during the peak hour periods. Additionally queuing is expected to be minimal.

**Conclusion & Recommendations**

The results of the analysis indicate that the existing traffic and pedestrian volumes during a typical 24-hour period at Johnson Drive and Woodson Road no longer meet the warrants for signalization. Additionally, operations as an unsignalized intersection are expected to be adequate.

It is recommended that the signalized intersection of Johnson Drive and Woodson Road be removed and replaced by a two-way stop controlled intersection with stop signs on the north/south street of Woodson Road. Prior to final design, sight distance must be checked for adequacy. Removal of the traffic signal is recommended to be completed by the steps outlined in the MUTCD and listed below.

Additionally it is recommended that crosswalk markings should be installed to match unsignalized intersections along Johnson Drive. This includes the installation of fluorescent yellow W11-2 crosswalk signs along Johnson Drive and hatched crosswalks across Johnson Drive with R1-6a stop for pedestrians sign in center of roadway on Johnson Drive. Main line stop bars are also recommended to be added on Johnson Drive to match adjacent unsignalized intersections.

The MUTCD provides criteria for the removal of a traffic control signal as follows:

*Removal of Traffic Control Signals*

If an engineering study indicates that the traffic control signal is no longer justified, and a decision is made to remove the signal, removal should be accomplished using the following steps:

- A. Determine the appropriate traffic control to be used after removal of the signal.
- B. Remove any sight-distance restrictions as necessary
- C. Inform the public of the removal study
- D. Flash or cover the signal heads for a minimum of 90 days, and install the appropriate stop control or other traffic control devices.
- E. Remove the signal if the engineering data collected during the removal study period confirms that the signal is no longer needed.

# TRAFFIC SIGNAL WARRANT ANALYSIS - VOLUME WARRANTS

## BUREAU OF TRAFFIC ENGINEERING

Major Street : Johnson Drive  
 Minor Street : Woodson Road  
 City : Overland Park, KS  
 County : Johnson

Time Count Began : 12:00 PM  
 Date : June 23, 2011  
 Day of Week of Count : Thursday

is the intersection in a community with a population less than 10,000 or are speeds greater than 40 mph? **no**  
 Minor Street

Adjustment factor for day of week and month of year of count :  
 Major Street 1  
 Minor Street 1

Number of Lanes : 2

Time	Major Street Approach Volumes		Total	Minor Street Approach Volumes	
	EAST	WEST		NORTH	SOUTH
12:00 m	26	28	54	1	1
1:00	13	15	28	1	1
2:00	15	8	23	0	1
3:00 am	5	5	10	0	1
4:00	13	8	21	1	1
5:00	25	33	58	7	8
6:00 am	215	141	356	14	9
7:00	399	298	697	41	45
8:00	488	328	796	58	62
9:00 am	390	284	674	45	32
10:00	417	372	789	45	32
11:00	482	574	1056	58	51
12:00 n	685	632	1317	51	60
1:00	524	530	1054	42	43
2:00	457	450	907	39	39
3:00 pm	426	486	912	56	45
4:00	540	601	1141	49	65
5:00	600	719	1319	51	76
6:00 pm	498	506	1004	43	48
7:00	397	384	781	37	25
8:00	315	287	602	17	23
9:00 pm	239	221	460	29	20
10:00	120	125	245	9	5
11:00	57	66	123	5	8
24HR Total	7326	7101	699	699	701

Note: = Total of both approaches.  
 \* The HIGHEST approach only.

**NOTE:** Basic minimum hourly volumes (unreduced)  
**NOTE:** No adjustment made

Warrant #1 - Condition A	Warrant #1 - Condition B	Warrant #1 - Combination of Conditions A & B	Warrant #2	Warrant #3
Percent of Warrant Volumes Met Major 9 Minor 1	Percent of Warrant Volumes Met Major 6 Minor 1	For this warrant vehicle volume requirements for conditions A and B are reduced to <b>80% Factor</b>  <b>NOTE:</b> Conditions A and B <b>SHALL BOTH</b> meet a minimum of 8 hours. However, the 8 hours satisfying condition A <b>NEED NOT</b> be the same as the 8 hours satisfying condition B.	Warrant Volume 0 Percent of Warrant 0	Warrant Volume 0 Percent of Warrant 0
9 5 4 2 4 10 59 116 133 112 132 176 220 176 151 152 190 220 167 130 100 77 41 21	1 3 3 1 2 6 40 77 88 75 88 117 146 117 101 127 147 112 87 67 51 27 14	19 60 83 60 60 77 80 57 52 75 87 101 80 57 26 37 43 51 32 25 15 19 6 5	0 0 0 0 0 0 240 200 250 200 130 80 170 170 110 80 140 210 280 350 0	0 0 0 0 0 0 400 360 420 360 250 180 310 250 230 180 270 360 460 0 0
Warranting Volumes 600	Warranting Volumes 900	Condition A Hours Met 0 Warrant Met No	Warranting Volumes From MUTCD Fig. 4C-1 Hours Met 0 Warrant Met No	Warranting Volumes From MUTCD Fig. 4C-3 Hours Met 0 Warrant Met No

Minor Street warrant exists

**Machine 24-Hour Counts**

<u>Date</u>	<u>Time Range</u>	<u>Volume</u>			
		<u>Southbound</u>	<u>Westbound</u>	<u>Northbound</u>	<u>Eastbound</u>
6/22/2011	12:00 PM	82	662	63	584
6/22/2011	01:00 PM	58	557	40	520
6/22/2011	02:00 PM	51	454	34	473
6/22/2011	03:00 PM	46	470	44	514
6/22/2011	04:00 PM	33	528	64	596
6/22/2011	05:00 PM	57	572	74	664
6/22/2011	06:00 PM	36	504	47	472
6/22/2011	07:00 PM	27	371	18	337
6/22/2011	08:00 PM	24	312	16	305
6/22/2011	09:00 PM	21	207	11	194
6/22/2011	10:00 PM	15	102	5	128
6/22/2011	11:00 PM	11	64	8	58
6/23/2011	12:00 AM	1	26	1	28
6/23/2011	01:00 AM	1	13	1	15
6/23/2011	02:00 AM	0	15	1	8
6/23/2011	03:00 AM	0	5	1	5
6/23/2011	04:00 AM	1	13	1	8
6/23/2011	05:00 AM	7	25	8	33
6/23/2011	06:00 AM	14	215	9	141
6/23/2011	07:00 AM	41	399	45	298
6/23/2011	08:00 AM	58	468	62	328
6/23/2011	09:00 AM	45	390	32	284
6/23/2011	10:00 AM	45	417	32	372
6/23/2011	11:00 AM	58	482	51	574
6/23/2011	12:00 PM	51	685	60	632
6/23/2011	01:00 PM	42	524	43	530
6/23/2011	02:00 PM	39	457	39	450
6/23/2011	03:00 PM	56	426	45	486
6/23/2011	04:00 PM	49	540	65	601
6/23/2011	05:00 PM	51	600	76	719
6/23/2011	06:00 PM	43	498	48	506
6/23/2011	07:00 PM	37	397	25	384
6/23/2011	08:00 PM	17	315	23	287
6/23/2011	09:00 PM	29	239	20	221
6/23/2011	10:00 PM	9	120	5	125
6/23/2011	11:00 PM	5	57	8	66
6/24/2011	12:00 AM	3	23	0	22
6/24/2011	01:00 AM	3	17	1	20
6/24/2011	02:00 AM	2	10	1	7
6/24/2011	03:00 AM	0	11	0	6
6/24/2011	04:00 AM	1	9	0	8
6/24/2011	05:00 AM	4	46	4	30
6/24/2011	06:00 AM	22	172	15	135
6/24/2011	07:00 AM	44	390	35	257
6/24/2011	08:00 AM	66	426	40	327
6/24/2011	09:00 AM	52	423	27	339
6/24/2011	10:00 AM	38	413	34	424
6/24/2011	11:00 AM	42	553	54	576



# Olsson Associates

7301 West 133rd St. Suite 200  
Overland Park, KS 66213

File Name : Johnson and Woodson AM  
Site Code : 00000000  
Start Date : 6/22/2011  
Page No : 1

Groups Printed- Unshifted

Start Time	WOODSON From North				JOHNSON From East				WOODSON From South				JOHNSON From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	2	2	2	0	5	38	1	0	3	1	2	0	6	66	6	0	134
07:15 AM	8	2	0	0	3	44	3	0	6	0	4	0	5	81	2	0	158
07:30 AM	2	1	2	0	6	73	2	0	7	2	1	0	1	109	3	0	209
07:45 AM	4	6	4	0	4	88	3	0	7	3	3	0	10	142	7	0	281
Total	16	11	8	0	18	243	9	0	23	6	10	0	22	398	18	0	782
08:00 AM	8	2	2	0	11	74	2	0	9	9	1	0	3	112	7	0	240
08:15 AM	3	2	3	1	2	75	4	0	4	1	1	1	8	106	5	2	218
08:30 AM	12	3	4	0	4	63	5	1	6	3	2	0	9	106	8	1	227
08:45 AM	5	3	2	0	8	70	7	0	7	2	3	0	6	105	6	0	224
Total	28	10	11	1	25	282	18	1	26	15	7	1	26	429	26	3	909
Grand Total	44	21	19	1	43	525	27	1	49	21	17	1	48	827	44	3	1691
Apprch %	51.8	24.7	22.4	1.2	7.2	88.1	4.5	0.2	55.7	23.9	19.3	1.1	5.2	89.7	4.8	0.3	
Total %	2.6	1.2	1.1	0.1	2.5	31	1.6	0.1	2.9	1.2	1	0.1	2.8	48.9	2.6	0.2	

# Olsson Associates

7301 West 133rd St. Suite 200  
Overland Park, KS 66213

File Name : Johnson and Woodson PM

Site Code : 00000000

Start Date : 6/22/2011

Page No : 1

Groups Printed- Unshifted

Start Time	WOODSON From North				JOHNSON From East				WOODSON From South				JOHNSON From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	11	3	2	3	2	139	6	2	6	3	4	0	9	111	1	1	303
04:15 PM	11	2	3	0	5	121	7	0	3	1	6	1	5	133	3	2	303
04:30 PM	13	7	3	0	4	150	5	0	4	2	4	0	8	110	6	2	318
04:45 PM	6	1	1	0	5	150	10	2	4	4	1	1	2	134	1	0	322
Total	41	13	9	3	16	560	28	4	17	10	15	2	24	488	11	5	1246
05:00 PM	18	7	6	3	7	201	10	3	9	8	4	0	7	148	4	0	435
05:15 PM	11	6	1	1	2	153	6	1	8	3	2	2	5	141	5	0	347
05:30 PM	7	2	1	1	5	152	2	0	8	3	5	0	5	155	0	1	347
05:45 PM	5	7	2	0	5	127	4	0	9	2	2	0	7	116	1	0	287
Total	41	22	10	5	19	633	22	4	34	16	13	2	24	560	10	1	1416
Grand Total	82	35	19	8	35	1193	50	8	51	26	28	4	48	1048	21	6	2662
Apprch %	56.9	24.3	13.2	5.6	2.7	92.8	3.9	0.6	46.8	23.9	25.7	3.7	4.3	93.3	1.9	0.5	
Total %	3.1	1.3	0.7	0.3	1.3	44.8	1.9	0.3	1.9	1	1.1	0.2	1.8	39.4	0.8	0.2	

# HCM Signalized Intersection Capacity Analysis

## 1: Johnson Drive & Woodson Dr

6/30/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	27	466	30	14	300	21	7	16	26	13	13	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Flt		0.99			0.98			0.94			0.93	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3497			3475			1743			1710	
Flt Permitted		0.92			0.91			0.96			0.95	
Satd. Flow (perm)		3214			3181			1683			1631	
Peak-hour factor, PHF	0.84	0.82	0.75	0.70	0.85	0.48	0.58	0.44	0.72	0.81	0.54	0.56
Adj. Flow (vph)	32	568	40	20	353	44	12	36	36	16	24	48
RTOR Reduction (vph)	0	3	0	0	6	0	0	29	0	0	38	0
Lane Group Flow (vph)	0	637	0	0	411	0	0	55	0	0	50	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		70.0			70.0			20.0			20.0	
Effective Green, g (s)		70.0			70.0			20.0			20.0	
Actuated g/C Ratio		0.70			0.70			0.20			0.20	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		2250			2227			337			326	
v/s Ratio Prot												
v/s Ratio Perm		c0.20			0.13			c0.03			0.03	
v/c Ratio		0.28			0.18			0.16			0.15	
Uniform Delay, d1		5.6			5.2			33.1			33.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			0.2			0.2			0.2	
Delay (s)		5.9			5.4			33.3			33.2	
Level of Service		A			A			C			C	
Approach Delay (s)		5.9			5.4			33.3			33.2	
Approach LOS		A			A			C			C	

### Intersection Summary

HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

1: Johnson Drive & Woodson Dr

6/30/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Volume (vph)	10	578	19	28	656	19	12	18	29	9	16	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frt		0.99			1.00			0.94			0.92	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3512			3514			1740			1700	
Flt Permitted		0.92			0.89			0.93			0.94	
Satd. Flow (perm)		3222			3146			1629			1611	
Peak-hour factor, PHF	0.50	0.93	0.68	0.70	0.82	0.68	0.60	0.56	0.81	0.38	0.57	0.58
Adj. Flow (vph)	20	622	28	40	800	28	20	32	36	24	28	72
RTOR Reduction (vph)	0	3	0	0	2	0	0	27	0	0	53	0
Lane Group Flow (vph)	0	667	0	0	866	0	0	61	0	0	71	0
Turn Type	Perm		Perm			Perm			Perm			
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		65.0			65.0			25.0			25.0	
Effective Green, g (s)		65.0			65.0			25.0			25.0	
Actuated g/C Ratio		0.65			0.65			0.25			0.25	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		2094			2045			407			403	
v/s Ratio Prot												
v/s Ratio Perm		0.21			0.28			0.04			0.04	
v/c Ratio		0.32			0.42			0.15			0.18	
Uniform Delay, d1		7.7			8.5			29.2			29.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.4			0.6			0.2			0.2	
Delay (s)		8.1			9.1			29.4			29.6	
Level of Service		A			A			C			C	
Approach Delay (s)		8.1			9.1			29.4			29.6	
Approach LOS		A			A			C			C	

## Intersection Summary

HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

TWO-WAY STOP CONTROL SUMMARY								
General Information			Site Information					
Analyst	J. Stretz		Intersection	Johnson Drive & Woodson Dr				
Agency/Co.	Olsson Associates		Jurisdiction	Mission, KS				
Date Performed	06/22/2011		Analysis Year	2011				
Analysis Time Period	7:00 am							
Project Description 010-2745								
East/West Street: Johnson Drive			North/South Street: Woodson Drive					
Intersection Orientation: East-West			Study Period (hrs): 1.00					
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	27	466	30	14	300	21		
Peak-Hour Factor, PHF	0.84	0.82	0.75	0.70	0.85	0.48		
Hourly Flow Rate, HFR (veh/h)	32	568	40	20	352	43		
Percent Heavy Vehicles	2	--	--	2	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	2	0	0	2	0		
Configuration	LT		TR	LT		TR		
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	7	16	26	13	13	27		
Peak-Hour Factor, PHF	0.58	0.44	0.72	0.81	0.54	0.56		
Hourly Flow Rate, HFR (veh/h)	12	36	36	16	24	48		
Percent Heavy Vehicles	2	2	2	2	2	2		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	LT	LTR			LTR		
v (veh/h)	32	20	84			88		
C (m) (veh/h)	1160	966	295			359		
v/c	0.03	0.02	0.28			0.25		
95% queue length	0.09	0.06	1.18			0.97		
Control Delay (s/veh)	8.2	8.8	22.0			18.3		
LOS	A	A	C			C		
Approach Delay (s/veh)	--	--	22.0			18.3		
Approach LOS	--	--	C			C		

TWO-WAY STOP CONTROL SUMMARY								
General Information			Site Information					
Analyst	J. Stretz		Intersection	Johnson Drive & Woodson Dr				
Agency/Co.	Olsson Associates		Jurisdiction	Mission, KS				
Date Performed	06/22/2011		Analysis Year	2011				
Analysis Time Period	4:00 pm							
Project Description 010-2745								
East/West Street: Johnson Drive			North/South Street: Woodson Drive					
Intersection Orientation: East-West			Study Period (hrs): 1.00					
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	10	578	19	28	656	19		
Peak-Hour Factor, PHF	0.50	0.93	0.68	0.70	0.82	0.68		
Hourly Flow Rate, HFR (veh/h)	20	621	27	40	800	27		
Percent Heavy Vehicles	2	--	--	2	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	2	0	0	2	0		
Configuration	LT		TR	LT		TR		
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	12	18	29	9	16	42		
Peak-Hour Factor, PHF	0.60	0.56	0.81	0.38	0.57	0.58		
Hourly Flow Rate, HFR (veh/h)	19	32	35	23	28	72		
Percent Heavy Vehicles	2	2	2	2	2	2		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT	LT	LTR			LTR		
v (veh/h)	20	40	86			123		
C (m) (veh/h)	800	934	154			188		
v/c	0.03	0.04	0.56			0.65		
95% queue length	0.08	0.13	3.45			4.93		
Control Delay (s/veh)	9.6	9.0	56.9			58.5		
LOS	A	A	F			F		
Approach Delay (s/veh)	--	--	56.9			58.5		
Approach LOS	--	--	F			F		