CITY OF MISSION, KANSAS
COMMUNITY DEVELOPMENT COMMITTEE

WEDNESDAY, APRIL 12, 2017
6:00 p.m.
Mission City Hall

PUBLIC COMMENTS

PUBLIC PRESENTATIONS / INFORMATIONAL ONLY

ACTION ITEMS

1. Traffic Signal at Johnson Drive and Woodson

   This item originally appeared on the April 5, 2017 Community Development Committee agenda. The Committee tabled the item for further discussion at a separate meeting scheduled for April 12th at 6:00 p.m. The Committee plans to discuss overall goals for improving traffic safety on Johnson Drive, specifically in the downtown corridor.

DISCUSSION ITEMS

OTHER

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

City of Mission	Item Number:	1.
ACTION ITEM SUMMARY	Date:	March 28, 2017
Administration	From:	Laura Smith

Action items require a vote to recommend the item to full City Council for further action.

RE: Traffic Signal Installation - Johnson Drive / Woodson

RECOMMENDATION: Authorize a task order to complete the preparation of plans and specifications for installation of a traffic signal at the intersection of Johnson Drive and Woodson, and authorize the Mayor, or his designee, to execute any and all related documents associated with purchase and installation of the traffic signal.

DETAILS: 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 federal funds were used on the project, the City was not able to return the signal to that intersection without sacrificing more than $2 million in grant funds. A copy of the traffic warrant analysis completed in connection with the Johnson Drive project is included in the packet.

On several occasions over the last eighteen months, the City Council has reviewed and discussed pedestrian and traffic safety on Johnson Drive. There has been concern with traffic speeds, motorists observing pedestrian crosswalks, visibility while turning onto Johnson Drive, and backing from parking stalls. Recently, the speed limit was reduced from 30 mph to 25 mph, LED lights were added to the flashing beacons, and parking nearest the intersections was restricted to “Compact Cars Only.”

Even after these modifications, the Council remains interested in additional steps intended to improve safety for both drivers and pedestrians. At the March 15th City Council meeting, staff was directed to initiate the next steps required to install a traffic signal at the Johnson Drive / Woodson intersection. Once the signal is designed, it will be bid and the Council will proceed to award the contract for construction. Based on the length of time anticipated for design, bidding, and lead times to order the signal, installation should be completed by November/December. Preliminary estimates to complete the project are shown below:

Budget:	
Survey:	$3,000
Engineering:	$26,000
Construction Admin:	$3,000
Contractor Mobilization:	$15,000
Signal Construction:	$250,000
PM/Signing/TTC Construction:	$10,000
Total:	$307,000

Related Statute/City Ordinance:	N/A
Line Item Code/Description:	01-00-001-00 General Fund Contingency
Available Budget:	$3,598,459

City of Mission	Item Number:	1.
ACTION ITEM SUMMARY	Date:	March 28, 2017
Administration	From:	Laura Smith

Action items require a vote to recommend the item to full City Council for further action.

Replacement of the signal was not originally included in the 2017 Budget, so funding is recommended to come from the General Fund's fund balance. The audited fund balance at the end of 2016 was $3,598,459 or 32% of General Fund revenues (Council Fund Balance Policy establishes 25% goal).

CFAA CONSIDERATIONS/IMPACTS: The signal will provided for more controlled vehicle and pedestrian movement at this intersection, ideally improving safety for residents and visitors of all ages and abilities.

Related Statute/City Ordinance:	N/A
Line Item Code/Description:	01-00-001-00 General Fund Contingency
Available Budget:	$3,598,459

CITY OF MISSION
KANSAS

MEMORANDUM

Date: **April 12, 2017**

To: **Mayor and City Council**

From: **Laura Smith, City Administrator**

RE: **Johnson Drive Safety Concerns**

The Council, both individually and collectively, continue to express concern for traffic and pedestrian safety along the Johnson Drive corridor (Lamar to Nall). A conversation regarding the installation of a traffic signal at the Johnson Drive and Woodson intersection was continued from the April 5th Community Development Committee meeting for more analysis and discussion. Staff has identified four areas of concern that have been expressed relative to this issue. The four areas of concern include: speed, pedestrian safety, vehicle turning movements onto Johnson Drive, and backing out of parking stalls. Options and alternatives to address each area of concern are detailed in the attached matrix.

As we review and evaluate options for the roadway, it will be important to determine how we intend to respond to the following question:

"How will we measure whether we've been successful in making Johnson Drive safer?"

The design of Johnson Drive has been studied and discussed by a number of different consultants and citizen/business Task Force members over the last 10+ years. A number of Resolutions have been adopted which provide guidance on the design concept for the street. Those most relevant are included in your packet:

Resolution 643	September 2006	(recommends 3-lane configuration)
Resolution 823	March 2011	Dictates 80 ft pavement width and 4-lanes
Resolution 849	December 2011	Stresses pedestrian improvements
Resolution 864	August 2012	Affirms 4-lane configuration and outlines other preferred design elements

I have also included information produced by BikeWalk KC on a "Road Diet," and a link to a website provided by Councilmember Schlossmacher. (http://wobo.org/campaigns/bikeways/abettergrandave)

We will look forward to the conversation and additional direction from the Governing Body on how to proceed.

						Areas of Concern			
Option/Alternative	**Pros**	**Cons**	**Spent to Date**	**Estimated Cost**	**Other Considerations**	**Speed**	**Pedestrian Safety**	**Turning onto or crossing Jo Drive**	**Backing from parking stall**
Reduce Speed Limit	- Impacts entire corridor	- Requires enforcement to be effective - Inside lane still gives drivers a sense they can go faster	- $704 for speed limit signs	- On-going personnel costs for dedicated traffic enforcement (see below)		X	X	X	X
Install speed tables	- Slows vehicles at various locations throughout corridor	- Hasn't been as effective as anticipated - If height increased or speed tables installed at other intersections may need to redo ADA ramps - Installation potentially contributes to street degradation or snow plowing concerns			- May result in driver frustration, and deter from using Jo Drive	X	X		
Increased traffic enforcement	- Slows traffic	- Jo Drive is perceived as "speed trap," resulting in negative publicity		- Depends on number of hours desired per week: 4 hours/week @$30/hour = $6,240	- Could use speed trailer in lieu of officer, but no ability to enforce with citations - May be perceived as a negative by business owners	X	X		
Yellow Pedestrian Flashing Beacons (with LED lights)	- Provides pedestrians with designated crossing areas - Visually signals drivers to stop for pedestrians in crosswalks - Once pedestrians have cleared, vehicles can resume driving. - Are only flashing when the button is pushed.	- Drivers may ignore "yellow warning message" - 4-lanes results in inside lane not seeing pedestrian	- Spent $17,156 to upgrade beacons to include flashing lights	- $25,000 per crossing	- May not reduce or eliminate pedestrians "jaywalking"		X		
Crossing Guards	- Provides "human" presence on the street to assist with pedestrian crossing	- May not be positioned at correct intersections at time pedestrians are present		- Depends on number of hours per week: 42 hours/week @18/hour = $39,312	- Could also provide parking enforcement		X		
Install Hawk Signal	- Requires traffic to come to complete stop for pedestrians - High visibility for motorists	- Does not address vehicle movement from side streets - Could result in stacking issues		- $95-100,000 per signal installed	- Will require KCPL power as solar power is not an option.		X		
Sign end parking stalls as "Compact Car Only"	- Improves visibility for traffic crossing or turning onto Jo Drive at various locations	- Difficult to enforce	- $830 for parking signage					X	

						Areas of Concern			
Option/Alternative	**Pros**	**Cons**	**Spent to Date**	**Estimated Cost**	**Other Considerations**	**Speed**	**Pedestrian Safety**	**Turning onto or crossing Jo Drive**	**Backing from parking stall**
Convert end stalls at intersections to "No Parking"	- Improves visibility for traffic crossing or turning onto Jo Drive at various locations	- Reduces total number of parking stalls throughout corridor			- May be perceived as a negative by business owners			X	
Make Jo Drive/Woodson a 4-way stop. Could also consider 4-way stops at Beverly and Outlook.	- Provides more protected movements for traffic turning onto or crossing Jo Drive - Less expensive than traffic signal	- May be difficult to navigate with 4 lanes of traffic - Adds delay to Jo Drive thru traffic - Not applicable in a 3-lane configuratioin due to queuing lengths				X	X	X	X
Install traffic signal at Jo Dr/Woodson	- Provides more protected pedestrian and traffic movements at Woodson/Jo Drive	- Adds delay to Jo Drive thru traffic		$307,000		X	X	X	X
Restripe to 3-lanes	- Creates more space for backing from parking stalls - Can provide a pedestrian "refuge" in the middle of the street - Dedicated left turn lane allows traffic to move efficiently without blocking a thru lane - Motorists and pedestrians only have to worry about one thru lane	- Doesn't bring east/west traffic to a complete stop anywhere in the corridor except if flashing pedestrian beacons are activated.		$150,000	- May be perceived as a negative by business owners	X	X	X	X

Speeding citations Johnson Drive (Nall-Lamar):

2015 - 18
2016 - 33
2017 – 75 (Jan – March)

Accidents at Johnson Drive Intersections

	2015	2016	2017 (JAN-MAR)
Nall	0	3	0
Maple	0	1	1
Reeds	0	4	0
Outlook	0	1	1
Woodson	2	3	0
Dearborn	0	4	0
Beverly	1	1	0
Horton	3	2	0
Lamar	5	3	2
TOTALS	11	22	4

ACCIDENTS AT OTHER LOCATIONS

LOCATION	2015	2016	2017 (JAN-MAR)
SMPKY/NALL	19	28	2
JOHNSON/BROADMOOR	12	15	4
MARTWAY/LAMAR	8	6	3
MARTWAY/BROADMOOR	8	3	0

RESOLUTION NO. 643

A RESOLUTION ADOPTING INDIVIDUAL COMPONENTS OF THE JOHNSON DRIVE TASKFORCE RECOMMENDATIONS, THUS ESTABLISHING POLICIES FOR CAPITAL INFRASTRUCTURE IMPROVEMENTS WITHIN THE JOHNSON DRIVE CORRIDOR AREA.

WHEREAS, Generally, Johnson Drive is presently a four-lane undivided street between Lamar Avenue and Roeland Drive, and a five-lane street from Roeland Drive to Roe Avenue. In summary, Johnson Drive could be best described as a very heterogeneous street with no two sections looking exactly the same. This configuration of Johnson Drive dates back to the days when it was a state highway, a designation removed over 25 years ago.

WHEREAS, The function of Johnson Drive has changed over time. Its role as a through-highway diminished as other streets and highways like Shawnee Mission Parkway and Interstate 35 were constructed.

WHEREAS, traffic volumes today can be characterized as modest - about 13,000 to 16,000 vehicles per day – and studies have indicated that only about 4-11% of drivers travel the entire length of Johnson Drive between Roe Avenue and Metcalf Avenue. Johnson Drive functions more today as a major collector street providing conduit to surrounding major streets and serving commercial areas within the city.

WHEREAS, travel speeds on Johnson Drive tend to be high due to very wide travel lanes, a minimal number of turns at cross streets, and modest traffic volumes.

WHEREAS, In the recent past, the City has recognized that it faces a series of challenges that, if adequately addressed, can be turned into opportunities for reinvestment in and revitalization of the community. Among these challenges are a declining sales tax base, stagnant population growth, deteriorating infrastructure, and an increased flood plain in commercial areas.

WHEREAS, in order to address these challenges, the City commissioned a series of studies (i.e. HyettPalma Downtown Action Agenda, The George Butler Associates Traffic Study, Johnson Drive Corridor Design Guidelines, Downtown Master Plan, West Gateway Vision Plan, East Gateway Redevelopment Plan) which recommended a range of alternatives to development and public infrastructure improvements.

WHEREAS, as part of these recommended action steps, recent studies for the Downtown, East Gateway, and West Gateway Districts have suggested changes to the configuration of Johnson Drive.

NOW, THEREFORE, BE IT RESOLVED BY THE GOVERNING BODY OF THE CITY OF MISSION, KANSAS:

Section 1. No improvements shall be carried out to Johnson Drive that can be demonstrated to have a negative impact on the capacity and level of service of Johnson Drive.

Section 2. Phase I of Johnson Drive will be reconfigured to a four-lane cross section between Roe Avenue and Roeland Drive. The existing outside lane of Eastbound Traffic will be converted to allow on-street parking area and additional sidewalk space, along the northern frontage of the Gateway project. We will work with the City of Roeland Park to make sure the improvements are complimentary with future improvements contemplated by the City of Roeland Park.

THIS RESOLUTION IS PASSED AND APPROVED BY THE GOVERNING BODY OF THE CITY OF MISSION, this 13th day of September 2006.

THIS RESOLUTION IS APPROVED BY THE MAYOR this 13th day of September 2006.

Laura McConwell

Laura McConwell, Mayor

ATTEST:

By Martha Sumrall

Martha Sumrall, City Clerk

CITY OF MISSION, KANSAS
RESOLUTION NO. 823

A RESOLUTION SUPPORTING INFRASTRUCTURE INVESTMENTS RELATED TO JOHNSON DRIVE AND THE DOWNTOWN CORRIDOR IN THE CITY OF MISSION, KANSAS.

WHEREAS, a consensus exists that Johnson Drive is in a significant state of disrepair between Nall Ave and Lamar Ave in downtown Mission; and

WHEREAS, the downtown corridor is considered the heart of the City of Mission; and

WHEREAS, the Downtown Visioning Committee has expressed a priority on getting Johnson Drive rehabilitated and the City Council affirmed that priority in Resolution 798; and

WHEREAS, the City of Mission recently implemented a street program beginning with the 2011 budget,

NOW, THEREFORE, be it ordained by the Governing Body of the City of Mission:

Section 1. The City Administrator will begin work on the necessary steps to have Johnson Drive rehabilitated by 2014 and include the project in the Community Investment Program (CIP). The following guidelines will be pursued as part of this street project:

A. The expected width of pavement from curb to curb is 80ft. Any design for the street should accommodate on-street parking and four driving lanes within this 80ft footprint.
B. The majority of on-street parking along Johnson Drive should be on public property.
C. The entire corridor should have a consistent design that supports the unique character of the downtown district.
D. Utilities should be addressed to every extent possible so as to prevent unnecessary damage to the street after rehabilitation.

Section 2. In conjunction with the street project, the city will finish storm water remediation along Rock Creek that affects the downtown district.

Section 3. All public property in the downtown district should be cleaned up so as to reflect positively on the community.

Section 4. These infrastructure investments are deemed necessary to provide basic public support to the downtown district. In addition to completing these public projects b the city will look at optional strategies that can be pursued to encourage private redevelopment in the district.

THIS RESOLUTION IS PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF MISSION, this 16th day of March 2011.

THIS RESOLUTION IS APPROVED BY THE MAYOR this 16th day of March 2011.

Laura McConwell, Mayor

ATTEST:

By _____
Martha Sumrall, City Clerk

RESOLUTION NO. 849
A RESOLUTION SUPPORTING THE RECOMMENDATIONS OF THE DOWNTOWN VISIONING COMMITTEE

WHEREAS, the Mission Downtown Area, whose boundaries are defined as the area between Nall and Lamar and 58th Street and Martway, has served as the heart of the Mission community; and

WHEREAS, the importance of this area has been noted in repeated planning studies, including the HyettPalma Study of 2002, the Design Guidelines for the Johnson Drive Corridor of 2004, the Mission/Rock Creek Redevelopment Master Plan of 2005, and the Comprehensive Plan of 2007; and

WHEREAS, it's the feeling of Mission Downtown Area property owners, businesses, and residents, as well as residents of the City of Mission that reinvestment in the Mission Downtown Area is key to the overall success of the community; and

WHEREAS, the City Council passed Resolution No. 823 (March 16, 2011), which identified public street and stormwater improvement projects to be completed by the City prior to 2014, in addition to the clean up of property owned by the City in this area; and

WHEREAS, Mayor McConwell convened a Downtown Visioning Committee made up of residents, businesses and property owners from the community in January 2010 to look at the reinvestment possibilities for the Mission Downtown Area; and

WHEREAS, the Downtown Visioning Committee has completed its work and established a set of recommendations that need to be incorporated into city-wide policies.

NOW, THEREFORE, BE IT RESOLVED BY THE GOVERNING BODY OF THE CITY OF MISSION, KANSAS:

Section 1. The city thanks the Downtown Visioning Committee for their diligent work and supports their five recommendations.

a. The redevelopment of the Downtown corridor should stress pedestrian improvements equal to those improvements suggested for automobiles.

b. The redevelopment of the Downtown corridor should stress a unifying them in both it's landscape and streetscapes. And should reflect the spirit of the designs and ideas reviewed by the Downtown Visioning Committee.

c. The redevelopment of the Downtown corridor should include substantial investments in public amenities that support the private businesses. This would include consideration of a City Market area and reuse of the Harleywoods site, addition of a pedestrian plaza or "ArtWalk" area along Woodson, and development of an ampitheatre east of Reeds.

d. The redevelopment of the Downtown corridor requires there to be a collaborative investment model that allows for public/private partnership to help redevelop the area.

e. The redevelopment of the Downtown corridor requires there to be an active and supported Downtown Business Council.

Section 2. The Mission Downtown Area shall receive priority funding as the City contemplates future community investments projects.

Section 3. The complexities of redeveloping the Mission Downtown Area are recognized and thus an entity will be designated by the city to steward public improvements to Johnson Drive, Rock Creek, and surrounding public property.

Section 4. The city reaffirms its intention to complete the public improvements to the Mission Downtown Area as identified in Council Resolution No. 823 by 2014 so that it can allow for private redevelopment to proceed.

THIS RESOLUTION IS PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF MISSION, this 21st day of December of 2011.

THIS RESOLUTION IS APPROVED BY THE MAYOR this 21st day of December of 2011.

Laura McConwell, Mayor

ATTEST:

Martha Sumrall, City Clerk

RESOLUTION NO. 864

A RESOLUTION ESTABLISHING THE JOHNSON DRIVE DESIGN CONCEPT FOR IMPROVEMENTS BETWEEN NALL AVENUE AND JUST WEST OF LAMAR AVENUE.

WHEREAS, Johnson Drive is a four-lane arterial between Nall Avenue and Lamar Ave, and the Mission Downtown Area, whose boundaries are defined as the area between Nall and Lamar and 58th Street and Martway, has served as the heart of the Mission community; and

WHEREAS, public input and multiple studies has pointed to maintaining a four-lane configuration on Johnson Drive between Lamar Avenue and Nall Avenue; and

WHEREAS, Johnson Drive and the correlated infrastructure systems have been identified in recent street, stormwater, and bridge condition inventories as a high-priority street in need of significant infrastructure repairs. The City Council passed Resolution No. 823 (March 16, 2011), which identified public street and stormwater improvement projects to be completed by the City prior to 2014; and

WHEREAS, the City Council passed Resolution No.849 (December 21, 2011) supporting the recommendations of the Downtown Visioning Committee, which indicated that the redevelopment of the Downtown corridor should stress pedestrian improvements equal to those improvements suggested for automobiles, and that the redevelopment of the Downtown corridor should stress unifying both it's landscape and streetscapes, and that the redevelopment of the Downtown corridor should include substantial investments in public amenities that support the private businesses, and that reinvestment in the public infrastructure by 2014 is a critical priority for the City; and,

WHEREAS, Resolution No. 862 (June 20, 2012) directs staff to design the project to include the "Johnson Drive Interceptor" stormwater conveyance system into the street rehabilitation project; and,

WHEREAS, the current total project budget is approximately $9.8 million of which $2,800,000 is allocated by federal Surface Transportation Program (STP) funds, and up to $1,500,000 is allocated by the Johnson County CARS program, and the City's remaining portion is $5.5 million; and,

WHEREAS, construction costs are currently estimated at $7.825 million, of which $5.3 million is considered the "baseline" project costs, $2.3 million accounts for the Johnson Drive Interceptor, and $225,000 accounts for an upgrade to decorative streetlights and additional seat walls from the base project estimate.

WHEREAS, pedestrian and other non-vehicular infrastructure is a focal point of all transportation improvement projects undertaken by the City of Mission and as such, sidewalks, trails, traffic signals, street lighting, and ADA compliant curb ramps will all be upgraded within the base scope of this project.

NOW, THEREFORE, BE IT RESOLVED BY THE GOVERNING BODY OF THE CITY OF MISSION, KANSAS:

Section 1. The Johnson Drive Rehabilitation Project (Lamar Avenue to Nall Avenue), including

the intersection at Johnson Drive and Lamar, will include full-depth pavement replacement, stormwater system upgrades, utility relocations and upgrades, curb, gutter, and sidewalk improvements.

Section 2. Base Project Costs ($5.3 million) will be funded out of the City's Transportation and Capital Improvement Funds.

Section 3. Project costs related to the Johnson Drive Interceptor ($2.3 million) will be funded by an additional $4/month/ERU Stormwater Utility Fee for a five year period, starting in the 2013 Budget year.

Sections 4 The project will include upgraded lighting to decorative ($140,000) and additional seat walls for planters (non-structural, $85,000) as approved by the City Council at the August 22, 2012 City Council Meeting.

Section 5. The traffic signal at the Johnson Drive / Woodson intersection will be removed and replaced with a two-way stop configuration on Woodson Rd, while Johnson Drive traffic will be allowed to flow without required stop.

Section 6. The City will acquire Rights-of-Way and permanent easements in order to ensure all lanes of traffic and on-street parking spaces are located in the public right of way and all sidewalks, from the back of curb to the face of the building, are located within permanent easements. The City will assume responsibility for maintenance and upkeep on both the street, parking spaces, and sidewalk as well as any other amenities that may be included such as street lights, benches, planter boxes, seat walls, etc.

Section 7. Public head-in on-street parking stalls will not have mandated maximum time limits on the use of each individual parking stall.

THIS RESOLUTION IS PASSED AND APPROVED BY THE GOVERNING BODY OF THE CITY OF MISSION, this 22nd day of August 2012.

THIS RESOLUTION IS APPROVED BY THE MAYOR this 22nd day of August 2012.

Laura McConwell

Laura McConwell, Mayor

ATTEST:

By _____

Martha Sumrall, City Clerk

APPROVED AS TO FORM:

By _____

David K. Martin, City Attorney

Road Diet Guide

Johnson Drive, Mission, KS

April 2017

Challenges on Johnson Drive

Johnson Drive is a major thoroughfare for traffic through Mission, as well as an active commercial street and home to dozens of small businesses that serve area residents. Recently, the street has attracted new businesses and new investment. **Johnson Drive's popularity is bringing more people and more traffic to the street.** With increased vehicle, foot, and bike traffic in the corridor, the City of Mission is interested in addressing:

Traffic speed

Many motorists drive along this stretch of Johnson Drive at higher than the posted 30 mph speed limit. This increases the likelihood of crashes, diminishes the business environment, and puts pedestrians at risk.

Pedestrian safety

Pedestrian safety and comfort is important in places where businesses depend on foot traffic. Recent streetscape improvements include enhancements for pedestrians, but traffic speeds and the safety of pedestrian crossings continue to be concerns.

Parking operations

The many businesses along Johnson Drive create a high demand for parking. Any solution to address traffic or pedestrian challenges will need to be balanced with demands for parking.

Business access

Any design of Johnson Drive should permit easy access to the businesses in the corridor. This means accomodating vehicle traffic while allowing for parking operations and pedestrian infrastructure.

Traffic Calming Solutions

An increasingly popular approach to addressing traffic concerns while fostering a pedestrian friendly environment is to implement "traffic calming" measures along a road. These measures are **designed to slow vehicle traffic in order to reduce crashes and increase safety and comfort for pedestrians and cyclists.** Traffic calming techniques can be classified into the following categories[1]:

Vertical treatments

These treatments use vertical elements in the street that force motorists to slow in order to comfortably traverse them. They include speed humps, lumps and tables; raised crosswalks; and raised intersections. The intersection of Johnson Drive and Woodson Ave is a raised intersection.

Horizontal treatments

These elements are meant to block and divert or slow vehicle traffic. They include mini traffic circles, roundabouts, lateral shifts, chicanes, and realigned intersections.

Road narrowing

These approaches are designed to slow traffic by extending curbs or center medians in order to narrow the vehicle travel lane. These have the added benefit of reducing crossing distance or providing refuge islands for pedestrians. The treatments include neckdowns or bulbouts, chokers, and center islands.

Other treatments

Additional less-intensive approaches can achieve traffic calming benefits, especially when used with other treatments. These include pedestrian crossing treatments[2], parking design[3], and restriping[4].

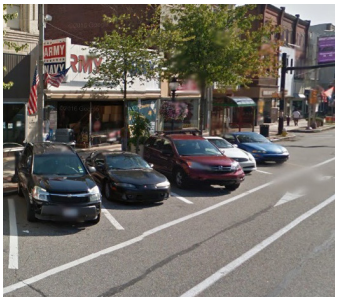
Source: FHWA


Source: FHWA


Source: FHWA


Source: FHWA


Source: FHWA


Source: Google Street View

Road diets

This traffic calming treatment typically involves converting a road from four lanes to three lanes, with one through lane in each direction and a center two-way left-turn lane, or TWLTL.

The treatment has been shown to slow traffic, reduce crashes, and enhance pedestrian safety. Road diets also open up additional space that can be used for bicycle facilities, widened sidewalks, or parking.

1 Institute of Transportation Engineers; FHWA, February 2008, p. 1
2 Transportation Research Board, *Improving Pedestrian Safety at Unsignalized Crossings,* Chapter 3
3 Project for Public Spaces, *Traffic Calming 101*
4 NACTO, *Relationship Between Lane Width and Speed Review of Relevant Literature*

What is a Road Diet?

Simply put, **a road diet is a reduction in the number of lanes on a road.** Most road diets are a conversion of four lanes to three lanes, although there are successful examples in many different configurations[5].

For a long time in the United States, a minimum of four lanes was the norm on major streets. Roadways were built to move car traffic and to move as much of it as possible. Often little space was left for pedestrians or bicycles.

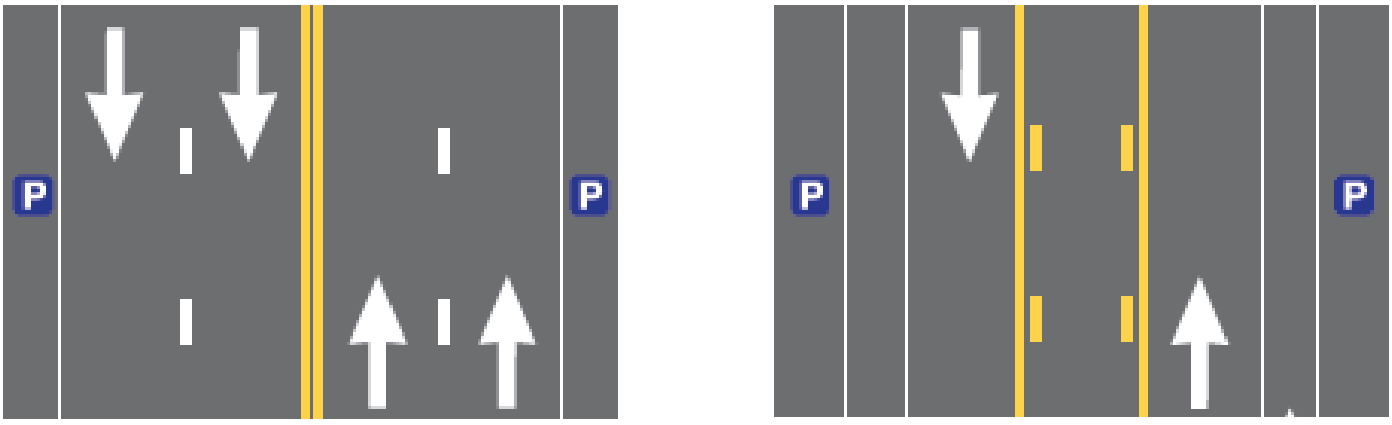
Recently, better pedestrian and cycling environments have become more desirable, and research has revealed that building more lanes doesn't necessarily result in the safest conditions for motorists. Traffic engineers and urban designers have increasingly turned to road diets as a low-cost way to adapt existing four-lane roads to meet shifting community desires and changing engineering standards[6].

How does it work?

In the case of a four lane road (with two travel lanes in each direction), a typical road diet works by converting four lanes to three: one travel lane in each direction and a center two-way left-turn lane, or TWLTL[7].

The design of a road diet reduces the potential for collisions. The center turn lane reduces conflicts between turning traffic and through traffic, while the fewer number of lanes overall reduces the number of potential conflict points for turning traffic and vehicles entering from side streets[8].

Most road diets take advantage of the new space created from lane reductions to add improved pedestrian infrastructure, bicycle facilities, and/or parking[9].



Before and after of a road diet conversion. The previous four travel lanes were converted to two travel lanes, a two-way left-turn lane (TWLTL), two bike lanes, and wider parallel parking lanes. Source: FHWA

5 Rosales, p.1. FHWA, *Road Diet Informational Guide,* p. 4; Kentucky Transportation Center, *Guidelines for Road Diet Conversions*, p. 1
6 FHWA, p. 5
7 See note 5
8 FHWA *Road Diet Informational Guide*, pp. 7-9
9 Rosales. p. 1-2

Road Diet Benefits

Done right, a road diet represents a cost-effective way to achieve a multiple benefits. The approach allows a city to feasibly **manage traffic speeds and volumes, as well as enhance multimodal facilities and foster more vibrant street life**.

- **Many road diets see reduced speeds and most result in less "aggressive" driving.**
- **Road diets reduce pedestrian crashes by as much as 80%.**
- **Road diets net an overall crash reduction of 19% to 47%.**
- **More room means bike lanes and other features can be added to a road diet conversion.**

As Easy as a Coat of Paint

Because road diet projects are mostly restriping of a street, they're a relatively low-cost approach to calming traffic – especially if they are implemented during a previously planned restriping or reconstruction project [16].

Calmer traffic

With just one travel lane in each direction, road diets often cut down on speeding vehicles, as all vehicles are forced to travel the speed of the lead vehicle[10]. Most case studies of road diets report less erratic, aggressive driving, as vehicles also cannot weave between lanes to pass slower vehicles[11]. Average speed can be reduced about 3 to 5 mph on average[12].

Better pedestrian environment

Slower and calmer vehicle traffic reduces the risk of crashes and severity of crashes, and produces a more pleasant experience for those walking. With a reduced number of travel lanes, a pedestrian has a shorter distance to cross and just one lane of traffic in each direction to cross at a time. Case studies show road diets reducing pedestrain crashes 19% to 80% [17].

Fewer crashes

Road diets consistently reduce the likelihood of a variety of crash scenarios and reduce crashes overal 19% to 47% [14]. On a four-lane road, left-turning traffic causes vehicles behind it to queue, producing a risk of rear-end collisions. Sideswipe crashes can occur when vehicles attempt to change lanes quickly to avoid queueing or avoid slower vehicles. With a road diet, the center lane and the elimination of a second travel lane reduce the risk of these types of crashes[15].

Room for more features

Reducing a four-lane road that is 40 feet wide to three lanes at 30-33 feet wide opens up space for additional features on the road. Many recent examples of road diets in urban and suburban settings include bike lanes as part of the conversion. Bike lanes and other features like new on-street parking can have an additional traffic calming effect[18].

10 FHWA, *Road Diet Informational Guide*, p. 7
11 Ibid., p. 7; Gates, p. 15
12 FHWA, p. 7; Gates, p. 11
13 FHWA, p. 9
14. Ibid, p. 6
15. FHWA, p. 7; Kentucky Transportation Center, p. v; Gates
16. FHWA, *Road Diet Informational Guide*, p. 28; Case Studies, "*Genessee Co., MI*
17. FHWA Road Diet Case Studies, "Wells Ave," "Stone Way," "Empire Blvd"
18. Project for Public Spaces, Traffic Calming 101, "Diagonal Parking"

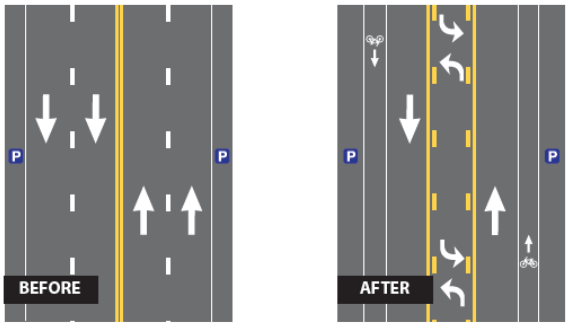
Road Diet Benefits to Business

Because road diets slow and calm traffic, business owners near a road diet often voice concerns that the project will affect the flow of customers to their establishments. However, case studies often show that road diets are ultimately well-received by the business community, who see safety benefits or increased customer traffic.

Ingersoll Avenue – Des Moines, IA

2 miles
Average Daily Trips: 11,000-17,000

In Des Moines, the business community that initially opposed a road diet conversion along the major thoroughfare ultimately came to support the project after it was completed, feeling the road was safer.



Source: FHWA

This road diet conversion was intended to calm traffic and improve conditions for cyclists and pedestrians. It was initially planned as a temporary trial and faced some community skepticism when it was implemented from people who feared it would increase congestion.

Source: Google Street View

The original four travel lanes were reduced to two with a center turn lane. Bike lanes were added in both directions, and existing parking lanes were retained. After a six-month trial, the diet was found to have not only achieved its goals of improving conditions for multimodal travel, a 50% reduction in crashes was recorded. Community reception of the project ended up being positive overall, and the new configuration was retained[19].

Valencia Street – San Francisco, CA

1.9 miles
Average Daily Trips: 10,000-15,000

In a survey of businesses owners along the road diet project in San Francisco, two-thirds reported a beneficial impact on business.

Source: Google Street View

A road diet was originally installed along several blocks of this vibrant commercial corridor in San Francisco's Mission District in 1999. Four lanes were reduced to one travel lane in each direction plus a center left turn lane. Existing parallel lanes on either side of the street remained. Car traffic declined along the street by 10%, while bike traffic grew 144%. Public opinion surveys showed that 94% of respondents approved of the conversion, and the project won praise in the press[20]. About two-thirds of business owners surveyed said that business improved after implementation of the road diet[21].

19. FHWA, *Road Diet Informational Guide,* p. 25
20. Drennen, E. Economic Effects of Traffic Calming on Urban Small Businesses. p. 29
21. Ibid., p. 46

Will a Road Diet Make Traffic Worse?

Because a road diet conversion reduces the number of through lanes, there is a common misconception that road diets result in more congested and difficult to travel roadways. However, when applied in the right locations, road diets can maintain the effective capacity of the roadway for automobiles while improving levels of service for other modes of travel. Generally, traffic flow along a road diet conversion is not only safer, but smoother and more predictable for a variety of users.

Four lane roads often operate like three-lane roads

For corridors like Johnson Drive with numerous unsignalized side streets and access drives, through traffic will often utilize outside lanes to avoid delays by left-turning vehicles. Whenever vehicles stop to turn left, the four-lane road effectively functions like a three-lane road. This means that a conversion from four to three lanes is unlikely to have a major impact on automobile capacity[22].

Intersection design may determine true capacity

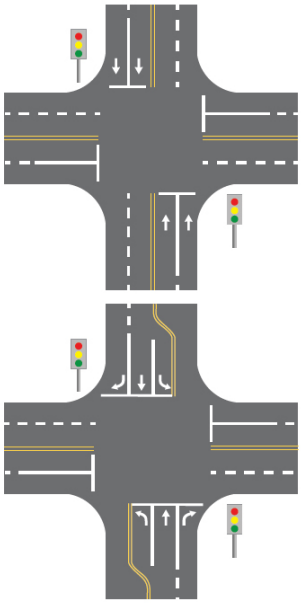
Often, it is not the number of through lanes that is the constraining factor for movement of traffic but rather the design and operations of intersections. Road diet conversions from four to three lanes free up space at intersections to provide dedicated turn lanes. For intersections with large numbers of turning vehicles this design can help reduce delay. On Johnson Drive the signalized intersection at Nall already operates in a three-lane configuration. The signalized intersection at Lamar expands to provide capacity for five total lanes[22].

Fewer conflict points and crashes

With a conversion of four lanes to three, drivers no longer have to pull across multiple lanes of traffic to turn left. Conflict points associated with cars stopping in through lanes or changing lanes are removed as well. Issues with visibility of oncoming traffic for left turning vehicles are also eliminated. Because they have fewer conflict points and increased visibility, three lane configurations allow for safer, smoother traffic[22].

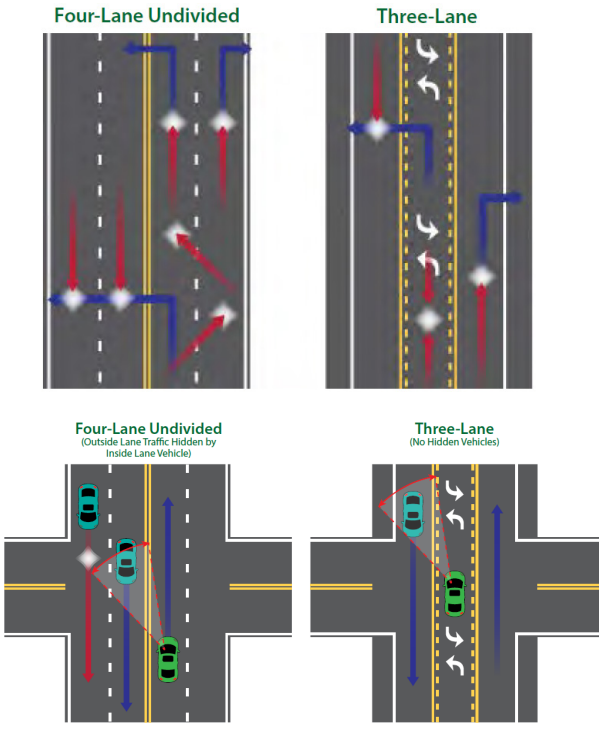
Smoother traffic flow

By removing stopped and turning vehicles from through lanes, road diet conversions result in a more consistent traffic flow, with less "accordion-style" or "slow-and-go" traffic[23].



Example of intersection with added turning movements.

Source: FHWA Road Diet Mythbusters



Source: FHWA Road Diet Informational Guide

22. FHWA, *Road Diet Mythbuster*
23. FHWA, *Road Diet Informational Guide,* p. 9

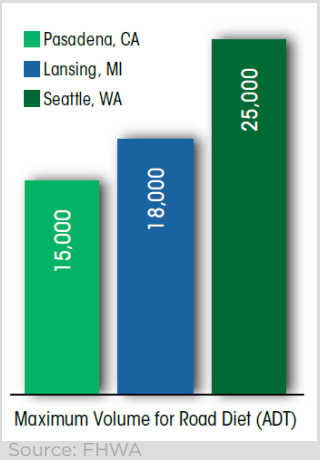
Is a Road Diet Right for Johnson Drive?

Johnson Drive is in need of a traffic calming measure like a road diet. But is a road diet conversion feasible? While every road should be considered on a case-by-case basis, several basic measures exist for analyzing the feasibility of a road diet conversion.

Traffic volume

Road diets are thought to be effective on roads that serve up to a certain number of vehicles, though the standards vary. A 2006 study recommended a maximum average daily traffic of between 15,000 and 17,500 vehicles per day [24]. Other jurisdictions have standards that allow for road diets where ADTs are between anywhere from 6,000 to 25,000 vehicles per day [25]. Data available through Johnson County shows that volumes along Johnson Drive between Lamar and Nall fall below most jurisdictions' upper limit for road diets, at between 11,000 and 17,000 [26].

+ Feasible – volumes fit standards for road diets



Source: FHWA

Intersections

The number and nature of intersections (side streets and driveways) is another basic consideration for road diet feasibility. The presence of too many high-volume side streets or driveways can increase the likelihood of crashes and diminish the effectiveness of a road diet. Offset intersections increase the chances of head-on conflicts in the center left-turn lane. Meanwhile, too many signals coupled with poor sequencing can reduce the effectiveness of a road diet[27].

+ Feasible – no problematic intersections exist along Johnson Dr


Source: Google Street View

Transitions and project extent

The design of transitions between road diets and different road cross sections can affect the safety outcomes of a road diet conversion. The FHWA states that "transition points should occur at locations where the only decision a driver needs to make is related to the lane drop or addition" [28]. Ultimately, intersections are considered poor locations for transitions as an intersection with a signal and turn lanes can add to the maneuvers a driver might need to make. The FHWA recommends considering a larger project extent so that a transition occurs beyond an intersection[28]. Johnson Dr. east of Nall is already two lanes plus a center lane; only a transition at Lamar needs careful scrutiny.

+ Feasible – with careful design, transitions can work

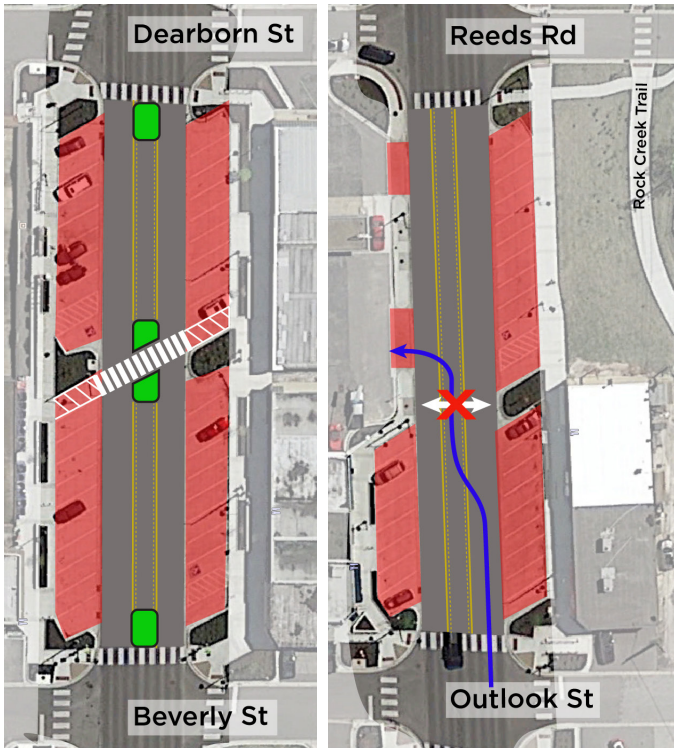

Source: Google Earth

24. Gates, p. 17
25. FHWA, *Road Diet Informational Guide,* pp. 24-28
26. Johnson County, KS AIMS, Johnson Drive at Lamar Avenue, Woodson St, and Nall Avenue
27. FHWA, *Road Diet Informational Guide,* p. 42; Kentucky Transportation Center, p. 92
28. FHWA, *Road Diet Informational Guide,* pp. 36-37

Additional Considerations

Pedestrian crossings

Road diet conversions are an opportunity to improve conditions for pedestrians. In addition to space created by eliminating traffic lanes, the center lane created from a road diet offers an opportunity for pedestrian enhancements. The center lane offers space for islands and medians that can provide pedestrians a safer, more comfortable crossing[29, 30]. (In fact, such features might be recommended where a large volume of turning vehicles and crossing pedestrians are anticipated.) Refuge islands and medians must be carefully located to avoid obstructions where turning movements are desired[30]. Midblock islands are feasible along Johnson Drive, taking advantage of the planted curb extensions halfway along each block. A marked crosswalk between the extensions would provide an additional safe crossing for pedestrians.



These diagrams compare the feasibility of midblock crossings along two stretches of Johnson Drive. Midblock crossings, potentially including pedestrian refuge islands, could take advantage of midblock curb extensions that already exist. Where turn-off maneuvers might occur (blue line), crossings and islands would need to be designed carefully.

Parking

The existing diagonal parking arrangement provides access to the many businesses along Johnson Drive. It also creates an additional traffic calming effect, as vehicles exiting a space momentarily block passing traffic[31]. A possible improvement to the existing arrangement would be to make the diagonal spaces "back-in" instead of "back-out." With back-in parking, as drivers exit a space, they can clearly see approaching vehicles or cyclists to the left before entering traffic. Meanwhile, the loading of vehicles is safer and more comfortable because trunks are oriented towards the sidewalk instead of the street[32].

Bicycle facilities

Road diet conversion projects open up space on a roadway for bicycle facilities. When diagonal parking is present as it is along Johnson Drive, the most common approach with a road diet is to add a bicycle lane between the travel lane and parking. The current pull-in parking configuration, however, is not recommended along a bike lane, as visibility of a cyclist for a driver backing out of a space is limited. If bike lanes are added, a back-in/pull-out parking arrangement should be considered[33].

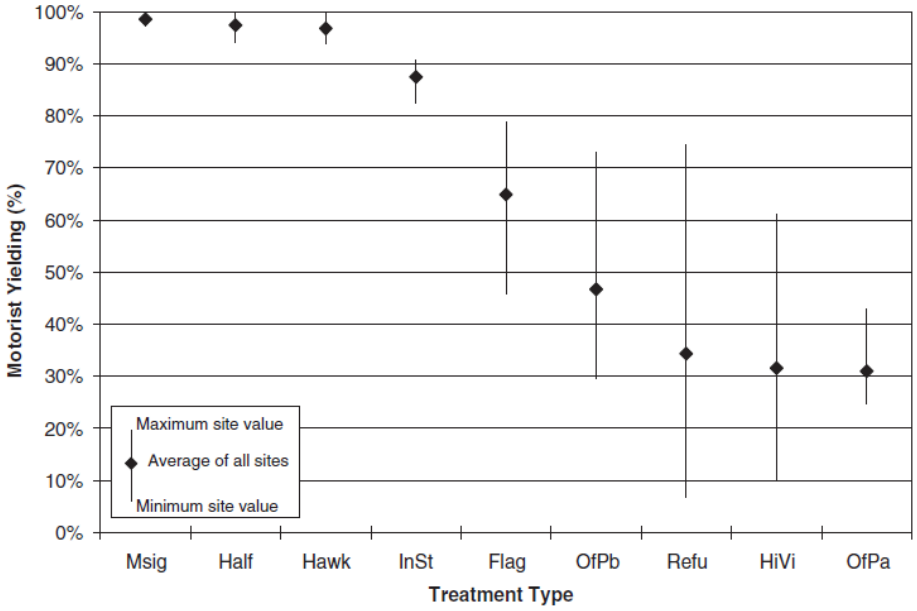
29. FHWA *Road Diet Informational Guide,* p. 9-10
30. FHWA Safety, *Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations,* p. 55
31. Project for Public Spaces, Traffic Calming 101, "Diagonal Parking"
32. Nelson\Nygaard Consulting Associates. *Back-in/Head-out Angle Parking.*
33. FHWA *COURSE ON BICYCLE AND PEDESTRIAN TRANSPORTATION*, p. 19-6; Nelson\Nygaard, p. 4

What about Signs and Signals?

Pedestrian-oriented signage and signals are traffic calming interventions that are relatively inexpensive alternatives to more intensive infrastructure modifications.

Johnson Drive already employs high-visibility pedestrian signs and signs known as "rectangular rapid flash beacons," or RRFBs. These signs have lights that are activated by a pedestrian with the push of a button and are intended to encourage motorists to yield to the pedestrian. They are considered a less expensive alternative to larger, overhead traffic signals. When placed on both sides of a street, as they are when used on Johnson Drive, they have been shown to increase yielding to pedestrians to 88% of the time, versus 18% with no signs[34]. This is similar to the impact of overhead signals, as seen in the chart below. Meanwhile, small, in-street signs are about as effective as RRFBs and overhead signals, causing just under 90% of vehicles to yield[35].

While signage might seem like an attractive alternative for traffic calming, Mission's experience suggests that additional signage would likely have minimal effect on traffic. The city has implemented proven measures, but traffic issues persist. Other sign and signal treatments to protect pedestrians have higher costs and higher impacts on traffic flow compared to what has already been deployed, but are not significantly more effective. For these reasons a modification of the roadway design through a road diet represents an economical, logical next step to creating a safer and more inviting Johnson Drive.



Abbreviations: Msig=midblock signal; Half=half signal; Hawk=HAWK signal beacon; InSt=in-street crossing signs; Flag=pedestrian crossing flags; OfPb=overhead flashing beacons (pushbutton activation); Refu=median refuge island; HiVi=high-visibility signs and markings; OfPa=overhead flashing beacons (passive activation)

Top left: Rectangular rapid flash beacon (RRFB) already installed along Johnson Drive

Middle left: An overhead "High-intensity Activated crossWalK" or "HAWK" signal
Source: PedBikeImages.org \ Sree Gajula

Bottom left: In-street crossing sign
Source: Institute of Transportation Engineers

Above: "Site average and range for motorist yielding by crossing treatment," See note 35.

34. FHWA *Rectangular Rapid Flash Beacon*
35. Transportation Research Board, *Improving Pedestrian Safety at Unsignalized Crossings,* p. 49 (Figure 24)

More Case Studies

Wells Avenue – Reno, NV

This project was built as part of a local complete streets initiative and was intended to reduce crashes and improve safety for bicyclists and pedestrians along a commercial corridor. The four lane road was narrowed to one lane in each direction. The center lane was dedicated to a combination of turn lane, pedestrian island, and median. Bike lanes were added, and existing parking lanes were retained. Sidewalks were extended from eight feet to ten. The project reduced crashes by 30% overall, including a 54% drop in pedestrian crashes. Average speeds along the conversion dropped by 5 to 9 miles per hour[36].

1 mile
Average Daily Trips: 15,900

Source: Google Street View

Stone Way – Seattle, WA

Connecting several neighborhoods in Seattle, Stone Way is a north-south arterial that carries approximately 13,000 vehicles per day and numerous bus routes. Local business owners initially opposed this four-lane to three-lane road diet conversion, based on concerns about traffic flow, business access, and displacement of traffic to neighborhood streets. A before-and-after study evaluated the effects of the road diet, alleviating business owners' major concerns. Top speeders decreased by more than 80%. Total collisions were reduced by 14% and injury collisions decresed by 33%. Pedestrian collisions were reduced by 80%. Peak hour capacity was maintained on the street, despite traffic counts on parallel streets declining 12-34% [37].

0.9 miles
Average Daily Trips: 13,000

Source: Google Street View

Mission Road – Prairie Village, KS

Neighbors began lobbying for a road revamp in 2015 after a crash in which a vehicle jumped the sidewalk. Residents noted that many students from a nearby elementary and high school walked along the road every school day. They were concerned that the narrow sidewalks, unbuffered from fast-moving traffic lanes, were dangerous to students[39]. In 2016 the City of Prairie Village completed a road diet along a half-mile stretch of Mission Road between 71st and 75th streets. The existing four travel lanes were reduced to two plus a center TWLTL. The new space made available was used for a buffered eight-foot path on one side of the road. The *Shawnee Mission Post* reported that the project cost about $1 million, of which $500,000 came in assistance from the Johnson County CARS program[40].

0.5 miles
Average Daily Trips: 14,000[38]

36. FHWA, *Road Diet Case Studies*, "Wells Avenue"
37. Ibid., "Stone Way"
38. Johnson County AIMS, Mission Road at 75th and 73rd. Retrieved from http://maps.jocogov.org/ims/
39. Senter, J. "Prairie Village council approves reduction of Mission Road to 3 lanes from 71st to 75th"
40. Senter, J "February car wreck has area parents asking Prairie Village to improve pedestrian safety along Mission Road"

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LIVEWELL JOHNSON COUNTY

an initiative of

JOHNSON COUNTY KANSAS
Health & Environment

BIKE WALK KC

Our mission is to redefine our streets as places for people to build a culture of active living.

OLSSON ASSOCIATES

MEMO

	Overnight
	Regular Mail
	Hand Delivery
X	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 22nd, 2011 and ending at 11:00 AM on Friday, June 24th, 2011. In addition to machine 24-hour counts, AM and PM peak hour manual turning movement counts were completed on Wednesday, June 22nd, 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:

7301 West 133rd Street, Suite 200
Overland Park, KS 66213-4750
TEL 913.381.1170
FAX 913.381.1174
www.oaconsulting.com

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 85th-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 22nd, 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)	**Stop Control** Approach Delay sec/veh	**Signal Control** 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	>35and ≤ 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

KANSAS DEPARTMENT OF TRANSPORTATION - 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

	Major Street	Minor Street
Adjustment factor for day of week and month of year of count . . .	1	1
Number of Lanes . . .	2	1

Time Beginning	Major Street Approach Volumes EAST	WEST	Total ≅	Minor Street Approach Volumes NORTH	SOUTH	*
12:00 m	26	28	54	1	1	1
1:00	13	15	28	1	1	1
2:00	15	8	23	0	1	1
3:00 am	5	5	10	0	1	1
4:00	13	8	21	1	1	1
5:00	25	33	58	7	8	8
6:00 am	215	141	356	14	9	14
7:00	399	298	697	41	45	45
8:00	468	328	796	58	62	62
9:00 am	390	284	674	45	32	45
10:00	417	372	789	45	32	45
11:00	482	574	1056	58	51	58
12:00 n	685	632	1317	51	60	60
1:00	524	530	1054	42	43	43
2:00	457	450	907	39	39	39
3:00 pm	426	486	912	56	45	56
4:00	540	601	1141	49	65	65
5:00	600	719	1319	51	76	76
6:00 pm	498	506	1004	43	48	48
7:00	397	384	781	37	25	37
8:00	315	287	602	17	23	23
9:00 pm	239	221	460	29	20	29
10:00	120	125	245	9	5	9
11:00	57	66	123	5	8	8
24HR Total	7326	7101		699	701	

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

NOTE: Basic minimum hourly volumes (unreduced)

NOTE: No adjust ment made

Warrant #1 - Condition A

Percent of Warrant Volumes Met

Major	Minor
9	1
5	1
4	1
2	1
4	1
10	5
59	9
116	30
133	41
112	30
132	30
176	39
220	40
176	29
151	26
152	37
190	43
220	51
167	32
130	25
100	15
77	19
41	6
21	5

Warranting Volumes: 600 / 150

Hours Met: 0
Warrant Met: No

Warrant #1 - Condition B

Percent of Warrant Volumes Met

Major	Minor
6	1
3	1
3	1
1	1
2	1
6	11
40	19
77	60
88	83
75	60
88	60
117	77
146	80
117	57
101	52
101	75
127	87
147	101
112	64
87	49
67	31
51	39
27	12
14	11

Warranting Volumes: 900 / 75

Hours Met: 1
Warrant Met: No

Warrant #1 - Combination of Conditions A & B

For this warrant vehicle volume requirements for conditions A and B are reduced to **80% Factor**

NOTE: Conditions A and B **SHALL BOTH** meet a minimum of 8 hours. However, the 8 hours satisfying condition A **NEED NOT** be the same as the 8 hours satisfying condition B,

Condition	A	B
Hours Met	0	4
Warrant Met	No	

Warrant #2

Warrant Volume	Percent of Warrant
0	*****
0	*****
0	*****
0	*****
0	*****
0	*****
0	*****
240	19
200	31
250	18
200	23
130	45
80	75
130	33
170	23
170	33
110	59
80	95
140	34
210	18
280	8
350	8
0	*****
0	*****

Warranting Volumes From MUTCD Fig. 4C-1

Hours Met: 0
Warrant Met: No

***** Major Street volume is so low that no Minor Street warrant exists

Warrant #3

Warrant Volume	Percent of Warrant
0	*****
0	*****
0	*****
0	*****
0	*****
0	*****
0	*****
400	11
360	17
420	11
360	13
250	23
180	33
250	17
310	13
300	19
230	28
180	42
270	18
360	10
460	5
0	*****
0	*****
0	*****

Warranting Volumes From MUTCD Fig. 4C-3

Hours Met: 0
Warrant Met: No

Machine 24-Hour Counts

Date	Time Range	Volume			
		Southbound	Westbound	Northbound	Eastbound
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

	WOODSON From North				JOHNSON From East				WOODSON From South				JOHNSON From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
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

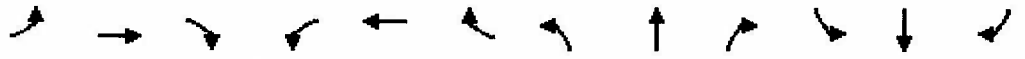
File Name : Johnson and Woodson PM
Site Code : 00000000
Start Date : 6/22/2011
Page No : 1

Groups Printed- Unshifted

	WOODSON From North				JOHNSON From East				WOODSON From South				JOHNSON From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
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	

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	
Frt		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			



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			c0.28			0.04			c0.04	
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

Analyst	J. Stretz
Agency/Co.	Olsson Associates
Date Performed	06/22/2011
Analysis Time Period	7:00 am

Site Information

Intersection	Johnson Drive & Woodson Dr
Jurisdiction	Mission, KS
Analysis Year	2011

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

Analyst	J. Stretz
Agency/Co.	Olsson Associates
Date Performed	06/22/2011
Analysis Time Period	4:00 pm

Site Information

Intersection	Johnson Drive & Woodson Dr
Jurisdiction	Mission, KS
Analysis Year	2011

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		

OLSSON ASSOCIATES

September 19, 2016

City Mission
Laura Smith
6090 Woodson Road
Mission, KS 66202

RE: Johnson Drive – Lamar to Nall – Recommended Corridor Modifications

Dear Mrs. Smith,

Thank you for taking the time to set up the meeting with the Mayor. We appreciate the conversation and we are glad to be made aware of his concerns regarding safety along the corridor. The following are recommendations that can be immediately implemented to improve the corridor from a pedestrian and vehicular standpoint. These solutions can all be implemented at a very reasonable cost and do not affect the intent of the original design.

It should be noted that during the design phase, it was our and staff's expectation that the traffic calming measures utilized on the project would decrease the 85th percentile speeds in the corridor below the 30mph posted speed limit. These measures included the design of the 10' lanes, the installation of the speed table at Woodson Rd., and pedestrian nodes at each intersection. Post construction, Olsson Associates conducted a speed study in October of 2015 and found that the 85th percentile speeds were 33 mph. Although this meets the posted speed limit, it does not achieve the desired effect of reducing speeds. Although there have been no reported accidents, in order to make the corridor safer for pedestrians, cars backing out of angled parking, and cars turning onto Johnson Drive from side streets, Olsson recommends reducing the speed limit on Johnson Drive to 25 miles per hour.

In addition, based on the corridors current performance and the concerns expressed by the Mayor, it is Olsson's recommendation that the City implement one these three options:

1. **Special Parking Use Signs and Markings:** The parking stalls on the northeast and southwest of the intersections can create difficult visibility issues for exiting traffic when these stalls are occupied by large vehicles. We recommend making the first parking stall closest to the intersection on these corners "motorcycle / bicycle only" and the adjacent stall "compact car only". This would be accomplished with signing and pavement markings. See Exhibit – 1. The stall signed for compact cars could have additional wider striping added to make the stall appear narrower to discourage large vehicles from utilizing the compact car stall. The motorcycle parking stall would actually accommodate two motorcycles since a motorcycle stall is 4.5 feet wide, or half a stall width. This would be accomplished by adding an additional stripe to delineate the two stalls and further discourage vehicular parking. Implementing this plan would eliminate large vehicles from blocking visibility for turning side street vehicles.
    a. We recommend the following locations receive this treatment:
        i. Northeast corner of Horton
        ii. Northeast corner of Beverly
        iii. Southwest corner of Dearborn
        iv. Northeast corner of Woodson

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v. Southwest corner of Woodson
vi. Northeast corner of Outlook
vii. Southwest corner of Outlook.
viii. Northeast corner of Reeds
ix. Southwest corner of Reeds

Example signing

2. **Adding stop signs on Johnson Drive at Woodson** (4 way stop condition) while keeping all the special parking stalls listed in item 1 above minus the Woodson intersection.
    a. The pros and cons of this idea are listed below.
        i. Pros
            1. Requires cars on Johnson Drive to stop at Woodson thereby reducing speeds in the corridor while at the same time allowing vehicles on Woodson an improved ability to turn left onto Johnson Drive.
            2. Increased Pedestrian safety at Woodson.
            3. In this scenario the motorcycle and compact car stalls could be eliminated from the northeast and southwest corners of Woodson since the stop controlled situation eliminates any potential intersection visibility issues.
        ii. Cons
            1. Queue lengths on Johnson Drive during the peak hour.
                a. Our traffic team analyzed the intersection as a 4 way stop with a traffic model using the traffic counts obtained during the speed study in 2015. This analysis yielded 7 vehicles queued in both westbound Johnson Drive lanes and 4 vehicles queued in both eastbound Johnson Drive lanes during the PM peak hour. This also corresponds to the worst 15 minutes in the PM peak hour.
                b. The queues during the peak hour would affect angled parking near the intersection during this period and should be weighed against the benefits of this idea. This would also have been an issue with the old signal, but to a lesser extent, since with a signal the green time would clear out the cars and potentially allow gaps for cars to back out.
            2. If Johnson Drive were ever converted to a three lane section the stop signs on Johnson drive would yield queue lengths that would extend into the next intersection in the PM peak hour. In a three lane scenario the 4 way stops don't work. These could be removed at a later date if the roadway section was revised.

3. **Adding stop signs on Johnson Drive at Beverly and Outlook** (4 way stop condition) while keeping all the special parking stalls listed in item 1 above minus the Beverly and Outlook intersections.
    a. The pros and cons of this idea are listed below.
        i. Pros
            1. Requires cars on Johnson Drive to stop at Beverly and Outlook thereby reducing speeds in the corridor while at the same time allowing vehicles at these two intersections a better ability to turn left onto Johnson Drive.
            2. Increased Pedestrian safety at Beverly and Outlook on top of the current raised intersection at Woodson.
            3. Traffic from the Community Center on Beverly could more easily turn onto Johnson Drive.
            4. In this scenario the motorcycle and compact car stalls could be eliminated from the northeast corner of Beverly and the northeast & southwest Corners of Outlook since the stop controlled situation eliminates any potential intersection visibility issues.
            5. Woodson would be a two way stop in this scenario but still has the raised intersection treatment which will continue to slow traffic on Johnson Drive at that location.
        ii. Cons
            1. Queue lengths on Johnson Drive during the peak hour.
                a. As noted in Idea #2 above the queue lengths along Johnson Drive will be an issue but in this instance it would occur at Beverly and Outlook.
                b. The queues during the peak hour would affect angled parking near the intersections of Beverly and Outlook during this period and should be weighed against the benefits of this idea.
            2. If Johnson Drive were ever converted to a three lane section the stop signs on Johnson drive would yield queue lengths that would extend into the next intersection in the PM peak hour. In a three lane scenario the 4 way stops don't work. These could be removed at a later date if the roadway section was revised

An additional measure that would increase parking capacity and provide parking for business owners would be for the city to improve the city owned parking lots on the south legs of Woodson and Outlook. It is understood that the city has been considering this action. Olsson staff have expertise in parking lot layout and could be of service in the design of these facilities.

An idea that could aid in vehicle backing out of the angled parking stalls would be to change the stall angle from 60 degrees to 45 degrees. While the vehicle would have to turn less to back into the lane on Johnson Dr. the following negatives outweigh this advantage:

1. The overall parking stall count would have to go down.

2. Restriping the concrete parking pavement would require removing the old markings which often times means leaving a scar on the pavement which would still look like pavement marking and would confuse drivers.

3. 45 degree parking would increase the angle a person would have to look over their shoulder to see oncoming cars as you back out.

The attached Exhibit - 1 should help illustrate the parking stall reconfiguration described in the Special Parking Use Signs and Markings idea above. We are here to address any questions and will be glad to help implement the recommendations.

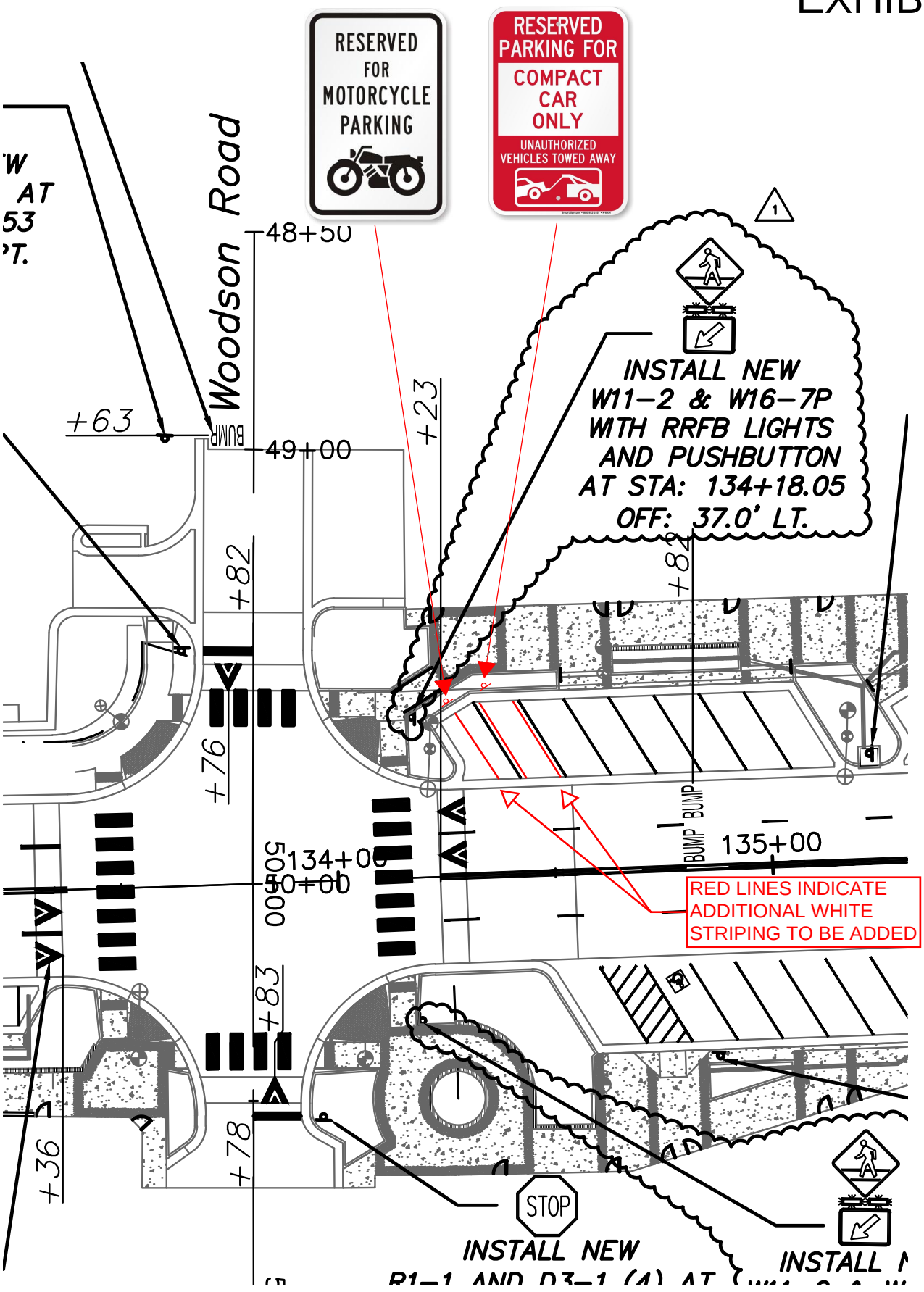
Please contact me if you have any questions or need additional information.

Sincerely,

Paul B. Moore

Paul Moore, P.E.
Project Manager

EXHIBIT - 1



TYPICAL PARKING STALL USAGE MODIFICAITON FOR THE NE AND SW CORNERS OF INTERSECTIONS