

Ranson Landing Traffic Impact Study

Ranson Road and Oldham Parkway
Lee's Summit, Missouri



Prepared for:
Quality Holdings

Prepared by TranSystems
May 2021



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May 26, 2021

Mr. Wayne Adolphsen
Quality Holdings
5922 Southview Drive
Liberty, MO 64068

**Re: Ranson Landing Traffic Impact Study
Ranson Road and Oldham Parkway
Lee's Summit, Missouri**

Dear Mr. Adolphsen:

TranSystems has completed a traffic impact study for the proposed commercial and residential development to be located generally in the southeast corner of Ranson Road and Oldham Parkway in Lee's Summit, Missouri. The purpose of this study was to assess the impact of the proposed development on the surrounding transportation system.


Included in this study is a discussion of the anticipated impact of the proposed development on the adjacent street network and identified improvements to mitigate deficiencies for the following scenarios:

- ▶ Existing Conditions
- ▶ Existing plus Approved Development Conditions
- ▶ Existing plus Approved plus Phase I Development Conditions
- ▶ Existing plus Approved plus Phase I & 2 Development Conditions
- ▶ Existing plus Approved plus Full Development Conditions

We trust that the enclosed information proves beneficial to you, the City of Lee's Summit, and the Missouri Department of Transportation (MoDOT) in this phase of the development process. We appreciate the opportunity to be of service to you and will be available to review this study at your convenience.

Sincerely,
TRANSYSTEMS

By: 
Jeffrey J. Wilke, PE, PTOE

By: 
Emma Martin, E.I.T.

EHM:JJW/em/PI01210149
Enclosure

Introduction

TranSystems has completed a traffic impact study for the proposed commercial and residential development to be located generally in the southeast corner of Ranson Road and Oldham Parkway in Lee's Summit, Missouri. The purpose of this study was to assess the impact of the proposed development on the surrounding transportation system. The location of the development site relative to the major streets in the area is shown on **Figure A-1** in **Appendix A**.

This study also contains a description of the proposed development and the surrounding transportation infrastructure along with trip generation estimates, trip distribution estimates, capacity analyses, and a summary of the findings.

Proposed Development Plan

The proposed development consists of commercial and residential land uses that will be built in phases. The first phase will include a gas station with 14 fueling positions, to be located on the western side of the site adjacent to Ranson Road. The second phase will be located in the northeastern portion of the site. It will include several buildings with self-storage units, totaling 82,000 square feet. There will also be a contractor's garage in the second phase, which includes 14,500 square feet of storage space and 4,500 square feet of office space. The third phase will include the residential portion of the development along the southern edge of the site. There will be 25 buildings each containing four units, totaling 100 residential units. The fourth phase will include several commercial buildings in the center of the site, totaling 34,900 square feet. The proposed development plan is included on **Figure A-2** in **Appendix A** for reference.

The proposed development site will be accessed from four proposed site driveways along Oldham Parkway. Site Drive 1 will be approximately 400 feet east of Ranson Road, and will be the primary access for the gas station, residential units, and some of the commercial buildings. Site Drive 2 will primarily service the commercial portion of the development and will be approximately 925 feet east of Ranson Road. Site Drives 3 and 4 will mainly provide access to the self-storage uses, but will also serve some of the commercial buildings and residential units. Site Drives 3 and 4 will be located 1,450 feet and 1,950 feet east of Ranson Road, respectively.

Study Area

To assess the impacts of the proposed development, the intersections listed below were identified for study during the A.M. and P.M. periods of a typical weekday.

- ▶ Todd George Parkway and Blue Parkway
- ▶ Ranson Road/Todd George Parkway and US-50 westbound ramps
- ▶ Ranson Road/Todd George Parkway and US-50 eastbound ramps
- ▶ Ranson Road and Oldham Parkway
- ▶ I 1th Street and Ranson Road
- ▶ Site Driveways

Traffic Counts

The turning-movement traffic volume counts were collected at the study intersections on Tuesday, April 27, 2021. The turning movement counts were collected from 7:00 to 9:00 A.M. and from 4:00 to 6:00 P.M. The A.M. peak hour generally occurred between 7:00 A.M. and 8:00 A.M. The P.M. peak hour generally occurred between 4:30 P.M. and 5:30 P.M.

At the time of this study, travel patterns may have been affected by the COVID-19 pandemic. Schools and businesses were open when the traffic counts were collected and traffic volumes were near pre-pandemic levels. However many professionals continue to from home and are not commuting. Turning-movement traffic volume counts were adjusted to account for the abnormal traffic volumes due to the COVID-19 pandemic. Traffic volumes at the study intersections were increased by 10 percent during both peak hours. The existing lane configuration and adjusted peak hour traffic volumes have been illustrated on **Figure A-3** through **A-5**.

Surrounding Land Uses and Street Network

The development site is located on approximately 22 acres of undeveloped land. The development site is bounded on the north by Oldham Parkway and on the west by Ranson Road. The Princeton senior living facility is currently being constructed on the east side. The Princeton Heights residential neighborhood is located to the south of the site.

Ranson Road is a part of the state highway system as Route RA. The Missouri Department of Transportation (MoDOT) classifies Route RA as a minor arterial roadway. South of Oldham Road, Ranson Road has two-lanes with left-turn lanes at some intersections. There are paved and aggregate shoulders of varying widths. There is a shared use path along the east side of the road extending south from Oldham Parkway. There is some sidewalk along the west side of the road, but it is not continuous. The posted speed limit is 45 mph.

Near the Oldham Parkway intersection, Ranson Road widens to a four-lane divided street with curbs and gutters and sidewalks along each side of the street. The posted speed limit is 40 mph. There is a diamond interchange with US-50 Highway located just north of Oldham Parkway. North of US-50 Highway, Ranson Road becomes Todd George Parkway, which is classified as a Major Arterial per the City of Lee's Summit Thoroughfare Master Plan

To the south of the development site, 11th Street provides access to the Princeton Heights and Oak Hill residential subdivisions. West of Ranson Road, 11th Street is classified as a residential collector Street, while east of Ranson Road it is a local street. There are wide approaches with sections of raised medians on both sides of 11th Street at the intersection with Ranson Road.

Oldham Parkway is the outer road along the south side of US-50 Highway. It is classified as a commercial collector street. Adjacent to the development site, Oldham Parkway is a 22-foot wide, two-lane street with aggregate and turf shoulders. The posted speed limit is 40 mph. Oldham Parkway ends to the east of the proposed development and is not a through street at this time. It is expected to extend east to Blackwell Road in the future.

Blue Parkway is the outer road along the north side of US-50 Highway. It is classified as a commercial collector street. Blue Parkway is a three-lane roadway with a center two-way left-turn lane. Blue Parkway has curbs and gutters with sidewalk along the north and south side of the street. The posted speed limit on Blue Parkway is 35 mph.

Approved Developments

There have been a number of development projects approved in the vicinity of the site in recent years. These developments are described below, and the locations of the approved developments are identified on **Figure A-1**.

Princeton Senior Living

The Princeton Senior Living facility includes independent living, assisted living, and a nursing home. It is currently being constructed along the south side of Oldham Parkway, east of the proposed development site. The development will also include a new local street connection from Oldham Parkway to the Princeton Heights subdivision. A traffic impact study was prepared for this development.

Culver's Restaurant

Culver's fast-food restaurant was recently opened on Oldham Parkway west of Ranson Road. The traffic counts collected for this study include traffic generated by the restaurant. The traffic study for this development also included roughly 5,000 square feet of commercial uses to the east of the restaurant. The commercial uses have not been built at the time of this study. The traffic study for Culver's identified the need for a signal and an eastbound left-turn lane at the Ranson Road and Oldham Parkway intersection. These improvements have been constructed and are open to traffic.

Lee's Summit R-7 Middle School

The Lee's Summit R-7 School District is constructing a new middle school and athletic fields to the southwest of the development site. The school will be located along Bailey Road west of Ranson Road. The school is scheduled to be open for the 2022-2023 school year. A traffic impact study prepared for this development analyzed many of the same study intersections along Ranson Road. The study identified the need for a northbound right-turn lane on Ranson Road at the US-50 Highway eastbound ramp, but it is not being constructed with the middle school development.

Bailey Farms

Bailey Farms is a residential subdivision in the southwest corner of Ranson Road and Bailey Road, adjacent to the middle school development. The subdivision includes 283 single-family homes. A traffic impact study was completed for the development. The study analyzed many of the same study intersections along Ranson Road, and did not identify any additional improvements needed to accommodate traffic from the Bailey Farms development. Construction has not begun on the Bailey Farms site.

Analysis

The scope of analysis for the assessment of the proposed development's impact on the surrounding transportation system is largely based on the recommended practices of the Institute of Transportation Engineers (ITE), as outlined in their Traffic Engineering Handbook. ITE is a nationally-recognized

organization of transportation professionals with members from both private and public sectors. The analysis of the proposed development's impact included development of trip generation and trip distribution estimates as well as a traffic operations assessment for each study scenario. Each of the analysis methodologies and findings are described in the subsequent sections.

Trip Generation

Trip generation estimates were prepared for the development scenarios using the Institute of Transportation Engineer's Trip Generation, 10th Edition. **Table 1** shows the expected trips to be generated by the proposed development. The specific commercial tenants are not known at this time. It is expected that there may be retail, restaurant, professional offices, and/or a hotel. To account for the variability in the land uses, the trip generation for the commercial uses was estimated using the shopping center land use category.

Table 1 Trip Generation									
Land Use	Intensity	ITE Code	Average Weekday	A.M. Peak Hour			P.M. Peak Hour		
				Total	In	Out	Total	In	Out
Phase 1 Land Uses									
Super Convenience Market/Gas Station	14 fueling positions	960	3,228	394	197	197	322	161	161
<i>Pass-by Trips (Super Convenience Store: 50%)</i>			–	197	98	99	161	80	81
Total New Phase 1 Development Trips			3,228	197	99	98	161	81	80
Phase 2 Land Uses									
Mini-Warehouse	96,500 sf	151	146	10	6	4	17	8	9
Small Office Building	4,500 sf	712	73	9	8	1	12	4	8
Total Phase 2 Development Trips			219	19	14	5	29	12	17
Phase 3 Land Uses									
Multifamily Housing (Low-Rise)	100 units	220	716	48	12	36	60	38	22
Total Phase 3 Development Trips			716	48	12	36	60	38	22
Phase 4 Land Uses									
Shopping Center	34,900 sf	820	2,939	170	106	64	250	120	130
<i>Pass-by Trips (Shopping Center PM peak: 34%)</i>			–	–	–	–	85	41	44
Total New Phase 4 Development Trips			2,939	170	106	64	165	79	86
Total New Full Development Trips			7,102	434	231	204	415	210	205

Pass-by traffic occurs when drivers stop at the proposed development while in route to their final destination. Pass-by traffic is common for gas stations and retail land uses. The ITE Trip Generation Handbook provides guidance on pass-by rates, which includes a pass-by percentage of 76% for the gas station/convenience store, and a pass-by percentage of 34% during the P.M. peak hour for shopping

centers. No pass-by percentage is provided for A.M. peak hour shopping center trips. For the purposes of this study, the pass-by percentage for the gas station/convenience store of 50% was used for a conservative analysis.

Some of the pass-by trips for this development are considered to be diverted link trips. That means nearby drivers may alter their route, or divert their trip, to access the development. For this study, diverted link trips include existing traffic at the US-50 ramp intersections traveling to and from the north on Todd George Parkway. Some of these existing drivers may divert south to access the proposed development. Addition information regarding trip generation and pass-by trips is included in **Appendix B**.

Trip Distribution

The estimated trips generated by the proposed development were distributed onto the street system based on the trip distributions summarized in **Table 2**. These distributions are based on existing traffic patterns, expected service area of the development and engineering judgment. The detailed distribution patterns through the study intersections are shown in **Appendix B**.

Table 2 Trip Distribution	
Direction To/From	Percentage
North on Todd George Parkway	25%
South on Ranson Road	15%
East on US-50 Highway	15%
West on US-50 Highway	40%
West on Oldham Parkway	5%
Total	100%

Traffic Operation Assessment

An assessment of traffic operations was made for the scenarios listed below. These scenarios allowed for comparison of the before and after impacts of the proposed development on the street network.

- ▶ Existing Conditions
- ▶ Existing plus Approved Development Conditions
- ▶ Existing plus Approved plus Phase 1 - 3 Development Conditions
- ▶ Existing plus Approved plus Full Development Conditions

The study intersections were evaluated using the Synchro traffic analysis software package. Calculations were performed based on the methodologies outlined in the Highway Capacity Manual (HCM), 6th Edition, which is published by the Transportation Research Board. The operating conditions at an intersection are graded by the “level of service” experienced by drivers. Level of service (LOS) describes the quality of traffic operating conditions and is rated from “A” to “F”. LOS A represents the least congested condition with free-flow movement of traffic and minimal delays. LOS F generally indicates

severely congested conditions with excessive delays to motorists. Intermediate grades of B, C, D, and E reflect incremental increases in the average delay per stopped vehicle. Control delay is measured in seconds per vehicle. **Table 3** shows the upper limit of delay associated with each level of service for signalized and unsignalized intersections.

Level of Service (LOS)	Signalized	Unsignalized
A	≤ 10 Seconds	≤ 10 Seconds
B	≤ 20 Seconds	≤ 15 Seconds
C	≤ 35 Seconds	≤ 25 Seconds
D	≤ 55 Seconds	≤ 35 Seconds
E	≤ 80 Seconds	≤ 50 Seconds
F	> 80 Seconds	> 50 Seconds

While LOS measurements apply to both signalized and unsignalized intersections, there are significant differences between how these intersections operate and how they are evaluated. LOS for signalized intersections reflects the operation of the intersection as a whole.

Unsignalized intersections, in contrast, are evaluated based on the movement groupings which are required to yield to other traffic. Typically, these are the left turns off of the major street and the side-street approaches for two-way stop-controlled intersections. At unsignalized intersections lower LOS ratings (D, E and F) do not, in themselves, indicate the need for additional improvements. Many times there are convenient alternative routes to avoid the longer delays. Other times the volumes on the unsignalized approaches are relatively minor when compared to the major street traffic, and improvements such as traffic signal installation may increase the average delay to all users of the intersection.

The LOS rating deemed acceptable varies by community, facility type and traffic control device. The City of Lee's Summit has designated LOS C as the minimum desirable standard for signalized intersections. However, at unsignalized intersections LOS D, E, or even F are often considered acceptable for low to moderate traffic volumes where the installation of a traffic signal is not warranted by the conditions at the intersection, or the location has been deemed undesirable for signalization.

The decision to install a traffic signal, which is often considered when lower LOS ratings are projected, should be based on engineering studies and the warrants for traffic signal installation as outlined in the Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD). Signals are typically not recommended in locations where there are convenient alternative paths, or if the installation of a traffic signal would have negative impacts on the surrounding transportation system.

Traffic queues were also evaluated as part of the analyses. Long traffic queues which extend beyond the amount of storage available, either between intersections or within turn lanes, can have significant impacts

on operations. The projected vehicular queues were analyzed to ensure the analyses are reflective of the physical constraints of the study intersections and to identify if additional storage is needed for turn lanes.

Existing Conditions

The results of the Existing Conditions intersection analyses are summarized in **Table 4**. The study intersections were evaluated with the lane configurations, traffic volumes, and traffic control devices shown on **Figure A-3** through **A-5**. The current signal timings and coordination plans were used in the analysis. The Synchro output files are included in **Appendix C**. The projected 95th percentile queues at the study intersections are shown on **Figure A-6**.

Table 4 Intersection Operational Analysis Existing Conditions					
Intersection	Movement	A.M. Peak Hour		P.M. Peak Hour	
		LOS¹	Delay²	LOS¹	Delay²
Todd George Parkway and Blue Parkway	<i>Traffic Signal</i>	B	14.0	D	46.6
Ranson Road and US-50 Westbound Ramps	<i>Traffic Signal</i>	D	35.6	B	19.1
Ranson Road and US-50 Eastbound Ramps	<i>Traffic Signal</i>	C	19.6	C	26.5
Ranson Road and Oldham Parkway	<i>Traffic Signal</i>	A	8.1	B	12.6
Ranson Road and 11th Street	<i>Eastbound Left-Turn</i>	D	25.6	F	55.9
	<i>Eastbound Through/Right-Turn</i>	B	10.3	B	12.5
	<i>Westbound Left-Turn</i>	C	18.8	D	31.7
	<i>Westbound Through/Right-Turn</i>	B	11.7	B	12.3
	<i>Northbound Left-Turn</i>	A	8.0	A	8.9
	<i>Southbound Left-Turn</i>	A	8.4	A	8.7

The results in **Table 4** indicate that most of the study intersections currently operate at acceptable levels of service during the peak hours. Two signalized intersections currently operate at LOS D at times. During the P.M. peak hour, the Todd George Parkway and Blue Parkway intersection operates at LOS D. A detailed look at the analysis results indicates that the eastbound right-turn movement operates at a poor LOS. Microsimulation using the SimTraffic program did not indicate much delay for this movement. Field observations also did not show much delay either, so it is unclear why the Synchro analysis show LOS D conditions.

The US-50 westbound ramps intersection operates at LOS D during the A.M. peak hour with 35.6 seconds of delay. The minimum threshold for LOS D conditions is 35 seconds, so this intersection is just beyond LOS C conditions.

The close spacing between the frontage road and US-50 ramp intersections leads to congestion. There is approximately 200 feet of storage on Todd George Parkway between the signalized Blue Parkway and US-50 westbound ramps intersections. There is also roughly 200 feet of storage on Ranson Road between

the signalized Oldham Parkway and US-50 eastbound ramps intersections. The queue results indicate that the queues of through traffic on Todd George Parkway and on Ranson Road exceed the 200 feet of available storage at times during the peak hours. This was confirmed in the microsimulations and field observations.

The eastbound left-turn movement at I Ith Street and Ranson Road operates at LOS F with 55.9 seconds of delay. While this LOS is generally undesirable, side street volumes are low and do not warrant traffic signal installation. Alternate routes are available to exit the Oak Hill subdivision if delays are unacceptable to drivers.

Existing plus Approved Development Conditions

The existing plus Approved Development Conditions scenario includes the addition of traffic from the unbuilt or unoccupied portions of approved developments in the vicinity of the proposed development. This includes Princeton Senior Living, the remaining commercial portion of the Culver's site, the middle school, and Bailey Farms developments. The approved development trips were obtained from the various traffic impact studies for these developments.

The results of the Existing plus Approved Development Conditions intersection analyses are summarized in **Table 5**. The study intersections were evaluated with the lane configurations, traffic volumes, and traffic control devices shown on **Figure A-7** through **A-9**. The current signal timings and coordination plans were used in the analysis, except as indicated in the discussion following the table. The Synchro output files are included in **Appendix C**. The projected 95th percentile queues at the study intersections are shown in **Figure A-10**.

Table 5					
Intersection Operational Analysis					
Existing plus Approved Development Conditions					
Intersection	Movement	A.M. Peak Hour		P.M. Peak Hour	
		LOS¹	Delay²	LOS¹	Delay²
Todd George Parkway and Blue Parkway	<i>Traffic Signal</i>	B	13.7	D	45.8
Ranson Road and US-50 Westbound Ramps	<i>Traffic Signal</i>	D	46.2	C	24.2
Ranson Road and US-50 Eastbound Ramps	<i>Traffic Signal</i>	C	26.0	C	29.9
Ranson Road and Oldham Parkway	<i>Traffic Signal</i>	B	18.4	B	14.8
Ranson Road and I Ith Street	<i>Eastbound Left-Turn</i>	F	>100	F	>100
	<i>Eastbound Through/Right-Turn</i>	B	13.0	B	14.7
	<i>Westbound Left-Turn</i>	E	45.2	F	52.4
	<i>Westbound Through/Right-Turn</i>	C	15.9	B	13.9
	<i>Northbound Left-Turn</i>	A	9.0	A	9.6
	<i>Southbound Left-Turn</i>	A	9.6	A	9.3

1 – Level of Service
2 – Delay in seconds per vehicle

Table 5 indicates that the addition of development traffic will have an impact on the interchange ramps and Ranson Road study intersections. The intersection of Todd George Parkway and Blue Parkway is projected to continue to operate at LOS D during the P.M. peak hour, as it does in the existing conditions scenario. Similar queues are projected to exceed the available storage on Todd George Parkway between the Blue Parkway and US-50 westbound ramps intersection.

The US-50 westbound ramps intersection is projected to operate at LOS D during the A.M. peak hour with the addition of approved development traffic. This includes approximately 160 additional westbound left-turns from the middle school. The traffic signal split times were optimized at this intersection during the A.M. peak hour to accommodate this additional volume. Even with the optimization, long queues of nearly 400 feet are projected for the westbound left-turn movement. This will block the short westbound right-turn lane, however the queue will be contained on the ramp. The single lane ramp is at least 18 feet wide. The wide ramp and shoulder may be utilized as a two-lane ramp when right-turn traffic will bypass long queues of left-turn traffic.

To improve operations and reduce lengthy left-turn queues, dual left-turn lanes are likely needed on the US-50 westbound exit ramp. There are two southbound lanes on Todd George Parkway/Ranson Road to receive dual left-turns. However, the right lane terminates as a right-turn only lane a short distance away at Oldham Parkway. Given the short distance to the lane drop, it is likely that there would be imbalanced usage of the dual left-turn lanes and the full benefit of such an improvement may not be realized.

Queuing is also projected to increase on Ranson Road between the Oldham Parkway and US-50 eastbound ramps intersections. The southbound 95th percentile queue at the Oldham Parkway intersection is projected to be 513 feet during the A.M. peak hour and 744 feet during the P.M. peak hour. These are substantial increases from the existing conditions scenario, and will extend back through the US-50 eastbound ramps intersection. An additional southbound through lane on Ranson Road south of Oldham Parkway would be needed to improve this situation, however no such improvements are planned. The additional southbound through lane would benefit a dual westbound left-turn movement at the US-50 westbound ramps intersection.

Access Management Considerations

Lee's Summit Access Management Code (AMC) provides guidance on turn lane requirements, throat lengths, and spacing of intersections and driveways. According to the AMC, all of these driveways meet the minimum throat length and driveway spacing requirements for a commercial collector roadway.

The traffic volumes projected at Site Drive 1 exceed the AMC's minimum threshold for an eastbound right-turn lane. An eastbound right-turn lane should be constructed with a storage length of 200 feet plus appropriate taper. A longer turn lane is identified due to the heavy volume of right-turn traffic for this movement. This lane should be constructed with the first phase of development. No other right-turn lanes are warranted at the site driveways. Westbound left-turn lanes are not warranted at any of the site driveways, however if Oldham Parkway is extended east in the future, a three-lane roadway with a center two-way left-turn lane may be appropriate.

The City of Lee's Summit has an Unimproved Road Policy to address developments along roadway such as Oldham Parkway. Non-residential development adjacent to an unimproved road is required to improve the roadway to urban standards. This includes curbs and gutters with sidewalk. Sidewalk is not necessary on the north side of Oldham Parkway since it is adjacent to US-50 Highway and pedestrian access is not needed.

Existing plus Approved plus Phases I-3 Development Conditions

The results of the Existing plus Phases I-3 Development Conditions intersection analyses are summarized in **Table 6**. The study intersections were evaluated with the lane configurations, traffic volumes, and traffic control devices shown on **Figure A-11** through **A-13**. The current signal timings and coordination plans were used in the analysis, except as indicated in the discussion following the table. The Synchro output files are included in **Appendix C**. The projected 95th percentile queues at the study intersections are shown in **Figure A-14**.

Table 6					
Intersection Operational Analysis					
Existing plus Approved plus Phases I-3 Development Conditions					
Intersection	Movement	A.M. Peak Hour		P.M. Peak Hour	
		LOS¹	Delay²	LOS¹	Delay²
Todd George Parkway and Blue Parkway	<i>Traffic Signal</i>	B	13.6	D	45.3
Ranson Road and US-50 Westbound Ramps	<i>Traffic Signal</i>	D	54.6	C	27.8
Ranson Road and US-50 Eastbound Ramps	<i>Traffic Signal</i>	C	28.9	C	30.7
Ranson Road and Oldham Parkway	<i>Traffic Signal</i>	C	25.4	C	28.2
Ranson Road and 11th Street	<i>Eastbound Left-Turn</i>	F	>100	F	>100
	<i>Eastbound Through/Right-Turn</i>	B	13.3	B	15.0
	<i>Westbound Left-Turn</i>	E	48.6	F	55.8
	<i>Westbound Through/Right-Turn</i>	C	16.3	B	14.2
	<i>Northbound Left-Turn</i>	A	9.0	A	9.7
	<i>Southbound Left-Turn</i>	A	9.7	A	9.3
Ranson Road and Site Drive 1	<i>Northbound</i>	B	10.1	B	10.5
	<i>Westbound Left-Turn</i>	A	0.0	A	0.0
Ranson Road and Site Drive 2	<i>Northbound</i>	A	9.0	A	9.0
	<i>Westbound Left-Turn</i>	A	0.0	A	0.0
Ranson Road and Site Drive 3	<i>Northbound</i>	A	8.9	A	8.9
	<i>Westbound Left-Turn</i>	A	0.0	A	0.0
Ranson Road and Site Drive 4	<i>Northbound</i>	A	8.9	A	8.8
	<i>Westbound Left-Turn</i>	A	0.0	A	0.0

1 – Level of Service
2 – Delay in seconds per vehicle

Several capacity improvements are identified to mitigate the addition of development traffic for Phases 1-3. These improvements are reflected in the analysis results in **Table 6**. The Phases 1-3 improvements include the following.

Ranson Road and Oldham Parkway

- ▶ Construct a westbound right-turn lane with a minimum storage length of 150 feet plus appropriate taper.
- ▶ Construct a westbound left-turn lane with a minimum storage length of 150 feet plus appropriate taper.
- ▶ Widen the south leg of the intersection to include a northbound left-turn lane with a minimum storage length of 200 feet plus appropriate taper. This improvement will result in a center two-way left-turn lane on Ranson Road between 11th Street and Oldham Parkway.
- ▶ Lengthen the northbound right-turn/through lane to provide a minimum storage length of 200 feet plus appropriate taper.

Oldham Parkway and Site Drive 1

- ▶ Construct an eastbound right-turn lane with a minimum storage length of 200 feet plus appropriate taper.

The results in **Table 6** indicate that the study intersections are projected to operate at similar levels of service as in the previous scenario. Queuing between the closely spaced ramp and frontage road intersections is projected to continue to occur. The southbound 95th percentile queue on Ranson Road at the Oldham Parkway intersection is projected to be 410 feet during the A.M. peak hour and 699 feet during the P.M. peak hour, which is a slight decrease from the previous scenario. This is due to the capacity improvements identified. The signal was analyzed with protected/permitted eastbound left-turn phasing and an overlap for the eastbound right-turn movement.

The southbound left-turn lane at Ranson Road and Oldham Parkway is relatively short with a 140-foot storage length. Both the Synchro and SimTraffic analysis projects that the 95th percentile queues will be contained within the existing turn lane storage.

The westbound left-turn movement at the US-50 westbound exit ramp is projected to have a 95th percentile queue length of 433 feet. This queue is lengthy, but it will be contained on the ramp, especially if right-turn traffic bypasses long queues by using the wide lane and shoulder.

Existing plus Approved plus Full Development Conditions

The addition of traffic from Phase 4 of the proposed development will require more extensive improvements for the street network to operate near acceptable levels of service. The following improvements are identified for the full development scenario.

US-50 Westbound Ramp and Todd George Parkway

- ▶ Construct second westbound left-turn lane to provide a minimum storage length of 250 feet plus appropriate taper.

US-50 Eastbound Ramp and Ranson Road

- ▶ Lengthen the eastbound right-turn lane to provide a minimum storage length of 400 feet plus appropriate taper
- ▶ Construct a continuous northbound right turn lane between the ramp and Oldham Parkway intersection.

Ranson Road and Oldham Parkway

- ▶ Construct a northbound right-turn/through lane with a minimum storage length of 200 feet plus appropriate taper.
- ▶ Construct a continuous southbound right-turn lane between Oldham Parkway and the eastbound ramp intersection.
- ▶ Lengthen the southbound left-turn lane by reducing the wider section of median to a width of four feet between Oldham Parkway and the eastbound ramps. This will create a continuous left-turn lane.
- ▶ Construct second eastbound left-turn lane to provide a minimum storage length of 250 feet plus appropriate taper.

Ranson Road

- ▶ Construct an additional through lane in both the northbound and southbound directions to continue south of Oldham Parkway through the I Ith Street intersection.

The results of the Existing plus Approved plus Full Development Conditions intersection analyses are summarized in **Table 7**. This study scenario assessed the street system with the addition of traffic generated by all phases of the proposed development, and the aforementioned improvements. The study intersections were evaluated with the lane configurations, traffic volumes, and traffic control devices shown on **Figure A-15** through **A-17**. The signal timings for the corridor were optimized for this scenario but the existing cycle lengths were maintained. The Synchro output files are included in **Appendix C**. The projected 95th percentile queues at the study intersections are shown in **Figure A-18**.

**Table 7
Intersection Operational Analysis
Existing plus Approved plus Full Development Conditions**

Intersection	Movement	A.M. Peak Hour		P.M. Peak Hour	
		LOS ¹	Delay ²	LOS ¹	Delay ²
Todd George Parkway and Blue Parkway	<i>Traffic Signal</i>	D	37.3	D	45.1
Ranson Road and US-50 Westbound Ramps	<i>Traffic Signal</i>	C	26.3	B	18.0
Ranson Road and US-50 Eastbound Ramps	<i>Traffic Signal</i>	B	17.6	C	23.6
Ranson Road and Oldham Parkway	<i>Traffic Signal</i>	C	21.2	C	27.2

**Table 7 – Continued
Intersection Operational Analysis
Existing plus Approved plus Full Development Conditions**

Intersection	Movement	A.M. Peak Hour		P.M. Peak Hour	
		LOS ¹	Delay ²	LOS ¹	Delay ²
Ranson Road and 11th Street					
	Eastbound Left-Turn	F	54.9	F	76.2
	Eastbound Through/Right-Turn	B	10.7	B	11.5
	Westbound Left-Turn	D	33.9	D	34.1
	Westbound Through/Right-Turn	B	11.8	B	11.0
	Northbound Left-Turn	A	9.1	A	9.8
	Southbound Left-Turn	A	9.8	A	9.4
Ranson Road and Site Drive 1					
	Northbound	B	12.4	B	12.6
	Westbound Left-Turn	A	0.0	A	0.0
Ranson Road and Site Drive 2					
	Northbound	A	9.6	A	9.8
	Westbound Left-Turn	A	0.0	A	0.0
Ranson Road and Site Drive 3					
	Northbound	A	9.0	A	9.0
	Westbound Left-Turn	A	0.0	A	0.0
Ranson Road and Site Drive 4					
	Northbound	A	8.9	A	8.8
	Westbound Left-Turn	A	0.0	A	0.0

1 – Level of Service
2 – Delay in seconds per vehicle

As shown in **Table 7**, all but two of the study intersections are anticipated to operate at acceptable levels of service with the aforementioned improvements. The intersection of Todd George Parkway and Blue Parkway is projected to operate at LOS D. An acceptable LOS may be able to be achieved with capacity improvements however the close spacing between the ramps and frontage road will continue to be an issue as queues extend between intersections.

There are several queues that are projected to exceed the available storage. These locations are the northbound left-turn movement at the Blue Parkway and at the US-50 westbound ramps. Volumes indicate that dual northbound left-turn lanes may be needed at the westbound ramps intersection. Given the constraints of the existing bridge and the close spacing of the frontage roads, the only way the queuing issues can be addressed in this area is with interchange reconfiguration.

The side street movements on 11th Street are projected to experience less delay with Ranson Road being widened for additional through lanes. However, the eastbound left-turn movement is still projected to operate at LOS F during the peak hours. The westbound left-turn movement improves to LOS D.

Summary

TranSystems has completed a traffic impact study for the proposed commercial and residential development to be located generally in the southeast corner of Ranson Road and Oldham Parkway in Lee's Summit, Missouri. The purpose of this study was to assess the impact of the proposed development on the surrounding transportation system.

The proposed development will be built in four phases. Phases 1 and 4 include the gas station and commercial land uses. These phases generate the majority of development traffic. The self-storage and residential land uses generate a minimal amount of development traffic. The site will be accessed from four new driveways along Oldham Parkway.

The existing conditions operational analysis indicated that close spacing between the frontage road and US-50 ramp intersections leads to congestion. There is approximately 200 feet of storage on Todd George Parkway between the signalized Blue Parkway and US-50 westbound ramps intersections. There is also roughly 200 feet of storage on Ranson Road between the signalized Oldham Parkway and US-50 eastbound ramps intersections. The queue results indicate that the queues of through traffic on Todd George Parkway and on Ranson Road exceed the 200 feet of available storage at times during the peak hours.

A number of developments have been approved in recent years in the vicinity of the development site. Traffic from the unbuilt or unoccupied portions of these approved developments was included in several analysis scenarios. The addition of development traffic will increase queueing between closely spaced intersections. Long queues are also projected on the westbound US-50 exit ramp due to the middle school development. The addition of development traffic will also increase delays for side street traffic at the 11th Street and Ranson Road intersection.

Several capacity improvements are identified to mitigate the addition of development traffic for Phases 1-3, which are listed below.

Ranson Road and Oldham Parkway

- ▶ Construct a westbound right-turn lane with a minimum storage length of 150 feet plus appropriate taper.
- ▶ Construct a westbound left-turn lane with a minimum storage length of 150 feet plus appropriate taper.
- ▶ Widen the south leg of the intersection to include a northbound left-turn lane with a minimum storage length of 200 feet plus appropriate taper. This improvement will result in a center two-way left-turn lane on Ranson Road between 11th Street and Oldham Parkway.
- ▶ Lengthen the northbound right-turn/through lane to provide a minimum storage length of 200 feet plus appropriate taper.

Oldham Parkway and Site Drive 1

- ▶ Construct an eastbound right-turn lane with a minimum storage length of 200 feet plus appropriate taper

Additionally, Oldham Parkway is to be improved to an urban roadway section adjacent to the development site, in accordance with the city's Unimproved Road Policy.

The addition of traffic from Phase 4 of the proposed development will require more extensive improvements for the street network to operate near acceptable levels of service. The following improvements are identified for the full development scenario.

US-50 Westbound Ramp and Todd George Parkway

- ▶ Construct second westbound left-turn lane to provide a minimum storage length of 250 feet plus appropriate taper.

US-50 Eastbound Ramp and Ranson Road

- ▶ Lengthen the eastbound right-turn lane to provide a minimum storage length of 400 feet plus appropriate taper
- ▶ Construct a continuous northbound right turn lane between the ramp and Oldham Parkway intersection.

Ranson Road and Oldham Parkway

- ▶ Construct a northbound right-turn/through lane with a minimum storage length of 200 feet plus appropriate taper.
- ▶ Construct a continuous southbound right-turn lane between Oldham Parkway and the eastbound ramp intersection.
- ▶ Lengthen the southbound left-turn lane by reducing the wider section of median to a width of four feet between Oldham Parkway and the eastbound ramps. This will create a continuous left-turn lane.
- ▶ Construct second eastbound left-turn lane to provide a minimum storage length of 250 feet plus appropriate taper.

Ranson Road

- ▶ Construct an additional through lane in both the northbound and southbound directions to continue south of Oldham Parkway through the 11th Street intersection.