



April 26, 2019

Mr. David Hirschbuehler, AIA, LEED AP BD+C  
BATESFORUM  
2199 Innerbelt  
Business Center Drive  
St. Louis, MO 63114

RE: Traffic Impact Study  
St. Louis County Library Facility  
Frontenac, Missouri  
Lochmueller #519-0010-1TE

Dear Mr. Hirschbuehler,

Lochmueller Group has prepared the following study to evaluate the traffic impact associated with a proposed St. Louis County Library administration and genealogy research facility in Frontenac, Missouri. The site is located in the northeast quadrant of Clayton Road and Spoede Road.

The development will consist of an approximately 65,000 s.f. administration and operations building as well as a 15,000 s.f. genealogy research building. It is anticipated that 175 staff members will work on the site with a small amount of visitors. The buildings are expected to open in late 2020 or early 2021.

Access to the buildings is proposed via a single full-access driveway on Spoede Road opposite South Forty Drive/I-64 Ramps. The proposed scope of services has been tailored to satisfy the requirements of the Missouri Department of Transportation (MoDOT) and the City of Frontenac. A preliminary site plan is provided in **Figure 1** and an overview of the site's location is provided in **Figure 2**.

The purpose of this study was to determine how much traffic would be generated by the proposed development, assess the ability of motorists to safely enter and exit the site at the access point, determine the impact of the additional trips on the adjoining road system, and identify the need for off-site improvements to mitigate any impacts. The following intersections were included in the study:

- Spoede Road at North Forty Drive
- Spoede Road at South Forty Drive/Site Driveway
- Spoede Road at Clayton Road
- Clayton Road at Stonington Place



The analysis of these intersections identified the existing and 2020 forecasted operating conditions, thereby providing a measure of the impacts from the site-generated traffic. The 2020 construction-year forecasts accounted for the planned redevelopment of a former temple on North Forty Drive as a 120-student private high school for Marian Academy. It also considered the 31 Villas being developed by McBride Homes to the east of the proposed site. The following scenarios were evaluated in this study:

- Existing Conditions
- 2020 Baseline / No-Build Conditions (existing plus the school & Villa traffic)
- 2020 Forecasted / Build Conditions (2020 Baseline plus the proposed library development)

The evaluation focused on the typical weekday morning (7:00 AM to 9:00 AM) and evening (4:00 PM to 6:00 PM) peak periods since these represent the busiest times for the adjacent roadways as well as for the proposed use. If the site traffic can be accommodated during these peak periods, it stands to reason that adequate capacity would be available throughout the remainder of the day.



**Figure 1: Preliminary Site Plan (by others)**





**Figure 2: Site Location Map**

## Existing Conditions

In order to identify the traffic impacts associated with the proposed development, it was first necessary to quantify the roadway, traffic and operating conditions as they currently exist.

## Existing Roadway Conditions

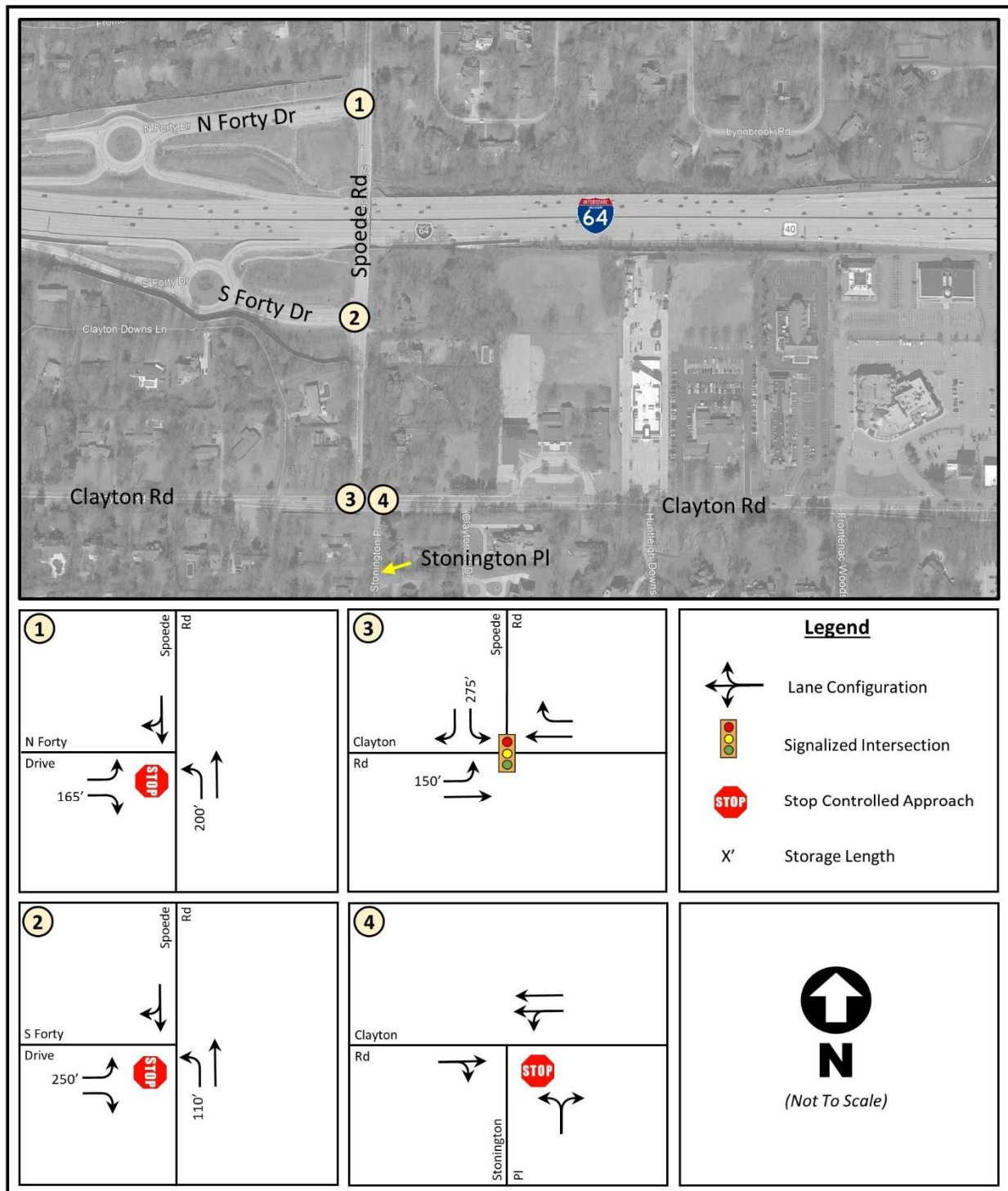
The study area road system was inventoried to identify existing roadway types, lane configurations, functional classifications, posted speeds, access provisions, and intersection control.

Spoele Road is a major collector that connects Clayton Road to Olive Boulevard (Missouri Route 340). It runs north-south and consists of a two-lane cross section with auxiliary turn lanes at major intersections. It has a posted speed limit of 30 miles per hour (mph).

Both North Forty Drive and South Forty Drive form tee-intersections with Spoele Road and connect Spoele Road with the I-64 on and off ramps. The intersections operate under side-street stop control and provide dedicated left and right-turn lanes on the off-ramps. A northbound left-turn lane is provided on Spoele Road at both intersections for motorists turning to the west.

Clayton Road is classified as a minor arterial and travels in the east-west direction. The speed limit is 35 mph within the study area. It has a signalized intersection with Spoele Road. Stonington Place, which is classified as a local residential road, intersects Clayton Road approximately 75 feet east of Spoele Road (center to center distance) and is controlled by a stop sign.

All existing intersection lane configurations and traffic control are depicted in **Figure 3**.



**Figure 3: Existing Lane Configuration and Traffic Control**

## Existing Traffic Volumes

To quantify study area traffic volumes, turning movement counts were performed at the study intersections on March 7<sup>th</sup>, 2019 from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. Based on the collected data, the peak hours were determined to occur from 7:00 AM to 8:00 AM and 4:45 PM to 5:45 PM. The existing peak hour volumes are shown in **Figure 4**.

## Existing Operating Conditions

Traffic operating conditions at the study intersections were evaluated using Synchro 10 traffic modeling software, which is based upon the methodologies outlined in the “Highway Capacity Manual” (HCM) published by the Transportation Research Board.

The performance of a transportation system is quantified by Levels of Service (LOS), which are measures of traffic flow that consider factors such as speed, delay, interruptions, safety, and driver comfort and convenience. There are six levels of service ranging from LOS A (“free flow”) to LOS F (“oversaturated”). LOS C is commonly used for design purposes and represents a roadway with volumes utilizing 70 to 80 percent of its capacity. LOS D is typically considered acceptable for peak period conditions in urban and suburban areas.

Level of service criteria vary depending upon the roadway component being evaluated. Intersections are most commonly evaluated since roadway capacity is typically dictated by the number of vehicles that can be served at critical intersections. For intersections, the criteria are based on delay and the type of control (i.e., whether it is signalized or unsignalized/roundabout).

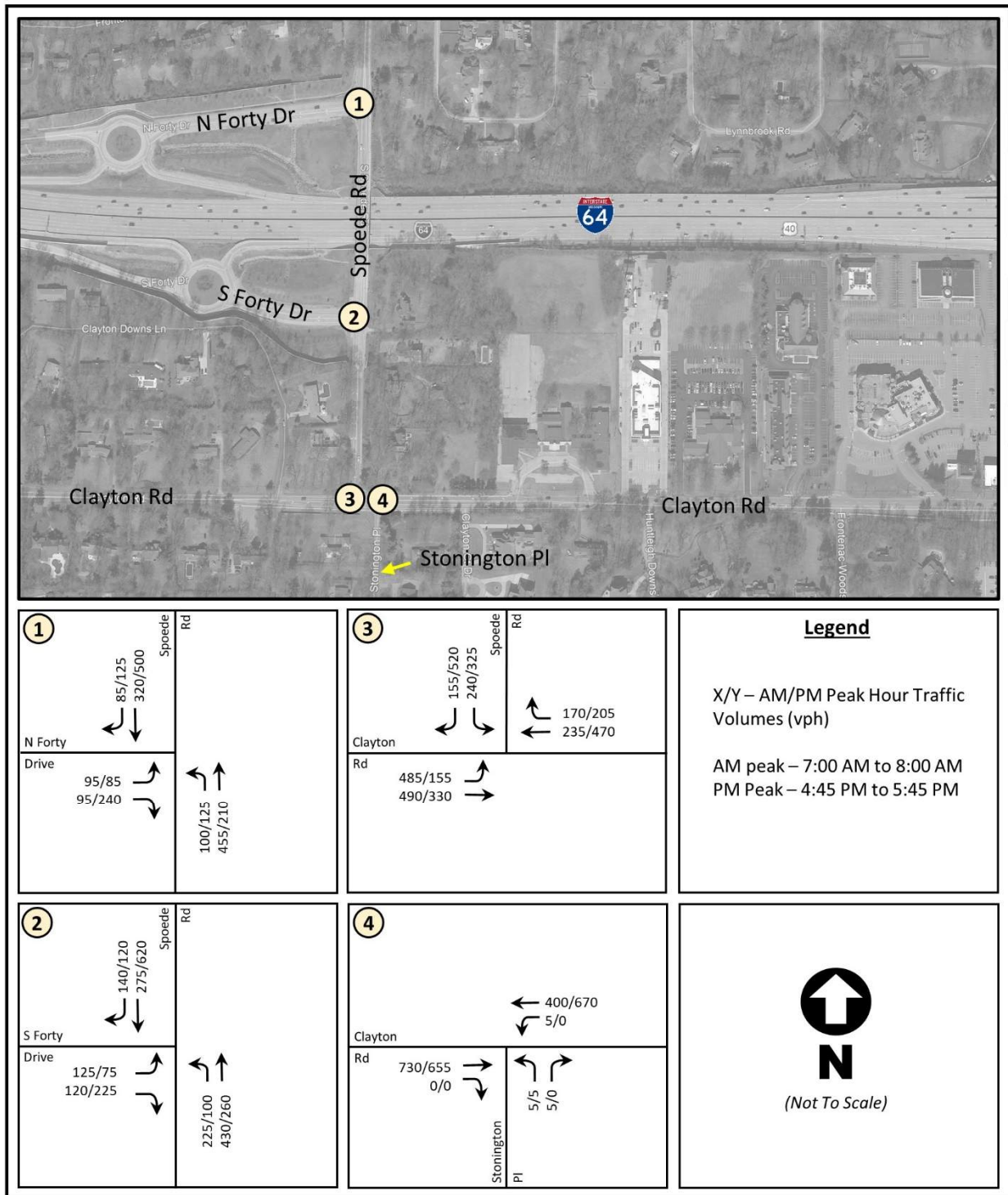
Signalized intersections reflect higher delay tolerances as compared to unsignalized and roundabout locations because motorists are accustomed to and accepting of longer delays at signals. For signalized and all-way stop intersections, the average control delay per vehicle is estimated for each movement and then aggregated for each approach and the intersection as a whole. For intersections with partial (side-street) stop control, delay is calculated for the minor movements only (side-street approaches and major road left-turns) since through traffic on the major road is not required to stop.

The thresholds for intersection level of service are summarized in **Table 1**. Existing operating conditions are summarized in **Table 2** and are presented in terms of Level of Service, delay (seconds per vehicle), and 95<sup>th</sup> percentile queue length (feet).

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

Level of Service	Delay per Vehicle (sec/veh)	
	Signalized	Unsignalized/Roundabout
A	< 10	0-10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50





**Figure 4: Existing Peak Hour Traffic Volumes**

**Table 2: Existing Operating Conditions**

Int #	Intersection/ Approach	AM Peak		PM Peak	
		LOS (Delay)	Max. Queue	LOS (Delay)	Max. Queue
<b>1</b>	<b><i>Spoele Road @ North Forty Drive (Unsignalized, Side Street STOP Control)</i></b>				
	Eastbound Left-Turn onto Spoele Rd	F (62.4)	100'	F (60.3)	93'
	Eastbound Right-Turn onto Spoele Rd	B (12.4)	18'	D (26.8)	118'
	Northbound Left-Turn onto N 40 Drive	A (8.8)	10'	B (10.1)	15'
<b>2</b>	<b><i>Spoele Road @ South Forty Drive (Unsignalized, Side Street STOP Control)</i></b>				
	Eastbound Left-Turn onto Spoele Rd	F (>200)	273'	F (75.6)	85'
	Eastbound Right-Turn onto Spoele Rd	B (12.7)	23'	D (30.2)	108'
	Northbound Left-Turn onto S 40 Drive	A (9.6)	25'	B (10.7)	15'
<b>3</b>	<b><i>Spoele Road @ Clayton Road (Signalized)</i></b>				
	<b>Overall Intersection</b>	<b>B (18.8)</b>	<b>-</b>	<b>B (19.8)</b>	<b>-</b>
	Eastbound Approach	B (19.8)	#360'	B (10.2)	144'
	Westbound Approach	B (17.6)	165'	C (24.3)	366'
	Southbound Approach	B (17.8)	171'	C (21.4)	275'
<b>4</b>	<b><i>Clayton Road @ Stonington Place (Unsignalized, Side Street STOP Control)</i></b>				
	Westbound Left-Turn onto Stonington Pl	A (9.7)	0'	A (0.0)	0'
	Northbound Approach	C (19.5)	3'	C (20.3)	3'

# 95<sup>th</sup> percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

As shown, eastbound left-turns onto Spoele Road from both North Forty Drive and South Forty Drive experience delays commensurate with LOS F during morning and afternoon peak hours. These left-turns must wait for a gap in both northbound and southbound traffic before proceeding. While Synchro may overstate the eastbound left-turn delay to some extent, observations confirmed that motorists experience difficulty in completing that movement during the peaks. Conversely, operating conditions of Clayton Road at its intersections with Spoele Road and Stonington Place are generally favorable during both peak periods.

### Sight Distance Assessment

Access to the site is proposed via a single driveway on Spoele Road opposite South Forty Drive. Sight distance at the proposed entrance was field verified to be adequate for passenger vehicles based on the approximate driveway location and grade in accordance with MoDOT's Engineering Policy Guide. Note that sight distances should be verified during the design process and then field inspected prior to opening the entrance to traffic.



During the site visit, the sight distance for eastbound motorists on South Forty Drive approaching Spoede Road was also checked. Motorists stopping at the stop bar to make an eastbound left-turn should be able to observe approaching vehicles in the southbound direction at a distance of 335 feet. This distance is based on the passenger vehicle sight distance requirements outlined in MoDOT's Engineering Policy Guide.

It was found from the field observation that the sight distance was adequate to safely make the eastbound left-turn onto Spoede Road. A previous sight distance constraint at this location was corrected by MoDOT. **Photo 1** shows the currently available sight lines.



**Photo 1: Eastbound South Forty Drive at Spoede Road Looking North At Stop Bar**

## 2020 Baseline Conditions

Baseline conditions were analyzed for the year 2020, which is when it is anticipated that the proposed site would be complete. It was necessary to forecast anticipated traffic growth within the study area based on “background” growth from other planned developments. Two specific developments are planned near the study location:

- Redevelopment of a former temple named ‘B’Nai El Congregation’ on North Forty Drive as a 120-student private high school for Marian Academy
- 31 McBride Villas to the east of the proposed site

Other than these two developments, no additional background traffic was assumed as the study area is largely built out. It should be noted that the temple is currently vacant and not generating any trips.

## Baseline Trip Generation & Distribution

The background traffic growth was estimated based on the 120-student private high school and 31 Villas. The trip generation estimates were based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10<sup>th</sup> Edition. The ITE land uses Private School (K-12) (ITE Code: 536) and Single-Family Detached Housing (ITE Code: 210) were used to estimate the trips. The baseline background trips that would be generated near the study location are summarized in **Table 3**.

**Table 3: 2020 Baseline Background Trips**

Land Use	ITE Code	Students/ Units	AM Peak			PM Peak		
			In	Out	Total	In	Out	Total
Private School	536	120	60	35	95	10	10	20
Villas	210	31	5	20	25	5	30	35

As shown above, the school would generate a total of approximately 95 and 20 trips, while the Villas would generate a total of approximately 25 and 35 trips during the AM and PM peak hours, respectively.

The directional distribution of the trips generated by the school and the villas were assumed based on their location and access relative to I-64. The school would have access points on North Forty Drive and the villas would have a single access point on Clayton Road. The estimated directional distribution percentages are depicted in **Table 4**.

**Table 4: Directional Distribution Percentages for School & Villas**

Direction	School	Villas
To/From North on Spoede	5%	0%
To/From East on I-64	40%	45%
To/From West on I-64	40%	45%
To/From West on Clayton	5%	0%
To/From East on Clayton	10%	10%

## Baseline Traffic Volumes

The 2020 baseline scenario represents conditions with the school and villas in place but not the proposed library site. The trips to/from the school and the villas were combined with the 2019 existing traffic to develop the 2020 baseline traffic volumes summarized in **Figure 5**.

## Baseline Operating Conditions

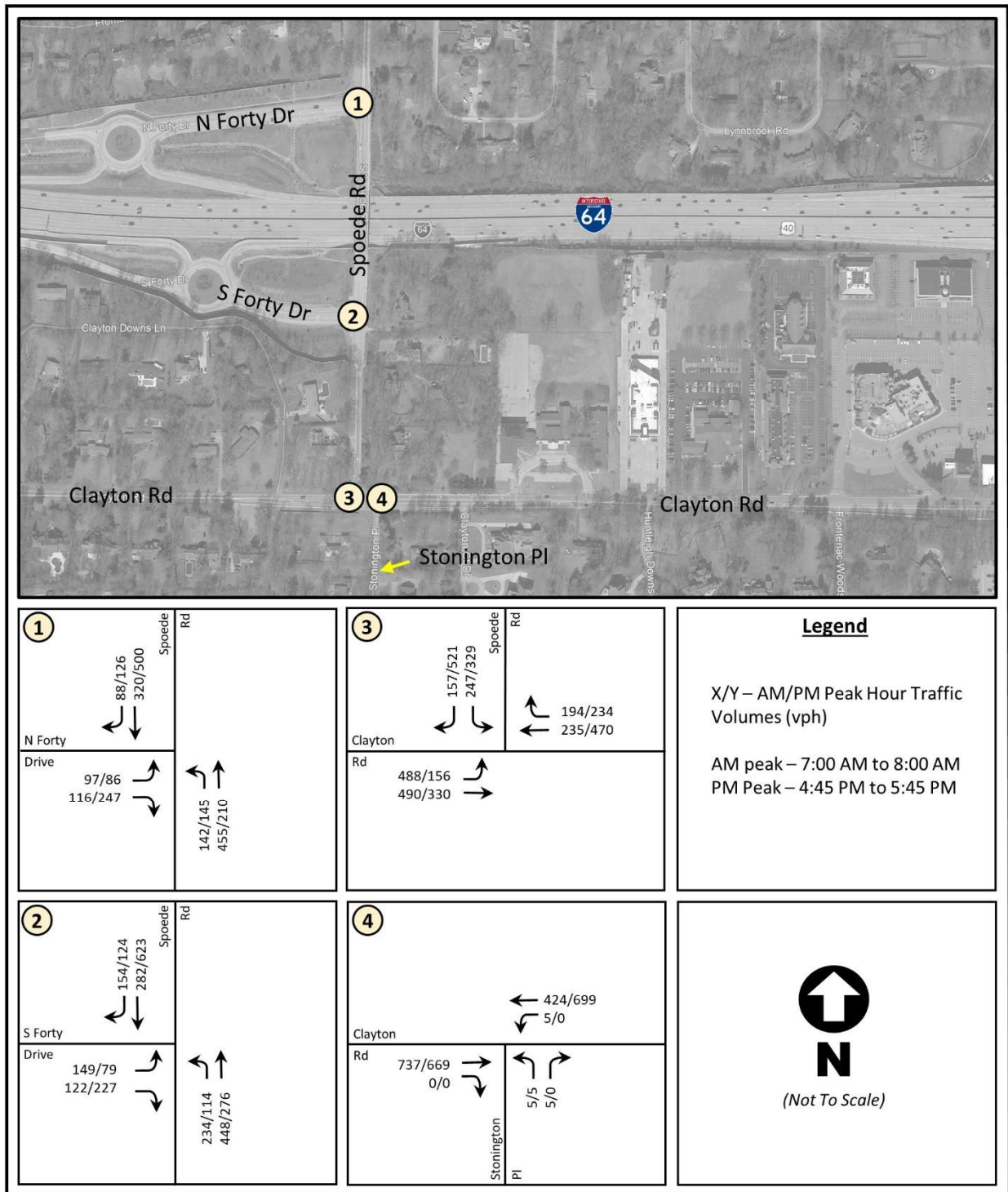
Similar to existing conditions, the 2020 baseline operating conditions were analyzed using Synchro 10, with LOS, delay, 95<sup>th</sup> percentile queue, and average queue as the measures of effectiveness. The 2020 baseline operating conditions are shown in **Table 5**.

**Table 5: 2020 Baseline Operating Conditions**

Int #	Intersection/ Approach	AM Peak		PM Peak	
		LOS (Delay)	Max. Queue	LOS (Delay)	Max. Queue
<b>1</b>	<b><i>Spoele Road @ North Forty Drive (Unsignalized, Side Street STOP Control)</i></b>				
	Eastbound Left-Turn onto Spoele Rd	<b>F (102.5)</b>	138'	<b>F (76.1)</b>	108'
	Eastbound Right-Turn onto Spoele Rd	B (12.8)	23'	D (27.9)	125'
	Northbound Left-Turn onto N 40 Drive	A (9.1)	15'	B (10.3)	20'
<b>2</b>	<b><i>Spoele Road @ South Forty Drive (Unsignalized, Side Street STOP Control)</i></b>				
	Eastbound Left-Turn onto Spoele Rd	<b>F (&gt;200)</b>	380'	<b>F (101.3)</b>	105'
	Eastbound Right-Turn onto Spoele Rd	B (13.0)	25'	D (31.3)	110'
	Northbound Left-Turn onto S 40 Drive	A (9.8)	28'	B (11.0)	18'
<b>3</b>	<b><i>Spoele Road @ Clayton Road (Signalized)</i></b>				
	<b>Overall Intersection</b>	<b>B (19.0)</b>	-	<b>B (19.6)</b>	-
	Eastbound Approach	C (20.4)	#365'	B (10.4)	144'
	Westbound Approach	B (17.0)	165'	C (23.6)	366'
	Southbound Approach	B (18.1)	176'	C (21.4)	279'
<b>4</b>	<b><i>Clayton Road @ Stonington Place (Unsignalized, Side Street STOP Control)</i></b>				
	Westbound Left-Turn onto Stonington Pl	A (9.8)	0'	A (0.0)	0'
	Northbound Approach	C (19.9)	3'	C (20.8)	3'

# 95<sup>th</sup> percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.





**Figure 5: 2020 Baseline Traffic Volumes**

**Table 5** indicates that all the critical movements during both morning and afternoon peak periods would continue to operate comparably to the existing conditions, but would incur increased delay due to the additional trips to/from the proposed school and the villas. The delays for the eastbound left-turns onto Spoele Road from both North Forty Drive and South Forty Drive would increase significantly.

## 2020 Forecasted Conditions

Once the existing roadway and baseline traffic conditions have been established, the impacts of the additional traffic generated by the proposed St. Louis County Library site can be analyzed. The purpose of this scenario is to identify the impacts of the proposed development and determine the roadway and traffic control improvements that may be necessary to support the resulting traffic demands.

### Forecasted Trip Generation & Distribution

The site-generated traffic volumes were estimated based on the total square footage (s.f.) of the proposed St. Louis County Library administration and genealogy research facility. The development would consist of approximately 65,000 s.f. administration and operations building and 15,000 s.f. genealogy research building, which gives a total of 80,000 s.f. of office space. For the trip generation estimates, ITE Land Use 710: General Office Building was used. The forecasted trips that would be generated by the proposed development are summarized in **Table 6**.

**Table 6: Trip Generation of the Proposed Library Site**

Land Use	ITE Code	Size (SF)	AM Peak			PM Peak		
			In	Out	Total	In	Out	Total
Office Space	710	80,000	85	15	100	15	75	90

As shown above, the proposed development would generate a total of approximately 100 and 90 trips during the morning and afternoon peak hours, respectively. No pass-by trip reduction was assumed since office trips are typically a destination trip and not a convenience trip.

The directional distribution of the site-generated traffic was assumed based on the site's location and access point. The proposed directional distribution percentages are depicted in **Table 7**.

**Table 7: Directional Distribution Percentages for the Proposed Site**

Direction	Office Building
To/From North on Spoede	5%
To/From East on I-64	35%
To/From West on I-64	40%
To/From West on Clayton	5%
To/From East on Clayton	15%

### **Forecasted Traffic Volumes**

The 2020 forecasted scenario represents conditions with the 2020 baseline conditions plus the proposed library site. The trips to/from the proposed site were combined with the 2020 baseline traffic to develop the 2020 forecasted traffic volumes summarized in **Figure 6**.

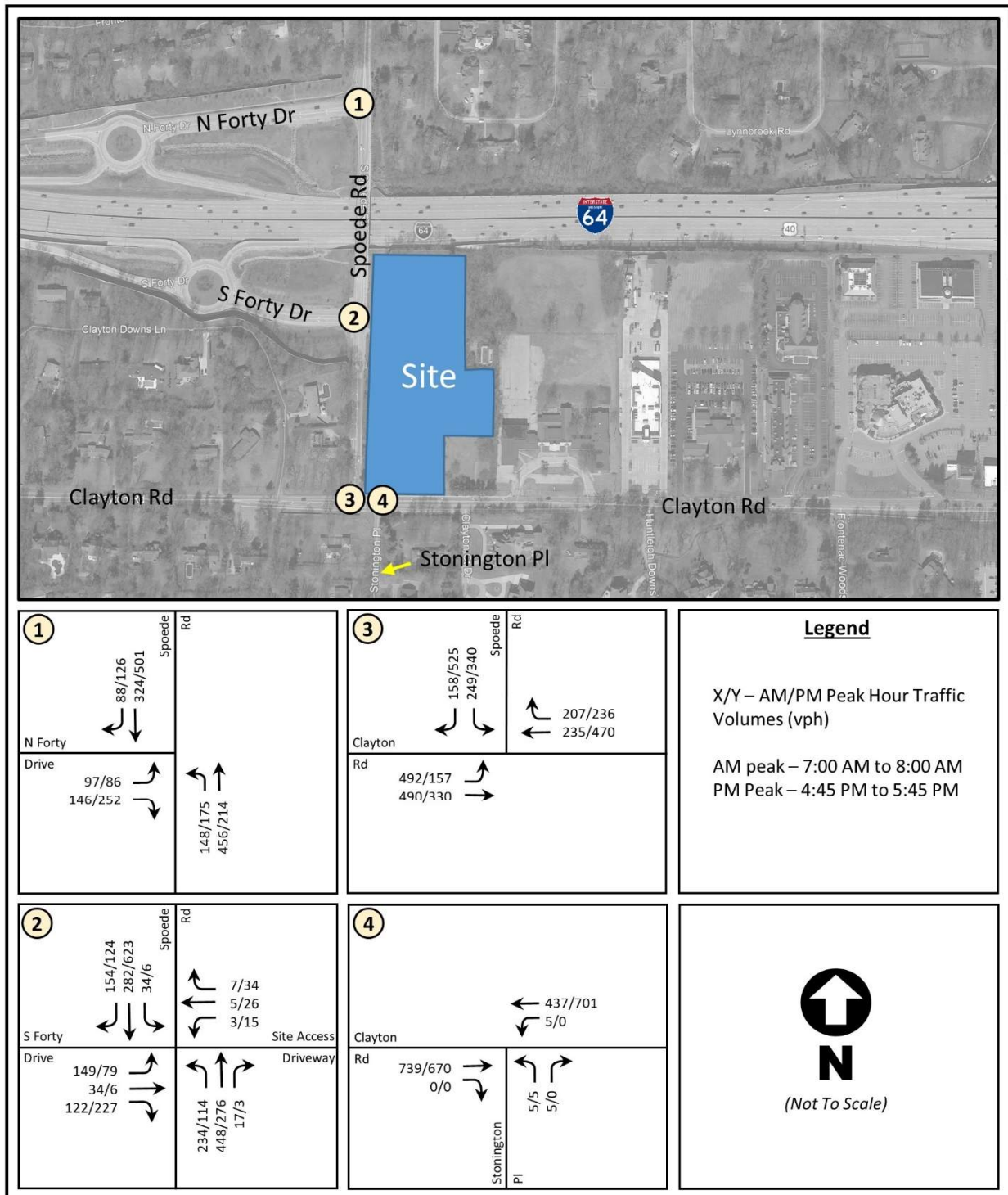


Figure 6: 2020 Forecasted Traffic Volumes



## Forecasted Operating Conditions

2020 forecasted operating conditions were evaluated to determine the adequacy of the road network to accommodate traffic generated by the proposed development and to mitigate external impacts. Two alternatives were evaluated for the Spoele Road and South Forty Drive/Site Driveway intersection:

- **Alternative A: Roundabout**
- **Alternative B: Traffic Signal**

### Alternative A: Roundabout

Alternative A evaluated a single-lane roundabout at the South Spoele and South Forty Drive/Site Driveway intersection. The roundabout option was evaluated using Sidra 6.0 traffic modeling software during both peak periods. The operating conditions are summarized in **Table 8**.

**Table 8: 2020 Forecasted Operating Conditions with Alternative A**

Int #	Intersection/ Approach	AM Peak		PM Peak	
		LOS (Delay)	Max. Queue	LOS (Delay)	Max. Queue
<b>2</b>	<b><i>Spoele Road @ South Forty Drive/ Site Access Driveway (Roundabout)</i></b>				
	<b>Overall Intersection</b>	<b>C (21.2)</b>	<b>-</b>	<b>C (24.8)</b>	<b>-</b>
	Eastbound Approach	B (10.7)	121'	D (28.9)	120'
	Westbound Approach	A (12.3)	8'	A (7.1)	19'
	Northbound Approach	D (34.3)	837'	A (5.1)	120'
	Southbound Approach	B (10.2)	244'	<b>E (35.8)</b>	1065'

Overall, the roundabout option (Alternative A) would operate acceptably with a LOS C during both peak periods. However, during the PM peak period, the operating conditions of the southbound approach would reach LOS E (>35.0) due to high traffic demand. Furthermore, based on the Sidra results, the 95<sup>th</sup> percentile queue of the northbound approach during the AM peak period (837 feet) could extend beyond the next intersection (Clayton Road). Similarly, during the PM peak period, the southbound approach 95<sup>th</sup> percentile queue could extend beyond the North Forty Drive intersection.

It is also important to note that the library would have large book-mobile vehicle (WB-67) movements accessing the site. Based on right-of-way and grade constraints, it would likely be infeasible to construct a roundabout large enough to accommodate these trucks at this location.

Based on the relatively poor operating conditions anticipated and constructability constraints, a roundabout is not recommended at the intersection of Spoele Road and South Forty Drive/Site Access Driveway.

### Alternative B: Traffic Signal

As discussed in the 2020 baseline conditions, operating conditions would be unacceptable under the no-build conditions at the Spoele Road intersections with both North Forty Drive and South Forty Drive. Therefore, a traffic signal warrant analysis was performed at both intersections.

### Signal Warrants

The traffic signal warrant analysis was based on the FHWA's Manual on Uniform Traffic Control Devices (MUTCD).

Warrant evaluations for traffic signals are based on the criteria found in MUTCD Chapter 4. The MUTCD provides nine criteria for evaluating an intersection and determining whether a traffic signal is justified, as follows:

1. Eight-Hour Vehicular Volume
2. Four-Hour Vehicular Volume
3. Peak Hour
4. Pedestrian Volume
5. School Crossing
6. Coordinated Signal System
7. Crash Experience
8. Roadway Network
9. Intersection Near a Grade Railroad Crossing

Observations at the existing intersections saw minimal pedestrian activity, the intersections are not immediately adjacent to a school, are not part of a coordinated signal system, do not meet the criteria for the roadway network warrant, are not near a railroad grade crossing, and the area is not a high-crash location. The peak hour warrant should only be applied in unusual circumstances, such as shift changes at an industrial park or hospital, where there is a large influx of traffic during a small period of time, which is not the case at this intersection. Therefore, this analysis focused on **Warrant 1** only, which is based on conditions during the 8<sup>th</sup> highest hour of traffic.

The traffic volumes for the 8<sup>th</sup> highest hour during a typical day are estimated to be approximately 55% of the peak hour volume. If the 8<sup>th</sup> highest hour does not meet the criteria for a traffic signal, the requirements for Warrant 1 would not be met.

There are two conditions that constitute Warrant 1: 1) Condition A is intended where large volumes of traffic intersect, and 2) Condition B is applied to situations where a continuous flow of traffic on the major street creates a significant delay on the minor street in order to enter or cross the major street. Per Section 4C.02 of the MUTCD:

"The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:

- A. The vehicles per hour given in both of the 100 percent columns of Condition A in [MUTCD] Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or
- B. The vehicles per hour given in both of the 100 percent columns of Condition B in [MUTCD] Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection."

The combination of Conditions A and B can be used when each condition is not satisfied by itself. A signal would also be warranted if it is found that both Conditions A and B are met using the 80% columns for

each of any 8 hours of an average day. The Warrant 1 analysis at the Spode Road intersections with North Forty Drive and South Forty Drive are summarized in **Table 9** and **Table 10**, respectively.

**Table 9: Signal Warrant 1 Analysis at Spode Road & North Forty Drive**

Warrant 1	# of Lanes		8 <sup>th</sup> Highest Hourly Volume		Major Street (both approaches)		Minor Street (one-direction only)		Meets 100% Criteria?	Meets 80% Criteria?
	Major	Minor	Major Street	Minor Street	100%	80%	100%	80%		
Condition A	1	2	559	186	500	400	200	160	No	Yes
Condition B	1	2			750	600	100	80	No	No

**Table 10: Signal Warrant 1 Analysis at Spode Road & South Forty Drive**

Warrant 1	# of Lanes		8 <sup>th</sup> Highest Hourly Volume		Major Street (both approaches)		Minor Street (one-direction only)		Meets 100% Criteria?	Meets 80% Criteria?
	Major	Minor	Major Street	Minor Street	100%	80%	100%	80%		
Condition A	1	2	630	172	500	400	200	160	No	Yes
Condition B	1	2			750	600	100	80	No	Yes

As shown above, a traffic signal would be warranted at the South Forty Drive intersection based on the volumes meeting the 80% criteria for both Conditions A and B. The North Forty Drive signal warrants fall just short of meeting the same criteria; if 41 additional vehicles are added to the major street it would fully meet the warrants.

In order to maintain uniformity at both I-64 ramps (North Forty Drive and South Forty Drive) and to improve operating conditions during peak peak periods, it is recommended that traffic signals be installed at both intersections. These signals should be interconnected and coordinated with the Spode/Clayton Road signal for maximum efficiency.

It is important to note that the installation of traffic signals is necessary to improve existing and no-build operating conditions, and the need for this improvement is not the direct result of the proposed library development. Nevertheless, **it would be appropriate for the traffic signal at the South Forty Drive intersection with Spode Road and the proposed site drive to be installed in conjunction with the library project. The signal at the North Forty Drive intersection is not a result of the library development and as such should be the responsibility of others.**

The analysis of 2020 forecasted operating conditions with the recommended improvements is summarized in **Table 11**.

**Table 11: 2020 Forecasted Operating Conditions with Alternative B**

Int #	Intersection/ Approach	AM Peak		PM Peak	
		LOS (Delay)	Max. Queue	LOS (Delay)	Max. Queue
<b>1</b>	<b><i>Spode Road @ North Forty Drive (Signalized)</i></b>				
	<b>Overall Intersection</b>	<b>A (7.5)</b>	<b>-</b>	<b>A (9.7)</b>	<b>-</b>
	Eastbound Approach	C (21.5)	90'	C (20.3)	92'
	Northbound Approach	A (3.3)	94'	A (5.5)	97'
	Southbound Approach	A (5.2)	117'	A (6.4)	216'
<b>2</b>	<b><i>Spode Road @ South Forty Drive/ Site Access Driveway (Signalized)</i></b>				
	<b>Overall Intersection</b>	<b>B (17.3)</b>	<b>-</b>	<b>B (14.5)</b>	<b>-</b>
	Eastbound Approach	C (31.2)	136'	C (22.2)	92'
	Westbound Approach	B (18.0)	5'	C (26.1)	52'
	Northbound Approach	B (12.0)	m260'	A (5.0)	43'
	Southbound Approach	B (15.6)	205'	B (15.9)	252'
<b>3</b>	<b><i>Spode Road @ Clayton Road (Signalized)</i></b>				
	<b>Overall Intersection</b>	<b>C (24.8)</b>	<b>-</b>	<b>C (21.3)</b>	<b>-</b>
	Eastbound Approach	C (25.1)	222'	B (14.0)	144'
	Westbound Approach	C (25.0)	191'	C (28.1)	366'
	Southbound Approach	C (24.0)	214'	B (19.7)	m277'
<b>4</b>	<b><i>Clayton Road @ Stonington Place (Unsignalized, Side Street STOP Control)</i></b>				
	Westbound Left-Turn would onto Stonington Pl	A (9.8)	0'	A (0.0)	0'
	Northbound Approach	C (19.8)	3'	C (21.1)	3'

# - 95<sup>th</sup> percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

m - volume for the 95<sup>th</sup> percentile queue is metered by the an upstream signal

As shown, all the intersections would operate favorably during both peak periods with the addition of traffic signals at South Forty and North Forty Drives. The laneage and traffic control within the study area under the recommended configuration are shown in **Figure 7**.



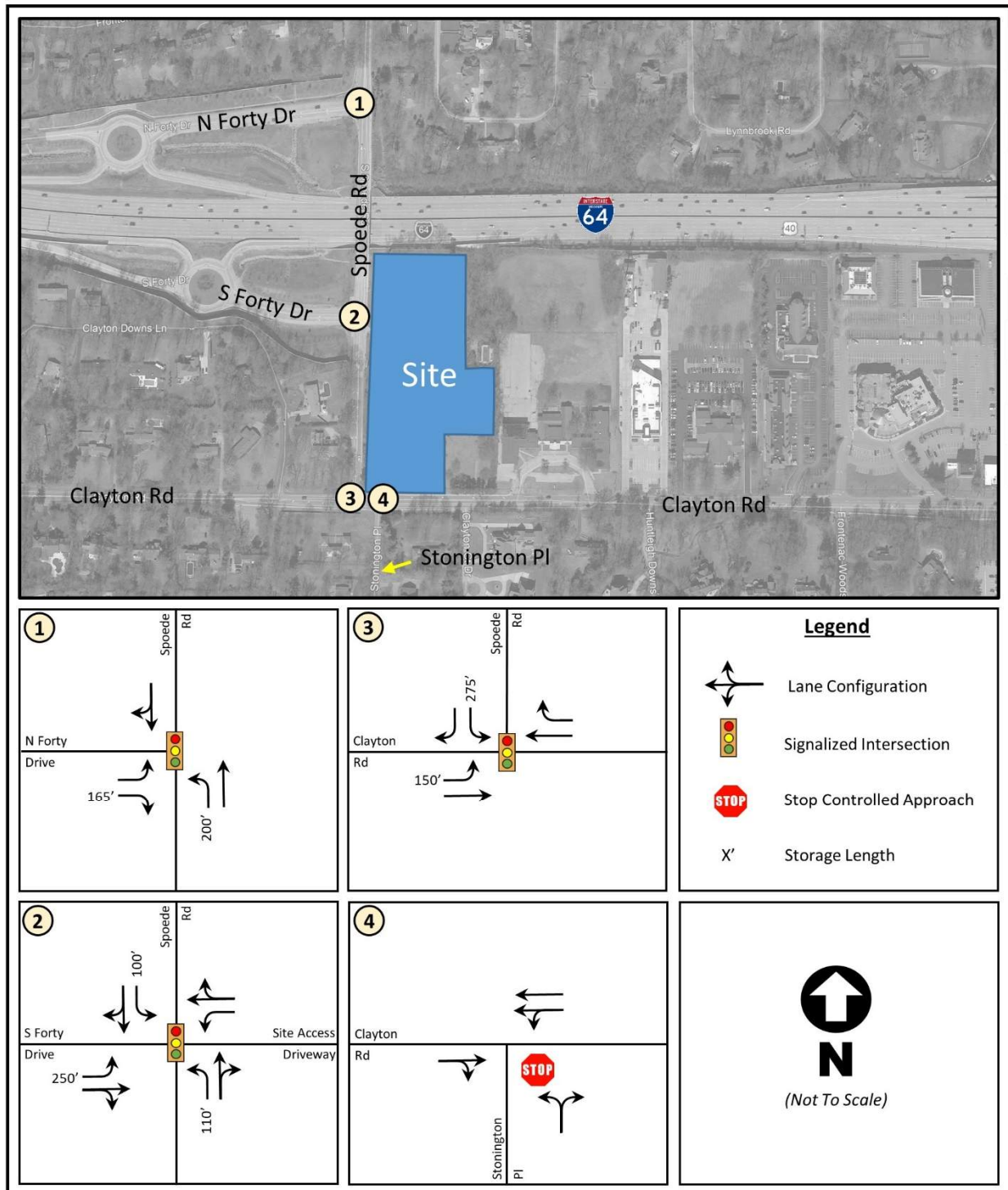


Figure 7: 2020 Forecasted Conditions- Laneage and Traffic Control



## Conclusions

Lochmueller Group has completed the preceding study to address the traffic impacts associated with the proposed administration/operations building and genealogy research building for St. Louis County Library in Frontenac. The evaluation resulted in the following conclusions:

- An analysis of existing operating conditions indicated that motorists making eastbound left-turns onto Spoele Road from both North Forty Drive and South Forty Drive experience lengthy delays during the peak hours while awaiting gaps in northbound and southbound traffic. These operational constraints would be exacerbated by other planned developments within the area.
- The proposed library development would generate approximately 100 and 90 trips during the morning and afternoon peak hours, respectively. The site would be served via a single full-access driveway on Spoele Road opposite South Forty Drive/I-64 Ramps.
- In order to maintain uniformity at both I-64 ramps (North Forty Drive and South Forty Drive) and to improve operating conditions during peak peak periods, it is recommended that traffic signals be installed at both intersections. These signals should be interconnected and coordinated with the Spoele/Clayton Road signal for maximum efficiency.

It is important to note that the installation of traffic signals is necessary to improve existing and no-build operating conditions, and the need for this improvement is not the direct result of the proposed library development. Nevertheless, it would be appropriate for the traffic signal at the South Forty Drive intersection with Spoele Road and the proposed site drive to be installed in conjunction with the library project. The signal at the North Forty Drive intersection is not a result of the library development and as such should be the responsibility of others.

We trust you will find this information useful in assessing the traffic impacts associated with the proposed library facility. Please contact me at (618) 667-1411 if you have any questions or comments concerning this report.

Sincerely,

**Lochmueller Group, Inc.**

A handwritten signature in black ink that reads "Dustin B. Riechmann".

Dustin Riechmann, P.E., PTOE  
Project Engineer