

5858 N COLLEGE, LLC

5858 N College Avenue Traffic Impact Study

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CHA Project #: 31993



Preparer Qualifications

I certify that this *Traffic Impact Study* has been prepared by me or under my direct supervision and that I have experience and training in the field of traffic and transportation engineering.

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Introduction

5858 N College, LLC is proposing a new development in Indianapolis, Indiana. The project site is located in the southwest quadrant of the intersection of College Avenue and Kessler Boulevard. Figure 1 shows the project area and Figure 2 shows the project site location. A preliminary site plan is provided in *Appendix A*.



Figure 1 – Project Area

The scope of this study was set forth by the City of Indianapolis Department of Public Works with input from the Indianapolis Public Transportation Corporation (IndyGo). Three traffic scenarios were analyzed.

Scenario A – Existing Conditions: Existing traffic volumes only, 2016

Scenario B - Existing Conditions (No Build): Future traffic volumes only, 2019

Scenario C – Future + Proposed: Future traffic volumes with the addition of the proposed site generated traffic volumes, 2019





Figure 2 – Project Site Location

For Scenario A, Existing Conditions, AM and PM peak hour turning movement counts were conducted in late 2015, at the intersections of College Avenue & Kessler Boulevard and College Avenue & 57th Street on a typical day.

The developer anticipates the opening of the property in 2018, but it will not be fully operational until 2019. Therefore, 2019 was used in the analysis as the full build out year. Based on the existing traffic and 2019 full build out year, a 1.0 percent annual background growth rate was assumed to occur outside of the proposed development. Thus, the projected 2019 peak hour traffic volumes were utilized in the analysis of all future conditions scenarios. This is Scenario B.



Next, traffic was generated assuming that the subject property is developed as shown on the preliminary site plan provided in *Appendix A*. The traffic volumes generated by the subject property were then added to the projected 2019 traffic volumes to represent Scenario C – Future + Proposed. Table 1 summarizes which traffic volumes are included in each scenario.

Included Traffic Volumes:	Existing Traffic (2016)	Future Traffic (2019)	Subject Property Traffic
Scenario A	\checkmark		
Scenario B		✓	
Scenario C		√	~

Table 1 – Traffic Analysis Scenarios

All three analysis scenarios include the AM and PM peak hour volumes at the existing intersections of College Avenue & Kessler Boulevard and College Avenue & 57th Street. The location of the existing intersections is indicated by a solid circle in Figure 2.

For future conditions with the subject site, a new intersection is created at one access point. The approximate location of this intersection is indicated by a dashed circle in Figure 2. The following proposed intersection was analyzed for future conditions with the subject site and the adjacent properties:

• College Avenue & Proposed Access Driveway; Full Access



Existing Roadway Conditions

College Avenue is a north-south roadway classified as a Minor Arterial on the Indiana Department of Transportation (INDOT) Roadway Inventory and has a posted speed limit of 35 mph within the study area. The northbound direction has three lanes, where the outside lane is used as on-street parking lane. The southbound direction has two lanes, where the outside lane is used as on-street parking lane. At major intersections along College Avenue, on-street parking is prohibited allowing vehicle movement on the outside lane. There are no bicycle facilities provided along College Avenue.

Kessler Boulevard is an east-west roadway classified as an Other Principal Arterial on the INDOT Roadway Inventory and has a posted speed limit of 35 mph within the study area. There is one travel lane in each direction and exclusive turn lanes at major intersections along the roadway. There are no on-street parking or bicycle facilities provided anywhere along Kessler Boulevard.

57th Street is an east-west roadway classified as a Local Road on the INDOT Roadway Inventory and has a posted speed limit of 30 mph within the study area. There is one travel lane in each direction. On-street parking is provided along 57th Street. There are no bicycle facilities provided along 57th Street.

The intersection of College Avenue & Kessler Boulevard is a signalized intersection. The east approach of Kessler Boulevard has a 125 ft. exclusive left-turn lane and one shared through/right-turn lane. The west approach of Kessler Boulevard has an 80 ft. exclusive left-turn lane and one shared through/right-turn lane. The south approach of College Avenue has a 120 ft. exclusive left-turn lane, one though lane and one shared through/right-turn lane. The north approach of College Avenue has a 90 ft. exclusive left-turn lane, one through lane and one shared through/right-turn lane.

The intersection of College Avenue & 57th Street is a signalized intersection approximately 0.35 miles south of Kessler Boulevard. Both approaches of 57th Street have one shared left/through/right-turn lane. The south approach of College Avenue has one shared though/left-turn lane and one shared through/right-turn lane. The north approach of College Avenue has one shared left/though/right-turn lane.



Existing Traffic Conditions

Intersection capacity analyses were conducted for AM and PM peak hour conditions at the study intersections. Synchro, an industry recognized analysis software, was used to determine Level of Service (LOS) ratings for each intersection. These LOS ratings are measured in terms of average control delay, where delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. The term "control" refers to the inclusion of deceleration delay, queue move-up time, stopped delay, and acceleration delay in the final delay measure. LOS A is the best operating condition, with delays of less than ten seconds experienced, and LOS F is the worst operating condition with the longest delays experienced. LOS D or better is generally considered acceptable in urban areas during peak hour conditions. However, it is not uncommon for the minor street approaches to two-way Stop controlled intersections with major crossroads to experience significantly higher levels of delay during the peak hours. Table 2 provides the criteria for the various LOS ratings for both signalized and unsignalized intersections in terms of control delay (seconds/vehicle).

Level of	Control Delay (Seconds per Vehicle)						
Service	Unsignalized	Signalized					
А	≤ 10	≤ 10					
В	> 10 and \leq 15	$> 10 \text{ and } \leq 20$					
С	$>$ 15 and \leq 25	$>$ 20 and \leq 35					
D	$>$ 25 and \leq 35	$>$ 35 and \leq 55					
Е	$>$ 35 and \leq 50	$>$ 55 and \leq 80					
F	> 50	> 80					

Table 2 – Level of Service (LOS) Criteria for Intersections



Base year traffic conditions in 2016 were analyzed at the existing intersections of College Avenue & Kessler Boulevard and College Avenue & 57th Street. The existing AM and PM peak hour volumes occurring on an average weekday in the study area were used to determine the current LOS ratings for the intersection. The LOS experienced during the remaining off-peak hours of the day is expected to be better than peak hour ratings because the volumes are less than those occurring during the peak hours. Table 3 provides the LOS results for existing conditions. Copies of the Synchro output are provided in *Appendix B*.

Signalized	Peak Hour Period	EB	WB	NB	SB	Intersection
College Avenue &	AM Peak	С	С	С	С	С
Kessler Boulevard	PM Peak	D	D	D	С	D
College Avenue &	AM Peak	В	В	Α	Α	В
57 th Street	PM Peak	В	В	Α	В	В

Table 3 – LOS for Scenario A (2016)

The existing intersections LOS ranges from B to D during the peak hours. These results are assuming optimized signal timings at all intersections. Based on optimal timings, the existing intersections currently operate within the acceptable range of LOS for an urban area. Figure 3 shows the AM and PM Peak Hour Volumes for Scenario A, respectively.





Figure 3 – Scenario A (2016) – AM (PM) Peak Hour Volumes



Future Roadway Conditions

The Red Line Bus Rapid Transit (BRT) will travel through the College Avenue corridor. This IndyGo project will result in changes to the geometric characteristics of College Avenue. Based on traffic models obtained through IndyGo coordination, the east approach on Kessler Boulevard would have a 285 ft. exclusive left-turn lane and a shared through/right-turn lane. The west approach on Kessler Boulevard would have a 135 ft. exclusive left-turn lane and a shared through/right-turn lane. The south approach on College Avenue would have a 150 ft. exclusive left-turn lane, a 150 ft. right-turn lane and one through lane. The north approach would have a 230 ft. exclusive left-turn lane and a shared through/right-turn lane.

The intersection of College Avenue & 57th Street would also have geometric changes due to the Red Line BRT project. The east and west approach on 57th Street would maintain its existing configuration of one lane per direction. The south approach on College Avenue would have a 120 ft. exclusive left-turn lane and a shared through/right-turn lane. The north approach on College Avenue would have a 125 ft. exclusive left-turn lane and a shared through/right-turn lane.

There is one proposed access drive that will serve the subject property. The proposed access drive will provide full access on College Avenue, and it is approximately 300 ft. south of Kessler Boulevard. The access drive would have one left-turn lane and one right-turn lane for outgoing traffic, and one lane for incoming traffic. College Avenue would have a 100 ft. left-turn lane to provide access to the subject site.



Traffic Generation

The trip generation calculations used in the analysis are consistent with the methodology prescribed by the 9th edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*.

The proposed development consists of 100 apartment units. ITE Land Use Code (LUC) #220 – Apartment was used to estimate the traffic generated by this portion of the site. Due to its proximity to the proposed Red Line BRT, this site is assumed to be a Transit Oriented Development (TOD). TODs are expected to reduce the amount of vehicle trips generated by the site due to the additional mode of transportation in its vicinity. Based on coordination with IndyGo, TCRP Report 128 was utilized to estimate the effects of the BRT on trips generated by the proposed development. Using equations from TCRP 128, the site will experience a vehicular trip reduction of 70% compared to the ITE Trip Generation Manual. However, for a more conservative analysis, a 25% reduction in vehicular trips was used in this report. Table 4 shows a comparison between the estimated total trips by the ITE Trip Generation Manual of a regular residential development and the reduction incurred by the BRT.

The proposed development will also include 9,000 square feet of commercial area. In order to estimate the number of trips generated by the commercial area, it was assumed that the space will consist of a coffee shop, an apparel store and a restaurant. Table 5 shows the assumed size and trips generated by each commercial use. It was assumed that the vehicular trip generation of the commercial facility will not be affected by the proximity to the proposed Red Line BRT; therefore no trip reduction was applied to these land uses.

Pass-by trips and internal trips were also considered for this development. According to the ITE Trip Generation Handbook, pass-by trips are defined as intermediate stops on the way from an origin to a primary trip destination without a route diversion. Pass-by trips are attracted from traffic passing the site on an adjacent street or roadway that offers direct access to the generator. Therefore, pass-by trips will add traffic to the subject site driveways, but not to the adjacent streets. The estimated pass-by rate for the restaurant land use is 43% for both AM and PM peak hours. The coffee shop pass-by rate was assumed to be similar to the restaurant. No pass-by rate were estimated for the apparel store.

Internal trips made between the different land uses within the subject site that do not use external public roadways have been deducted from the trip generation for this development. Copies of the calculations of the estimated trips, including internal trips and pass-by trips calculations, are provided in *Appendix C*.



Parce	A	M Peak Ho	our	PM Peak Hour				
Land Use: Apartment	LUC	Apartment Units	Total Trips	Trips Enter (20%)	Trips Exit (80%)	Total Trips	Trips Enter (65%)	Trips Exit (35%)
ITE Trip Generation Manual	220	100	53	11	42	73	47	26
TOD Trips Reduction	_	100	-13	-3	-11	-18	-12	-6
Internal Trips Reduction	-	100	-6	0	-6	-10	-6	-4
Total New Vehicular Trips	-	100	34	8	26	44	29	15

Table 4 – Trip Generation Summary (Residential)

Table 5 – Trip Generation Summary (Commercial)

Parc	el		AM Peak Hour PM Peak Hou				k Hour			
Land Use	Area (sf)	LUC	Pass- By Trips	Total Trips	Trips Enter	Trips Exit	Pass- By Trips	Total Trips	Trips Enter	Trips Exit
Apparel Store	2,500	876	0	0	0	0	0	3	2	1
Restaurant	5,000	932	22	50	25	25	16	37	25	12
Coffee Shop	1,500	936	42	98	50	48	22	52	26	26

Note: Pass-by trips for LUC 936 (Coffee shop) was estimated using LUC 932 (Restaurant) pass-by rate.



Traffic Distribution and Assignment

Subject Site

The subject site is located approximately 7 miles north of Downtown Indianapolis and 0.6 miles south of Broad Ripple Village. The subject site is located in a primarily residential area with a retail node at the intersection of College Avenue & Kessler Boulevard. Traffic patterns from the 2016 count show a heavy northbound and southbound flow of traffic in both morning and evening peak on College Avenue. It is expected most traffic from the development will travel to and from the downtown area via College Avenue. Figure 4 shows the general trip distribution assumed for the site.



XX/XX: AM Peak % / PM Peak %





Future Traffic Conditions

<u>Scenario B</u>

The proposed development is anticipated to be completed within the next three years. A 1.0 percent annual growth rate was assumed for College Avenue and Kessler Boulevard and a 0.3 percent annual growth rate for 57th Street. This annual growth rate was applied to the 2016 volumes to forecast the 2019 volumes. The resulting traffic conditions represent the Scenario B traffic volumes. The LOS results for Scenario B are listed in Table 6 and the AM and PM peak hour volumes for are shown in Figure 5.

Signalized	Peak Hour Period	EB	WB	NB	SB	Intersection
College Avenue &	AM Peak	D	Е	Е	Е	Ε
Kessler Boulevard	PM Peak	F	F	D	Е	Ε
College Avenue &	AM Peak	D	D	Α	Α	Α
57 th Street	PM Peak	С	С	Α	Α	Α

Table 6 – LOS for Scenario B (2019)

Future traffic projections of the study area with the proposed lane configuration provided by IndyGo shows that the College Avenue & Kessler Boulevard intersection does not operate within acceptable range with a LOS E on both peak hour periods, including two approaches with a LOS F. This projection does not include the traffic volumes generated by the development.





Figure 5 - Scenario B AM (PM) Peak Hour Volumes



<u>Scenario C</u>

Traffic volumes in Scenario C include Scenario B volumes plus estimated traffic from the proposed development. The resulting traffic conditions are for the full build out of the project area. The LOS results for Scenario C are listed Table 6 and the AM and PM peak hour volumes are shown in Figure 6.

All intersection and approach LOS are within acceptable range, except for the intersection of College Avenue & Kessler Boulevard which has a LOS rating of E on both peak hour periods. Nevertheless, the LOS were the same for Scenarios B and C, which indicates that the proposed development would not have a significant impact to the existing intersections. Copies of the Synchro output for Scenario B and C are provided in *Appendix D* and *Appendix E*, respectively.

Signalized	Peak Hour Period	EB	WB	NB	SB	Intersection
College Avenue & Kessler	AM Peak	D	Е	D	Е	Ε
Boulevard	PM Peak	F	F	Е	Е	Ε
College Avenue & Proposed	AM Peak	D		Α	Α	Α
Access Drive	PM Peak	Е	I	Α	Α	Α
College Amonus & 57th Stuget	AM Peak	D	D	Α	Α	Α
Conege Avenue & 5/ ^m Street	PM Peak	С	С	Α	Α	Α

Table 7 – LOS for Scenario C (2019 Full Build Out)



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Figure 6 - Scenario C AM (PM) Peak Hour Volumes



Results

The Synchro Capacity Analysis results lead to the findings outlined below. The existing and future signal timing plans and phasing was simulated and optimized using the Synchro capacity software. Figure 7 and Figure 8 present a schematic of the final layout of the improvements on the proposed driveway and the College Avenue intersections.

College Avenue & Kessler Boulevard

The proposed geometry in the traffic model provided by IndyGo is sufficient to adequately serve future traffic volumes plus the proposed development.

College Avenue & Proposed Access Driveway

The intersection of College Avenue & Proposed Access Driveway is to be a full access driveway. A 100 ft. northbound left-turn lane would be provided for incoming traffic. The driveway would have one shared left-turn/right-turn lane, as proposed by the developer, and be signalized.

College Avenue & 57th Street

The proposed geometry in the traffic model provided by IndyGo is sufficient to adequately serve future traffic volumes plus the proposed development.





Figure 7 – Schematic Layout of Driveway Improvements at Full Build Out (2019) (1 of 2)





Figure 8 – Schematic Layout of Driveway Improvements at Full Build Out (2019) (2 of 2)



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Appendix