11404 TAYLORSVILLE ROAD APARTMENTS

KY 155

Louisville, Kentucky

TRAFFIC IMPACT STUDY

September 2016

Prepared for:

Prepared by:

Architecture Engineering Planning

Groundbreaking by Design.

815 West Market Street, Suite 300
Louisville, Kentucky 40202
Phone: 502-585-2222 • Fax: 502-566-3058

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1.0 INTRODUCTION

Qk4, Inc. was retained to perform a Traffic Impact Study (TIS) for the proposed apartment development located south of Taylorsville Rd (KY 155) and east of Blankenbaker Pkwy (KY 913) in Jefferson County, Kentucky. The location of the site is illustrated below.

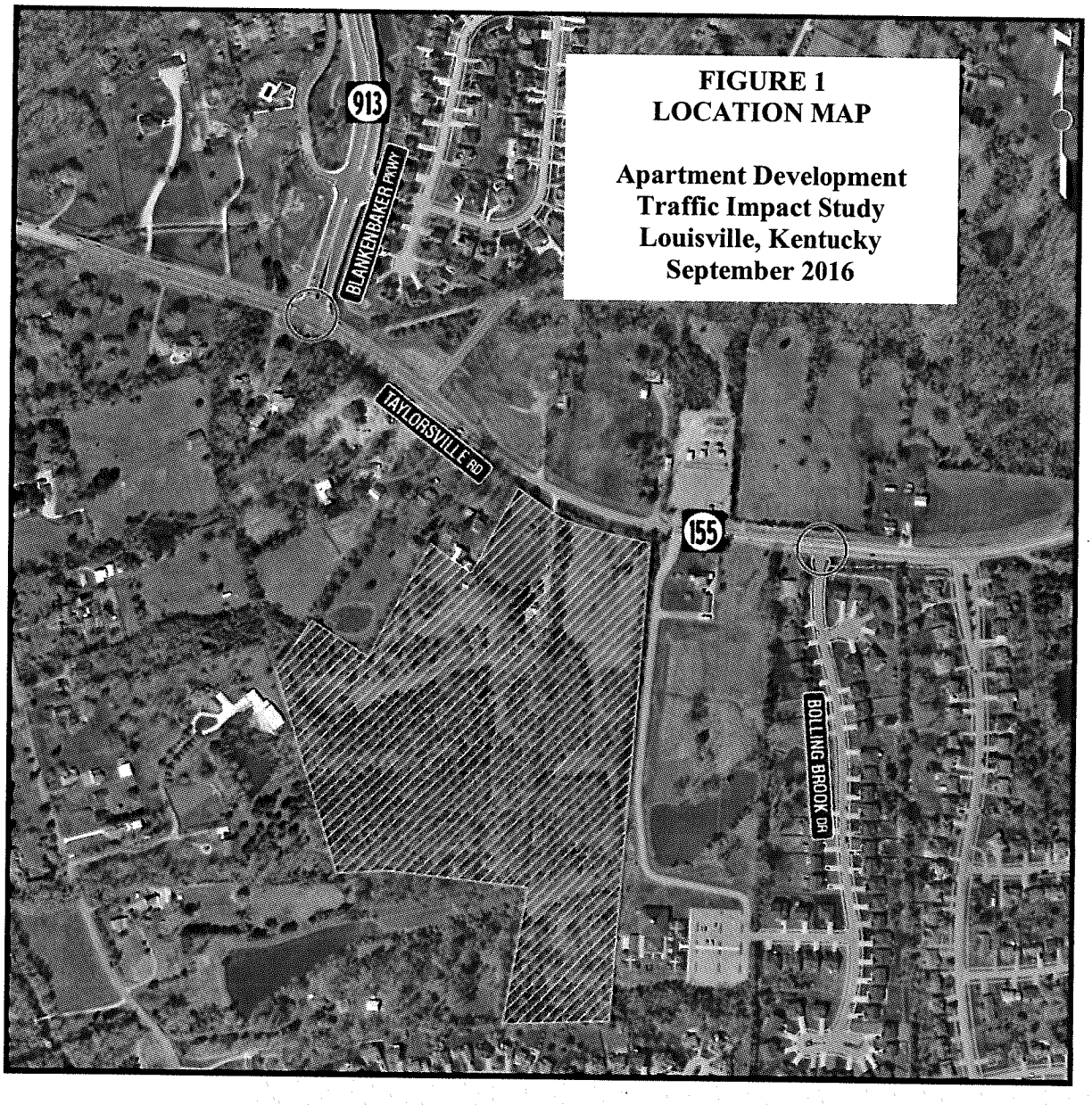
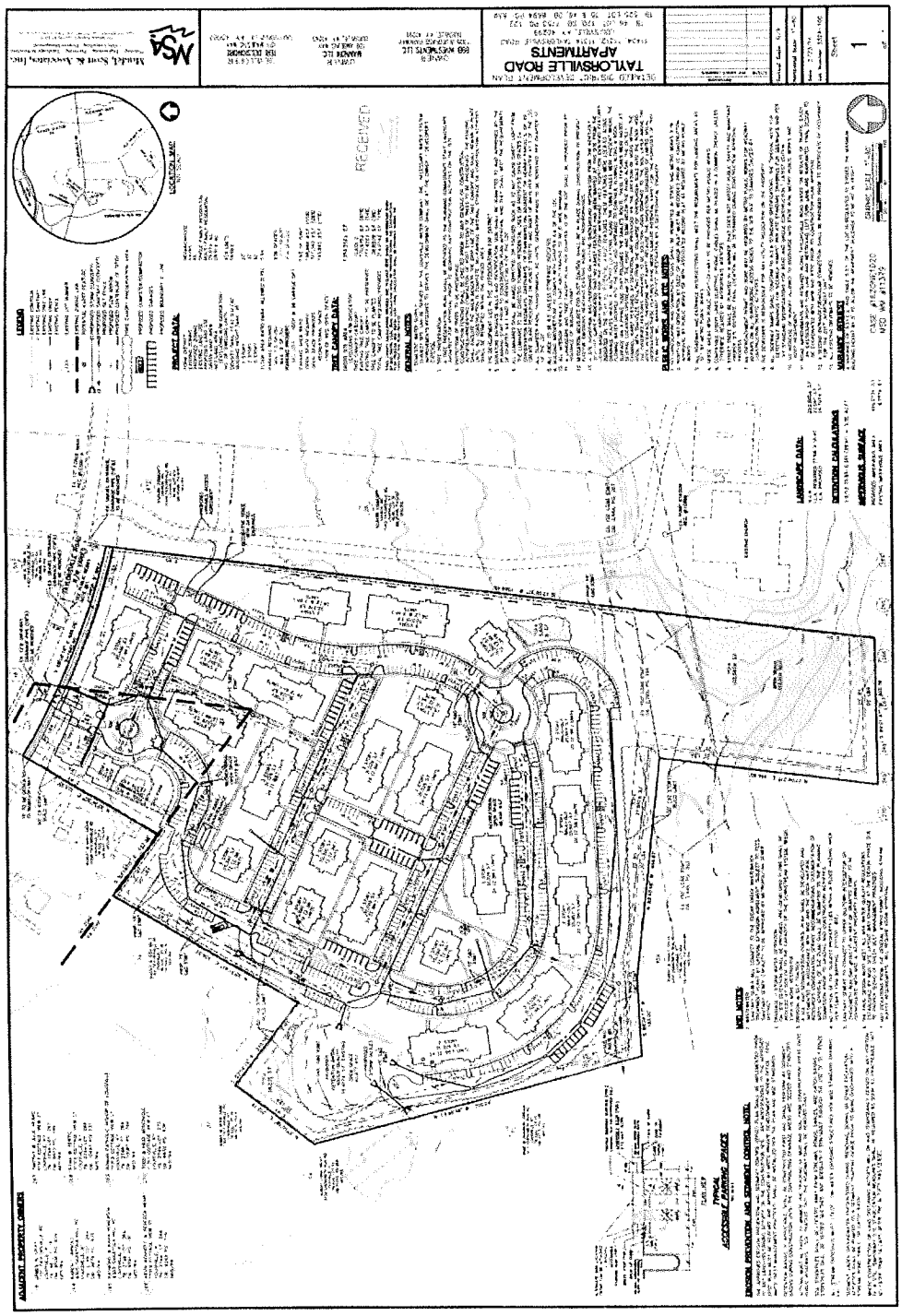


FIGURE 1
LOCATION MAP

Apartment Development
Traffic Impact Study
Louisville, Kentucky
September 2016

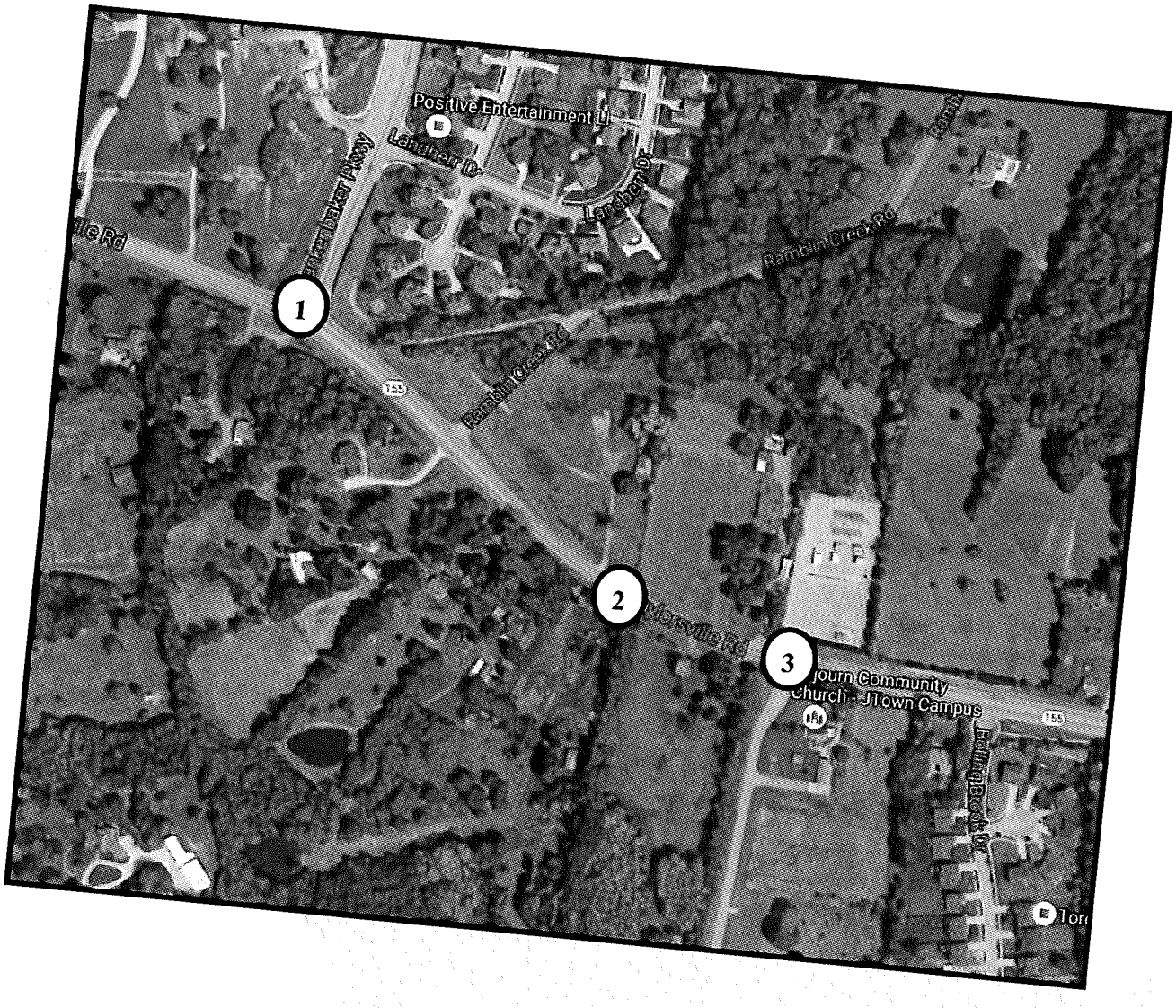
2.0 PROPOSED DEVELOPMENT

The proposed apartment development will include a total of 424 units and cover just over 29 acres. The site plan below shows details of the development as well as the proposed internal roadway network and roadway access.



3.0 STUDY AREA

The study area for this traffic impact study includes the following intersections: (1) KY 155 & KY 913, (2) KY 155 & Proposed Site Entrance, and (3) KY 155 & Church Entrance. The map below shows the approximate location of these intersections.



KY 155 & KY 913

The intersection of KY 155 & KY 913 is currently signal-controlled. The northbound approach to the intersection consists of a single shared left/through/right lane. The southbound approach to the intersection consists of an exclusive right turn lane and an exclusive left turn lane. The eastbound approach to the intersection consists of an exclusive left turn lane and a shared through/right lane. The westbound approach to the intersection consists of an exclusive left turn lane, a single through lane, and an exclusive right turn lane.

KY 155 & SOJOURN CHURCH ENTRANCE

The intersection of KY 155 & Sojourn Church entrance is currently stop-controlled with the northbound approach to the intersection required to stop. The northbound approach to the intersection consists of an exclusive left turn lane and an exclusive right turn lane. The eastbound approach to the intersection consists of a shared through/right lane. The westbound approach to the intersection consists of a shared left/through lane.

4.0 TURNING MOVEMENT COUNTS

All turing movement data was collected on Tuesday, September 13th between the hours of 7AM and 7PM. Truck data was collected independently of passenger car data to determine peak hour truck percentages. These intersections were counted with a Miovision data collection units. AM and PM peak hour miovision summaries for both peak hours can be seen below. This existing turning movement data is summarized graphically on Figures 3 and 4.

Study Name	KY 155 & Blankenbaker Pkwy
Start Date	Tuesday, September 13, 2016 7:00 AM
End Date	Tuesday, September 13, 2016 7:00 PM
Site Code	

Report Summary

		Southbound						Westbound						Northbound						Eastbound					
Time Period	Class.	R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	Total
Peak 1	Lights	62	0	87	0	149	1035	496	507	0	0	1003	406	0	0	0	0	0	0	0	319	539	0	858	569	2010
Specified Period	%	91%	0%	99%	0%	99%	99%	99%	97%	0%	0%	98%	93%	0%	0%	0%	0%	0%	0%	0%	98%	99%	0%	98%	97%	97%
7:00 AM - 12:00 PM	Other Vehicle	6	0	14	0	20	15	11	14	0	0	25	29	0	0	0	0	0	0	0	15	4	0	19	20	64
One Hour Peak	%	9%	0%	14%	0%	1%	1%	2%	3%	0%	0%	2%	7%	0%	0%	0%	0%	0%	0%	0%	4%	1%	0%	2%	3%	3%
7:15 AM - 8:15 AM	**Total**	**68**	**0**	**101**	**0**	**169**	**1050**	**507**	**521**	**0**	**0**	**1028**	**435**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**334**	**543**	**0**	**877**	**589**	**2074**
	PHF	0.68	0	0.81	0	0.84	0.89	0.89	0.9	0	0	0.89	0.95	0	0	0	0	0	0	0	0.89	0.86	0	0.97	0.9	0.95
	Approach %					8%	51%					50%	21%					0%	0%					42%	28%	
Peak 2	Lights	609	0	592	0	1201	394	253	497	1	0	751	1150	0	0	0	0	0	1	0	558	141	0	699	1106	2651
Specified Period	%	99%	0%	98%	0%	99%	98%	94%	97%	100%	0%	99%	99%	0%	0%	0%	0%	0%	100%	0%	99%	99%	0%	99%	99%	99%
12:00 PM - 7:00 PM	Other Vehicle	4	0	10	0	14	18	17	13	0	0	30	16	0	0	0	0	0	0	0	6	1	0	7	17	51
One Hour Peak	%	1%	0%	2%	0%	1%	2%	6%	3%	0%	0%	4%	1%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	1%	2%	2%
5:00 PM - 6:00 PM	**Total**	**613**	**0**	**602**	**0**	**1215**	**412**	**270**	**510**	**1**	**0**	**781**	**1166**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**564**	**142**	**0**	**706**	**1123**	**2702**
	PHF	0.91	0	0.91	0	0.94	0.77	0.9	0.89	0.25	0	0.89	0.95	0	0	0	0	0	0.25	0	0.93	0.61	0	0.91	0.95	0.97
	Approach %					45%	15%					39%	43%					0%	0%					26%	42%	

Study Name	KY 155 & Bolling Brook Dr
Start Date	Tuesday, September 13, 2016 7:00 AM
End Date	Tuesday, September 13, 2016 7:00 PM
Site Code	

Report Summary

		Westbound					Northbound					Eastbound					
Time Period	Class.	T	L	U	I	O	R	L	U	I	O	R	T	U	I	O	Total
Peak 1	Lights	1009	3	0	1012	400	12	27	0	39	10	7	388	1	396	1037	1447
Specified Period	%	99%	100%	0%	99%	95%	100%	96%	0%	98%	91%	88%	99%	100%	99%	98%	97%
7:00 AM - 12:00 PM	Other Vehicle	20	0	0	20	21	1	0	0	1	1	1	20	0	21	20	42
One Hour Peak	%	2%	0%	0%	2%	5%	8%	0%	0%	2%	9%	13%	5%	0%	5%	2%	3%
7:00 AM - 8:00 AM	**Total**	**1029**	**3**	**0**	**1032**	**421**	**13**	**27**	**0**	**40**	**11**	**8**	**408**	**1**	**417**	**1057**	**1489**
	PHF	0.9	0.38	0	0.9	0.88	0.65	0.75	0	0.71	0.46	0.5	0.88	0.25	0.89	0.9	0.9
	Approach %				69%	28%				3%	1%				28%	71%	
Peak 2	Lights	757	7	0	764	1137	6	15	0	21	22	15	1131	0	1146	772	1931
Specified Period	%	99%	88%	0%	99%	99%	100%	94%	0%	95%	96%	94%	99%	0%	99%	97%	98%
12:00 PM - 7:00 PM	Other Vehicle	22	1	0	23	15	0	1	0	1	1	0	15	0	15	23	39
One Hour Peak	%	3%	13%	0%	3%	1%	0%	6%	0%	5%	4%	0%	1%	0%	1%	3%	2%
5:15 PM - 6:15 PM	**Total**	**779**	**8**	**0**	**787**	**1152**	**6**	**16**	**0**	**22**	**23**	**15**	**1146**	**0**	**1161**	**795**	**1970**
	PHF	0.93	0.5	0	0.9	0.98	0.75	0.67	0	0.79	0.64	0.75	0.98	0	0.99	0.91	0.97
	Approach %				40%	58%				1%	1%				59%	41%	

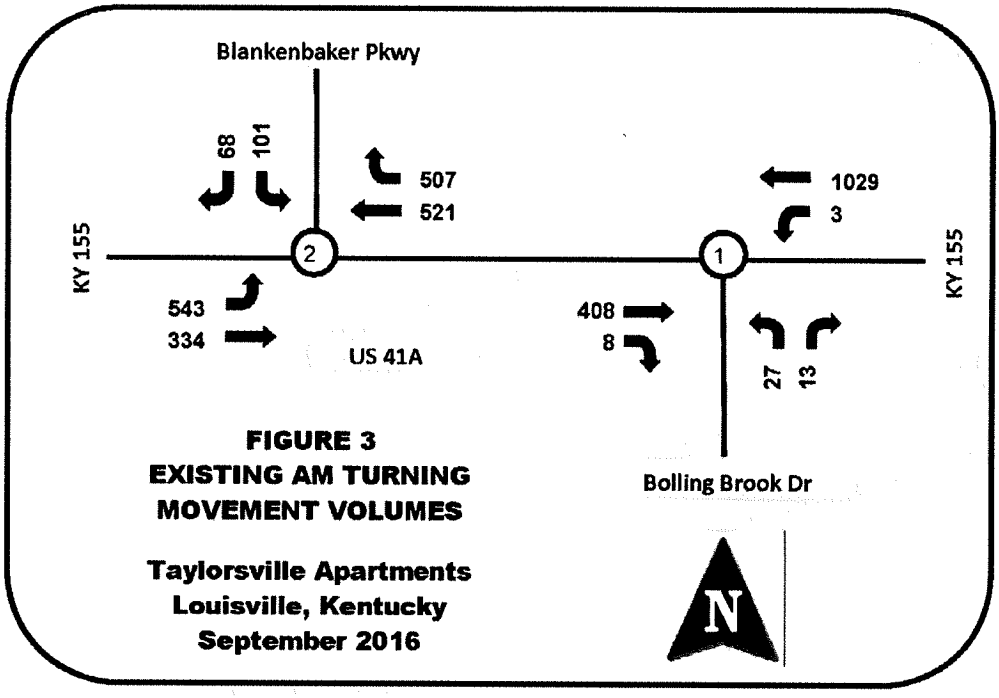


FIGURE 3
EXISTING AM TURNING MOVEMENT VOLUMES

Taylorsville Apartments
Louisville, Kentucky
September 2016

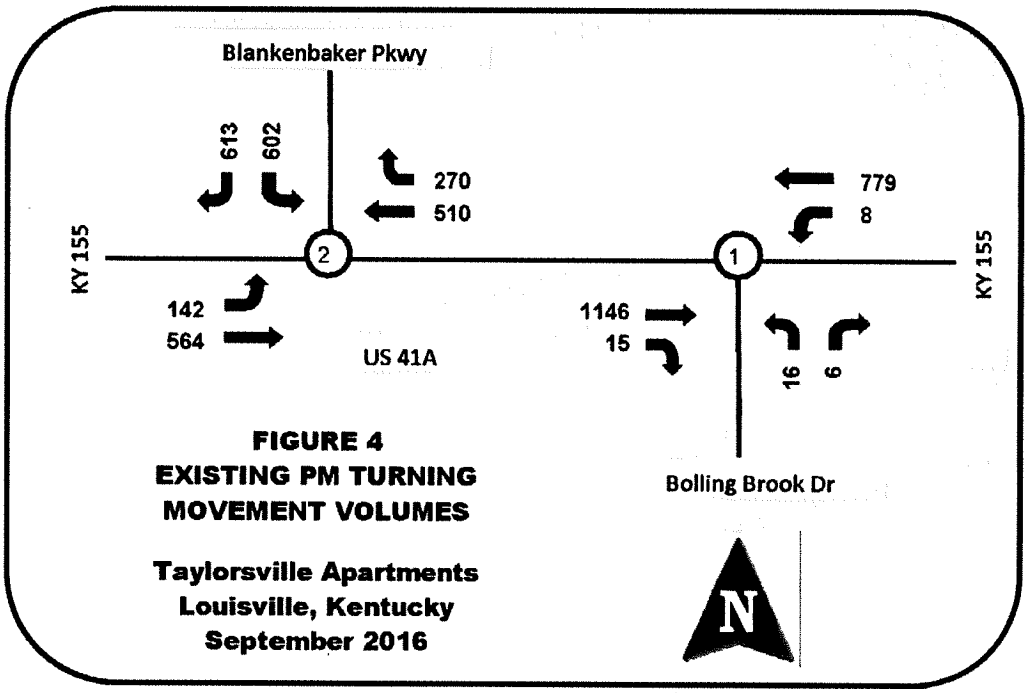


FIGURE 4
EXISTING PM TURNING MOVEMENT VOLUMES

Taylorsville Apartments
Louisville, Kentucky
September 2016

5.0 PROJECTED TRAFFIC

5.1 BACKGROUND TRAFFIC

Traffic was analyzed for no build and build scenarios for the future year of 2020. Existing turning movements were grown by 2% annually to determine 2020 no build traffic volumes. Figures 5 & 6 summarize AM and PM no build traffic.

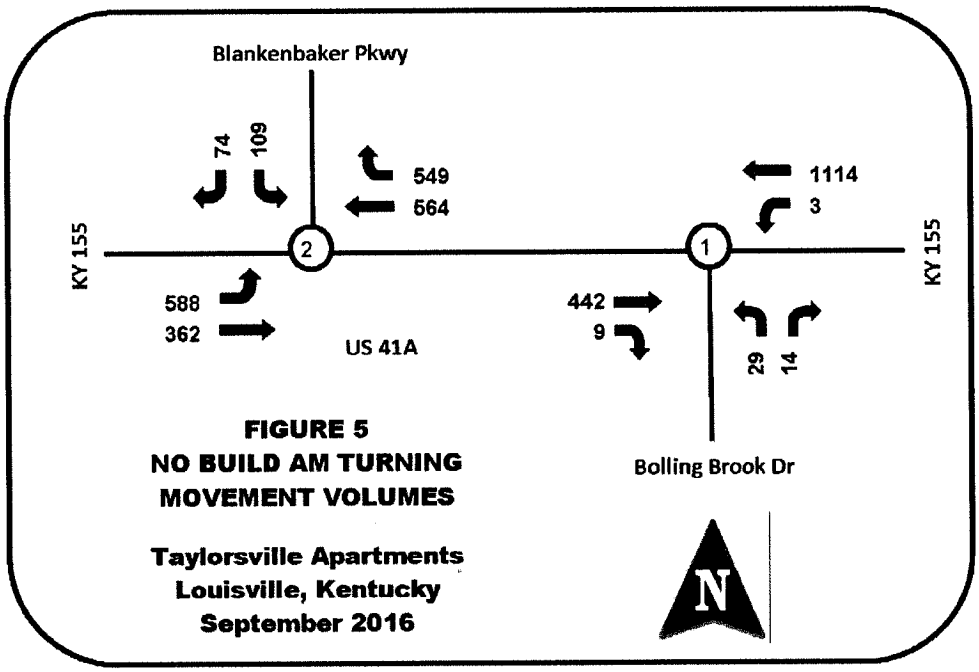


FIGURE 5
NO BUILD AM TURNING MOVEMENT VOLUMES

Taylorsville Apartments
Louisville, Kentucky
September 2016

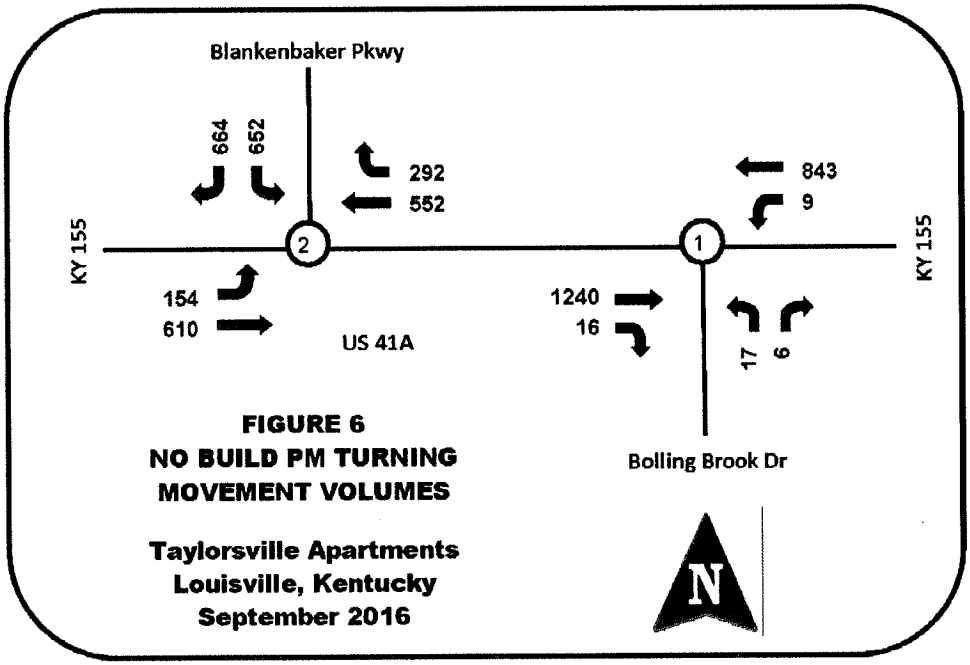


FIGURE 6
NO BUILD PM TURNING MOVEMENT VOLUMES

Taylorsville Apartments
Louisville, Kentucky
September 2016

5.2 TRIP GENERATION

Trips were generated for this site based on information from the 9th edition of the *Trip Generation Manual* distributed by the Institute of Transportation Engineers (ITE). ITE site code 220 "Apartment" was used for these calculactions. The following summarizes trips generation calculations for daily, AM, and PM trips.

Weekday	AM Peak Hour	PM Peak Hour
T = 6.06(X)+123.56	T = 0.49(X)+3.73	T = 0.55(X)+17.65
T = 6.06(424)+123.56	T = 0.49(424)+3.73	T = 0.55(424)+17.65
T = 2693 (50% in / 50% out)	T = 211 (20% in / 80% out)	T = 251 (65% in / 35% out)
T(in) = 1,347	T(in) = 42	T(in) = 163
T(out) = 1,347	T(out) = 169	T(out) = 88

5.3 TRIP DISTRIBUTION / ASSIGNMENT

Traffic was distributed to and from the proposed development based on existing traffic patterns in the study area. Figures 7 & 8 summarize AM and PM peak hour primary trips generated by the development. Figures 9 & 10 summarize AM and PM peak hour build turning movements.

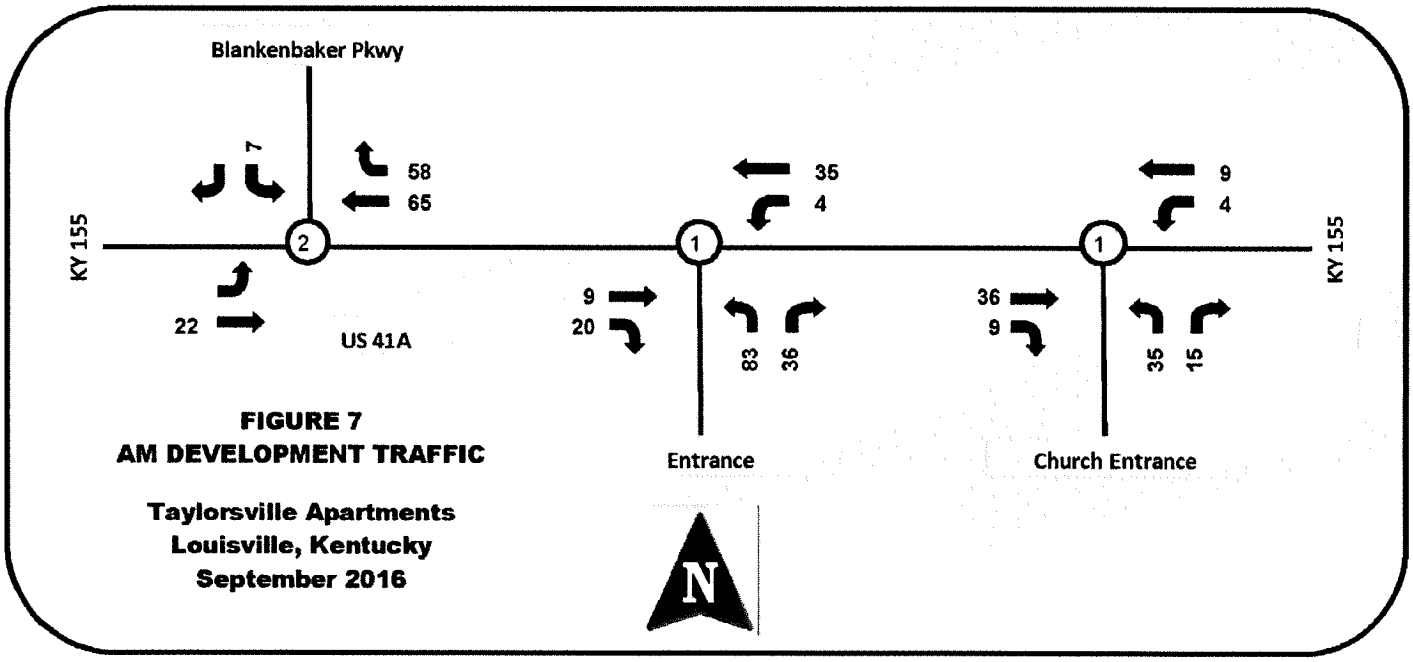


FIGURE 7
AM DEVELOPMENT TRAFFIC

Taylorsville Apartments
Louisville, Kentucky
September 2016

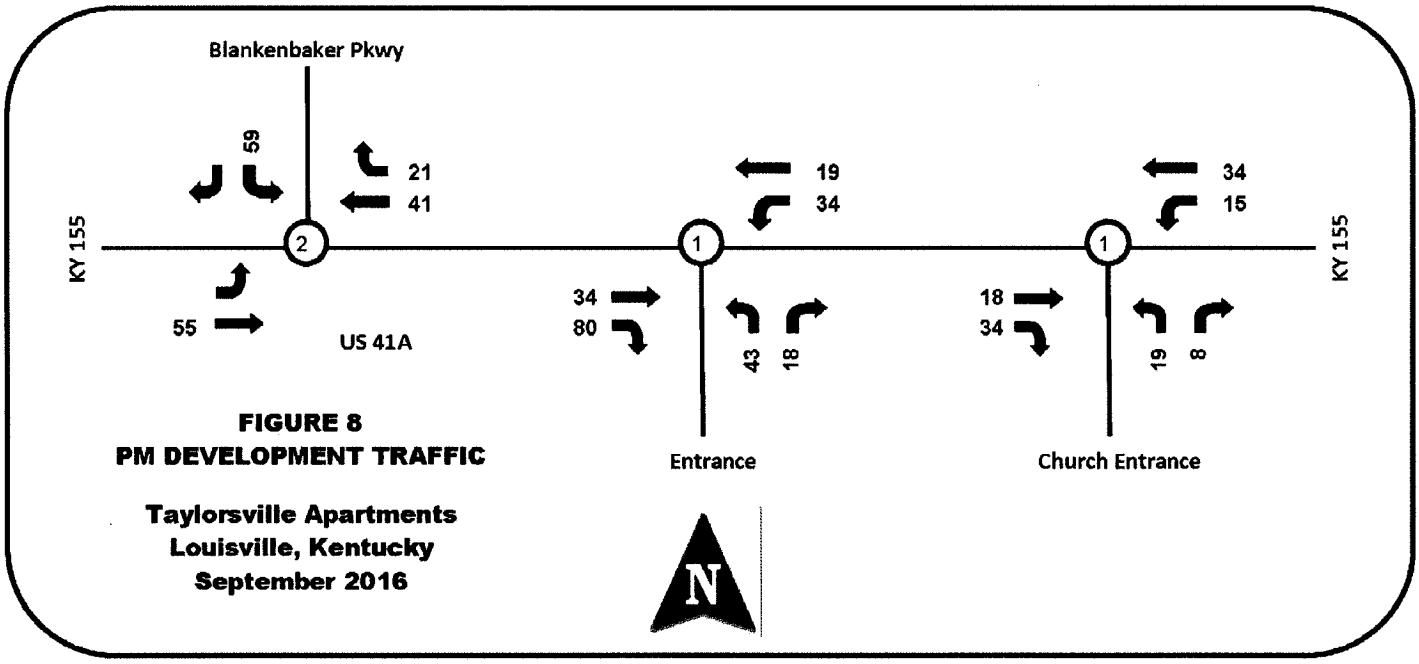


FIGURE 8
PM DEVELOPMENT TRAFFIC

Taylorsville Apartments
Louisville, Kentucky
September 2016

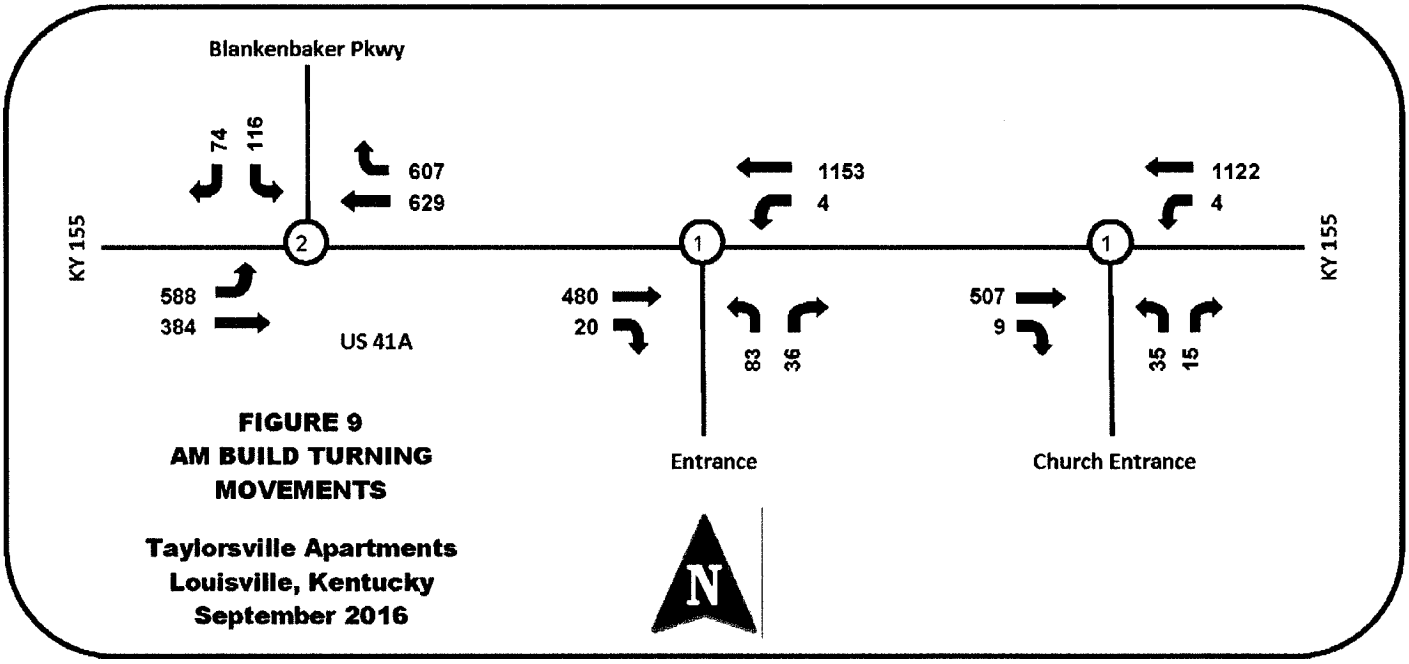
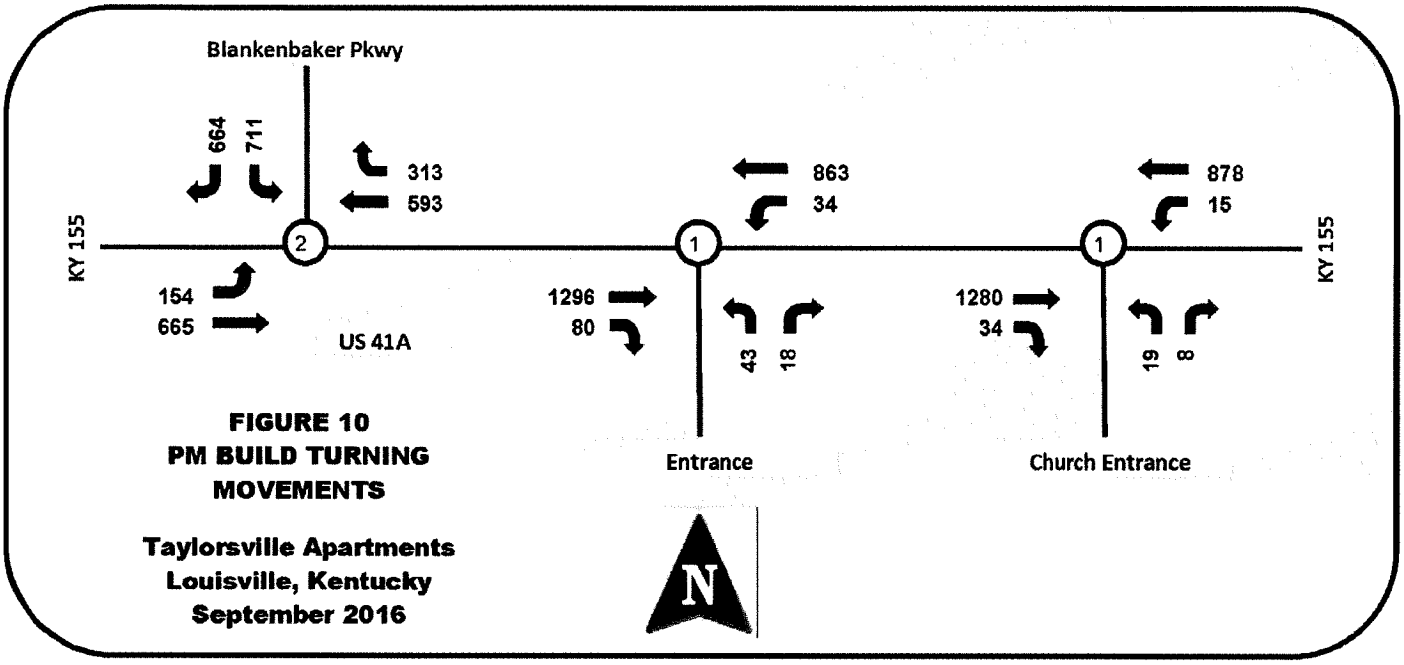


FIGURE 9
AM BUILD TURNING MOVEMENTS

Taylorsville Apartments
Louisville, Kentucky
September 2016



6.0 ANALYSIS

6.1 TURN LANE ANALYSIS

Turning movements at the intersection of KY 155 with the proposed site entrance were compared to KYTC turn lane warrants to determine where turn lanes would be required per KYTC policy. 2020 build volumes were used for all turn lane analysis. As seen below both right and left turn lanes would be warranted at the proposed entrance to the development.

Eastbound Right Turn Analysis

AM Peak Hour
Right Turn Volume: 29
Advancing Volume: 500
Warranted: NO

PM Peak Hour
Right Turn Volume: 96
Advancing Volume: 1,376
Warranted: YES

Westbound Left Turn Lane Analysis

AM Peak Hour
Left Turn Volume: 7
Advancing Volume: 1,125
Opposing Volume: 500
Warranted: YES

PM Peak Hour
Left Turn Volume: 43
Advancing Volume: 889
Opposing Volume: 1,376
Warranted: YES

6.2 CAPACITY ANALYSIS

Level of service (LOS) is a term that is commonly used to evaluate roadway functions. Level of service is defined as a qualitative measure of operational conditions and the perception of these conditions by motorists. These conditions are usually defined in terms of factors such as speed and travel time, maneuverability, delay, and safety. There are six levels of service, which are designated by the letters "A" through "F." Level of service "A" represents the best operating conditions, while level of service "F" defines the worst.

The methodology used to analyze the capacity and level of service was based on standard traffic engineering procedures outlined in the *Highway Capacity Manual* (HCM 2010). The analysis was performed using the latest version of the Highway Capacity software. The procedure considers traffic and geometric conditions of the facility, such as traffic volumes, percent of large vehicles, design speed, lane and shoulder widths, grades, and directional distributions to determine the LOS.

Delay is a critical performance measure on interrupted-flow facilities. Delay is measured as the time a vehicle is slowed by a signalized or stop-controlled intersection compared to the average travel time of a vehicle if it were unimpeded by the intersection. Delay includes the time a vehicle decelerates approaching the intersection and accelerating as it leaves the intersection. Although the definition of delay is the same for both signalized and stop-controlled intersections, the thresholds used to determine LOS differ. LOS thresholds for signalized and unsignalized intersections are summarized below.

LOS Threshold for Signalized Intersections

Delay (sec)	LOS	Description
1-10	A	Free Flow
10-20	B	Reasonable Unimpeded Flow
20-35	C	Stable Operation
35-55	D	*Approaching Unstable Flow
55-80	E	Unstable Flow
>80	F	Congested Flow

*Considered acceptable For urban areas

LOS Threshold for Unsignalized Intersections

Delay (sec)	LOS	Description
1-10	A	Free Flow
10-15	B	Reasonable Unimpeded Flow
15-25	C	Stable Operation
25-35	D	*Approaching Unstable Flow
35-50	E	Unstable Flow
>50	F	Congested Flow

*Considered acceptable for urban areas.

Capacity analyses were performed for all study area intersections for both the AM and PM peak hours, including the following scenarios: existing, no build 2017, and build 2017.

The capacity analyses included a comparison—expressed as a volume to capacity (v/c) ratio—of the traffic volume to the operating capacity of the road based on its characteristics (number of lanes, shoulder width, grades, etc.). The v/c ratio ranges from zero (0) to (1.0), defined as follows:

- **v/c = 0**: the flow rate is zero—this is the starting point for the comparison.
- **v/c = 0– 0.999**: the volume of traffic is less than the road's capacity to handle it.
- **v/c = 1.0**: the flow rate equals the roadway's capacity; i.e., the road is approaching the limits of its ability (capacity) to handle the traffic volume.
- **v/c = > 1.0**: the traffic volume exceeds the road's capacity, producing unacceptable delays and LOS "F."

KY 155 & KY 913

All movements at this intersection would operate at a LOS E or above for existing conidtions. Both southbound movments approach capacity during the PM peak hour. Currently, congestion at this intersection is exacerbated by back ups east of the study area that spill back into the study area during the PM peak hour. These spill backs were seen on the miovision cameras during the PM peak hour and cause congestion levels over those reported from the highway capacity software.

The southbound left movments drops to a LOS F during the PM peak hour for both the no build and build scenarios. The v/c ratio for this movement also exceeds a 1.0 in the PM peak hour for the no build and build scenarios. Existing signal timing was used for all scenarios.

KY 155 & KY 913 Capacity Summary

Movement	Time Period	v/c Ratio			Average Queue			Delay			LOS		
		Existing	No Build	Build	Existing	No Build	Build	Existing	No Build	Build	Existing	No Build	Build
Eastbound, Left	AM	0.843	0.922	0.948	79	214	408	16.1	29.5	42.6	B	C	D
	PM	0.43	0.502	0.55	48	53	53	20.1	21.6	23.3	C	C	C
Eastbound, Through	AM	0.245	0.265	0.279	17	22	27	3	3.2	3.3	A	A	A
	PM	0.591	0.637	0.694	240	271	313	20.3	21.4	23.2	C	C	C
Westbound, Through	AM	0.553	0.637	0.752	151	206	293	15	19.4	26	B	B	C
	PM	0.686	0.746	0.801	285	327	370	31.3	34.1	37.2	C	C	D
Westbound, Right	AM	0.549	0.622	0.6	111	158	166	11.3	14.7	16.3	B	B	B
	PM	0.227	0.246	0.264	27	31	34	3.7	4	4.1	A	A	A
Southbound, Left	AM	0.733	0.73	0.753	53	61	70	39.6	41.9	44.4	D	D	D
	PM	0.956	1.041	1.135	483	608	756	58.5	81.3	113.7	E	F	F
Southbound, Right	AM	0.177	0.165	0.146	25	27	27	24.2	22.8	21.6	C	C	C
	PM	0.927	0.997	0.997	436	561	561	47.9	64.7	64.7	D	E	E

Note average queues are reported in feet

KY 155 & Proposed Site Entrance

This intersection would have some congestion associated with the northbound left turn movement out of the development onto KY 155. During both peak hours this movement would experience a LOS F. The 95% queue for this movement would reach five vehicles during either peak hour. KY 155 traffic would experience little if any delay caused by the addition of development traffic. As noted on the previous intersection, traffic from east of this intersection backs past this intersections during parts of the PM peak hour.

KY 155 & Proposed Site Entrance Capacity Summary

Movement	Time Period	v/c Ratio	95% Queue	Delay	LOS
Westbound, Left	AM	0	0	8.6	A
	PM	0.09	0.3	14.1	B
Northbound, Left	AM	0.81	4.7	108.6	F
	PM	1.07	4.4	296.5	F
Northbound, Right	AM	0.07	0.2	12.1	B
	PM	0.12	0.4	30.3	D

Note 95% queues are reported in vehicles

KY 155 & Church Entrance

This intersection would also have some congestion associated with the northbound left turn movement out of the development onto KY 155. During both peak hours this movement would experience a LOS F. The 95% queue for this movement would only reach two vehicles during either peak hour. KY 155 traffic would experience little if any delay caused by the addition of development traffic. As noted on the previous intersection, traffic from east of this intersection backs past this intersections during parts of the PM peak hour.

KY 155 & Church Entrance Capacity Summary

Movement	Time Period	v/c Ratio	95% Queue	Delay	LOS
Westbound, Left	AM	0	0	8.6	A
	PM	0.04	0.1	13.1	B
Northbound, Left	AM	0.34	1.4	52.2	F
	PM	0.43	1.6	125	F
Northbound, Right	AM	0.03	0.1	12.2	B
	PM	0.06	0.2	28.6	D

Note 95% queues are reported in vehicles

7.0 CONCLUSIONS

Traffic added by the proposed apartment development would have impacts to the existing roadway network. To minimize these impacts, both right and left turn lanes from KY 155 into the proposed development should be constructed. The site entrance approach to KY 155 should consist of separated right and left turn lanes. Although the analysis does show traffic leaving the development will experience heavy delays, this congestion should have little affect on KY 155.

REPORT

Taylorsville Road Apartments Louisville, KY

Traffic Impact Study

Louisville Metro Planning

May 9, 2016

CDM Smith

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Introduction

The proposed apartment development in Louisville, KY is located on Taylorsville Road west of Bolling Brook Drive. The apartment community will have 424 units. **Figure 1** displays a map of the site. Access to the tract will be from an entrance on Taylorsville Road and a secondary access from the adjacent Sojourn Community Church campus. The purpose of this study is to examine the traffic impacts of the proposed development upon the adjacent highway system. For this study the impact area was defined to be the intersection of Taylorsville Road at the apartment community and at Blankenbaker Parkway.

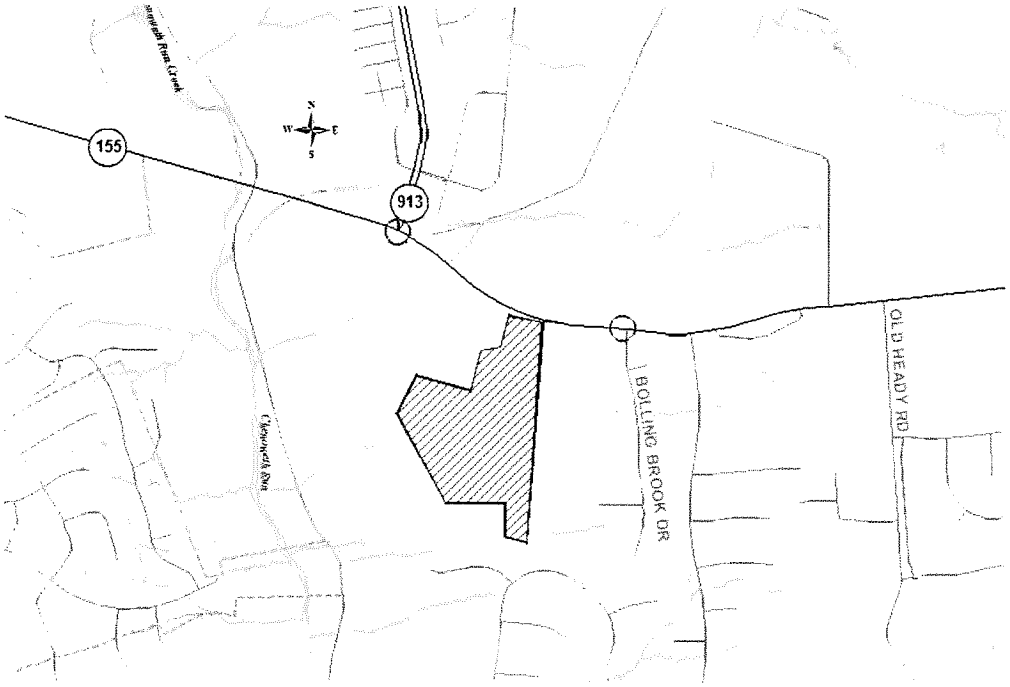


Figure 1
Site Location

Existing Conditions

Taylorsville Road is maintained by the Kentucky Transportation Cabinet with an estimated 2015 ADT of 18,500 vehicles per day east of Bolling Brook Drive, as provided by a Metro Public Works count. The road is a two lane road with eleven-foot lanes with four foot shoulders. The posted speed limit is 55 mph. There are no sidewalks.

A.m. and p.m. peak hour traffic counts were obtained at the intersection on April 26, 2016 (see Appendix A). The a.m. peak hour occurred between 7:15 and 8:15 and the p.m. peak hour occurred between 4:45 and 5:45 p.m. **Figure 2** illustrates the existing peak hour traffic volumes.

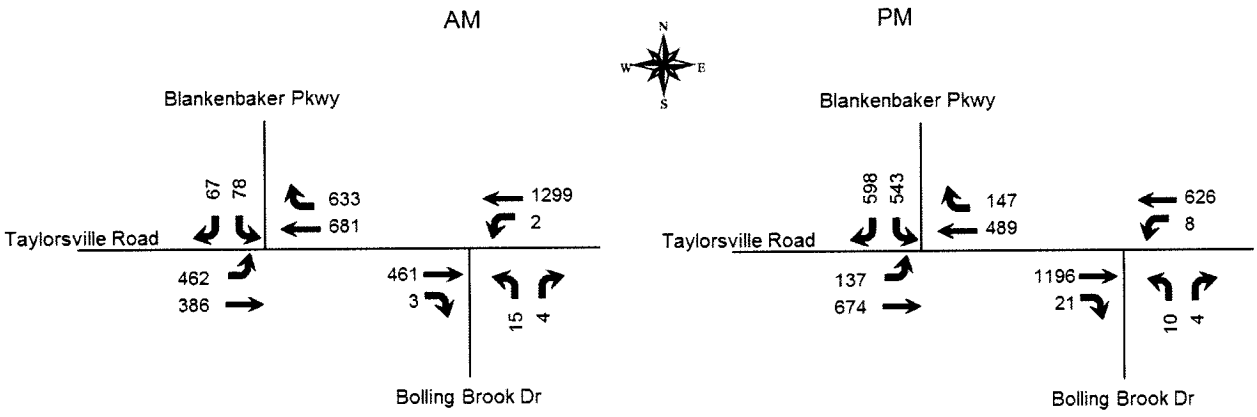


Figure 2
2016 Peak Hour Counts

Future Conditions

The projected completion year for this development is 2020, so the analysis year for this study is 2020. To predict traffic conditions in 2020, two percent annual growth in traffic was added. This growth is based upon a review of the count data along Taylorsville Road. **Figure 3** displays the 2020 No Build volumes.

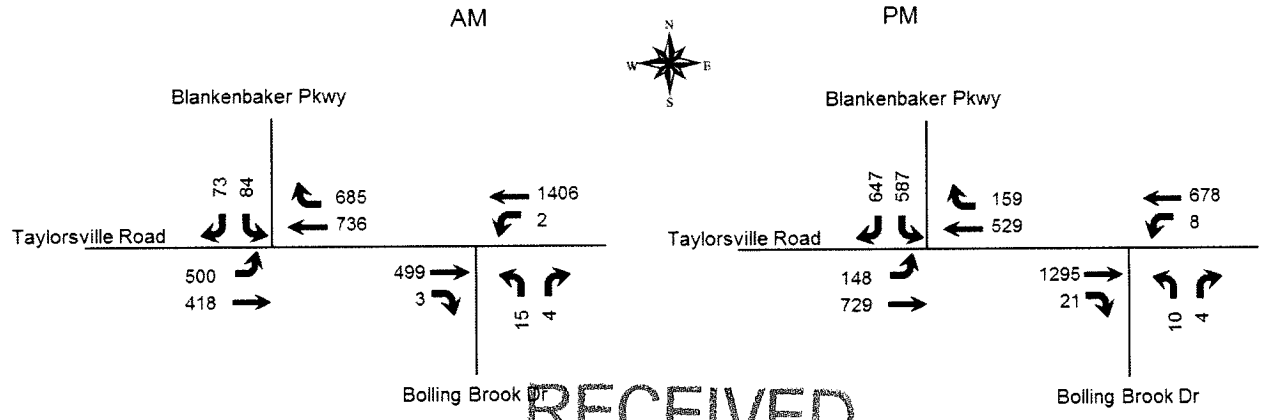


Figure 3
2020 No Build Peak Hour Volumes

Trip Generation

The Institute of Transportation Engineers Trip Generation Manual, 9th Edition contains trip generation rates for a wide range of developments. The land uses of "Apartments (220) best describes this development. The trip generation results are listed in **Table 1**. The results of the trip generation analysis are that this development will generate 211 a.m. peak hour trips and 251 p.m. peak hour trips. The trips were assigned to the highway network with 70 percent to/from the west and 30 percent to/from the east. This is based upon the existing traffic pattern on Taylorsville Road. **Figure 4** shows the trips generated by this development and distributed

throughout the road network for the year 2020during the peak hours. **Figure 5** displays the individual turning movements for the year 2020 for the peak hours when the development is completed.

Table 1 – Trip Generation

	AM Peak Hour			PM Peak Hour		
	Total	Enter	Exit	Total	Enter	Exit
Apartments (424 units)	211	42	169	251	163	88

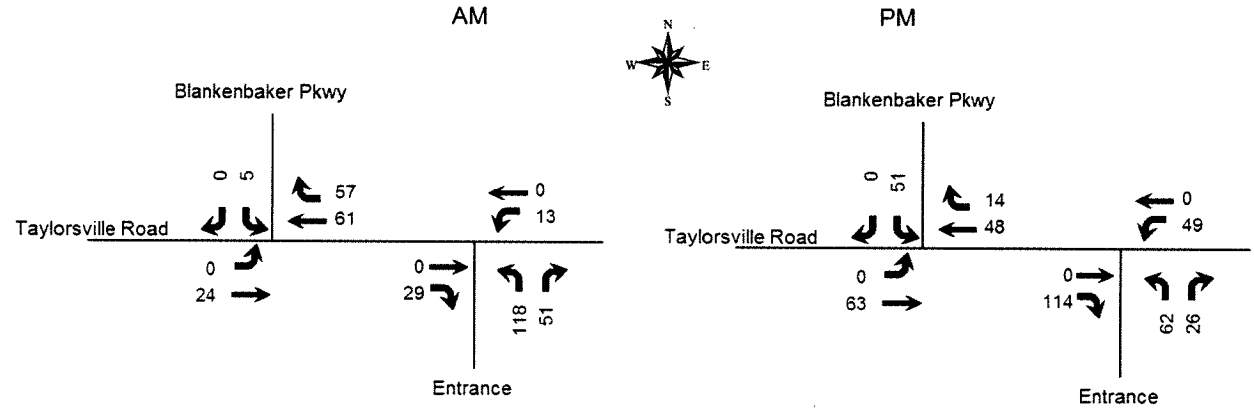


Figure 4
Trip Distribution for Site

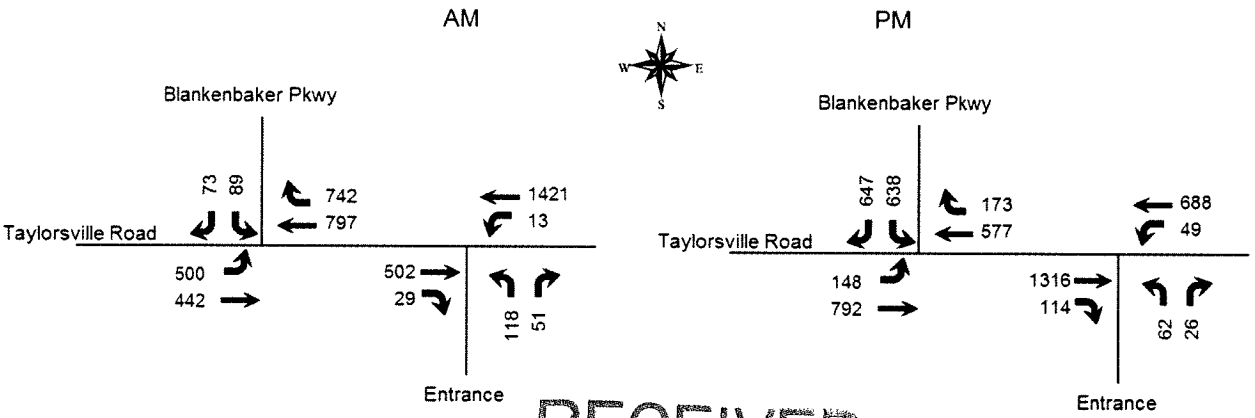


Figure 5
2020 Build Peak Hour Volumes

Analysis

The qualitative measure of operation for a roadway facility or intersection is evaluated by assigning a "Level of Service" or LOS. Level of Service is a ranking scale from A through F with each level representing a range. LOS results depend upon the type of facility that is analyzed. In

this case, the LOS is based upon the average vehicle delay each movement experiences at an intersection.

To evaluate the impact of the proposed development, the vehicle delays at the intersection were determined using procedures detailed in the Highway Capacity Manual, 2010 edition. Future delay and Level of Service were determined for the intersection using HCS 2010 TWSC and Streets software (version 6.70). **Table 2** shows the results of the analysis for the three scenarios analyzed. The full printouts are included in Appendix B.

Table 2 - Level of Service Results

	AM Peak Hour			PM Peak Hour		
	2016 Existing	2020 No Build	2020 Build	2016 Existing	2020 No Build	2020 Build
Taylorsville Road at Blankenbaker Parkway	**B 17.6**	**C 26.2**	**C 32.7**	**C 31.5**	**D 44.0**	**D 52.5**
Taylorsville Road Eastbound	B 17.6	C 30.4	D 43.9	C 23.9	C 24.4	D 36.4
Taylorsville Road Westbound	B 16.0	C 22.1	C 24.7	C 25.0	C 25.1	C 28.8
Blankenbaker Parkway Southbound	C 32.1	D 39.3	D 43.5	D 40.5	E 68.6	E 78.2
Taylorsville Road at Entrance						
Taylorsville Road Westbound (left turn)			A 8.7			B 14.6
Entrance Northbound			E 39.3			E 49.4

Note: Level of Service, delay in seconds

The 2020 PM Build conditions are achieved with an increase in the southbound (Blankenbaker Parkway) phase from 40 to 55 seconds.

Using the Kentucky Transportation Cabinet Auxiliary Turn Lane Policy dated 7/20/2009 and the volumes in **Figure 5**, the volumes do meet the warrants for an eastbound right turn lane and a westbound left turn lane on Taylorsville Road.

Conclusions

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2020, there will be an impact to the existing highway network. At the main entrance to the apartment community an eastbound right turn lane and a westbound left turn lane will be constructed. The exit will have a dedicated left and right turn lane.

Appendix A

Traffic Counts

16 ZONE 10

04.26.16

Interval Start Time	*Bolling Brook Drive* From South			*Taylorsville Road* From East			*Taylorsville Road* From West		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:00	4		5	1	206			57	0
7:15	4		1	0	367			101	2
7:30	6		3	1	339			131	1
7:45	5		0	0	328			114	0
8:00	0		0	1	265			115	0
8:15	3		0	1	215			103	1
8:30	4		3	0	264			98	1
8:45	0		2	0	273			127	0
AM TOTALS	**26**		**14**	**4**	**2257**			**846**	**5**
16:00	1		2	1	122			172	2
16:15	0		3	1	123			227	4
16:30	3		0	5	128			266	2
16:45	3		1	2	134			313	4
17:00	0		3	0	154			310	2
17:15	2		0	3	149			275	6
17:30	5		0	3	189			298	9
17:45	2		0	0	125			304	4
PM TOTALS	**16**		**9**	**15**	**1124**			**2165**	**33**

Interval Start Time	*Bolling Brook Drive* From South			*Taylorsville Road* From East			*Taylorsville Road* From West		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
7:15	4		1	0	367			101	2
7:30	6		3	1	339			131	1
7:45	5		0	0	328			114	0
8:00	0		0	1	265			115	0
TOTAL	**15**	**0**	**4**	**2**	**1299**	**0**	**0**	**461**	**3**

16:45	3		1	2	134			313	4
17:00	0		3	0	154			310	2
17:15	2		0	3	149			275	6
17:30	5		0	3	189			298	9
TOTAL	**10**	**0**	**4**	**8**	**626**	**0**	**0**	**1196**	**21**

CDM Smith

16 ZONE 1020

File Name: Taylorsville Rd & Blankenbaker Pkwy
Start Date: 2/25/2014

	Blankenbaker From North				Taylorsville Road From East				Taylorsville Road From West			
Start Time	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Rght	Thru	Left	Other
7:00 AM	12	0	10	0	115	135	0	0	0	65	72	0
7:15 AM	16	0	17	0	104	144	0	0	0	85	91	0
7:30 AM	17	0	17	0	152	158	0	0	0	115	98	0
7:45 AM	13	0	15	0	151	142	0	0	0	83	136	0
8:00 AM	15	0	22	0	130	133	0	0	0	66	93	0
8:15 AM	15	0	17	0	102	134	0	0	0	61	83	0
8:30 AM	14	0	15	0	70	105	0	0	0	63	55	0
8:45 AM	29	0	20	0	60	127	0	0	0	73	49	0
4:00 PM	63	0	70	0	25	118	0	0	0	131	18	0
4:15 PM	60	0	74	0	18	129	0	0	0	132	27	0
4:30 PM	93	0	95	1	42	122	0	0	0	146	24	0
4:45 PM	89	0	103	0	24	94	0	0	0	143	24	0
5:00 PM	115	0	112	0	33	110	0	0	0	136	25	0
5:15 PM	150	0	95	0	40	107	0	0	0	113	34	0
5:30 PM	113	0	114	0	35	128	0	0	0	134	24	0
5:45 PM	71	0	93	1	31	111	0	0	0	132	29	0

	Blankenbaker From North				Taylorsville Road From East				Taylorsville Road From West			
Start Time	Rght	Thru	Left	Other	Rght	Thru	Left	Other	Rght	Thru	Left	Other
7:15 AM	16	0	17	0	104	144	0	0	0	85	91	0
7:30 AM	17	0	17	0	152	158	0	0	0	115	98	0
7:45 AM	13	0	15	0	151	142	0	0	0	83	136	0
8:00 AM	15	0	22	0	130	133	0	0	0	66	93	0
TOTAL	**61**	**0**	**71**	**0**	**537**	**577**	**0**	**0**	**0**	**349**	**418**	**0**

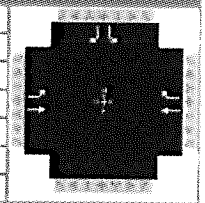
4:45 PM	89	0	103	0	24	94	0	0	0	143	24	0
5:00 PM	115	0	112	0	33	110	0	0	0	136	25	0
5:15 PM	150	0	95	0	40	107	0	0	0	113	34	0
5:30 PM	113	0	114	0	35	128	0	0	0	134	24	0
TOTAL	**467**	**0**	**424**	**0**	**132**	**439**	**0**	**0**	**0**	**526**	**107**	**0**

Appendix B

HCS Reports

HCS 2010 Signalized Intersection Results Summary

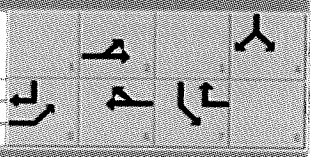
General Information				Intersection Information	
Agency	CDM Smith			Duration, h	0.25
Analyst	DBZ	Analysis Date	May 9, 2016	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Urban Street	Taylorsville Road	Analysis Year	2016	Analysis Period	1> 7:00
Intersection	Blankenbaker Pkwy	File Name	Blankenbaker AM 16.xus		
Project Description	Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	462	386			681	633				78		67

Signal Information			
Cycle, s	83.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	16.7	43.3	6.2	0.0	0.0	0.0
Yellow	3.5	5.0	3.6	0.0	0.0	0.0
Red	2.0	1.5	1.5	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		7.3				9.0
Phase Duration, s	22.2	72.0		49.8				11.3
Change Period, (Y+R c), s	5.5	6.5		6.5				5.1
Max Allow Headway (MAH), s	4.1	4.4		4.4				3.2
Queue Clearance Time (g s), s	15.1	7.4		29.9				6.0
Green Extension Time (g e), s	1.5	14.1		13.2				0.3
Phase Call Probability	1.00	1.00		1.00				0.98
Max Out Probability	0.12	0.01		0.11				0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (v), veh/h	513	429			757	703				87		74
Adjusted Saturation Flow Rate (s), veh/h/ln	1757	1845			1845	1563				1757		1563
Queue Service Time (g s), s	13.1	5.4			27.9	27.7				4.0		3.0
Cycle Queue Clearance Time (g c), s	13.1	5.4			27.9	27.7				4.0		3.0
Green Ratio (g/C)	0.75	0.79			0.52	0.59				0.07		0.28
Capacity (c), veh/h	569	1451			959	930				131		431
Volume-to-Capacity Ratio (X)	0.902	0.296			0.789	0.756				0.660		0.173
Available Capacity (c a), veh/h	740	2204			1653	1517				839		1061
Back of Queue (Q), veh/ln (95 th percentile)	11.1	2.0			16.1	13.2				3.2		1.9
Queue Storage Ratio (RQ) (95 th percentile)	0.54	0.05			0.64	0.56				0.22		0.13
Uniform Delay (d 1), s/veh	18.3	2.5			16.3	12.5				37.7		23.1
Incremental Delay (d 2), s/veh	11.9	0.1			1.6	1.4				2.1		0.1
Initial Queue Delay (d 3), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (d), s/veh	30.2	2.6			18.0	13.9				39.8		23.1
Level of Service (LOS)	C	A			B	B				D		C
Approach Delay, s/veh / LOS	17.6	B		16.0	B		0.0			32.1	C	
Intersection Delay, s/veh / LOS	17.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.6	A	2.2	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	2.0	B	2.9	C				F

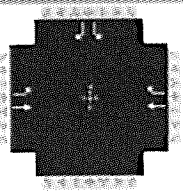
 HCS 2010™ Streets Version 6.70 Generated: 5/10/2016 2:35:01 PM

CDM Smith

16 ZONE

HCS 2010 Signalized Intersection Results Summary

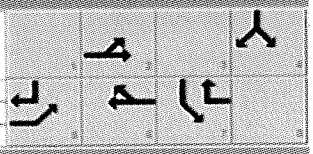
General Information				Intersection Information	
Agency	CDM Smith			Duration, h	0.25
Analyst	DBZ	Analysis Date	May 9, 2016	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Urban Street	Taylorsville Road	Analysis Year	2020 No Build	Analysis Period	1> 7:00
Intersection	Blankenbaker Pkwy	File Name	Blankenbaker AM 20 NB.xus		
Project Description	Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	500	418			736	685				84		73

Signal Information			
Cycle, s	104.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	24.5	55.5	7.7	0.0	0.0	0.0	
Yellow	3.5	5.0	3.6	0.0	0.0	0.0	
Red	2.0	1.5	1.5	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		7.3				9.0
Phase Duration, s	30.0	92.1		62.0				12.8
Change Period, ($Y+R_c$), s	5.5	6.5		6.5				5.1
Max Allow Headway (*MAH*), s	4.1	4.4		4.4				3.2
Queue Clearance Time (g_s), s	24.3	8.5		41.5				7.5
Green Extension Time (g_e), s	0.2	16.9		14.0				0.3
Phase Call Probability	1.00	1.00		1.00				0.99
Max Out Probability	1.00	0.02		0.28				0.00

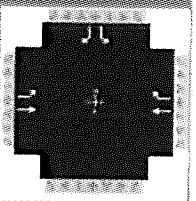
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (v), veh/h	556	464			818	761				93		81
Adjusted Saturation Flow Rate (s), veh/h/ln	1757	1845			1845	1563				1757		1563
Queue Service Time (g_s), s	22.3	6.5			39.3	39.5				5.5		4.0
Cycle Queue Clearance Time (g_c), s	22.3	6.5			39.3	39.5				5.5		4.0
Green Ratio (g/C)	0.78	0.82			0.53	0.60				0.07		0.31
Capacity (c), veh/h	581	1505			977	943				130		481
Volume-to-Capacity Ratio (X)	0.956	0.309			0.837	0.807				0.719		0.169
Available Capacity (c_a), veh/h	589	1757			1318	1232				669		961
Back of Queue (Q), veh/ln (95 th percentile)	24.5	2.6			23.3	19.4				4.4		2.6
Queue Storage Ratio (RQ) (95 th percentile)	1.19	0.07			0.92	0.83				0.30		0.18
Uniform Delay (d_1), s/veh	27.4	2.4			20.9	16.1				47.6		26.5
Incremental Delay (d_2), s/veh	26.3	0.1			3.8	3.2				2.8		0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (d), s/veh	53.7	2.5			24.7	19.3				50.3		26.6
Level of Service (LOS)	D	A			C	B				D		C
Approach Delay, s/veh / LOS	30.4		C	22.1		C	0.0			39.3		D
Intersection Delay, s/veh / LOS	26.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.6	A	2.3	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	2.2	B	3.1	C				F

CDM Smith

HCS 2010 Signalized Intersection Results Summary

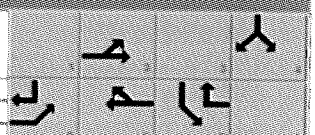
General Information				Intersection Information	
Agency	CDM Smith			Duration, h	0.25
Analyst	DBZ	Analysis Date	May 9, 2016	Area Type	Other
Jurisdiction		Time Period	AM Peak	PHF	0.90
Urban Street	Taylorsville Road	Analysis Year	2020 Build	Analysis Period	1> 7:00
Intersection	Blankenbaker Pkwy	File Name	Blankenbaker AM 20 B.xus		
Project Description	Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	500	442			797	742				89		73

Signal Information			
Cycle, s	113.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	25.0	63.1	8.6	0.0	0.0	0.0
Yellow	3.5	5.0	3.6	0.0	0.0	0.0
Red	2.0	1.5	1.5	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		7.3				9.0
Phase Duration, s	30.5	100.1		69.6				13.7
Change Period, ($Y+R_c$), s	5.5	6.5		6.5				5.1
Max Allow Headway (*MAH*), s	4.1	4.4		4.4				3.2
Queue Clearance Time (g_s), s	27.0	9.3		49.0				8.3
Green Extension Time (g_e), s	0.0	20.4		14.1				0.3
Phase Call Probability	1.00	1.00		1.00				1.00
Max Out Probability	1.00	0.05		0.47				0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (v), veh/h	556	491			886	824				99		81
Adjusted Saturation Flow Rate (s), veh/h/ln	1757	1845			1845	1563				1757		1563
Queue Service Time (g_s), s	25.0	7.3			46.8	47.0				6.3		4.4
Cycle Queue Clearance Time (g_c), s	25.0	7.3			46.8	47.0				6.3		4.4
Green Ratio (g/C)	0.79	0.82			0.55	0.63				0.08		0.30
Capacity (c), veh/h	538	1517			1023	985				133		462
Volume-to-Capacity Ratio (X)	1.033	0.324			0.866	0.837				0.745		0.176
Available Capacity (c_a), veh/h	538	1622			1216	1149				618		893
Back of Queue (Q), veh/ln (95 th percentile)	29.9	3.1			27.8	22.9				5.1		3.0
Queue Storage Ratio (RQ) (95 th percentile)	1.46	0.08			1.09	0.98				0.35		0.20
Uniform Delay (d_1), s/veh	32.8	2.4			21.7	16.5				51.5		29.8
Incremental Delay (d_2), s/veh	47.6	0.1			6.0	5.0				3.1		0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (d), s/veh	80.4	2.6			27.8	21.5				54.6		29.9
Level of Service (LOS)	F	A			C	C				D		C
Approach Delay, s/veh / LOS	43.9		D	24.7		C	0.0			43.5		D
Intersection Delay, s/veh / LOS	32.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.6	A	2.3	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	2.2	B	3.3	C				F

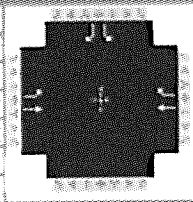
HCS 2010™ Streets Version 6.70

Generated: 5/10/2016 11:50:36 AM

CDM Smith

HCS 2010 Signalized Intersection Results Summary

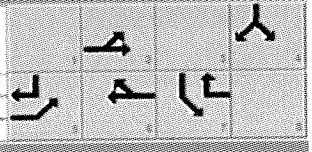
General Information				Intersection Information	
Agency	CDM Smith			Duration, h	0.25
Analyst	DBZ	Analysis Date	May 9, 2016	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Urban Street	Taylorsville Road	Analysis Year	2016	Analysis Period	1> 4:45
Intersection	Blankenbaker Pkwy	File Name	Blankenbaker PM 16.xus		
Project Description	Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	137	674			489	147				543		598

Signal Information			
Cycle, s	102.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	7.5	37.3	40.0	0.0	0.0	0.0						
Yellow	3.5	5.0	3.6	0.0	0.0	0.0						
Red	2.0	1.5	1.5	0.0	0.0	0.0						



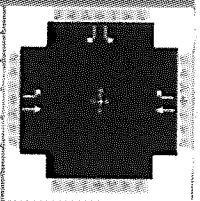
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		7.3				9.0
Phase Duration, s	13.0	56.9		43.8				45.1
Change Period, (Y+R$_c$), s	5.5	6.5		6.5				5.1
Max Allow Headway (MAH), s	4.1	4.3		4.3				3.3
Queue Clearance Time (g$_s$), s	7.2	37.3		29.0				42.0
Green Extension Time (g$_e$), s	0.4	8.4		8.3				0.0
Phase Call Probability	0.99	1.00		1.00				1.00
Max Out Probability	0.00	0.00		0.02				1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (v), veh/h	152	749			543	163				603		664
Adjusted Saturation Flow Rate (s), veh/h/ln	1757	1845			1845	1563				1757		1563
Queue Service Time (g$_s$), s	5.2	35.3			27.0	2.9				32.4		40.0
Cycle Queue Clearance Time (g$_c$), s	5.2	35.3			27.0	2.9				32.4		40.0
Green Ratio (g/C)	0.46	0.49			0.37	0.76				0.39		0.47
Capacity (c), veh/h	287	911			675	1185				689		729
Volume-to-Capacity Ratio (X)	0.530	0.822			0.805	0.138				0.875		0.911
Available Capacity (c$_a$), veh/h	538	1809			1357	1763				689		729
Back of Queue (Q), veh/ln (95 th percentile)	3.9	21.0			17.6	1.3				21.6		23.7
Queue Storage Ratio (RQ) (95 th percentile)	0.19	0.52			0.69	0.05				1.47		1.62
Uniform Delay (d$_1$), s/veh	21.3	22.0			29.1	3.3				28.7		25.3
Incremental Delay (d$_2$), s/veh	1.5	2.1			2.5	0.1				11.7		15.4
Initial Queue Delay (d$_3$), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (d), s/veh	22.8	24.1			31.6	3.4				40.4		40.6
Level of Service (LOS)	C	C			C	A				D		D
Approach Delay, s/veh / LOS	23.9		C	25.0		C	0.0			40.5		D
Intersection Delay, s/veh / LOS	31.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.3	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	2.0	A	1.7	A				F

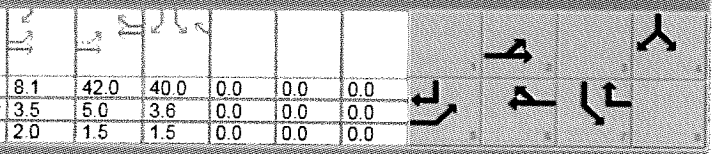
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CDM Smith			Duration, h	0.25
Analyst	DBZ	Analysis Date	May 9, 2016	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Urban Street	Taylorsville Road	Analysis Year	2020 No Build	Analysis Period	1> 4:45
Intersection	Blankenbaker Pkwy	File Name	Blankenbaker PM 20 NB.xus		
Project Description	Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	148	729			529	159				587		647

Signal Information			
Cycle, s	107.2	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	8.1	42.0	40.0	0.0	0.0	0.0
Yellow	3.5	5.0	3.6	0.0	0.0	0.0
Red	2.0	1.5	1.5	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		7.3				9.0
Phase Duration, s	13.6	62.1		48.5				45.1
Change Period, (Y+R c), s	5.5	6.5		6.5				5.1
Max Allow Headway (MAH), s	4.1	4.3		4.3				3.3
Queue Clearance Time (g s), s	7.7	42.4		32.5				42.0
Green Extension Time (g e), s	0.5	9.7		9.5				0.0
Phase Call Probability	0.99	1.00		1.00				1.00
Max Out Probability	0.00	0.01		0.04				1.00

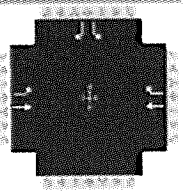
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (v), veh/h	164	810			588	177				652		719
Adjusted Saturation Flow Rate (s), veh/h/ln	1757	1845			1845	1563				1757		1563
Queue Service Time (g s), s	5.7	40.4			30.5	3.2				39.7		40.0
Cycle Queue Clearance Time (g c), s	5.7	40.4			30.5	3.2				39.7		40.0
Green Ratio (g/C)	0.49	0.52			0.39	0.76				0.37		0.45
Capacity (c), veh/h	288	956			722	1196				656		702
Volume-to-Capacity Ratio (X)	0.572	0.847			0.814	0.148				0.995		1.025
Available Capacity (c a), veh/h	565	1721			1291	1678				656		702
Back of Queue (Q), veh/ln (95 th percentile)	4.2	23.6			19.4	1.4				30.0		33.5
Queue Storage Ratio (RQ) (95 th percentile)	0.21	0.59			0.77	0.06				2.05		2.29
Uniform Delay (d 1), s/veh	21.8	22.1			29.1	3.3				33.5		29.5
Incremental Delay (d 2), s/veh	1.8	2.4			2.5	0.1				33.7		40.4
Initial Queue Delay (d 3), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (d), s/veh	23.6	24.5			31.6	3.4				67.2		69.9
Level of Service (LOS)	C	C			C	A				E		F
Approach Delay, s/veh / LOS	24.4	C		25.1	C		0.0			68.6	E	
Intersection Delay, s/veh / LOS	44.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.3	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	2.1	B	1.7	A				F

CDM Smith

HCS 2010 Signalized Intersection Results Summary

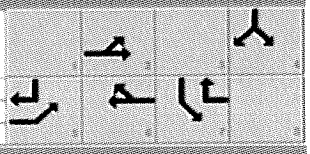
General Information				Intersection Information	
Agency	CDM Smith			Duration, h	0.25
Analyst	DBZ	Analysis Date	May 9, 2016	Area Type	Other
Jurisdiction		Time Period	PM Peak	PHF	0.90
Urban Street	Taylorsville Road	Analysis Year	2020 Build timing modified	Analysis Period	1> 4:45
Intersection	Blankenbaker Pkwy	File Name	Blankenbaker PM 20 B imp.xus		
Project Description	Apartments				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	148	792			577	173				638		647

Signal Information			
Cycle, s	140.2	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

	EB			WB			NB			SB		
Green	9.3	62.3		55.0	0.0	0.0	0.0					
Yellow	0.0	5.0		3.6	0.0	0.0	0.0					
Red	2.0	1.5		1.5	0.0	0.0	0.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		7.3				9.0
Phase Duration, s	11.3	80.1		68.8				60.1
Change Period, (*Y+R_c*), s	2.0	6.5		6.5				5.1
Max Allow Headway (*MAH*), s	4.1	4.3		4.3				3.2
Queue Clearance Time (g_s), s	8.9	62.8		43.5				57.0
Green Extension Time (g_e), s	0.4	10.8		10.4				0.0
Phase Call Probability	1.00	1.00		1.00				1.00
Max Out Probability	0.00	0.11		0.16				1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (*v*), veh/h	164	880			641	192				709		719
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1757	1845			1845	1563				1757		1563
Queue Service Time (g_s), s	6.9	60.8			41.5	3.2				55.0		55.0
Cycle Queue Clearance Time (g_c), s	6.9	60.8			41.5	3.2				55.0		55.0
Green Ratio (*g/C*)	0.52	0.52			0.44	0.84				0.39		0.46
Capacity (*c*), veh/h	283	968			819	1308				689		717
Volume-to-Capacity Ratio (*X*)	0.581	0.909			0.782	0.147				1.028		1.002
Available Capacity (c_a), veh/h	480	1316			987	1450				689		717
Back of Queue (*Q*), veh/ln (95 th percentile)	5.3	36.7			26.2	1.3				41.3		39.8
Queue Storage Ratio (*RQ*) (95 th percentile)	0.26	0.92			1.03	0.06				2.82		2.71
Uniform Delay (d_1), s/veh	26.0	30.3			33.2	2.1				42.6		37.9
Incremental Delay (d_2), s/veh	1.9	7.7			3.5	0.1				41.7		34.2
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (*d*), s/veh	27.9	38.0			36.7	2.2				84.3		72.1
Level of Service (LOS)	C	D			D	A				F		F
Approach Delay, s/veh / LOS	36.4	D		28.8	C		0.0			78.2		E
Intersection Delay, s/veh / LOS	52.5						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.3	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	2.2	B	1.9	A				F

HCS 2010 Two Way Stop Control Summary Report

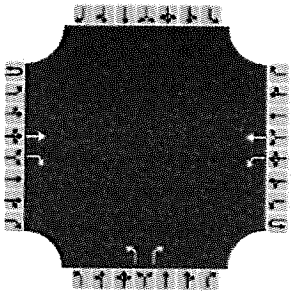
General Information

Analyst	DBZ
Agency/Co.	CDM Smith
Date Performed	5/6/2016
Analysis Year	2020
Time Analyzed	AM Peak Build
Intersection Orientation	East-West
Project Description	Taylorsville Road Apartments

Site Information

Intersection	Entrance
Jurisdiction	
East/West Street	Taylorsville Road
North/South Street	Entrance
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume (veh/h)			502	29		13	1114			118		51				
Percent Heavy Vehicles						3				3		3				
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Left Only															
Median Storage	1															

Delay, Queue Length, and Level of Service

Flow Rate (veh/h)						14				127		55				
Capacity						996				198		540				
v/c Ratio						0.01				0.64		0.10				
95% Queue Length						0.0				3.8		0.3				
Control Delay (s/veh)						8.7				50.9		12.4				
Level of Service (LOS)						A				F		B				
Approach Delay (s/veh)					0.1				39.3							
Approach LOS					A				E							

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Entrance AM 20 8.xtw

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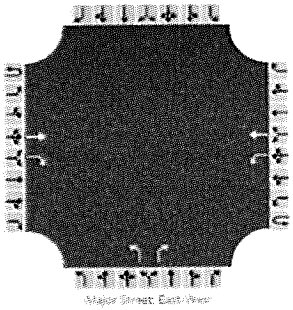
CDM Smith

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	DBZ	Intersection	Entrance
Agency/Co.	CDM Smith	Jurisdiction	
Date Performed	5/6/2016	East/West Street	Taylorsville Road
Analysis Year	2020	North/South Street	Entrance
Time Analyzed	PM Peak Build	Peak Hour Factor	0.93
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Taylorsville Road Apartments		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume (veh/h)			1316	114		49	688			62		26				
Percent Heavy Vehicles						3				3		3				
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Left Only															
Median Storage	1															

Delay, Queue Length, and Level of Service

Flow Rate (veh/h)						53				67		28				
Capacity						429				132		168				
v/c Ratio						0.12				0.51		0.17				
95% Queue Length						0.4				2.4		0.6				
Control Delay (s/veh)						14.6				57.3		30.7				
Level of Service (LOS)						B				F		D				
Approach Delay (s/veh)					1.0				49.4							
Approach LOS					A				E							

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CDM Smith

Summary of Neighborhood Meetings
16ZONE1020

Neighborhood meetings were called to order by Bill Bardenwerper, counsel for applicant, on April 11 and May 19, 2016 beginning at 7:00 at Sojourn Community Church located at 11412 Taylorsville Road. He was assisted at the first meeting by David Mindel with Mindel, Scott, land planners and engineers. He was assisted at the second meeting by David Mindel, Diane Zimmerman with CBM Smith, Traffic engineers, and by George Chapman with Integra Realty Resources (IRR).

At the first meeting, the room was full, and at the second meeting, the room was half full, of property owners living along Taylorsville Road and in nearby subdivisions, or along nearby roads where all those people present stated that traffic is the overriding issue, arguing against any new development in this area. Most of the questions and speeches after the initial presentations involved traffic. Some involved storm water. Some involved why this location instead of others.

So the meetings began with Bill Bardenwerper showing a powerpoint presentation with images of the area, nearby road networks, nearby workplaces and nearby residential communities and homes. He explained that this site was chosen because of its good access to the large business park generally known as Bluegrass Industrial Park, Commonwealth Industrial Park, Blankenbaker Crossings and Blankenbaker Station – one of the largest business parks in the country. He said that this site was just a few hundred yards from Blankenbaker Parkway within easy access to all of that vast acreage. He said that people residing at this apartment community are not likely to be people working in downtown Louisville, off Bardstown Road or Hurstbourne Parkway. Rather the apartment community is intended for people who want to live in close proximity to these business parks. That means, he said, that this development's impact on Taylorsville Road will be hardly more significant than at present because people residing here to a large extent already travel Taylorsville Road into Jeffersontown or to the Snyder Freeway to access the places where they live. He said that the main traffic issues that he had the applicant's traffic engineer, Diane Zimmerman, have identified will be making left turns into and out of the proposed apartment community. He said this will be accommodated with a center left turn lane.

Diane Zimmerman, at the second meeting, presented her traffic impact study (TIS). As she showed the numbers and explained them, levels of service are acceptable in 2020 post development conditions and hardly change at all from what is otherwise projected considering normal growth conditions.

George Chapman, also at the second meeting, presented his market analysis with these conclusions. First, he said that this apartment community tested as the second highest rated apartment community he has ever analyzed. Second, he said that rental rates will be comparable to other nearby high-end apartment communities. Third, he said that market demand at this location is projected to be greater than the rate at which the builders can actually construct these apartment buildings. Fourth, he said that the above-referenced business parks are the primary attraction to people wanting to live at this location. He said that those workers are already of this road system and that apartments at this location will reduce their commuting distance.

At the first meeting, there were lots of speeches about traffic and some about storm water. Those regarding storm water had to do with the fact that Chenoweth Run carries more water today than apparently every before. Mr. Bardenwerper and Mr. Mindel explained that this project will include detention facilities such that post development peak rates of run off will not exceed predevelopment conditions. These detention basins are intended to fully mitigate all adverse impacts of storm water. Few people who heard this believed it, even though this standard, as Mr. Bardenwerper explained, is one set by MSD, and accordingly the development plan will be carefully scrutinized by MSD to assure that these measures are met.

At the second meeting, virtually all of the speeches were about traffic and the desire that this apartment community be located somewhere else than along Taylorsville Road or that new housing like this not be built until roads are improved.

After considerable talk on both occasions about traffic in particular, Mr. Bardenwerper explained the process and likely schedule for official filing and planning commission committee meeting followed by full public hearing and final vote by Metro Council.

Respectfully submitted,

William B. Bardenwerper

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16 ZONE 1020

Traffic Impact Analysis

REPORT

Taylorsville Road Apartments Louisville, KY

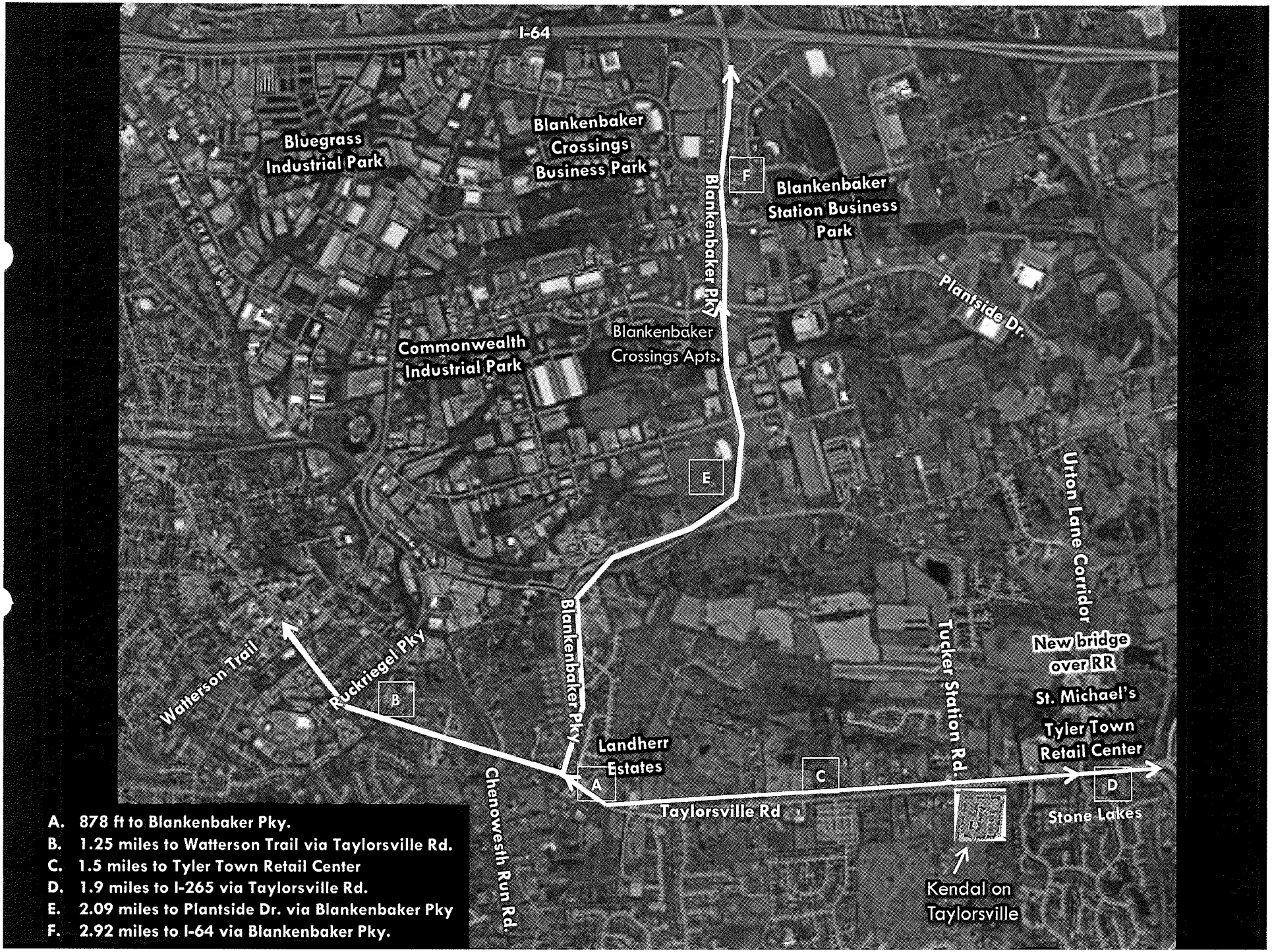
Traffic Impact Study

Louisville Metro Planning

May 9, 2016

CDM Smith


N
TAYLORSVILLE ROAD
Taylorsville Road
Sojourn
Comm. Ch
Bolling
Brook
Sub.
Chenoweth Run Road



A. 878 ft to Blankenbaker Pky.
B. 1.25 miles to Watterson Trail via Taylorsville Rd.
C. 1.5 miles to Tyler Town Retail Center
D. 1.9 miles to I-265 via Taylorsville Rd.
E. 2.09 miles to Plantside Dr. via Blankenbaker Pky
F. 2.92 miles to I-64 via Blankenbaker Pky.

Existing Conditions

Taylorsville Road is maintained by the Kentucky Transportation Cabinet with an estimated 2015 ADT of 18,500 vehicles per day east of Bolling Brook Drive, as provided by a Metro Public Works count. The road is a two lane road with eleven-foot lanes with four foot shoulders. The posted speed limit is 55 mph. There are no sidewalks.

A.m. and p.m. peak hour traffic counts were obtained at the intersection on April 26, 2016 (see Appendix A). The a.m. peak hour occurred between 7:15 and 8:15 and the p.m. peak hour occurred between 4:45 and 5:45 p.m. **Figure 2** illustrates the existing peak hour traffic volumes.

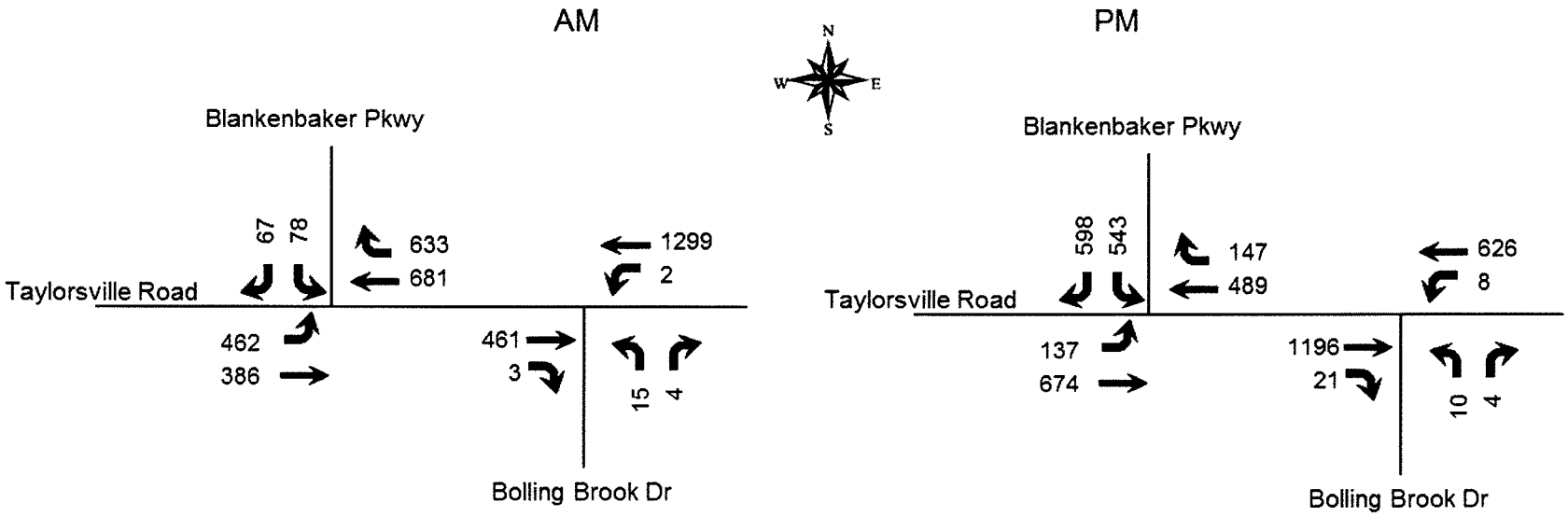


Figure 2
2016 Peak Hour Counts

Future Conditions

The projected completion year for this development is 2020, so the analysis year for this study is 2020. To predict traffic conditions in 2020, two percent annual growth in traffic was added. This growth is based upon a review of the count data along Taylorsville Road. **Figure 3** displays the 2020 No Build volumes.

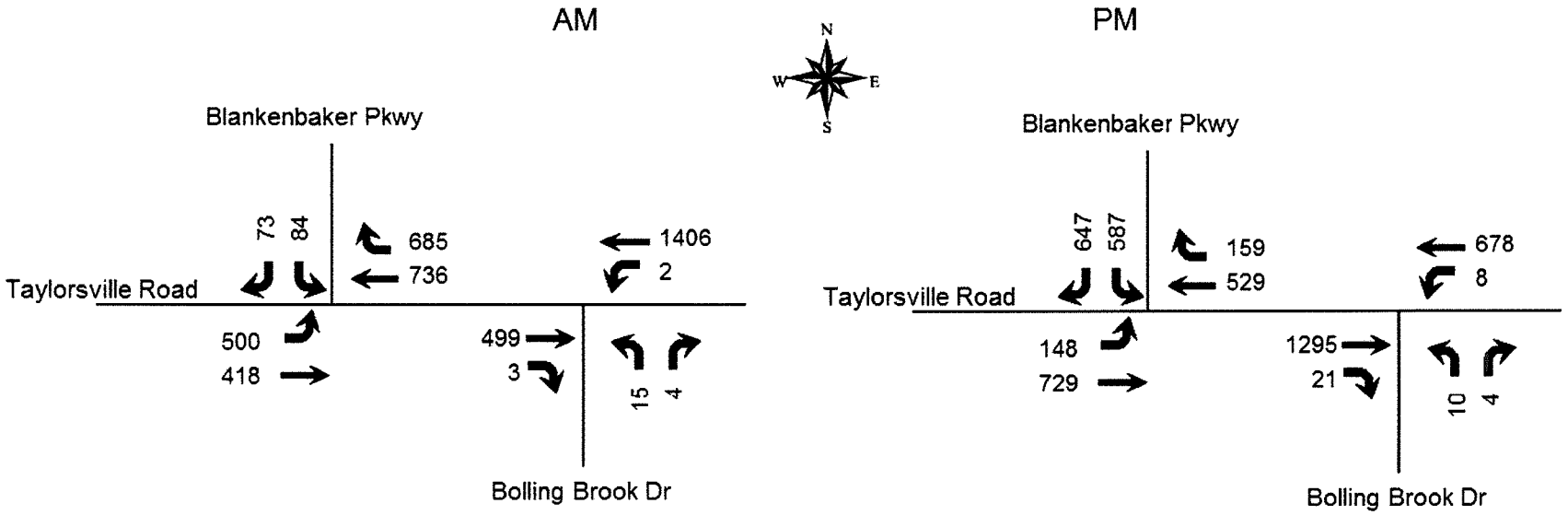


Figure 3
2020 No Build Peak Hour Volumes

Trip Generation

The Institute of Transportation Engineers Trip Generation Manual, 9th Edition contains trip generation rates for a wide range of developments. The land uses of "Apartments (220) best describes this development. The trip generation results are listed in **Table 1**. The results of the trip generation analysis are that this development will generate 211 a.m. peak hour trips and 251 p.m. peak hour trips. The trips were assigned to the highway network with 70 percent to/from the west and 30 percent to/from the east. This is based upon the existing traffic pattern on Taylorsville Road. **Figure 4** shows the trips generated by this development and distributed throughout the road network for the year 2020during the peak hours. **Figure 5** displays the individual turning movements for the year 2020 for the peak hours when the development is completed.

Table 1 – Trip Generation

	AM Peak Hour			PM Peak Hour		
	Total	Enter	Exit	Total	Enter	Exit
Apartments (424 units)	211	42	169	251	163	88

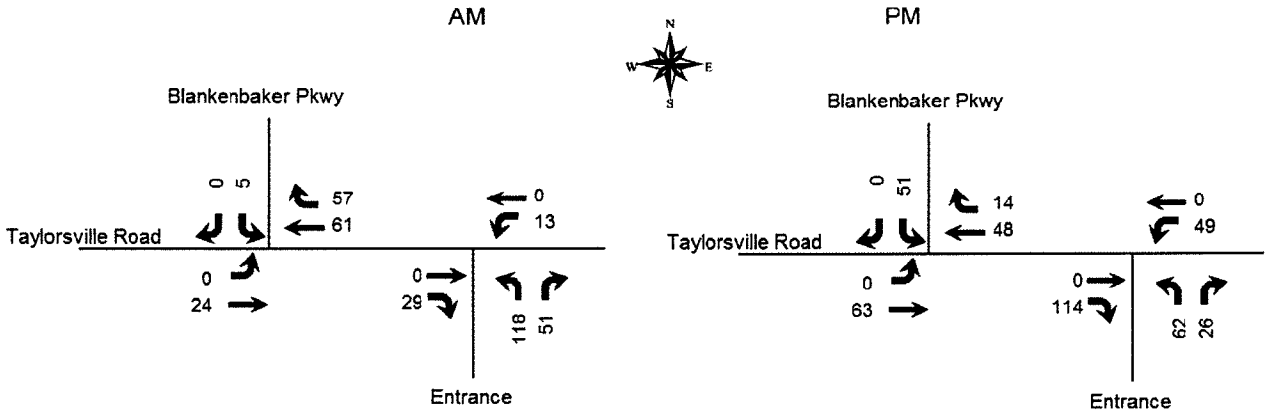


Figure 4
Trip Distribution for Site

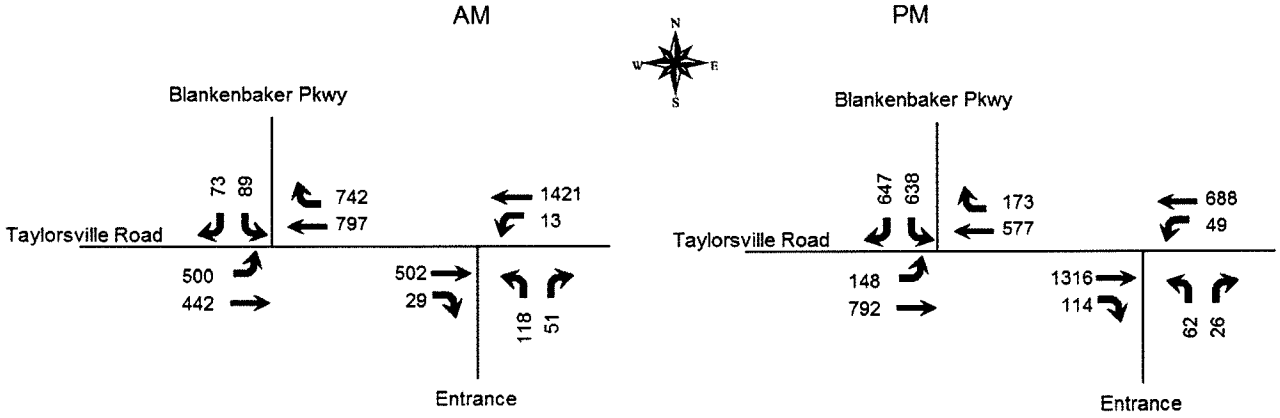


Figure 5
2020 Build Peak Hour Volumes

Analysis

The qualitative measure of operation for a roadway facility or intersection is evaluated by assigning a "Level of Service" or LOS. Level of Service is a ranking scale from A through F with each level representing a range. LOS results depend upon the type of facility that is analyzed. In this case, the LOS is based upon the average vehicle delay each movement experiences at an intersection.

To evaluate the impact of the proposed development, the vehicle delays at the intersection were determined using procedures detailed in the Highway Capacity Manual, 2010 edition. Future delay and Level of Service were determined for the intersection using HCS 2010 TWSC and Streets software (version 6.70). **Table 2** shows the results of the analysis for the three scenarios analyzed. The full printouts are included in Appendix B.

Table 2 - Level of Service Results

	AM Peak Hour			PM Peak Hour		
	2016 Existing	2020 No Build	2020 Build	2016 Existing	2020 No Build	2020 Build
Taylorsville Road at Blankenbaker Parkway	**B 17.6**	**C 26.2**	**C 32.7**	**C 31.5**	**D 44.0**	**D 52.5**
Taylorsville Road Eastbound	B 17.6	C 30.4	D 43.9	C 23.9	C 24.4	D 36.4
Taylorsville Road Westbound	B 16.0	C 22.1	C 24.7	C 25.0	C 25.1	C 28.8
Blankenbaker Parkway Southbound	C 32.1	D 39.3	D 43.5	D 40.5	E 68.6	E 78.2
Taylorsville Road at Entrance						
Taylorsville Road Westbound (left turn)			A 8.7			B 14.6
Entrance Northbound			E 39.3			E 49.4

Note: Level of Service, delay in seconds

The 2020 PM Build conditions are achieved with an increase in the southbound (Blankenbaker Parkway) phase from 40 to 55 seconds.

Using the Kentucky Transportation Cabinet Auxiliary Turn Lane Policy dated 7/20/2009 and the volumes in **Figure 5**, the volumes do meet the warrants for an eastbound right turn lane and a westbound left turn lane on Taylorsville Road.

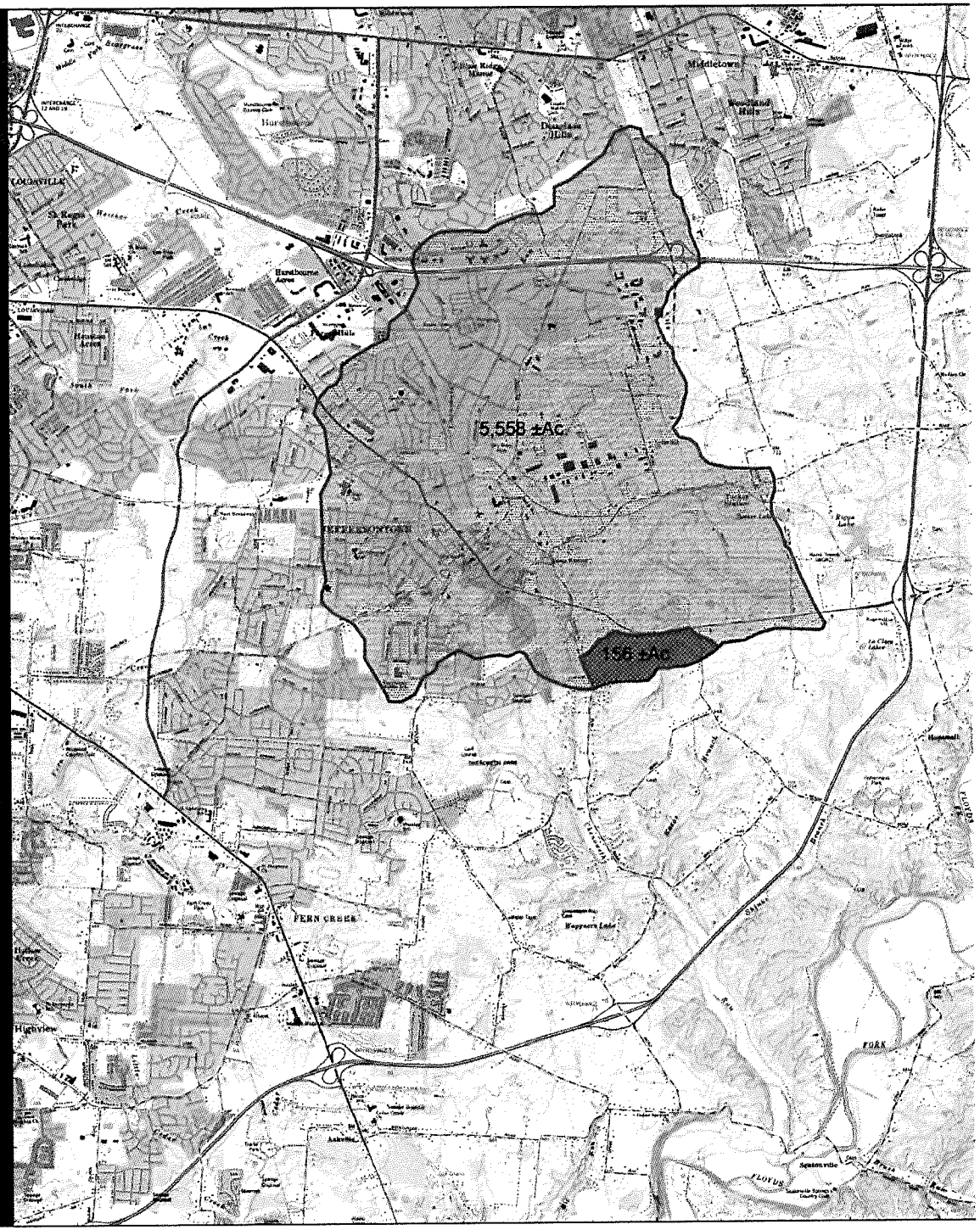
Conclusions

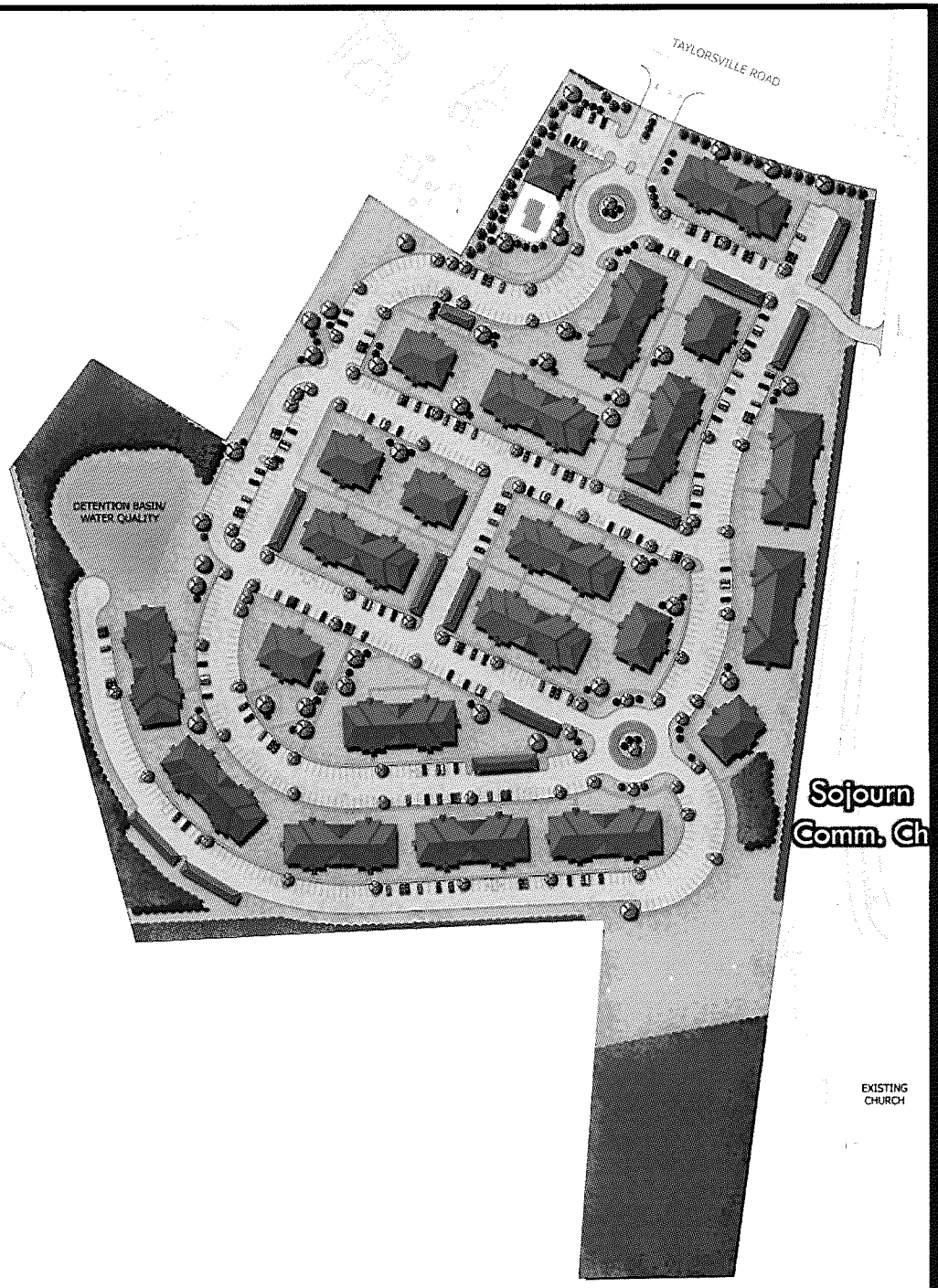
Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2020, there will be an impact to the existing highway network. At the main entrance to the apartment community an eastbound right turn lane and a westbound left turn lane will be constructed. The exit will have a dedicated left and right turn lane.

Stormwater Analysis


TAYLORSVILLE ROAD
Taylorsville Road
Sojourn
Comm. Ch
Bolling
Brook
Sub.
Chenoweth Run Road

Watershed Analysis




TAYLORSVILLE ROAD
DETENTION BASIN/
WATER QUALITY
Sojourn
Comm. Ch
EXISTING
CHURCH

Market Analysis

Integra Realty Resources
Kentucky-Southern Indiana

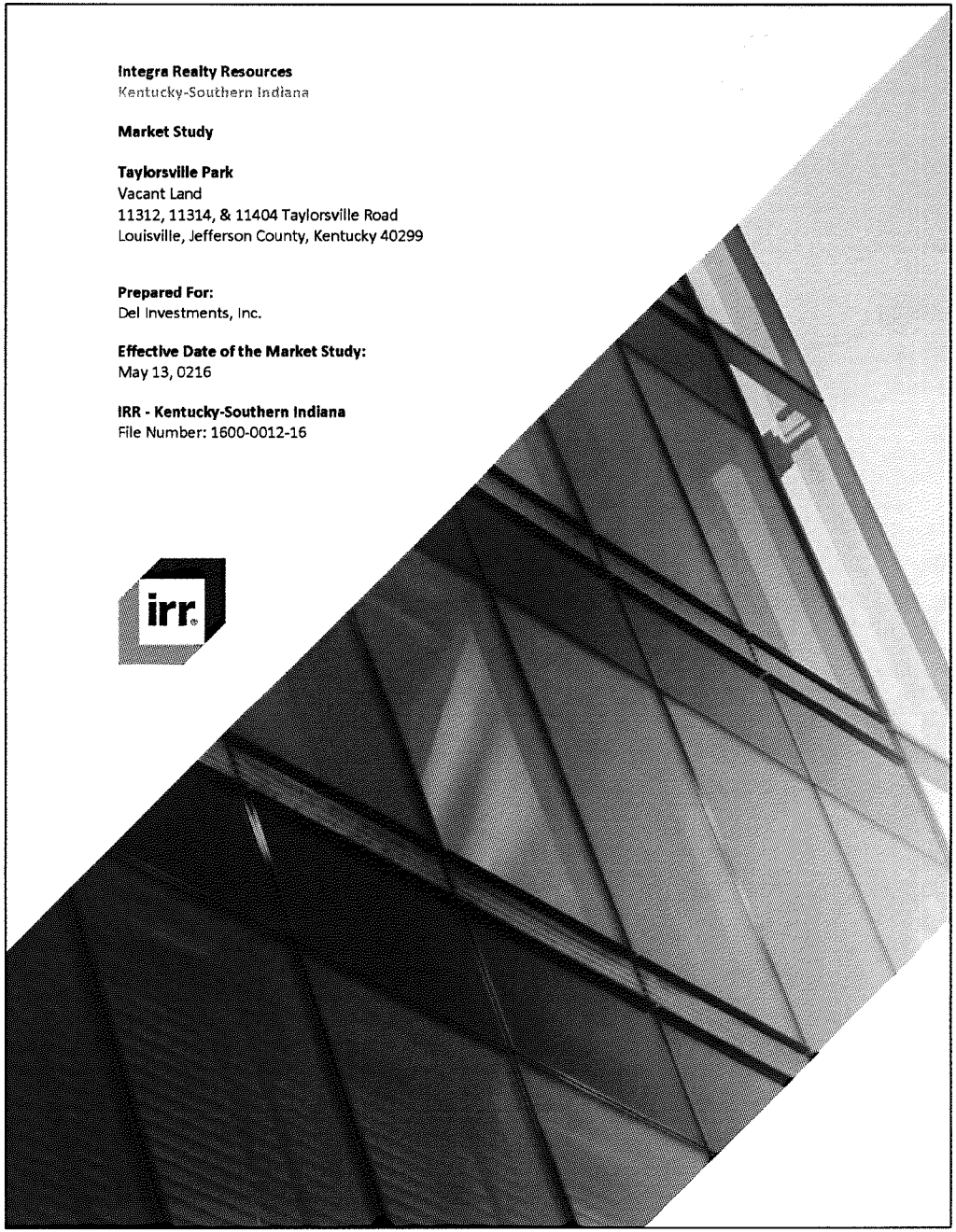
Market Study

Taylorsville Park
Vacant Land
11312, 11314, & 11404 Taylorsville Road
Louisville, Jefferson County, Kentucky 40299

Prepared For:
Del Investments, Inc.

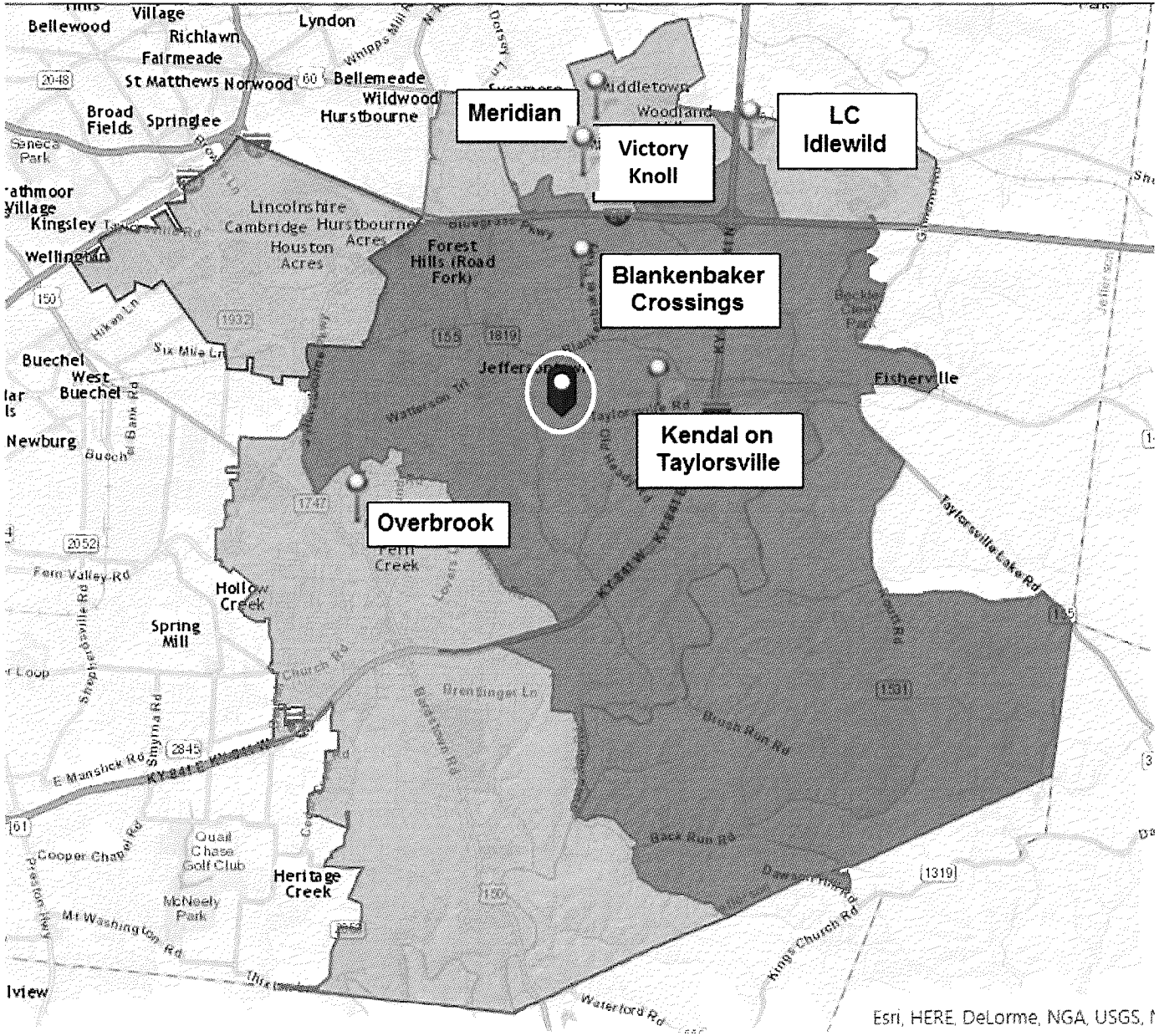
Effective Date of the Market Study:
May 13, 0216

IRR - Kentucky-Southern Indiana
File Number: 1600-0012-16



A. 878 ft to Blankenbaker Pky.
B. 1.25 miles to Watterson Trail via Taylorsville Rd.
C. 1.5 miles to Tyler Town Retail Center
D. 1.9 miles to I-265 via Taylorsville Rd.
E. 2.09 miles to Plantside Dr. via Blankenbaker Pky
F. 2.92 miles to I-64 via Blankenbaker Pky.

Major nearby newer/like-kind apartment communities (Subject site circled in yellow)



Summary of rentals at major nearby newer/like-kind apartment communities (not including site fka Victory Knoll because construction slated to start next year)

No.	Property Name; Address	Yr Built; Stories	Unit Mix	# Units; % Occ.	Avg. Unit SF	Avg. Rent/ Month	Avg. Rent/ SF
1	Kendal on Taylorsville Apartments	2015-2016		309			
	4004 Keighley Park Ln.	3		100%			
			1BD/1BA	–	935	$958	$1.02
			2BD/2BA	–	1,290	$1,190	$0.92
			3BD/2.5BA Townhome	–	1,762	$1,588	$0.90
	Tenant-Paid Utilities:	Cable, In-Unit Electric, Sewer, Water, Gas					
2	Meridian on Shelbyville	2014		304			
	12900 Observation Cir.	3		99%			
			1BR/1BA	80	830	$995	$1.20
			1BR/1BA w/ Study	25	1,043	$1,065	$1.02
			2BR/2BA	153	1,158	$1,165	$1.01
			2BR/2BA w/ Study	46	1,454	$1,490	$1.02
	Tenant-Paid Utilities:	Water, Sewer, Gas, In-Unit Electric, Cable					
3	LC Idlewild	2013-2014		360			
	700 Landis Ridge Dr.	3		99%			
			Bentley Flat I	–	698	$940	$1.35
			Bentley Flat II	–	772	$965	$1.25
			Greystone Flat I	–	748	$945	$1.26
			Greystone Flat II	–	1,104	$1,050	$0.95
	Tenant-Paid Utilities:	Water, Sewer, Trash, Gas, In-Unit Electric, Cable					
4	Overbrook Apartments	2012-2015		150			
	8901 Fairground Rd.	3		80%			
			1BD/1BA	42	850	$825	$0.97
			2BD/2BA	104	1,175	$1,065	$0.91
			3BD/2BA	4	1,300	$1,299	$1.00
	Tenant-Paid Utilities:	Cable, In-Unit Electric, Electric Heat, Electric Cooking					
5	Blankenbaker Crossings	2006		236			
	2515 Shining Water Dr.	3		99%			
			One Bedroom Flat	109	841	$855	$1.02
			Two Bedroom Flat	128	1,147	$1,005	$0.88
	Tenant-Paid Utilities:	Sewer, In-Unit Electric, Water, Gas					

**Data provided as of First Quarter 2016*

Competitive Market Product by Unit Type				
Apartment Community	Location	Bed/Bath	Average SF	Average Rent/SF
Kendal at Taylorsville	40299	1, 1	935	$1.02
Meridian	40243	1, 1	880	$1.15
LC Idlewild	40245	1, 1	739	$1.28
Overbrook	40291	1, 1	850	$0.97
			Weighted Average	***$1.14***
Kendal at Taylorsville	40299	2, 2	1290	$0.92
Meridian	40243	2, 2	1226	$1.01
LC Idlewild	40245	2, 2	1104	$0.95
Overbrook	40291	2, 2	1175	$0.91
			Weighted Average	***$0.96***
Kendal at Taylorsville	40299	3, 2.5 TH	1762	$0.90
Meridian	40243	NA	NA	NA
LC Idlewild	40245	NA	NA	NA
Overbrook	40291	3, 2	1300	$1.00
			Weighted Average	***$0.94***

**Data provided as of First Quarter 2016*

The following rents were used for the subject property survey:

- 1 bdrm: $1.10 psf
- 2 bdrm: $0.96 psf
- 3 bdrm: $0.94 psf

Subject apartment communities locational rank among 5 tested newer/like-kind apartment community locations

	Score*	Overall Rank
The intersection of Taylorsville Road and Blankenbaker Parkway, near Veterans Memorial Park	99	1
The intersection of Bardstown Road and Hurstbourne Parkway, near the Fern Creek area	96	2
The intersection of Shelbyville Road and Hurstbourne Parkway, near the University of Louisville Shelby campus	93	3
The intersection of Blankenbaker Parkway and I-64, near Ellingsworth Lane	87	4
The intersection of Shelbyville Road and the Gene Snyder, near Middletown	75	5

*Score is a weighted aggregate.

Analysis Conclusions

- Subject capture is estimated conservatively between 21 and 25 units per month and optimistically at 33 units per month.

- Demand is strongest for two bedroom units, with 50% of respondents choosing a two bedroom unit. Approximately 27% of respondents chose a three bedroom unit and 23% chose a one bedroom.

- The subject's location is considered strong, ranking 1st among five tested locations. This is a good sign for the subject property.

- The sample is heavily represented by the 25 to 44 age demographics and the $60,000 to $74,999 income demographic. The majority of respondent have an annual household income of over $45,000. This is a positive indicator for the proposed apartment community.