February 24, 2015

Mr. David Knoll
Ryan Companies US, Inc
111 Congress Avenue, Suite 1850
Austin, TX 78701

Subject: Reserve at Springdale Traffic Study

Dear David:

HDR Engineering, Inc. has been retained by Ryan Companies US, Inc. to perform a traffic study for the proposed Reserve at Springdale development located east of Springdale Road, between East 51st Street and Rogge Lane, in Austin, Texas, as shown in Figure 1. The two primary purposes of this traffic study are:

(1) Compare the traffic impact of the proposed 292-unit multifamily development versus an alternative retail development that could be constructed consistent with the current underlying zoning and not categorized as a Conditional Use.

(2) Assess the two development scenario's future traffic impact on the two nearby intersections: Springdale Road at East 51st Street and Springdale Road at Rogge Lane. Based upon the results of the traffic analysis, we will determine the need for future intersection improvements.

Development Scenarios:

The two potential development scenarios assume the following land uses:

- Scenario 1 (Proposed Development): 292 apartments and a 150 square foot coffee shop
- Scenario 2 (Alternative Retail Development per Existing Zoning): 75,000 square foot shopping center and 6,500 square foot fast food restaurant with drive-through

The property is currently vacant, and the development is anticipated to be completed by 2017.

Executive Summary

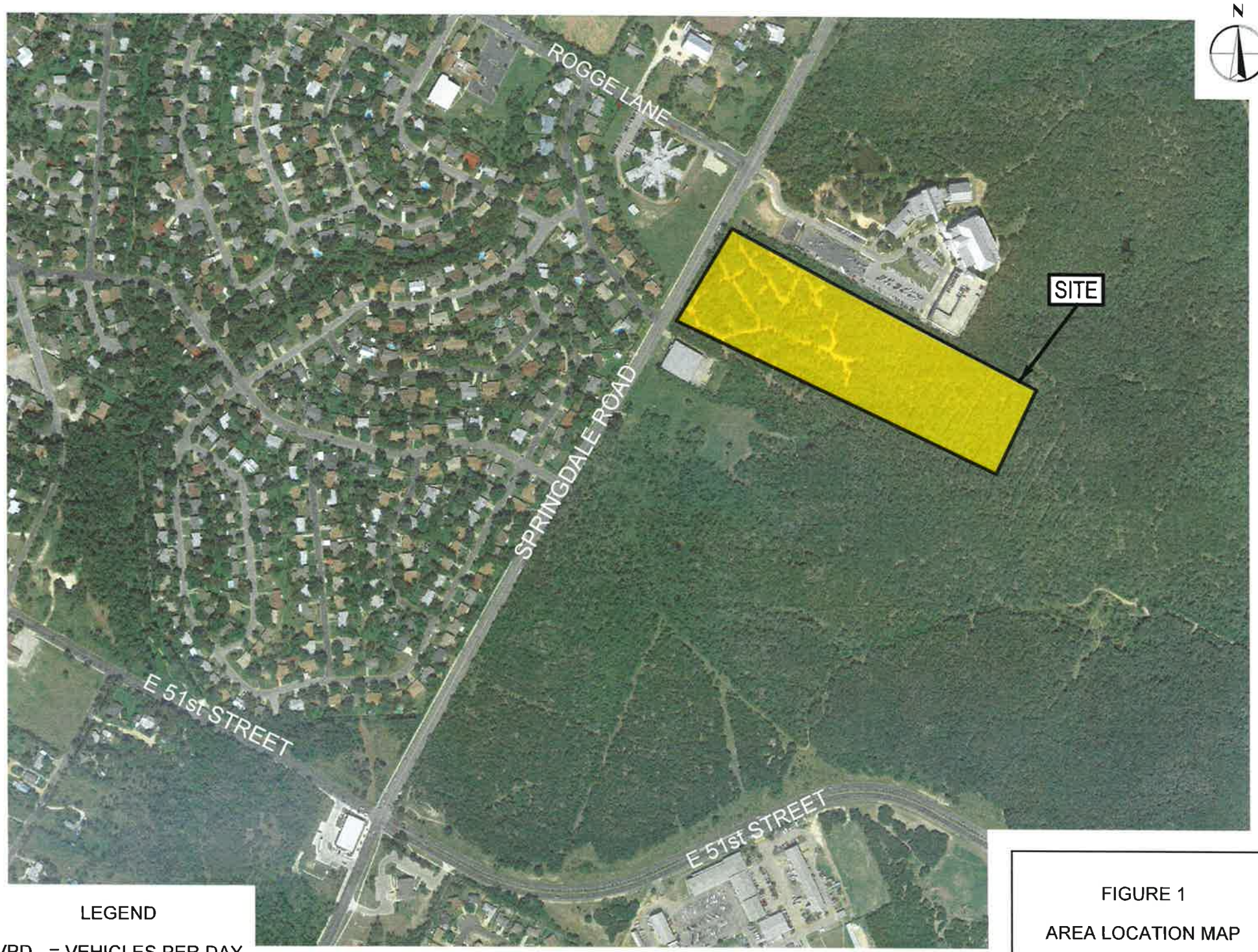
The multifamily land use that is proposed as part of the conditional use permit under site plan number SPC-2014-0086C, which is described by the Proposed Development (Scenario1) of this report, meets Section 25-5-145 of the City's code. The proposed conditional use does not adversely impact the safety or convenience of vehicular or pedestrian circulation, including the reasonably anticipated traffic and uses in the area, nor does it adversely affect an adjacent property or traffic control through the location, lighting, or type of sign. It should be noted that many of the land uses that are permitted by right generate three times the amount of traffic that the proposed conditional use generates, as shown in the Alternative Retail Development Scenario. Therefore, the proposed conditional use could be considered a benefit, since it generates significantly less traffic than what a permitted use could.

Site and Access Characteristics

As shown in Figure 1, the site is located east of Springdale Road, between of Rogge Lane/Private Driveway and East 51st Street. Access to the site is proposed via one (1) full purpose driveway on Springdale Road.

Trip Generation

Based on recommendations and data contained in the Institute of Transportation Engineers' (ITE) Trip Generation, 9th Edition, the proposed project will generate approximately 1,953 and 8,858 unadjusted daily trips upon buildout for Scenario 1 and Scenario 2, respectively. Table 1 provides a detailed summary of traffic production, which is directly related to the assumed land use plan.



LEGEND

VPD = VEHICLES PER DAY

FIGURE 1

AREA LOCATION MAP

Table 1.
Summary of Unadjusted Daily and Peak Hour Trip Generation

Proposed Land Use	Size	24 Hour Two-Way Volume	AM Peak Hour		PM Peak Hour	
			Enter	Exit	Enter	Exit
Scenario 1 (Proposed Development)						
Apartment	292 DU	1,893	29	117	116	62
Coffee without Drive-Through*	150 SF	60	8	8	3	3
Total		**1,953**	**37**	**125**	**119**	**65**
Scenario 2 (Alternative Retail Development)						
Shopping Center	75,000 SF	5,633	81	50	237	257
Fast-Food Restaurant with Drive-Through	6,500 SF	3,225	151	145	110	102
Total		**8,858**	**232**	**195**	**347**	**359**

* The 24 Hour Two-Way Volume was estimated using peak period volumes.

Analysis Assumptions

The traffic impact analysis process involves both the use of primary data and engineering judgment on transferable parameters. Specifically, engineering judgment is required for estimation of background traffic growth, pass-by capture, internal capture, and transit trip reductions, all of which are further described in the following paragraphs.

Background Traffic – Traffic growth rates for the area were examined using previously collected traffic volumes from TxDOT. Based on available information, a one (1) percent annual growth rate has been assumed for the study.

Pass-By Capture – Studies have shown that retail land uses will capture from 20 to 60 percent of their traffic as pass-by trips, depending upon their size. It is well documented that many other land uses also experience significant pass-by trip capture, such as drive-in banks and restaurants. The amount of trip reduction that each tract may attribute to the pass-by phenomenon will depend directly on the type of land use that is developed. The following pass-by reductions were assumed in this analysis.

	AM Peak	PM Peak
Shopping Center		34 Percent
Fast-Food Restaurant with Drive-Through	49 Percent	50 Percent

Internal Capture – Once the total buildout of proposed land uses occurs, there will be interaction among the uses within this development. Internal capture is accounted for in two ways. First, to account for internal capture among similar retail land uses in adjacent areas, the sizes may be combined during the trip generation process. Because the equations used in trip generation estimations are logarithmic, the number of trips generated by a site does not increase in direct proportion to an increase in the square footage of a development. By combining retail projects in close proximity to each other, a lower number of trips will be estimated, thereby taking into account the internal capture factor. The second way to account for internal capture is to reduce the expected number of trips directly by some percentage, which reflects expected multipurpose trip-making among different types of land uses that are in close proximity. However, as with pass-by trip reductions, internal capture depends on the type and quantity of land uses. An internal capture of five (5) percent was assumed for the fast-food restaurant with drive-through, during both the AM and PM peak periods. No other internal capture reductions were assumed.

Transit Trips – The provision of transit service to an area may reduce the expected number of trips by providing a mode of travel alternative to the private automobile. The reduction may be in two forms, either a reduction in site generated trips or a reduction in background trips. A five (5) percent transit reduction was assumed for the entire project in both scenarios based on the proximity of the site to major bus routes.

Pedestrian and Bicycle Trips – No pedestrian or bicycle reduction was assumed for the study.

Table 2 provides a detailed summary of the overall adjusted trip generation for the development. The proposed project will generate approximately 1,855 and 5,912 adjusted weekday daily trips for the Scenario 1 and Scenario 2, respectively.

Table 2.
Summary of Adjusted Daily and Peak Hour Trip Generation

Proposed Land Use	Size	24 Hour Two-Way Volume	AM Peak Hour		PM Peak Hour	
			Enter	Exit	Enter	Exit
Scenario 1 (Proposed Development)						
Apartment	292 DU	1,798	28	111	110	59
Coffee without Drive-Through	150 SF	57	8	8	3	3
Total		**1,855**	**36**	**119**	**113**	**62**
Scenario 2 (Alternative Retail Development)						
Shopping Center	75,000 SF	4,442	77	48	149	161
Fast-Food Restaurant with Drive-Through	6,500 SF	1,470	70	67	50	46
Total		**5,912**	**147**	**115**	**199**	**207**

Directional Distribution – Once site generated trips were known, the next step involved distribution of those trips to appropriate geographic directions and logical connecting roadways. The major thoroughfares that have a direct bearing on the accessibility of the project have been previously identified.

Traffic counts conducted during the study provided the basis for the overall directional distribution of traffic approaching and departing the project site, as summarized in Table 3.

Table 3.
Forecasted Overall Directional Distribution of Site Oriented Traffic

Direction/Roadway	% of Site Traffic
North Springdale Road	25
South Springdale Road	35
West Rogge Lane	5
East 51st Street	15
West 51st Street	20
Total	**100**

Given the total site generated traffic and the directional distribution by approach, the next step in the process is to assign the traffic destined to and from the project to the most likely travel paths.

This step was performed by investigating a number of alternative travel patterns, as well as ingress/egress points along the project boundaries. Primary consideration was given to the traffic flow and safety of the major roadways.

Traffic Analysis

The impact of the proposed development on existing area intersections was analyzed. Two time periods and three travel conditions were evaluated for the two development scenarios:

1. 2015 Existing Conditions
2. 2017 Forecasted Conditions
3. 2017 Forecasted Conditions with Site Generated Traffic

Intersections in the vicinity of the site are considered the locations of principal concern because they are the locations of highest traffic conflict and delay. The standard used to evaluate traffic conditions at intersections is level of service (LOS), which is a qualitative measure of the effect of a number of factors such as speed, volume of traffic, geometric features, traffic interruptions, freedom to maneuver, safety, driving comfort, convenience, and operating cost.

The two types of intersections to be evaluated are signalized and unsignalized, which use different criteria for assessment of operating levels. The analysis procedures are described in the following sections.

Signalized Intersection Level of Service

Signalized intersection LOS is defined in terms of delay, which is a direct and/or indirect measure of driver discomfort, frustration, fuel consumption, and lost travel time. The levels of service have been established based on driver acceptability of various delays. The delay for each approach lane group is calculated based on a number of factors including lane geometrics, percentage of trucks, peak hour factor, number of lanes, signal progression, volume, signal green time to total cycle time ratio, roadway grades, parking conditions, and pedestrian flows.

Because delay is a complex measure, its relationship to capacity is also complex. The City of Austin considers overall intersection levels of service A to D to be acceptable, while overall LOS of E and F is unacceptable.

Table 4 summarizes the levels of service that are appropriate for different levels of average control delay, and a qualitative description for each. The 2010 Highway Capacity Manual (HCM) uses the criteria of average control delay. Average control delay includes initial deceleration, delay, queue move-up time, stopped delay, and final acceleration delay.

Table 4.
Signalized Intersection: Level of Service Measurement and Qualitative Descriptions

Level of Service	Control Delay Per Vehicle (sec)	Qualitative Description
A	≤ 10	Good progression and short cycle lengths
B	> 10 and ≤ 20	Good progression or short cycle lengths, more vehicle stops
C	> 20 and ≤ 35	Fair progression and/or longer cycle lengths, some cycle failures
D	> 35 and ≤ 55	Congestion becomes noticeable, high volume to capacity ratio
E	> 55 and ≤ 80	Limit of acceptable delay, poor progression, long cycles, and/or high volume
F	> 80	Unacceptable to drivers, volume greater than capacity

Unsignalized Intersection Level of Service

Unsignalized intersection LOS is defined in terms of average control delay and, in some cases, the degree of saturation (v/c ratio). Control delay is that portion of total delay attributed to traffic control measures, either traffic signals or stop signs. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

The analysis method assumes that major street through traffic is not affected by minor street flows. Major street left-turning traffic and the traffic on the minor approaches will be affected by opposing movements. Stop or yield signs are used to assign the right-of-way to the major street. This designation forces drivers on the controlled street to judgmentally select gaps in the major street flow through which to execute crossing or turning maneuvers. Thus, the capacity of the controlled legs is based upon two factors:

1. The distribution of gaps in the major street traffic stream.
2. Driver judgment in selecting gaps through which to execute their desired maneuvers.

The LOS procedure computes a capacity for each movement based upon the critical time gap required to complete the maneuver and the volume of traffic that is opposing the movement. The average control delay for any particular movement is calculated as a function of the capacity of the approach and the degree of saturation (v/c ratio). The degree of saturation is defined as the volume for a movement, expressed as an hourly flow rate, divided by the capacity of the movement, expressed as an hourly flow rate. With the 2000 HCM methodology, movement, approach, and overall intersection LOS are solely a function of average control delay. However, the 2010 HCM methodology adjusts individual movement delay to account for a degree of saturation (v/c ratio) that is greater than 1.0. Those movements are assigned a LOS of F, regardless of the average control delay. The approach and overall intersection delay is still just a function of average control delay with the 2010 HCM methodology. Engineering judgment must be used to determine which methodology is applicable at a given intersection. For this analysis, 2010 HCM methodology was used all unsignalized intersections.

Table 5 shows the relationship between the average control delay, v/c ratio, and the LOS. The LOS for unsignalized intersections is different than that for signalized intersections. This difference is due to the fact that drivers expect different levels of performance from different kinds of transportation facilities. Unsignalized intersections carry less traffic volume than signalized intersections and delays at unsignalized intersections are variable. For these reasons, control delay would be less for an unsignalized intersection than for a signalized intersection. The overall approach LOS is computed as a weighted average of the vehicle delay for each movement; therefore, an approach may have an overall LOS C or D and have individual movements, which are LOS E or F.

Analysis was performed using the microcomputer program "Synchro 8.0" by Trafficware, which is based on the procedures contained in the HCM.

Table 5.
Unsignalized Overall Intersection: Level of Service Measurement

Level of Service	Control Delay Per Vehicle (sec)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Intersection Level of Service (LOS)

This traffic study analyzed three intersections, one of which is currently signalized. Turning movement counts were collected at all existing intersections during the AM (7-9) and PM (4-6) peaks on February 4, 2015, and February 10, 2015, while schools were in session. Data collection and other technical information are provided in the Addendum of this letter report.

Springdale Road and E 51st Street

Scenario 1 (Proposed Development)

This intersection will operate at LOS C under 2017 site plus forecasted traffic conditions during both the AM and PM peak periods. No improvements are recommended at this intersection. Site traffic comprises approximately 6.5 and 5.6 percent of total traffic at the intersection during the AM and PM peak periods, respectively.

Scenario 2 (Alternative Retail Development)

This intersection will operate at LOS C and D under 2017 site plus forecasted traffic conditions during the AM and PM peak periods, respectively. No improvements are recommended at this intersection. Site traffic comprises approximately 10.6 and 12.1 percent of total traffic at the intersection during the AM and PM peak periods, respectively.

Springdale Road and Rogge Lane

Scenario 1 (Proposed Development)

This intersection will operate at LOS A under 2017 site plus forecasted traffic conditions during both the AM and PM peak period. No improvements are recommended at this intersection. Site traffic comprises approximately 4.4 and 3.7 percent of total traffic at the intersection during the AM and PM peak periods, respectively.

Scenario 2 (Alternative Retail Development)

This intersection will operate at LOS A under 2017 site plus forecasted traffic conditions during both the AM and PM peak period. No improvements are recommended at this intersection. Site traffic comprises approximately 7.2 and 8.2 percent of total traffic at the intersection during the AM and PM peak periods, respectively.

Driveway A and Springdale Road

Scenario 1 (Proposed Development)

Driveway A is proposed to be constructed with a minimum 30-foot cross-section to provide one inbound and one outbound lane. The intersection will operate at a LOS A during both the AM and PM peak periods. No additional improvements are recommended at this intersection.

Scenario 2 (Alternative Retail Development)

Driveway A is proposed to be constructed with a minimum 30-foot cross-section to provide one inbound and one outbound lane. The intersection will operate at a LOS A and B during the AM and PM peak periods, respectively. No additional improvements are recommended at this intersection.

The intersection LOS and delays discussed are summarized in Table 6.

Table 6.
Intersection Level of Service

Intersection	2015 Existing		2017 Forecasted		2017 Site + Forecasted	
	AM	PM	AM	PM	AM	PM
Overall intersection LOS is reported for all intersections.						
Scenario 1 (Proposed Development)						
E 51st Street and Springdale Road	C (25.7)	C (29.6)	C (26.4)	C (30.7)	C (27.4)	C (32.7)
Rogge Lane and Springdale Road	A (2.8)	A (4.3)	A (2.8)	A (4.5)	A (2.9)	A (4.7)
Driveway A and Springdale Road	-	-	-	-	A (2.1)	A (1.5)
Scenario 2 (Alternative Retail Development)						
E 51st Street and Springdale Road	C (25.7)	C (29.6)	C (26.4)	C (30.7)	C (27.6)	D (36.6)
Rogge Lane and Springdale Road	A (2.8)	A (4.3)	A (2.8)	A (4.5)	A (2.9)	A (5.1)
Driveway A and Springdale Road	-	-	-	-	A (2.4)	B (14.5)

Conclusions and Recommendations

Based upon the results of this analysis, HDR Engineering concludes and recommends the following:

(1) Comparison of Development Scenarios: The proposed 292-unit multi-family development would produce a significantly lower traffic impact versus an alternative retail development that could be constructed per the existing zoning and not categorized as a Conditional Use.

(2) Intersections: Upon completion and full operation of either development in 2017 (including forecasted conditions), the two nearby intersections will operate at an acceptable level of service. We conclude that no roadway or intersection improvements will be required and none are recommended.

The multifamily land use that is proposed as part of the conditional use permit under site plan number SPC-2014-0086C, which is described by the Proposed Development (Scenario1) of this report, meets Section 25-5-145 of the City's code. The proposed conditional use does not adversely impact the safety or convenience of vehicular or pedestrian circulation, including the reasonably anticipated traffic and uses in the area, nor does it adversely affect an adjacent property or traffic control through the location, lighting, or type of sign. It should be noted that many of the land uses that are permitted by right generate three times the amount of traffic that the proposed conditional use generates, as shown in the Alternative Retail Development Scenario. Therefore, the proposed conditional use could be considered a benefit, since it generates significantly less traffic than what a permitted use could.

Please contact me if you have questions on the analysis above.

Sincerely,

Kathleen Smith

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Enclosures

MH

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