

October 19, 2006

Mr. Richard Mather  
13911 Norby  
Grandview, MO 64030

Re: Highlands at the Meadows of Winterset Traffic Impact Study  
BWR Job # 2006-0723

Dear Mr. Mather:

The traffic impact study for the Highlands at the Meadows of Winterset development in Lee's Summit, Missouri has been completed as requested. The purpose of the study was to determine the impact the proposed development will have on the surrounding transportation system.

This study discusses the impacts that the Highland at the Meadows of Winterset development will have on the existing plus site traffic conditions and 2030 plus site traffic conditions. Access management for the site has been examined and improvements have been recommended to mitigate deficiencies on the street system.

We trust that this impact analysis has adequately described the traffic conditions that may be expected in connection with the proposed development. If additional information is desired, please contact us.

Sincerely,

**BUCHER, WILLIS & RATLIFF CORPORATION**



Gary S. Graham, P.E., P.T.O.E.  
Project Manager  
Traffic Engineering and Transportation Planning

**TABLE OF CONTENTS**

Introduction ..... 2  
Existing Traffic Conditions ..... 4  
Projected Traffic Conditions ..... 6  
Trip Generation ..... 6  
Trip Assignment ..... 7  
Traffic Analysis ..... 10  
2030 Conditions ..... 12  
Conclusions ..... 15

**LIST OF TABLES**

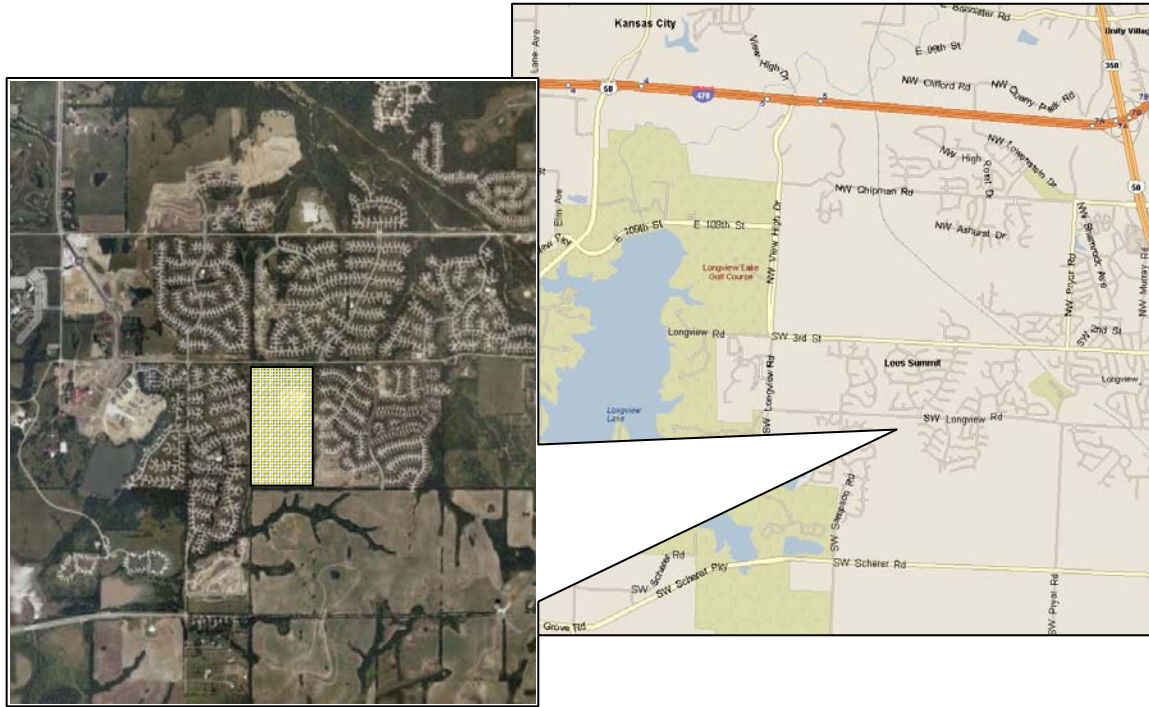
Table 1 – Proposed Land Use Trip Generation ..... 6  
Table 2 - Level of Service Criteria ..... 10  
Table 3 – Existing Plus Site Capacity Analysis..... 10  
Table 4 – Year 2030 Plus Site Capacity Analysis ..... 12

**LIST OF FIGURES**

Figure 1 – Site Location ..... 2  
Figure 2 – Site Plan ..... 3  
Figure 3 – Existing Traffic Volumes ..... 5  
Figure 4 – Trip Distributions ..... 8  
Figure 5 – Existing Plus Site AM/PM Traffic Volumes..... 9  
Figure 6 – Existing Plus Site AM/PM LOS and Queues ..... 11  
Figure 7 – 2030 Plus Site AM/PM Traffic Volumes ..... 13  
Figure 8 – 2030 Plus Site AM/PM LOS and Queues ..... 14

**Introduction**

The purpose of this study is to examine the potential traffic impact of a proposed development, The Highlands at the Meadows of Winterset, on the local roadway network. The Highlands at the Meadows of Winterset will consist of single family detached houses and is proposed to be developed on a tract of land approximately 4,750 feet east of SW View High Drive along Longview Road in Lee's Summit, Missouri. The proposed location of the Highlands at the Meadows of Winterset is illustrated in Figure 1.



**Figure 1 – Site Location**

This study will estimate the traffic to be generated by the proposed land use and will determine the potential traffic impacts on the adjacent street network caused by the additional traffic. Recommendations will then be made to mitigate the traffic impacts accordingly.

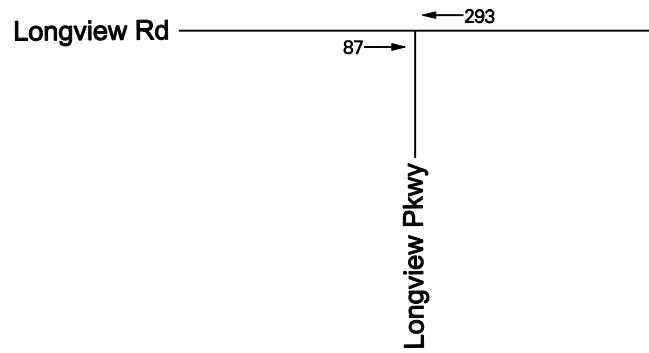
Currently, the Highlands at the Meadows of Winterset site plan shows Longview Parkway forming a T-intersection with Longview Road. Longview Parkway will be constructed to SW 10<sup>th</sup> Street. Future development will further extend Longview Parkway to connect it with a development to the south. The site plan for the development is depicted in Figure 2.



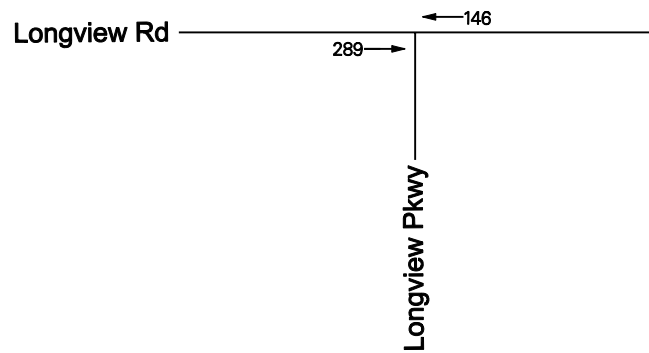
**Existing Traffic Conditions**

The proposed site is located on the south side of Longview Road between SW Sampson Road and SW Goldenrod Drive. Longview Road is an arterial street with a posted speed limit of 35 mph. Presently, Longview road is under construction. The improvements will consist of constructing a four lane roadway to the west of the Highlands at the Meadows of Winterset main access, Longview Parkway, and a three lane roadway to the east.

In addition to an inventory of the existing roadway conditions, existing traffic volumes and 2030 traffic forecasts were obtained from the City of Lee's Summit as a basis for assessing the traffic impact of the development. The traffic counts are included in the appendix. Figure 3 depicts the existing traffic volumes.



**AM Existing Traffic Volumes**



**PM Existing Traffic Volumes**



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**Figure 3 – Existing AM/PM Traffic Volumes**

**Projected Traffic Conditions**

The Highlands at the Meadows of Winterset is an 80 acre residential development consisting of 51 villa lots and 178 single family housing lots. All lots will be considered as single family dwelling units for the purposes of this study.

The City of Lee's Summit's Comprehensive Plan designates the area of the development as low density residential.

The proposed development is bordered on the east, west and north by existing residential developments. The land to the south is currently undeveloped.

The proposed development will utilize access from Longview Parkway. Adequate street width should be provided on the streets intersecting Longview Parkway to provide for left and right turn exiting lanes. There is one proposed street connection to the east via SW 12<sup>th</sup> street and one proposed street connection to the west via SW 11<sup>th</sup> Terrace. When Longview Parkway is extended to the south SW 12<sup>th</sup> Street will connect to it.

The Highlands at the Meadows of Winterset development was compared to the Lee's Summit Access Management Plan (AMP). The AMP requires that residential corner lots shall obtain access from the street with the lowest functional classification, and access shall be placed as far from the intersection as possible to achieve the maximum available corner clearance. As the final lot plans are developed, this guideline should be followed.

The AMP also requires that access locations to subdivisions shall provide appropriate sight distance, driveway spacing and include a review of related considerations. Sight distance was unobtainable due to construction on Longview Road and is therefore subject to verification of compliance. A minimum sight distance requirement for crossing two lanes at 35 mph on Longview Road is 410 feet.

**Trip Generation**

Since the traffic impact of a proposed development cannot actually be measured until after the development has occurred, projected traffic demand for the proposed development must be estimated. An estimate of trip generation for the Highlands at the Meadows of Winterset development was based on the ITE *Trip Generation Manual, Seventh Edition* for the a.m. and p.m. commuter traffic peak hour. A summary of expected trip generation of the development is shown in Table 1. Trip generation codes and supporting information has been included in the appendix. The villas in the site plan were analyzed as single family detached housing.

<b>Table 1 – Proposed Land Use Trip Generation</b>											
<i>Land Use</i>	<i>ITE Code</i>	<i>Units</i>	<i>Weekday Trips</i>			<i>A.M. Peak hour Trips</i>			<i>P.M. Peak Hour Trips</i>		
			<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Single Family Detached Housing	210	229	1114 (50%)	1114 (50%)	2228	42 (25%)	128 (75%)	170	142 (63%)	84 (37%)	226

### **Trip Assignment**

Once the number of trips expected to be generated has been estimated, the projected traffic must be assigned to the adjacent street network. For this analysis, estimates of the expected trip assignments to and from the proposed site were based on the gravity of existing traffic and conversations with City of Lee's Summit staff. The trip distribution is shown in Figure 4.

The traffic generated by the Highlands at the Meadows of Winterset development was superimposed onto the existing traffic for post development traffic conditions, or existing plus site traffic conditions. The a.m. and p.m. peak hour existing plus site traffic conditions for the development is shown in Figure 5.



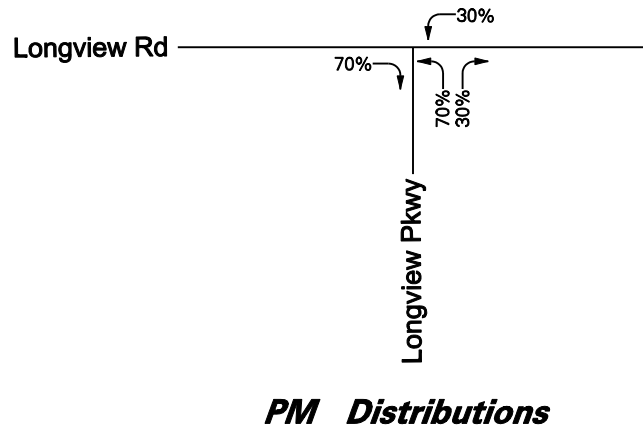
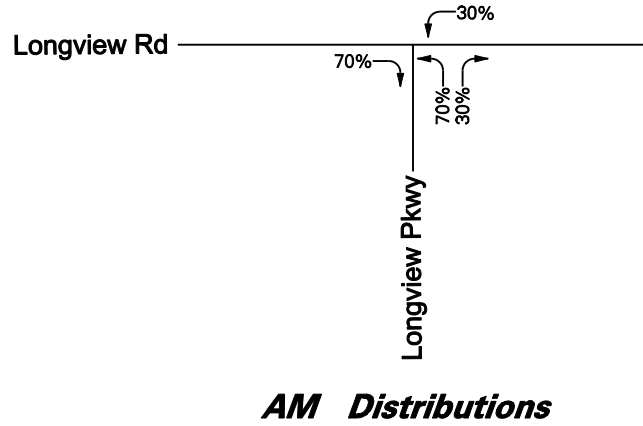
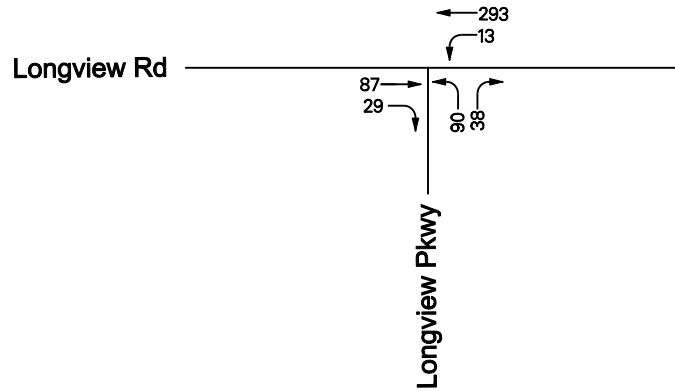
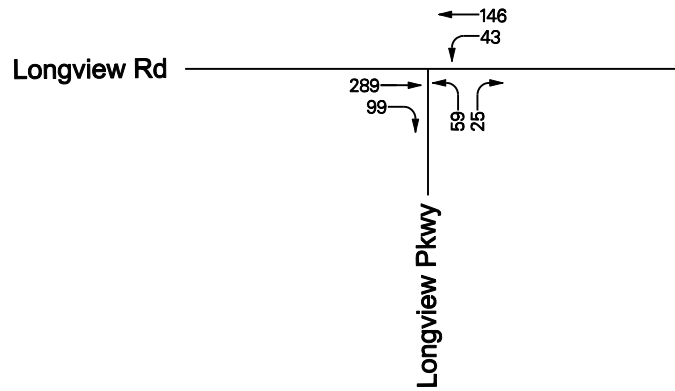


Figure 4 – Trip Distributions



**AM Existing + Site Traffic Volumes**



**PM Existing + Site Traffic Volumes**

**Figure 5 - Existing Plus Site AM/PM Traffic Volumes**



Not to Scale

**Traffic Analysis**

The quality of traffic operation at an intersection is defined through intersection capacity analysis. Capacity analysis provides a grade for intersection operation known as level of service (LOS). Level of service consists of a grade assignment “A” through “F”, with “A” the best and “F” the poorest, based on vehicle delay during the commuter peak period. The procedures and methodology for determining the level of service are outlined in the *Highway Capacity Manual* (HCM2000), produced by the Transportation Research Board. Generally LOS “A” through “D” is considered acceptable traffic operation. A description of the LOS criteria used in these analyses is shown in Table 3.

<b>Table 2 - Level of Service Criteria</b>	
<i>LOS</i>	<i>Stop Control Intersection Delay per vehicle</i>
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Unsignalized capacity analysis was performed using the traffic analysis software *HCS2000* and reported using the HCM unsignalized, and queuing reports. Stop controlled intersection level of service is based on the vehicle delay of the stopped approach assuming that Longview Parkway was the controlled approach.

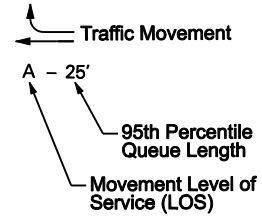
Because the intersection of Longview Road and Longview Parkway does not currently exist, no capacity analysis was conducted for existing conditions. Unsignalized capacity analysis was completed for existing plus site conditions at the intersection of Longview Road and Longview Parkway during the a.m. and p.m. peak hours.

The lane configurations and the results of the capacity analysis including 95<sup>th</sup> percentile vehicle queues for the existing plus site are depicted in Figure 6. Detailed capacity and queuing reports are included in the appendix. The results of the capacity analysis for the a.m. and p.m. peak hours for the existing plus site conditions are summarized in Table 3.

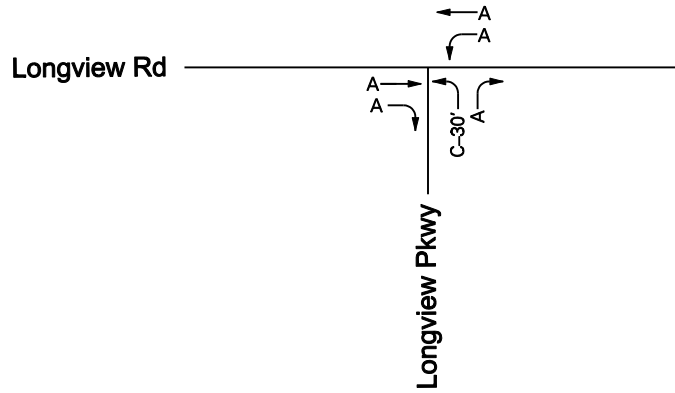
<b>Table 3 – Existing Plus Site Capacity Analysis</b>					
<i>Location</i>		<i>AM Peak Hour</i>		<i>PM Peak Hour</i>	
		<i>LOS</i>	<i>Delay (sec/veh)</i>	<i>LOS</i>	<i>Delay (sec/veh)</i>
Longview Road and Longview Parkway	<i>WBL</i>	A	8.1	A	8.3
	<i>NBL</i>	C	22.5	B	13.9
	<i>NBR</i>	A	8.9	B	10.1

The analysis of the existing plus site conditions indicates that the intersection of Longview Road and Longview Parkway will operate adequately for both the a.m. and p.m. peak hours. All movements operate at a LOS C or better.

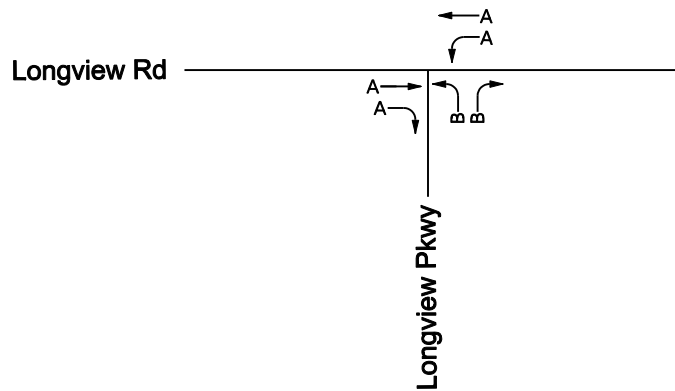
**LEGEND**



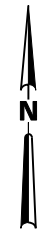
\*Queue Lengths less than one vehicle are not shown.



**AM Existing + Site LOS & Queue**



**PM Existing + Site LOS & Queue**



Not to Scale

**Figure 6 - Existing Plus Site AM/PM LOS & Queues**

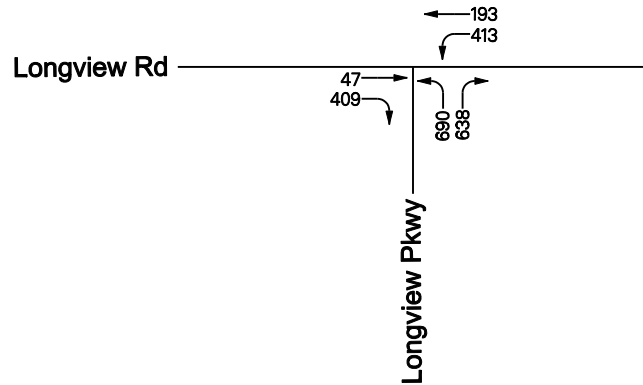
**2030 Conditions**

The potential traffic impacts of the proposed development were also evaluated for the 2030 conditions. The city generated the 2030 traffic volumes to be used as a basis for the analysis and subtracted out the volumes from the model for this site. The proposed site volumes developed in this study were added to the traffic volumes provided by the city.

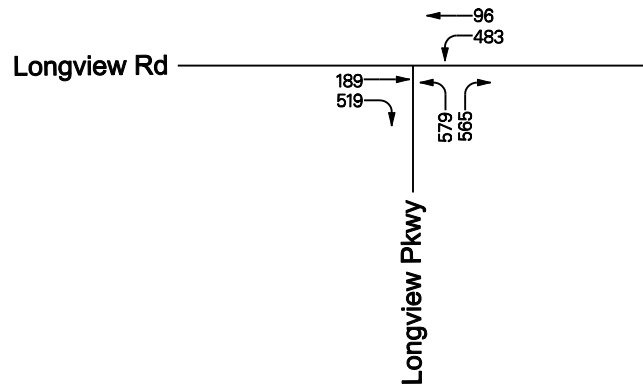
The traffic volumes for the a.m. and p.m. 2030 conditions plus site traffic are depicted in Figure 7. For the 2030 plus site traffic conditions the intersection was examined as multilane roundabout. Due to the lane configuration on Longview Road, it was assumed that the change in lane configuration would occur at the roundabout. Therefore, there would be one eastbound through lane, a dedicated eastbound right lane that would bypass the roundabout, two westbound departure lanes, two northbound approach lanes, and two southbound departure, two westbound approach lanes and one eastbound departure lane. The lane configurations and the results of the capacity analysis for the 2030 conditions plus site traffic with mitigations, including 95<sup>th</sup> percentile vehicle queues, for the study intersections are depicted in Figure 8. The results of the capacity analysis for the 2030 conditions for the a.m. and p.m. peak hour are summarized in Table 4.

<b>Table 4 – Year 2030 Plus Site Capacity Analysis</b>					
<i>Location</i>		<i>AM Peak Hour</i>		<i>PM Peak Hour</i>	
		<i>LOS</i>	<i>Delay (sec/veh)</i>	<i>LOS</i>	<i>Delay (sec/veh)</i>
Longview Road and Longview Parkway	<i>NB Approach</i>	A	8.3	A	7.6
	<i>WB Approach</i>	B	12.8	B	12.3
	<i>EBT</i>	A	5.4	A	4.6
	<i>EBR</i>	A	5.3	A	5.3

The analysis for the 2030 conditions indicates that a multilane roundabout would adequately accommodate the projected traffic volumes. The potential queues could increase to five or six vehicles per lane on some approaches during the peak hour operation.



**AM 2030 + Site Generated Volumes**

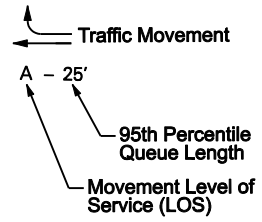


**PM 2030 + Site Generated Volumes**

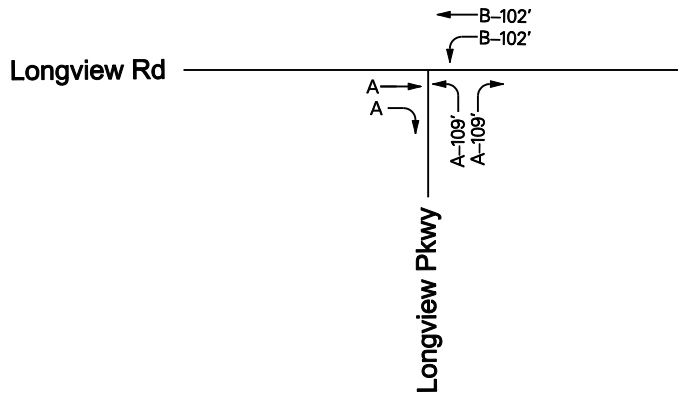


**Figure 7 - 2030 Plus Site AM/PM Traffic Volumes**

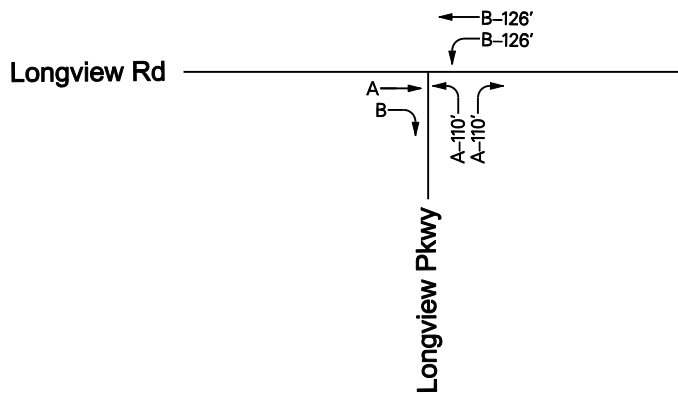
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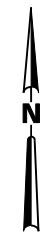
\*Queue Lengths less than one vehicle are not shown.



**2030 + Site AM LOS & Queue**



**2030 + Site PM LOS & Queue**



Not to Scale

**Figure 8 - 2030 Plus Site AM/PM LOS & Queues**

## **Conclusions**

Based on the analysis of the proposed site plan, the intersection of Longview Road and Longview Parkway should adequately accommodate the proposed traffic volumes for the existing plus site conditions.

Under the 2030 projected traffic volumes a multilane roundabout should operate adequately.

The sight distance at the intersection of Longview Road and Longview Parkway should be verified following construction. Longview Road is currently under construction and therefore the sight distance can not be measured.

As the final lot plans are developed, for the corner lots within the subdivision, access should be provided to the local streets and not the collector streets.