



FISHER ARNOLD  
ENGINEERING INTEGRATION

May 11, 2017

Mr. Will Ralph, PE, LEED AP  
Director of Development  
Braxton Development  
1735 South 19<sup>th</sup> Avenue, Suite B  
Bozeman, MT 59718

**RE: TRAFFIC STUDY PREPARED FOR  
BRAXTON DEVELOPMENT APARTMENTS**

Dear Mr. Ralph:

Concern was expressed regarding the impact to the ingress and egress of an existing drive to commercial businesses located immediately across from the main entrance to the proposed apartment complex on South Caraway Road near Glenn Place. FA has been requested to address the impact to the vehicles entering and exiting this existing development once the apartment complex is constructed.

In order to determine the impact as it relates to the Level-of-Service (LOS) and delays for vehicles utilizing this existing drive, traffic counts were taken entering and exiting at this location during the AM and PM Peak Hours when volumes are heaviest on South Caraway. These Peak Hours also correspond to the heaviest volume that will be experienced from the proposed apartment complex. These volumes are shown in Figure 1 and reflect the actual number of vehicles entering and exiting these businesses along with projected traffic for the 2020 No Build Scenario. The 2020 No Build Scenario reflects no build-out of the apartment complex but does include some increase in overall traffic along S. Caraway.

A LOS analysis was then performed using the Highway Capacity Software Version 5.6 for unsignalized intersections to determine what LOS and delays the traffic is experiencing currently - without the apartment complex. This unsignalized intersection was analyzed as a "T" Intersection since it does not reflect the construction and development of the apartment complex. The results show that the southbound left turn movement was operating at a LOS "A" and the westbound left/right turn movement was operating at a LOS "C". The results are shown in Table 1.

The intersection was then analyzed again with the 2020 Build Scenario which included the projected traffic from the apartment complex and the slightly increased volumes for S. Caraway Road. This time the intersection was analyzed as a four-leg intersection due to the addition of the main entrance to the proposed apartment complex. The results show that these movements in and out of these businesses will continue to operate at the same LOS. Only a slight increase in delay will occur. The results are shown in Table 2. Table 3 compares the "No-Build" with the "Build" option, and shows a maximum increase in delay of 2.7 seconds.

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TABLE 1					
S. CARAWAY ROAD AND EXISTING DRIVE Projected 2020 Traffic (No-Build)					
Approach	Movement	LEVEL OF SERVICE			
		AM Peak Hour (LOS)	Average Delay (sec/veh)	PM Peak Hour (LOS)	Average Delay (sec/veh)
Westbound	Left/Right	C	15.5	C	15.3
Southbound	Left	A	9.7	A	8.7
	Through	-	-	-	-

TABLE 2					
S. CARAWAY ROAD AND EXISTING DRIVE Projected 2020 Traffic (Build)					
Approach	Movement	LEVEL OF SERVICE			
		AM Peak Hour (LOS)	Average Delay (sec/veh)	PM Peak Hour (LOS)	Average Delay (sec/veh)
Westbound	Left/Right	C	15.9	C	18.0
Southbound	Left	A	9.8	A	8.7
	Through	-	-	-	-

TABLE 3							
S. CARAWAY ROAD AND EXISTING DRIVE Comparison of Delays No-Build vs. Build							
Approach	Movement	Average Delay AM Peak		Increase In Delay (Sec)	Average Delay PM Peak		Increase In Delay (Sec)
		No-Build	Build	AM Peak	No-Build	Build	PM Peak
Westbound	Left/Right	15.5	15.9	0.4	15.3	18.0	2.7
Southbound	Left	9.7	9.8	0.1	8.7	8.7	0
	Through	-	-	-	-	-	-

FA was also requested to analyze the intersection of the Secondary Drive of the proposed apartment complex if the Main Entrance was limited to a Right-in and Right-Out (RIRO) only drive. This of course would place all left turn movements in and out of the proposed site at this secondary entrance across from Glenn Place. In the traffic study performed in April of 2017, this intersection was analyzed based upon full movement at the main entrance and results are shown below in Table 4. The analysis was performed again which eliminated left turns into and out of the site at the main entrance. Traffic volumes are shown in Figure 3. The results show that traffic at Glenn Place is virtually unchanged, however, the traffic exiting the proposed site is significantly impacted. Excessive delays could be expected for vehicles attempting to exit the apartment complex in both the AM and PM Peak Hours. Queue lengths in the apartment complex would also greatly increase. These results are shown in Table 5.

TABLE 4					
S. CARAWAY ROAD AND GLENN PLACE					
Proposed Conditions (Build)					
Approach	Movement	LEVEL OF SERVICE			
		AM Peak Hour (LOS)	Average Delay (sec/veh)	PM Peak Hour (LOS)	Average Delay (sec/veh)
Eastbound	Left/Right	E	48.0	F	66.5
Westbound	Left/Right	D	25.9	C	21.5
Northbound	Left	A	8.0	A	9.4
	Through	-	-	-	-
	Right	-	-	-	-
Southbound	Left	A	9.5	A	8.8
	Through	-	-	-	-
	Right	-	-	-	-

TABLE 5					
S. CARAWAY ROAD AND GLENN PLACE					
Proposed Conditions (Build with Main Entrance RIRO Only)					
Approach	Movement	LEVEL OF SERVICE			
		AM Peak Hour (LOS)	Average Delay (sec/veh)	PM Peak Hour (LOS)	Average Delay (sec/veh)
Eastbound	Left/Right	F	239.5	F	207.2
Westbound	Left/Right	D	25.6	C	21.3
Northbound	Left	A	8.0	A	9.4
	Through	-	-	-	-
	Right	-	-	-	-
Southbound	Left	A	9.4	A	8.7
	Through	-	-	-	-
	Right	-	-	-	-

Mr. Will Ralph, P.E., LEED, AP

May 11, 2017

Page 4

In summary, traffic entering and exiting the drive to the existing businesses that would be directly across the street from the proposed main entrance to the apartment complex are currently experiencing no lengthy delays during the AM and PM Peak Hours of traffic. The analysis show that with the addition of the apartment complex and full-movement at the main entrance, no change in LOS occurs for traffic entering and exiting the existing drive. Only a slight increase in delay would occur ranging from 0 to 2.7 seconds, which is insignificant. On the other hand, if the main entrance is limited to Right-In and Right-Out only, although it will not impact Glenn Place traffic, it will significantly impact delays to the future traffic attempting to exit the apartment complex.

Should you have any questions or desire additional information, please contact me.

Sincerely,

**FISHER & ARNOLD, INC.**



Richard E. Gafford, P.E.

Vice President

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REG/mkg

Cc: Mr. Terry Bare, P.S.

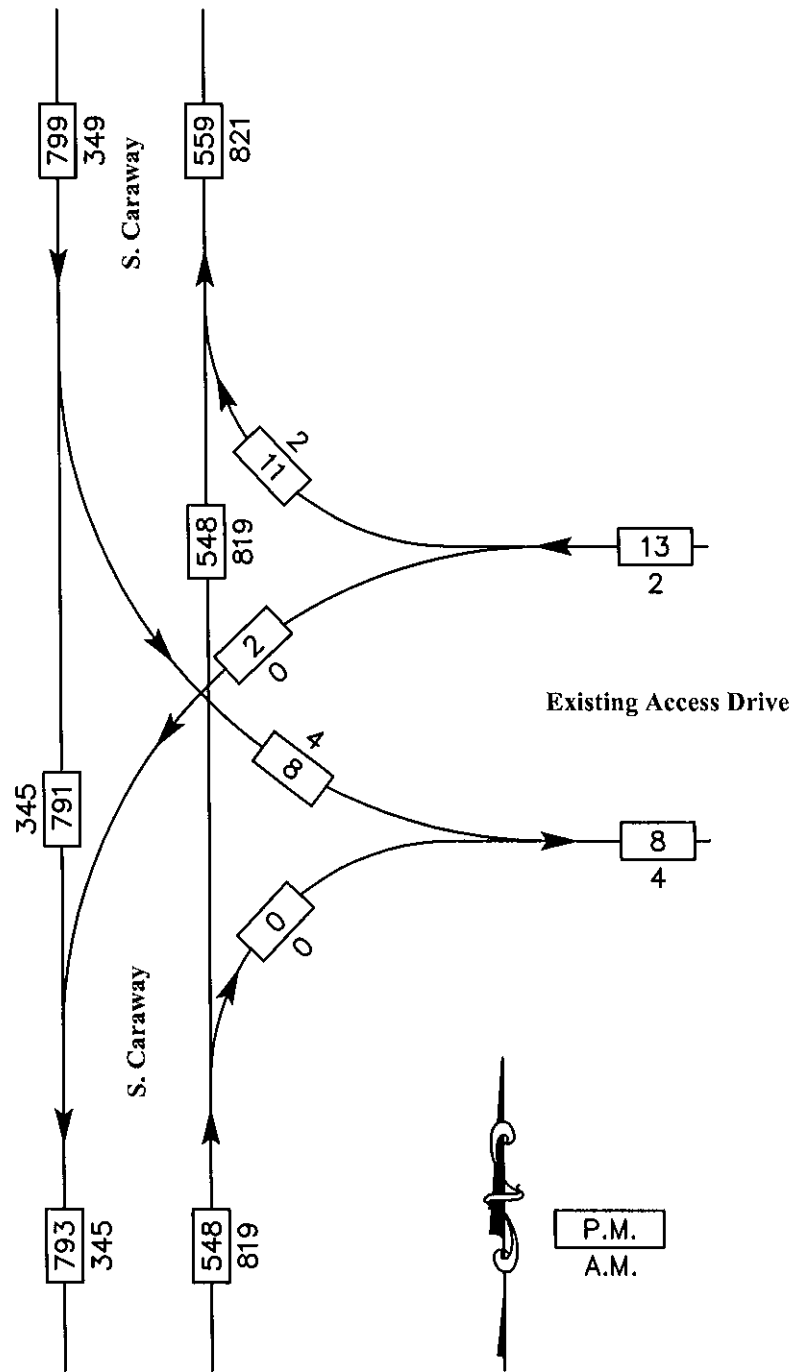


Figure 1  
 Proposed Peak Hour Volumes (2020 No-Build)  
 Existing Access Drive at S. Caraway Road

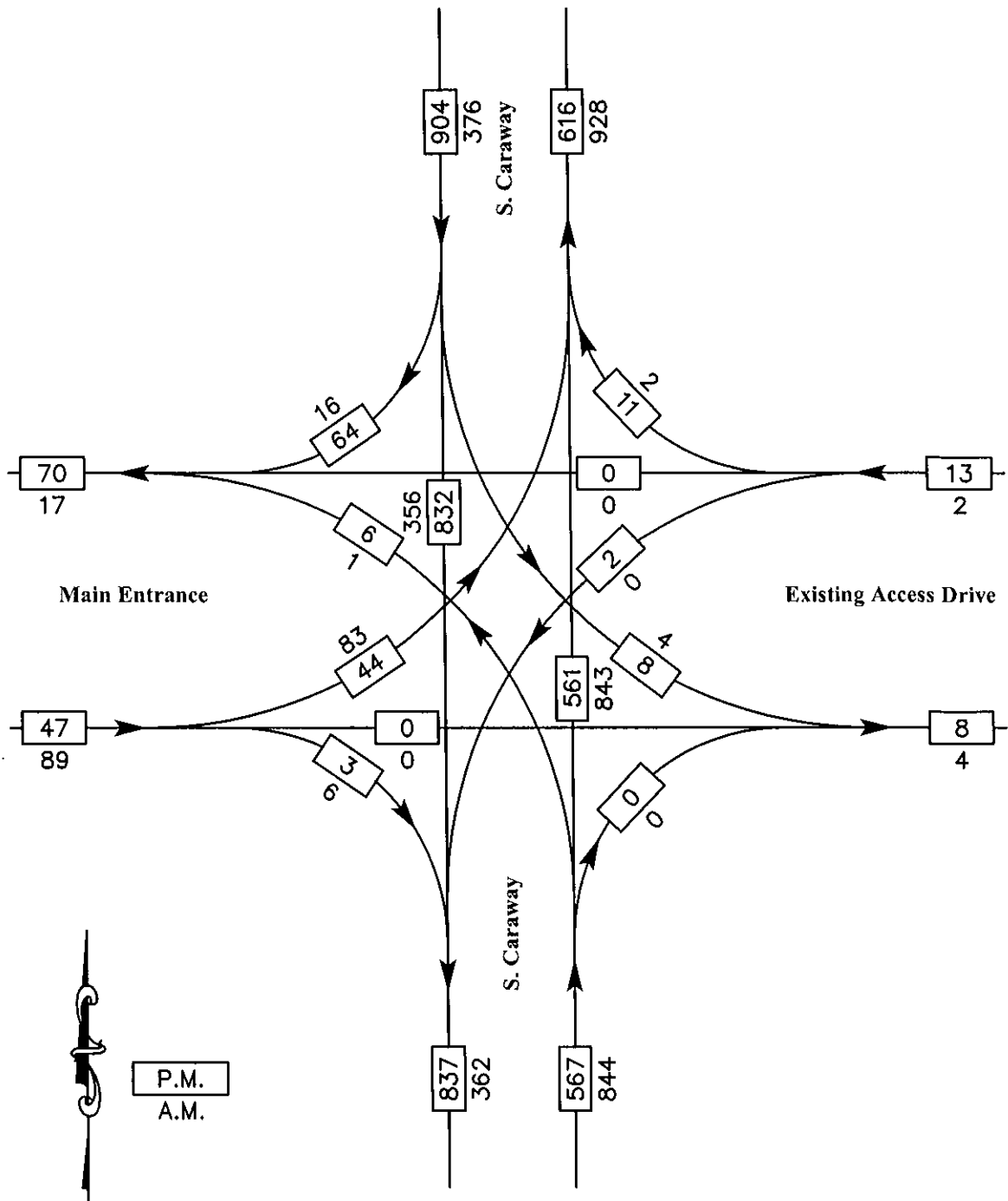
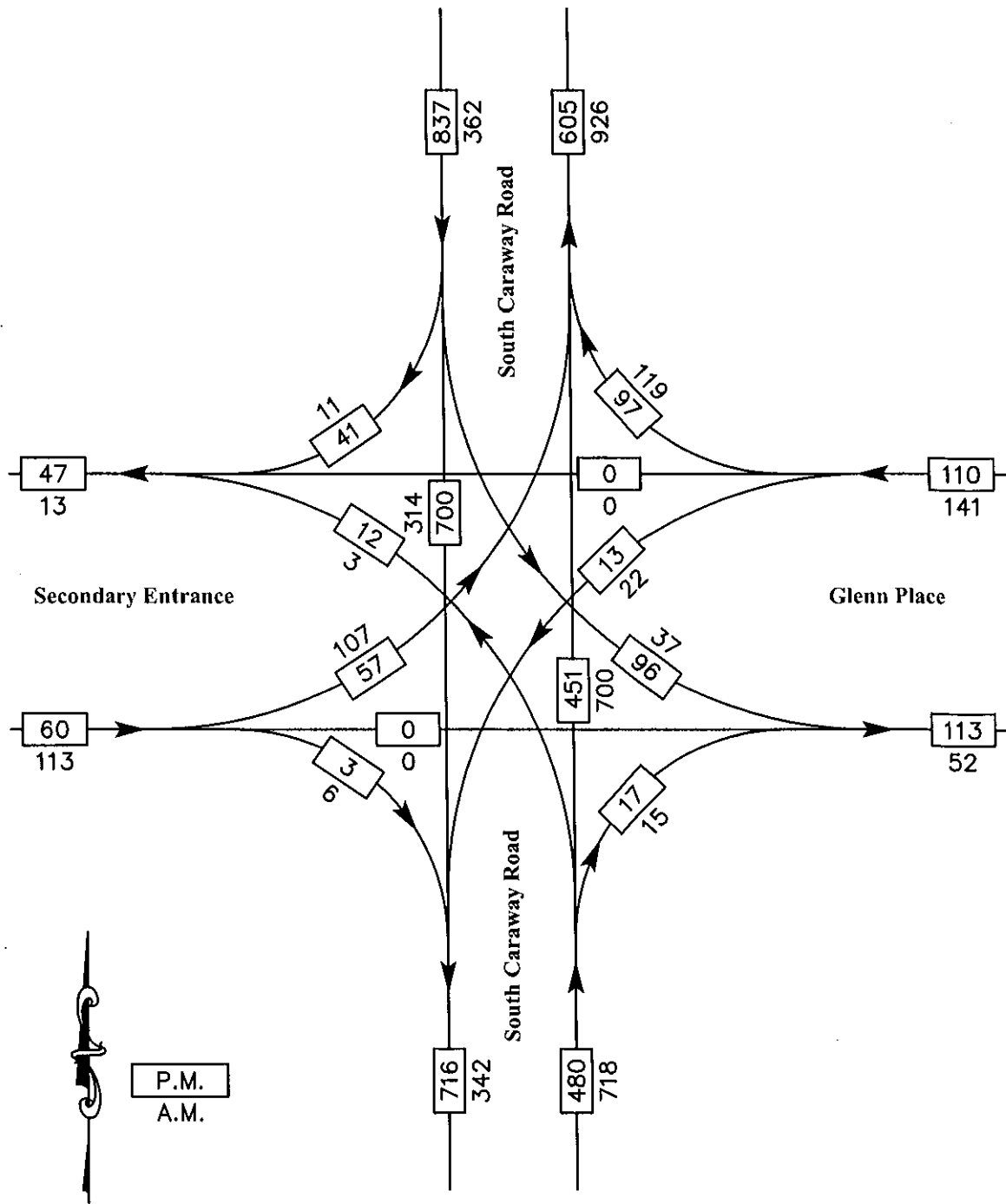


Figure 2  
 Proposed Peak Hour Volumes (2020 Build)  
 Main Entrance/Existing Access Drive at South Caraway Road



**Figure 3**  
**Proposed Peak Hour Volumes (2020 Build with RIRO Main Entrance)**  
**Glenn Place/Secondary Entrance at South Caraway Road**