

Traffic Assessment for

5201 Old Middleton Road Redevelopment

Flad Development & Investment Corporation | August 11, 2020

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Introduction

Flad Development & Investment Corporation is proposing a redevelopment of the parcel located at 5201 Old Middleton Road in Madison, WI. The site is located at the southwest corner of the Old Middleton Road intersection with North Whitney Way. The proposed redevelopment consists of 50 multifamily housing units and 1,450 square feet of office space.

KL Engineering, Inc. was contracted by Flad Development & Investment Corporation to perform a traffic assessment study for the proposed development.

Study Purpose and Objective

This study was performed to evaluate traffic operations under existing conditions and upon completion of the proposed development. The evaluation was used to identify impacts to the roadway network and any required mitigation. Both weekday morning (AM) and afternoon (PM) peak hour traffic volumes were considered.

Project Location and Study Area

The development site is located at the southwest corner of the Old Middleton Road intersection with North Whitney Way in Madison, Wisconsin. One commercial office building is located on the site. However, this building has been vacant for a number of years. The site is bordered by residential housing to the west and south, and commercial land uses to the north and east.

The study considered traffic operations in the immediate vicinity of the development. The intersections of Old Middleton Road with the development driveway and with North Whitney Way were included in the study area.

Existing Conditions

KL Engineering conducted turning movement counts and site observations as part of the existing conditions assessment. A turning movement count was performed at the intersection of Old Middleton Road and North Whitney Way on June 24, 2020. No turning movement counts were performed at the intersection of Old Middleton Road and the development driveway because the site is not currently in use. The AM peak traffic volume hour was found to be 7:15-8:15 am, and the PM peak hour was found to be 4:15-5:15 pm. Traffic conditions at the time counts were performed were impacted by the restrictions to activities imposed in response to the SARS-CoV-2 virus. Therefore, these traffic counts were used only to observe driver behavior.

The City of Madison provided a turning movement count completed during the year 2017 at the intersection of Old Middleton Road with Whitney Way. These volumes were used for analysis as the most current volumes representing normal conditions. These turning movement count volumes are summarized in **Figure 1**. They represent traffic conditions at the intersection without impacts of the restrictions in place at the time of counting.

Existing traffic volumes and roadway geometry were used to perform traffic modelling and estimate delays experienced by motorists at the intersection of Old Middleton Road with North Whitney Way. Estimated delays were used to assign a Level of Service (LOS) at each movement of the intersection.

Level of Service is determined by using estimated delay to assign letter grades to each movement and intersection. The letter grades represent operating conditions as specified in the Highway Capacity Manual 6th Edition. LOS for each movement and for the intersection are summarized in **Table 1**.

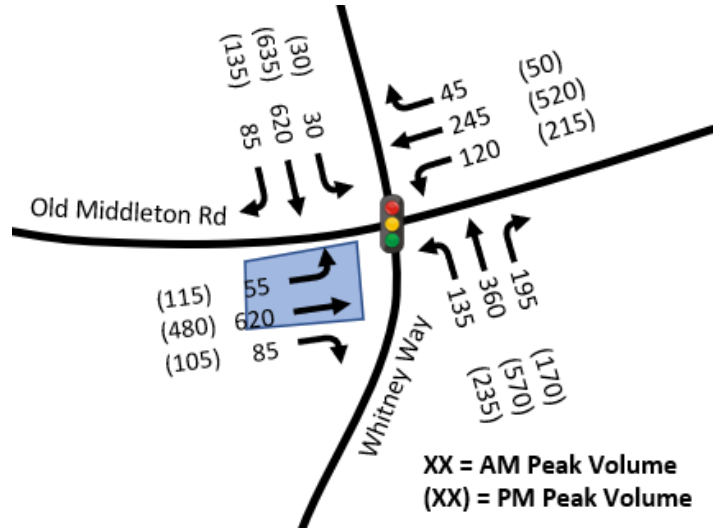


Figure 1. Traffic Volumes – Existing Conditions

Table 1. Level of Service Table – Existing Conditions

Intersection	Peak	Movement												Intersection	
		Eastbound			Westbound			Northbound			Southbound				
		L	T	R	L	T	R	L	T	R	L	T	R		
Old Middleton Road & N Whitney Way	AM	C	F	F	C	C	C	C	C	C	C	C	D	D	E
	PM	E	F	F	D	C	C	D	C	C	D	D	D	D	E

The intersection is estimated to operate at LOS E during both the AM and PM peak hours. Most movements currently operate at a LOS D or better. However, the eastbound approach operates with levels of service E and F during the AM and PM peak hours. These delays were unable to be confirmed due to the traffic pattern changes resulting from the response to the SARS-CoV-2 virus.

Traffic analysis software was also used to estimate vehicular queues along each approach of the intersection. The estimated 95th percentile queue lengths during the AM and PM peak hours are summarized in **Figure 2**. Queues

Existing Conditions

could not be confirmed in the field due to the abnormal traffic conditions that currently exist. Analysis performed using current year 2020 traffic volumes indicated that these queues are likely overestimates. The reason for the disparity may be that the models account for the eastbound lanes as they are striped on the roadway. However, the intersection operates with a de facto right turn lane during periods of congestion, meaning that some vehicles use the extra pavement width and the bike lane to bypass through traffic and perform a right turn on red.

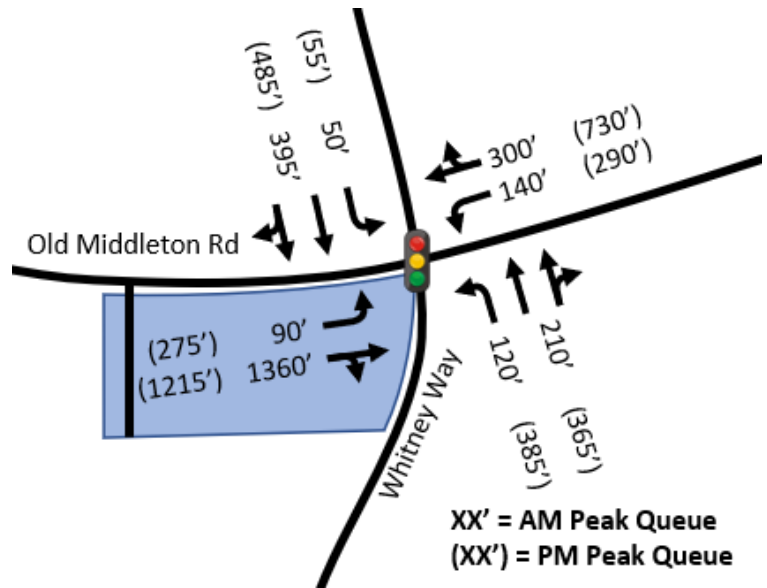


Figure 2. 95th Percentile Queues – Existing Conditions

Proposed Development

Site Characteristics

The proposed development consists of a mixed-use building, primarily used for multifamily housing. Fifty multifamily units, primarily studio and one-bedroom units, and 1,450 square feet (SF) of office space are proposed. A total of 71 parking stalls are proposed with the development. A site layout is provided in **Figure 3**.

Access proposed with the development is similar to the existing parcel access, which is provided via a single full access driveway on Old Middleton Road. However, current development site plans include relocating the driveway as far west within the parcel boundaries as feasible. This will increase spacing between the driveway and the intersection of Old Middleton Road with North Whitney Way. This increased spacing is anticipated to decrease the likelihood of traffic operations at the driveway to interfere with traffic operations at the intersection and vice versa. Specifically, this will decrease the likelihood that vehicles will have to wait to complete a left turn into the development due to stacked vehicles waiting at the Whitney Way intersection with Old Middleton Road.

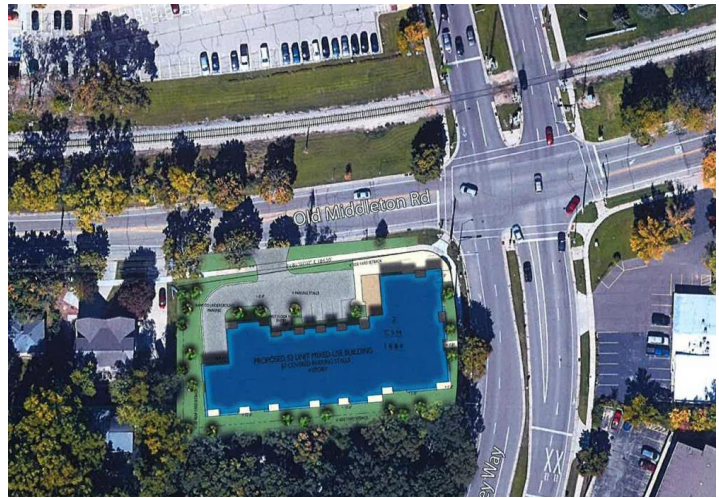


Figure 3. Site Layout

Projected Traffic

The assessment included estimating the amount of new traffic generated by the development. Two methods were used for this estimate.

The first estimate was based on traffic counts taken at an apartment development with similar characteristics to the one proposed, located at 4200 University Avenue. That development contains 100 multifamily units. Traffic entering and exiting the site was divided by 2 in order to account for the proposed development's 50 units as opposed to the counted development's 100 units. This method of trip estimation resulted in a negligible amount of new traffic related to the redevelopment; less than 10 trips in and about five trips out of the development during the peak hour. Such a small number of trips is not anticipated to result in an appreciable impact to traffic operations in the vicinity of the proposed development. The site that was counted for this comparison did not include any office space. However, the small amount of space proposed with the redevelopment is also not anticipated to generate a significant amount of traffic. Additional details related to the office land use trip generation potential can be found in **Table 2**.

The second method of trip generation was utilized to represent a more conservative, or higher estimate of the traffic generating potential of the site using the industry standard Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition. This methodology is summarized in **Table 2**.

Proposed Conditions

Table 2: Trip Generation – Proposed Development

ITE Land Use	ITE Land Use Code	Size	Weekday Daily Trips (rate)	AM Peak			PM Peak		
				In (%)	Out (%)	Total (rate)	In (%)	Out (%)	Total (rate)
Multifamily Housing (Low-Rise)	220	50 Dwelling	335 (6.74)	5 (23%)	20 (77%)	25 (0.49)	20 (63%)	10 (37%)	30 (0.64)
Small Office Building	712	1,450 ksf	25 (16.19)	5 (83%)	0 (17%)	5 (1.92)	0 (32%)	5 (68%)	5 (2.45)
Total Generated Trips			360	10	20	30	20	15	35
<i>Multimodal Trip Reduction (25%)</i>			(90)	(5)	(5)	(10)	(5)	(5)	(10)
Total New Trips:			270	5	15	20	15	10	25

Each trip represents either an entering or exiting vehicle to or from the development. Total trips generated were reduced to account for multimodal trips to and from the site, or those trips completed via transit or by walking or biking. The reduction in trips was used to determine the total number of new trips generated by the proposed development.

A 25% reduction in trips was used to account for multimodal trips. Multimodal trips include trips completed via transit, bicycle, pedestrian, or a combination of these modes of transportation. A 25% reduction was estimated given the accessibility of nearby transit, bicycle, and pedestrian facilities.

The proposed development is expected to generate 270 new trips per day. 20 (5 entering, 15 exiting) new trips during the AM peak hour are expected, and 25 (15 entering, 10 exiting) new trips during the PM peak hour are expected.

Local traffic counts from the City of Madison’s website, concentrations of population, and employment location considerations were used to develop the trip distribution for the proposed development. This is the estimate of the direction that trips will originate and terminate in and influences how traffic will utilize the study intersection. The trip distribution is estimated to be:

- 10% to/from the west on Old Middleton Road
- 35% to/from the north on North Whitney Way from (University Avenue to/from the west)
- 35% to/from the east on Old Middleton Road (University Avenue to/from the east)
- 20% to/from the south on N Whitney Way

This trip distribution is summarized in **Figure 4**. New trips were assigned to the roadway network using this trip distribution and added to the existing traffic volumes to determine the estimated total traffic volumes. The total traffic volumes represent anticipated traffic volumes with the redevelopment, using the conservative ITE trip generation methodology.

Total traffic volumes and existing roadway geometry were used to perform traffic modelling and estimate delays experienced by motorists at the intersection of Old Middleton Road with North Whitney Way.



Figure 4. Trip Distribution

Proposed Conditions

Results of this traffic analysis are summarized in **Table 3**.

Table 3. Level of Service Table – Total Traffic

Intersection	Peak	Movement												Intersection
		Eastbound			Westbound			Northbound			Southbound			
		L	T	R	L	T	R	L	T	R	L	T	R	
Old Middleton Road & N Whitney Way	AM	C	F	F	C	C	C	C	C	C	C	D	D	F
	PM	E	F	F	D	D	D	D	C	C	D	D	D	E

Analysis results for the total traffic scenario are similar to those under existing conditions. No changes to movement levels of service are anticipated as a result of the redevelopment. However, the Level of Service for the intersection drops from LOS E to LOS F during the AM peak hour due to a slight increase in intersection delay. This minor increase is related to the minor increase in traffic anticipated with the redevelopment.

95th percentile queues anticipated under the total traffic scenario are summarized in **Figure 5**. Queues on the eastbound approach of the intersection of Whitney Way with Old Middleton Road are estimated to increase approximately 30' and 15' during the AM and PM peak hours, respectively, or about one car length at most.

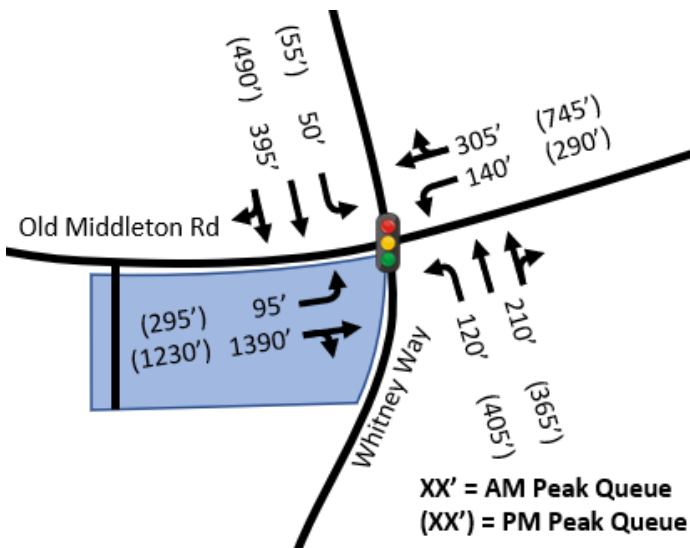


Figure 5. 95th Percentile Queues – With Redevelopment

These analysis results were obtained using the more conservative development traffic generation estimate developed according to the ITE methodology. If traffic generation is closer to the estimate derived from counting a similar nearby apartment building, incremental delay and queue increases would be even less than these estimates.

(HV%) information was not provided; the analysis used PHF and heavy vehicle percentages from the year 2020 traffic counts performed for this study. Both PHF and HV% generally increase as overall volumes decrease and both result in higher delays and queues as they increase. In other words, PHF and HV% used with the analysis are likely higher than those associated with the 2017 volumes, and therefore resulted in overly conservative analysis results.

As previously noted, modelling of the year 2020 volumes as counted resulted in an overestimate of eastbound queues compared to field observations, likely as a result of eastbound vehicles using extra pavement width as a right turn lane during times of congestion.

As a result of both factors, the analysis presented in this assessment is likely a conservative estimate of traffic operations present under typical conditions and with the proposed redevelopment. Analysis methodologies become more sensitive to increases in traffic volumes as they get closer to and exceed capacity. Therefore, the incremental increase in delays and queues as a result of the redevelopment are also likely overestimates.

Land Use Comparison

The developer requested a comparison between the proposed development trip generation and that of a few alternate land use scenarios be included with this assessment. Using land use scenarios provided by the developer, trip generation was performed for each. The following scenarios were considered:

- One 5,000 square foot coffee shop and one 5,000 square foot sit down restaurant – **Table 4**
- One 25,000 square foot office building – **Table 5**
- One 8-pump gas station – **Table 6**

Table 4. Trip Generation – Foodservice Land Uses

ITE Land Use	ITE Land Use Code	Size	Weekday Daily Trips (rate)	AM Peak			PM Peak		
				In (%)	Out (%)	Total (rate)	In (%)	Out (%)	Total (rate)
Coffee/Donut Shop without Drive-through window	936	5 ksf	3,775 (754.55)	260 (51%)	245 (49%)	505 (101.14)	90 (50%)	90 (50%)	180 (36.31)
High-Turnover (Sit-Down) Restaurant	932	5 ksf	560 (112.18)	30 (55%)	25 (45%)	50 (9.94)	30 (62%)	20 (38%)	50 (9.77)
Total Generated Trips			4335	290	270	555	120	110	230
<i>Multimodal Trip Reduction (25%)</i>			(1,085)	(75)	(70)	(140)	(30)	(30)	(60)
Total Driveway Trips:			3,250	215	200	415	90	80	170
<i>Pass-By Trip Reduction (30%)</i>			(975)	(65)	(60)	(125)	(25)	(25)	(50)
Total New Trips:			2,275	150	140	290	65	55	120

Table 5. Trip Generation – Office Land Use

ITE Land Use	ITE Land Use Code	Size	Weekday Daily Trips (rate)	AM Peak			PM Peak		
				In (%)	Out (%)	Total (rate)	In (%)	Out (%)	Total (rate)
Small Office Building	712	1,450 ksf	275 (11.06)	45 (86%)	5 (14%)	50 (2.01)	5 (16%)	25 (84%)	30 (1.22)
Total Generated Trips			275	45	5	50	5	25	30
<i>Multimodal Trip Reduction (25%)</i>			(70)	(10)	0	(10)	0	(5)	(5)
Total New Trips:			205	35	5	40	5	20	25

Table 6. Trip Generation – Gas Station Land Use

ITE Land Use	ITE Land Use Code	Size	Weekday Daily Trips (rate)	AM Peak			PM Peak		
				In (%)	Out (%)	Total (rate)	In (%)	Out (%)	Total (rate)
Gasoline/Service Station	944	8 Fueling Positions	1,375 (172.01)	40 (50%)	40 (50%)	80 (10.28)	55 (50%)	55 (50%)	110 (14.03)
Total Generated Trips			1375	40	40	80	55	55	110
<i>Multimodal Trip Reduction (10%)</i>			(140)	(5)	(5)	(10)	(5)	(5)	(10)
Total Driveway Trips:			1,235	35	35	70	50	50	100
<i>Pass-By Trip Reduction (40%)</i>			(495)	(15)	(15)	(30)	(20)	(20)	(40)
Total New Trips:			740	20	20	40	30	30	60

These estimates include pass-by trips. These trips are defined as trips where the proposed development is an intermediate stop along a route that drivers already travel on. An example is a commuter stopping along their morning commute for coffee without leaving their normal route to work.

Percentage for multimodal and pass-by trips for each land use were chosen using engineering judgement.

Land Use Comparison

Of these potential land use scenarios, office land use is the closest to the currently proposed land uses with 40 and 25 new trips anticipated during the AM and PM peak hour, respectively. This is in comparison to the 20 and 25 new trips anticipated during the AM and PM peak hour, respectively, with the currently proposed redevelopment. Other potential land use scenarios are anticipated to generate significantly more traffic than the currently proposed redevelopment.



Conclusions

Flad Development & Investment Corporation is proposing to construct a mixed-use development at 5201 Old Middleton Road in Madison, WI. Land uses would predominantly consist of multi-family units. A traffic assessment was performed to evaluate current traffic operations and impacts of the development. The following conclusions summarize the assessment.

- Traffic operations are congested within the study area. High delays and long queues are estimated for the eastbound leg, though they were not observed due to short term traffic pattern changes.
- The proposed development is estimated to generate no more than 25 trips during the peak traffic hour using a conservative ITE trip generation methodology. Using rates derived from similar, local projects, the site is anticipated to generate approximately 15 peak hour trips.
- Residential land uses are generally less intense generators of traffic than commercial land uses.
- The development site plan proposes moving the existing driveway on Old Middleton Road as far away from the intersection of North Whitney Way with Old Middleton Road as feasible within the development parcel.
- Increased vehicle queuing and delays as a result of the redevelopment are anticipated to be minimal.