

McDonough & Rea Associates, Inc.

Traffic and Transportation Consulting

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May 12, 2021

West Long Branch Zoning Board of Adjustment
965 Broadway
West Long Branch, NJ 07764

Re: Monmouth University ZB-2019-22
Proposed Main Campus Use Changes & Improvements
Lots, 1-5, 7-9, 11, 12.01 & 12.02 in Block 39
Borough of West Long Branch, Monmouth County
MRA File No. 19-162

Dear Board Members:

McDonough and Rea Associates (MRA) has prepared a *Traffic Impact Analysis* for the noted *Application* which is before the Zoning Board. We have reviewed the engineering report from E.M. Waterbury & Associates, dated April 10, 2021 and the West Long Branch Police Department Traffic Safety Bureau *Memorandum* of April 15, 2021 with regard to traffic comments dealing with the new access connection to Larchwood Avenue and the operation of the Cedar Avenue (Route 71)/Larchwood Avenue intersection.

The primary concern expressed in the traffic reviews deals with potential back-ups on northbound Larchwood Avenue that could impact the location of the new access drive to Larchwood Avenue which is approximately 290 feet from the intersection.

We have reviewed these concerns and have conducted queuing calculations for the northbound Larchwood Avenue approach to the Cedar Avenue intersection. Attached to this letter are printouts from the *Level of Service Analysis* we performed which also show calculations for the 85th percentile queue on northbound Larchwood Avenue for the AM peak street hour and PM peak street hour time frames.

The 85th percentile queue calculation is typically utilized as a design parameter in determining whether queuing would impact adjacent driveways (new or existing).

Please reply to:

- 1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-6673
- 105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181



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Borough of West Long Branch Zoning Bd. of Adj. 2-

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Findings were that during the AM peak street hour, the 85th percentile queue on northbound Larchwood Avenue is 21.1 feet and represents approximately 1 vehicle. Given the location of the proposed driveway, 290 feet from the intersection, the potential for additional traffic, exiting onto Larchwood Avenue from the new parking lots, creating a queue that extends 290 feet to the new driveway, is minimal, at best. We also note that during the morning peak hour, it is entering traffic more than exiting traffic that will impact the driveway. Therefore, any vehicles making left turns from southbound Larchwood Avenue into the new driveway will not be impacted by queuing on northbound Larchwood Avenue.

For the PM peak street hour, the 85th percentile queue is calculated at 115.3 feet or approximately 4.5 vehicles. Again, the existing queueing is well short of the distance that the driveway is located from the intersection at 290 feet. Therefore, the likelihood of additional traffic creating a queue that extends 290 feet to the new driveway is minimal. We note that this was the highest queue on northbound Larchwood Avenue during the 2:15 PM-3:15 PM hour.

We also note that it is unlikely for motorists who wish to travel east on Cedar Avenue, leaving the new parking lot, to travel west to Larchwood Avenue via the new connection to Larchwood Avenue, get in a queue on northbound Larchwood Avenue at the Cedar Avenue traffic signal, only to turn right and proceed east on Cedar Avenue. It is much easier for these motorists to utilize the existing unsignalized driveway to Cedar Avenue, which is significantly further east than the Larchwood Avenue/Cedar Avenue intersection.

In addition to the foregoing, it is the Applicant's intention to widen the existing unsignalized access to Cedar Avenue to provide for separate left and right turn lanes exiting the campus so that right turning vehicles will not be queued behind left turning vehicles in order to travel east on Cedar Avenue. The Applicant will also install signage within the new parking lot, directing motorists who wish to go east on Cedar Avenue, to this driveway and motorists who wish to go west on Cedar Avenue to the Larchwood Avenue driveway. A concept of the change is appended to this letter as well as a change to the crosswalk location across the access driveway to Cedar Avenue.



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May 12, 2021

In summary, the location of the proposed new driveway to Larchwood Avenue at 290 feet from the intersection, is in a location where queuing on northbound Larchwood Avenue will not impact driveway movements into and out of this location during either the AM or PM peak hour. We continue to believe that giving motorists the option of accessing the traffic signal at Cedar Avenue in order to make left turns or crossing movements, instead of utilizing the existing unsignalized access to Cedar Avenue, is in the best interest of traffic safety, not only for University traffic, but for the general public. In combination with the widening of the unsignalized Cedar Avenue driveway to provide separate left and right turn lanes, we believe traffic from the new parking areas can access Cedar Avenue efficiently.

A representative of MRA will be in attendance at an upcoming Borough of West Long Branch Zoning Board of Adjustment meeting to provide expert testimony and answer any questions board members, board experts or the public may have regarding this issue or other traffic related issues as they may arise.

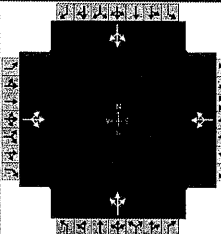
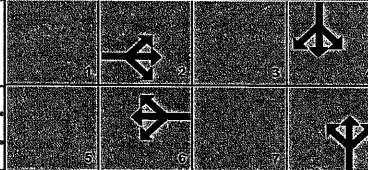
Very truly yours,

John H. Rea, PE
Principal

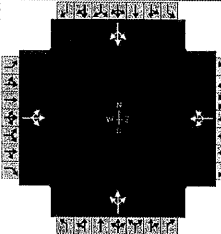
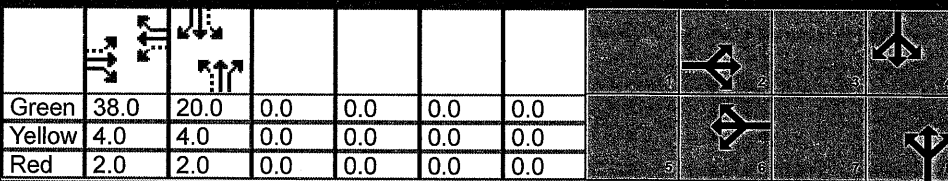
Scott T. Kennel
Sr. Associate

cc: Steven Mlenak, Esq.
Bill Fitzgerald, PE
Patti Swannack, VP Administrative Services

HCS7 Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		MRA				Duration, h		0.250											
Analyst		STK		Analysis Date		Area Type		Other											
Jurisdiction				Time Period		PM		PHF		0.90									
Urban Street		CEDAR AV		Analysis Year		2019 EXIST		Analysis Period		1 > 7:00									
Intersection		LARCHWOOD AV		File Name		19-162PE-1-85th.xus													
Project Description		19-162PE-1-85th																	
Demand Information						EB			WB			NB			SB				
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R		
Demand (v), veh/h						1	326	41	12	360	4	112	26	40	5	14	3		
Signal Information																			
Cycle, s		70.0		Reference Phase		2													
Offset, s		0		Reference Point		End													
Uncoordinated		No		Simult. Gap E/W		On													
Force Mode		Fixed		Simult. Gap N/S		On													
Green						38.0	20.0	0.0	0.0	0.0	0.0								
Yellow						4.0	4.0	0.0	0.0	0.0	0.0								
Red						2.0	2.0	0.0	0.0	0.0	0.0								
Timer Results						EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT						
Assigned Phase							2		6		8		4						
Case Number							8.0		8.0		8.0		8.0						
Phase Duration, s							44.0		44.0		26.0		26.0						
Change Period, (Y+R c), s							6.0		6.0		6.0		6.0						
Max Allow Headway (MAH), s							0.0		0.0		3.2		3.2						
Queue Clearance Time (g s), s											9.4		2.7						
Green Extension Time (g e), s							0.0		0.0		0.3		0.4						
Phase Call Probability											1.00		1.00						
Max Out Probability											0.00		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	12	1	6	16	3	8	18	7	4	14		
Adjusted Flow Rate (v), veh/h						409			418			198			24				
Adjusted Saturation Flow Rate (s), veh/h/ln						1833			1848			1508			1723				
Queue Service Time (g s), s						0.0			0.0			6.2			0.0				
Cycle Queue Clearance Time (g c), s						9.2			9.2			7.4			0.7				
Green Ratio (g/C)						0.54			0.54			0.29			0.29				
Capacity (c), veh/h						1047			1056			515			555				
Volume-to-Capacity Ratio (X)						0.391			0.396			0.384			0.044				
Back of Queue (Q), ft/ln (85 th percentile)						137.2			140			115.3			13.5				
Back of Queue (Q), veh/ln (85 th percentile)						5.4			5.5			4.5			0.5				
Queue Storage Ratio (RQ) (85 th percentile)						0.00			0.00			0.00			0.00				
Uniform Delay (d 1), s/veh						9.4			9.4			20.4			18.1				
Incremental Delay (d 2), s/veh						1.1			1.1			2.2			0.1				
Initial Queue Delay (d 3), s/veh						0.0			0.0			0.0			0.0				
Control Delay (d), s/veh						10.5			10.5			22.6			18.2				
Level of Service (LOS)						B			B			C			B				
Approach Delay, s/veh / LOS						10.5	B		10.5	B		22.6	C		18.2	B			
Intersection Delay, s/veh / LOS						13.0						B							
Multimodal Results						EB			WB			NB			SB				
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

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General Information						Intersection Information											
Agency	MRA					Duration, h	0.250										
Analyst	STK		Analysis Date			Area Type	Other										
Jurisdiction			Time Period	AM		PHF	0.90										
Urban Street	CEDAR AV		Analysis Year	2019 EXIST		Analysis Period	1 > 7:00										
Intersection	LARCHWOOD AV		File Name	19-162AE-1-85th.xus													
Project Description	19-162AE-1-85th																
Demand Information						EB			WB			NB			SB		
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h						5	398	113	15	317	4	11	20	3	16	11	36
Signal Information																	
Cycle, s	70.0	Reference Phase	2														
Offset, s	0	Reference Point	End														
Uncoordinated	No	Simult. Gap E/W	On														
Force Mode	Fixed	Simult. Gap N/S	On														
Green	38.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Yellow	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Red	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Timer Results						EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase							2		6		8		4				
Case Number							8.0		8.0		8.0		8.0				
Phase Duration, s							44.0		44.0		26.0		26.0				
Change Period, (Y+R _c), s							6.0		6.0		6.0		6.0				
Max Allow Headway (MAH), s							0.0		0.0		3.2		3.2				
Queue Clearance Time (g _s), s											3.0		4.2				
Green Extension Time (g _e), s							0.0		0.0		0.2		0.1				
Phase Call Probability											1.00		1.00				
Max Out Probability											0.00		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	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h						573			373			38			70		
Adjusted Saturation Flow Rate (s), veh/h/ln						1796			1828			1682			1605		
Queue Service Time (g _s), s						0.0			0.0			0.0			0.0		
Cycle Queue Clearance Time (g _c), s						15.0			8.0			1.0			2.2		
Green Ratio (g/C)						0.54			0.54			0.29			0.29		
Capacity (c), veh/h						1027			1046			549			523		
Volume-to-Capacity Ratio (X)						0.558			0.357			0.069			0.134		
Back of Queue (Q), ft/ln (85 th percentile)						207			124.5			24.4			40.3		
Back of Queue (Q), veh/ln (85 th percentile)						8.2			4.9			0.8			1.6		
Queue Storage Ratio (RQ) (85 th percentile)						0.00			0.00			0.00			0.00		
Uniform Delay (d ₁), s/veh						10.7			9.1			18.2			18.6		
Incremental Delay (d ₂), s/veh						2.2			1.0			0.2			0.5		
Initial Queue Delay (d ₃), s/veh						0.0			0.0			0.0			0.0		
Control Delay (d), s/veh						12.9			10.1			18.5			19.2		
Level of Service (LOS)						B			B			B			B		
Approach Delay, s/veh / LOS						12.9	B		10.1	B		18.5	B		19.2	B	
Intersection Delay, s/veh / LOS						12.5						B					
Multimodal Results						EB			WB			NB			SB		
Pedestrian LOS Score / LOS																	
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