FLEIS&VANDENBRINK
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May 7, 2020

VIA EMAIL

Mr. Derek Gentile
President & CEO
EEI Global
1400 S. Livernois Rd.,
Rochester Hills, MI 48307

RE: Supplemental Memo - TIS
Rochester Hills Research Park Development
Rochester Hills, Michigan

Dear Mr. Gentile:

Fleis & VandenBrink (F&V) staff has completed this letter to provide supplementary information regarding the Rochester Hills Research Park Development. This letter is in response to comments provided by the City of Rochester Hills in a review letter dated March 9, 2020 and comments expressed by the Planning Commission at the meeting on April 21, 2020. Further clarification regarding these comments and the corresponding to the traffic impact study performed by F&V in the report dated October 15, 2019 are summarized herein.

Planning Commission Comment: *Concern was expressed by the commission regarding the decreased delay for several of the EB/WB movements at the signalized intersection of Livernois Road & Drexelgate Parkway.*

F&V Response: The EB/WB (N. Site Drive/Drexelgate Drive) approaches at the signalized intersection of Livernois Road & Drexelgate Parkway are underutilized under existing and background conditions. The majority of the delay experienced for vehicles on these approaches is waiting for a phase change to provide a green light for the Drexelgate Parkway approaches. The existing long delays and poor LOS are due to the low volume of traffic and the random arrival of vehicles on these approaches, in conjunction with the long cycle length (120 seconds). The consequence of the random arrival of vehicles is that vehicles will often arrive at the intersection on a red signal and have to wait throughout the majority of the cycle length to receive a green signal. Furthermore, because the approaches have low volumes of vehicles, each cycle length may only serve a few vehicles for that approach, which does not facilitate efficient operations.

With the addition of the site generated traffic, traffic volumes are increased on the underutilized minor street approaches, and the arrival of vehicles becomes more uniform and less random. As a result, the likelihood of vehicles arriving to an approach during a green light or just before the phase change and experiencing little or no delay increases. HCM methodology takes an average delay of all vehicles utilizing a specific movement during the peak period in question. Therefore, with more vehicles on the underutilized approaches, the probability of arriving on a green light for any random vehicle increases, resulting in a decreased average delay for all vehicles on that approaches or movement.

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DPS Engineering Comment: *The following improvements may be included on the proposed site plans as alternatives for helping to mitigate traffic impacts as a result of the development*

c. NB Livernois Road at Horizon Court (future Horizon Drive).
i. Improve the existing passing lane to meet RCOC requirements
1. Entering Taper – 150 feet
2. Passing lane length – 150 feet
3. Thru lane portion – 100 feet
4. Exiting Taper – 150 feet

F&V Response: The existing passing flare dimensions for the entering taper, passing lane length, through lane portion, and exiting taper are approximately 100 feet, 100 feet, 95 feet, and 125 feet, respectively. A vehicle queueing and LOS analysis was performed at this intersection under existing conditions and with the implementation of the proposed improvements in order to determine the impact. The results of the analysis are summarized below and indicate that the changes to traffic operations and queueing along Livernois Road will be negligible with the implementation of the improved passing flare. Additionally, all vehicle queue lengths during the peak operations can be adequately accommodated without impacting through traffic on northbound Livernois Road.

Level of Service (LOS)														
Intersection	Control	Approach	Future Conditions				Future Conditions (with Improvements)				Difference			
			AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
			Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Livernois Road & Horizon Court	Stop (Minor)	EB	44.7	E	57.6	F	44.7	E	57.6	F	No Change			
		NB LT	11.5	B	9.9	A	11.5	B	9.9	A				
		SB	Free		Free		Free		Free					

Queue Length (ft)														
Intersection	Control	Approach	Future Conditions				Future Conditions (with Improvements)				Difference			
			AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
			Avg.	95th %	Avg.	95th %	Avg.	95th %	Avg.	95th %	Avg.	95th %	Avg.	95th %
Livernois Road & Horizon Court	Stop (Minor)	EB	11	38	46	108	10	32	42	99	-1	-6	-4	-9
		NB LT	23	54	4	20	21	50	4	20	-2	-4	0	0

Furthermore, the crash history was evaluated at this intersection to determine if existing design of the passing flare is a safety concern for existing operations. The analysis included and evaluation of the crash history for the last 5 years of available data (January 2016-December 2018). The results of the crash analysis showed that no crashes at this intersection were experienced as a result of the existing passing flare operations or design.

If you have any further questions, please contact our office.

Sincerely,

FLEIS & VANDENBRINK ENGINEERING, INC.

Julie M. Kroll

Julie M. Kroll, PE, PTOE
Traffic Engineering Services Manager

Attachments

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	8	42	643	1082	17
Future Vol, veh/h	5	8	42	643	1082	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	83	83	95	95
Heavy Vehicles, %	0	0	2	2	1	1
Mvmt Flow	8	13	51	775	1139	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2016	1139	1157	0	-	0
Stage 1	1139	-	-	-	-	-
Stage 2	877	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.12	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.218	-	-	-
Pot Cap-1 Maneuver	65	247	604	-	-	-
Stage 1	308	-	-	-	-	-
Stage 2	410	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	60	247	604	-	-	-
Mov Cap-2 Maneuver	60	-	-	-	-	-
Stage 1	282	-	-	-	-	-
Stage 2	410	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	44.7	0.7	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	604	-	112	-	-
HCM Lane V/C Ratio	0.084	-	0.193	-	-
HCM Control Delay (s)	11.5	-	44.7	-	-
HCM Lane LOS	B	-	E	-	-
HCM 95th %tile Q(veh)	0.3	-	0.7	-	-

Intersection: 2: Livernois Road & Horizon Court

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	40	62
Average Queue (ft)	10	21
95th Queue (ft)	32	50
Link Distance (ft)	859	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		150
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	46	8	1190	795	3
Future Vol, veh/h	14	46	8	1190	795	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	95	95	85	85
Heavy Vehicles, %	7	7	0	0	1	1
Mvmt Flow	16	52	8	1253	935	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2204	935	939	0	-	0
Stage 1	935	-	-	-	-	-
Stage 2	1269	-	-	-	-	-
Critical Hdwy	6.47	6.27	4.1	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.363	2.2	-	-	-
Pot Cap-1 Maneuver	47	315	738	-	-	-
Stage 1	374	-	-	-	-	-
Stage 2	258	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	46	315	738	-	-	-
Mov Cap-2 Maneuver	46	-	-	-	-	-
Stage 1	370	-	-	-	-	-
Stage 2	258	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	57.6	0.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	738	-	133	-	-
HCM Lane V/C Ratio	0.011	-	0.513	-	-
HCM Control Delay (s)	9.9	-	57.6	-	-
HCM Lane LOS	A	-	F	-	-
HCM 95th %tile Q(veh)	0	-	2.4	-	-

Intersection: 2: Livernois Road & Horizon Court

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	149	31
Average Queue (ft)	42	4
95th Queue (ft)	99	20
Link Distance (ft)	859	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		150
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 0