

MEMORANDUM

DATE: 01/03/2018

SUBJECT: Intersection Study – Five Mile & Beechmont

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TEC Engineering, Inc. was retained to complete an intersection evaluation of Five Mile Road & Beechmont Avenue. This intersection has recently been converted to a Continuous Flow Intersection (CFI) for the northbound/southbound (Five Mile Road) approaches.

Turning movement data was collected for the intersection on November 28, 2017. TEC obtained current traffic signal timing from ODOT. Due to the complex nature of the intersection operation, a VISSIM model was developed to model the intersection. VISSIM is a microscopic, time-step and behavior-based simulation program. It analyzes traffic operations, which are influenced by several factors including roadway geometry, traffic composition, and traffic signals. Output files from VISSIM were generated to evaluate operational performance in terms of average intersection delays and maximum queue length on intersection approaches.

The results of the current (2017) CFI operation are compared to the 2004 conventional intersection operational results as reported in a planning study completed by Woolpert in October 2005 in **Table 1** and **Table 2**.

Table 1: 2004 Conventional Intersection vs. 2017 CFI Operation – AM Peak Hour

Direction	LOS / Delay(s)			Max Queue (ft)		
	2004 Conv Geo	2017 CFI	% decrease	2004 Conv Geo	2017 CFI	% decrease
Northbound	D / 42.9	C / 25.61	-40%	476	290.8	-39%
Southbound	D / 44.6	C / 25.90	-42%	374	142.6	-62%
Eastbound	F / 115.9	C / 29.13	-75%	1171	254.3	-78%
Westbound	D / 50.4	C / 26.99	-46%	861	359.7	-58%
Overall	E / 63.6	C / 26.84	-58%	-	-	

Table 2: 2004 Conventional Intersection vs. 2017 CFI Operation – PM Peak Hour

Direction	LOS / Delay(s)			Max Queue (ft)		
	2004 Conv Geo	2017 CFI	% decrease	2004 Conv Geo	2017 CFI	% decrease
Northbound	D / 38.2	C / 29.82	-22%	346	266.1	-23%
Southbound	E / 72.3	C / 29.76	-59%	486	195.7	-60%
Eastbound	F / 127.9	C / 28.44	-78%	1674	421.3	-75%
Westbound	D / 35.2	C / 28.91	-18%	809	393.6	-51%
Overall	E / 73.6	C / 28.95	-61%	-	-	

Table 1 and **Table 2** show the improvement of the intersection operation (CFI vs. Conventional Geometry) even with 13 years of growth. All movements show decreases in delays as well as max queue.

In addition to existing operational conditions, TEC was tasked with comparing existing operational results with those projected in the planning study. The planning study analyzed a horizon year of 2025. The counts collected for the current analysis were grown at 0.5% per year (straight line growth) for eight years to obtain 2025 projected traffic. The results of the comparison are provided in **Table 3** and **Table 4**.

Table 3: Comparison of Results – 2025 AM Peak Hour

CFI Geometry - AM Peak Hour				
Direction	LOS / Delay(s)		Max Queue (ft)	
	From 2005 Study	Existing network with grown traffic	From 2005 Study	Existing network with grown traffic
Northbound	C / 28.29	C / 27.27	356	239.8
Southbound	C / 26.98	C / 25.09	582	147.5
Eastbound	C / 25.02	C / 29.76	572	307.7
Westbound	C / 27.73	C / 28.99	251	345.3
Overall	C / 26.9	C / 28.26	-	-

Table 4: Comparison of Results – 2025 PM Peak Hour

CFI Geometry - PM Peak Hour				
Direction	LOS / Delay(s)		Max Queue (ft)	
	From 2005 Study	Existing network with grown traffic	From 2005 Study	Existing network with grown traffic
Northbound	C / 26.3	C / 29.82	377	278.7
Southbound	C / 27.6	C / 31.98	254	228.7
Eastbound	C / 26.91	C / 29.89	395	427.2
Westbound	D / 37.48	C / 32.55	915	540.3
Overall	C / 29.84	C / 30.39	-	-

The results of the comparison in **Table 3** and **Table 4** indicate similar capacity LOS and delay results between the planning study and current projections. The max queues in the 2025 horizon are anticipated to be slightly less in many cases than the planning study results.