

# Technical Memorandum – Traffic Assessment

**Date:** March 20, 2019

**Re:** Fairfield Hotel Development

A 77,366 square-foot, 108 room hotel development is proposed for the vacant land on Gateway Drive south of Indianapolis Airport Suites in Plainfield, Indiana. This technical memorandum presents a preliminary assessment of the proposed development from a traffic standpoint with respect to issues that may arise at the Hadley Road/Gateway Drive intersection.

## Trip Generation

- The proposed development is expected to generate 902 new trips during an average weekday, 51 new trips during the AM peak hour and 65 new trips during the PM peak hour.

Land Use Code – Source	Description & Size	Daily		AM Peak Hour		PM Peak Hour	
		In	Out	In	Out	In	Out
310 - ITE	Hotel (108 Rooms)	451	451	30	21	33	32

**Table 1 – Side Street Level of Service (LOS) and Worst Movement Delay**

Intersection and Approach	Hadley Road/Gateway SB Delay		Hadley Road/Gateway NB Delay	
	AM Peak	PM Peak	AM Peak	PM Peak
Existing	N/A	N/A	B - 29	B - 27
2019 No-Build	N/A	N/A	B - 29	B - 27
2019 Build	F – 105	F – 133	C - 54	C – 47
2028 Build	F – 168	F – 223	C - 69	C – 63
2038 Build	F – 281	F – 357	D - 93	D – 90

<sup>1</sup> The first letter is the Level of Service for the approach. The number is the highest movement delay in sec/veh.

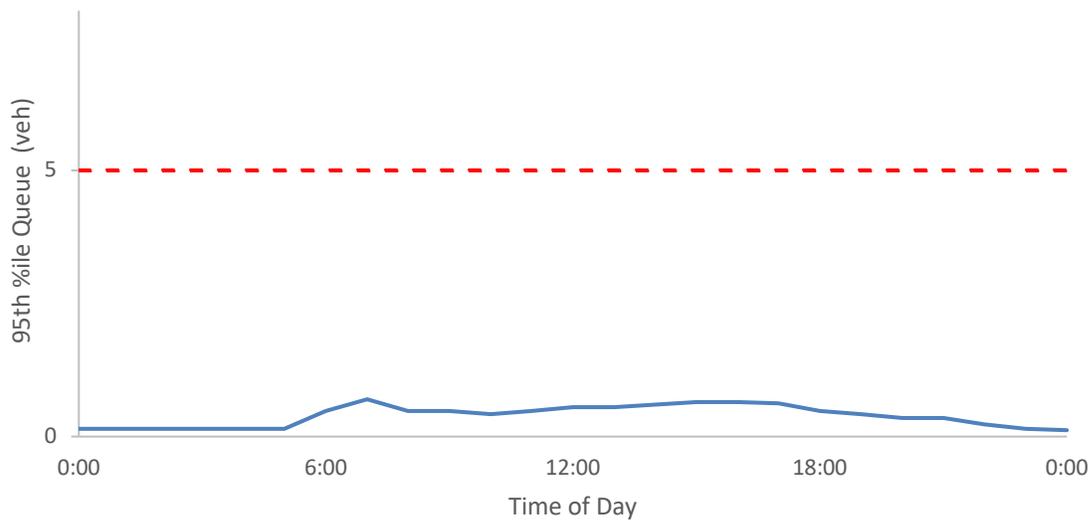
**Table 2 – Side Street Queues**

Intersection and Approach	Hadley Road/Gateway SB Delay		Hadley Road/Gateway NB Delay	
	AM Peak	PM Peak	AM Peak	PM Peak
Existing	N/A	N/A	0.72	0.64
2019 No-Build	N/A	N/A	0.74	0.65
2019 Build	7.81	5.56	0.84	1.34
2028 Build	6.49	4.98	0.99	1.88
2038 Build	8.02	5.94	1.22	2.56

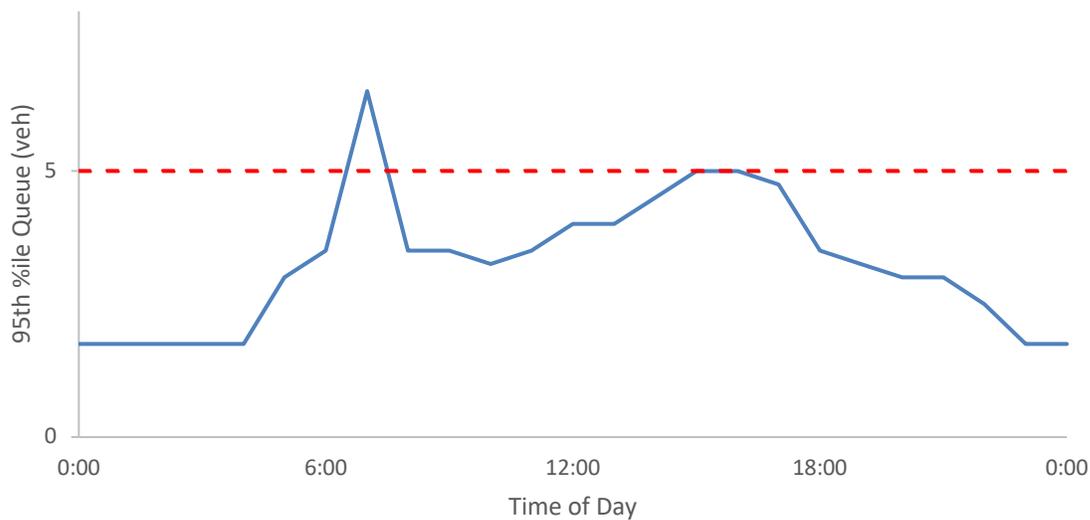
As Tables 1 and 2 show, the side street experiences average delays that are higher than preferred, specifically with the southbound direction. In general, side street queues are identified as an issue if stretching back five to ten vehicles. These results put the queues in the gray area, indicating improvements to the intersection would be a benefit, but are not necessarily an absolute requirement.

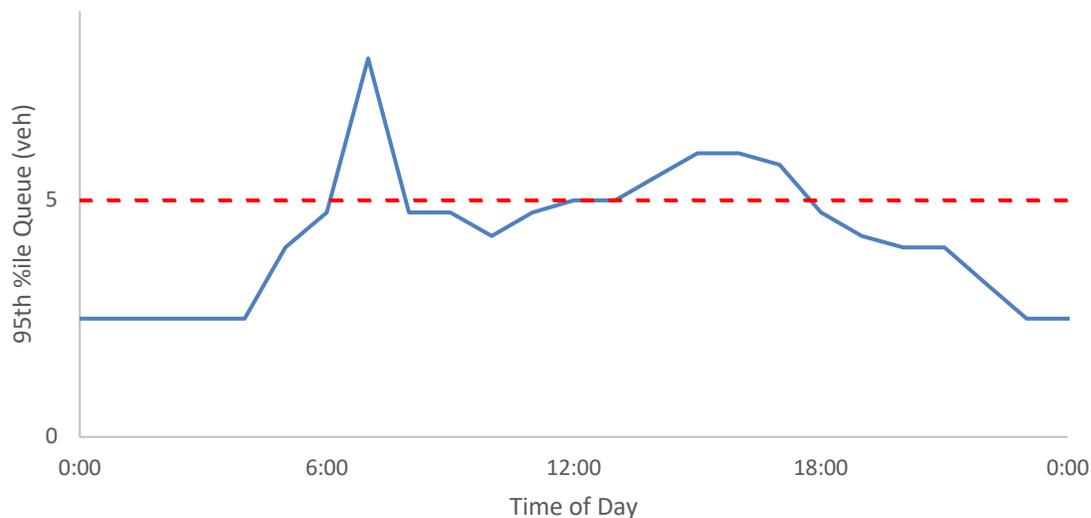
Overall, these results are not a major concern as they are only expected to occur during the two heaviest periods of vehicle traffic per day and operate with better delays, queues, and LOS for the remaining hours. Using the general distribution of traffic over the course of the day along with the expected traffic for the intersection and other traffic flow assumptions, Figures 1 through 3 below show forecasted side-street vehicle queues over the course of an average day for the existing, 2028 Build, and 2038 Build scenarios.

**Figure 1 – Existing Side-Street Vehicle Queues**



**Figure 2 – 2028 Forecasted Side-Street Vehicle Queues**



**Figure 3 – 2038 Forecasted Side-Street Vehicle Queues**

From the above figures, it is expected that the 95<sup>th</sup> percentile queue for the highest delayed movement, the southbound left-turn, will surpass five vehicles for approximately three hours in the 2028 Build scenario and seven hours in the 2038 Build scenario. When the maximum queue enters the five to ten vehicle range, improvements are often warranted at the intersection.

Mitigation options for the southbound movements have been addressed in previous studies and include the  $\frac{3}{4}$ -access intersection, which works well at reducing intersection delays by removing the highest delayed movement from the intersection, the side street left turn movement.

Ideally, an access restriction would be accommodated by improvements elsewhere to ensure drivers are able to travel in their desired direction. For traffic south of this intersection, restricting to  $\frac{3}{4}$ -access means drivers would want an alternative method to travel west. Unfortunately, given the characteristics of the area, a right-in/right-out access to SR 267 would not accommodate that movement and Clarks Creek eliminates inexpensive options for additional access to the west.

For traffic on the north side, the desired travel direction is east to SR 267 under a  $\frac{3}{4}$ -access scenario. In this case, a new right-in/right-out access to SR 267 would allow for eliminating the southbound left turn movement at the study intersection. Combined with wayfinding signs, drivers could easily maneuver toward their destination without significant difficulty.

Assuming the southbound left turn movement were restricted, overall operations at the study intersection would improve. Besides less traffic, the eliminated movement would result in less overall conflicting traffic.

Another option to improve safety and operations is to convert the intersection to a multi-lane roundabout. Under roundabout operation, the southbound delays would be greatly reduced. However, the eastbound and westbound traffic would experience an increase in delays and queues compared to the existing condition in which they do not stop. The northbound delay would remain about the same.

A final option, signalized traffic control, was also previously analyzed and identified as a possible solution to achieve acceptable delays during the AM and PM peak hours. The signal would also need to run in coordination with the SR 267/Hadley Road intersection to ensure that vehicles queues do not stretch back and block the closely spaced intersections.

### Crash Analysis

Information for reported crashes in the area was obtained from the Indiana State Police, based on the State of Indiana's crash repository - Automated Reporting Information Exchange System (ARIES). Crash data from 2016, 2017, and 2018 was analyzed and is summarized in Table 3. This table shows the total number of crashes at each intersection along with the highest type of crash by percentage of the total.

Table 3 – Intersection Crash Data Summary

Intersection	Total 2016-2018 Crashes	Highest Crash	
		Type	% of Total
Hadley Road at Gateway Drive	8	Rear End	37.5%
		Left Turn	37.5%
		Right Angle	12.5%
		Unknown	12.5%

While zero crashes are desired, the eight crashes over three years at the Hadley Road/Gateway Drive intersection is within normal range for these types of intersections. The crash rate of 0.58 per million vehicles entering (MEV) is comparable to other side street stop-controlled intersections.

Two of the eight crashes, a left-turn collision and a collision with a pedestrian, resulted in incapacitating injuries. Considering only fatal and serious injury crashes, the observed rate for the time frame is 14.42 per 100 MEV. This fatal and serious crash rate is higher than what would normally be expected at this type of intersection. However, the number of these crashes, two, is relatively low.

The study intersection should continue to be carefully monitored as additional development, regional traffic growth, and other roadway changes occur in the area. Changes to the intersection, including restricting access even if alternative access is not provided, may be appropriate based on the new crash data or trends along with potential operational trends.

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**Fairfield Hotel Traffic Study Notes**

- A growth rate factor of 1.0 was used for no build and build scenarios.
- Trips for the proposed mixed-use development north of the Hadley Road/Gateway intersections were added to the analysis to accurately model future conditions.
- Truck percentages remain at 2% with the assumption that most of the traffic to and from the site during the peak hours will be via passenger car.
- It was assumed that all accesses are for both incoming and outgoing traffic, and are two-way stop controlled.
- Trip distribution was assumed as follows based on surrounding roads AADT volumes:
  - 18% to/from the West
  - 25% to/from the North
  - 15% to/from the East
  - 42% to/from the South

**Geometry Used for Build Scenario**

- Hadley Road/Gateway Drive
  - NB – Shared Thru-Left/Right
  - SB – Shared Thru-Left/Right
  - EB – Left/2 Thru/Right
  - WB – Left/2 Thru/Right