

EXECUTIVE SUMMARY

A&F Engineering Co., LLC prepared a traffic study to determine the operational efficiency of potential configurations of the intersections of Sycamore Street & 1st Street and Sycamore Street & Main Street in Zionsville, Indiana in September 2025. In addition to the existing intersection configurations, five additional configurations were analyzed. This executive summary details the purpose, scope of work, and the results of the study.

The purpose of this traffic study was to determine how well the potential configurations for the intersections of Sycamore Street & 1st Street and Sycamore Street & Main Street would operate. This analysis identifies any existing roadway deficiencies and potential roadway deficiencies that may occur under these proposed configurations. The traffic study determined what modifications to the roadway system would be required for each scenario. Conclusions were made addressing the performance of each scenario pertaining to traffic operations.

The scenarios considered in this analysis are shown below.

Scenario 1: Year 2025 No Build – Based on year 2025 traffic volumes and existing intersection conditions.

Scenario 2: Year 2035 No Build – Based on year 2035 traffic volumes and existing intersection conditions.

Scenario 3: Coordinated Signal System – Based on year 2035 traffic volumes and adding a traffic signal to the intersection of Sycamore St & 1st Street with an added westbound right-turn lane.

Scenario 4: Moved Signal/Realignment – Based on year 2035 traffic volumes and realigning Main Street south of Sycamore Street to align with 1st Street, creating a right-in/right-out only access at Sycamore Street & Main Street, and moving the traffic signal control from Main Street to 1st Street.

Scenario 5: “Peanut” Roundabout Two-Way Operation West – Based on year 2035 traffic volumes and realigning Main Street south of Sycamore Street to align with 1st Street. The intersections would be reconstructed as a “peanut” roundabout with the south leg at 1st Street.

Scenario 6: “Peanut” Roundabout Two-Way Operation East – Based on year 2035 traffic volumes and reconstructing the intersections as a “peanut” roundabout with the south leg remaining at Main Street.

Scenario 7: “Peanut” Roundabout One-Way Operation – Based on year 2035 traffic volumes and reconstructing the intersections as a “peanut” roundabout with the one-way northbound leg remaining at Main Street and the one-way southbound leg at 1st Street.

A&F Engineering made use of previously conducted turning movement count traffic volume data from the Town of Zionsville Road Impact Fee Update at the intersections of Sycamore Street & 1st Street and Sycamore Street & Main Street. These traffic volumes were balanced so that the traffic volumes exiting one intersection would equal the traffic volumes entering the adjacent intersection. These traffic volumes were grown to year 2025 and year 2035 levels using a non-compounded growth rate of 1.5% per year to account for growth in the traffic volumes due to development outside of the study area. These traffic volumes were then redistributed to correspond to the proposed changes in the intersection configurations for each scenario studied.

A&F Engineering completed a capacity analysis, level of service analysis, and 95th percentile queue length analysis based on the proposed intersection configuration scenarios. For the conventional intersection scenarios (Scenarios 1, 2, 3, & 4), the recognized traffic analysis computer software *Synchro/SimTraffic* was used. For the roundabout scenarios (Scenarios 5, 6, & 7), the recognized traffic analysis computer software *SIDRA* was utilized with INDOT's *SIDRA* methodology.

The capacity analysis determines how much traffic an intersection can accommodate. The level of service analysis determines what level an intersection functions at based on the average delay experienced by a vehicle at a given approach of an intersection. The 95th percentile queue length analysis determines the queue length which 95% of AM and PM queue lengths will fall below. A&F Engineering utilized these analyses to draw conclusions about the performance of each of the proposed intersection configurations.

While the following conclusions address vehicular traffic operations in the study area, each scenario allows for the design of pedestrian facilities that offer minimal impact to pedestrian operations in the study area. Such facilities may include but are not limited to raised crosswalks, crosswalks with rapid flashing beacons, pedestrian refuge islands, or midblock crossings.

The conclusions that follow are based on the data and analyses presented in the traffic study and a field review conducted at the site.

SCENARIO 1: NO BUILD - 2025

The purpose of this analysis is to replicate the existing congestion issues that are present on the study area roadway network today as well as create a baseline for comparison with the proposed configurations. While the AM and PM peak hours experience acceptable levels of service (apart from the southbound approach at Sycamore Street & Main Street during the PM peak hour), the 95th percentile queue lengths show congestion along 1st Street and Sycamore Street. The southbound queue along 1st Street reaches the intersection of 1st Street & Oak Street during the PM peak hour and the westbound queue along Sycamore Street reaches the intersection of Sycamore Street & Elm Street during the PM peak hour.

SCENARIO 2: NO BUILD - 2035

Capacity analysis has shown that as traffic volumes at the study intersections continue to grow due to development outside of the study area, the study area roadway network will begin to experience increased delay during the PM peak hour. Additionally, the southbound 95th percentile queueing along 1st Street will begin to have a greater impact on Oak Street during the AM and PM peak hours. The westbound queueing along Sycamore Street will reach Elm Street during the AM and PM peak hours with the PM peak hour queue extending past the entrance to Lions Park. The northbound queueing along Main Street reaches the intersection of 106th Street & Zionsville Road during the PM Peak hour.

SCENARIO 3: COORDINATED SIGNAL SYSTEM

Capacity analysis has shown that some approaches to the study intersections will continue to operate below acceptable levels of service during the AM and PM peak hours under this scenario. This is due to congestion within the study area. The southbound queueing along 1st Street will begin to impact operations on Oak Street during the AM and PM peak hours. The westbound queueing along Sycamore Street will reach the intersection of Sycamore Street & Elm Street and will extend past the entrance to Lions Park during the AM and PM peak hours. The northbound queueing along Main Street reaches the intersection of 106th Street & Zionsville Road during the PM Peak hour.

SCENARIO 4: MOVED SIGNAL/REALIGNMENT

Capacity analysis has shown that two approaches operate below acceptable levels of service during the PM peak hour. The realignment of Main Street to 1st Street allows for southbound traffic to easily continue southbound along Main Street towards 106th Street. This corresponds to a much shorter southbound queue along 1st Street. However, the westbound queues along Sycamore Street continue to impact Elm Street and the Lions Park entrance during the AM and PM peak hours. Additionally, the change in access at Sycamore Street & Main Street to right-in/right-out only, means that southbound vehicles are unable to freely turn onto Sycamore Street during times of increased congestion. This leads to a southbound queue along Main Street during the AM peak hour that extends past Oak Street.

SCENARIO 5: “PEANUT” ROUNDABOUT TWO-WAY WEST

Capacity analysis has shown that all approaches to the study intersections will operate at acceptable levels of service during the AM and PM peak hours apart from the southbound approach at Sycamore Street & Main Street during the PM peak hour. The 95th percentile queue length analysis has shown that during the AM and PM peak hours, the westbound queue along Sycamore Street will impact the intersection of Sycamore Street & Elm Street.

SCENARIO 6: “PEANUT” ROUNDABOUT TWO-WAY EAST

Capacity analysis has shown that all approaches to the study intersections will operate at acceptable levels of service during the AM and PM peak hours. The queue length analysis has shown that the southbound 95th percentile queues along 1st Street will impact the intersection 1st Street & Hawthorne Street during the AM peak hour. Additionally, these southbound queues will restrict access to the businesses west of 1st Street and south of Hawthorne Street during these times of congestion.

SCENARIO 7: “PEANUT” ROUNDABOUT ONE-WAY (RECOMMENDED)

Capacity analyses have shown that all approaches to the study intersections operate at acceptable levels of service during the AM and PM peak hours. The 95th percentile queue length analysis has shown that this scenario offers minimal queueing with no significant impact on the adjacent intersections.