Future Traffic Conditions

Good transportation planning is based on defensible projections of development and trip-making. The normal "design year" of improvements is 20 years in the future to ensure, insofar as possible, that they do not become inadequate or functionally obsolete before then.

Projections were made for this study on the basis of both regional forecasts as well as local expectations of development. North-south traffic through the corridor is anticipated by the Miami Valley Regional Planning Commission (MVRPC) to grow approximately 29 percent in the next 20 years; this number is consistent with local expectations in this growth area and was therefore used to project traffic on old U.S. 25. In order to develop east-west traffic projections, future land use patterns west of the Great Miami River were reviewed and quantified into an estimated number of new households. Household trip data was then used in developing future traffic counts along the U.S. 725 corridor.

These increased volumes were then distributed throughout the street network and were also converted into future turning movements which were then used for NETSIM analyses of the future "design year".

Analysis

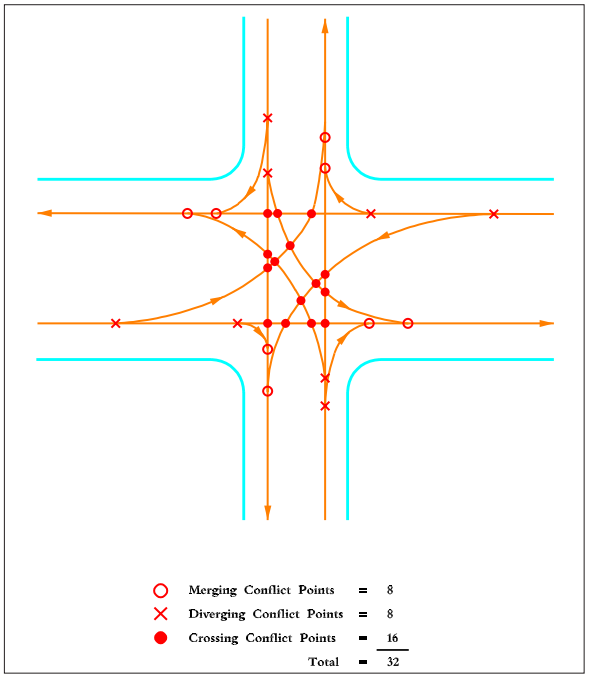
NETSIM Analysis

The NETSIM analysis for future conditions was run for the PM peak hour, and the results are shown in the PM Peak LOS- Future (2020) Traffic Volumes table located in Appendix 4. As traffic volumes increase, the "congestion" differences between one-way and two-way operation become more discernible.

Major impacts occur at the intersections of Main & Sycamore and First & Mound. At the Main and Sycamore intersection, a "D" LOS for a one-way street system goes to "F" under a two-way scenario; average delay goes from 28.29 seconds per vehicle to 71.88. A "B" LOS with average delay of 9.97 seconds for First & Mound under a one-way scenario goes to "F" and 87.13 seconds under two-way operation.

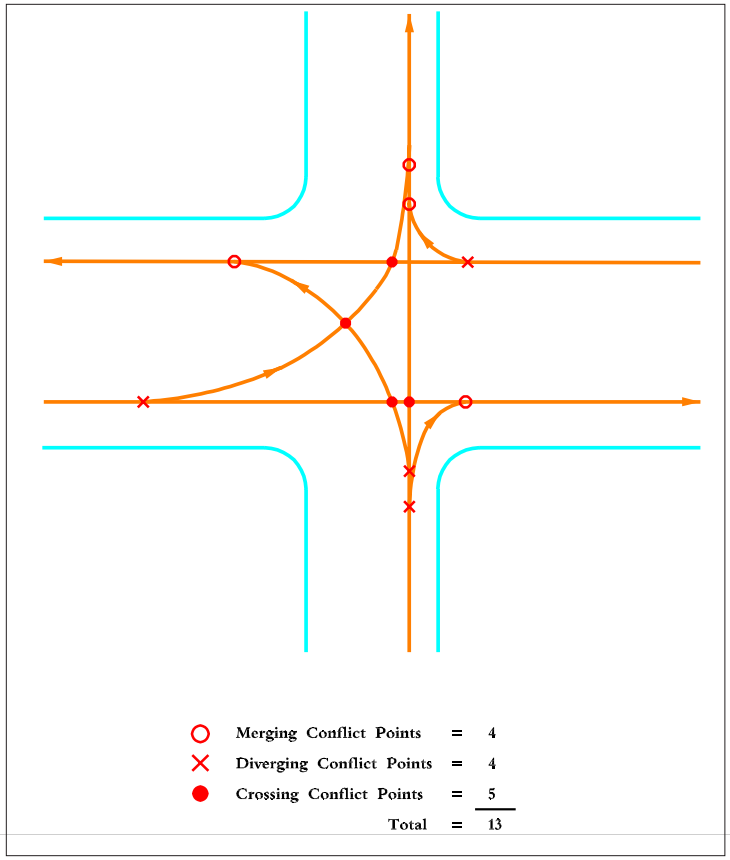
Conflicts

One significant change from one-way operation to two-way is the increase in conflict points. Conflict points represent potential (sometimes actual) interaction between vehicles passing through an intersection; they can be crossing (left turns, right angles, etc.), diverging (rear end) or merging (side swipe, angles). As shown by the two figures included herein, there are 32 conflict points (including 16 crossing type) in an intersection of two two-way streets but only 13 (5 crossing type) when a two-way street intersects a one-way street.



Conflict Diagram: 4-Approach Intersection of 2 Two-Way Streets

Conflict points relate to accidents since each conflict point is a potential collision. They also affect the capacity of an intersection since the avoidance of a collision requires an adequate gap in one of the two conflicting



Conflict Diagram: 3-Approach Intersection of One & Two-Way Streets

streams, and a greater number of conflict points requires a greater amount of gaps, and therefore time. Consequently, conflict diagrams demonstrate the inherent safety and capacity differences between one-way and two-way operations.

Conflict diagrams can also demonstrate why one-way streets are safer for pedestrians, a very important factor in pedestrian-oriented downtown areas. When drivers make right turns, their only conflict is with the pedestrian in the parallel crosswalk. When drivers make left turns, they are preoccupied with finding a gap in opposing traffic, and the pedestrian in the crosswalk is often forgotten.

Geometric and Intersection Improvements

An extensive field review was conducted to determine physical improvements that would be required to convert the two streets from one way to two-way operation. The end points of the current one-way couplet would need to be significantly modified so traffic would intersect and diverge in a safe manner. The current design facilitates the smooth diverge and merge of the one-way streets. Other physical improvements required would be additional signal hardware, signal installation modifications, corner radius improvements, some widening for left-turn lanes, and extensive pavement marking and signing changes.

Parking

The field review also identified locations where parking would have to be removed to provide additional pavement width for left-turn lanes and for adequate cross-corner sight distance at various intersections.

Business Service Requirements

Truck loading zones would be needed to replace a number of current on-street loading operations. In some situations, off-street construction would be required to offset the loss of on-street spaces.

Truck Routes

Through trucks could be removed from Main Street by making at least First Street two-way and signing it accordingly. This would eliminate a number of concerns and complaints; it would also eliminate the southbound left-turn conflicts at Main Street and Central Avenue. Adoption of a two-way street scenario would address this concern; retention of the one-way couplet would not.

Impact on Urban Design

Conversion of the one-way couplet to a pair of two-way streets would require the removal of curb extensions (bumpouts) and some signal and light poles on Main Street to provide space for left-turn lanes.

Cost

The estimated capital cost to convert the one-way couplet to two-way streets is $683,880; no cost would be required to maintain the existing flow. A detailed evaluation of the traffic alternatives is located in Appendix 4: Traffic Data.

Findings and Recommendations

One-Way vs. Two-Way

Findings of the one-way/two-way analysis are:

- There is more directness of travel with two-way streets.
- A two-way system would lack the capacity to support projected future traffic levels.
- Levels of service within the downtown area would deteriorate.
- Accidents as well as congestion would increase.
- Pedestrian safety and circulation would be detrimentally affected.
- On-street parking would be reduced.
- Truck deliveries in the downtown area would be negatively affected.
- Aesthetic improvements on Main Street would be reduced to provide more street space.
- Local businesses would be disrupted during construction.
- No data supporting improved business from two-way system have been found.
- Through truck traffic could be eliminated from Main Street by a two-way system.
- The capital costs for the conversion would not be supported by identifiable benefits.

Based on review of these findings and the supporting data, the retention of the existing one-way system is recommended.

An additional analysis was conducted to further evaluate possible options for removing through trucks from Main Street. A number of options, including converting First Street to two-way while leaving Main Street one-way, were identified and analyzed.

Findings of this additional analysis are as follows:

- A number of truck routes east of First Street were identified, evaluated and rejected, primarily because they would detrimentally affect residential neighborhoods.
- During the 7-hour survey period, 208 trucks drove south on Main from Sycamore to Central; this is an average of approximately 30 per hour, or one every two minutes.
- During that time, 75 of the 208 turned left to go east on Central; this is an average of approximately 11 per hour, or one every 5.5 minutes.
- Forty-nine (49) trucks turned left from Main Street to go east on Linden.
- Based on the survey, truck traffic on Main Street is not as high as perceived. In addition, a number of the trucks were local vehicles — some making deliveries – which would not be affected by a through truck route requirement.
- Making First Street two-way and increasing truck traffic on it would result in increased congestion and accidents on that street.
- There was concern that a truck routing on First Street would create the perception of a downtown bypass.
- The cost of only the First Street conversion would be approximately $345,000.

Based on these findings, the steering committee supported the concept to maintain the existing S.R. 725 truck route on Main Street, First Street, Sycamore Street and Central Avenue.

The final recommendations of the traffic analysis are therefore:

1. To retain the existing one-way couplet on Main Street and First Street,
2. To maintain the existing S.R. 725 truck route on Main Street, First Street, Sycamore Street and Central Avenue, and
3. To enhance the existing system by modernizing the traffic signals and incorporating them into an interconnected system comparable to the rest of the City's signals. To improve aesthetics by use of mast-arm signal supports and by other urban-design features, including an attractive and effective wayfinding sign system.