



**Piqua**  
WHERE VISION BECOMES REALITY

## Intersections Improvements Study

January 2009

Prepared for the  
City of Piqua, Ohio

by:



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Kleingers and Associates has performed this intersections improvements study project as the result of a recommendation from **Plan it PIQUA**, the City's recent Comprehensive Plan Update, a section of which identified numerous intersections in the City as having "Unwarranted Signals". Many of the City's intersections were constructed in the early 1900's and have generally remained in their original configurations since that time. In general, the traffic control devices that have been used at many locations throughout the City have also been in place for a significant period of time. Although over the years, there have been changes in modes of travel, traffic patterns, and development characteristics that have impacted the traffic control needs at many of the City's intersections, the traffic control methods used at these intersections generally remain unchanged.

This study includes the review of 27 intersections within the City of Piqua. Of these intersections, 22 are controlled by traffic signals, 3 are four-way stop controlled, and 2 are two-way stop controlled. The purpose of the study as outlined in the Request for Proposals for this project is, "to fully assess the traffic control devices and physical characteristics of the improvements found at certain locations throughout the City." The listed goals for this study are as follows:

1. Conduct limited research of historical traffic and land development records to establish a "best guess" supposition regarding the rationale for the original installation of the current traffic control device being utilized at each intersection to determine how well the rationale measures up to the current standards and practices; and, compare and contrast the historical data to current and projected trends to establish changes that may have or are anticipated to occur, which may influence the recommendations of this study.
2. Positively identify the warrant status of the existing traffic control devices being utilized at each location and identify the traffic control device and incidental improvements that will enhance the functionality, level of service, and level of safety of each intersection.
3. Fully assess the existing design characteristics of the physical improvements found at each location, and identify any existing deficiencies or opportunities regarding the geometric configuration and functionality of the intersection.
4. Fully assess the physical characteristics of the built environment surrounding each location to identify any existing deficiencies or opportunities regarding coordination between the use of buildings, landscaping, public spaces, sidewalks, streets, bike lanes/trails, on-street and off-street parking, and the like.
5. Provide alternative recommendation for modifications specific to each intersection in consideration of the findings and determinations of items 1 through 4 above.
6. Estimate the cost to implement the alternative improvements for each intersection, including the demolition and or removal of existing improvements, and the construction and or installation of any new improvements. (*Note: This item was not included in the scope of this study.*)
7. Provide all documentation, completed forms, and analysis necessary, and a strategy for the implementation of the traffic control device removal, modification, or enhancement recommendation selected for each intersection by the City.

The study methodology and the list of study intersections are outlined in the pages to follow. A summary of recommendations for the study intersections is provided on Pages 178 and 179.

The methodology used in this study includes three primary components: data collection, input/awareness, and traffic analyses. A description of each of these components is provided below.

### Data Collection

In order to obtain the necessary information to perform the analyses for this study, various data was collected. Turning movement counts were performed at each of the study intersections. Tables showing the count data, as well as the dates and times each count was performed, are provided for each intersection. A minimum of four hours of count data was collected for each intersection. The counts were performed during the hours that traffic volumes were expected to be the highest. For typical intersections that were not expected to be impacted by school traffic, the hours of 7:00 to 9:00 am and 4:00 to 6:00 pm were counted. For intersections that were expected to be affected by school traffic, count times were established such that the peak traffic periods associated with the school were included. For some intersections, it was determined that up to four additional hours of count data were needed in order to fully determine the warrant status of the existing traffic control device. As with the base count data, these additional hours of traffic counts were scheduled such that the hours with the highest traffic volumes would be collected.

Geometric data was collected for each intersection. The collected information includes general intersection configuration, number of approach lanes, lane widths, type of traffic control, applicable traffic signal timing information, locations of any on-street parking, crosswalk locations, and existing development characteristics adjacent to the intersection.

Crash reports for the study intersections were provided by the City of Piqua. These reports were from crashes that occurred from January 2005 through June 2008. For intersections where crashes occurred, crash diagrams were performed to identify any recurring crash patterns. The crash data was also used to evaluate Warrant 7 (Crash Experience) in the traffic signal warrant analyses.

### Input/Awareness

As part of this study, an Input/Awareness meeting was held on August 25, 2008. The purpose of the meeting was to introduce the project to City staff members, advisory board members and the general public, to discuss “best practices” in providing intersection traffic control, and to receive input from those in attendance regarding their specific concerns and observations at the intersections being studied.

This meeting was held in two separate sessions. The first session was held at 3:00 p.m. with City staff and advisory board members. The second session was held at 6:00 p.m. with members of the general public. Kleingers and Associates discussed various traffic control methods as well as issues considered by traffic engineers when determining the proper traffic control devices to be used for various types of intersections. Input was received from the session attendees regarding general concerns about traffic operations and safety as well as specific concerns about the intersections included in this study. A summary of the input received is included in the Appendix.

### Traffic Analyses

Traffic signal warrant analyses were performed at each study intersection that is currently controlled by a traffic signal in accordance with the Ohio Manual on Uniform Traffic Control Devices (OMUTCD), 2005 edition. Warrant One is the Eight Hour Vehicular Volume Warrant. As indicated in the data collection discussion earlier in this section, only four hours of traffic count data was collected at some of the study intersections. In order to evaluate the Eight Hour Vehicular Volume Warrant where only four hours of traffic data were collected, it was assumed that if the traffic volumes for each of the hours counted fell below the thresholds outlined in this warrant, traffic volumes for all other hours throughout the day would be below those thresholds as well. If the traffic volumes from the original four hours that were counted met or nearly met the thresholds for the Eight Hour Vehicular Volume Warrant, additional traffic count data was collected.

Field observations and/or capacity analyses were used to evaluate the current operation of stop-controlled intersections. Capacity analyses were also performed at certain signalized intersections where it was necessary to evaluate alternate traffic control methods.

This report outlines recommendations for each intersection based on the data collected and the analyses performed as described above. These recommendations are provided in the detailed descriptions for each intersection as well as in the summary Pages 178 and 179.

The intersections included for analysis in this study area listed below. The existing traffic control method currently in use at each intersection as well as the primary nature of issue / concern are also shown. Also shown is a description of each of the codes listed as the primary nature of issue / concern:

<b>Intersection</b>	<b>Existing Traffic Control</b>	<b>Primary Nature of Issue/Concern</b>
High at Broadway	Traffic Signal	W
High at Downing	Traffic Signal	W
High at Wayne	Traffic Signal	W
High/Market at Main	Two-Way Stop	W/T
College at North	Traffic Signal	W
College at Greene	Traffic Signal	W
College at Ash	Traffic Signal	W
College at High	Traffic Signal	C
College at Water	Traffic Signal	C
Greene at Downing	Traffic Signal	W
Greene at Wayne	Traffic Signal	W
Greene at Main	Traffic Signal	W/P/T
Park at College / Nicklin	Traffic Signal	W
Park at Broadway	Traffic Signal	W
Broadway at North	Traffic Signal	W
Ash at Broadway	Traffic Signal	W
Ash at Downing	Traffic Signal	W/C
Ash at Main	Traffic Signal	W/P/T
South at Wayne	Traffic Signal	W
South at Downing	Four-Way Stop	W
South at Roosevelt	Traffic Signal	W
Wood at Roosevelt	Traffic Signal	W
College at Wood	Four-Way Stop	W
College at Young	Four-Way Stop	W
South at Brice	Traffic Signal	W
McKinley at Grant	Traffic Signal	W
McKinley at Clark	Two-Way Stop	W

W = Warrant Status—Is this the most appropriate and most effective traffic control device for this intersection.

C = Coordination—Is the timing and/or operation of this signal optimal with reference to the movement of vehicular and pedestrian traffic through the intersection and surrounding area. Should this signal be connected to another nearby signal for coordinated operation.

P = Parking—Does the on-street parking layout on the approaches to this intersection interfere with the optimal movement of traffic through the intersection and surrounding area and/or inhibit the successful operation of nearby business ventures.

T = Turn Lane—Are the turn lanes at this intersection detrimental to achieving the optimal balance between meeting the demand for on-street parking and attaining the optimum movement of traffic through the intersection and surrounding area, in particular with reference to the impact on nearby business ventures.

The following sections outline the analyses performed at each of the study intersections. For simplicity, the intersections have been grouped based on their geographic locations. It should be noted that the intersection of McKinley at Grant was not included as a study intersection at the beginning of this project. Traffic data for this intersection was provided by the City of Piqua. Also, since this intersection was added to the project after the geometric characteristics were collected for each intersection, no existing conditions diagram is provided.

