

DRAFT
ROADWAY SUFFICIENCY ANALYSIS
Municipality of Murrysville Transportation Impact Fee Study
Municipality of Murrysville, Westmoreland County, Pennsylvania

Trans Associates (TA) has completed a Roadway Sufficiency Analysis based on the adopted Land Use Assumptions Report prepared by the Planning Director for the Municipality of Murrysville to be used as a basis for establishing a Transportation Capital Improvements Plan for the Municipality. The following sections of this report detail the introduction and purpose of the report; 2005 existing conditions and analysis; 2026 projected traffic volumes; 2026 pass-through traffic projections and analysis; 2026 projected new development traffic volumes and analysis; and a summary.

A. Introduction and Purpose of Report

On April 5, 2006, the Municipality of Murrysville Council enacted Resolution No. 486-05 of 2005, establishing an Impact Fee Advisory Committee (advisory committee) and authorizing the preparation and public advertisement of the Township's notice of intention to adopt an impact fee ordinance in accordance with Section 504-A(b) of Article V-A of the Pennsylvania Municipalities Planning Code (MPC). Prior to adoption of an impact fee ordinance, Article V-A of the MPC specifies that the following studies be performed:

- Development of land use assumptions for the determination of future growth and development within a designated area;
- Development of a roadway sufficiency analysis establishing the existing level of infrastructure sufficiency, preferred levels of service and the need for road improvements attributable to projected pass-through traffic and future new development; and
- Development of a transportation capital improvements plan specifying the costs of improvements to correct existing deficiencies, pass-through traffic and future new development.

In accordance with Section 504-A(c) of Article V-A, a prerequisite to the development of a transportation capital improvements plan is the development of land use assumptions for the determination of future growth and development within the Township and to recommend those assumptions to the governing body for adoption. The Municipality of Murrysville Director of Community Development, along with input from TA and TA's sub-consultant, Olsen & Associates, has completed, and the advisory committee has recommended, the Land Use Assumptions Report, at a public hearing held on February 27, 2006. The Land Use Assumptions Report has been adopted for use in the preparation of this Roadway Sufficiency Analysis and subsequent Transportation Capital Improvements Plan by the Municipality of Murrysville Council on April 5, 2006.

In accordance with Section 504-A(d) of Article V-A, upon adoption of the land use assumptions by the municipality, a roadway sufficiency analysis shall be prepared. The roadway sufficiency analysis shall include the following:

- Establishment of existing volumes and levels of service;
- Identification of preferred levels of service;
- Identification of existing deficiencies which need to be remedied to accommodate traffic at the preferred level of service;

- Specification of the required road improvements needed to bring the existing level of service to the preferred level of service;
- Projection of anticipated traffic volumes, with separate determination of pass-through trips, for a period of not less than five years from the date of the roadway sufficiency analysis based upon the adopted land use assumptions;
- Identification of forecasted deficiencies which will be created by pass-through trips; and
- Identification of forecasted deficiencies that will be created by future new development, exclusive of pass-through trips.

B. 2005 Existing Conditions

The purpose of evaluating existing conditions is to determine existing deficiencies. Such deficiencies are defined as existing highways, roads or streets operating at a level of service below the preferred level of service designated by the municipality. The remediation of such deficiencies cannot be funded by impact fees.

1. Data Collection

In accordance with a scope of work dated March 28, 2003, TA included for the study 24 intersections, they are as follows:

- 1) Sardis Road and Saltsburg Road (S.R. 0286);
- 2) Sardis Road and Mamont Road;
- 3) Sardis Road and School Road;
- 4) Logan Ferry Road and Gun Club Road;
- 5) Logan Ferry Road and Shangri-La Drive;
- 6) Sardis Road and Logan Ferry Road/Franklintown Court;
- 7) Old William Penn Highway and Sardis Road/Vincent Hall Road;**
- 8) Old William Penn Highway and North Hills Road;
- 9) Old William Penn Highway and Tarr Hollow Road;
- 10) Old William Penn Highway and School Road;
- 11) Old William Penn Highway and Cline Hollow Road;
- 12) Old William Penn Highway and Cozy Inn Cut-Off;
- 13) Old William Penn Highway and Hills Church Road;
- 14) Old William Penn Highway and Borland Farm Road;
- 15) Borland Farm Road and Italy Road;
- 16) Haymaker Farm Road and School Road South;
- 17) Hills Church Road and Kemerer Hollow Road;
- 18) Wiestertown Road and Hills Church Road;
- 19) Hills Church Road and Windover Road;
- 20) Wiestertown Road and Evans Road/Bollinger Road;
- 21) Hills Church Road and Mamont Road/Christy Road;
- 22) School Road and Tarr Hollow Road/North Hills Road
- 23) Golden Mile Highway (S.R. 0286) and Logan Ferry Road;** and
- 24) Golden Mile Highway (S.R. 0286) and Logan Ferry Road/Old Logan Ferry Road

Note: Intersections shown in bold are signaled.

Exhibit 1 shows the study intersections and roadway segments at which data was collected.

Turning movement counts were performed at the study intersections during typical weekdays from 10/30/03 to 11/20/03. The counts were collected between 7-9 A.M. and between 4-6 P.M. The data was summarized in 15-minute increments and included the number of heavy vehicles. The A.M. and P.M. peak hour volumes (four consecutive highest volume 15-minute periods) were determined for each intersection.

It should be noted, however, that these counts were performed during the reconstruction of William Penn Highway (S.R. 0022). Therefore TA recounted 5 critical intersections in February of 2005 to compare and, if necessary, adjust the counts performed in 2003. The counts performed in 2003 were increased using an annual growth rate of 1.31 percent to adjust to 2005. This growth rate was obtained from the Southwestern Pennsylvania Commission (SPC) for the Municipality of Monroeville. The 2005 existing A.M. and P.M. peak hour turning movement volumes are presented in **Exhibit 2**. Turning movement count summaries are included in the Appendix to this report.

In addition to intersection counts, TA collected automatic traffic recorder (ATR) counts at 6 locations (2-directions at each location) around the Township. These counts were conducted over 2 to 3 day periods between 11/18/03 and 11/20/03. The 24-hour average daily traffic volumes (ADT's) are presented on **Exhibit 3**. This data was used to help calibrate the traffic projection model discussed in Section D.1. ATR data summaries are included in the Appendix to this report.

2. Inventory of Existing Roadway Conditions

TA performed an extensive inventory of existing study roadways and intersections within the Municipality. Included in the inventory were roadway ownership, number and width of lanes, width of shoulder, posted speed limit, type of traffic control at intersections and any other significant condition.

Descriptions of significant highways and roads within the Municipality are included in **Exhibit 4**. William Penn Highway (S.R. 0022), from the western Municipal Boundary to the Cozy Inn Cut-Off, and Golden Mile Highway, north of Saltsburg Road, are the only 4-lane highways within the Municipality. William Penn Highway is situated in an east-west direction and, along with Old William Penn Highway, which parallels William Penn Highway through most of the Municipality, provides access to the majority of the commercially zoned and commercially developed property within the Municipality. Most north-south access within the Municipality is provided via longer local or collector roadways such as School Road and Sardis Road. There are approximately 40 miles of state-owned roads and 130 miles of Municipal-owned roads. The Municipality of Murrysville operates and maintains 13 traffic signals.

The only significant capital transportation project currently planned or in construction within the Municipality is the reconstruction and widening of approximately 4.1 miles of William Penn Highway (S.R. 0022), from the Cozy Inn Cut-Off to the S.R. 0022/S.R. 0066 interchange. This project will widen William Penn Highway to provide four (4) lanes of travel with a median divider that will provide openings and left turn lanes at critical intersections.

Traffic signal permit drawings for the six signalized study intersections were obtained from PENNDOT.

3. Analysis

Analysis of existing conditions included an intersection capacity analysis, a two-lane highway capacity analysis, a signal warrant evaluation and a left turn lane warrant evaluation.

a. Intersection Capacity Analysis

Capacity analyses were performed for all study intersections, both signalized and unsignalized, using methodology published by the Transportation Research Board in their *Highway Capacity Manual 2000*.

The results of the intersection capacity analysis are expressed in terms of levels of service (LOS). LOS for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The following table provides the ranges of control delay for each LOS:

SIGNALIZED INTERSECTION LOS DEFINITIONS

LEVEL OF SERVICE (LOS)	CONTROL DELAY PER VEHICLE (SEC)
A	≤10
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

Source: *2000 Highway Capacity Manual*, Transportation Research Board, 2000, Exhibit 16-2.

LOS for unsignalized two-way stop-controlled intersections and all-way stop control intersections are determined by the computed or measured control delay, and are defined for each minor movement. LOS for two-way stop control is not defined for the intersection as a whole, while LOS for all-way stop control is defined for the intersection as a whole. The following table provides the ranges of control delay for each LOS:

UNSIGNALIZED INTERSECTION LOS DEFINITIONS

LEVEL OF SERVICE (LOS)	CONTROL DELAY PER VEHICLE (SEC)
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

Source: *2000 Highway Capacity Manual*, Transportation Research Board, 2000, Exhibit 17-2.

Detailed descriptions of intersection LOS are included in the Appendix.

At the Impact Fee Advisory Committee meeting on February 27, 2006, the Impact Fee Advisory Committee adopted a preferred LOS D for the Municipality of Murrysville. This LOS is consistent with PennDOT criteria for urban areas, which specifies a minimum acceptable LOS for design purposes as LOS D.

The results of the intersection capacity analysis are summarized on **Exhibit 5**. The following intersections currently operate below LOS D during one or both peak hours:

2005 EXISTING CAPACITY DEFICIENT INTERSECTIONS

INTERSECTION	PEAK HOUR LOS	
	A.M.	P.M.
Logan Ferry Rd. and Shangri-La Dr.	C	F
Sardis Road and Logan Ferry Road	C	E
Old William Penn Highway and Sardis Road/Vincent Hall Road	D	E
Old William Penn Highway and Tarr Hollow Road	C	E
Old William Penn Highway and School Road	E	E
School Road and North Hills Road	C	E

Source: Analysis by Trans Associates.

Detailed LOS summaries and capacity analysis are included in the Appendix.

b. Signal Warrant Evaluation

In addition to a capacity analysis of study intersections and roadways, warrants for installation of traffic signals were evaluated at selected study intersections. The peak hour volumes shown on **Exhibit 2** were evaluated using the criteria in Title 67, Chapter 201 of the Pennsylvania Code, *Engineering and Traffic Studies* for Warrant xi, the *Peak Hour Volume* warrant. Unsignalized intersections with significant peak hour volumes were selected. The following table summarizes the findings.

2005 EXISTING CONDITIONS SIGNAL WARRANT EVALUATION SUMMARY

INTERSECTION	SATISFIES WARRANT xi CRITERIA?	
	A.M. PEAK HOUR	P.M. PEAK HOUR
Logan Ferry Road and Shangri-La Drive	NO	YES
Sardis Road and Logan Ferry Road	YES	YES
Old William Penn Highway and Tarr Hollow Road	NO	NO
Old William Penn Highway and School Road	YES	YES
Trafford Road and Pleasant Valley Road	NO	NO
School Road and North Hills Road	NO	YES

Source: Analysis by Trans Associates.

Four (4) intersections currently satisfy the peak hour volume warrant for signalization.

Copies of the graph used to evaluate the *Peak Hour Volume* warrant for the installation of traffic signal control are included in the Appendix to this report.

e. Left Turn Lane Warrant Evaluation

Warrants for left turn lanes were evaluated at unsignalized study intersections currently operating at a LOS E or worse, as applicable. The peak hour volumes shown on **Exhibit 2** were evaluated using the criteria in the American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*. The following table summarizes the findings.

**2005 EXISTING CONDITIONS
LEFT TURN LANE WARRANT EVALUATION SUMMARY**

INTERSECTION		MEETS LEFT TURN LANE WARRANT?	
		A.M. PEAK HOUR	P.M. PEAK HOUR
MAJOR STREET/DIRECTION	MINOR STREET		
Sardis Road NB	Logan Ferry Road.	NO	YES
Old William Penn Highway EB	Tarr Hollow Road	NO	YES
Old William Penn Highway WB	Tarr Hollow Road	NO	NO

Source: Analysis by Trans Associates.

Existing peak hour volumes currently warrant left turn lanes at 2 study intersections. Left turn lane warrant charts are included in the Appendix.

4. Mitigation of 2005 Existing Deficiencies

In order to determine the magnitude of improvements needed to mitigate existing capacity deficiencies, a capacity analysis was performed for all locations where substandard LOS exists. The mitigation of existing deficiencies cannot be funded by impact fees. Substandard LOS is defined as less than the minimum preferred LOS D.

As described in Section B.1.a, six (6) intersections currently operate at less than minimum preferred LOS D during one or both peak hours. These intersections were reanalyzed to develop mitigation that would result in LOS D or better. The following table presents the mitigation and resulting LOS:

2005 EXISTING CONDITIONS POTENTIAL MITIGATION AND RESULTING LOS

INTERSECTION	MITIGATION	MITIGATED PEAK HOUR LOS	
		A.M.	P.M.
Logan Ferry Road and Shangri-La Drive	Install traffic signal	B	B
Sardis Road and Logan Ferry Road	Construct northbound left turn lane and Install traffic signal.	B	B
Old William Penn Highway and Sardis Road (signalized)	Construct westbound right turn lane and optimize signal timings	D	D

2005 EXISTING CONDITIONS POTENTIAL MITIGATION AND RESULTING LOS (continued)

INTERSECTION	MITIGATION	MITIGATED PEAK HOUR LOS	
		A.M.	P.M.
Old William Penn Highway and Tarr Hollow Road	Construct eastbound left turn lane	C	D
Old William Penn Highway and School Road	Install traffic signal	C	C
School Road and North Hills Road	Install traffic signal	B	B

Source: Analysis by Trans Associates.

The mitigations are also shown graphically on **Exhibit 7**. Capacity analyses for 2005 mitigated conditions are included in the Appendix to this report.

C. 2026 Projected Traffic Volumes and Analysis

The next step in the roadway sufficiency analysis is to project and analyze traffic volumes for a period of not less than five years from the date of preparation of the roadway sufficiency analysis for both pass-through traffic and traffic from new development. The traffic volume projections shall be based on the adopted Land Use Assumptions Report. For the purposes of the land use assumptions and roadway sufficiency analysis, a 20-year period from the date of preparation of the roadway sufficiency analysis (2026) was assumed.

1. Description of Traffic Projection Model

To forecast 2026 A.M. and P.M. peak hour volumes by turn movement, the travel demand model *TransCAD* was used. Travel demand forecasting can be described as the process of developing traffic volume projections for a set of transportation features in a given analysis area from mathematical models of actual travel behavior. The models provide a tool for evaluating hypothetical scenarios such as alternative land development patterns, alternative demographic forecasts, major highway and transit initiatives such as the construction of new roadways, or even minor transportation improvements such as the addition of new travel lanes. The models are typically calibrated to match travel activity from an observed baseline (existing) condition. This ensures the validity of future travel estimates when evaluating alternative scenarios.

The model relies on four major components to forecast travel demand: trip generation; trip distribution; mode choice; and traffic assignment. In travel demand forecasting, socioeconomic and land-use information is typically aggregated into geographic areas referred to as traffic activity zones (TAZ). The representation of each TAZ is then further simplified into a single geographic point known as the centroid. The centroid represents the location from where all origins and destinations arrive or depart from the TAZ. This aggregated representation of points of activity is necessary to overcome the logistical and computational challenges of representing every household, place of employment, or other activity center as a separate origin and destination in a travel demand model.

Exhibit 8 illustrates the TAZ coverage for the Municipality of Murrysville, as provided in the Land Use Assumptions Report.

The following steps were used in the development and validation of the TransCAD model:

- Establish baseline roadway network, intersection performance and TAZ's;
- Estimate trip generation by TAZ using the Institute of Transportation Engineers *Trip Generation*, Seventh Edition;
- Estimate baseline origin-destination matrices;
- Model existing year 2005 traffic assignment and validate model with actual traffic counts;
- Establish year 2026 trip matrices; and
- Develop year 2026 traffic assignment.

2. Summary of Land Use Assumptions and Trip Generation

An inventory of existing land uses and assumptions of future development within the Municipality has been established in the *Land Use Assumptions Report* dated February 2006, prepared by the Municipality of Murrysville Director of Community Development. In that report, the following land uses and quantities were assumed for development between 2006 and 2026:

2006-2026 LAND USE ASSUMPTIONS

LAND USE	QUANTITY
Residential Uses	
Single Family Detached Dwellings	1,395 Dwellings
Multi-Family Attached Dwellings (2-4 Unit Buildings)	451 Dwellings
<i>Sub-Total Residential</i>	<i>1,846 Units</i>
Commercial Uses	
Shopping Centers/General Retail	552.6 KSF
General Office	253 KSF
Industrial Park	130 KSF

These assumed uses along with all existing land uses in the Township were assigned into 158 TAZ's as shown on **Exhibit 8**.

The vehicle trip generation for the A.M. and P.M. peak hour for each TAZ was calculated as the first component of the travel demand model. Vehicle trip generation for each land use was calculated using the average rates from the Institute of Transportation Engineers (ITE) *Trip Generation*, Seventh Edition, 2003. The trips generated by each TAZ were further broken down into new trips and pass-by trips, depending on the land use. A new or primary trip is a trip made for a specific purpose from the trip origin to the trip generator and returning to the trip origin. Pass-by trips are made as intermediate stops on the way from an origin to a primary trip destination without a route diversion. Pass-by trips are attracted from traffic passing a site on an adjacent street or roadway that offers direct access to the generator. Pass-by trips were calculated using information presented in the ITE publication, *Trip Generation Handbook*, Second Edition, 2004. Vehicle trip generation for each TAZ is included in the Appendix.

3. Establishment of Transportation Service Areas (TSA's)

In addition to the TAZ's, it is proposed that the Township be serviced by one (1) Transportation Service Area (TSA) in accordance with Article V-A of the MPC. A TSA is a geographically defined portion of the municipality not to exceed seven square miles with an aggregation of sites with development potential creating the need for transportation improvements within such area to be funded with impact fees. Since the total land area of the Township is 27.0 square miles, it is proposed that slightly more than 20.0 square miles be made exempt from the TSA.

The boundaries of the TSA are also shown on **Exhibit 8**.

D. 2026 Pass-Through Traffic Projections and Analysis

Article V-A of the MPC defines a pass-through trip as a trip that has both an origin and destination outside of the TSA. Pass-through trips must be determined so that the identification of forecasted deficiencies due to traffic having an origin and destination outside of the TSA can be determined. The mitigation of deficiencies caused by pass-through traffic cannot be funded by impact fees. These trips may have either an origin and destination outside of the Municipality of Murrysville, an origin and destination in an area of the Municipality outside the TSA, or any combination of origins or destinations outside of the subject TSA. The travel demand model accounted for trips having an origin and destination outside of the Municipality of Murrysville through the application of a traffic growth rate applied to 2005 existing A.M. and P.M. peak hour volumes. This growth rate was obtained from the Southwestern Pennsylvania Commission (SPC) for adjacent municipalities. The rate used for growth in pass-through trips having neither an origin nor a destination in Richland Township was 1.31 percent per year, linear. The 2026 A.M. and P.M. peak hour pass-through traffic volumes are presented in **Exhibit 9**. The 2026 pass-through traffic projections were determined assuming the mitigation described in Section B.4, to correct existing deficiencies.

1. Analysis of 2026 Projected Pass-Through Traffic Volumes

To determine deficiencies caused by pass-through traffic within the TSA, an analysis of 2026 base pass-through A.M. and P.M. peak hour volumes was performed. The analyses included an intersection capacity analysis, a signal warrant evaluation and a left turn lane warrant evaluation. Improvements identified to mitigate 2005 existing deficiencies in Section B.4. were assumed to be in place.

a. Intersection Capacity Analysis

A capacity analysis of the 2026 A.M. and P.M. peak hour pass-through traffic volumes was performed for all study intersections, both signalized and unsignalized, using the methodology in the *Highway Capacity Manual 2000*, published by the Transportation Research Board.

The results of the intersection capacity analyses are summarized on **Exhibit 10**. The results of the capacity analyses indicate that, under 2026 conditions with pass-through traffic volumes, all intersections, both signalized and unsignalized, can be anticipated to operate at LOS D or better during each of the peak hours analyzed assuming only the roadway improvements required to mitigate existing 2005 deficiencies. No additional roadway improvements were determined to be

required to mitigate forecasted 2026 A.M. and P.M. peak hour pass-through traffic volumes.

b. Signal Warrant Evaluation

In addition to a capacity analysis of study intersections and roadways, warrants for installation of traffic signals were evaluated at unsignalized intersections with significant peak hour volumes that did not satisfy warrants for the installation of traffic signal control under 2005 existing conditions. The results of the traffic signal warrants evaluation indicated that warrants for the installation of traffic signal control are not forecasted to be satisfied at any of the remaining unsignalized study intersections under forecasted 2026 pass-through traffic volume conditions. Copies of the graph used to evaluate the *Peak Hour Volume* warrant for the installation of traffic signal control are included in the Appendix to this report.

c. Left Turn Lane Warrant Evaluation

Warrants for left turn lanes were evaluated at unsignalized intersections with significant peak hour volumes that did not satisfy warrants for the installation of traffic signal control under 2005 existing conditions using the criteria in the American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*. The results of the left turn lane warrants evaluation indicated that warrants for left turn lanes are not forecasted to be satisfied at any of the remaining unsignalized study intersections under forecasted 2026 pass-through traffic volume conditions. Left turn lane warrant charts are included in the Appendix to this report.

2. Mitigation of 2026 Pass-Through Deficiencies

In order to determine the magnitude of improvements needed to mitigate capacity deficiencies caused by pass-through traffic, a capacity analysis was performed for all locations where substandard LOS was identified. The mitigation of deficiencies caused by pass-through traffic cannot be funded by impact fees. Substandard LOS is defined as less than the minimum preferred LOS D.

As described in Section D.1.a, no intersections are projected to operate at less than minimum preferred LOS during one or both peak hours. Capacity analysis for 2026 pass-through conditions is included in the Appendix to this report.

E. 2026 Projected New Development Traffic Volumes and Analysis

Article V-A of the MPC defines new development as any commercial, industrial or residential or other project which involves new construction, enlargement, reconstruction, redevelopment, relocation or structural alteration and which is expected to generate additional vehicular traffic within a transportation service area of a municipality. Impact fees can be used for the mitigation of deficiencies caused by new development.

1. 2026 New Development Traffic Volume Projections

The 2026 projected base new development traffic volume projections were determined assuming the mitigation described in Section B.4 to correct existing deficiencies as well as the mitigation described in Section D.2 to correct pass-through deficiencies.

These base new development traffic projections were then verified once the original mitigation was developed to correct deficiencies caused by new development traffic. These new projections included the capacity enhancements that impact the travel patterns and volumes derived for the base new traffic volume condition. The 2026 A.M. and P.M. peak hour traffic projections from new development are shown on **Exhibit 11**.

2. Analysis of 2026 Projected New Development Traffic Volumes

To determine deficiencies caused by new development traffic, an analysis of 2026 new development A.M. and P.M. peak hour volumes was performed using the A.M. and P.M. peak hour projected volumes shown on **Exhibit 11**. The analyses included an intersection capacity analysis, a signal warrant evaluation and a left turn lane warrant evaluation. Improvements identified to mitigate 2005 existing deficiencies in Section B.4 and to mitigate forecasted 2026 pass-through deficiencies identified in Section D.2 were assumed to be in place.

a. Intersection Capacity Analysis

A capacity analysis of the 2026 A.M. and P.M. peak hour new development traffic volumes was performed for all study intersections, both signalized and unsignalized, using the methodology in the *Highway Capacity Manual 2000*, published by the Transportation Research Board.

The results of the intersection capacity analysis are summarized on **Exhibit 12**. The following intersections are projected to operate below LOS D during one or both peak hours:

2026 NEW DEVELOPMENT CONDITIONS CAPACITY DEFICIENT INTERSECTIONS

INTERSECTION	PEAK HOUR LOS	
	A.M.	P.M.
Sardis Road and Saltsburg Road (S.R. 0286)	E	F
Sardis Road and School Road	F	F
Logan Ferry Road and Franklinton Court	C	F
Old William Penn Highway and Sardis Road	D	F
Old William Penn Highway and Tarr Hollow Road	E	F
Old William Penn Highway and Cline Hollow Road	C	F
Old William Penn Highway and Cozy Inn Cut-Off	B	F
Old William Penn Highway and Hills Church Road	F	F
Old William Penn Highway and Borland Farm Road	C	E
Saltsburg Road (S.R. 0286) and Logan Ferry Road/Old Logan Ferry Road	F	F

Source: Analysis by Trans Associates.

Detailed LOS summaries and capacity analysis are included in the Appendix to this report.

b. Signal Warrant Evaluation

In addition to a capacity analysis of study intersections, warrants for installation of traffic signals were evaluated at selected study intersections. The peak hour volumes shown on **Exhibit 11** at unsignalized intersections with significant peak hour volumes that did not satisfy warrant xi under either 2005 existing volume or 2026 pass-through volumes conditions were selected. The following table summarizes the findings.

**2026 NEW DEVELOPMENT CONDITIONS
SIGNAL WARRANT EVALUATION SUMMARY**

INTERSECTION	SATISFIES WARRANT xi CRITERIA?	
	A.M. PEAK HOUR	P.M. PEAK HOUR
Sardis Road and Saltsburg Road (S.R. 0286)	NO	YES
Sardis Road and School Road	YES	YES
Logan Ferry Road and Franklintown Court	NO	YES
Old William Penn Highway and Tarr Hollow Road	NO	YES
Old William Penn Highway and Cline Hollow Road	NO	YES
Old William Penn Highway and Cozy Inn Cut-Off	NO	YES
Old William Penn Highway and Hills Church Road	YES	YES
Old William Penn Highway and Borland Farm Road	NO	YES
Saltsburg Road (S.R. 0286) and Logan Ferry Road/Old Logan Ferry Road	NO	YES

Source: Analysis by Trans Associates.

Nine (9) additional intersections are projected to satisfy the peak hour volume warrant for signalization with 2026 new development traffic volumes.

c. Left Turn Lane Warrant Evaluation

Warrants for left turn lanes were evaluated at unsignalized intersections with significant peak hour volumes that did not satisfy warrants for the installation of traffic signal control under 2005 existing conditions or forecasted 2026 pass-through conditions using the criteria in the American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*. The following table summarizes the findings.

**2026 NEW DEVELOPMENT CONDITIONS
LEFT TURN LANE WARRANT EVALUATION SUMMARY**

INTERSECTION		MEETS LEFT TURN LANE WARRANT?	
MAJOR STREET/ DIRECTION	MINOR STREET	A.M. PEAK HOUR	P.M. PEAK HOUR
Sardis Road	Hills Church Road	NO	NO
Old William Penn Highway EB	Hills Church Road	NO	YES
Old William Penn Highway WB	West Pike Street	NO	YES
Old William Penn Highway WB	Borland Farm Road	NO	NO

Source: Analysis by Trans Associates.

2026 new development peak hour volumes warrant left turn lanes at one study intersection. Left turn lane warrant charts are included in the Appendix to this report.

3. Mitigation of 2026 New Development Deficiencies

In order to determine the magnitude of improvements needed to mitigate capacity deficiencies caused by new development traffic, a capacity analysis was performed for all locations where substandard LOS was identified. The mitigation of deficiencies caused by new development traffic are eligible to be funded by impact fees. Substandard LOS is defined as less than the minimum preferred LOS D.

As described in Section E.2.a, ten (10) intersections are projected to operate at less than minimum preferred LOS during one or both peak hours. These intersections were reanalyzed to develop mitigation that would result in LOS D or better. The following table presents the mitigation and resulting LOS:

**2026 NEW DEVELOPMENT CONDITIONS
POTENTIAL MITIGATION AND RESULTING LOS**

INTERSECTION	MITIGATION	MITIGATED PEAK HOUR LOS	
		A.M.	P.M.
Sardis Road and Saltsburg Road (S.R. 0286)	Install traffic signal	B	B
Sardis Road and School Road	Construct westbound left turn lane and Install traffic signal	C	D
Logan Ferry Road and Franklinton Court	Install traffic signal	B	C
Old William Penn Highway and Sardis Road (signalized)	Construct northbound right turn lane on Vincent Hall Road and southbound right turn lane on Sardis Road	D	D
Old William Penn Highway and Tarr Hollow Road	Install traffic signal	B	B
Old William Penn Highway and Cline Hollow Road	Install traffic signal	B	B
Old William Penn Highway and Cozy Inn Cut-Off	Install traffic signal	B	C
Old William Penn Highway and Hills Church Road	Construct eastbound and westbound left turn lanes on Old William Penn Highway and Install traffic signal	B	B

**2026 NEW DEVELOPMENT CONDITIONS
POTENTIAL MITIGATION AND RESULTING LOS (continued)**

INTERSECTION	MITIGATION	MITIGATED PEAK HOUR LOS	
		A.M.	P.M.
Old William Penn Highway and Borland Farm Road	Install traffic signal	B	B
Golden Mile Highway (S.R. 0286) and Logan Ferry Road/Old Logan Ferry Road	Install traffic signal	C	C

Source: Analysis by Trans Associates.

The mitigation is also shown graphically on **Exhibit 12**. Capacity analysis for 2026 new development conditions is included in the Appendix to this report.

F. Summary

1. Purpose

The purpose of the roadway sufficiency analysis is to establish the existing level of infrastructure sufficiency, preferred levels of service and the need for road improvements attributable to projected pass-through traffic and future new development.

2. Scope of Study

Twenty-four (24) intersections and six (6) roadway segments were studied within the Municipality of Murrysville. Data for the study was collected in October and November of 2003, and was supplemented by additional data collected following the completion of roadway construction along William Penn Highway (S.R. 0022) in February 2005.

3. Preferred Level of Service

The Impact Fee Advisory Committee established a minimum preferred level of service (LOS) of D for the Municipality of Murrysville.

4. Existing Conditions

Six intersections currently operate at a LOS below D as follows:

- Logan Ferry Road and Shangri-La Drive
- Sardis Road and Logan Ferry Road
- Old William Penn Highway and Sardis Road
- Old William Penn Highway and Tarr Hollow Road
- Old William Penn Highway and School Road
- School Road and North Hills Road

Mitigation needed to correct existing deficiencies cannot be funded by impact fees.

5. Traffic Projections

Traffic projections were derived for the year 2026. Travel demand model *TransCAD* was calibrated with existing volumes, added volumes generated by future development based on approved Land Use Assumptions Report.

One (1) Transportation Service Areas (TSA) was established for determination of pass-through traffic. Pass-through trips have both an origin and a destination outside of a TSA.

6. 2026 Pass-Through Traffic Analysis

No intersections are forecasted to operate at a LOS below D. This assumes mitigation is implemented to correct existing deficiencies.

Mitigation needed to correct deficiencies caused by pass-through traffic cannot be funded by impact fees.

7. 2026 New Development Traffic Analysis

Ten (10) intersections are forecasted to operate at a LOS below D as follows:

- Saltsburg Road (S.R. 0286) and Sardis Road
- Sardis Road and School Road
- Logan Ferry Road and Franklinton Court
- Old William Penn Highway and Sardis Road
- Old William Penn Highway and Tarr Hollow Road
- Old William Penn Highway and Cline Hollow Road
- Old William Penn Highway and Cozy Inn Cut-Off
- Old William Penn Highway and Hills Church Road
- Old William Penn Highway and Borland Farm Road
- Golden Mile Highway (S.R. 0286) and Logan Ferry Road/Old Logan Ferry Road

This assumes mitigation is implemented to correct existing and pass-through deficiencies.

Mitigation to correct deficiencies caused by new development traffic can be funded through impact fees.

8. Next Steps

Upon adoption of the roadway sufficiency analysis by the Council, the findings herewith will be used to develop a transportation capital improvements plan.

File 03071-murry00/