

Pennsylvania Act 209 Transportation Impact Fee Study

Lower Providence Township Roadway Sufficiency Analysis and Transportation Capital Improvements Plan



**Prepared for:
Lower Providence Township,
Montgomery County,
Pennsylvania**

May 2009



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Introduction

This *Roadway Sufficiency Analysis and Transportation Capital Improvements Plan* has been prepared in accordance with the requirements set forth in Pennsylvania Act 209 on behalf of Lower Providence Township, Montgomery County, Pennsylvania. Pennsylvania Act 209 was signed into law effective December 19, 1990. It amends the Pennsylvania Municipalities Code (Act 247 of 1968, as amended) to permit municipalities to assess transportation impact fees on new development within their boundaries provided that they have adopted a municipal transportation impact fee ordinance in accordance with the procedures set forth in the Act.

Impact fees under Act 209, with only one exception contained in Act 68 amendments to the Municipalities Planning Code (2000), may only be used for those costs incurred for improvements designated in the adopted transportation capital improvements plan of the municipality that are attributable to new development. The impact fees cannot be used for municipal, non-transportation related capital improvements; for the repair, maintenance, or operation of existing or new municipal transportation capital improvements; or for the upgrade or replacement of existing municipal transportation capital improvements due to operational or safety deficiencies not related to new development. The Act specifically and only applies to off-site transportation capital improvements attributable to new development; it neither applies to, nor restricts, the procedures or powers of the municipality to require on-site transportation improvements to remedy impacts of new development, nor is it intended to replace the municipality's ordinance requirements for submission of traffic impact studies.

Without the adoption of this Ordinance, permitted by the Act 209 Law, a municipality does not have the power to require, as a condition for approval of a land development or subdivision application, the construction, dedication, or payment of any offsite improvements or capital expenditures.

All appendices supporting the *Roadway Sufficiency Analysis and Transportation Capital Improvements Plan* referred to in this report are contained in a separate bound document entitled *Pennsylvania Act 209 Transportation Impact Fee Study Technical Appendices*, Lower Providence Township, Montgomery County, dated December 2008.

Process

The process that Lower Providence Township has undertaken includes the completion of the necessary milestones pursuant to the Act 209 legislation, as follows:

1. Appointment of a Transportation Advisory Committee and designation of the geographic areas of the municipality that will be subject to the transportation impact fee ordinance. Meeting minutes prepared by the Transportation Advisory Committee are included in **Appendix A**.

2. Development and adoption of a land use assumptions report for the Township and its designated geographic areas, called Transportation Service Areas (TSA), which together with existing development, are the subject of the roadway sufficiency analysis and development of a transportation capital improvements plan.
3. Completion and approval of a roadway sufficiency analysis for the Transportation Service Areas, identifying traffic deficiencies and needed improvements attributable to existing traffic, future traffic not originating from the service areas (i.e., pass-through traffic), and future traffic originating from new development within the service areas based on preferred levels of service (desired traffic operations) for the designated peak hour of study.
4. Development and adoption of a transportation capital improvements plan, including costs, implementation priorities, and funding sources, specifically and separately addressing improvements required to remedy:
 - a. current traffic deficiencies resulting from **existing** traffic volumes and capacity limitations;
 - b. traffic deficiencies attributable to future **pass-through** traffic after existing deficiencies have been addressed; and
 - c. traffic deficiencies attributable to expected **new development** within the service area after pass-through and existing traffic deficiencies have been addressed.
5. Adoption of a Transportation Impact Fee Ordinance based on the total cost of identified transportation improvements attributable to new development within the Transportation Service Areas, to be assessed on a "per trip" basis.

Act 209 requires a minimum future planning horizon of five years. In order to be consistent with the future horizon year of the Land Use Assumptions Report, the future year 2016 was selected as the design year of this study. However, this document should not be considered a static, "one-time" effort, as the Act 209 legislation has provisions for periodic updates of the roadway sufficiency analysis, capital improvements plan, and impact fees, as changes in the land use assumptions, transportation improvement needs, or funding conditions occur.

As the law allows for the periodic update of the impact fees, it is recommended that the Transportation Advisory Committee continue to meet periodically and make recommendations to the Board of Supervisors, as necessary, to update the Capital Improvements Plan (CIP) or impact fees based on the following:

1. New subsequent development that has occurred in the Township.
2. Capital improvements, listed in the CIP, which have been constructed.

3. Unavoidable delays in construction of the improvements listed in the CIP that are outside the control or responsibility of the Township.
4. Significant changes in the land use assumptions.
5. Significant changes in the estimated costs of the improvements listed in the CIP.
6. Significant changes in the projected revenues from all sources listed, needed for the construction of the improvements listed in the CIP.

Transportation Service Areas

Act 209 requires the establishment of specific study boundaries, or transportation service areas, for evaluation and application of transportation impact fees. By law, each transportation service area is required to be completely contiguous, and is limited to a maximum size of seven square miles. Moreover, traffic impact fees for each transportation service area are applicable only to development located within that respective service area, and therefore, development traffic from one service area is considered pass-through traffic within the other service areas. Further explanation of pass-through and development traffic will be provided in subsequent sections.

As illustrated in **Figure 1**, the Transportation Advisory Committee has established two transportation service areas within Lower Providence Township in accordance with the requirements of Act 209, which cover the most developable areas of the Township. Each of the transportation service areas measures equal to or less than the maximum seven square miles required by the Act 209 legislation.

Transportation Service Area 1

As illustrated in Figure 1, Transportation Service Area 1 generally includes the area of the Township north of Audubon Road, to the west of Rittenhouse Road, and north of Egypt Road, to the east of Rittenhouse Road. The area includes the following 24 study intersections, which are listed in **Table 1**.

Table 1. Transportation Service Area 1 Study Intersections

Reference Number	Intersection	Existing Traffic Control
1	Shannondell Connector and Park Avenue (S.R. 4004)	N/A
2	River Road and Germantown Pike	Stop Sign
3	Cross Keys Road and Germantown Pike	Stop Sign
4	Grange Avenue and Germantown Pike	Stop Sign
5	Cross Keys Road and Ridge Pike (S.R. 4031)	Stop Sign
6	Evansburg Road and Ridge Pike (S.R. 4031)	Signal
7	Grange Avenue and Ridge Pike (S.R. 4031)	Stop Sign
8	Smith Road and Ridge Pike (S.R. 4031)	Stop Sign
9	Park Lane Drive/Eagleville Road (S.R. 4006) and Ridge Pike (S.R. 4031)	Signal
10	East Mount Kirk Avenue and Ridge Pike (S.R. 4031)	Signal
11	Church Road and Ridge Pike (S.R. 4031)	Stop Sign
12	Sunnyside Avenue and Ridge Pike (S.R. 4031)	Stop Sign
13	Park Avenue (S.R. 4004/0363) and Ridge Pike (S.R. 4031/0363)	Signal
14	Trooper Road (S.R. 0363) and Ridge Pike (S.R. 0363)	Signal
15	Level Road and Arcola Road	Stop Sign
16	Eagleville Road (S.R. 4006) and Arcola Road	Stop Sign
17	Pinetown Road and Egypt Road (S.R. 4002)	Stop Sign

MAP FIGURE PROVIDED FROM
 LOWER PROVIDENCE TOWNSHIP
 LAND USE ASSUMPTIONS REPORT
 COMPLETED BY THE MONTGOMERY
 COUNTY PLANNING COMMISSION

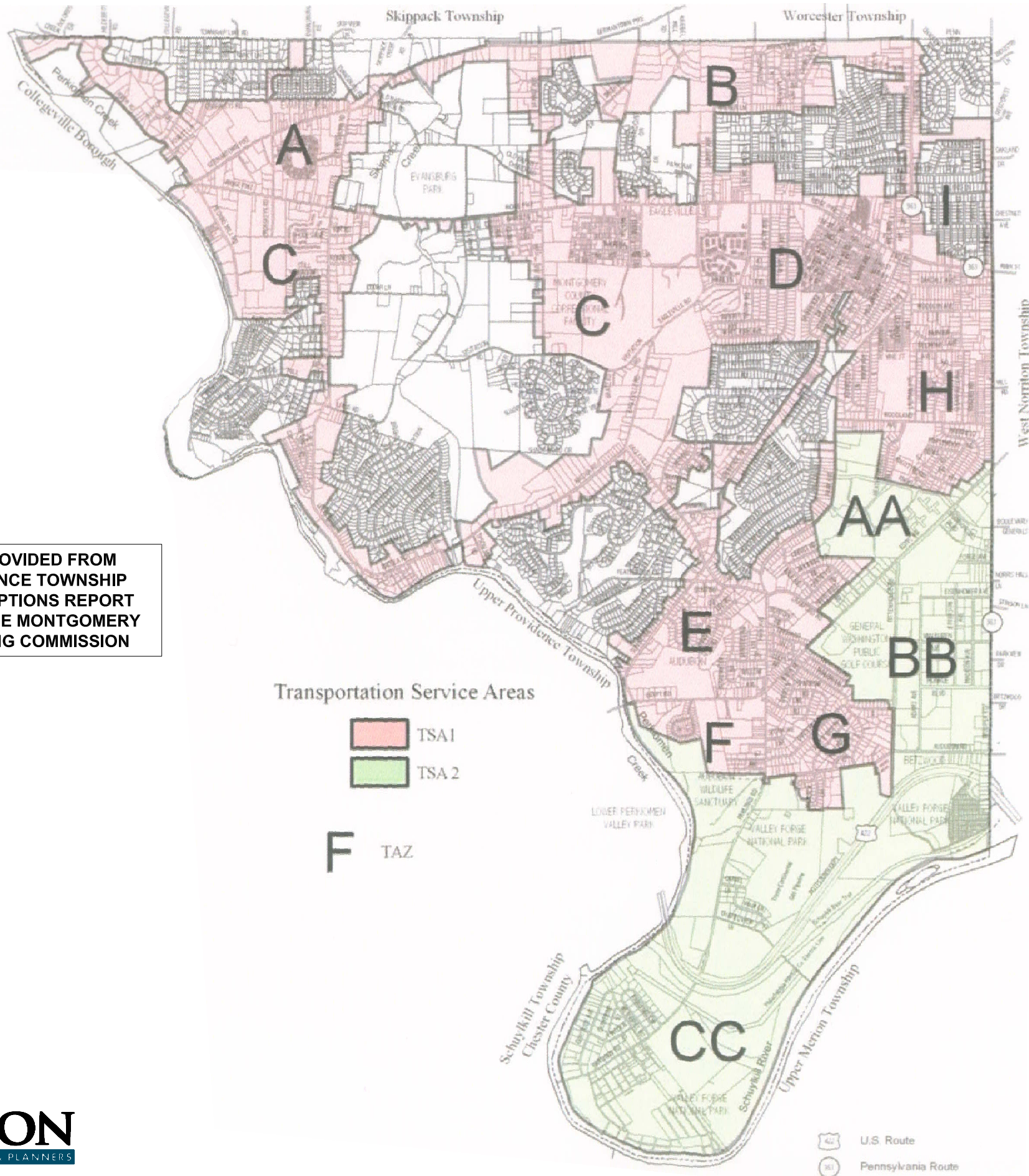


FIGURE 1
 Transportation Service Areas
ROADWAY
SUFFICIENCY ANALYSIS
 LOWER PROVIDENCE TOWNSHIP
 MONTGOMERY COUNTY, PA

18	Eagleville Road (S.R. 4006) and Pinetown Road/Sunnyside Avenue	Stop Sign
19	Park Avenue (S.R. 4004) and Woodland Avenue	Stop Sign
20	Park Avenue (S.R. 4004) and Eagleville Road (S.R. 4006)	Stop Sign
21	Park Avenue (S.R. 4004) and Crawford Road	Stop Sign
22	Park Avenue/Pawlings Road (S.R. 4004) and Egypt Road (S.R. 4002)	Signal
23	Crawford Road and Egypt Road (S.R. 4002)	Signal
35	Evansburg Road and Germantown Pike	Signal

Transportation Service Area 2

As illustrated in Figure 1, Transportation Service Area 2 generally includes the area of the Township south of Audubon Road, to the west of Rittenhouse Road, and south of Egypt Road, to the east of Rittenhouse Road. The 13 study intersections included in this service area are listed in **Table 2**.

Table 2. Transportation Service Area 2 Study Intersections

Reference Number	Intersection	Existing Traffic Control
24	Rittenhouse Road and Egypt Road (S.R. 4002)	Signal
25	Trooper Road (S.R. 0363) and Egypt Road (S.R. 4002)	Signal
26	Trooper Road (S.R. 0363) and Boulevard of the Generals	Signal
27	Trooper Road (S.R. 0363) and Forge Road	Stop Sign
28	Trooper Road (S.R. 0363) and Eisenhower Avenue	Stop Sign
29	Trooper Road (S.R. 0363) and Van Buren Avenue	Signal
30	Trooper Road (S.R. 0363) and Monroe Boulevard	Stop Sign
31	Pawlings Road (S.R. 4004) and Audubon Road (S.R. 4041)	Signal
32	Rittenhouse Road and Audubon Road (S.R. 4041)	Stop Sign
33	Adams Avenue and Audubon Road (S.R. 4041)	Signal
34	Trooper Road (S.R. 0363) and Audubon Road (S.R. 4041)	Signal
36	Trooper Road (S.R. 0363) and Norris Hall Lane	Signal
37	Shannondell Boulevard and Egypt Road (S.R. 4002)	Signal

Land Use Assumptions Report

As required by Act 209, the Lower Providence Township Transportation Advisory Committee approved the Lower Providence Township *Land Use Assumptions Report (LUAR)* (dated 2008), which was prepared and completed by the Montgomery County Planning Commission, and a public hearing was held on the LUAR on August 27, 2008. Subsequently, the Board of Supervisors adopted the *Land Use Assumptions Report* by resolution, as required by Act 209, on September 18, 2008. A copy of the *Land Use Assumptions Report*, and the resolution drafted by the Township to accept it, are provided in **Appendix B**.

The *Land Use Assumptions Report* identifies the anticipated development build-out potential within Lower Providence Township, as well as the projected 2016 build-out on an area-by-area basis, and provides graphics illustrating the potential locations of these parcels. The projected 2016 build-out within each Transportation Service Area, which is the basis of this analysis, is summarized below in **Table 3**.

Table 3. Land Use Assumptions Report 2016 Build-Out Summary

Land Use Classification	Service Area 1	Service Area 2
Residential	271 dwelling units	41 dwelling units
Non-Residential	247,824 square feet	656,949 square feet

Existing Transportation Network

This section includes a designation of the roadways and intersections selected to be evaluated as part of this *Roadway Sufficiency Analysis*, as well as an inventory of physical and operational characteristics of the existing Township transportation system, required for the completion of the *Roadway Sufficiency Analysis*.

Roadway Characteristics

The Lower Providence Township roadway system, as illustrated in **Figure 2**, consists primarily of two-lane, undivided roadways. Additionally illustrated in Figure 2 is the existing Average Daily Traffic (ADT) volumes collected on several of the main roadways entering, within, and exiting the Township. Major regional access to/from the Township is provided via Germantown Pike, Ridge Pike (S.R. 4031/0363), Egypt Road (S.R. 4002) and Trooper Road (S.R. 0363).

The roadway network shown in Figure 2, including both roadway segments and intersections, constitutes the transportation roadway network analyzed pursuant to Act 209. The designations and operating characteristics of each of the major study roadways are summarized in **Table 4**.

Table 4. Existing Transportation Network Summary

Roadway	Classification	Ownership	Posted Speed Limit (mph)
Germantown Pike	Primary Arterial	County	35
Ridge Pike (S.R. 4031/0363)	Primary Arterial	State	40
Arcola Road	Feeder Road	Township	25
Crawford Road	Feeder Road	Township	35
Woodland Road	Feeder Road	Township	30
Egypt Road (S.R. 4002)	Primary Arterial	State	35 to 45
Shannondell Boulevard	Collector Road	Township	25
Forge Road	Feeder Road	Township	25
Norris Hall Lane	Feeder Road	Township	25
Eisenhower Avenue	Feeder Road	Township	35
Van Buren Avenue	Feeder Road	Township	35
Monroe Boulevard	Feeder Road	Township	35
Audubon Road (S.R. 4041)	Collector Road	State	35
River Road (S.R. 4009)	Feeder Road	State	35
Cross Keys Road	Feeder Road	Township	30
Evansburg Road (S.R. 4008)	Collector Road	State	35

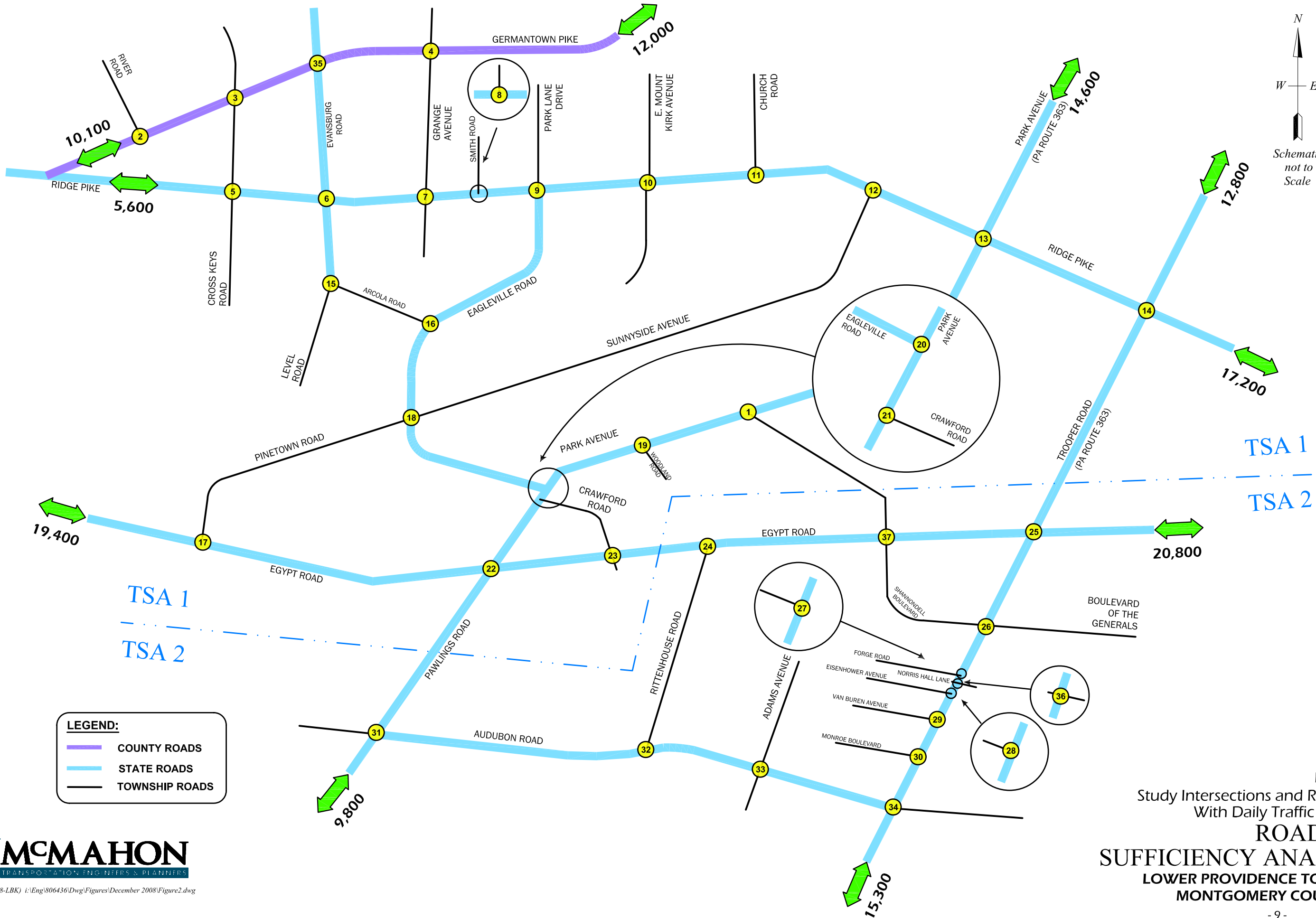


FIGURE 2
 Study Intersections and Roadways
 With Daily Traffic Volumes
ROADWAY
SUFFICIENCY ANALYSIS
LOWER PROVIDENCE TOWNSHIP
MONTGOMERY COUNTY, PA



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Table 4. Existing Transportation Network Summary (continued)

Roadway	Classification	Ownership	Posted Speed Limit (mph)
Grange Avenue	Feeder Road	Township	25
Smith Road	Feeder Road	Township	25
Park Lane Drive	Feeder Road	Township	15
Level Road	Feeder Road	Township	45
Eagleville Road (S.R. 4006)	Collector Road	State	40
East Mount Kirk Avenue	Collector Road	Township	35
Eagle Stream Drive	Feeder Road	Township	35
Church Road	Feeder Road	Township	25
Sunnyside Avenue	Collector Road	Township	35
Pinetown Road (S.R. 4004)	Collector Road	Township	25
Park Avenue (S.R. 4004/0363)	Primary Arterial	State	35
Trooper Road (S.R. 0363/3002)	Primary Arterial	State	45
Pawlins Road (S.R. 4004)	Collector Road	State	40
Rittenhouse Road	Collector Road	Township	35 to 45
Adams Avenue	Collector Road	Township	25

Existing Transportation Conditions

The evaluation of the existing transportation network is based on the physical (i.e., intersection geometry, lane usage, etc.) and operational (i.e., traffic controls, traffic volumes, signal timing/phasing, etc.) characteristics of the study intersections and roadways during the weekday afternoon peak hour. The Transportation Advisory Committee selected the weekday afternoon peak hour as the basis of this *Roadway Sufficiency Analysis*.

Existing Traffic Volumes

Traffic operating conditions are influenced by the relationships between traffic volumes and the service capacities of the roadways and intersections. In order to evaluate existing conditions at area intersections, Manual Turning Movement (MTM) counts were conducted at 36 of the 37 study intersections listed in Tables 1 and 2 during the weekday afternoon peak period (4:00 PM to 6:00 PM). One intersection does not exist, and is expected to be created by the proposed extension of Shannodell Boulevard to Park Avenue. The counts were conducted on a typical Tuesday, Wednesday, or Thursday from 2005 to 2007. To reflect existing 2007 conditions, older counts were adjusted upwards accordingly. This traffic count/volume data should be considered the baseline by the Township for determining new developments' or redevelopments' effects on the study roadway network, based upon the vacancy/occupancy levels of each property at the time of the study. These traffic counts were tabulated by 15-minute periods to establish the four highest consecutive 15-minute periods, which constitute the weekday afternoon peak hour, and serve as the basis for this analysis. **Figure 3** illustrates the 2007 existing weekday afternoon peak hour traffic volumes at the study area intersections. The actual MTM counts are provided in **Appendix C**.

Analysis Methodology

The traffic volumes depicted in **Figure 3** were subjected to detailed capacity/level-of-service analysis in accordance with the standard techniques contained in the *Highway Capacity Manual*⁽¹⁾. These standard capacity/level-of-service analysis techniques, which calculate total control delay, are more thoroughly described in **Appendix D** for both signalized and unsignalized intersections, as well as the correlation between average total control delay and the respective levels of service (LOS) for each intersection type. Level of service (LOS) is the criteria utilized to evaluate the study intersections and roadways in accordance with standard traffic engineering practice and the Act 209 legislation. In the surrounding area, PennDOT District 6-0, as well as many local municipalities, considers LOS A through D as constituting acceptable operating conditions, while LOS E represents conditions approaching capacity, and LOS F indicates that traffic volumes exceed available capacity.

⁽¹⁾ *Transportation Research Board, Special Report 209, Highway Capacity Manual, published by the Transportation Research Board, Washington, DC, 2000.*

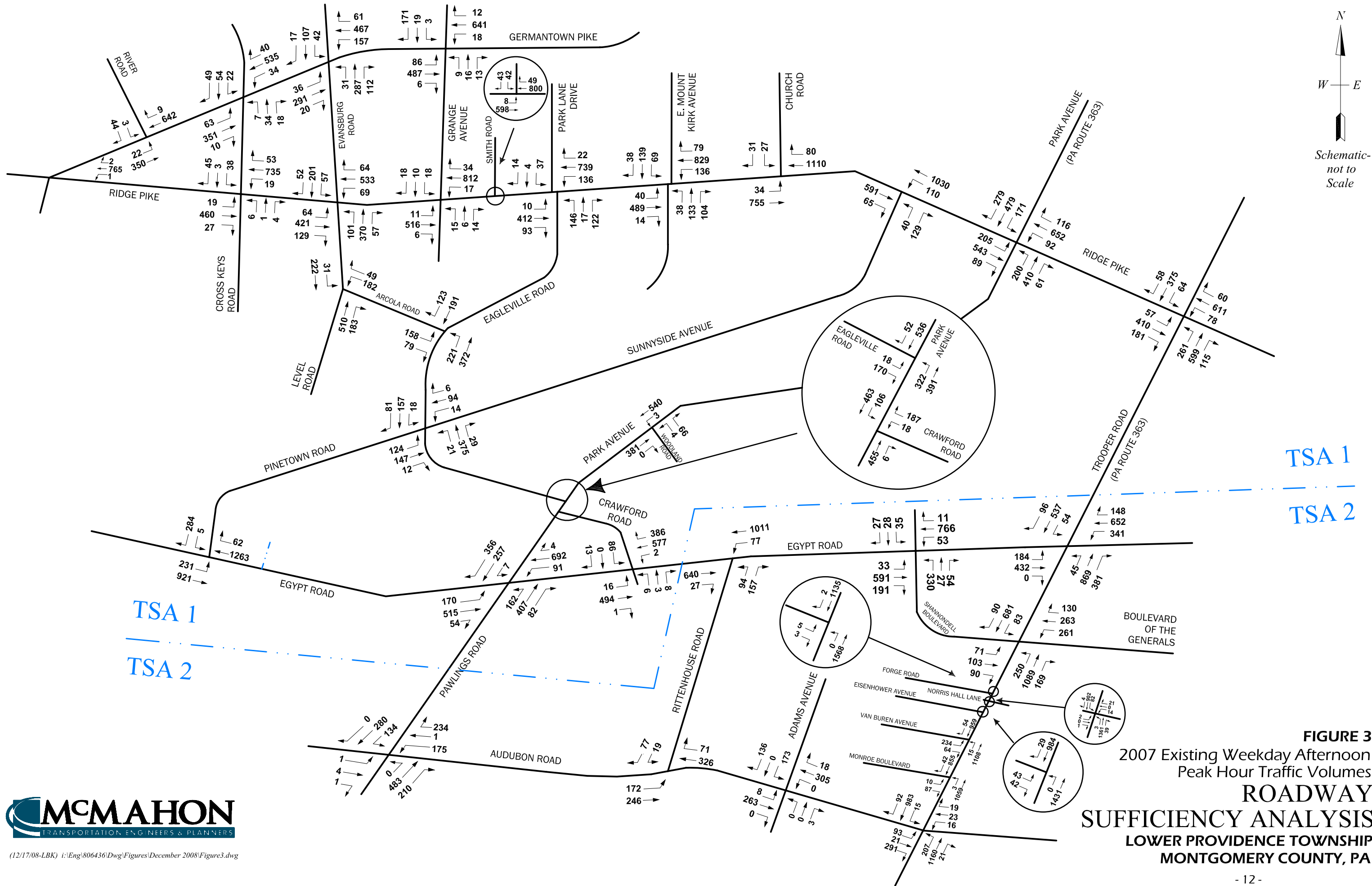


FIGURE 3
 2007 Existing Weekday Afternoon
 Peak Hour Traffic Volumes
ROADWAY
SUFFICIENCY ANALYSIS
 LOWER PROVIDENCE TOWNSHIP
 MONTGOMERY COUNTY, PA

Preferred Levels of Service

Consistent with the Act 209 legislation, the Transportation Advisory Committee has adopted preferred levels of service for the intersections studied. The preferred level of service is considered the operational design standard by which each study intersection and roadway segment must operate under existing conditions, future pass-through conditions, and future development conditions in this *Roadway Sufficiency Analysis*. Deficient (worsened) operations that do not satisfy the preferred levels of service at the study intersections must be improved for each condition.

According to Act 209, the preferred level of service may be waived by the municipality at individual intersections based upon difficulty in implementing various improvements (i.e., geometric design limitations, topographic limitations, or unavailable/unobtainable necessary right-of-way). For unsignalized intersections where the preferred level-of-service criterion is not satisfied, most often only signalization can mitigate the traffic deficiency. Where traffic volumes do not meet traffic signal warrant criteria, these intersections cannot be improved and the improvement must be waived or deferred until traffic volumes warrant signalization.

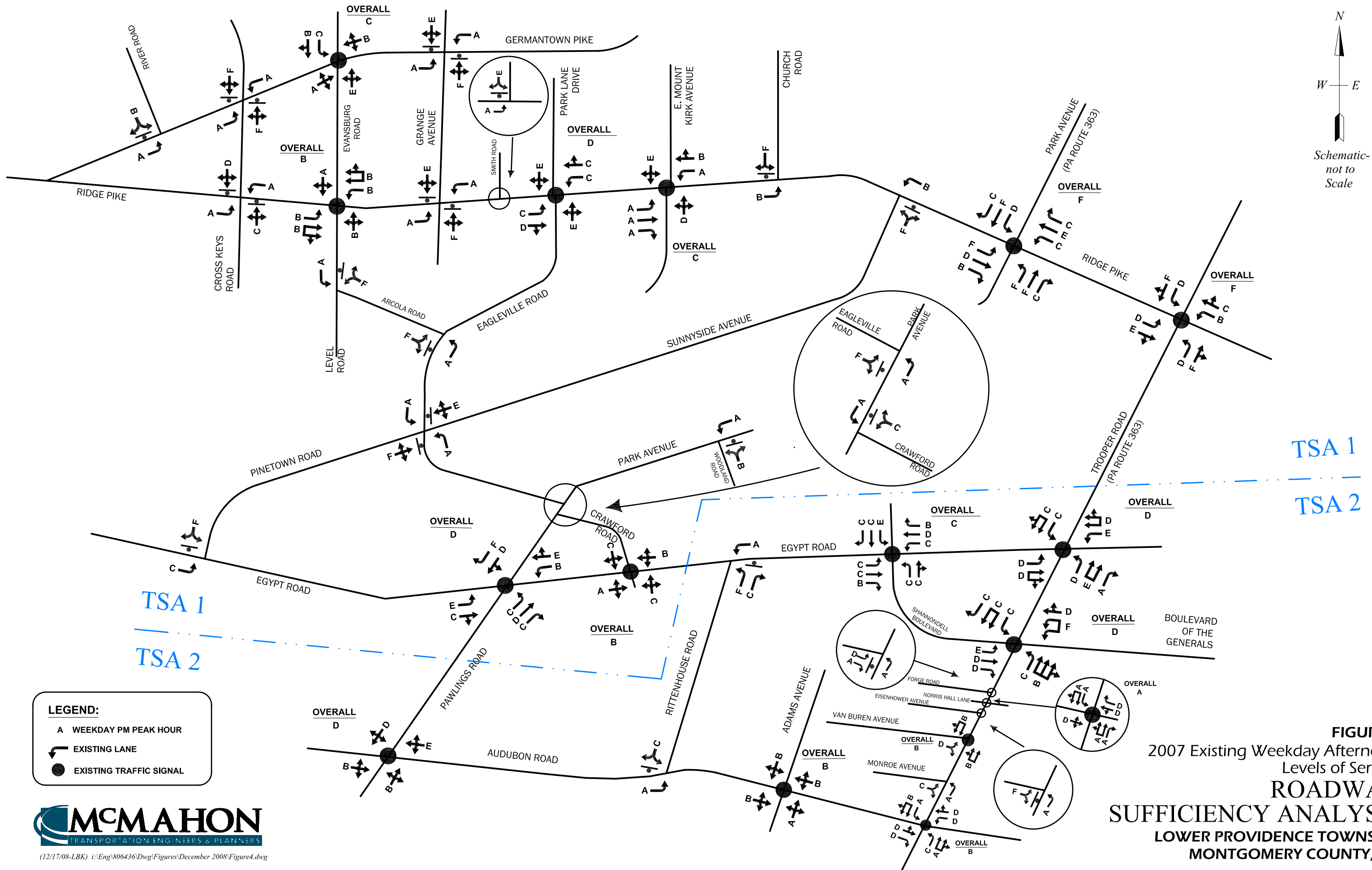
As shown in **Table 5**, the Transportation Advisory Committee has adopted specific preferred level-of-service criteria for the purposes of this *Roadway Sufficiency Analysis* for each of the Transportation Service Areas. For signalized intersections, the preferred levels of service apply to the individual movements, as well as the overall intersection operation. For unsignalized intersections, the preferred levels of service apply only to the main street left-turn movements and the minor street, stop-controlled movements. The preferred levels of service were established based on a review of typical acceptable thresholds utilized by PennDOT and other adjacent municipalities, and also reflect the urban/suburban character of each Transportation Service Area.

Table 5. Preferred Level-of-Service Criteria

Intersection	TSA 1	TSA 2
Signalized	LOS E all movements LOS D overall	LOS E all movements LOS D overall
Unsignalized	LOS D all movements	LOS D all movements

Existing Levels of Service

The 2007 existing weekday afternoon peak hour traffic volumes presented in Figure 3 were subjected to the detailed capacity/level-of-service analysis methodology previously described. The results of the analysis are illustrated in **Figure 4**, and the detailed capacity/level-of-service analysis worksheets are contained in **Appendix E**.



LEGEND:
 A WEEKDAY PM PEAK HOUR
 ↪ EXISTING LANE
 ● EXISTING TRAFFIC SIGNAL

N
 W — E
 Schematic - not to Scale

FIGURE 4
 2007 Existing Weekday Afternoon
 Levels of Service
ROADWAY
SUFFICIENCY ANALYSIS
 LOWER PROVIDENCE TOWNSHIP
 MONTGOMERY COUNTY, PA

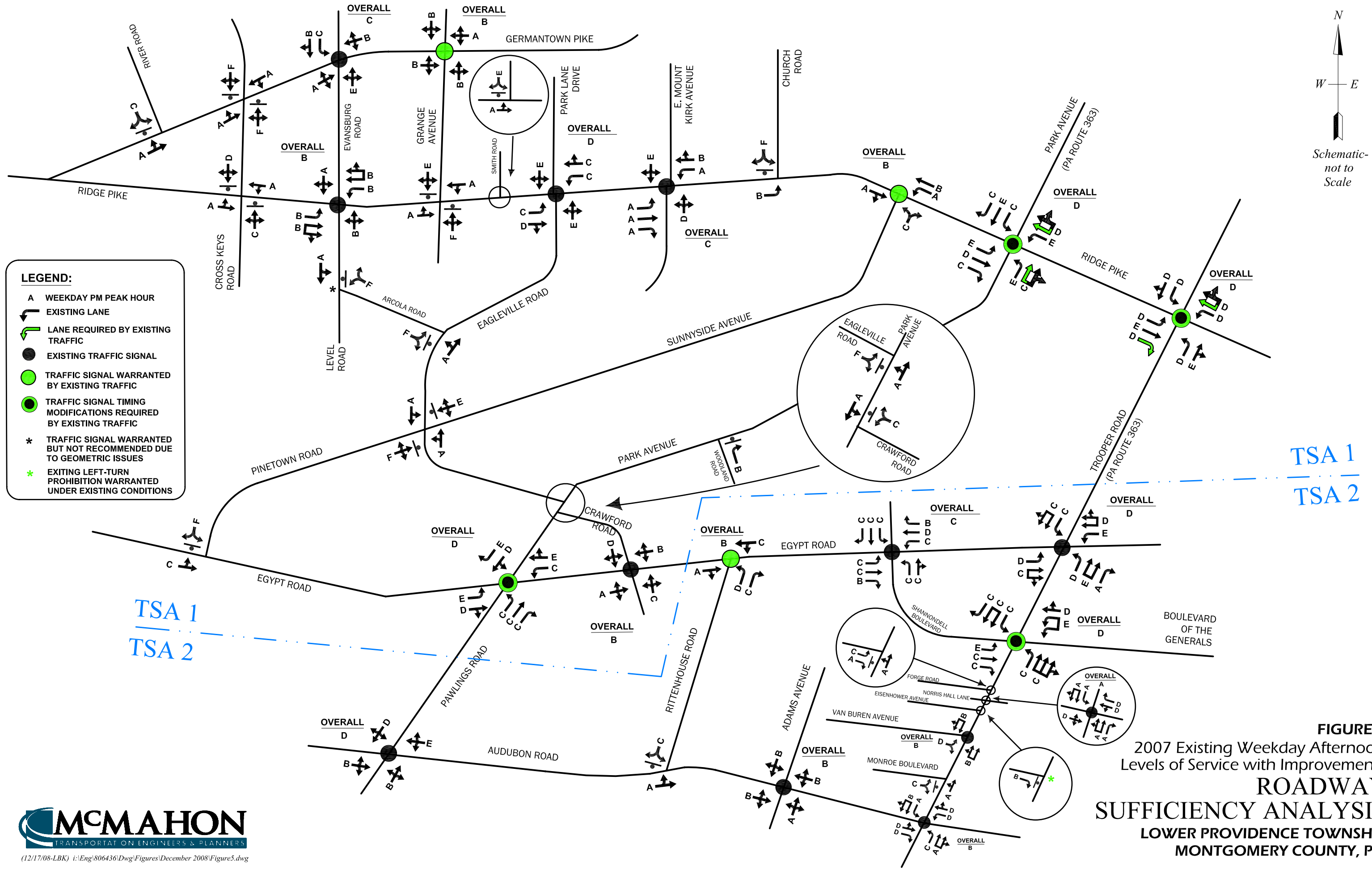
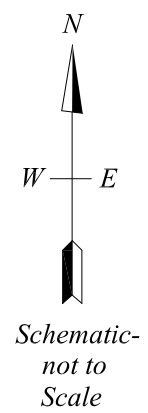
As shown in Figure 4, of the 36 existing study intersections, 19 presently operate at acceptable levels of service during the weekday afternoon peak hour, in accordance with the preferred level-of-service criteria contained in Table 5. The following 17 intersections currently do not satisfy the preferred level-of-service criteria:

- **Transportation Service Area 1**
 - Cross Keys Road and Germantown Pike
 - Grange Avenue and Germantown Pike
 - Grange Avenue and Ridge Pike (S.R. 4031)
 - Smith Road and Ridge Pike (S.R. 4031)
 - Church Road and Ridge Pike (S.R. 4031)
 - Sunnyside Avenue and Ridge Pike (S.R. 4031)
 - Park Avenue (S.R. 4004/0363) and Ridge Pike (S.R. 4031/0363)
 - Trooper Road (S.R. 0363) and Ridge Pike (S.R. 0363)
 - Level Road & Arcola Road
 - Eagleville Road (S.R. 4006) and Arcola Road
 - Pinetown Road and Egypt Road (S.R. 4002)
 - Eagleville Road (S.R. 4006) and Pinetown Road/Sunnyside Avenue
 - Park Avenue (S.R. 4004) and Eagleville Road (S.R. 4006)
 - Park Avenue/Pawlings Road (S.R. 4004) and Egypt Road (S.R. 4002)

- **Transportation Service Area 2**
 - Rittenhouse Road and Egypt Road (S.R. 4002)
 - Trooper Road (S.R. 0363) and Boulevard of the Generals
 - Trooper Road (S.R. 0363) and Eisenhower Avenue

Existing Improvement Program

The improvements necessary to mitigate existing traffic deficiencies and satisfy the preferred level-of-service criteria are illustrated in **Figure 5** and summarized in **Table 6** for each study intersection. Improvements will be required, and are feasible, at eight study intersections in order to achieve the preferred levels of service under existing traffic conditions. The nine additional unsignalized intersections do not satisfy the preferred level-of-service criteria. However, existing afternoon peak hour traffic volumes do not meet warrants for traffic signal installation in accordance with PennDOT guidelines; no other reasonable improvements are feasible. Therefore, the improvements at these intersections must be deferred.



- LEGEND:**
- A WEEKDAY PM PEAK HOUR
 - EXISTING LANE
 - LANE REQUIRED BY EXISTING TRAFFIC
 - EXISTING TRAFFIC SIGNAL
 - TRAFFIC SIGNAL WARRANTED BY EXISTING TRAFFIC
 - TRAFFIC SIGNAL TIMING MODIFICATIONS REQUIRED BY EXISTING TRAFFIC
 - * TRAFFIC SIGNAL WARRANTED BUT NOT RECOMMENDED DUE TO GEOMETRIC ISSUES
 - * EXITING LEFT-TURN PROHIBITION WARRANTED UNDER EXISTING CONDITIONS

FIGURE 5
 2007 Existing Weekday Afternoon
 Levels of Service with Improvements
ROADWAY SUFFICIENCY ANALYSIS
 LOWER PROVIDENCE TOWNSHIP
 MONTGOMERY COUNTY, PA

Table 6 - Existing Conditions Improvements Program for Study Intersections

Int No.	Intersection	Service Area	Control Type	Recommended Improvement
1	Shannondell Connector and Park Avenue (S.R. 4004)	1	N/A	--
2	River Road and Germantown Pike	1	Stop Sign	No improvements recommended or required.
3	Cross Keys Road and Germantown Pike	1	Stop Sign	No improvements recommended or required as signal is not warranted.
4	Grange Avenue and Germantown Pike	1	Stop Sign	Install new traffic signal.
5	Cross Keys Road and Ridge Pike (S.R. 4031)	1	Stop Sign	No improvements recommended or required.
6	Evansburg Road and Ridge Pike (S.R. 4031)	1	Signal	No improvements recommended or required.
7	Grange Avenue and Ridge Pike (S.R. 4031)	1	Stop Sign	No improvements recommended or required as signal is not warranted.
8	Smith Road and Ridge Pike (S.R. 4031)	1	Stop Sign	No improvements recommended or required as signal is not warranted.
9	Park Lane Drive/Eagleville Road (S.R. 4006) and Ridge Pike (S.R. 4031)	1	Signal	No improvements recommended or required.
10	East Mount Kirk Avenue and Ridge Pike (S.R. 4031)	1	Signal	No improvements recommended or required.
11	Church Road and Ridge Pike (S.R. 4031)	1	Stop Sign	No improvements recommended or required as signal is not warranted.
12	Sunnyside Avenue and Ridge Pike (S.R. 4031)	1	Stop Sign	Install new traffic signal.
13	Park Avenue (S.R. 4004/0363) and Ridge Pike (S.R. 4031/0363)	1	Signal	Install additional WB through lane on Ridge Pike and install additional NB through lane on Park Ave. Modify signal timings.
14	Trooper Road (S.R. 0363) and Ridge Pike (S.R. 0363)	1	Signal	Install additional WB through lane on Ridge Pike and install additional EB right lane on Ridge Pike. Modify signal timings.
15	Level Road and Arcola Road	1	Stop Sign	No improvements recommended or required as signal is not recommended due to geometric issues.
16	Eagleville Road (S.R. 4006) and Arcola Road	1	Stop Sign	No improvements recommended or required as signal is not warranted.
17	Pinetown Road and Egypt Road (S.R. 4002)	1	Stop Sign	No improvements recommended or required as signal is not warranted.
18	Eagleville Road (S.R. 4006) and Pinetown Road/Sunnyside Avenue	1	Stop Sign	No improvements recommended or required as signal is not warranted.
19	Park Avenue (S.R. 4004) and Woodland Avenue	1	Stop Sign	No improvements recommended or required.
20	Park Avenue (S.R. 4004) and Eagleville Road (S.R. 4006)	1	Stop Sign	No improvements recommended or required as signal is not warranted.
21	Park Avenue (S.R. 4004) and Crawford Road	1	Stop Sign	No improvements recommended or required.
22	Park Avenue/Pawlings Road (S.R. 4004) and Egypt Road (S.R. 4002)	1	Signal	Modify signal timings.
23	Crawford Road and Egypt Road (S.R. 4002)	1	Signal	No improvements recommended or required.
24	Rittenhouse Road and Egypt Road (S.R. 4002)	2	Signal	Install new traffic signal.
25	Trooper Road (S.R. 0363) and Egypt Road (S.R. 4002)	2	Signal	No improvements recommended or required.
26	Trooper Road (S.R. 0363) and Boulevard of the Generals	2	Signal	Modify signal timings.
27	Trooper Road (S.R. 0363) and Forge Road	2	Stop Sign	No improvements recommended or required.
28	Trooper Road (S.R. 0363) and Eisenhower Avenue	2	Stop Sign	Convert Eisenhower Avenue to right-out-only condition.
29	Trooper Road (S.R. 0363) and Van Buren	2	Signal	No improvements recommended or required.
30	Trooper Road (S.R. 0363) and Monroe Boulevard	2	Stop Sign	No improvements recommended or required.
31	Pawlings Road (S.R. 4004) and Audubon Road (S.R. 4041)	2	Signal	No improvements recommended or required.
32	Rittenhouse Road and Audubon Road (S.R. 4041)	2	Stop Sign	No improvements recommended or required.
33	Adams Avenue and Audubon Road (S.R. 4041)	2	Signal	No improvements recommended or required.
34	Trooper Road (S.R. 0363) and Audubon Road (S.R. 4041)	2	Signal	No improvements recommended or required.
35	Evansburg Road and Germantown Pike	1	Signal	No improvements recommended or required.
36	Trooper Road (S.R. 0363) and Norris Hall Lane	2	Signal	No improvements recommended or required.
37	Shannondell Boulevard and Egypt Road (S.R. 4002)	2	Signal	No improvements recommended or required.

Future Transportation Conditions

Act 209 requires a minimum five-year future time horizon for the development of the *Transportation Capital Improvements Plan* and *Transportation Impact Fee Ordinance*. An eight-year time frame was selected by consensus of the Transportation Advisory Committee for the Lower Providence Township Act 209 traffic analysis, which is consistent with the development projections contained in the *Land Use Assumptions Report*. Therefore, a future forecast year of 2016 was utilized in the study.

Future Traffic Components

Traffic volume forecasts for 2016 include three components: existing traffic, pass-through traffic, and development traffic. The first component, **existing traffic**, was described in the previous section. The second component of future traffic projections is **pass-through traffic**, which reflects future increases in regional traffic, and is subdivided into the following two elements:

- This first element reflects future increases in regional traffic which is both generated by, and destined to, locations external to the designated transportation service areas, but passes through the designated service areas along the study area roadways. This first element of pass-through traffic also includes traffic generated by specific known future developments located within the adjacent municipalities.
- The second element of pass-through traffic includes future development traffic generated from one designated transportation service area within the Township that passes through the other designated transportation service area within the Township. For example, while traffic generated from within TSA 1 is considered “development” traffic in TSA 1, this same traffic is considered “pass-through” traffic when it traverses through TSA 2.

Development traffic is generated by new development within the respective or designated transportation service area, and constitutes the third and final component of future 2016 traffic volumes.

This section first addresses development trip generation for each service area, based upon the development projections contained in the *Land Use Assumptions Report* and the trip distribution assumptions utilized in the analysis. Future pass-through traffic conditions are then described for each service area, incorporating existing traffic volumes in the service area; regional traffic growth (external to the Transportation Service Area); and development traffic from the adjacent service area. Finally, future 2016 development traffic conditions are defined, incorporating existing traffic volumes, future pass-through traffic volumes, and future development traffic volumes.

Service Area Trip Generation

From the *Land Use Assumptions Report*, the transportation service area development vehicular trip generation was estimated for the 2016 weekday afternoon peak hour utilizing the Institute of Transportation Engineers publication, *Trip Generation, 7th Edition*, for both the TSA 1 and TSA 2. The resulting 2016 weekday afternoon peak hour trip generation is summarized in **Table 7** for each service area.

Table 7. Service Area Development Vehicular “New” Trip Generation ⁽¹⁾

Description	ITE Land Use Code	Size	Weekday Afternoon Peak Hour ⁽²⁾		
			In	Out	Total
<u>TSA 1</u>					
Residential					
Single-Family	210	271 d.u.	200	117	317
Non-Residential					
Retail	820	31,915 s.f.	94	101	195
Light Industrial	110	215,909 s.f.	<u>25</u>	<u>187</u>	<u>212</u>
Total			319	405	724
<u>TSA 2</u>					
Residential					
Single-Family	210	41 d.u.	33	19	52
Non-Residential					
Retail	820	254,826 s.f.	368	398	766
Light Industrial	110	54,991 s.f.	6	48	54
Municipal	610/530	347,132 s.f.	<u>145</u>	<u>130</u>	<u>275</u>
Total			552	595	1,147

(1) The locations of developments are identified and illustrated in the *Land Use Assumptions Report*.

(2) Trips shown exclude “pass-by” trips, which are applicable to commercial developments.

Accordingly, Transportation Service Area 1 is estimated to experience an increase in total new (inbound and outbound) weekday afternoon peak hour trip generation of 724 new trips over the next nine years, while Transportation Service Area 2 is estimated to experience an increase of 1,147 total new trips over the same period, which have been included in the with-development traffic analysis.

Programmed Improvements

The Township has a number of programmed improvements to be completed by developers or by PennDOT and Lower Providence Township:

- **Ridge Pike and Park Lane Drive/Eagleville Road** – Additional northbound right-turn lane to be installed.
- **Ridge Pike and East Mount Kirk Avenue** – Additional northbound left-turn lane to be installed.
- **Egypt Road and Pinetown Road** – Traffic signal to be installed in addition to southbound left-turn lane on Pinetown Road, and an additional through lane and eastbound left-turn lane on Egypt Road.
- **Arcola Road and Eagleville Road** – Traffic signal to be installed in addition to a realignment of the School's main access to form the fourth leg of this intersection, in addition to eastbound and westbound left-turn lanes and westbound right-turn lanes on Arcola Road, and northbound and southbound left-turn lanes and northbound right-turn lane on Eagleville Road.
- **Shannondell Connector and Park Avenue** – Shannondell Boulevard is to be extended to Park Avenue to create a new intersection, with separate left- and right-turn lanes on Shannondell Boulevard, a single eastbound approach lane on Park Avenue, and a westbound approach consisting of a through lane and a left-turn lane.
- **Trooper Road and Audubon Road** – Additional eastbound right-turn lane to be installed on Audubon Road, in addition to an additional southbound through lane on Trooper Road. Lastly, the westbound through/right lane on Audubon Road will be converted to a left/through/right lane.
- **Crawford Road Realignment** – Based on discussions with the Township, it is proposed to realign the offset intersections of Park Avenue (S.R. 4004) and Eagleville Road (S.R. 4006) and Crawford Road into one signalized intersection. Specifically, the Crawford Road approach would be realigned to intersect Park Avenue directly opposite Eagleville Road.
- **Norris Hall Lane Extension** – Based on discussions with the Township, it is proposed to extend Norris Hall Lane across Trooper Road in such a manner that it intersects with Egypt Road (S.R. 4002) slightly to the northwest of the current intersection of Rittenhouse Road and Egypt Road (S.R. 4002). Additionally, Rittenhouse Road would be realigned so that it connects with the new realigned Norris Hall Lane. An additional extension to Adams Avenue to intersect the new Norris Hall Extension roadway in order to allow Valley Forge Corporate Center traffic to exit onto Egypt Road directly.

Trip Distribution

Vehicular traffic volumes generated by the new development over the next nine years were distributed to the area roadway network based on existing travel patterns determined from the ADT volumes, entering and exiting the Township, as shown in **Figure 6**, as well as the locations of specific future development parcels with respect to the study roadway network and other major traffic generators and destinations.

2016 Future Pass-Through Traffic

To determine 2016 future weekday afternoon peak hour pass-through traffic volumes, an annual traffic growth rate of 1.0 percent per year was applied to existing weekday afternoon peak hour traffic volumes to reflect regional traffic growth.

In addition to regional traffic growth, traffic associated with a number of developments located within the surrounding seven municipalities, including the Borough of Collegeville, East Norriton Township, Schuylkill Township, Skippack Township, Upper Merion Township, Upper Providence Township, and West Norriton Township was also distributed through the two service area roadway networks, and is included in the future traffic projections. These developments represent specific known/proposed developments identified by staff of the surrounding municipalities, and were determined to potentially have a potential significant influence on the study roadways and intersections. The trip generation for these specific developments has been calculated, and is included in **Appendix F**, and the estimated portion of those development trips that will traverse the two service areas was distributed within the study roadway and intersection network based upon the distribution outlined in Figure 6. Once again, these traffic volumes also reflect the assignment of development traffic from one transportation service area which will pass through the other transportation service area. The 2016 future weekday afternoon peak hour pass-through traffic volumes are illustrated in **Figure 7**.

2016 Future Pass-Through Traffic Levels of Service

The future 2016 weekday afternoon pass-through traffic volumes illustrated in Figure 7 were subjected to the previously described capacity/level-of-service analysis procedures to determine 2016 pass-through levels of service. The detailed analyses are provided in **Appendix G**. As required by Act 209, the future 2016 pass-through conditions analysis for each study intersection determines the **incremental** traffic impacts and required mitigation of future pass-through traffic in comparison to existing traffic conditions after required existing traffic mitigation has been added.

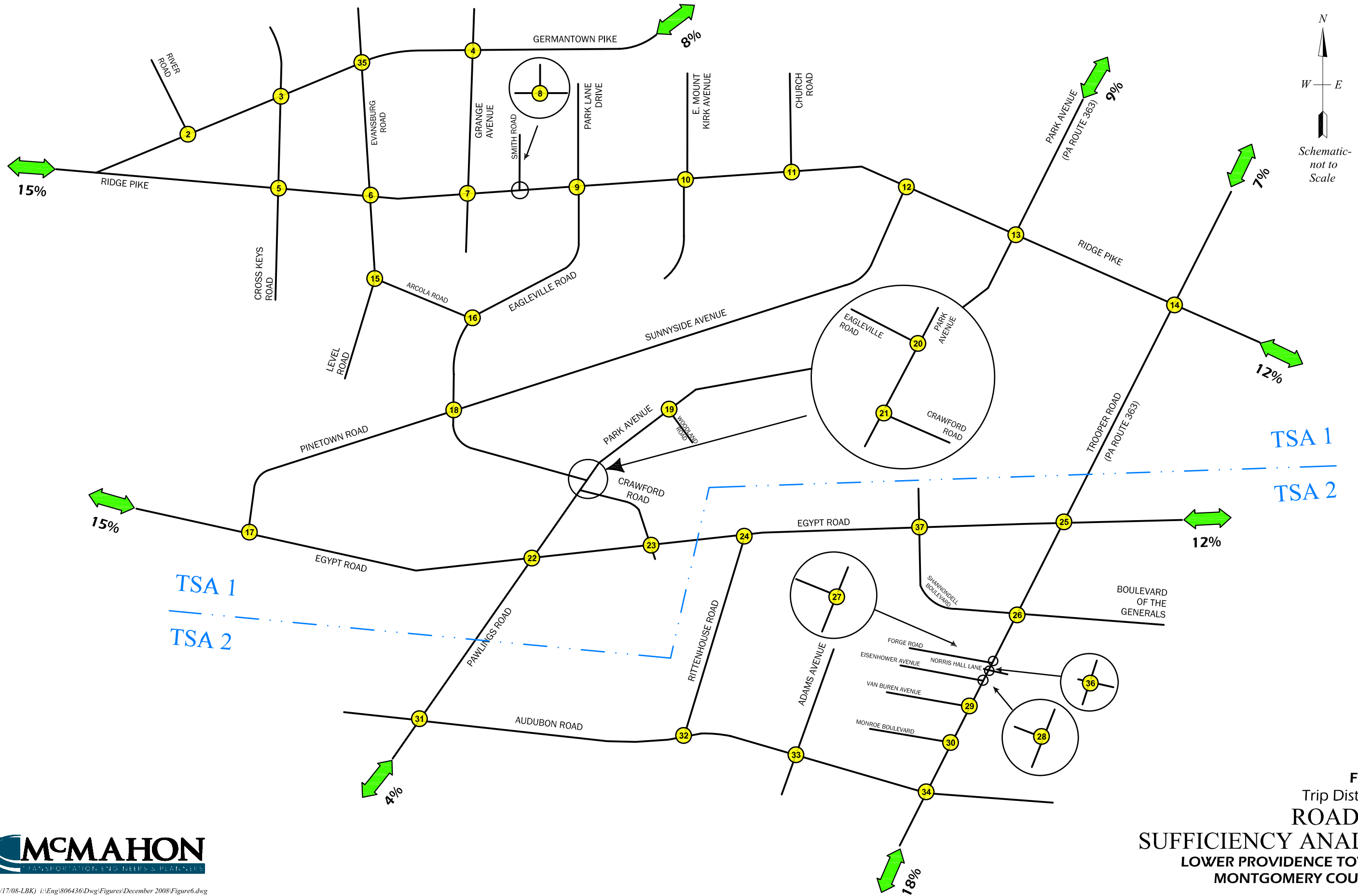
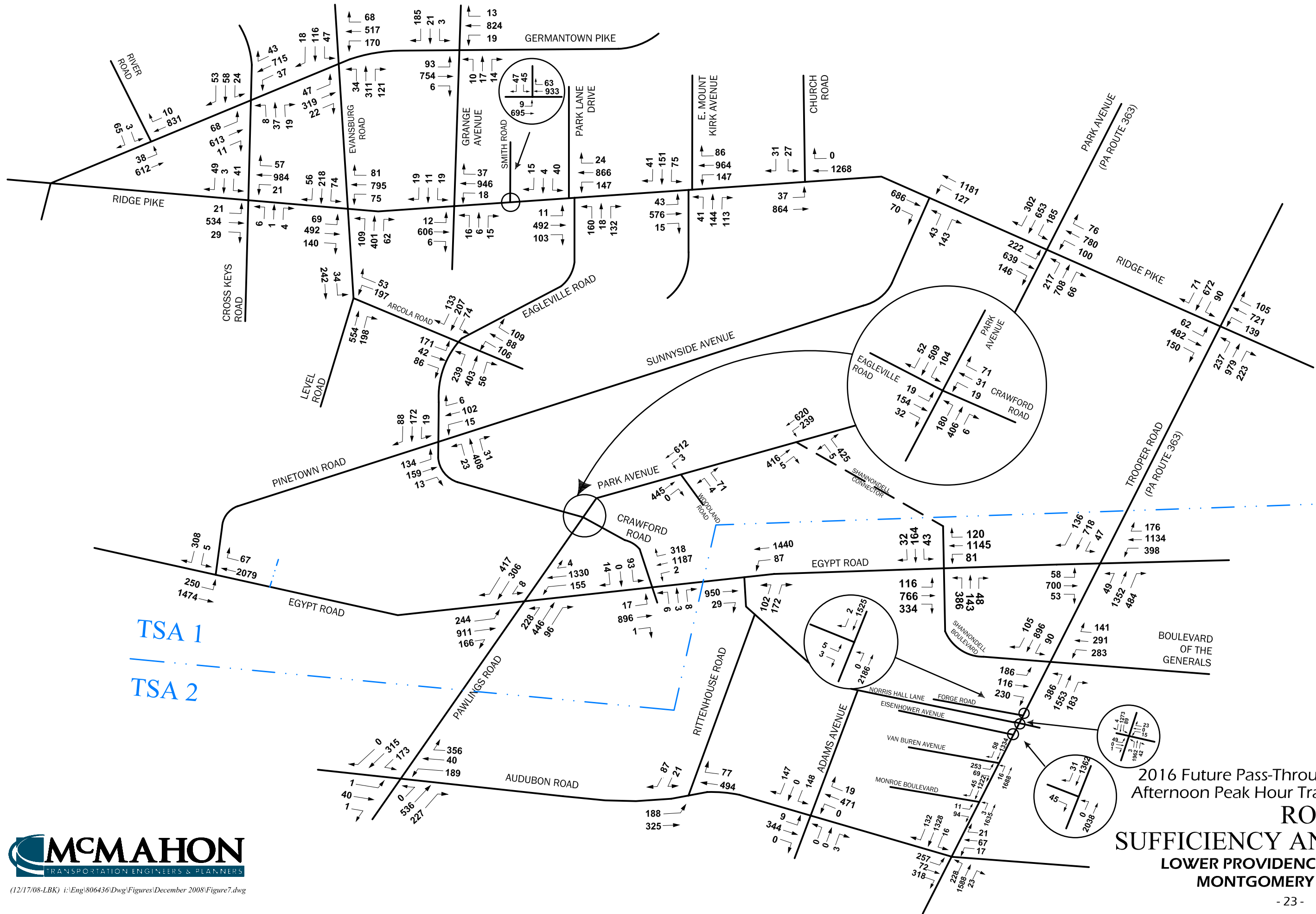


FIGURE 6
 Trip Distribution
ROADWAY
SUFFICIENCY ANALYSIS
 LOWER PROVIDENCE TOWNSHIP
 MONTGOMERY COUNTY, PA



TSA 1
TSA 2

FIGURE 7
 2016 Future Pass-Through Weekday
 Afternoon Peak Hour Traffic Volumes
ROADWAY
SUFFICIENCY ANALYSIS
 LOWER PROVIDENCE TOWNSHIP
 MONTGOMERY COUNTY, PA



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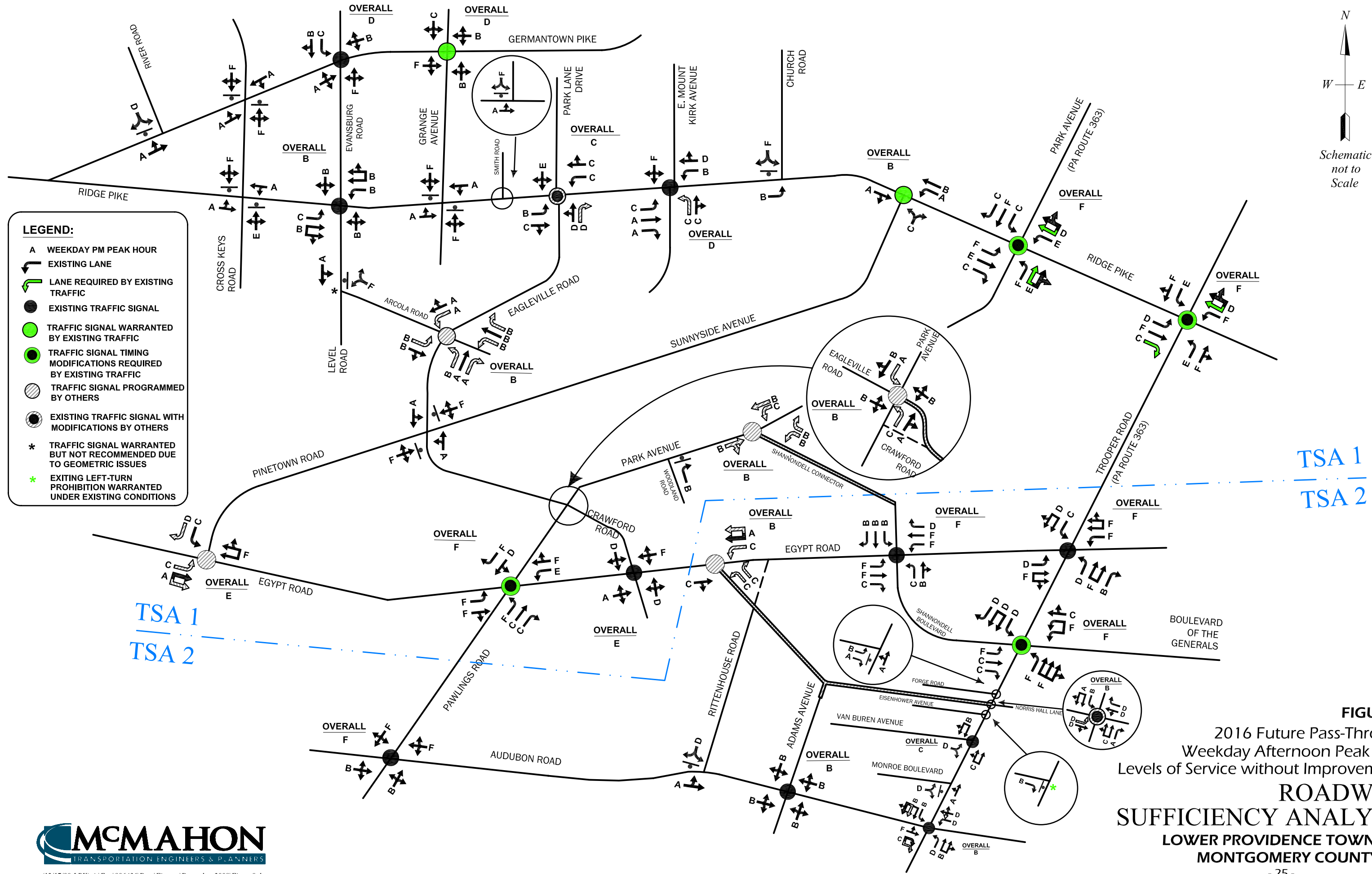
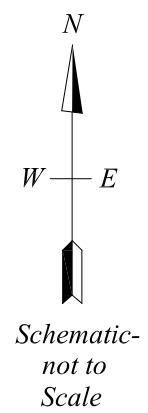
Figure 8 summarizes the results of the 2016 future pass-through traffic capacity/level-of-service analyses for the study intersections with the recommended improvements proposed under existing conditions. Traffic operating conditions at the following 20 study intersections will not satisfy the preferred level-of-service criteria under 2016 future pass-through conditions:

- **TSA 1**
 - Cross Keys Road and Germantown Pike
 - Grange Avenue and Germantown Pike
 - Cross Keys Road and Ridge Pike (S.R. 4031)
 - Evansburg Road and Germantown Pike
 - Grange Avenue and Ridge Pike (S.R. 4031)
 - Smith Road and Ridge Pike (S.R. 4031)
 - East Mount Kirk Avenue and Ridge Pike (S.R. 4031)
 - Church Road and Ridge Pike (S.R. 4031)
 - Park Avenue (S.R. 4004/0363) and Ridge Pike (S.R. 4031/0363)
 - Trooper Road (S.R. 0363) and Ridge Pike (S.R. 0363)
 - Level Road and Arcola Road
 - Pinetown Road and Egypt Road (S.R. 4002)
 - Eagleville Road (S.R. 4006) and Pinetown Road/Sunnyside Avenue
 - Park Avenue (S.R. 4004) and Eagleville Road (S.R. 4006)
 - Crawford Road and Egypt Road (S.R. 4002)

- **TSA 2**
 - Trooper Road (S.R. 0363) and Egypt Road (S.R. 4002)
 - Trooper Road (S.R. 0363) and Boulevard of the Generals
 - Pawlings Road (S.R. 4004) and Audubon Road (S.R. 4041)
 - Trooper Road (S.R. 0363) and Audubon Road (S.R. 4041)
 - Shannondell Boulevard and Egypt Road (S.R. 4002)

2016 Future Pass-Through Improvement Program

The additional improvements required to accommodate pass-through traffic are illustrated in **Figure 9**. These improvements are also summarized in more detail in **Table 8** for each study intersection, respectively in Transportation Service Area 1 and Transportation Service Area 2. Improvements will be required at 14 study intersections in order to achieve the preferred levels of service under pass-through traffic conditions. At the other six intersections with deficient operations, all are currently unsignalized and will not meet traffic signal warrants, and as a result, the preferred level-of-service criteria will be deferred at these locations. Additionally, improvements (which would be required by the Township, County, or PennDOT) were recommended at the intersection of Germantown Pike and Grange Avenue due to observed weekday morning peak hour conditions. These include the addition of left-turn lanes on Germantown Pike in the eastbound and westbound directions.

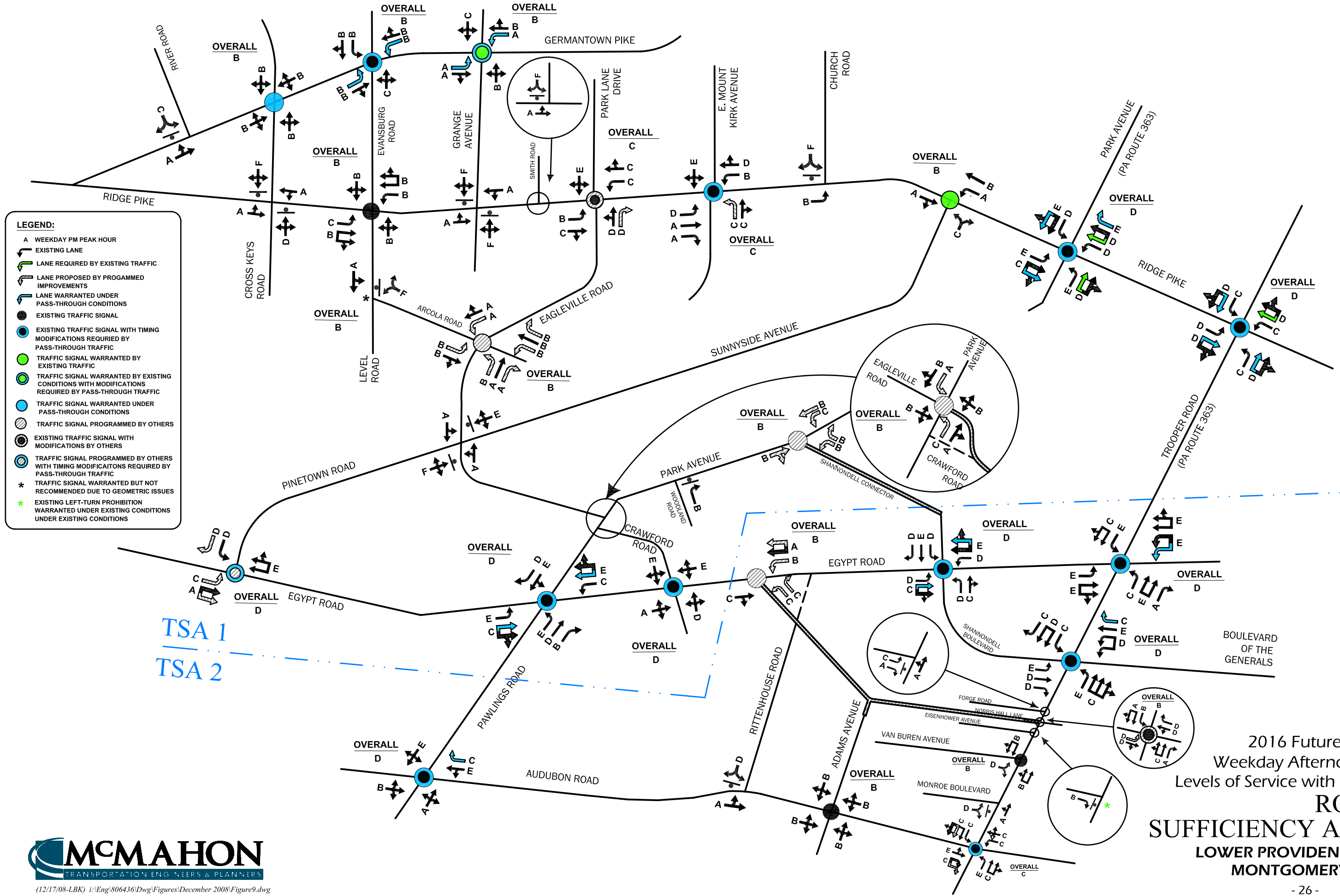
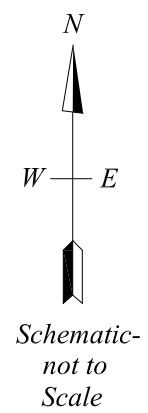


- LEGEND:**
- A WEEKDAY PM PEAK HOUR
 - EXISTING LANE
 - LANE REQUIRED BY EXISTING TRAFFIC
 - EXISTING TRAFFIC SIGNAL
 - TRAFFIC SIGNAL WARRANTED BY EXISTING TRAFFIC
 - TRAFFIC SIGNAL TIMING MODIFICATIONS REQUIRED BY EXISTING TRAFFIC
 - TRAFFIC SIGNAL PROGRAMMED BY OTHERS
 - EXISTING TRAFFIC SIGNAL WITH MODIFICATIONS BY OTHERS
 - * TRAFFIC SIGNAL WARRANTED BUT NOT RECOMMENDED DUE TO GEOMETRIC ISSUES
 - * EXITING LEFT-TURN PROHIBITION WARRANTED UNDER EXISTING CONDITIONS

TSA 1
TSA 2

FIGURE 8
 2016 Future Pass-Through
 Weekday Afternoon Peak Hour
 Levels of Service without Improvements
ROADWAY SUFFICIENCY ANALYSIS
 LOWER PROVIDENCE TOWNSHIP
 MONTGOMERY COUNTY, PA





- LEGEND:**
- A WEEKDAY PM PEAK HOUR
 - EXISTING LANE
 - LANE REQUIRED BY EXISTING TRAFFIC
 - LANE PROPOSED BY PROGRAMMED IMPROVEMENTS
 - LANE WARRANTED UNDER PASS-THROUGH CONDITIONS
 - EXISTING TRAFFIC SIGNAL
 - EXISTING TRAFFIC SIGNAL WITH TIMING MODIFICATIONS REQUIRED BY PASS-THROUGH TRAFFIC
 - TRAFFIC SIGNAL WARRANTED BY EXISTING TRAFFIC
 - TRAFFIC SIGNAL WARRANTED BY EXISTING CONDITIONS WITH MODIFICATIONS REQUIRED BY PASS-THROUGH TRAFFIC
 - TRAFFIC SIGNAL WARRANTED UNDER PASS-THROUGH CONDITIONS
 - TRAFFIC SIGNAL PROGRAMMED BY OTHERS
 - EXISTING TRAFFIC SIGNAL WITH MODIFICATIONS BY OTHERS
 - TRAFFIC SIGNAL PROGRAMMED BY OTHERS WITH TIMING MODIFICATIONS REQUIRED BY PASS-THROUGH TRAFFIC
 - * TRAFFIC SIGNAL WARRANTED BUT NOT RECOMMENDED DUE TO GEOMETRIC ISSUES
 - * EXISTING LEFT-TURN PROHIBITION WARRANTED UNDER EXISTING CONDITIONS UNDER EXISTING CONDITIONS

FIGURE 9
 2016 Future Pass-Through
 Weekday Afternoon Peak Hour
 Levels of Service with Improvements
ROADWAY SUFFICIENCY ANALYSIS
 LOWER PROVIDENCE TOWNSHIP
 MONTGOMERY COUNTY, PA

Table 8 - Pass Through Conditions Improvements Program for Study Intersections

Int No.	Intersection	Service Area	Control Type	Recommended Improvement
1	Shannondell Connector and Park Avenue (S.R. 4004)	1	Signal	No improvements recommended or required.
2	River Road and Germantown Pike	1	Stop Sign	No improvements recommended or required.
3	Cross Keys Road and Germantown Pike	1	Stop Sign	Install new traffic signal.
4	Grange Avenue and Germantown Pike	1	Stop Sign	Widen Germantown Pike for separate left-turn lanes in each direction. Modify signal timings as warranted by AM conditions.
5	Cross Keys Road and Ridge Pike (S.R. 4031)	1	Stop Sign	No improvements recommended or required as signal is not warranted.
6	Evansburg Road and Ridge Pike (S.R. 4031)	1	Signal	No improvements recommended or required.
7	Grange Avenue and Ridge Pike (S.R. 4031)	1	Stop Sign	No improvements recommended or required as signal is not warranted.
8	Smith Road and Ridge Pike (S.R. 4031)	1	Stop Sign	No improvements recommended or required as signal is not warranted.
9	Park Lane Drive/Eagleville Road (S.R. 4006) and Ridge Pike (S.R. 4031)	1	Signal	No improvements recommended or required.
10	East Mount Kirk Avenue and Ridge Pike (S.R. 4031)	1	Signal	Modify signal timings.
11	Church Road and Ridge Pike (S.R. 4031)	1	Stop Sign	No improvements recommended or required as signal is not warranted.
12	Sunnyside Avenue and Ridge Pike (S.R. 4031)	1	Signal	No improvements recommended or required.
13	Park Avenue (S.R. 4004/0363) and Ridge Pike (S.R. 4031/0363)	1	Signal	Install additional EB through lane and WB right-turn lane on Ridge Pike and SB through lane on Park Ave. Modify signal timings.
14	Trooper Road (S.R. 0363) and Ridge Pike (S.R. 0363)	1	Signal	Install additional EB through lane on Ridge Pike and NB and SB through lanes on Trooper Road. Modify signal timings.
15	Level Road and Arcola Road	1	Stop Sign	No improvements recommended as signal is not recommended due to geometric issues.
16	Eagleville Road (S.R. 4006) and Arcola Road	1	Stop Sign	No improvements recommended or required.
17	Pinetown Road and Egypt Road (S.R. 4002)	1	Stop Sign	Modify signal timings.
18	Eagleville Road (S.R. 4006) and Pinetown Road/Sunnyside Avenue	1	Stop Sign	No improvements recommended or required as signal is not warranted.
19	Park Avenue (S.R. 4004) and Woodland Avenue	1	Stop Sign	No improvements recommended or required.
20	Park Avenue (S.R. 4004) and Eagleville Road (S.R. 4006)	1	Stop Sign	No improvements recommended or required.
21	Park Avenue (S.R. 4004) and Crawford Road	1	Stop Sign	No improvements recommended or required.
22	Park Avenue/Pawlings Road (S.R. 4004) and Egypt Road (S.R. 4002)	1	Signal	Install additional EB & WB through lanes on Egypt Road. Modify signal timings.
23	Crawford Road and Egypt Road (S.R. 4002)	1	Signal	Modify signal timings.
24	Rittenhouse Road and Egypt Road (S.R. 4002)	2	Signal	No improvements recommended or required.
25	Trooper Road (S.R. 0363) and Egypt Road (S.R. 4002)	2	Signal	Install additional WB left-turn lane on Egypt Road. Modify signal timings.
26	Trooper Road (S.R. 0363) and Boulevard of the Generals	2	Signal	Install WB right-turn lane on Blvd of the Generals. Modify signal timings.
27	Trooper Road (S.R. 0363) and Forge Road	2	Stop Sign	No improvements recommended or required.
28	Trooper Road (S.R. 0363) and Eisenhower Avenue	2	Stop Sign	No improvements recommended or required.
29	Trooper Road (S.R. 0363) and Van Buren	2	Signal	No improvements recommended or required.
30	Trooper Road (S.R. 0363) and Monroe Boulevard	2	Stop Sign	No improvements recommended or required.
31	Pawlings Road (S.R. 4004) and Audubon Road (S.R. 4041)	2	Signal	Install WB right-turn lane on Pawlings Road. Modify signal timings.
32	Rittenhouse Road and Audubon Road (S.R. 4041)	2	Stop Sign	No improvements recommended or required.
33	Adams Avenue and Audubon Road (S.R. 4041)	2	Signal	No improvements recommended or required.
34	Trooper Road (S.R. 0363) and Audubon Road (S.R. 4041)	2	Signal	Modify signal timings.
35	Evansburg Road and Germantown Pike	1	Signal	Modify signal timings. Also install EB and WB left-turn lanes on Germantown Pike
36	Trooper Road (S.R. 0363) and Norris Hall Lane	2	Signal	No improvements recommended or required.
37	Shannondell Boulevard and Egypt Road (S.R. 4002)	2	Signal	Install additional EB and WB through lanes on Egypt Road. Modify signal timings.

2016 Future Development Traffic

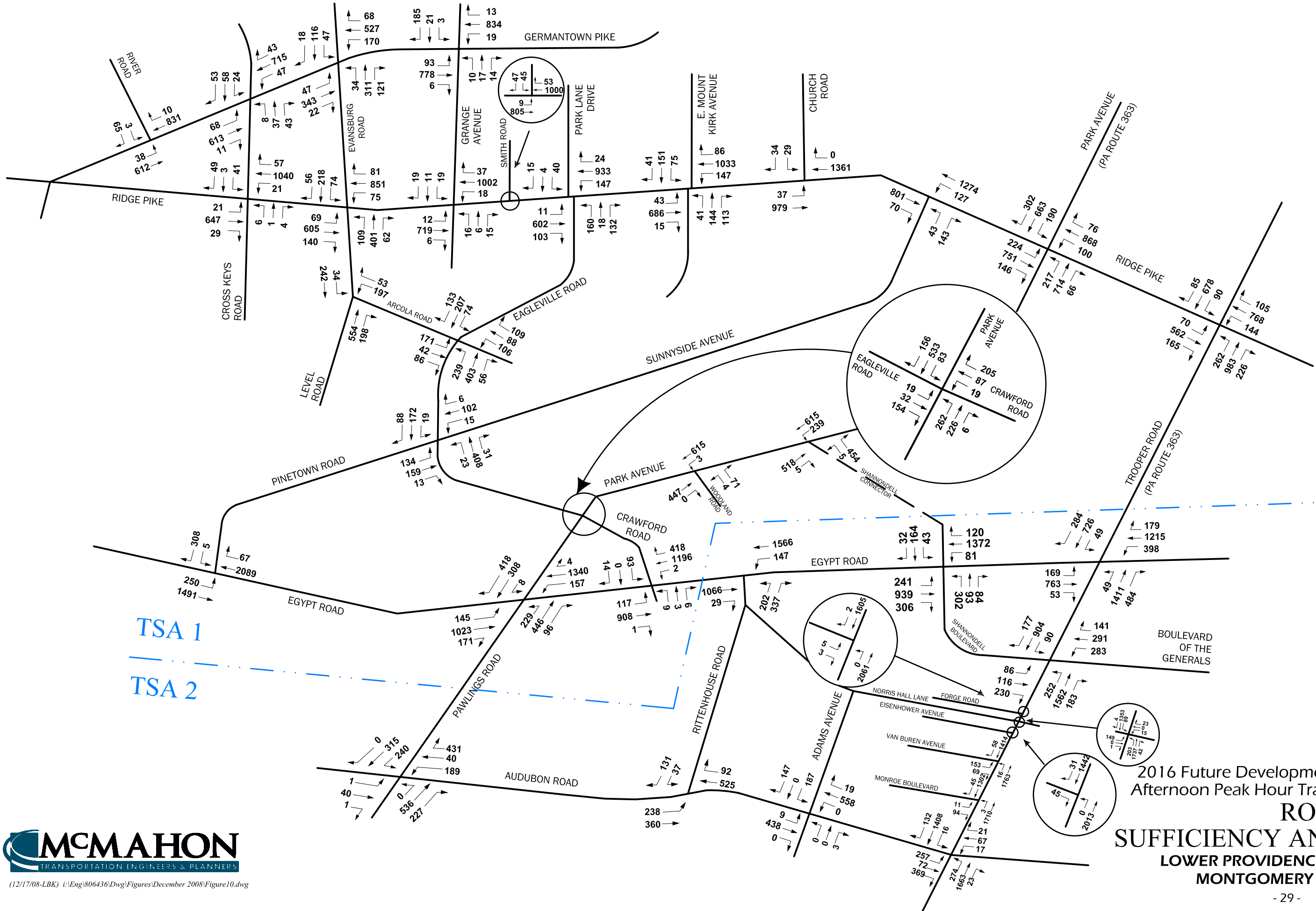
As explained previously, traffic generated by new development internal to each designated transportation service area constitutes the third and final component of future 2016 traffic. The 2016 future development traffic volumes were determined based on assignment of service area development traffic within each respective transportation service area to the study roadway network, and the addition of these volumes to 2016 future pass-through traffic volumes. Total 2016 volumes, including both future pass-through traffic and future development traffic volumes, are summarized in **Figure 10**.

2016 Future Development Traffic Levels of Service

The future development traffic volumes presented in Figure 10 were subject to the previously described capacity/level-of-service analysis procedures to determine future 2016 development levels of service, and the detailed analyses are provided in **Appendix H**. The 2016 future development conditions are illustrated in **Figure 11**, and indicate that the following 17 study intersections will not satisfy the preferred level-of-service criteria and will require further improvements beyond the previously identified future pass-through improvements:

- **TSA 1**
 - Cross Keys Road and Ridge Pike (S.R. 4031)
 - Grange Avenue and Ridge Pike (S.R. 4031)
 - Eagleville Road (S.R. 4006)/Park Lane Drive and Ridge Pike (S.R. 4031)
 - Smith Road and Ridge Pike (S.R. 4031)
 - Church Road and Ridge Pike (S.R. 4031)
 - Park Avenue (S.R. 4004/0363) and Ridge Pike (S.R. 4031/0363)
 - Level Road and Arcola Road
 - Eagleville Road (S.R. 4006) and Pinetown Road/Sunnyside Avenue
 - Park Avenue/Pawlings Road (S.R. 4004) and Egypt Road (S.R. 4002)
 - Crawford Road and Egypt Road (S.R. 4002)

- **TSA 2**
 - Trooper Road (S.R. 0363) and Egypt Road (S.R. 4002)
 - Trooper Road (S.R. 0363) and Boulevard of the Generals
 - Trooper Road (S.R. 0363) and Monroe Boulevard
 - Pawlings Road (S.R. 4004) and Audubon Road (S.R. 4041)
 - Rittenhouse Road and Audubon Road (S.R. 4041)
 - Trooper Road (S.R. 0363) Norris Hall Lane
 - Shannondell Boulevard and Egypt Road (S.R. 4002)



TSA 1
TSA 2

FIGURE 10
2016 Future Development Weekday
Afternoon Peak Hour Traffic Volumes
ROADWAY
SUFFICIENCY ANALYSIS
LOWER PROVIDENCE TOWNSHIP
MONTGOMERY COUNTY, PA



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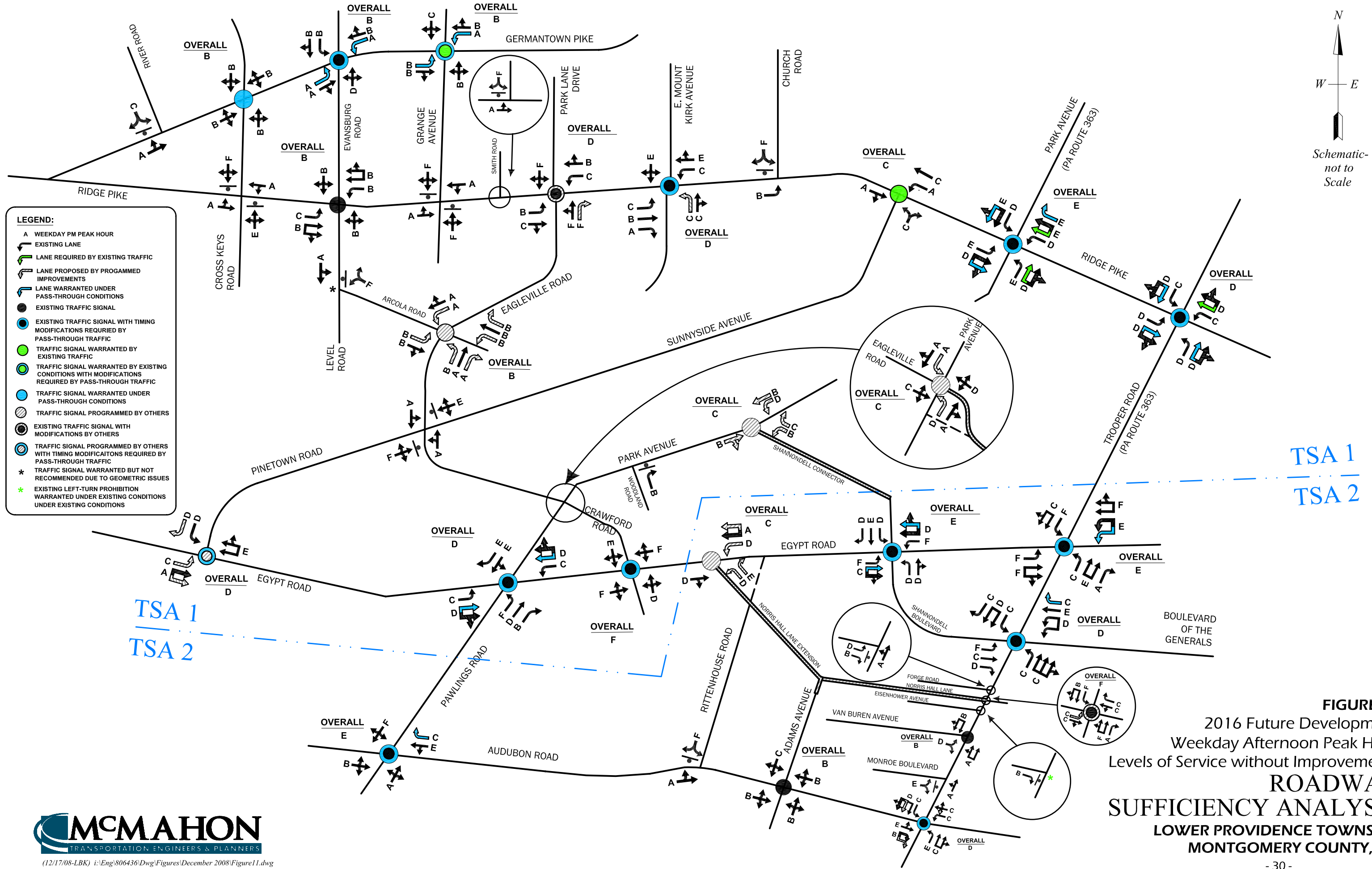


FIGURE 11
 2016 Future Development
 Weekday Afternoon Peak Hour
 Levels of Service without Improvements
ROADWAY SUFFICIENCY ANALYSIS
 LOWER PROVIDENCE TOWNSHIP
 MONTGOMERY COUNTY, PA

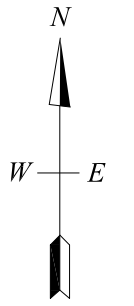
2016 Future Development Improvement Program

Improvements will be required at ten of the existing study intersections to accommodate development-generated traffic within the transportation service areas of the established preferred levels of service. The additional improvements required to accommodate development traffic are illustrated in **Figure 12**. These improvements are also summarized in more detail in **Table 9** for each study intersection, respectively in Transportation Service Area 1 and Transportation Service Area 2. At the other seven intersections with deficient operations, all are currently unsignalized and will not meet traffic signal warrants, and as a result, the preferred level-of-service criteria will be waived at these locations.

Other Transportation Improvements

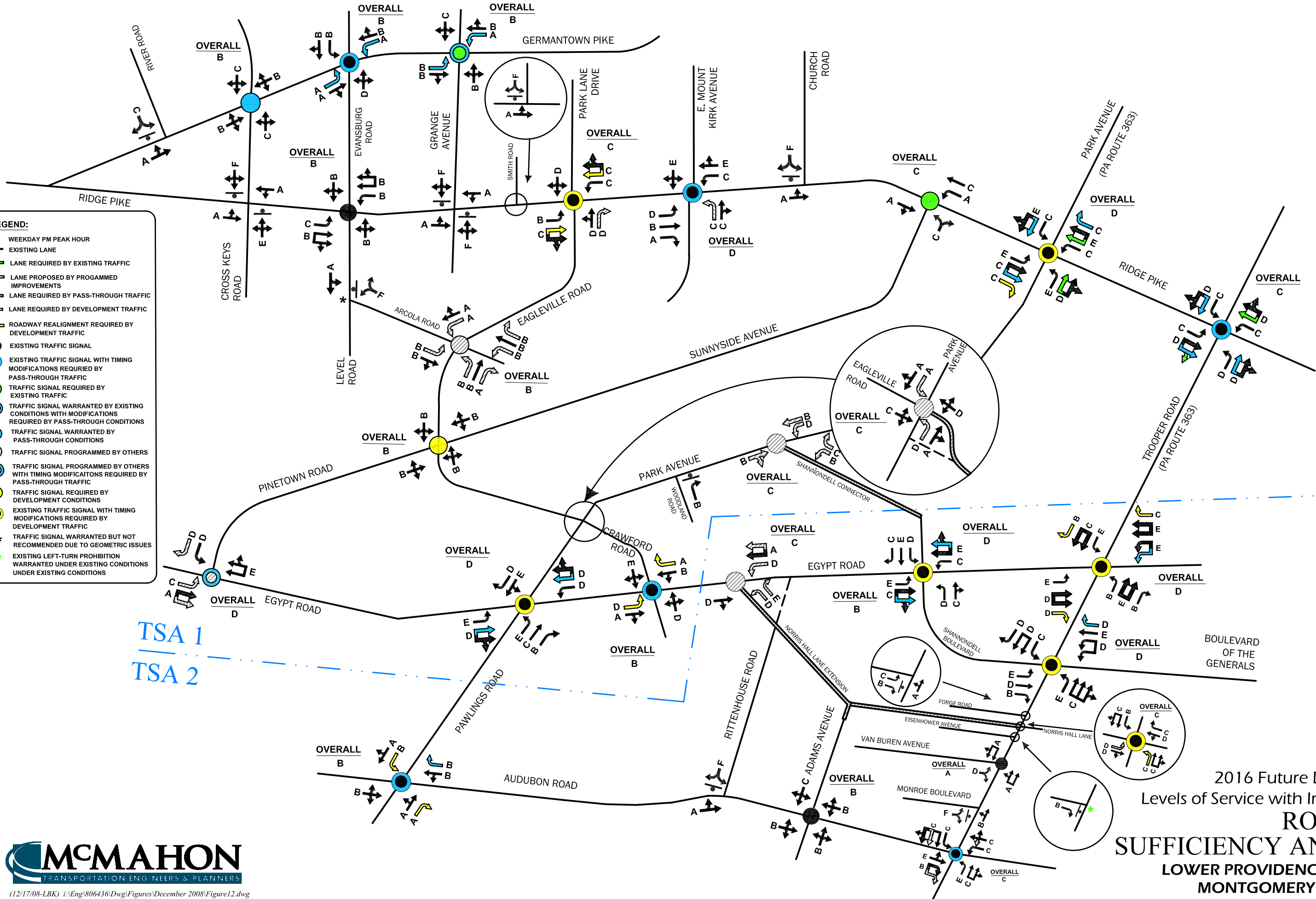
In addition, the Township should consider the following improvements not recommended in the Transportation Capital Improvements Program:

- **Closed-Loop Traffic Control System** – It is recommended that the Township continue its efforts to incorporate all traffic signals within the Township into a closed-loop traffic control system(s), to improve traffic operations along these roadways. Also, the Township may wish to consider providing emergency pre-emption capability at all new or upgraded traffic signals.
- **Trooper Road Widening** – Although not specifically warranted in the Roadway Sufficiency Analysis, the Township should consider installing left-turn lanes at the remaining intersections along Trooper Road, between U.S. Route 422 and Egypt Road, in order to provide a consistent five-lane cross-section. These improvements are necessary if the Valley Forge Corporate Center is revitalized beyond its current land use and zoning, as determined in the Township’s study of the business park. Also, the Township should consider widening Trooper Road between Egypt Road and Ridge Pike, to provide a five-lane roadway, as well as modifications to Trooper Road between Ridge Pike and Germantown Pike to provide one through lane in each direction with a continuous center left-turn lane, if the opportunity is available to acquire right-of-way, etc. These improvements may be necessary in the future as traffic growth occurs.
- **Ridge Pike Access** – It is recommended that the Township continue its efforts to improve access management along the Ridge Pike corridor, to reduce the number of intersections/ access points from future development along the corridor.



Schematic
not to
Scale

- LEGEND:**
- A WEEKDAY PM PEAK HOUR
 - EXISTING LANE
 - LANE REQUIRED BY EXISTING TRAFFIC
 - LANE PROPOSED BY PROGRAMMED IMPROVEMENTS
 - LANE REQUIRED BY PASS-THROUGH TRAFFIC
 - LANE REQUIRED BY DEVELOPMENT TRAFFIC
 - ROADWAY REALIGNMENT REQUIRED BY DEVELOPMENT TRAFFIC
 - EXISTING TRAFFIC SIGNAL
 - EXISTING TRAFFIC SIGNAL WITH TIMING MODIFICATIONS REQUIRED BY PASS-THROUGH TRAFFIC
 - TRAFFIC SIGNAL REQUIRED BY EXISTING TRAFFIC
 - TRAFFIC SIGNAL WARRANTED BY EXISTING CONDITIONS WITH MODIFICATIONS REQUIRED BY PASS-THROUGH CONDITIONS
 - TRAFFIC SIGNAL WARRANTED BY PASS-THROUGH CONDITIONS
 - TRAFFIC SIGNAL PROGRAMMED BY OTHERS
 - TRAFFIC SIGNAL PROGRAMMED BY OTHERS WITH TIMING MODIFICATIONS REQUIRED BY PASS-THROUGH TRAFFIC
 - TRAFFIC SIGNAL REQUIRED BY DEVELOPMENT CONDITIONS
 - EXISTING TRAFFIC SIGNAL WITH TIMING MODIFICATIONS REQUIRED BY DEVELOPMENT TRAFFIC
 - * TRAFFIC SIGNAL WARRANTED BUT NOT RECOMMENDED DUE TO GEOMETRIC ISSUES
 - * EXISTING LEFT-TURN PROHIBITION WARRANTED UNDER EXISTING CONDITIONS UNDER EXISTING CONDITIONS



TSA 1
TSA 2

TSA 1
TSA 2

FIGURE 12
2016 Future Development
Levels of Service with Improvements
ROADWAY
SUFFICIENCY ANALYSIS
LOWER PROVIDENCE TOWNSHIP
MONTGOMERY COUNTY, PA



Table 9 - Development Conditions Improvements Program for Study Intersections

Int. No.	Intersection	Service Area	Control Type	Recommended Improvement
1	Shannondell Connector and Park Avenue (S.R. 4004)	1	Signal	No improvements recommended or required.
2	River Road and Germantown Pike	1	Stop Sign	No improvements recommended or required.
3	Cross Keys Road and Germantown Pike	1	Stop Sign	No improvements recommended or required.
4	Grange Avenue and Germantown Pike	1	Stop Sign	No improvements recommended or required.
5	Cross Keys Road and Ridge Pike (S.R. 4031)	1	Stop Sign	No improvements recommended or required as signal is not warranted.
6	Evansburg Road and Ridge Pike (S.R. 4031)	1	Signal	No improvements recommended or required.
7	Grange Avenue and Ridge Pike (S.R. 4031)	1	Stop Sign	No improvements recommended or required as signal is not warranted.
8	Smith Road and Ridge Pike (S.R. 4031)	1	Stop Sign	No improvements recommended or required as signal is not warranted.
9	Park Lane Drive/Eagleville Road (S.R. 4006) and Ridge Pike (S.R. 4031)	1	Signal	Install additional through lanes on Ridge Pike. Modify traffic signal timing.
10	East Mount Kirk Avenue and Ridge Pike (S.R. 4031)	1	Signal	No improvements recommended or required.
11	Church Road and Ridge Pike (S.R. 4031)	1	Stop Sign	No improvements recommended or required as signal is not warranted.
12	Sunnyside Avenue and Ridge Pike (S.R. 4031)	1	Signal	No improvements recommended or required.
13	Park Avenue (S.R. 4004/0363) and Ridge Pike (S.R. 4031/0363)	1	Signal	Install WB right-turn lane onto Ridge Pike and modify signal timings.
14	Trooper Road (S.R. 0363) and Ridge Pike (S.R. 0363)	1	Signal	No improvements recommended or required.
15	Level Road and Arcola Road	1	Stop Sign	No improvements recommended as signal is not recommended due to geometric issues.
16	Eagleville Road (S.R. 4006) and Arcola Road	1	Stop Sign	No improvements recommended or required.
17	Pinetown Road and Egypt Road (S.R. 4002)	1	Stop Sign	No improvements recommended or required.
18	Eagleville Road (S.R. 4006) and Pinetown Road/Sunnyside Avenue	1	Stop Sign	Install new traffic signal.
19	Park Avenue (S.R. 4004) and Woodland Avenue	1	Stop Sign	No improvements recommended or required.
20	Park Avenue (S.R. 4004) and Eagleville Road (S.R. 4006)	1	Stop Sign	No improvements recommended or required.
21	Park Avenue (S.R. 4004) and Crawford Road	1	Stop Sign	No improvements recommended or required.
22	Park Avenue/Pawlings Road (S.R. 4004) and Egypt Road (S.R. 4002)	1	Signal	Modify signal timings.
23	Crawford Road and Egypt Road (S.R. 4002)	1	Signal	Install EB left-turn and WB right-turn lanes on Egypt Road. Modify signal timings
24	Rittenhouse Road (Norris Hall Lane Extension) and Egypt Road (S.R. 4002)	2	Signal	No improvements recommended or required.
25	Trooper Road (S.R. 0363) and Egypt Road (S.R. 4002)	2	Signal	Install EB & WB right-turn lanes on Egypt Road and SB right-turn lane on Trooper Road.
26	Trooper Road (S.R. 0363) and Boulevard of the Generals	2	Signal	Modify signal timings.
27	Trooper Road (S.R. 0363) and Forge Road	2	Stop Sign	No improvements recommended or required.
28	Trooper Road (S.R. 0363) and Eisenhower Avenue	2	Stop Sign	No improvements recommended or required.
29	Trooper Road (S.R. 0363) and Van Buren	2	Signal	No improvements recommended or required.
30	Trooper Road (S.R. 0363) and Monroe Boulevard	2	Stop Sign	No improvements recommended or required as signal is not warranted.
31	Pawlings Road (S.R. 4004) and Audubon Road (S.R. 4041)	2	Signal	Install SB left-turn and NB right-turn lanes on Pawlings Rd.
32	Rittenhouse Road and Audubon Road (S.R. 4041)	2	Stop Sign	No improvements recommended or required as signal is not warranted.
33	Adams Avenue and Audubon Road (S.R. 4041)	2	Signal	No improvements recommended or required.
34	Trooper Road (S.R. 0363) and Audubon Road (S.R. 4041)	2	Signal	No improvements recommended or required.
35	Evansburg Road and Germantown Pike	1	Signal	No improvements recommended or required.
36	Trooper Road (S.R. 0363) and Norris Hall Lane	2	Signal	Install NB left-turn lane on Trooper Rd. Modify signal timings.
37	Shannondell Boulevard and Egypt Road (S.R. 4002)	2	Signal	Modify signal timings.

Transportation Capital Improvements Plan

This section summarizes Lower Providence Township's *Transportation Capital Improvements Plan*, resulting from the *Roadway Sufficiency Analysis*. In accordance with Act 209, the following public notification requirements were met:

1. Public notice of a public hearing on the *Transportation Capital Improvements Plan* was published two successive weeks, between seven and thirty days from the date of the hearing.
2. The *Transportation Capital Improvements Plan* was available for public inspection at the Township building at least ten working days prior to the hearing.
3. The public hearing was held on the *Transportation Capital Improvements Plan* to receive comments on _____.

Following the public hearing, the *Transportation Capital Improvements Plan* was adopted by the Township Board of Supervisors by resolution, along with the Roadway Sufficiency Analysis, on _____.

The *Transportation Capital Improvements Plan* consists of three sections, which are described below, and includes the *Existing Transportation Capital Improvements Program*, *Future Pass-Through Transportation Capital Improvements Program*, and *Future Development Transportation Capital Improvements Program*.

Existing Transportation Capital Improvements Program

The Existing Transportation Capital Improvement Program is summarized in **Table 10** for Transportation Service Areas 1 and 2, respectively, and details the improvements necessary to achieve the preferred levels of service under existing 2007 conditions. Table 10 also provides cost allocations for the improvements, indicating the portions of the total cost for which the Township, County, and PennDOT are responsible. **The total cost of the Existing Transportation Capital Improvements Program is approximately \$3,178,000 for Transportation Service Area 1 and \$143,000 for Transportation Service Area 2.** The anticipated completion year for each of the improvements is also included in Table 10.

**Table 10. Existing Transportation Capital Improvement Program
-- Transportation Service Area 1 --**

Int. No.	Intersection or Corridor	Improvements Required	Total Project Cost ⁽¹⁾	Allocated Funding			Construction Completion ⁽²⁾
				PennDOT Costs	Others Costs <i>County</i>	Township Costs	
4	Germantown Pike/Grange Avenue	Install new traffic signal.	\$185,868	\$0	\$46,467	\$139,401	2016 B
12	Ridge Pike/Sunnyside Avenue	Install new traffic signal	\$214,662	\$71,554	\$0	\$143,108	2016 A
13	Ridge Pike/Park Avenue	Install additional WB through lane on Ridge Pike Install additional NB through lane on Park Avenue. Modify Signal Timing	\$1,156,462	\$578,231	\$0	\$578,231	2016 A
14	Ridge Pike/Trooper Road	Install additional WB through lane on Ridge Pike Install additional WB right lane on Park Avenue. Modify Signal Timing	\$1,616,043	\$808,022	\$0	\$808,021	2016 A
22	Egypt Road/Park Avenue/Pawlings Rd	Modify Signal Timing	\$5,000	\$2,500	\$0	\$2,500	2016 A
			\$3,178,035	\$1,460,307	\$46,467	\$1,671,261	

-- Transportation Service Area 2 --

Int. No.	Intersection or Corridor	Improvements Required	Total Project Cost ⁽¹⁾	Allocated Funding			Construction Completion ⁽²⁾
				PennDOT Costs	Others Costs	Township Costs	
24	Egypt Road/Rittenhouse Road	Install new traffic signal.	\$137,375	\$45,792	\$0	\$91,583	2016 B
26	Trooper Road and Boulevard of Gen.	Modify Signal Timing	\$5,000	\$1,650	\$0	\$3,350	2016 A
14	Trooper Road and Eisenhower Road	Prohibit left turns on Eisenhower Road	\$500	\$0	\$0	\$500	2016 A
			\$142,875	\$47,442	\$0	\$95,433	

⁽¹⁾ - Estimated costs include engineering, right-of-way, and construction, plus 10% contingencies.

⁽²⁾ - Estimated completion year and priority level (A (primary) or B (secondary)).

Future Pass-Through Transportation Capital Improvements Program

The Future Pass-Through Transportation Capital Improvements Program is summarized in **Tables 11 and 12** for Transportation Service Areas 1 and 2, respectively, and details the additional improvements necessary to achieve the preferred levels of service under future 2016 pass-through conditions. Tables 11 and 12 also provide cost allocations for the improvements, indicating the portions of the total cost for which the Township, County, and PennDOT are responsible. **The total cost of the Future Pass-through Transportation Capital Improvements Program is approximately \$7,876,000 for Transportation Service Area 1, and \$2,831,000 for Transportation Service Area 2.** The anticipated completion year for each of the improvements is also included in Tables 11 and 12.

Future Development Transportation Capital Improvements Program

The Future Development Transportation Capital Improvements Program is summarized in **Tables 13 and 14** for Transportation Service Areas 1 and 2, respectively, and details the improvements necessary to achieve the preferred levels of service under future 2016 development traffic conditions. Tables 13 and 14 also provide cost allocations for the improvements, indicating the portions of the total cost for which the Township, County, and PennDOT, and future development are responsible. **The total cost of the Future Development Transportation Capital Improvement Program is approximately \$2,629,000 for Transportation Service Area 1 and \$872,000 for Transportation Service Area 2.** The anticipated completion year for each of the improvements is also included in Tables 13 and 14.

Improvements Summary

The total costs of the Lower Providence Township *Transportation Capital Improvements Plan*, which includes existing, pass-through, and development improvements for both Transportation Service Areas 1 and 2 are summarized in **Table 15**. As indicated, the total cost of the *Transportation Capital Improvements Plan* for the entire Township is approximately **\$17,528,000**, of which **\$7,810,000** is allocated to the Township (approximately 45 percent), **\$7,537,000** to PennDOT (approximately 43 percent), and **\$1,786,000** to future development (approximately 10 percent).

Impact Fee

The impact fee calculations for development improvements are summarized in **Table 16** for the transportation service areas. It should be noted that, according to the impact fee law, an applicant may physically construct improvements identified in the Transportation Capital Improvements Plan as being development warranted, in lieu of paying the impact fee to the Township, upon agreement by the Township.

Table 11. Pass-Through Transportation Capital Improvement Program
-- Transportation Service Area 1 --

Int. No.	Intersection or Corridor	Improvements Required	Total Project Cost ⁽¹⁾	Allocated Funding			Construction Completion ⁽²⁾
				PennDOT Costs	Others Costs	Township Costs	
3	Germantown Pike/Cross Keys Road	Install new traffic signal.	\$181,578	\$0	\$45,395 County	\$136,183	2016 B
4	Germantown Pike/Grange Avenue	Widen Germantown Pike for separate left-turn lanes in each direction. Modify traffic signal timings.	\$544,100	\$0	\$136,025 County	\$408,075	2016 B
10	Ridge Pike/East Mount Kirk Avenue	Modify Signal Timing	\$5,000	\$1,250	\$0	\$3,750	2016 A
13	Ridge Pike/Park Avenue	Install additional EB through lane on Ridge Pike Install additional SB through lane on Park Ave Install additional WB right lane on Ridge Pike	\$1,786,477	\$893,239	\$0	\$893,238	2016 A
14	Ridge Pike/Trooper Road	Install additional EB through lane on Ridge Pike Install additional NB through lane on Trooper Rd Install additional SB right lane on Trooper Rd	\$2,209,768	\$1,104,884	\$0	\$1,104,884	2016 A
17	Pinetown Road/Egypt Road	Modify Signal Timing	\$5,000	\$1,667	\$0	\$3,333	2016 A
22	Egypt Road/Park/Pawlings Road	Install additional EB & WB through lanes on Egypt Road.	\$2,465,693	\$1,232,846	\$0	\$1,232,847	2016 B
22	Crawford Road/Egypt Road	Modify Signal Timing	\$5,000	\$1,667	\$0	\$3,333	2016 A
35	Evansburg Road & Germantown Pike	Install additional EB & WB through lanes on Germantown Pike Modify Signal Timing	\$673,037	\$168,259	\$168,259	\$336,519	2016 A
			\$7,875,653	\$3,403,812	\$349,679	\$4,122,162	

⁽¹⁾ - Estimated costs include engineering, right-of-way, and construction, plus 10% contingencies.

⁽²⁾ - Estimated completion year and priority level {A (primary) or B (secondary)}.

Table 12. Pass-Through Transportation Capital Improvement Program (continued)
-- Transportation Service Area 2 --

Int. No.	Intersection or Corridor	Improvements Required	Total Project Cost ⁽¹⁾	Allocated Funding			Construction Completion ⁽²⁾
				PennDOT Costs	Others Costs	Township Costs	
24	Egypt Road/Rittenhouse Road	Install WB left-turn lane on Egypt Road	\$378,250	\$126,083	\$0	\$252,167	2016 B
25	Egypt Road/Trooper Road	Install additional WB left-turn lane on Egypt Rd Modify Signal Timings	\$593,408	\$296,704	\$0	\$296,704	2016 B
26	Shamondell Boulevard/Trooper Road	Install WB right-turn lane on Shamondell Blvd Modify Signal Timings	\$156,940	\$39,235	\$0	\$117,705	2016 B
31	Audubon Road/Pawlings Road	Install WB right-turn lane on Pawlings Road Modify Signal Timings	\$177,548	\$66,580	\$0	\$110,968	2016 A
34	Trooper Road/Audubon Road	Modify Signal Timing	\$5,000	\$1,875	\$0	\$3,125	2016 A
37	Egypt Road/Shamondell Boulevard	Install additional EB & WB through lanes on Egypt Road. Modify Signal Timings	\$1,520,190	\$380,048	\$0	\$1,140,142	2016 B
			\$2,831,335	\$910,525	\$0	\$1,920,810	

⁽¹⁾ - Estimated costs include engineering, right-of-way, and construction plus 10% contingencies.

⁽²⁾ - Estimated completion year and priority level {A (primary) or B (secondary)}.

Table 13. Development Transportation Capital Improvement Program
-- Transportation Service Area 1 --

Int. No.	Intersection or Corridor	Improvements Required	Total Project Cost ⁽¹⁾	Allocated Funding		Construction Completion ⁽²⁾
				PennDOT Costs	Others Costs	
9	Ridge Pike/Park Lane Drive/ Eagleville Road	Install additional through lanes on Ridge Pike. Modify traffic signal timing.	\$1,544,003	\$772,001	\$0	2016 B
13	Ridge Pike/Park Avenue	Install WB right lane onto Ridge Pike. Modify signal timings.	\$199,612	\$99,806	\$0	2010 B
17	Pinetown Road/Egypt Road	Modify Signal Timing	\$5,000	\$1,667	\$0	2016 A
18	Eagleville Road/ Pinetown Road/ Sunnyside Avenue	Install new traffic signal.	\$194,342	\$97,171	\$0	2016 B
22	Egypt Road/Pawlings Rd/Park Ave	Modify Signal Timing	\$5,000	\$2,500	\$0	2016 A
23	Egypt Road/Crawford Road	Install EB Left-Turn Lane on Egypt Road Install WB Right-Turn Lane on Egypt Road Modify Signal Timings	\$680,625	\$340,312	\$0	2016 B
			\$2,628,581	\$1,313,457	\$0	\$1,315,124

⁽¹⁾ - Estimated costs include engineering, right-of-way, and construction, plus 10% contingencies.

⁽²⁾ - Estimated completion year and priority level (A (primary) or B (secondary)).

Table 14. Development Transportation Capital Improvement Program (continued)
-- Transportation Service Area 2 --

Int. No.	Intersection or Corridor	Improvements Required	Total Project Cost ⁽¹⁾	Allocated Funding			Construction Completion ⁽²⁾
				PennDOT Costs	Others Costs	Development Costs	
24	Egypt Road/Rittenhouse Road (Norris Hall Lane Extension)	At realigned intersection, install WB left-turn lane and additional through lane on Egypt Road.	\$0	\$0	\$0	\$0	2016 B
25	Egypt Road/Trooper Road	Install EB & WB Right-Turn Lanes on Egypt Rd & SB Right-Turn Lane on Trooper	\$601,345	\$300,673	\$0	\$300,672	2016 B
26	Shamondell Boulevard/Trooper Road	Modify Signal Timings	\$5,000	\$1,250	\$0	\$3,750	2016 B
31	Audubon Road/Pawlings Road	Install SB Left-Turn Lane on Pawlings Road Install NB Right-Turn Lane	\$260,541	\$97,703	\$0	\$162,838	2016 B
34	Trooper Road and Audubon Road	Modify Signal Timing	\$5,000	\$1,650	\$0	\$3,350	2016 A
			\$871,886	\$401,276	\$0	\$470,610	

⁽¹⁾ - Estimated costs include engineering, right-of-way, and construction, plus 10% contingencies.

⁽²⁾ - Estimated completion year and priority level (A (primary) or B (secondary)).

Table 15. Transportation Capital Improvement Plan Summary

Transportation Service Area 1

	Cost Allocations				Total
	PennDOT	County	Others	Township	
Existing Program	\$1,460,307.00	\$46,467.00	\$0.00	\$1,671,260.50	\$3,178,034.50
Pass-Through Program	\$3,403,812.00	\$349,679.00	\$0.00	\$4,122,161.50	\$7,875,652.50
Development Program	\$1,313,457.00	\$0.00	\$0.00	\$0.00	\$2,628,581.25
	\$6,177,576.00	\$396,146.00	\$0.00	\$5,793,422.00	\$13,682,268.25
Share of Total	45%	3%	0%	42%	10%

Transportation Service Area 2

	Cost Allocations				Total
	PennDOT	County	Others	Township	
Existing Program	\$47,442.00	\$0.00	\$0.00	\$95,433.00	\$142,875.00
Pass-Through Program	\$910,525.00	\$0.00	\$0.00	\$1,920,810.25	\$2,831,335.25
Development Program	\$401,276.00	\$0.00	\$0.00	\$0.00	\$871,885.50
	\$1,359,243.00	\$0.00	\$0.00	\$2,016,243.25	\$3,846,095.75

Combined Study Intersections/Roadways

	Cost Allocations				Total
	PennDOT	County	Others	Township	
Existing Program	\$1,507,749.00	\$46,467.00	\$0.00	\$1,766,693.50	\$3,320,909.50
Pass-Through Program	\$4,314,337.00	\$349,679.00	\$0.00	\$6,042,971.75	\$10,706,987.75
Development Program	\$1,714,733.00	\$0.00	\$0.00	\$0.00	\$3,500,466.75
	\$7,536,819.00	\$396,146.00	\$0.00	\$7,809,665.25	\$17,528,364.00

Table 16. Transportation Impact Fee

Transportation Service Area	Development Capital Improvement Costs ⁽¹⁾	Development Trips	Impact Fee ^{(2), (3)}
1	\$1,318,900	724 trips	\$1,822
2	\$473,200	1,147 trips	\$413

(1) Inclusive of the prorated share of costs incurred for the completion of the *Roadway Sufficiency Analysis* that is attributable to development (\$7,091, as allocated by the cost of development-warranted improvements for Transportation Service Area 1, and \$9,148, as allocated by the cost of development-warranted improvements for Transportation Service Area 2).

(2) To be assessed on a per weekday afternoon peak hour trip basis.

(3) Development capital improvement costs divided by new development trips