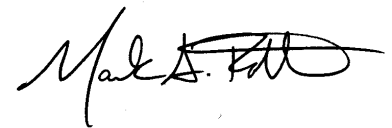
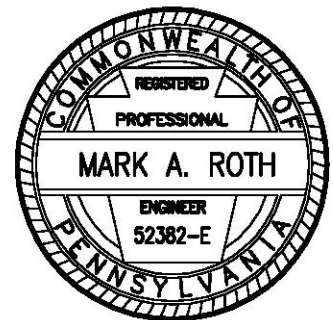


Route 202 Corridor – Transportation Master Plan

Solebury Township, Bucks County, PA

A handwritten signature of Mark A. Roth.

Mark A. Roth, P.E.
PA License Number PE052382E

Prepared by
McMahon Associates, Inc.
1515 Market Street, Suite 1360
Philadelphia, PA 19102
215.433.1660

Prepared for
Solebury Township

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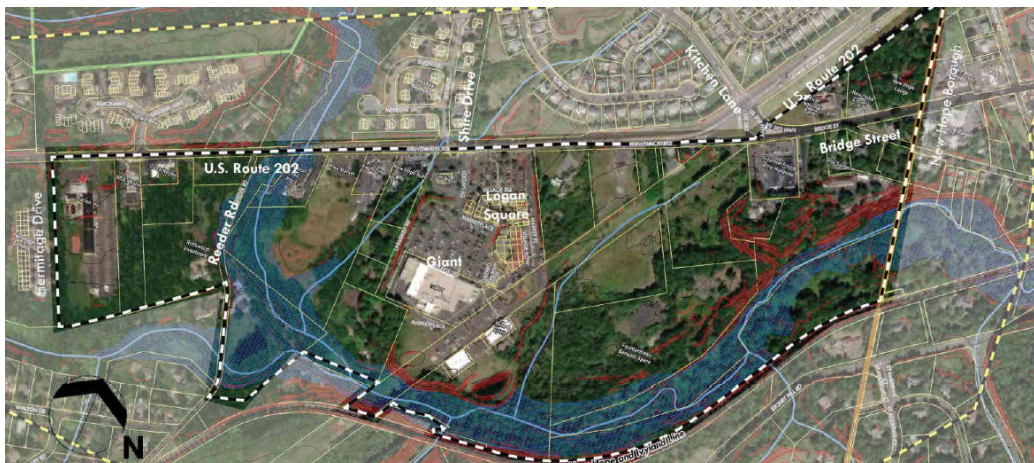
Executive Summary

The Route 202 Corridor, which is located through the center of Solebury Township, extends from approximately Aquetong Road to Sugan Road. Route 202 in this region serves as both a major roadway for through traffic, traveling north and south, as well as a connection to the commercial district in Solebury Township. The main focus of the transportation master plan is to develop a corridor plan that supports future growth, creating a network of roadways that reduces traffic congestion by improving regional traffic flow along the Route 202 Corridor through Smart Transportation technology, and providing a sustainable plan for the future to support and control traffic growth. In order to assist Solebury Township in planning for this potential growth, McMahon worked together with Township Supervisors and Staff.

The key components of this effort include a corridor evaluation and alternatives analysis. Throughout the corridor evaluation, several constraints were identified throughout the Route 202 Corridor which caused poor traffic operations. In order to determine the existing transportation issues along the Route 202 Corridor, the following tasks were performed:

- Field observations along the Route 202 Corridor
- Data collection along the Route 202 Corridor
- Crash analysis to identify any prevalent crash patterns under existing conditions
- Capacity/level-of-service and queueing analysis at several key intersections

Once the existing constraints were identified, and the corridor needs were discussed, it led to the evaluation of providing a 3-lane cross-section along Route 202 from Aquetong Road to 800 feet south of Shire Drive, providing a 5-lane cross-section along Route 202 from 800 feet south of Shire Drive to Kitchens Lane, as well as a focused alternatives analysis. The focused alternatives analysis was on the commercial area of Route 202 which extends from Reeder Road to Sugan Road (shown on aerial below). Through the alternative analyses, three future build alternatives were developed and analyzed for the Route 202 Corridor. The objective of the alternatives analysis was to determine the best scenario of improvements to efficiently accommodate the existing and future demands of vehicular, transit, and pedestrian/bicycle traffic anticipated in the area, due both to the increased planned development along Route 202, as well as general background growth throughout the regional area.

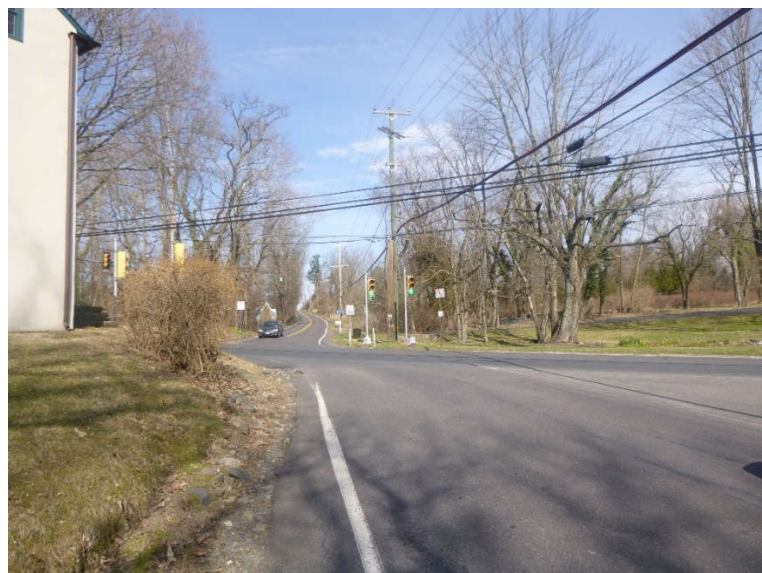


Existing Conditions

There are several existing issues and constraints on the transportation system within the vicinity of the Route 202 Corridor that cause delays, queueing, and unexpected movements throughout the study area. These issues must be addressed in order to support future growth along the Route 202 Corridor in Solebury Township.

Lower York Road (Route 202) and Aquetong Road

The off-set approaches of Aquetong Road cause the traffic signal to utilize split phasing for the minor approaches (minor approaches operate at different times). The split phasing causes unnecessary delay for the minor approaches due to inefficient signal timings. Due to the lack of left-turn lanes and narrow shoulders along Route 202, vehicles traveling north and south often experience delays due to left-turning vehicles. At this location, rear-end crashes along Route 202 account for the majority of the reportable crashes.



Lower York Road (Route 202) and Lower Mountain Road

Due to the lack of left-turn lanes and narrow shoulders along Route 202, vehicles traveling south often experience delays due to left-turning vehicles. At this location, rear-end crashes along Route 202 account for the majority of the reportable crashes.



Lower York Road (Route 202) and Reeder Road

Due to the lack of left-turn lanes and narrow shoulders along Route 202, vehicles traveling south often experience delays due to left-turning vehicles. At this location, rear-end crashes along Route 202 account for the majority of the reportable crashes.



Lower York Road (Route 202) and Shire Drive/Logan Square Shopping Center

At this signalized intersection, Route 202 consists of a 5-lane cross-section. However, the northbound approach only has one through lane in this area. This lane configuration causes significant queueing issues along the northbound approach at the signalized intersection of Route 202 and Shire Drive/Logan Square Shopping Center. The traffic queues at this intersection can extend to 800 feet which makes it difficult for vehicles to enter or exit the businesses along Route 202.



Significant delays exist along the Logan Square Shopping Center Approach. This delay is caused by the off-set nature of the intersection with Shire Drive and the split phasing of the traffic signal.



At this location, rear-end crashes along Route 202 account for the majority of the reportable crashes.

Lower York Road (Route 202) and Kitchens Lane/Bridge Street (Route 179)

Vehicles traveling north in this section of Route 202 have the option of splitting right onto Bridge Street (Route 179) to continue towards New Hope or staying on Route 202 to continue towards New Jersey. Vehicles that decide to split right onto Bridge Street (Route 179) experience unexpected conflicts due to the unconventional intersection of Route 202 and Kitchens Lane/Bridge Street (Route 179). There is a stop-controlled approach entering Bridge Street with vehicles traveling from Kitchens Lane and southbound Route 202. There is also a stop-controlled approach exiting Bridge Street to enter the unconventional signalized intersection. Both of these stop-controlled approaches have very short storage lengths and cannot accommodate many vehicles. These short storage lengths cause the potential of vehicles backing into the main travel lanes. Along Bridge Street, there are also several private driveways.





Vehicles traveling south along Bridge Street (Route 179) experience minor delays and queueing along the approach to Route 202. This approach utilizes dual left-turn lanes onto Route 202 which allows these vehicles to make this movement under protected conditions and no conflict from other movements. However, this phase uses a significant amount of green time from the signal.



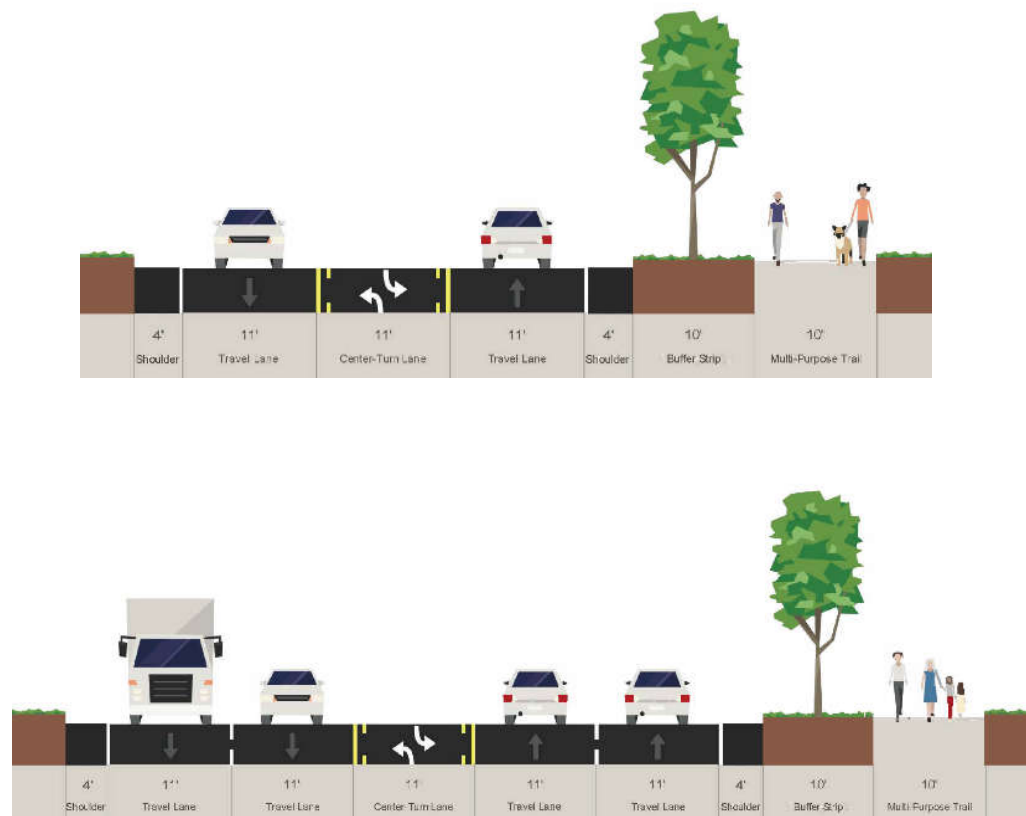
Improvements

In order to improve existing traffic conditions and help in accommodating the long-term future traffic demand throughout the Route 202 Corridor, the following traffic improvements were analyzed for Future Build Alternatives. The three Build Alternatives maintain similar characteristics along Route 202 from Aquetong Road to Silvertail Lane, and introduce unique differences in the commercial portion of Route 202. The characteristics of each Build Alternative are described below:

Corridor Improvements for Build Alternatives

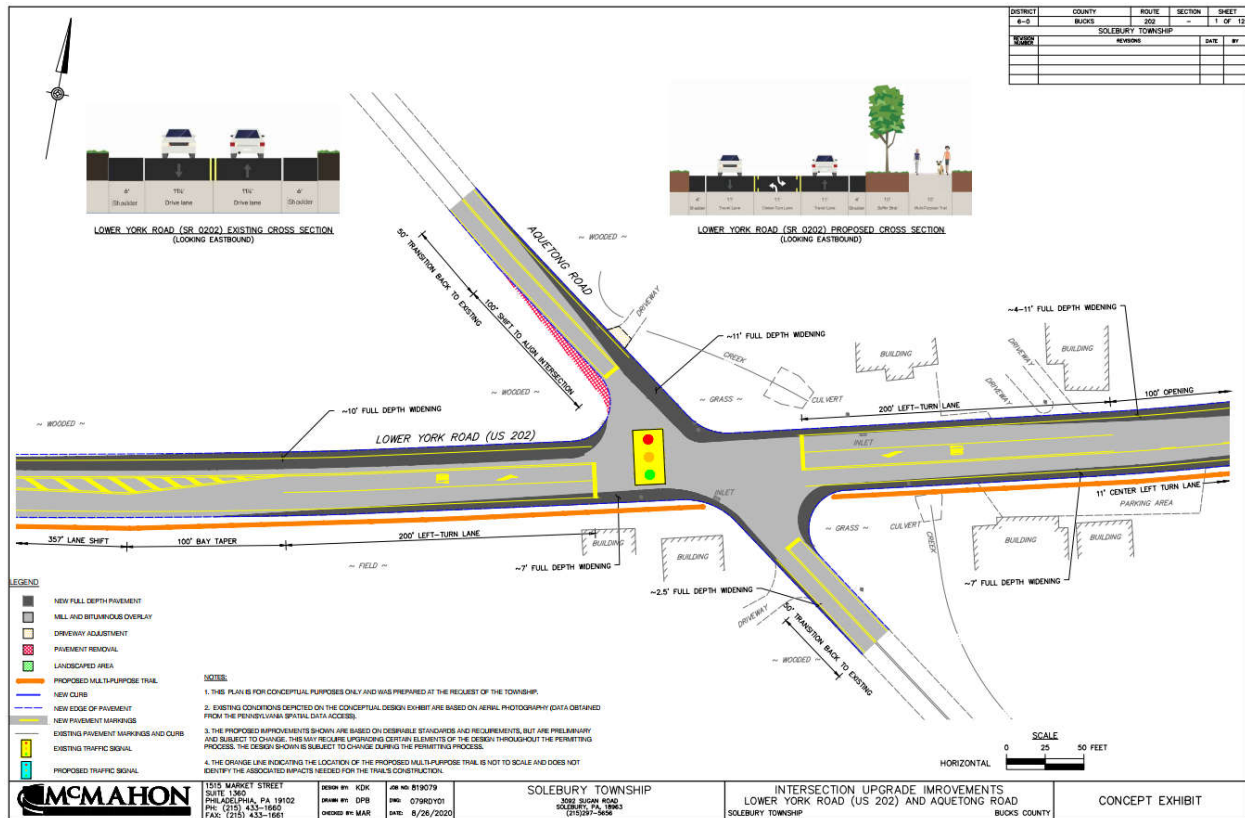
Route 202

- Optimize signal timings and provide necessary equipment upgrades at all signalized intersections to maximize operations and traffic responsiveness.
- Provide a 3-lane cross-section along Route 202 from Aquetong Road to approximately 800 feet south of Shire Drive.
- Provide a 5-lane cross-section along Route 202 from approximately 800 feet south of Shire Drive to Kitchens Lane.
- Provide a multi-use trail along one side of Route 202 to accommodate multi-modal transportation use along the corridor. A planted buffer strip is also recommended to separate vehicle traffic and pedestrian/bicycle traffic along the corridor.



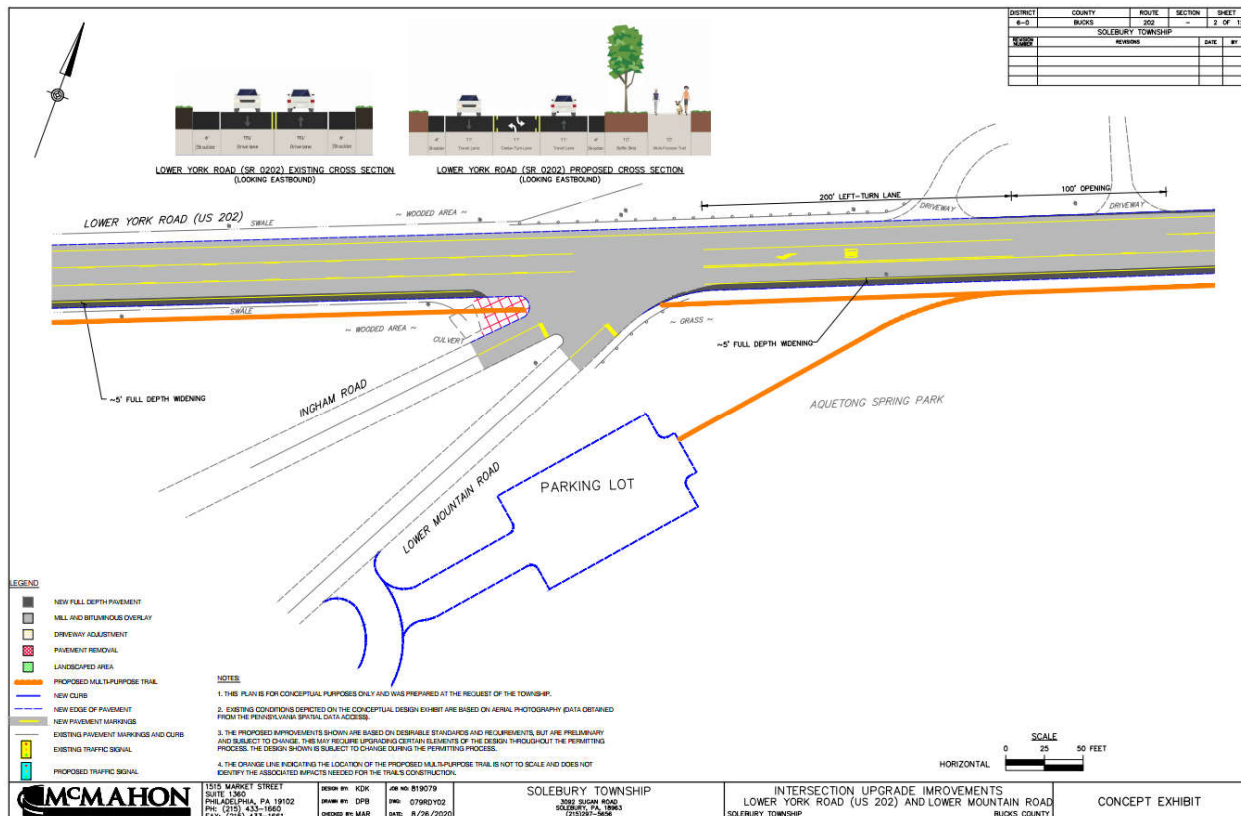
Lower York Road (Route 202) and Aquetong Road

- Widen Route 202 to provide separate left-turn lanes on each approach.
- Utilize striping and minor widening to align the Aquetong Road approaches.
- Modify traffic signal to eliminate split phasing of Aquetong Road.
- Provide ADA curb ramps, pedestrian crosswalk, pedestrian signal heads, and ADA push buttons for crossing Aquetong Road.



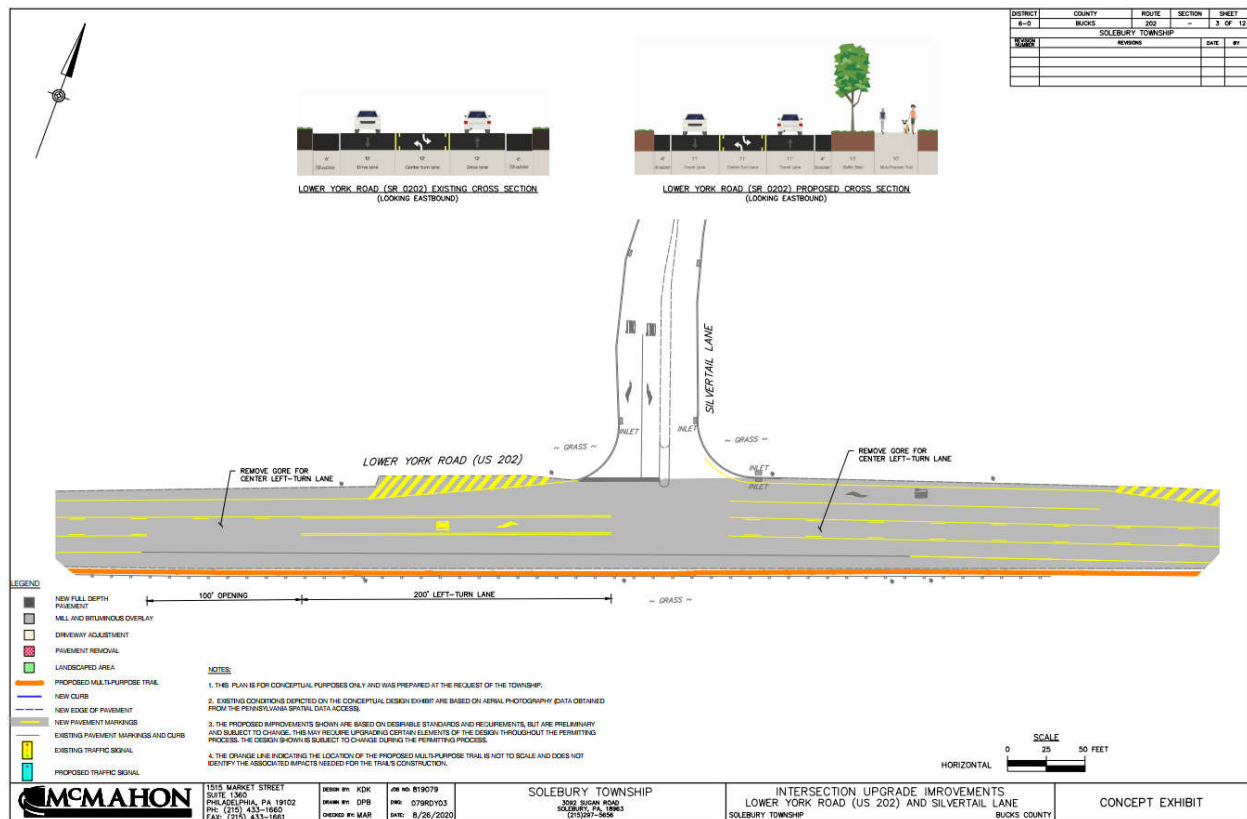
Lower York Road (Route 202) and Lower Mountain Road

- Provide a separate left-turn lane along the Route 202 southbound approach.
 - The separate southbound left-turn lane along Route 202 will help address the issues of vehicle delay due to left-turns and rear-end crashes accounting for the majority of crashes at this location. This improvement will also help assist public access to and from Lower Mountain Road to Route 202 for Aquetong Spring Park.
- Provide three-lane cross section with area for future pedestrian trail on east side.
- Provide ADA curb ramps and pedestrian crosswalk for crossing Lower Mountain Road.



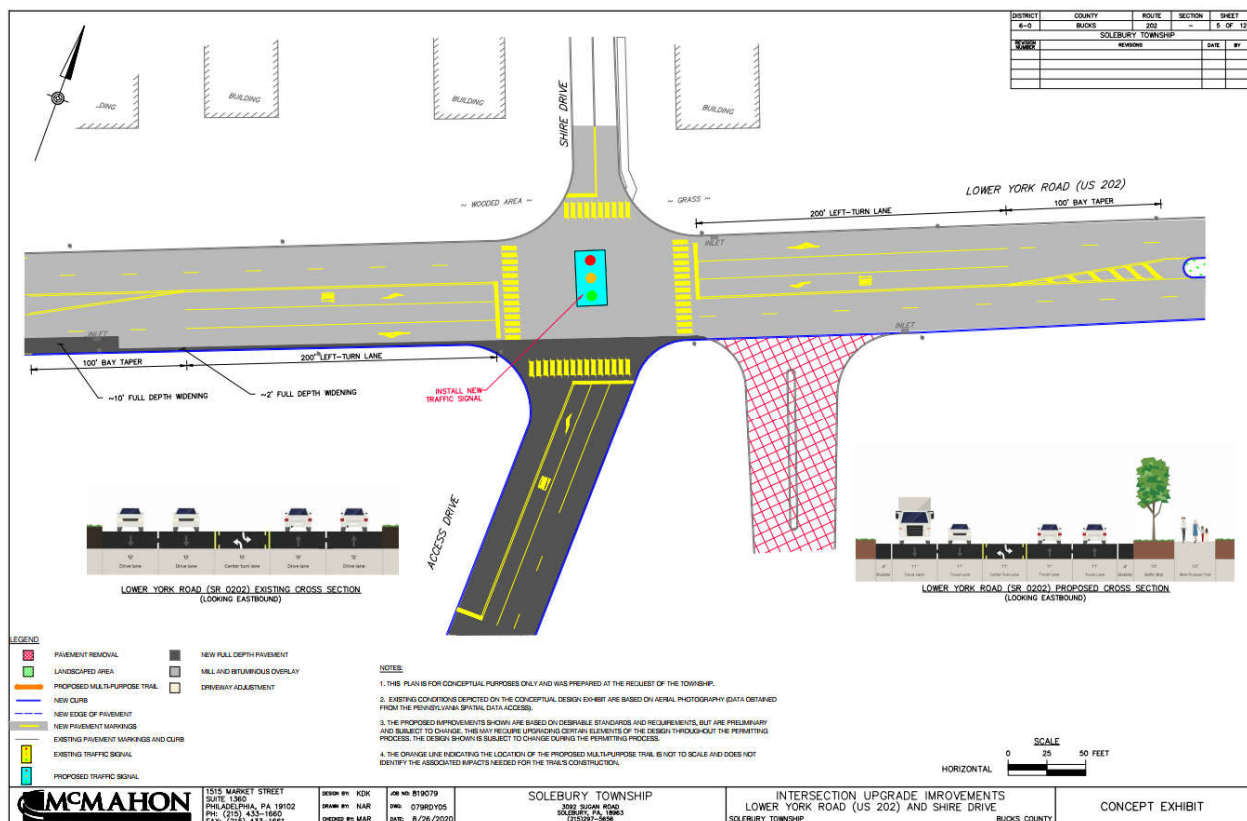
Lower York Road (Route 202) and Silvertail Lane

- Remove gore along Route 202 for full center left-turn lane.
- Provide three-lane cross section with area for future pedestrian trail on east side.



Lower York Road (Route 202) and Shire Drive/Logan Square Shopping Center

- Modify the intersection to align Shire Drive with the Logan Square site access to eliminate the existing off-set intersection and split phasing of traffic signal.
- Convert the existing northbound right-turn lane into an additional northbound through lane to improve vehicle flow and reduce vehicle queues.
- Provide a separate left-turn lane and shared through/right-turn lane on the westbound approach of the shopping center to accommodate future development and traffic associated with the extension of W. Bridge Street.
- Complete upgrade of the traffic control signal to provide video detection, dilemma zone detection, and provide advanced Smart Technology.
- Provide ADA curb ramps, pedestrian crosswalks, pedestrian signal heads, and ADA push buttons on all corners and approaches.



Build Alternative 1

Build Alternative 1 includes an additional traffic signal between Kitchens Lane/Bridge Street (Route 179) and Shire Drive intersections.

Lower York Road (Route 202) and Proposed Signalized Driveway

- Provision of an additional traffic signal between Kitchens Lane/Bridge Street (Route 179) and Shire Drive.
- Provide a separate left-turn lane along the southbound approach of Route 202.
- Provide a separate left-turn lane and a separate right-turn lane along the egress approach to Route 202.
- Provide ADA curb ramps, pedestrian crosswalks, pedestrian signal heads, and ADA push buttons on all corners and approaches.

Build Alternative 2

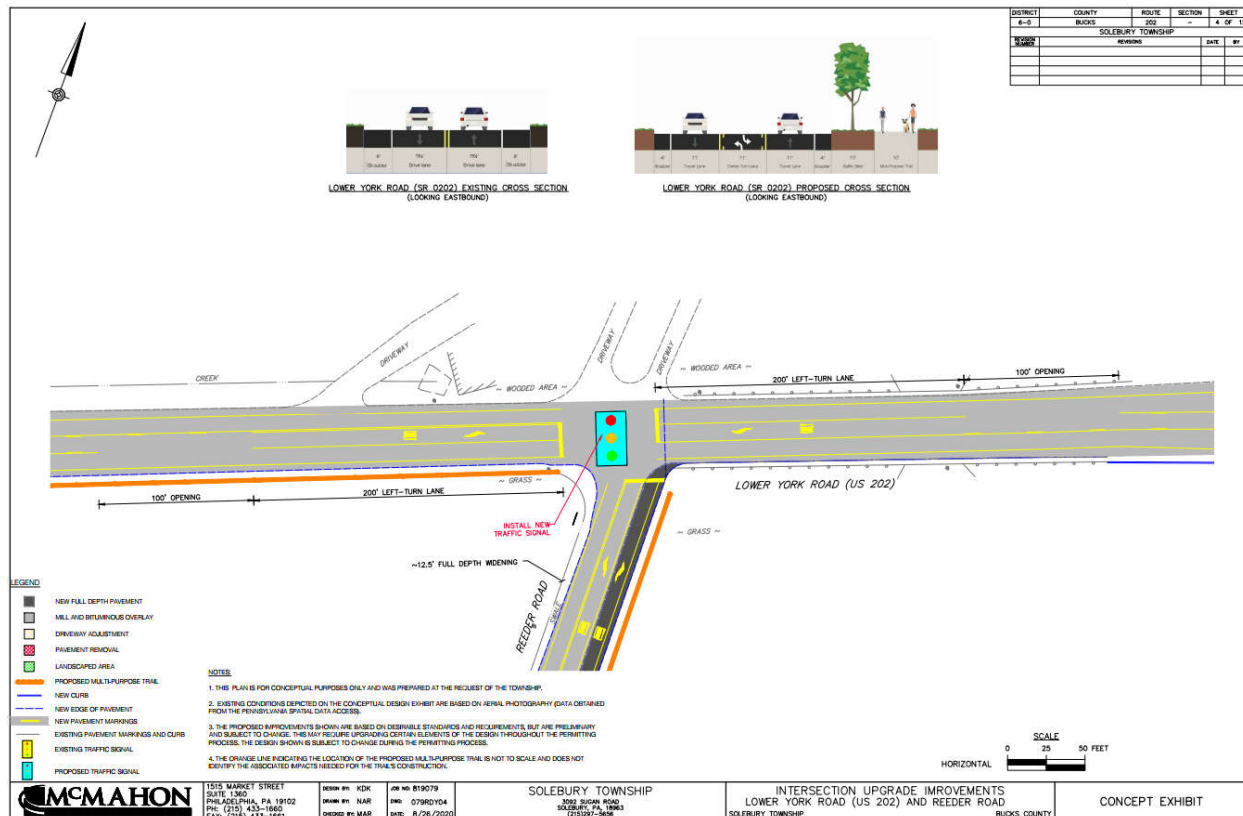
Build Alternative 2 includes an additional traffic signal between Kitchens Lane/Bridge Street (Route 179) and Shire Drive intersections, relocation of W Bridge Street through the Route 202 commercial district, Kitchens Lane redesigned as an unsignalized T-intersection, a new traffic signal at Reeder Road, and modifications to the intersection of Route 202 and Sagan Road.

Bridge Street (Route 179)

- Eliminate the existing connection of Route 202 to/from Bridge Street.
- Create a new Bridge Street that extends through a commercial/mixed-use district along the eastern side of the Route 202 corridor.
- Provide access connections between Route 202 and the commercial/mixed-use district at various locations.

Lower York Road (Route 202) and Reeder Road

- Provide separate left-turn lanes along the Route 202 approaches.
- Widen Reeder Road approach to provide separate left and right lanes.
- Install a new traffic control signal if and when future traffic volumes warrant the need for additional control for vehicles entering and exiting Reeder Road.
- Design for the potential of a future connection to Township owned lands along the northeast quadrant of the intersection.
- Provide ADA curb ramps, pedestrian crosswalk, pedestrian signal heads, and ADA push buttons for crossing Reeder Road.



Lower York Road (Route 202) and Proposed Signalized Driveway

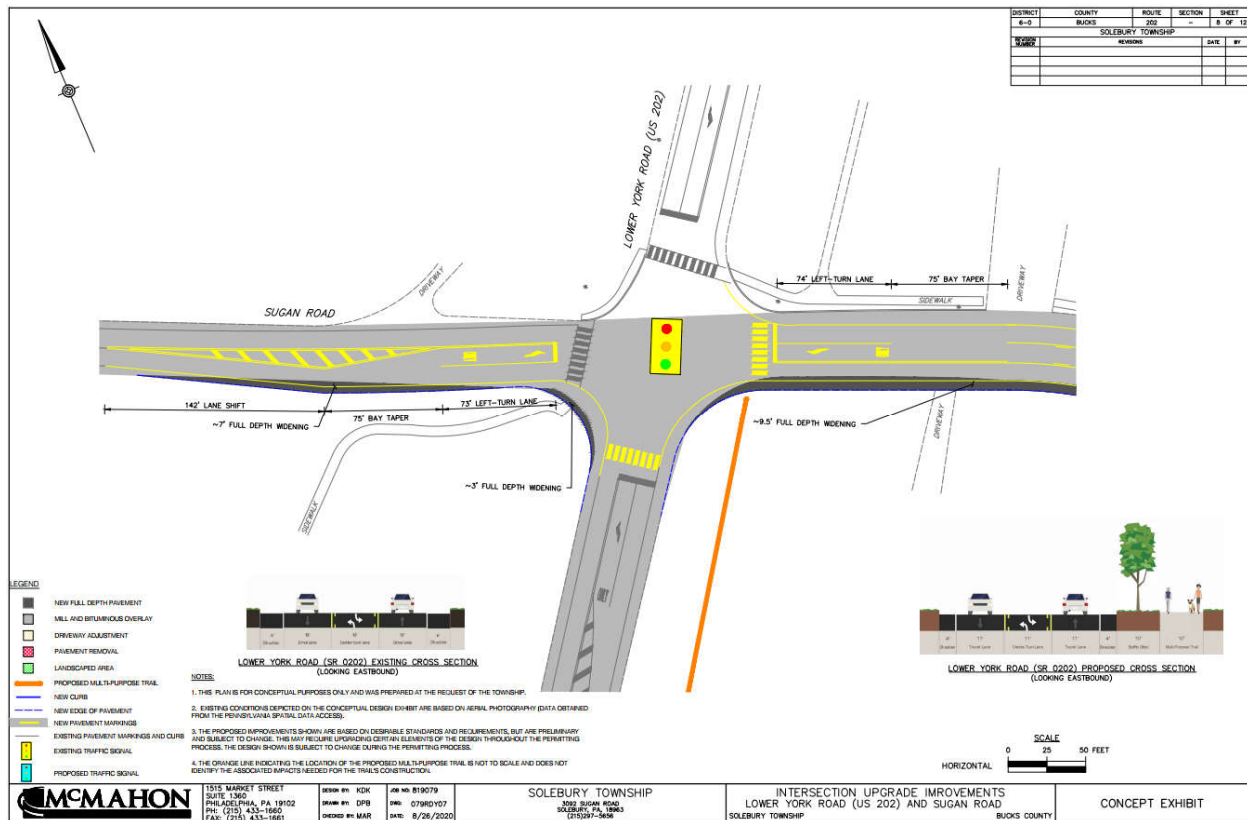
- Provision of an additional traffic signal between Bridge Street (Route 179) and Shire Drive to provide an additional signal to accommodate the extension of Bridge Street.
- Provide a separate left-turn lane along the southbound approach of Route 202.
- Provide a separate left-turn lane and a separate right-turn lane along the egress approach to Route 202.
- Provide ADA curb ramps, pedestrian crosswalks, pedestrian signal heads, and ADA push buttons on all corners and approaches.

Lower York Road (Route 202) and Kitchens Lane

- Eliminate the connection to Bridge Street (Route 179).
- Convert intersection to an unsignalized T-intersection.

Lower York Road (Route 202) and Suga Road

- Widen Suga Road to provide separate left-turn lanes.
- Provide ADA curb ramps, pedestrian crosswalks, pedestrian signal heads, and ADA push buttons on the northbound and westbound approaches (provided in existing conditions for southbound and eastbound approaches).



Build Alternative 3

Build Alternative 3 includes the construction of a roundabout in place of the existing Route 202 and Kitchens Lane/Bridge Street (Route 179) intersection.

Lower York Road (Route 202) and Kitchens Lane/Bridge Street (Route 179)

- Remove traffic signal.
- Construct a multi-lane roundabout with two lanes along the Route 202 approaches, two lanes along the Bridge Street approach, and one lane along the Kitchens Lane approach.
- Design the roundabout to accommodate two Bridge Street approach lanes, however, the second lane should not be provided for traffic to use until traffic operations show the need for the second lane.

The characteristics of each Build Alternative are described in more detail below in **Table 1**.

Table 1. Build Alternatives Matrix

Intersection	Improvement	Build Alternative		
		1	2	3
Route 202	Optimize signal timings at all signalized intersections	X	X	X
	Provide a 3-lane cross-section from Rt 202 from Aquetong Rd to 800' south of Shire Dr	X	X	X
	Provide a 5-lane cross-section along Rt 202 from 800' south of Shire Dr to Kitchens Ln	X	X	X
Route 202 & Aquetong Road	Provide separate left-turn lanes on each approach of Rt 202	X	X	X
	Realign Aquetong Rd	X	X	X
	Modify traffic signal to eliminate split phasing	X	X	X
Route 202 & Lower Mountain Rd	Provide a separate left-turn lane along the Rt 202 approach	X	X	X
Route 202 & Silvertail Lane	Remove gore along Rt 202 for center left-turn lane	X	X	X
Route 202 & Reeder Road	Provide separate left-turn lanes along the Route 202 approaches	X	X	X
	Provide a separate left-turn lane and separate right-turn lane along Reeder Rd		X	
	Install a new traffic signal		X	
Route 202 & Shire Drive/Logan Square Shopping Center	Align Shire Dr with the Logan Square site access to eliminate the off-set intersection and split phasing	X	X	X
	Convert the existing NB right-turn lane into a NB through lane	X	X	X
	Provide a separate left-turn lane and shared through/right-turn lane along the WB approach	X	X	X
	Complete upgrade of the traffic control signal	X	X	X
Route 202 & Proposed Signalized Driveway	Provide an additional traffic signal between Bridge St (Rt 179) and Shire Dr	X	X	
	Provide a separate left-turn lane along the SB approach of Rt 202	X	X	
	Provide a separate left-turn lane and separate right-turn lane along the egress approach to Rt 202	X	X	
Bridge Street (Route 179)	Eliminate the existing connection of Rt 202 to Bridge St and create a new Bridge St that extends through a commercial district		X	
Route 202 & Kitchens Lane/Bridge Street (Route 179)	Eliminate the connection to Bridge St (Rt 179) and convert to a signalized T-intersection		X	
	Remove traffic signal and construct a multi-lane roundabout			X
Route 202 & Sukan Road	Widen Sukan Rd to provide separate left-turn lanes		X	

Matrix tables summarizing the results of the level-of-service and queueing analyses for each of the study area intersections and Build Alternatives are contained in **Appendices A and K**.

Recommendations and Project Priorities

Short-Term Project Goals (3-year to 7-year Horizon)

- Route 202 and Aquetong Road intersection improvements (*safety and operation benefits*)
- Route 202 and Lower Mountain Road intersection improvements (*safety and operation benefits*)
- Route 202 and Silvertail Lane intersection improvements (*safety and operation benefits*)
- Route 202 and Reeder Road intersection improvements (*safety and operation benefits*)
- Route 202 and SC Access/Shire Drive intersection realignment improvements (*safety and operation benefits*)
- Route 202 and Sukan Road intersection improvements (*safety and operation benefits*)
- Route 202 – 5-lane cross section from west of Shire Drive through Kitchens Lane (*capacity improvement for sustained growth*)
- Additional traffic signal along Route 202 between Kitchens Lane and Shire Drive (*capacity and safety improvement for sustained growth*)

Long-Term Project Goals (8-year to 15-year Horizon)

- Route 202 – 3-lane cross section from west of Aquetong Road to east of Reeder Road (*capacity and safety improvement for sustained growth*)
- Route 202 Multi-Use Trail along entire length of corridor within Solebury Township limits
- Bridge Street (Route 179) - eliminate the existing connection to Route 202 and create alignment through commercial/mixed-use district. (*capacity improvement for sustained growth*)
- Route 202 Roundabout - construct a multi-lane roundabout with two lanes along the Route 202 approaches, two lanes along the Bridge Street approach, and one lane along the Kitchens Lane approach. (*capacity improvement for sustained growth*)

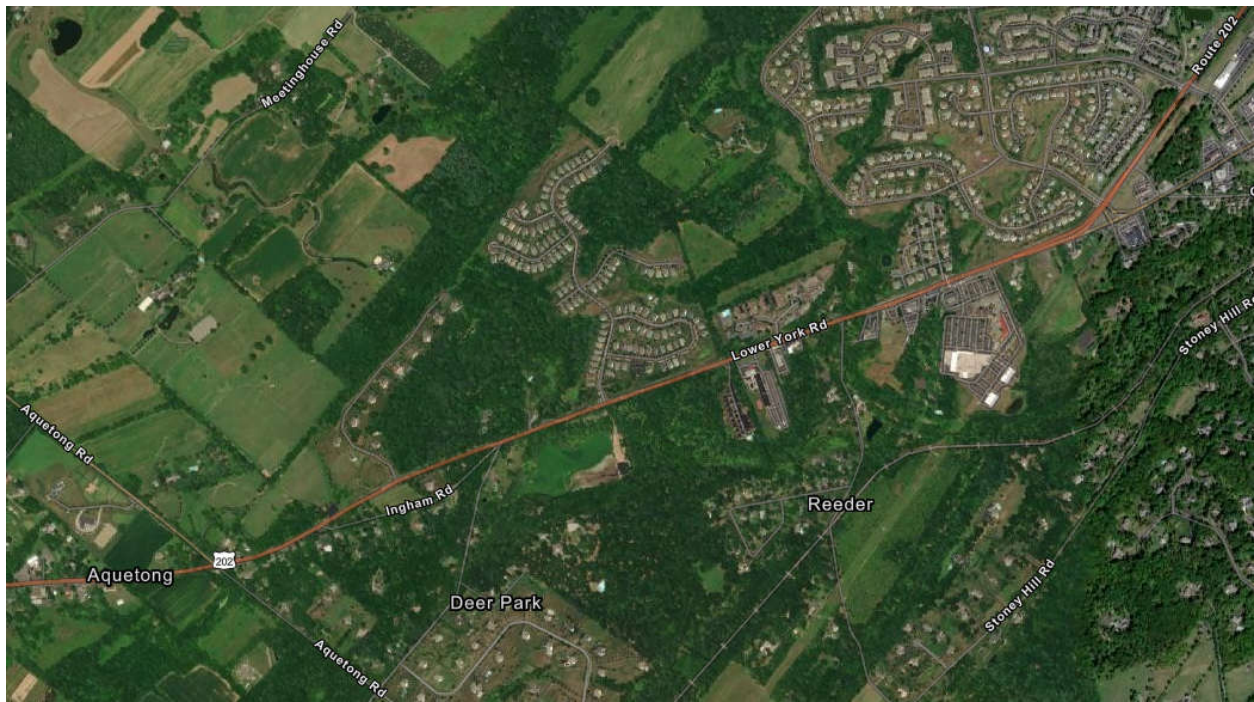
Next Steps

There has been significant collaboration in the development of the Route 202 Corridor – Transportation Master Plan. It is recommended that this collaboration continue to decide which Build Alternative best fits the Township’s needs for the future and to encourage the implementation of this plan over time.

Specific steps toward implementation of the above improvements include the preparation of more detailed conceptual design plans and roadway cross-sections at various locations along the corridor to visually depict the recommended roadway and intersection improvements for the corridor to be utilized in the preparation of public funding grants and for consideration by PennDOT, as well as for further discussion with potential private-sector developers for implementation into their development plans for the corridor.

Additionally, conduct a constructability review of the recommendations to determine probable construction sequencing, phasing, and ability to implement the recommended improvements and work within existing physical and operational constraints and needs of the corridor.

Finally, it is recommended that Solebury Township continue to work with developers and affected property owners as new development and redevelopment occur along the corridor to enforce the recommendations outlined in this report.



1 | Background

Introduction

The Route 202 Corridor, which is located through the center of Solebury Township, extends from approximately Aquetong Road to Sogan Road. The specific area that is the subject of the Route 202 Corridor – Transportation Master Plan include the following study intersections:

- Lower York Road (Route 202) and Aquetong Road
- Lower York Road (Route 202) and Lower Mountain Road
- Lower York Road (Route 202) and Silvertail Lane
- Lower York Road (Route 202) and Reeder Road
- Lower York Road (Route 202) and Shire Drive/Logan Square Shopping Center
- Lower York Road (Route 202) and Kitchens Lane/Bridge Street (Route 179)
- Lower York Road (Route 202) and Sogan Road

The main focus of the transportation plan is to develop a transportation master plan that supports future development and sustainable growth, creating a network of roadways that reduces traffic congestion by improving regional traffic flow along the Route 202 Corridor through Smart Transportation technology, and providing a plan for the future to support and control traffic growth from development.

In order to develop this transportation master plan and assist Solebury Township in planning for future development and redevelopment that is envisioned for the commercial district in Solebury Township, the focus of this effort include the following:

- Provide a safe and equitable travel corridor for all users (pedestrians, bicycles, transit, vehicles).
- Provide a controlled, yet flexible environment capable of support of the various and diverse demands for future/anticipated traffic and frontage development, including:
 - Vehicular and pedestrian accessibility
 - Aesthetics
 - Public Spaces
 - Compatibility with/enhancement of adjacent neighborhoods and communities
 - Green/sustainable spaces
- Develop a corridor plan for promoting development and sustainable growth.
- Improve traffic flow and reduce traffic congestion along the corridor.
- Provide a plan for the future to support and control traffic growth from development.

The study area for this project through Solebury Township, consists of one principal arterial, Route 202, approximately 2.0 mile-long segment that traverse the center of the Township. Carrying over 16,000 vehicles per day, Route 202 is a vitally important roadway that provides regional traffic flow and connectivity across Solebury Township, as well as across Bucks County and western New Jersey. Route 202 provides linkages to a wide variety of key destinations, including schools, office parks, community facilities, retail shops, park, residential neighborhoods, and other major roadways.

Table 2. Roadway Characteristics

Route 202	
Limits	Aquetong Road to Sukan Road
Length	2.0 miles
Classification / Road Typology	Principal Arterial
ADT ⁽¹⁾	12,364 - 16,920
Posted Speed Limit	45 MPH
85th Percentile Speed ⁽¹⁾	NB: 47 – 51 MPH
	SB: 48 – 53 MPH

(1) Based on ATR Data provided in Appendix D.

There are many existing conditions and key issues within the Route 202 Corridor. In order to understand Route 202 issues from a resident's perspective, Solebury Township residents were contacted to provide comments regarding the issues along the Route 202 Corridor. Township residents voiced the following issues:

- Heavy traffic flow especially bad on weekends.
- Timing of lights along Route 202 is insufficient and uncoordinated especially at Logan Square.
- Left-turns along Route 202 are dangerous where there is no left turn lane.
- Shoulders are non-existent or not wide enough to skirt around cars turning left.
- Right-turn lane along Route 202 from Pizza Parlor to Logan Square Shopping Center does not work remove traffic from through lane along Route 202.
- Driving from Kitchens Lane to Bridge Street (Route 179) the turn into Jamie Hollander's complex is too quick of a right without enough right-turn lanes to maneuver.
- Need left-turn lanes at both Lower & Upper Mountain Road (southbound).
- Bike and walking trails are intermittent.
- There is no safe crossings for pedestrians to cross Route 202.
- Intersection of Route 202 and Shire Drive/Logan Square Shopping Center slows traffic considerably due to its disjointed layout.

In response to input received from the community, the following improvements have been evaluated and developed for the Route 202 Corridor:

- Roadway cross-sections to accommodate various modes and uses including the provision of bicycle and walking trails along the entire corridor.
- Studied the operational effectiveness of auxiliary turn lanes at key intersections and access driveways.
- Analyzed the re-alignment of the intersection Logan Square and Shire Drive to eliminate off-set intersection and split phasing of traffic signal.
- Evaluated the realignment of W. Bridge Street to traverse through a commercial district, thus eliminating the unconventional Route 202 and W. Bridge Street intersection and the need for a potential roundabout in the future to control vehicle flows at the intersection.
- Design for the potential future connection to Reeder Road via the extension of W. Bridge Street through a commercial district.
- Evaluated a multi-lane roundabout at the intersection of Route 202 and Kitchens Lane/Bridge Street (Route 179), thus eliminating the unconventional Route 202 and W. Bridge Street intersection
- Additional through lane on the northbound Route 202 approach at Shire Drive, and improved traffic signal progression along Route 202 Corridor to help reduce vehicle emissions.

Project Process and Schedule

The Route 202 Corridor – Transportation Master Plan began as an idea to help support future development by creating a network of roadways that reduces traffic congestion. With the recommendations from residents and Solebury Township Officials, McMahon developed a transportation plan that reduces existing traffic delay and queueing issues along Route 202,

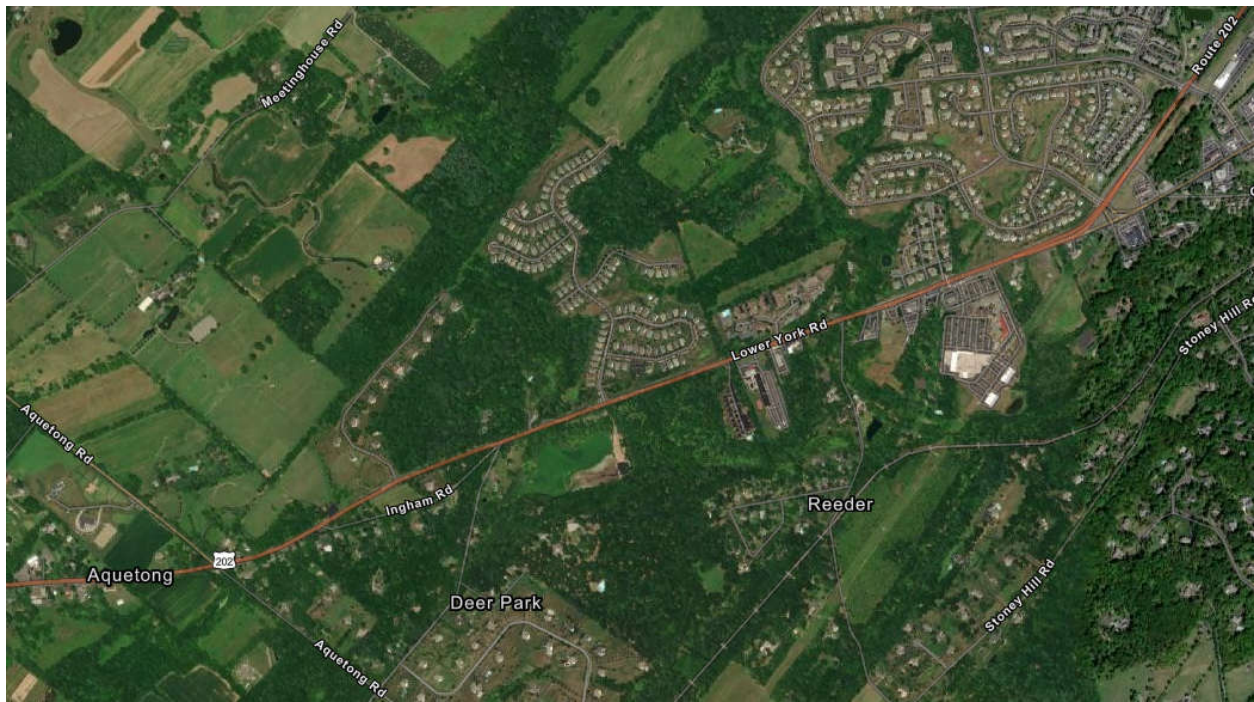
improves the safety and connectivity along Route 202, and provides a roadway network that supports future development and growth. This transportation plan provides a blueprint for transforming the Route 202 Corridor into a safe, vibrant, comfortable, and desirable area of the Township for walking, biking, and driving. The process started in early 2019 and is expected to be completed and a plan approved by Solebury Township Board of Supervisors in summer of 2020.



Stakeholder and Public Involvement

The Route 202 Corridor – Transportation Master Plan was developed and shaped with input from Township Officials, Staff, and residents of Solebury Township.

- Committee Meetings
 - The Solebury Township Land Use & Transportation Project Steering Committee and McMahon Associates met four times throughout the planning process and provided input on key deliverables and recommendations. Additional meetings have been scheduled for the future to address any additional concerns. The members of the Solebury Township Land Use & Transportation Project Steering Committee consisted of a diverse group of members from the Board of Supervisors, Planning Commission, Solebury Community Representative, Township Manager, and Assistant Township Manager.
- Public Meetings
 - There were several public meetings scheduled for this project. One was held, on June 18, 2019, at the Township’s regularly scheduled Board of Supervisors meeting. This meeting was the first round of conceptual approaches after more than five months of comments and suggestions from Solebury Residents.



2 | Existing Conditions

Existing Issues

There are several existing constraints to an efficient transportation system within the vicinity of the Route 202 Corridor that cause delays, queueing, and unexpected movements throughout the study area. These issues must be addressed in order to support future development and growth along the Route 202 Corridor in Solebury Township such as Aquetong Spring Park. Aquetong Spring Park is located along Lower Mountain Road directly off of Route 202, and the Park is anticipated to generate additional traffic turning in and out of Lower Mountain Road. The existing issues along Route 202 must be addressed to assist public access to and from Lower Mountain Road to Route 202.

Vehicular Transportation Issues

One of the largest issues for efficient vehicular traffic operations are the delays and queueing caused by the cross-section of Route 202 within the study area. From Aquetong Road to 400 feet south of Shire Drive, Route 202 is a 2-lane cross-section for vehicular traffic. Due to the lack of left-turn lanes and



Existing 2-Lane Cross-Section Northbound



Existing 2-Lane Cross-Section Southbound

narrow shoulders, vehicles traveling north and south often experience delays due to left-turning vehicles at several intersections. This scenario is experienced at the Route 202 study intersections of Aquetong Road, Lower Mountain Road/Ingham Road, and Reeder Road. From 400 feet south of Shire Drive to Kitchens Lane, Route 202 varies from 3-5 lane cross-section for vehicular traffic, depending on location. However, due to the lane configuration along the northbound approach in this area, the northbound approach only has one through lane. This lane configuration causes significant queueing issues along the northbound approach at the signalized intersection of Route 202 and Shire Drive/Logan Square Shopping Center. The traffic queues at this intersection can extend to 800 feet which makes it difficult for vehicles to enter or exit the businesses along Route 202.

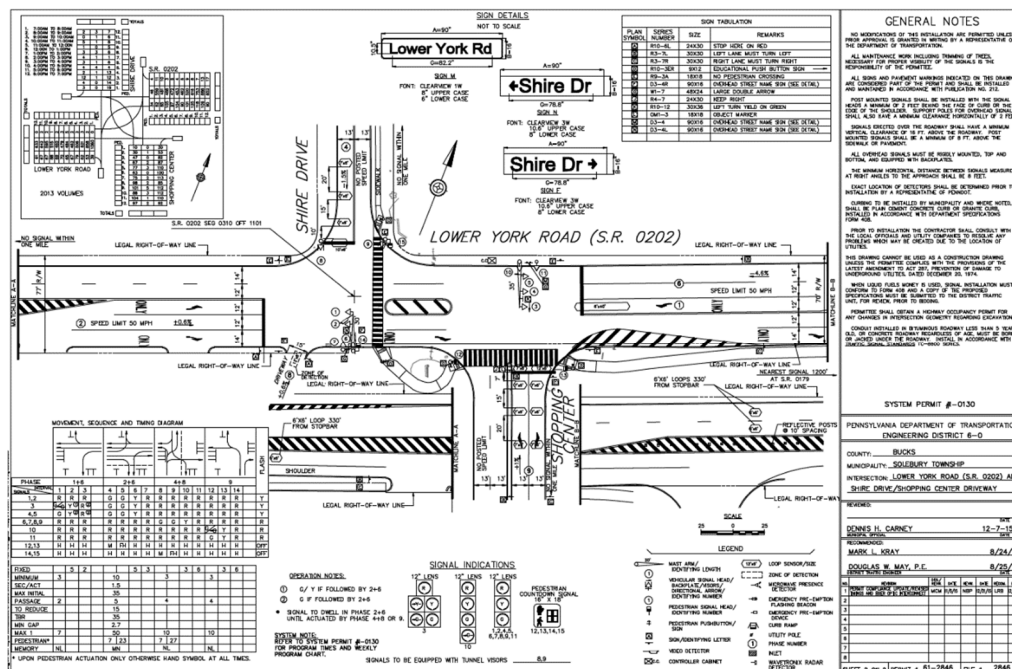


Existing 4-Lane Cross-Section



Existing Queueing Issues

An additional issue along the corridor, is the traffic delay experienced at the signalized intersection of Route 202 and Shire Drive/Logan Square Shopping Center. Significant delays exist along the Logan Square Shopping Center approach. This delay is caused by the off-set nature of the intersection with Shire Drive and the split phasing of the traffic signal.



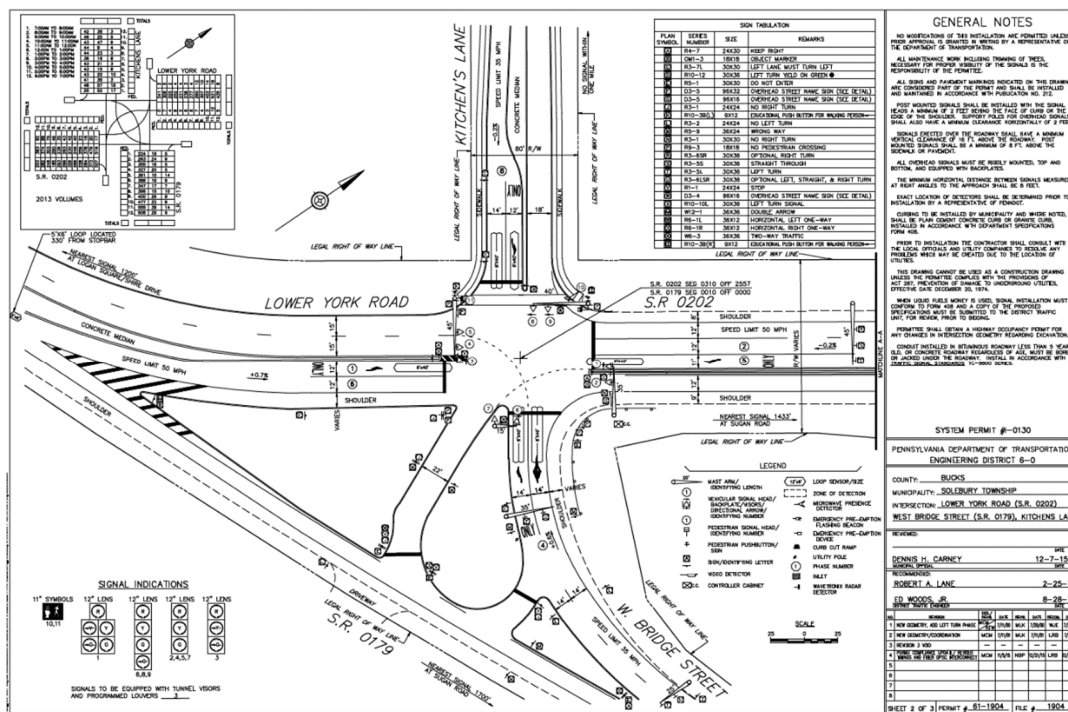
The unconventional intersection of Route 202 and Kitchens Lane/Bridge Street (Route 179) also is a reason for driver frustration along the corridor. Vehicles traveling north in this section of Route 202 have the option of splitting right onto Bridge Street (Route 179) to continue towards New Hope or staying on Route 202 to continue towards New Jersey. Vehicles that decide to split right onto Bridge Street (Route 179) experience unexpected conflicts due to the unconventional intersection of Route 202 and Kitchens Lane/Bridge Street (Route 179). There is a stop-controlled approach entering Bridge Street with vehicles traveling from Kitchens Lane and southbound Route 202. There is also a stop-controlled approach exiting Bridge Street to enter the unconventional signalized intersection. Both of these stop-controlled approaches have very short storage lengths and cannot accommodate many vehicles. These short storage lengths cause the potential of vehicles backing into the main travel lanes. Along Bridge Street, there are also several private driveways.





Vehicles traveling south along Bridge Street (Route 179) experience minor delays and queueing along the approach to Route 202. This approach utilizes dual left-turn lanes onto Route 202 which allows these vehicles to make this movement under protected conditions and no conflict from other movements. However, this phase uses a significant amount of green time from the signal.

Photographs of the existing traffic operation issues are provided in **Appendix E**.



Existing Pedestrian/Bicycle Network Issues

From a Pedestrian/bicyclist perspective, minimal accommodations are currently provided within the study area. There are short segments of sidewalk along the site frontage of the Logan Square Shopping Center, but no sidewalks exist south of this area. There is also the Solebury Township Trail, a shared-use trail for walkers, joggers, and bicyclists. However, in existing conditions, this trail only extends up to Sугan Road. Many Township residents have also voiced complaints about the difficulty of crossing Route 202 as a pedestrian.



Solebury Township Trail at Sугan Road

Pedestrian Crossing Warrants

Pedestrian crossings along Route 202 are desired by Township residents and it is understood there may be a need for a pedestrian crossing in the vicinity of Lower Mountain Road and Silvertail Lane. However, pedestrian crossings must satisfy PennDOT requirements before being recommended at a location along Route 202.

At locations where the potential crossings are uncontrolled, the minimum requirements for new uncontrolled midblock crossing are utilized for this evaluation due to the similar characteristic, including uncontrolled traffic operation on the main arterial and unprotected pedestrian crossing. In accordance with the Manual on Uniform Traffic Control Devices (MUTCD) 2009 Edition, PennDOT Publication 46, and HCM 2000, the following factors were considered:

- Speed Limit – The posted speed limit is 35 mph or less.
- Other Nearby Marked Crosswalks – The nearest marked crosswalk on the same roadway is over 300 feet from the proposed crossing.
- Traffic Volumes – The maximum traffic volume on the roadway is 10,000 ADT, except on two-lane roadways the maximum traffic volume may be 15,000 ADT. If a raised median or pedestrian refuge island exists where pedestrians are protected from vehicular traffic, the maximum traffic volume applies to each segment of the pedestrian crossing.
- Number of Lanes – No more than three travel lanes may be crossed without a raised median or pedestrian refuge island.
- Parking Restrictions – To improve visibility, parking is not permitted within 75 feet, unless a 6- to 8-foot curb extension is in place to improve pedestrian visibility
- Pedestrian Delay – The pedestrian delay determines the likeliness of risk-taking behavior by pedestrian.

Along Route 202, pedestrian crossing warrant analyses were conducted at Lower Mountain Road and Silvertail Lane for crossing Route 202. For both of these locations along Route 202,

pedestrian crossing warrants are not satisfied which indicate that these locations are not good candidates for a pedestrian crossing. The various warrant/guidelines analysis worksheets are contained in **Appendix L**

However, if further justification is provided, before a marked uncontrolled crossing location is installed, the following countermeasures should be considered at the location:

- High-visibility crosswalk markings, parking restriction on crosswalk approach, adequate nighttime lighting levels
- Advance Yield Here To (Stop Here For) Pedestrian sign and yield (stop) line
- Pedestrian Hybrid Beacon (but not immediately at the intersection, MUTCD guidance is to locate PHB's at least 100 feet away from an intersection)

Public Transit Issues

From a public transit perspective, there are no transit alternatives within the Solebury Township area.

The existing characteristics of the study intersections, including photographs, field sketches, and signal plans are provided in **Appendix B**.

Crash Summary

Reportable crash data was obtained from PennDOT for the five year period from January 1, 2014 to December 31, 2018. A reportable crash is defined as a crash in which there was an injury and/or a vehicle needed to be towed from the scene. **Table 3** below provides a summary of the reportable crashes at each of the study intersections.

**Table 3. Reportable Crash Summary
January 1, 2014 to December 31, 2018**

Location	Traffic Control	Frequency of Crashes (Number per Year)						Average Per Year
		2014	2015	2016	2017	2018	Total	
Lower York Road (Route 202) & Aquetong Road	Signal	1	5	1	3	1	11	2.2
Lower York Road (Route 202) & Lower Mountain Road/Ingham Road	TWSC	1	2	2	3	1	9	1.8
Lower York Road (Route 202) & Silvertail Lane	TWSC	0	1	0	0	0	1	0.2
Lower York Road (Route 202) & Reeder Road	TWSC	1	0	2	1	1	5	1.0
Lower York Road (Route 202) & Shire Drive/Logan Square Shopping Center	Signal	1	0	4	2	2	9	1.8
Lower York Road (Route 202) & Kitchens Lane/Route 179	Signal	0	2	2	2	0	6	1.2
Lower York Road (Route 202) & Sугan Road	Signal	5	3	1	0	0	9	1.8
Route 179 near split with Route 202 (Between Segment 0010, Offset 0000 and Segment 0010, Offset 0561)	Midblock	0	5	0	1	0	6	1.2
Lower York Road (Route 202) Midblock Locations (Aquetong Road to Reeder Road)	Midblock	4	4	5	5	1	19	3.8
Lower York Road (Route 202) Midblock Locations (Reeder Road to Sугan Road)	Midblock	1	2	2	3	3	11	2.2
Total	---	14	24	19	20	9	86	17.2

As documented in Table 3, there were a total of eighty-six (86) reportable crashes within the study area during the five-year time-period from January 1, 2014 to December 31, 2018 for an average of 17.2 reportable crashes per year. Of the 86 total crashes, there were no fatalities or major injuries reported.

Table 4 provides a summary of the crash types of reportable crashes that occurred at each intersection, respectively. The majority of the study area crashes were rear-end incidents (51 percent) or angle incidents (23 percent).

Table 4. Reportable Crash Types by Location

Location	Angle	Rear-End	Hit Fixed Object	Head-On	Pedestrian	Same Direction Side-Swipe	Unknown	Total
Lower York Road (Route 202) & Aquetong Road	3	5	2	0	0	0	1	11
Lower York Road (Route 202) & Lower Mountain Road/Ingham Road	0	7	2	0	0	0	0	9
Lower York Road (Route 202) & Silvertail Lane	0	1	0	0	0	0	0	1
Lower York Road (Route 202) & Reeder Road	0	4	0	0	0	1	0	5
Lower York Road (Route 202) & Shire Drive/Logan Square Shopping Center	1	7	0	1	0	0	0	9
Lower York Road (Route 202) & Kitchens Lane/Route 179	1	2	2	1	0	0	0	6
Lower York Road (Route 202) & Sugan Road	8	1	0	0	0	0	0	9
Route 179 near split with Route 202 (Between Segment 0010, Offset 0000 and Segment 0010, Offset 0561)	4	0	1	0	0	0	1	6
Lower York Road (Route 202) Midblock Locations (Aquetong Road to Reeder Road)	1	11	4	0	0	1	2	19
Lower York Road (Route 202) Midblock Locations (Reeder Road to Sugan Road)	2	6	2	0	0	1	0	11
Total	20	44	13	2	0	3	4	86

Existing Traffic Volumes

Daily Traffic counts were conducted in January and February 2019 for one full week along Route 202 to collect traffic volumes, vehicle classifications, and travel speeds. The traffic count worksheets are provided in **Appendix D**. Turning movement traffic counts were conducted in January and February 2019 during the weekday morning peak period (7:00 AM to 9:00 AM), weekday afternoon peak period (4:00 PM to 6:00 PM), and Saturday midday peak period (11:00 AM to 1:00 PM). These counts include heavy vehicles by movements, and pedestrian and bicycle activity at the following intersections:

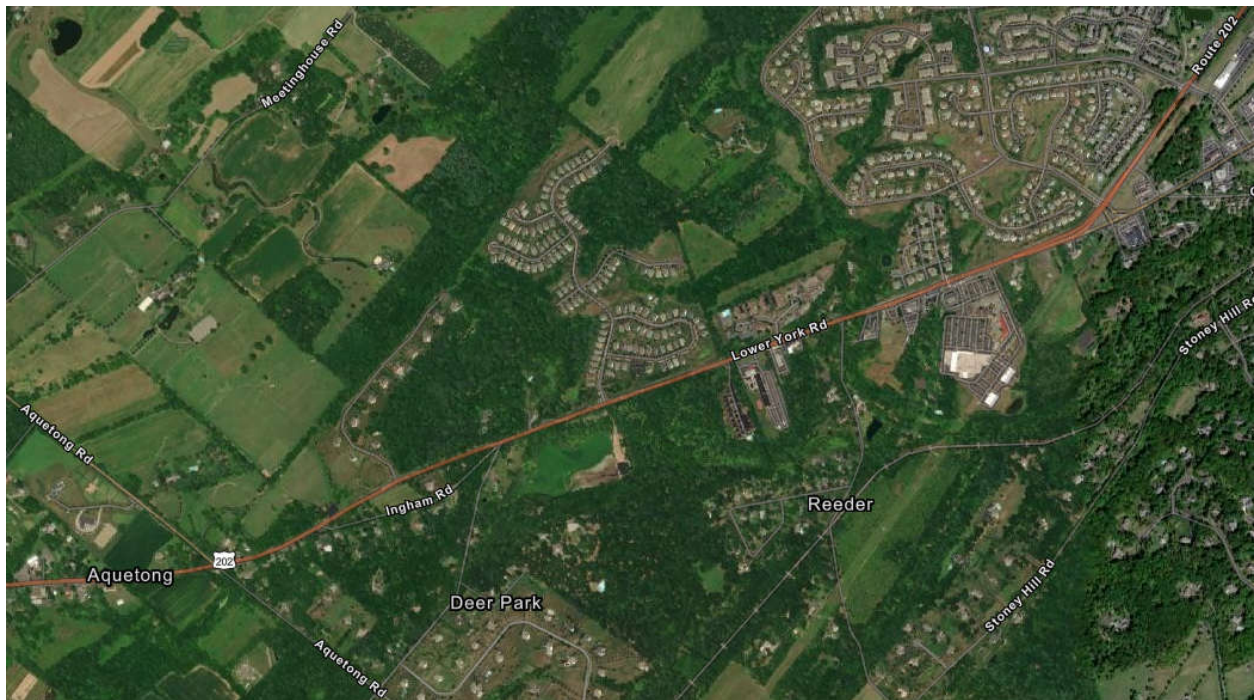
- Lower York Road (Route 202) and Aquetong Road
- Lower York Road (Route 202) and Lower Mountain Road
- Lower York Road (Route 202) and Silvertail Lane
- Lower York Road (Route 202) and Reeder Road
- Lower York Road (Route 202) and Shire Drive/Logan Square Shopping Center
- Lower York Road (Route 202) and Kitchens Lane/Bridge Street (Route 179)
- Lower York Road (Route 202) and Sukan Road

The traffic counts were tabulated by 15-minute intervals **Appendix C**. The four highest consecutive 15-minute peak intervals during these traffic count periods constitute the peak hours that are the basis of this traffic analysis. **Figure 1A** illustrates the 2019 existing weekday morning, weekday afternoon, and Saturday midday peak hours.

Existing Traffic Conditions

The vehicular traffic volumes summarized in Figure 1A, were analyzed to determine the existing traffic operating conditions in accordance with the standard techniques contained in the current *Highway Capacity Manual (6th Edition)* for both signalized and unsignalized intersections. These standard capacity/level-of-service analysis techniques, which calculate total control delay, are more thoroughly described in **Appendix F** for both signalized and unsignalized intersections, as well as the correlation between average total control delay and the respective level 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. 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 capacity.

The 2019 existing weekday morning, weekday afternoon, and Saturday midday peak hour traffic volumes presented in Figure 1 were analyzed to determine the existing traffic operating conditions. The results of this analysis are shown in **Figure 1B** and the detailed capacity/level of service analysis worksheets are provided in **Appendix G**.



3 | Future Traffic Conditions

This section presents the future build-out year (2040) traffic conditions, both without and with future developments. The future 2040 build-out year without-development traffic volumes were estimated by increasing the existing 2019 traffic volumes to account for regional growth, as described below. The 2040 build-out year without-development volumes were redistributed per each Build Alternative and the increase due to the anticipated trip generation for potential future developments was then added, resulting in the future 2040 build-out year with-development traffic volumes for each Build Alternative.

Regional Traffic Growth

To account for regional traffic growth, the existing traffic volumes were increased by an annual traffic growth rate of 0.60 percent per year compounded for twenty-one years to 2040, or 13.39 percent total to 2040. This growth rate is consistent with the traffic growth rate recommended by the PennDOT Bureau of Planning and Research *Growth Factors for August 2018 to July 2019* for similar, Urban Non-Interstate roadways in Bucks County.

Local Traffic Growth

Aquetong Spring Park is a development located along Route 202 at the intersection with Lower Mountain Road. Aquetong Spring Park's parking lot is located along Lower Mountain Road directly off of Route 202, and the Park is anticipated to generate additional traffic turning in and out of Lower Mountain Road. The existing issues along Route 202 must be addressed to assist public access to and from Lower Mountain Road to Route 202.

Planned Roadway Improvements

It is our understanding that there are no roadway projects planned by Solebury Township, PennDOT, or other area development projects that would have an impact on any of the study intersections.

Build Alternative Characteristics

In order to improve existing traffic conditions and help in accommodating the long-term future traffic demand throughout the Route 202 Corridor, the following traffic improvements were analyzed for the different Build Alternatives. The three Build Alternatives maintain similar characteristics along Route 202 from Aquetong Road to Silvertail Lane, and introduce unique differences in the commercial portion of Route 202. The characteristics of each Build Alternative are described below:

All Build Alternatives

Route 202

- Optimize signal timings at all signalized intersections.
- Provide a 3-lane cross-section along Route 202 from Aquetong Road to approximately 800 feet south of Shire Drive.
- Provide a 5-lane cross-section along Route 202 from approximately 800 feet south of Shire Drive to Kitchens Lane.

Lower York Road (Route 202) and Aquetong Road

- Widen Route 202 to provide separate left-turn lanes on each approach.
- Utilize striping and minor widening to align Aquetong Road.
- Modify traffic signal to eliminate split phasing of Aquetong Road.
- Provide ADA curb ramps, pedestrian crosswalk, pedestrian signal heads, and ADA push buttons for crossing Aquetong Road.

Lower York Road (Route 202) and Lower Mountain Road

- Provide a separate left-turn lane along the Route 202 approach.
- Provide ADA curb ramps and pedestrian crosswalk for crossing Lower Mountain Road.

Lower York Road (Route 202) and Silvertail Lane

- Remove gore along Route 202 for center left-turn lane.

Lower York Road (Route 202) and Reeder Road

- Provide separate left-turn lanes along the Route 202 approaches.
- Provide ADA curb ramps and pedestrian crosswalk for crossing Reeder Road.

Lower York Road (Route 202) and Shire Drive/Logan Square Shopping Center

- Modify the intersection to align Shire Drive with the Logan Square site access to eliminate the existing off-set intersection and split phasing of traffic signal.
- Convert the existing northbound right-turn lane into an additional northbound through lane to improve vehicle flow and reduce vehicle queues.
- Provide a separate left-turn lane and shared through/right-turn lane on the westbound approach of the shopping center to accommodate future development and traffic associated with the extension of W. Bridge Street.
- Complete upgrade of the traffic control signal to provide video detection, dilemma zone detection, and to provide Smart Technology.
- Provide ADA curb ramps, pedestrian crosswalks, pedestrian signal heads, and ADA push buttons on all corners and approaches.

Build Alternative 1

Build Alternative 1 includes an additional traffic signal between Bridge Street (Route 179) and Shire Drive intersections.

Lower York Road (Route 202) and Proposed Signalized Driveway

- Provision of an additional traffic signal between Bridge Street (Route 179) and Shire Drive.
- Provide a separate left-turn lane along the southbound approach of Route 202.
- Provide a separate left-turn lane and a separate right-turn lane along the egress approach to Route 202.
- Provide ADA curb ramps, pedestrian crosswalks, pedestrian signal heads, and ADA push buttons on all corners and approaches.

Build Alternative 2

Build Alternative 2 includes an additional traffic signal between Bridge Street (Route 179) and Shire Drive intersections, relocation of W Bridge Street through a commercial district, Kitchens Lane as a signalized T-intersection, a new traffic signal at Reeder Road, and modifications to Sukan Road at Route 202.

Bridge Street (Route 179)

- Eliminate the existing connection of Route 202 to Bridge Street.
- Create a new Bridge Street that extends through a commercial district.
- Connect to Route 202 at various locations.

Lower York Road (Route 202) and Reeder Road

- Provide a separate left-turn lane and a separate right-turn lane along Reeder Road.
- Install a new traffic signal.
- Design for the potential future connection to a commercial district via the extension of Bridge Street.

- Provide ADA curb ramps, pedestrian crosswalk, pedestrian signal heads, and ADA push buttons for crossing Reeder Road.

Lower York Road (Route 202) and Proposed Signalized Driveway

- Provision of an additional traffic signal between Bridge Street (Route 179) and Shire Drive to provide an additional signal to accommodate the extension of Bridge Street.
- Provide a separate left-turn lane along the southbound approach of Route 202.
- Provide a separate left-turn lane and a separate right-turn lane along the egress approach to Route 202.
- Provide ADA curb ramps, pedestrian crosswalks, pedestrian signal heads, and ADA push buttons on all corners and approaches.

Lower York Road (Route 202) and Kitchens Lane

- Eliminate the connection to Bridge Street (Route 179).
- Convert intersection to a signalized T-intersection.

Lower York Road (Route 202) and Sukan Road

- Widen Sukan Road to provide separate left-turn lanes.
- Provide ADA curb ramps, pedestrian crosswalks, pedestrian signal heads, and ADA push buttons on the northbound and westbound approaches (provided in existing conditions for southbound and eastbound approaches).

Build Alternative 3

Build Alternative 3 includes the construction of a roundabout in place of the existing Route 202 and Kitchens Lane/Bridge Street (Route 179) intersection.

Lower York Road (Route 202) and Kitchens Lane/Bridge Street (Route 179)

- Remove traffic signal.
- Construct a multi-lane roundabout with two lanes along the Route 202 approaches, two lanes along the Bridge Street approach, and one lane along the Kitchens Lane approach.
- Design the roundabout to accommodate two Bridge Street approach lanes, however, the second lane should not be provided for traffic to use until traffic operations show the need for the second lane.

The characteristics of each Build Alternative are described in more detail below in **Table 5**.

Table 5. Build Alternatives Matrix

Intersection	Improvement	Build Alternative		
		1	2	3
Route 202	Optimize signal timings at all signalized intersections	X	X	X
	Provide a 3-lane cross-section from Rt 202 from Aquetong Rd to 800' south of Shire Dr	X	X	X
	Provide a 5-lane cross-section along Rt 202 from 800' south of Shire Dr to Kitchens Ln	X	X	X
Route 202 & Aquetong Road	Provide separate left-turn lanes on each approach of Rt 202	X	X	X
	Realign Aquetong Rd	X	X	X
	Modify traffic signal to eliminate split phasing	X	X	X
Route 202 & Lower Mountain Rd	Provide a separate left-turn lane along the Rt 202 approach	X	X	X
Route 202 & Silvertail Lane	Remove gore along Rt 202 for center left-turn lane	X	X	X
Route 202 & Reeder Road	Provide separate left-turn lanes along the Route 202 approaches	X	X	X
	Provide a separate left-turn lane and separate right-turn lane along Reeder Rd		X	
	Install a new traffic signal		X	
Route 202 & Shire Drive/Logan Square Shopping Center	Align Shire Dr with the Logan Square site access to eliminate the off-set intersection and split phasing	X	X	X
	Convert the existing NB right-turn lane into a NB through lane	X	X	X
	Provide a separate left-turn lane and shared through/right-turn lane along the WB approach	X	X	X
	Complete upgrade of the traffic control signal	X	X	X
Route 202 & Proposed Signalized Driveway	Provide an additional traffic signal between Bridge St (Rt 179) and Shire Dr	X	X	
	Provide a separate left-turn lane along the SB approach of Rt 202	X	X	
	Provide a separate left-turn lane and separate right-turn lane along the egress approach to Rt 202	X	X	
Bridge Street (Route 179)	Eliminate the existing connection of Rt 202 to Bridge St and create a new Bridge St that extends through a commercial district		X	
Route 202 & Kitchens Lane/Bridge Street (Route 179)	Eliminate the connection to Bridge St (Rt 179) and convert to a signalized T-intersection		X	
	Remove traffic signal and construct a multi-lane roundabout			X
Route 202 & Sугan Road	Widen Sугan Rd to provide separate left-turn lanes		X	

Trip Generation

Traffic volumes generated by potential future developments were prepared based on trip generation data compiled from numerous studies contained in the Institute of Transportation Engineers (ITE) publication, *Trip Generation, 10th Edition*. **Tables 6 through 9** present the anticipated vehicular trip generation for potential future developments.

Table 6. Vehicular Trip Generation – Parcel 1

Land Use	Size	Daily	Weekday Morning Peak Hour			Weekday Afternoon Peak Hour			Saturday Midday Peak Hour		
			In	Out	Total	In	Out	Total	In	Out	Total
Retail ⁽¹⁾	20,000 s.f.	755	12	7	19	36	40	76	47	43	90

(2) ITE Land Use Code 820 for Shopping Center.

The assumed location for Parcel 1 is on the eastern side of Route 202 between Reeder Road and Shire Drive.

Table 7. Vehicular Trip Generation – Parcel 2

Land Use	Size	Daily	Weekday Morning Peak Hour			Weekday Afternoon Peak Hour			Saturday Midday Peak Hour		
			In	Out	Total	In	Out	Total	In	Out	Total
Senior Care Facility ⁽¹⁾	125 rooms	477	9	16	25	18	14	32	26	16	42
Retail ⁽²⁾	10,560 s.f.	399	6	4	10	19	21	40	25	23	48
Urgent Care Facility ⁽³⁾	8,880 s.f.	254	20	6	26	9	23	32	16	12	28
Total Trips		1,130	35	26	61	46	58	104	67	51	118

(1) ITE Land Use Code 252 for Senior Adult Housing – Attached.

(2) ITE Land Use Code 820 for Shopping Center.

(3) ITE Land Use Code 720 for Medical-Dental Office Building.

The assumed location for Parcel 2 is on the eastern side of Route 202 just north of the existing Logan Square Shopping Center.

Table 8. Vehicular Trip Generation – Parcel 3

Land Use	Size	Daily	Weekday Morning Peak Hour			Weekday Afternoon Peak Hour			Saturday Midday Peak Hour		
			In	Out	Total	In	Out	Total	In	Out	Total
Hotel ⁽¹⁾	125 rooms	984	34	23	57	35	33	68	51	40	91
Banquet Facility ⁽²⁾	46,730 s.f.	1,170	5	4	9	84	42	126	88	61	149
Office ⁽³⁾	47,780 s.f.	518	61	10	71	9	47	56	14	11	25
Total Trips		2,672	100	37	137	128	122	250	153	112	265

(1) ITE Land Use Code 310 for Hotel.

(2) ITE Land Use Code 931 for Quality Restaurant.

(3) ITE Land Use Code 710 for General Office Building.

The assumed location for Parcel 3 is on the eastern side of Route 202 just north of Parcel 2.

Table 9. Vehicular Trip Generation – Parcel 4

Land Use	Size	Daily	Weekday Morning Peak Hour			Weekday Afternoon Peak Hour			Saturday Midday Peak Hour		
			In	Out	Total	In	Out	Total	In	Out	Total
Hotel ⁽¹⁾	125 rooms	984	34	23	57	35	33	68	51	40	91
Museum ⁽²⁾	20,000 s.f.	250	0	0	0	10	10	20	10	10	20
Total Trips		1,234	34	23	57	45	43	88	61	50	111

(1) ITE Land Use Code 310 for Hotel.

(2) Based on assumptions.

The assumed location for Parcel 4 is north of Kitchens Lane in an area between Route 202 and Route 179.

Trip Distribution and Assignment

Site-generated traffic will approach and depart the site via different routes depending on factors such as the existing traffic patterns, location of major roadways, and the location of the development's site access. Below is a description for each Build Alternative.

Build Alternative 1

The Build Alternative 1 distribution percentages for the anticipated directions of approach and departure and traffic assignment percentages are illustrated in **Figures 4A, 4C, 4E, 4G, and 4I**. Application of the percentages illustrated in the distribution figures to the new peak hour trips contained in Tables 6 through 9, provides an estimate of the site traffic to be added to the study area. The site generated traffic is also shown in **Figures 4B, 4D, 4F, 4H, 4J, and 4K** for the weekday morning, weekday afternoon, and Saturday midday peak hours.

Build Alternative 2

The Build Alternative 2 distribution percentages for the anticipated directions of approach and departure and traffic assignment percentages are illustrated in **Figures 5A, 5C, 5E, 5G, and 5I**. Application of the percentages illustrated in the distribution figures to the new peak hour trips contained in Tables 6 through 9, provides an estimate of the site traffic to be added to the study area. The site generated traffic is also shown in **Figures 5B, 5D, 5F, 5H, 5J, and 5K** for the weekday morning, weekday afternoon, and Saturday midday peak hours.

Build Alternative 3

The Build Alternative 3 distribution percentages for the anticipated directions of approach and departure and traffic assignment percentages are illustrated in **Figures 6A, 6C, 6E, 6G, and 6I**. Application of the percentages illustrated in the distribution figures to the new peak hour trips contained in Tables 6 through 9, provides an estimate of the site traffic to be added to the study area. The site generated traffic is also shown in **Figures 6B, 6D, 6F, 6H, 6J, and 6K** for the weekday morning, weekday afternoon, and Saturday midday peak hours.

Future 2040 Traffic Volumes

In order to determine future 2040 weekday morning, weekday afternoon, and Saturday midday peak hour traffic volumes, an annual traffic growth rate of 0.60 percent per year was applied to existing weekday morning, weekday afternoon, and Saturday midday peak hour traffic volumes to reflect regional traffic growth. The resultant 2040 peak hour traffic volumes without-development are illustrated in **Figure 2A**.

Below is a description of the volume development for each Build Alternative.

Build Alternative 1

In Build Alternative 1, the reconfiguration of Route 202 and Shire Drive/Logan Square Shopping Center will redistribute traffic at the intersection (**Figure 3A**). Next, the site generated traffic volumes, as shown in Figure 4K, were added to the future 2040 without-development traffic volumes, resulting in the future 2040 with-development traffic volumes for Build Alternative 1. The resultant future 2040 peak hour traffic volumes with development are illustrated in **Figure 7A** for Build Alternative 1.

Build Alternative 2

In Build Alternative 2, the reconfiguration of Route 202 and Shire Drive/Logan Square Shopping Center, the disconnection of Bridge Street from Route 202 and Kitchens Lane, and the extension of Bridge Street through a commercial district will change traffic patterns in the study area and redistribute traffic along Route 202 (**Figure 3B**). Next, the site generated traffic volumes, as shown in Figure 5K, were added to the future 2040 without-development traffic volumes, resulting in the future 2040 with-development traffic volumes for Build Alternative 2. The resultant future 2040 peak hour traffic volumes with development are illustrated in **Figure 8A** for Build Alternative 2.

Build Alternative 3

In Build Alternative 3, the reconfiguration of Route 202 and Shire Drive/Logan Square Shopping Center and the addition of a roundabout will redistribute traffic in the study area (**Figure 3C**). Next, the site generated traffic volumes, as shown in Figure 6K, were added to the future 2040 without-development traffic volumes, resulting in the future 2040 with-development traffic volumes for Build Alternative 3. The resultant future 2040 peak hour traffic volumes with development are illustrated in **Figure 9A** for Build Alternative 3.

Future Traffic Conditions

The future 2040 peak hour traffic volumes presented in Figure 2A were then analyzed to determine the future traffic operating conditions. These traffic volumes were then analyzed to determine the future 2040 without-development traffic operating conditions. The results of the future 2040 without-development analysis are shown in **Figure 2B**. The detailed capacity/level of service analysis worksheets are provided in **Appendix H**.

Below is a description of the future traffic operating conditions for each Build Alternative. The Matrix tables summarizing the results of the level-of-service and queueing analyses for existing, future without-development, and future with-development traffic conditions are contained in Appendices A and K.

Build Alternative 1

The future 2040 peak hour traffic volumes presented in Figure 7A were then analyzed to determine the future traffic operating conditions. These traffic volumes were then analyzed to determine the future 2040 with-development traffic operating conditions for Build Alternative 1. The results of the Build Alternative 1 future 2040 with-development analysis are shown in **Figure 7B**. The detailed capacity/level of service analysis worksheets are provided in **Appendix I**.

As shown in the matrix tables, Build Alternative 1 at all study intersections operate at acceptable conditions overall (LOS C or better) during all peak hours. However, at the intersection of Route 202 and Kitchens Lane/Bridge Street (Route 179), the westbound approach of Bridge Street (Route 179) continues to operate at a high LOS D during all peak hours. At this intersection, the queue results for the westbound approach of Bridge Street (Route 179) are over 300' during the weekday afternoon and Saturday midday peak hours which extends to the private driveways along Bridge Street. Build Alternative 1 also does not address the unexpected conflicts experienced due to the unconventional intersection of Route 202 and Kitchens Lane/Bridge Street (Route 179). The short storage lengths at intersection stop-controlled approaches and conflict along Bridge Street from private driveways still exist during this Build Alternative.

Build Alternative 2

The future 2040 peak hour traffic volumes presented in Figure 8A were then analyzed to determine the future traffic operating conditions. These traffic volumes were then analyzed to determine the future 2040 with-development traffic operating conditions for Build Alternative 2. The results of the Build Alternative 2 future 2040 with-development analysis are shown in **Figure 8B**. The detailed capacity/level of service analysis worksheets are provided in **Appendix J**.

As shown in the matrix tables, Build Alternative 2 at all study intersections operate at acceptable conditions overall (LOS C or better) during all peak hours. However, at the

intersection of Route 202 and Shire Drive/Logan Square Shopping Center, the westbound left movement experiences higher queues than existing and future without-development conditions due to the redistribution of traffic from Bridge Street.

Build Alternative 3

The future 2040 peak hour traffic volumes presented in Figure 9A were then analyzed to determine the future traffic operating conditions. These traffic volumes were then analyzed to determine the future 2040 with-development traffic operating conditions for Build Alternative 3. The results of the Build Alternative 3 future 2040 with-development analysis are shown in **Figure 9B**. As shown in Figure 9B for Build Alternative 3, along Route 202 from Aquetong Road to Reeder Road, the results for the weekday morning, weekday afternoon, and Saturday midday peak hours are shown for this Build Alternative. The volumes, configuration, capacity analysis results for this Build Alternative at these intersections are identical to Build Alternative 1 in this area. Therefore, the detailed capacity/level-of-Service analysis worksheets are provided in Appendix I for Build Alternative 3 from Aquetong Road to Reeder Road.

As shown in the matrix tables, Build Alternative 3 at the study intersections from Aquetong Road to Reeder Road operate at acceptable conditions overall (LOS B or better) during all peak hours.

Due to the roundabout proposed in Build Alternative 3, VISSIM was utilized to analyze the intersections along Route 202 from Shire Drive to Sukan Road. For the VISSIM analysis, only the weekday afternoon peak hour was analyzed to show the most conservative approach. Below is a summary of the VISSIM analysis for Build Alternative 3.

VISSIM Microsimulation of Roundabout

VISSIM has been utilized to further analyze the operations at the proposed roundabout. VISSIM is a microscopic, multi-modal traffic flow simulation software package. Microscopic simulation, also known as microsimulation, refers to the individual simulation of multiple modes of transportation (automobile, transit, pedestrian, etc.) within a roadway network. These transportation modes mutually interact with one another within the model in order to accurately simulate real-world traffic conditions. Microscopic models consist of an accurate description of the roadway geometry and a detailed modeling of the transportation system users' (i.e., drivers, pedestrians, etc.) behavior.

VISSIM analysis was completed for the Build Alternative 3 future 2040 with-development conditions for the weekday afternoon peak hour for the proposed multi-lane roundabout at the intersection of Route 202 and Kitchens Lane/Bridge Street (Route 179), signalized intersection of Route 202 and Shire Drive/Logan Square Shopping Center, and signalized intersection of Route 202 and Sukan Road. The VISSIM model includes the operations of vehicles traveling through the roundabout, as well as the operational effects from the adjacent intersections. Standard assumptions were made regarding driver behavior and vehicle routes while modelling the network. Five simulation runs were performed for the weekday afternoon peak hour, and an average of the results are reported in order to obtain a better representation of realistic

conditions. The results for the weekday afternoon peak hour can be found in **Figure 9B** and **Appendix K**.

As shown in the matrix tables, the VISSIM delay for the three study intersections analyzed are all operating at acceptable conditions overall (LOS B or better) and movement (LOS D or better) during the weekday afternoon peak hour. The proposed multi-lane roundabout operates at LOS A overall and LOS C or better by movement. The max queue lengths at the roundabout also do not extend past the proposed storage length or block any existing private driveways. At the intersection of Route 202 and Sukan Road, the VISSIM model max queue results is 270' for the southbound left movement and 594' for the southbound through/right movement. This max queue for the southbound left movement extends past the southbound left storage length and causes the left-turning vehicles to block the through lane. However, these queue lengths along the southbound approach occur only 1 out of 5 simulation runs. The average queue lengths are one vehicle for the southbound left movement and two vehicles for the southbound through movement.

The VISSIM model demonstrates that the proposed multi-lane roundabout will operate acceptably during the future 2040 with-development conditions. If Build Alternative 3 is selected as the preferred alternative, construct a multi-lane roundabout with two lanes along the Route 202 approaches, two lanes along the Bridge Street approach, and one lane along the Kitchens Lane approach. Design the roundabout to accommodate two Bridge Street approach lanes, however, the second lane should not be provided for traffic to use until traffic operations show the need for the second lane in the future.

All Build Alternatives

In all Build Alternatives, the traffic operations along the Route 202 Corridor are significantly improved due to the 3-lane cross section along Route 202 from Aquetong Road to 800 feet south of Shire Drive, 5-lane cross-section along Route 202 from 800 feet south of Shire Drive to Kitchens Lane, the realignment of Aquetong Road, and the modification of the intersection of Route 202 and Shire Drive/Logan Square Shopping Center. The 3-lane cross section along Route 202 from Aquetong Road to 800 feet south of Shire Drive improves left-turning conditions along Route 202. In existing conditions, the majority of the reportable crashes were rear-end crashes in this area of Route 202. The 5-lane cross section along Route 202 from 800 feet south of Shire Drive to Kitchens Lane improves the operations at the intersection of Route 202 and Shire Drive/Logan Square Shopping Center by reducing the northbound queue. The realignment of Aquetong Road improves the unnecessary delay for the minor approaches at the intersection of Route 202 and Aquetong Road due to inefficient signal timings caused by the split phasing. The modification of the intersection of Route 202 and Shire Drive/Logan Square Shopping Center reduces the delay for the Logan Square Shopping Center approach caused by the split phasing.

Auxiliary Turn Lane Warrants

Auxiliary turn lane warrants were performed at the intersection of Route 202 and Sukan Road along the westbound approach of Sukan Road. The need for a right-turn lane was based on the

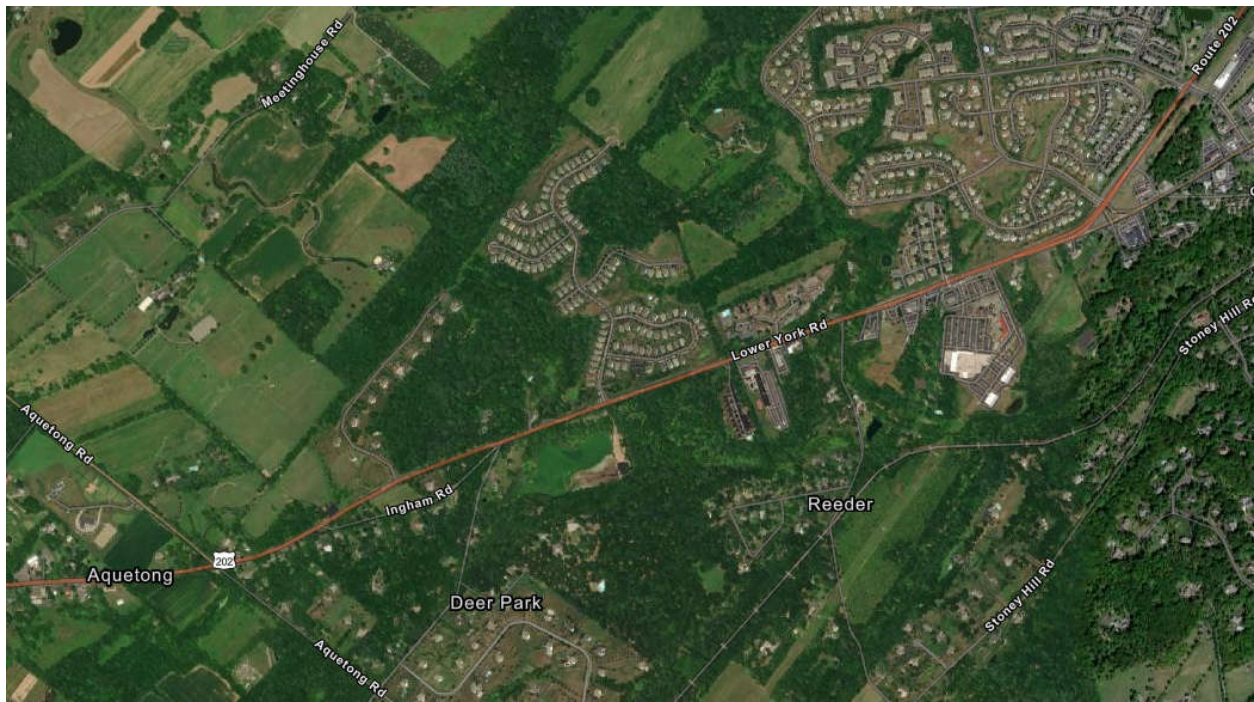
current PennDOT guidelines in accordance with *Publication 46, Chapter 11 – Traffic Studies*. The turn lane warrant analysis worksheets are contained in **Appendix M**. As shown in Appendix M, the separate westbound right-turn lane is only marginally warranted during the Saturday midday peak hour in Alternatives 1 and 3. In all other peak hours and conditions, the separate westbound right-turn lane is not warranted. It should be noted that this intersection operates at LOS B overall and LOS D or better for all movements during all three peak hours. Therefore, a separate westbound right-turn lane is not recommended along this approach of Suga Road.

Traffic Signal Warrants

A traffic signal warrant analysis was conducted at the intersection of Route 202 and Silvertail Lane in accordance with PennDOT criteria contained in the Department's *Publication 212, Official Traffic Control Devices*, for Warrant 3 (Peak Hour), which is based on the guidelines contained in the Federal Highway Administration's, *Manual on Uniform Traffic Control Devices (MUTCD)*. As shown in **Appendix N**, the intersection of Route 202 and Silvertail Lane does not satisfy warrants for a traffic signal for Warrant 3 (Peak Hour). It should be noted that this intersection operates at LOS A overall and LOS C or better for all movements during all three peak hours. The egress approach of Silvertail Lane has a vehicle queue of approximately one vehicle during all three peak hours.

Although the traffic volume along Route 202 is significant, the minor street volume along Silvertail Lane is too low to warrant a signal based on vehicular volumes. Based on crash experience, this intersection also does not warrant a signal (1 crash in 5 years).

For vehicles egressing Silvertail Lane, a traffic signal is not warranted. However, in existing conditions, Route 202 has a gore area traveling northbound after the intersection. It is recommended to remove the gore area to provide a center left-turn lane area, which would assist egressing vehicles.



4 | Conclusions and Recommendations

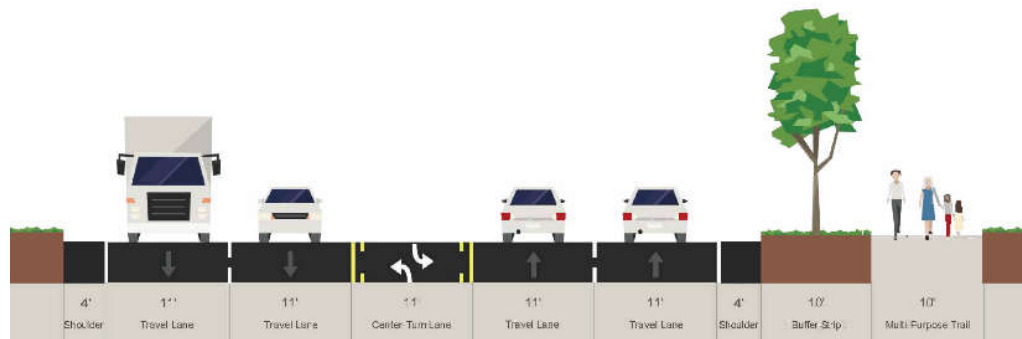
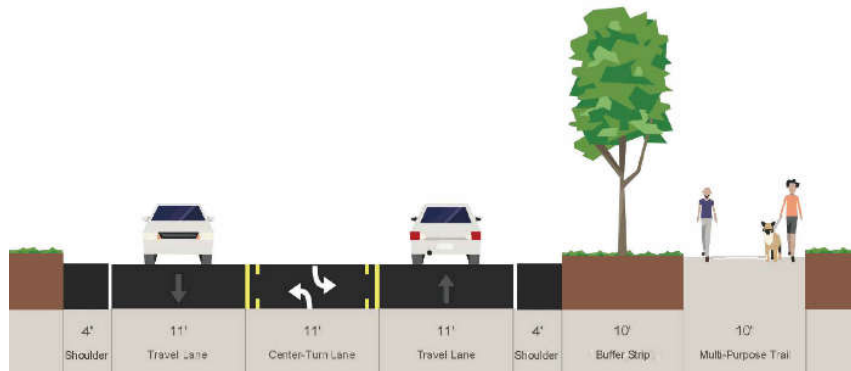
In summary, based on existing conditions, as well as projected future traffic volumes, several significant transportation infrastructure improvements are recommended to develop a corridor plan that supports development and sustainable growth.

In order to improve existing traffic conditions and help in accommodating the long-term future traffic demand throughout the Route 202 Corridor, the following traffic improvements were analyzed for the different Build Alternatives. The three Build Alternatives maintain similar characteristics along Route 202 from Aquetong Road to Silvertail Lane, and introduce unique differences in the commercial portion of Route 202. The characteristics of each Build Alternative are described below:

Corridor Improvements for Build Alternatives

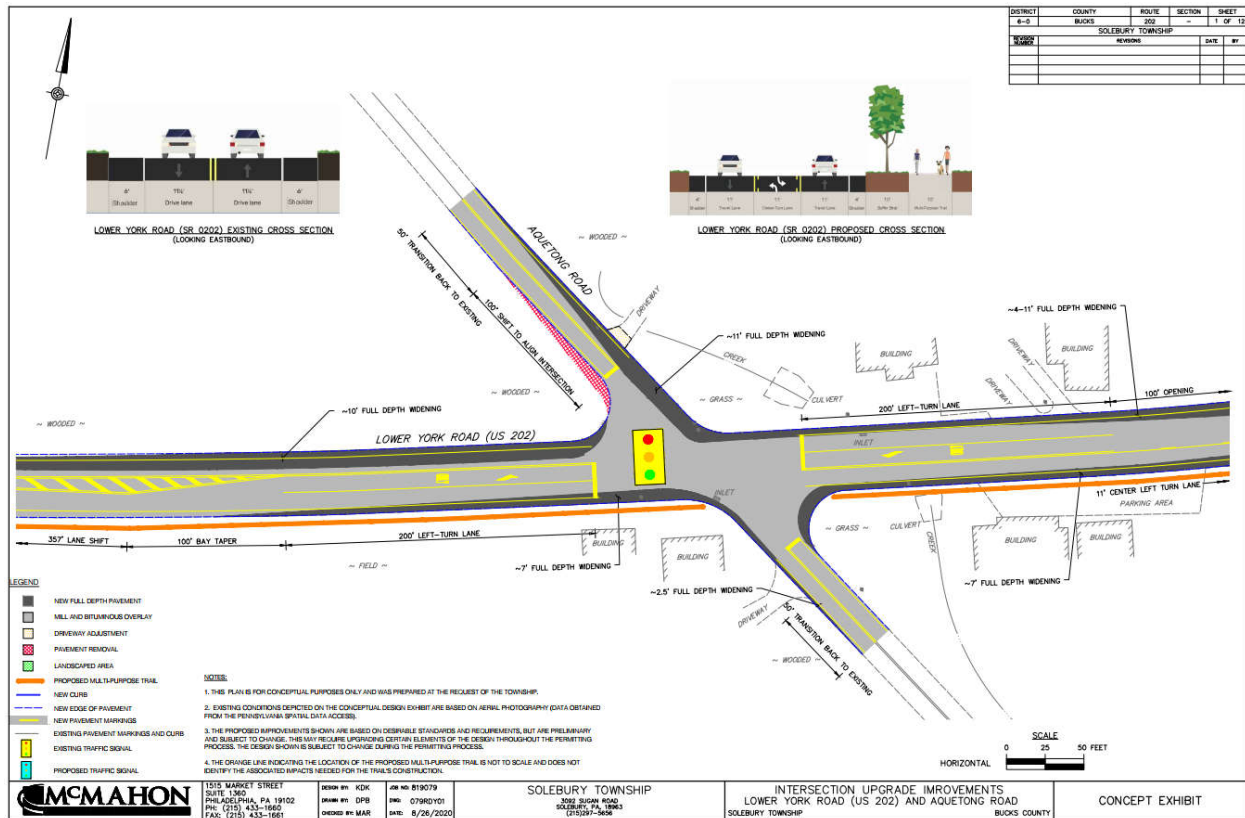
Route 202

- Optimize signal timings and provide necessary equipment upgrades at all signalized intersections to maximize operations and traffic responsiveness.
- Provide a 3-lane cross-section along Route 202 from Aquetong Road to approximately 800 feet south of Shire Drive.
- Provide a 5-lane cross-section along Route 202 from approximately 800 feet south of Shire Drive to Kitchens Lane.
- Provide a multi-use trail along one side of Route 202 to accommodate multi-modal transportation use along the corridor. A planted buffer strip is also recommended to separate vehicle traffic and pedestrian/bicycle traffic along the corridor.



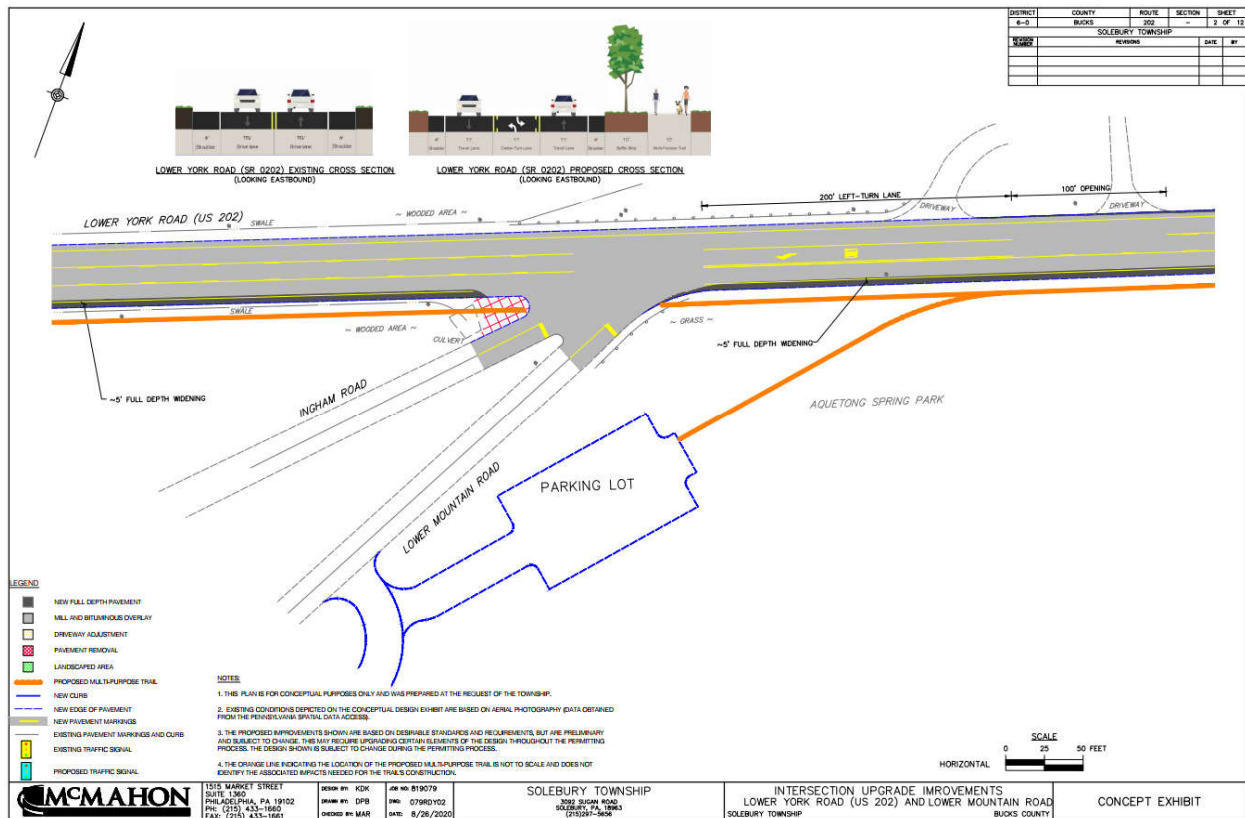
Lower York Road (Route 202) and Aquetong Road

- Widen Route 202 to provide separate left-turn lanes on each approach.
- Utilize striping and minor widening to align the Aquetong Road approaches.
- Modify traffic signal to eliminate split phasing of Aquetong Road.
- Provide ADA curb ramps, pedestrian crosswalk, pedestrian signal heads, and ADA push buttons for crossing Aquetong Road.



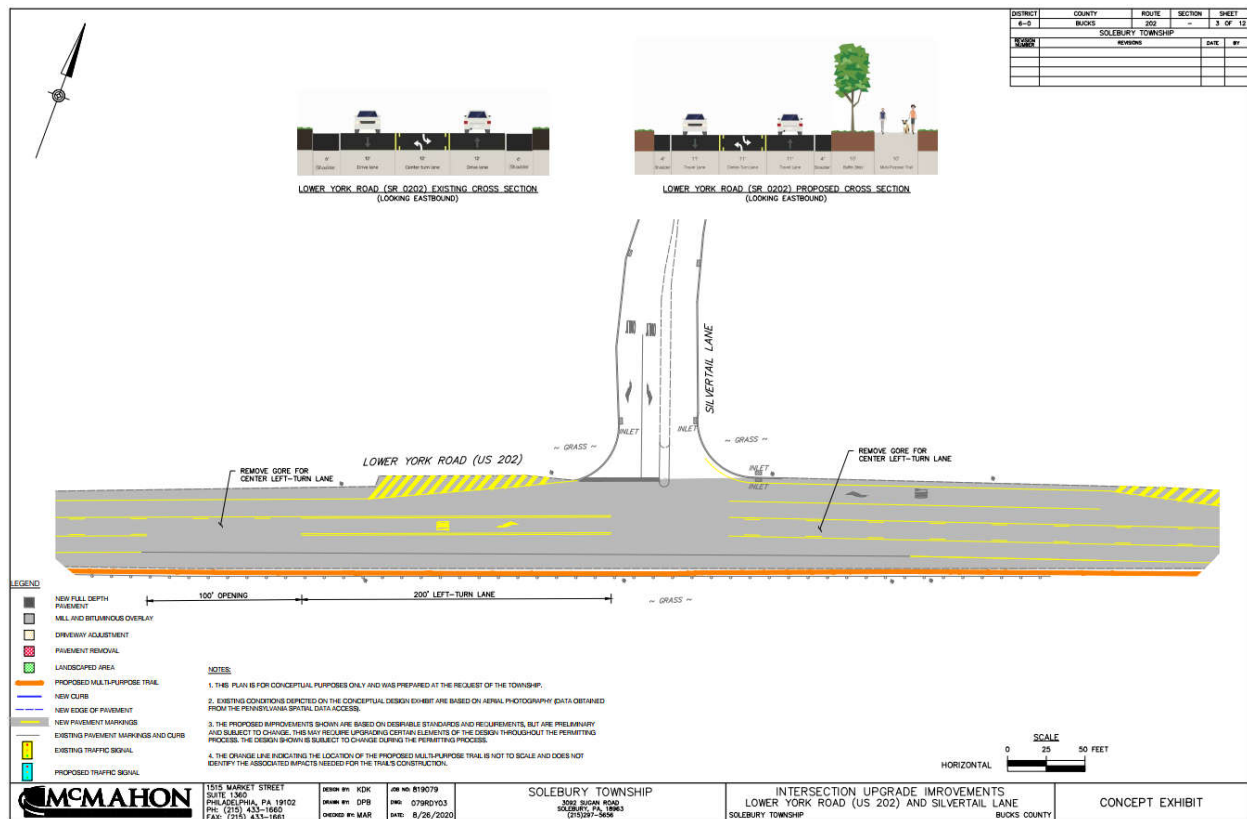
Lower York Road (Route 202) and Lower Mountain Road

- Provide a separate left-turn lane along the Route 202 southbound approach.
 - The separate southbound left-turn lane along Route 202 will help address the issues of vehicle delay due to left-turns and rear-end crashes accounting for the majority of crashes at this location. This improvement will also help assist public access to and from Lower Mountain Road to Route 202 for Aquetong Spring Park.
- Provide three-lane cross section with area for future pedestrian trail on east side.
- Provide ADA curb ramps and pedestrian crosswalk for crossing Lower Mountain Road.



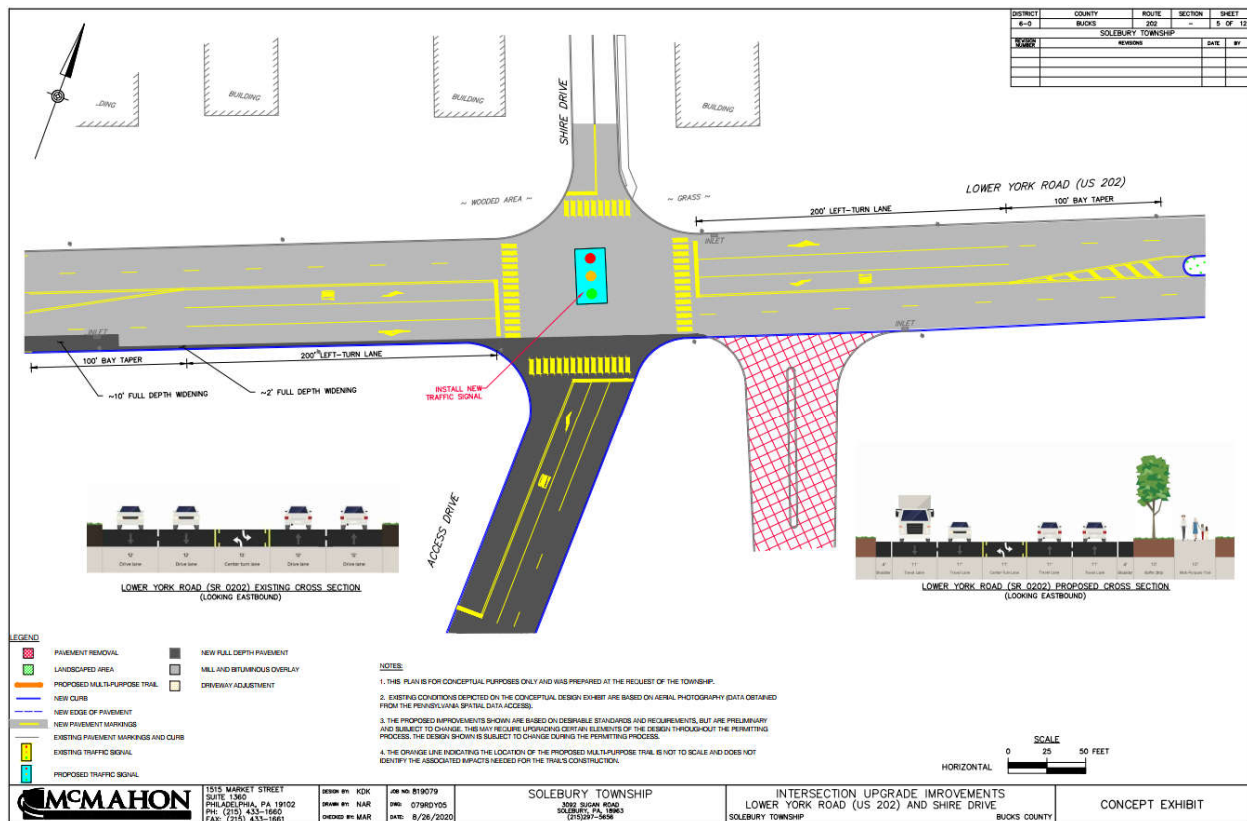
Lower York Road (Route 202) and Silvertail Lane

- Remove gore along Route 202 for full center left-turn lane.
- Provide three-lane cross section with area for future pedestrian trail on east side.



Lower York Road (Route 202) and Shire Drive/Logan Square Shopping Center

- Modify the intersection to align Shire Drive with the Logan Square site access to eliminate the existing off-set intersection and split phasing of traffic signal.
- Convert the existing northbound right-turn lane into an additional northbound through lane to improve vehicle flow and reduce vehicle queues.
- Provide a separate left-turn lane and shared through/right-turn lane on the westbound approach of the shopping center to accommodate future development and traffic associated with the extension of W. Bridge Street.
- Complete upgrade of the traffic control signal to provide video detection, dilemma zone detection, and provide advanced Smart Technology.
- Provide ADA curb ramps, pedestrian crosswalks, pedestrian signal heads, and ADA push buttons on all corners and approaches.



Build Alternative 1

Build Alternative 1 includes an additional traffic signal between Kitchens Lane/Bridge Street (Route 179) and Shire Drive intersections.

Lower York Road (Route 202) and Proposed Signalized Driveway

- Provision of an additional traffic signal between Kitchens Lane/Bridge Street (Route 179) and Shire Drive.
- Provide a separate left-turn lane along the southbound approach of Route 202.
- Provide a separate left-turn lane and a separate right-turn lane along the egress approach to Route 202.
- Provide ADA curb ramps, pedestrian crosswalks, pedestrian signal heads, and ADA push buttons on all corners and approaches.

Build Alternative 2

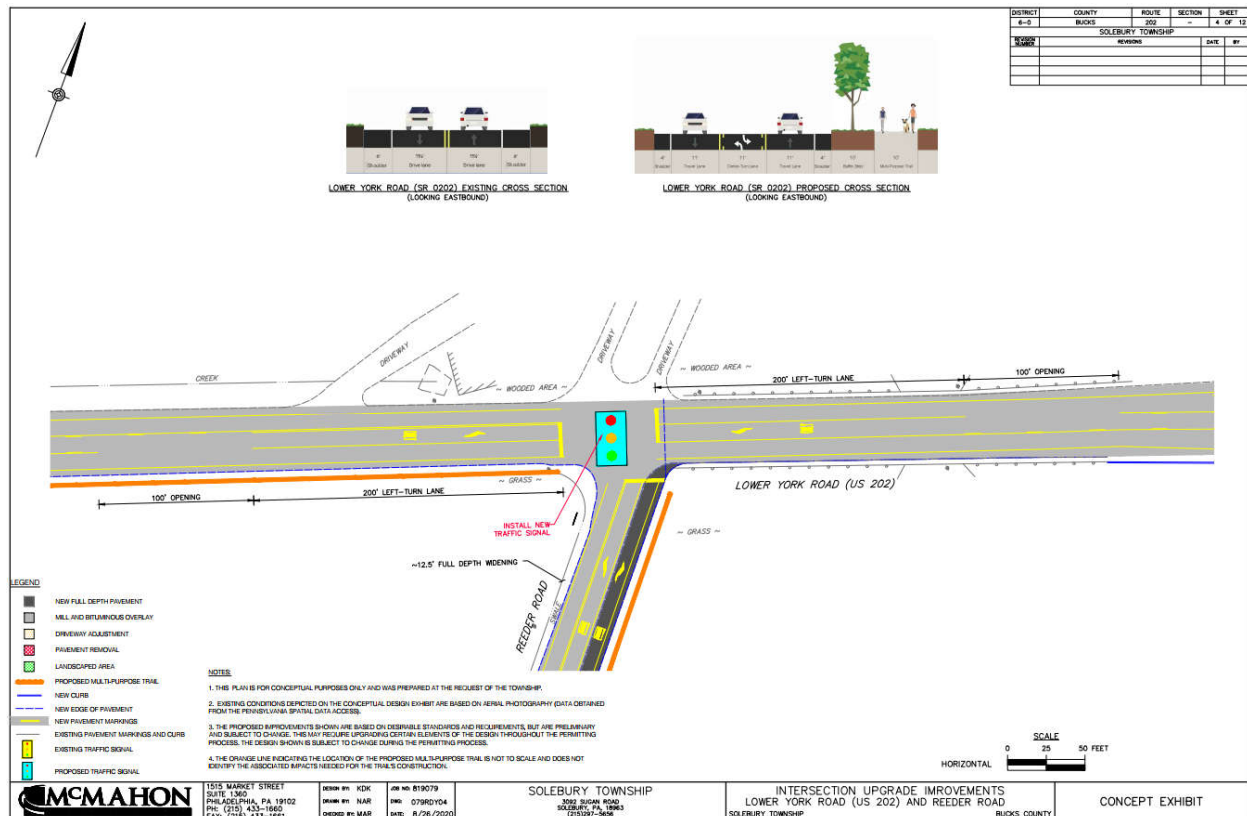
Build Alternative 2 includes an additional traffic signal between Kitchens Lane/Bridge Street (Route 179) and Shire Drive intersections, relocation of W Bridge Street through the Route 202 commercial district, Kitchens Lane redesigned as an unsignalized T-intersection, a new traffic signal at Reeder Road, and modifications to the intersection of Route 202 and Sagan Road.

Bridge Street (Route 179)

- Eliminate the existing connection of Route 202 to/from Bridge Street.
- Create a new Bridge Street that extends through a commercial/mixed-use district along the eastern side of the Route 202 corridor.
- Provide access connections between Route 202 and the commercial/mixed-use district at various locations.

Lower York Road (Route 202) and Reeder Road

- Provide separate left-turn lanes along the Route 202 approaches.
- Widen Reeder Road approach to provide separate left and right lanes.
- Install a new traffic control signal if and when future traffic volumes warrant the need for additional control for vehicles entering and exiting Reeder Road.
- Design for the potential of a future connection to Township owned lands along the northeast quadrant of the intersection.
- Provide ADA curb ramps, pedestrian crosswalk, pedestrian signal heads, and ADA push buttons for crossing Reeder Road.



Lower York Road (Route 202) and Proposed Signalized Driveway

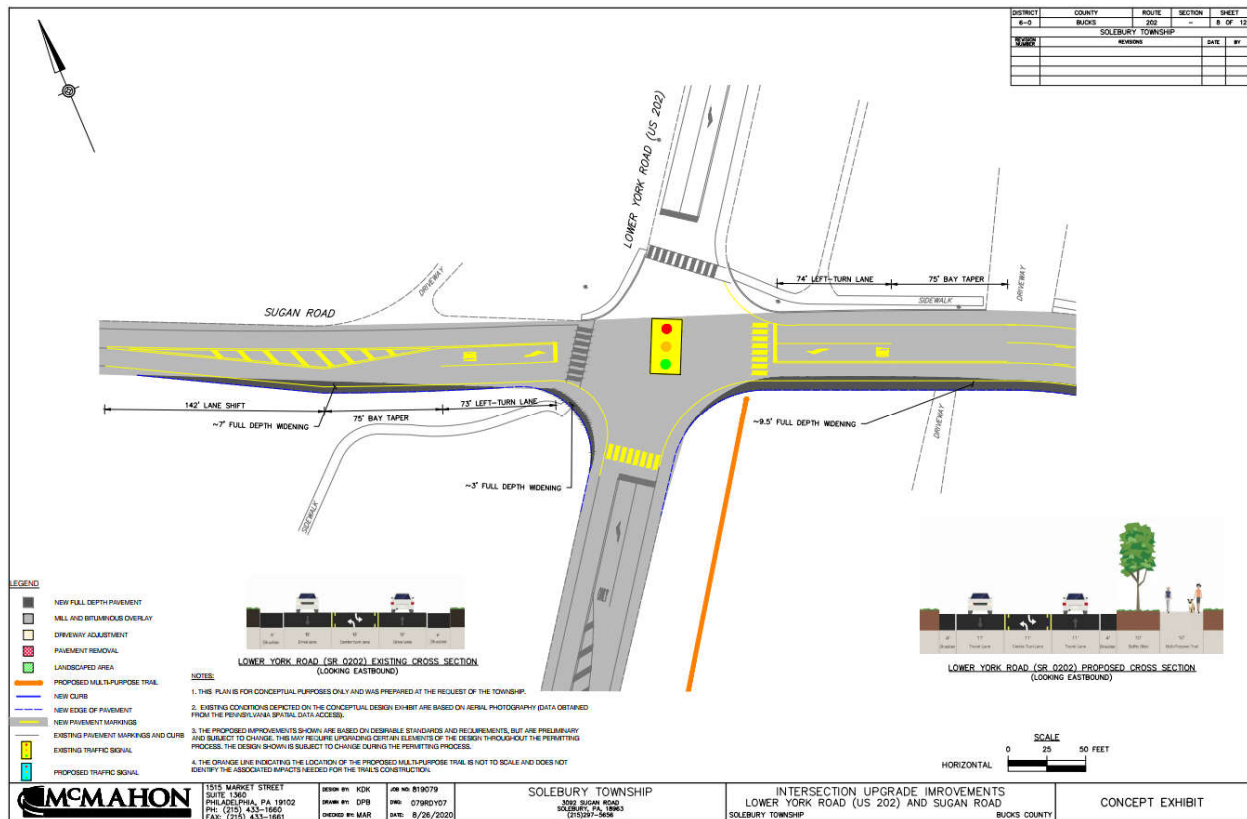
- Provision of an additional traffic signal between Bridge Street (Route 179) and Shire Drive to provide an additional signal to accommodate the extension of Bridge Street.
- Provide a separate left-turn lane along the southbound approach of Route 202.
- Provide a separate left-turn lane and a separate right-turn lane along the egress approach to Route 202.
- Provide ADA curb ramps, pedestrian crosswalks, pedestrian signal heads, and ADA push buttons on all corners and approaches.

Lower York Road (Route 202) and Kitchens Lane

- Eliminate the connection to Bridge Street (Route 179).
- Convert intersection to an unsignalized T-intersection.

Lower York Road (Route 202) and Sугan Road

- Widen Sугan Road to provide separate left-turn lanes.
- Provide ADA curb ramps, pedestrian crosswalks, pedestrian signal heads, and ADA push buttons on the northbound and westbound approaches (provided in existing conditions for southbound and eastbound approaches).



Build Alternative 3

Build Alternative 3 includes the construction of a roundabout in place of the existing Route 202 and Kitchens Lane/Bridge Street (Route 179) intersection.

Lower York Road (Route 202) and Kitchens Lane/Bridge Street (Route 179)

- Remove traffic signal.
- Construct a multi-lane roundabout with two lanes along the Route 202 approaches, two lanes along the Bridge Street approach, and one lane along the Kitchens Lane approach.
- Design the roundabout to accommodate two Bridge Street approach lanes, however, the second lane should not be provided for traffic to use until traffic operations show the need for the second lane.

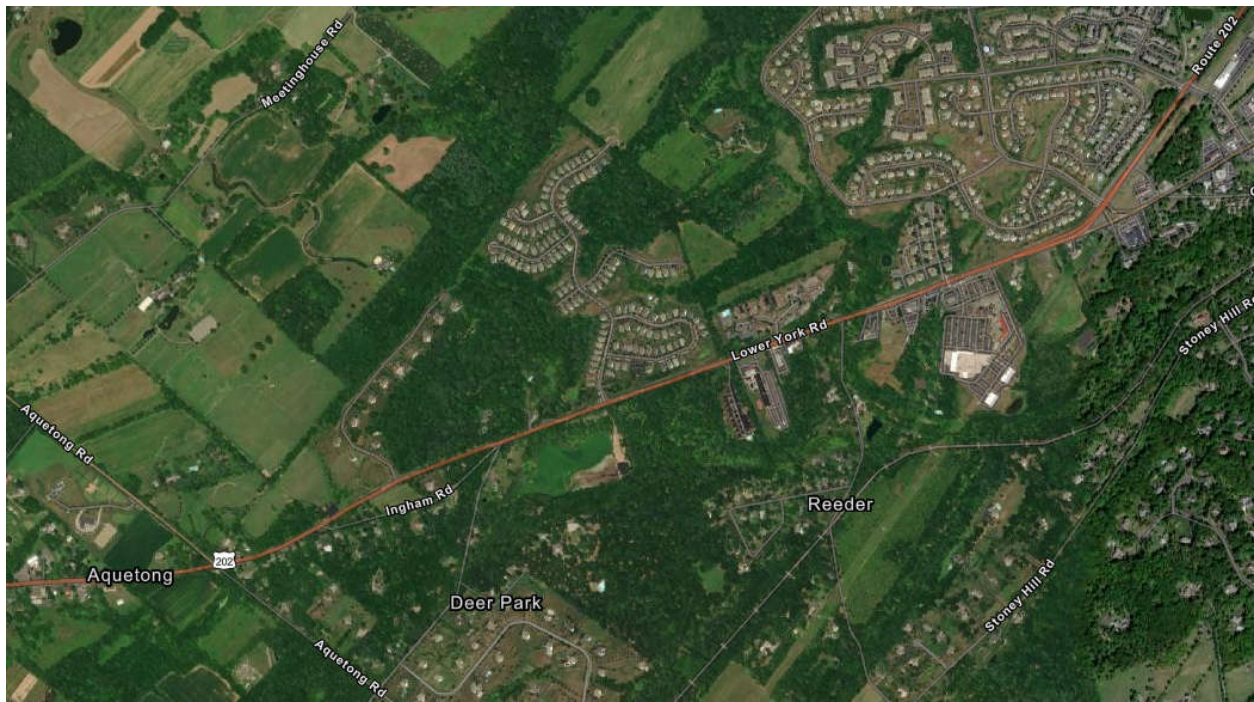
Recommendations and Project Priorities

Short-Term Project Goals (3-year to 7-year Horizon)

- Route 202 and Aquetong Road intersection improvements (*safety and operation benefits*)
- Route 202 and Lower Mountain Road intersection improvements (*safety and operation benefits*)
- Route 202 and Silvertail Lane intersection improvements (*safety and operation benefits*)
- Route 202 and Reeder Road intersection improvements (*safety and operation benefits*)
- Route 202 and SC Access/Shire Drive intersection realignment improvements (*safety and operation benefits*)
- Route 202 and Sugan Road intersection improvements (*safety and operation benefits*)
- Route 202 – 5-lane cross section from west of Shire Drive through Kitchens Lane (*capacity improvement for sustained growth*)
- Additional traffic signal along Route 202 between Kitchens Lane and Shire Drive (*capacity and safety improvement for sustained growth*)

Long-Term Project Goals (8-year to 15-year Horizon)

- Route 202 – 3-lane cross section from west of Aquetong Road to east of Reeder Road (*capacity and safety improvement for sustained growth*)
- Route 202 Multi-Use Trail along entire length of corridor within Solebury Township limits
- Bridge Street (Route 179) - eliminate the existing connection to Route 202 and create alignment through commercial/mixed-use district. (*capacity improvement for sustained growth*)
- Route 202 Roundabout - construct a multi-lane roundabout with two lanes along the Route 202 approaches, two lanes along the Bridge Street approach, and one lane along the Kitchens Lane approach. (*capacity improvement for sustained growth*)



5 | Key Next Steps

There has been significant collaboration in the development of the Route 202 Corridor – Transportation Master Plan. It is recommended that this collaboration continue to decide which Build Alternative best fits the Township’s needs for the future and to encourage the implementation of this plan over time.

Specific steps toward implementation of the above improvements include the preparation of conceptual design plans and roadway cross-sections at various locations along the corridor to visually depict the recommended roadway and intersection improvements for the corridor to be utilized in the preparation of public funding grants and for consideration by PennDOT, as well as for further discussion with potential private-sector developers for implementation into their development plans for the corridor.

Additionally, conduct a constructability review of the recommendations to determine probable construction sequencing, phasing, and ability to implement the recommended improvements and work within existing physical and operational constraints and needs of the corridor.

Finally, it is recommended that Solebury Township continue to work with developers and affected property owners as new development and redevelopment occur along the corridor to enforce the recommendations outlined in this report.

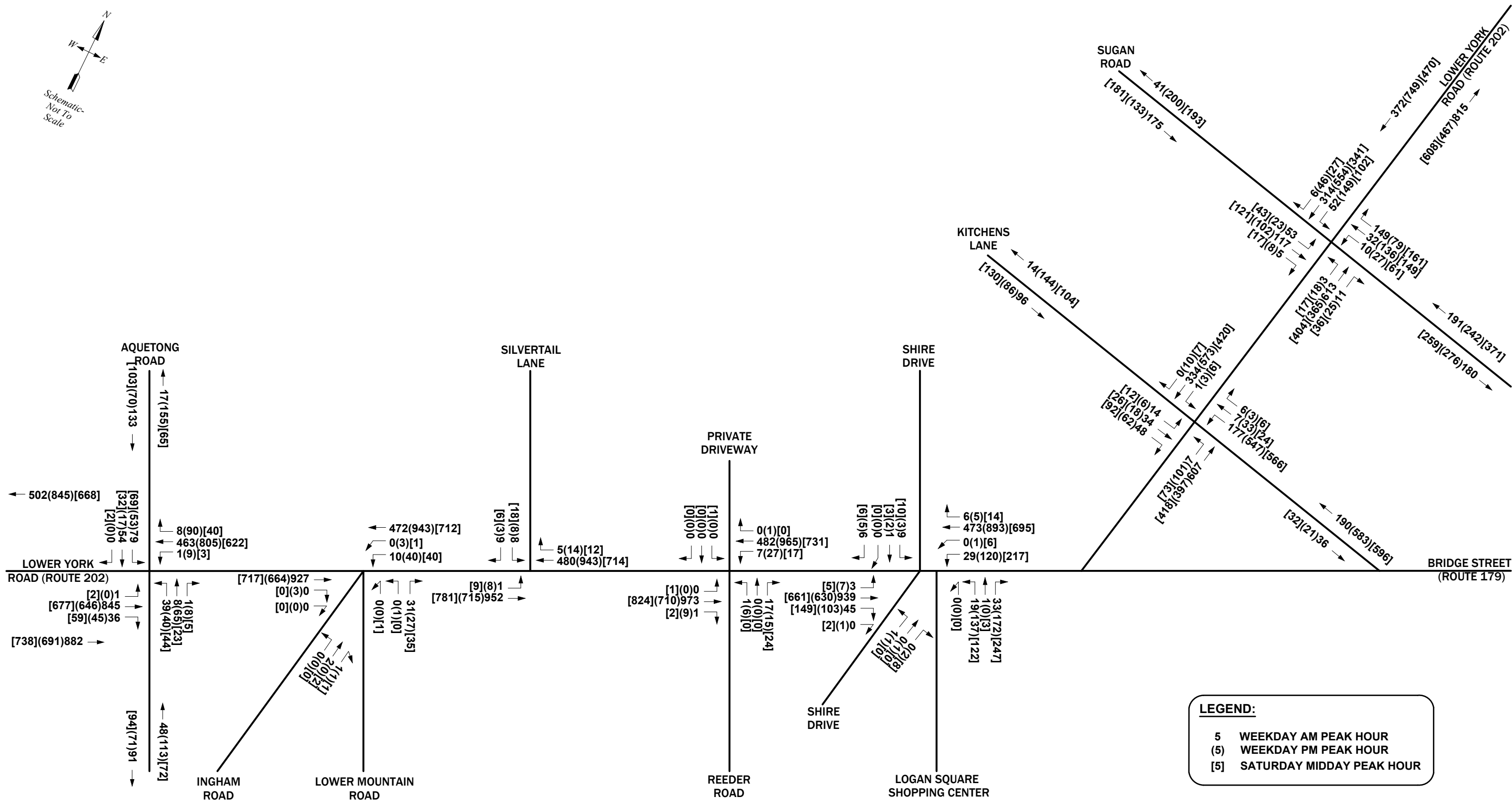


FIGURE 2A
 2040 Future without Development Peak Hour Traffic Volumes
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

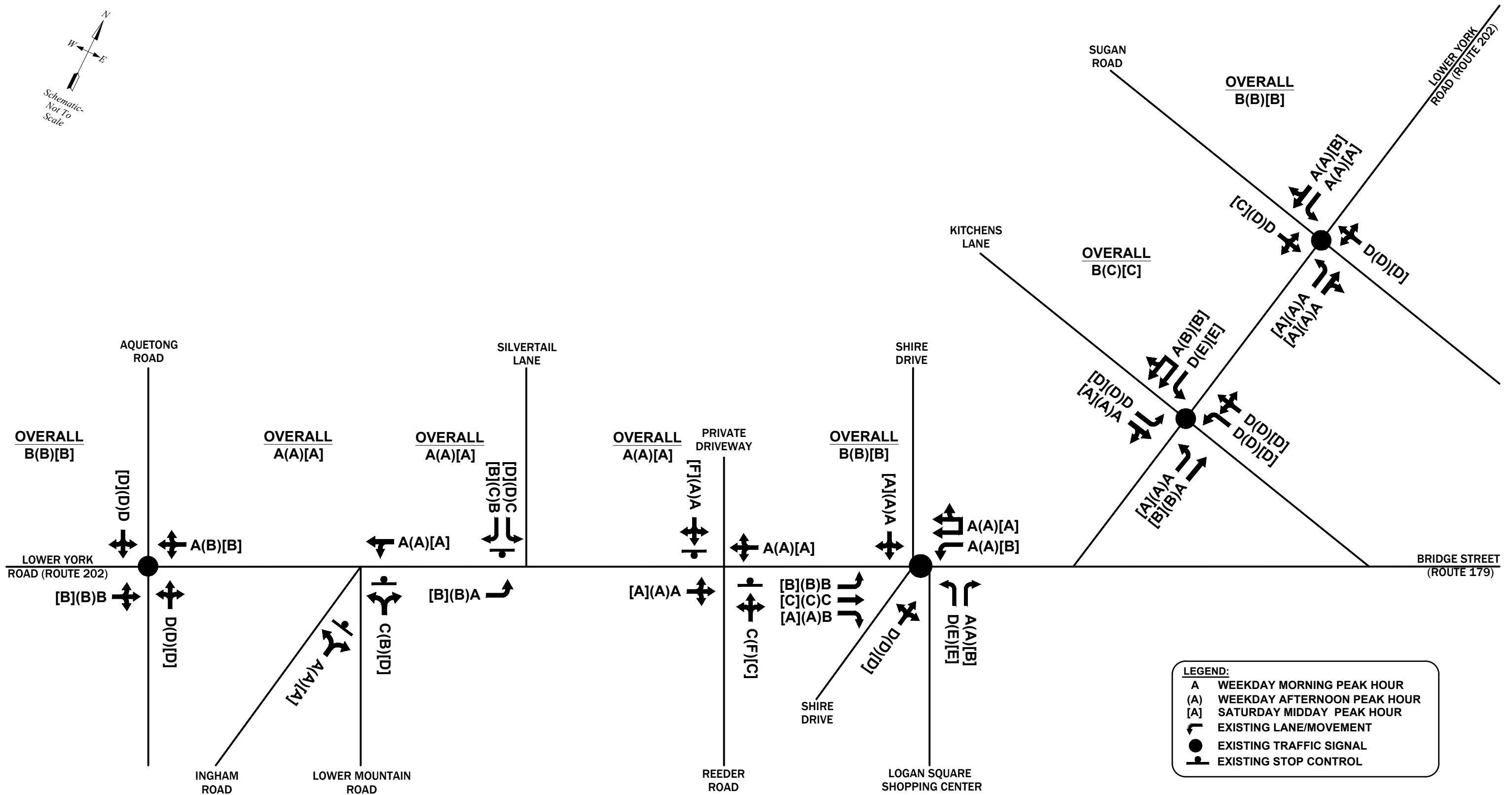
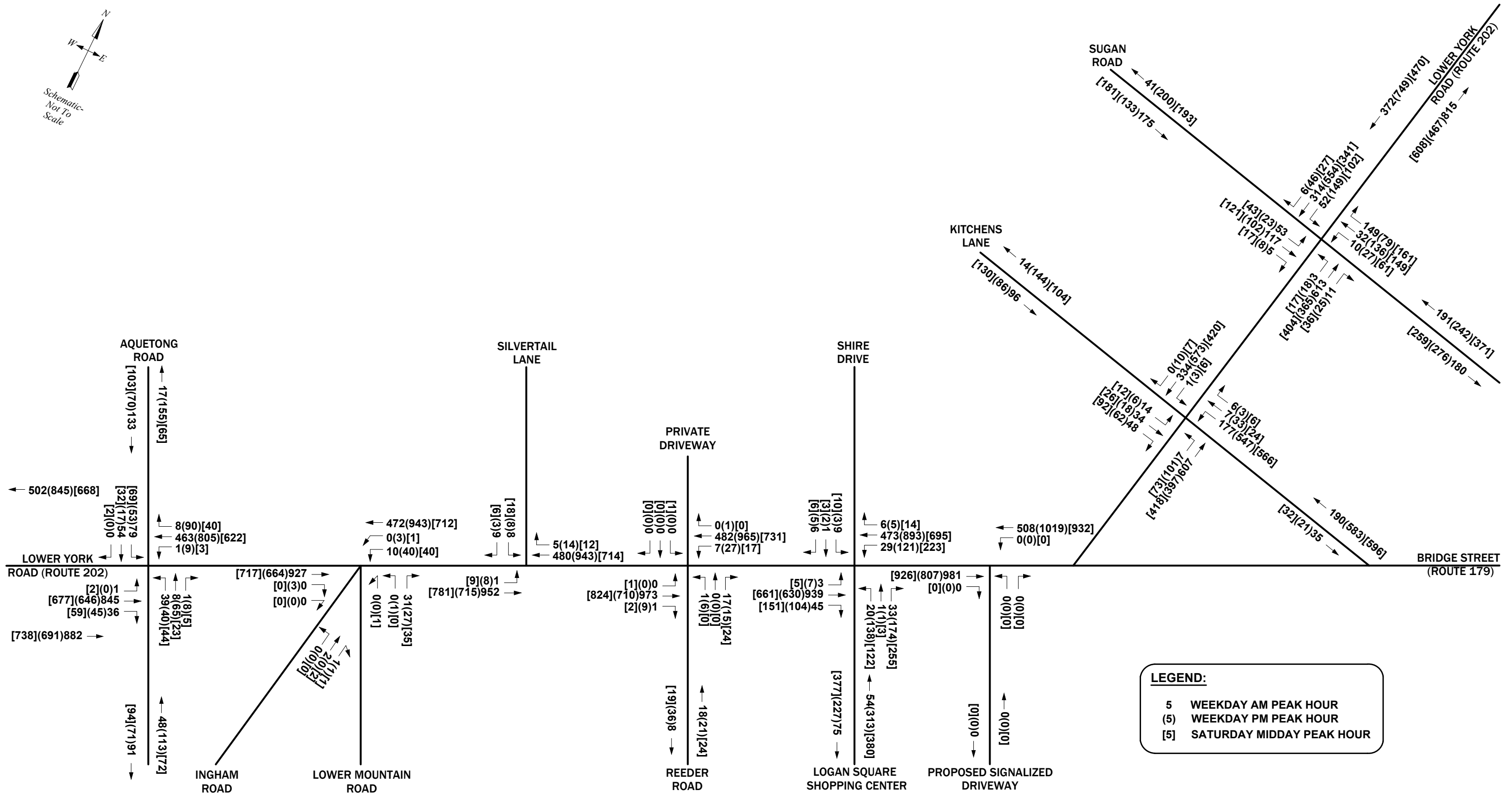


FIGURE 2B
 2040 Future without Development Levels of Service
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA



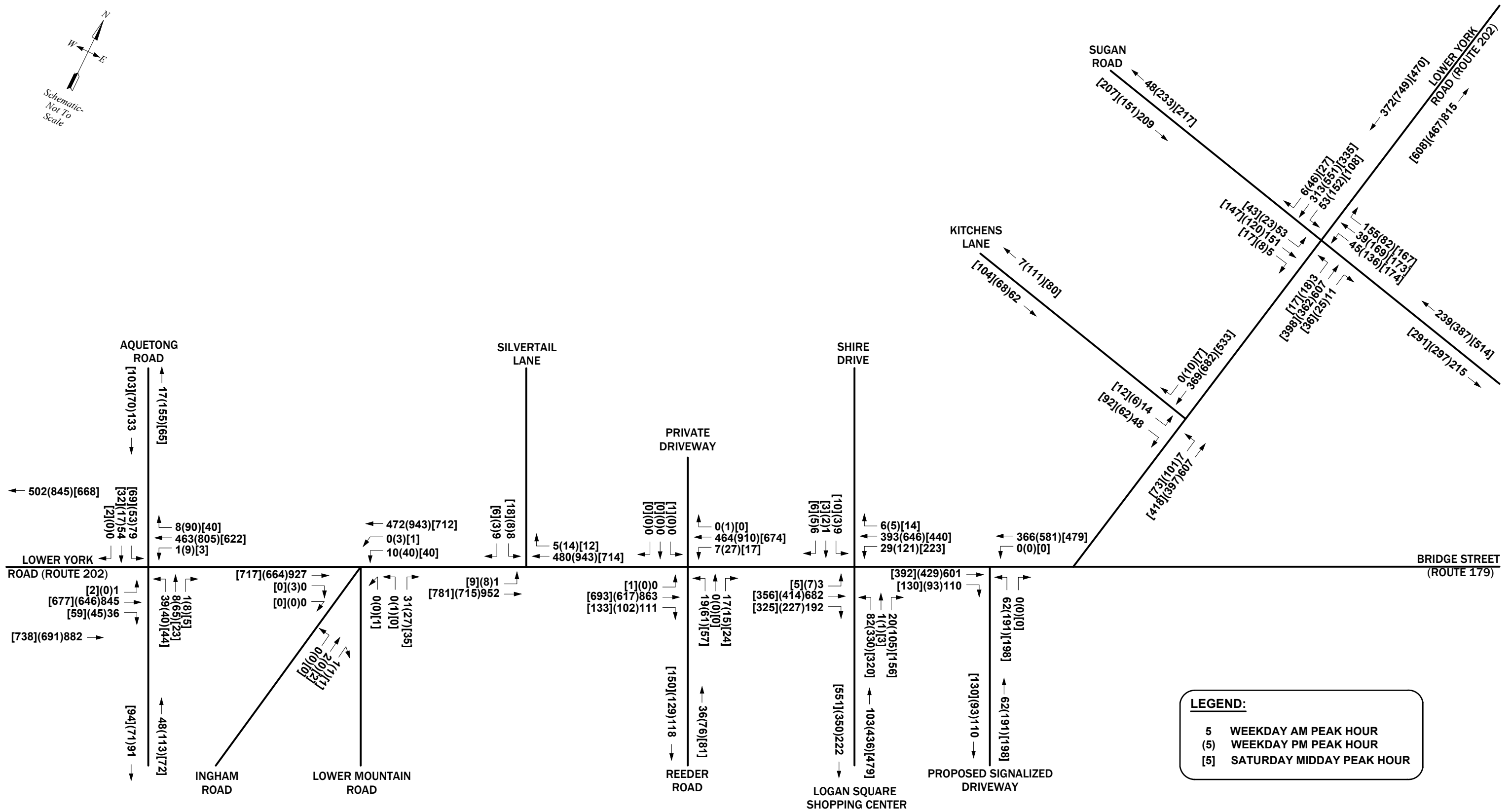


FIGURE 3B
 Build Alternative 2 - Redistributed Volumes
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA



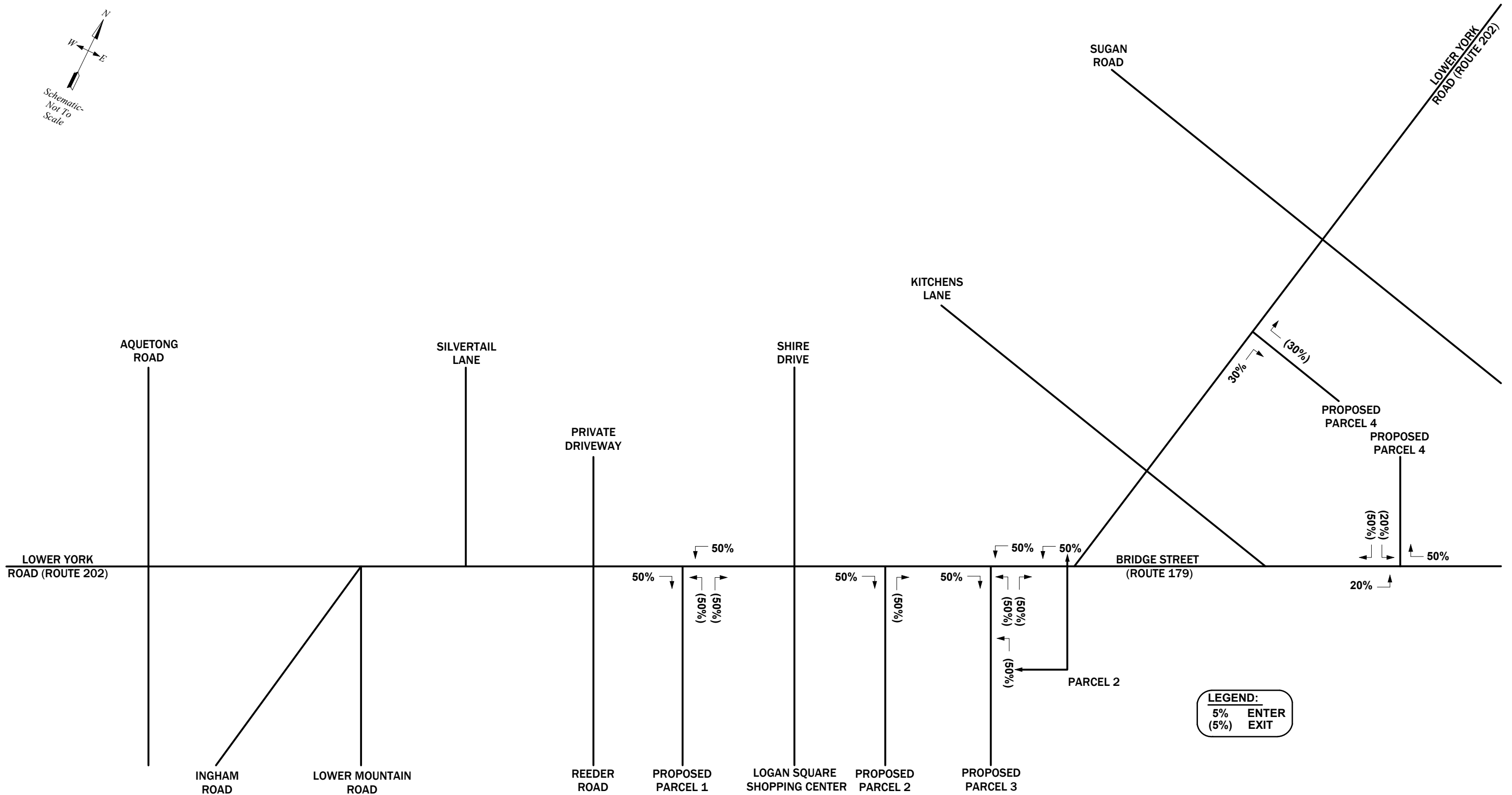
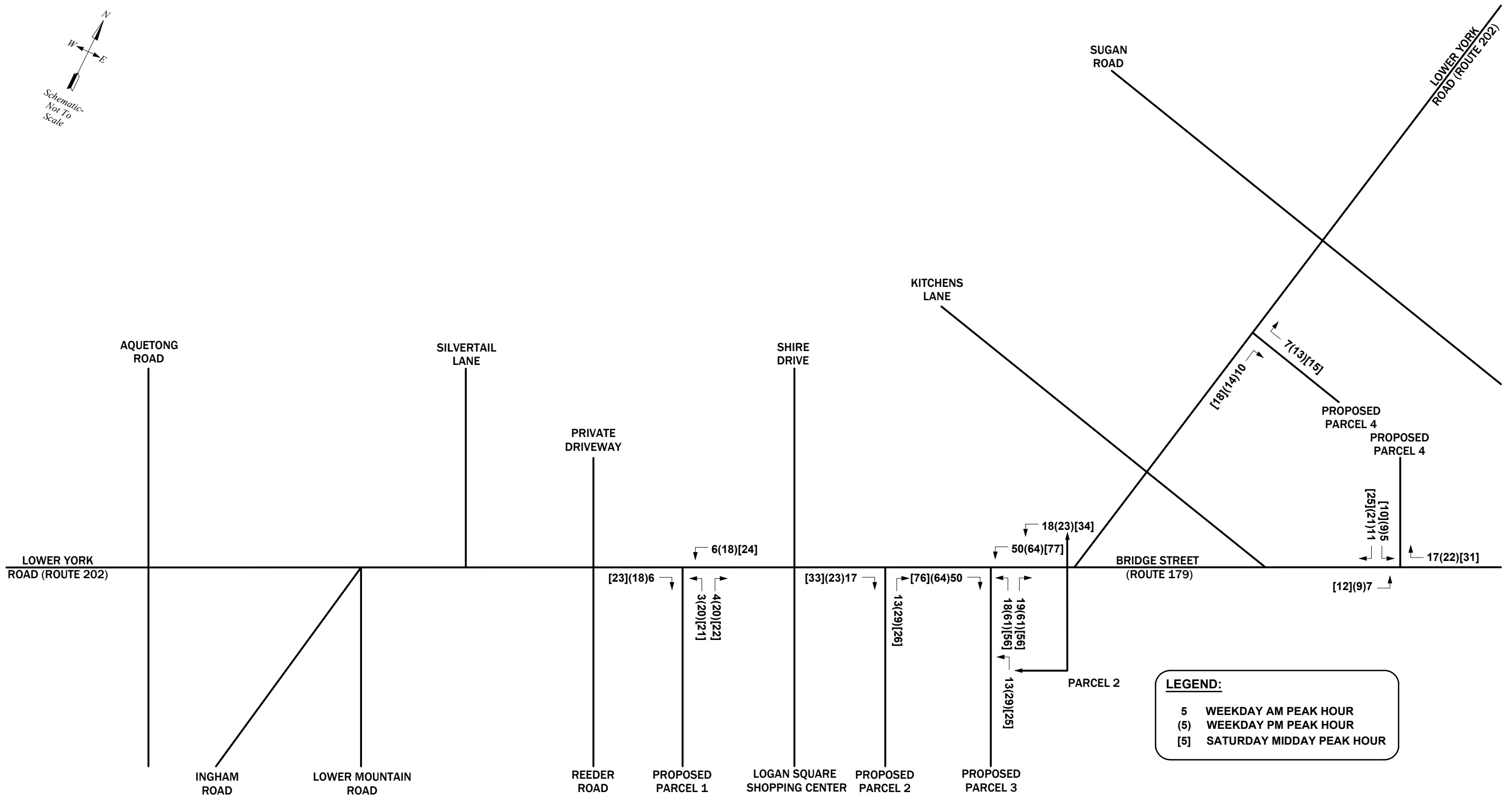


FIGURE 4A
 Build Alternative 1 - Trip Distribution for Each Parcel at Site Driveway
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA



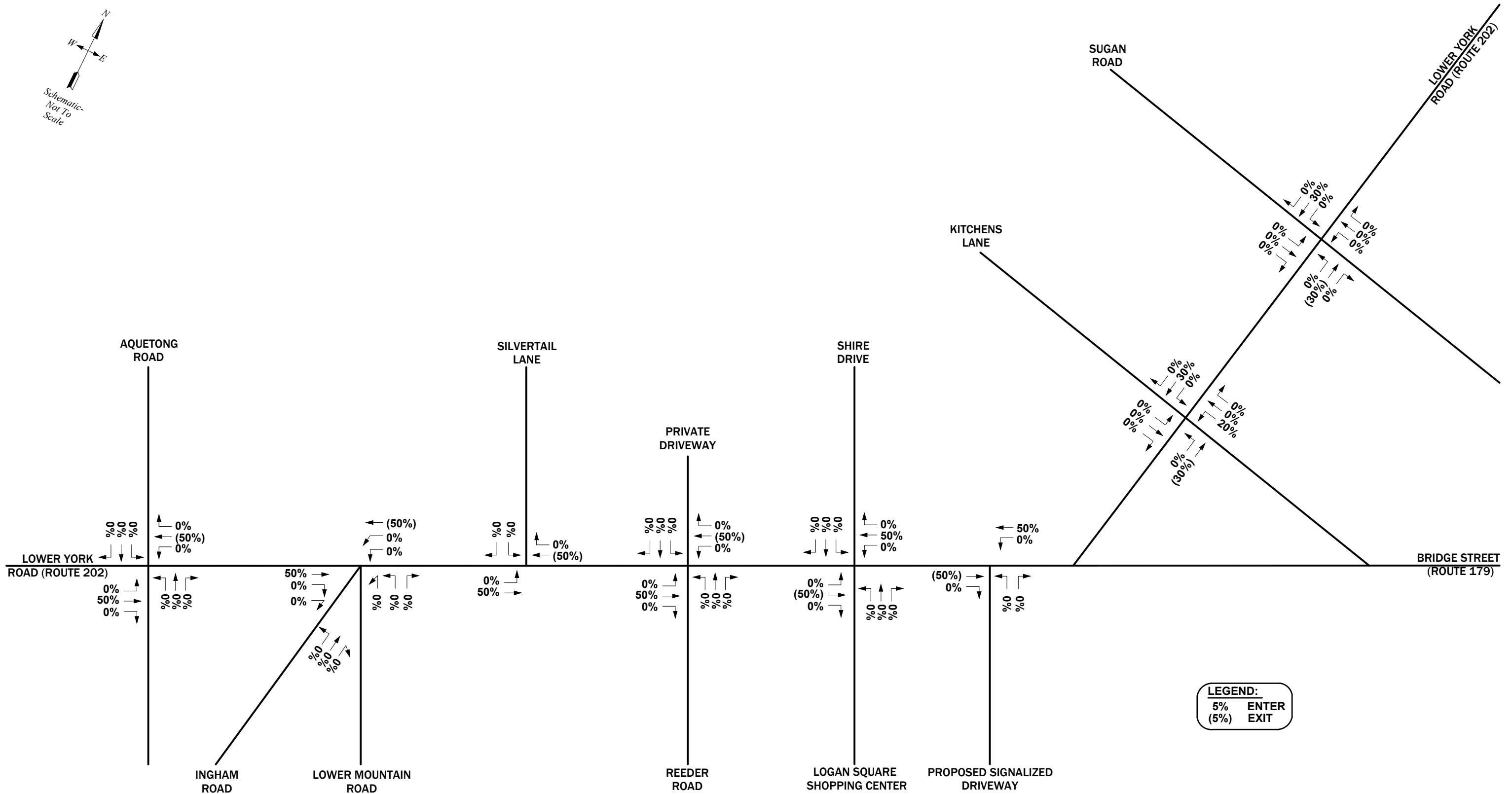


FIGURE 4C
 Build Alternative 1 - Trip Distribution Parcel 1
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

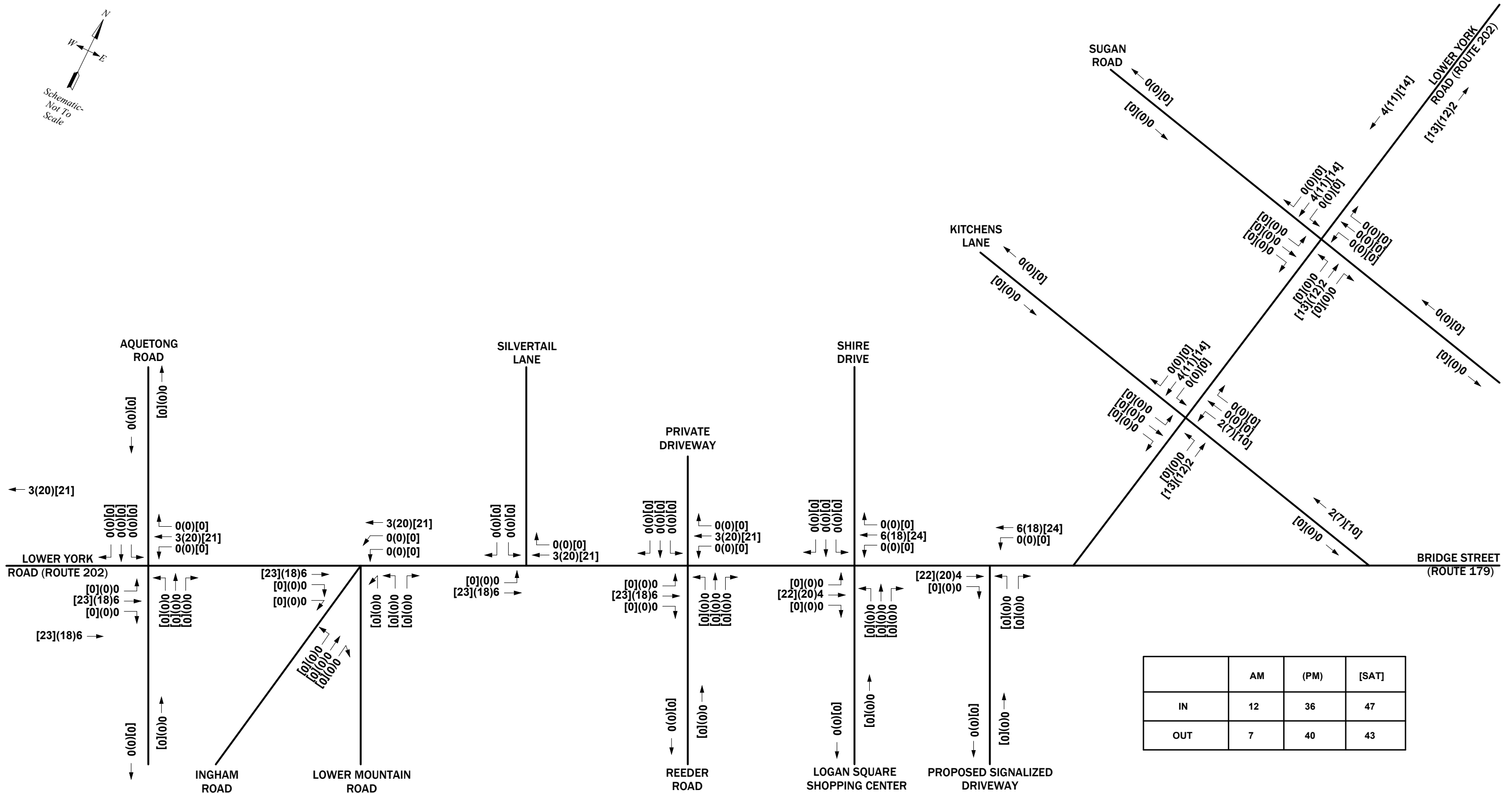


FIGURE 4D
 Build Alternative 1 - Trip Assignment Parcel 1
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

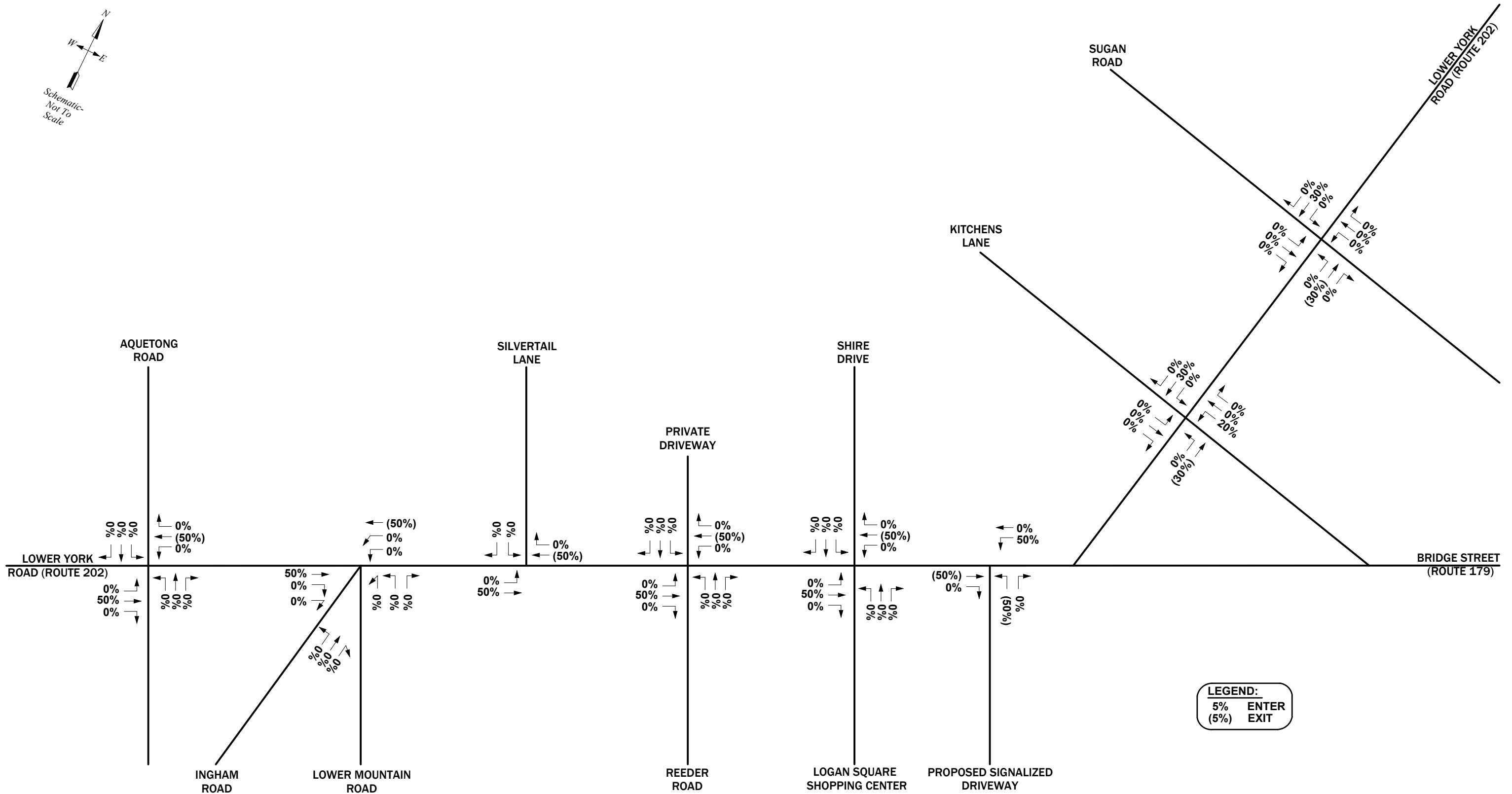


FIGURE 4E

Build Alternative 1 - Trip Distribution Parcel 2

Route 202 Corridor - Transportation Master Plan

SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

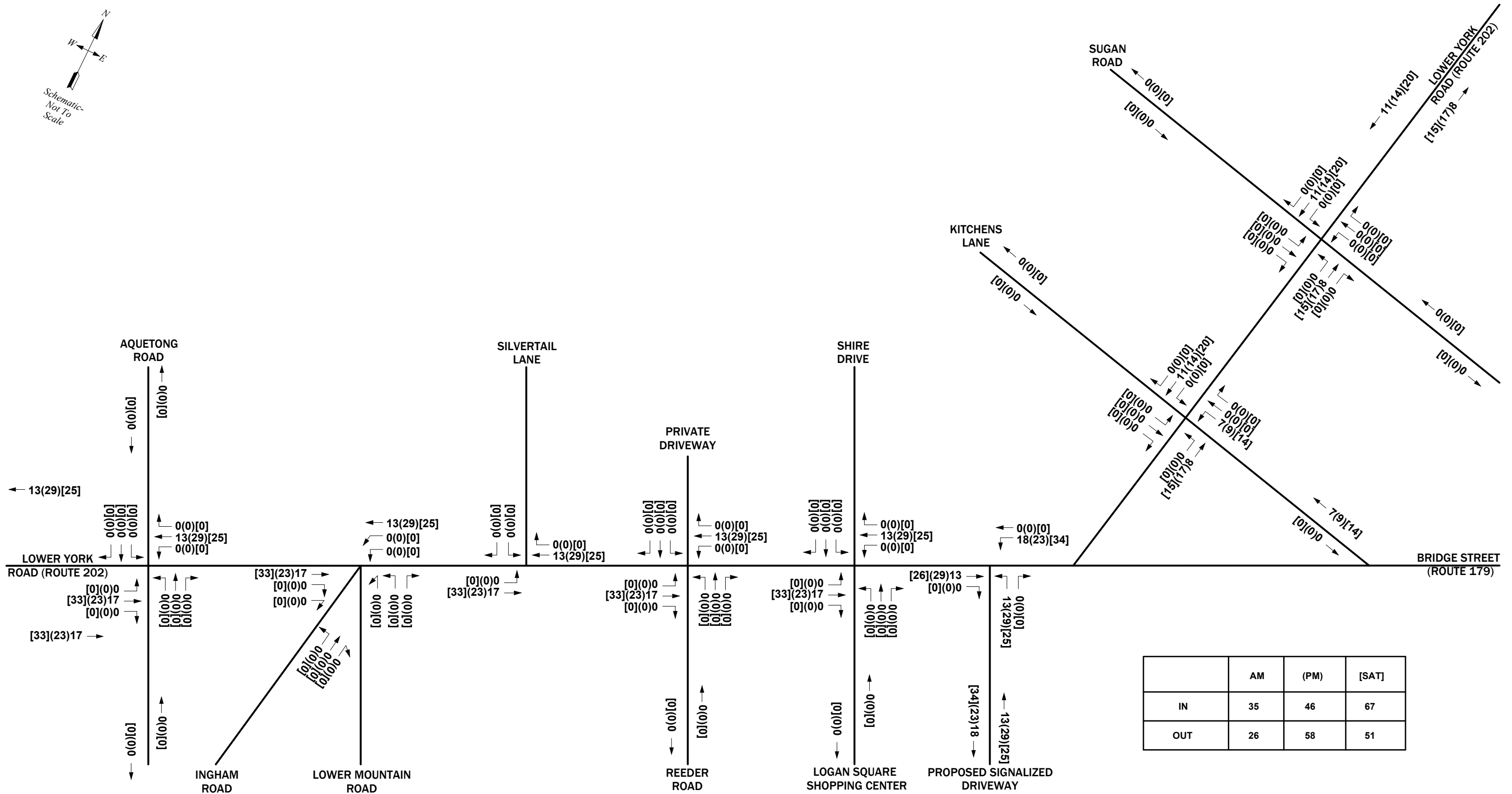


FIGURE 4F
 Build Alternative 1 - Trip Assignment Parcel 2
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

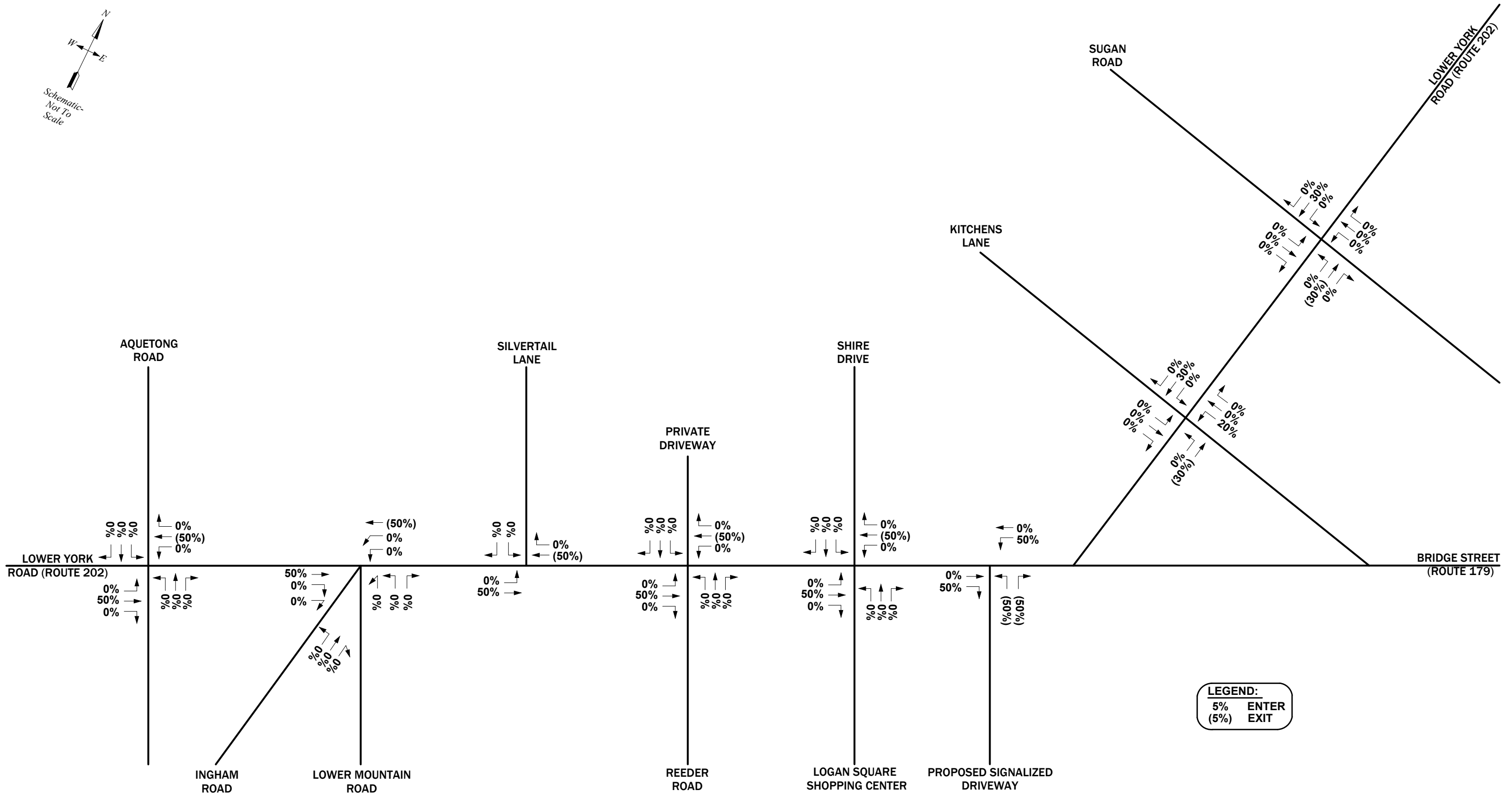


FIGURE 4G
 Build Alternative 1 - Trip Distribution Parcel 3
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

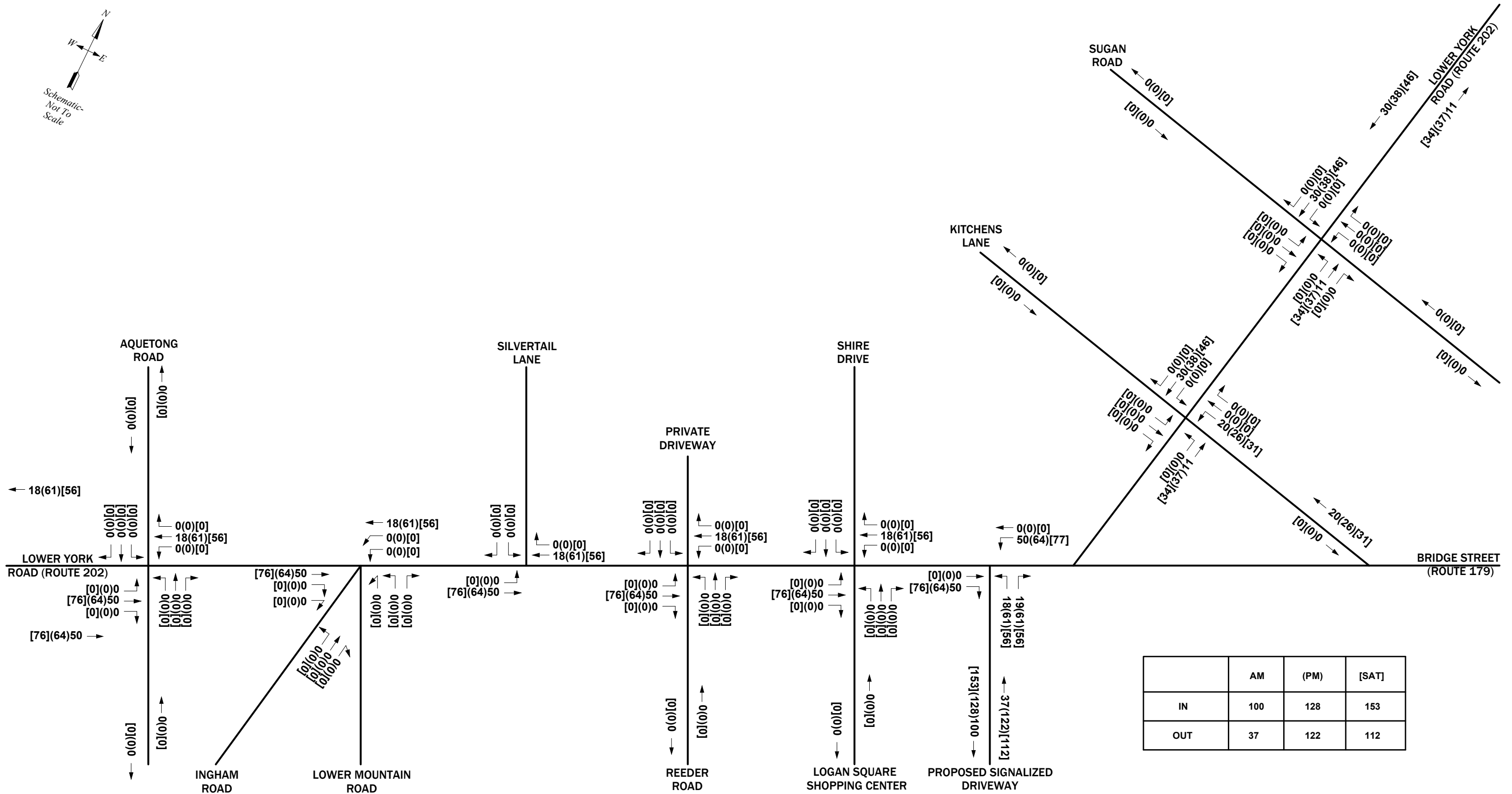


FIGURE 4H
 Build Alternative 1 - Trip Assignment Parcel 3
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

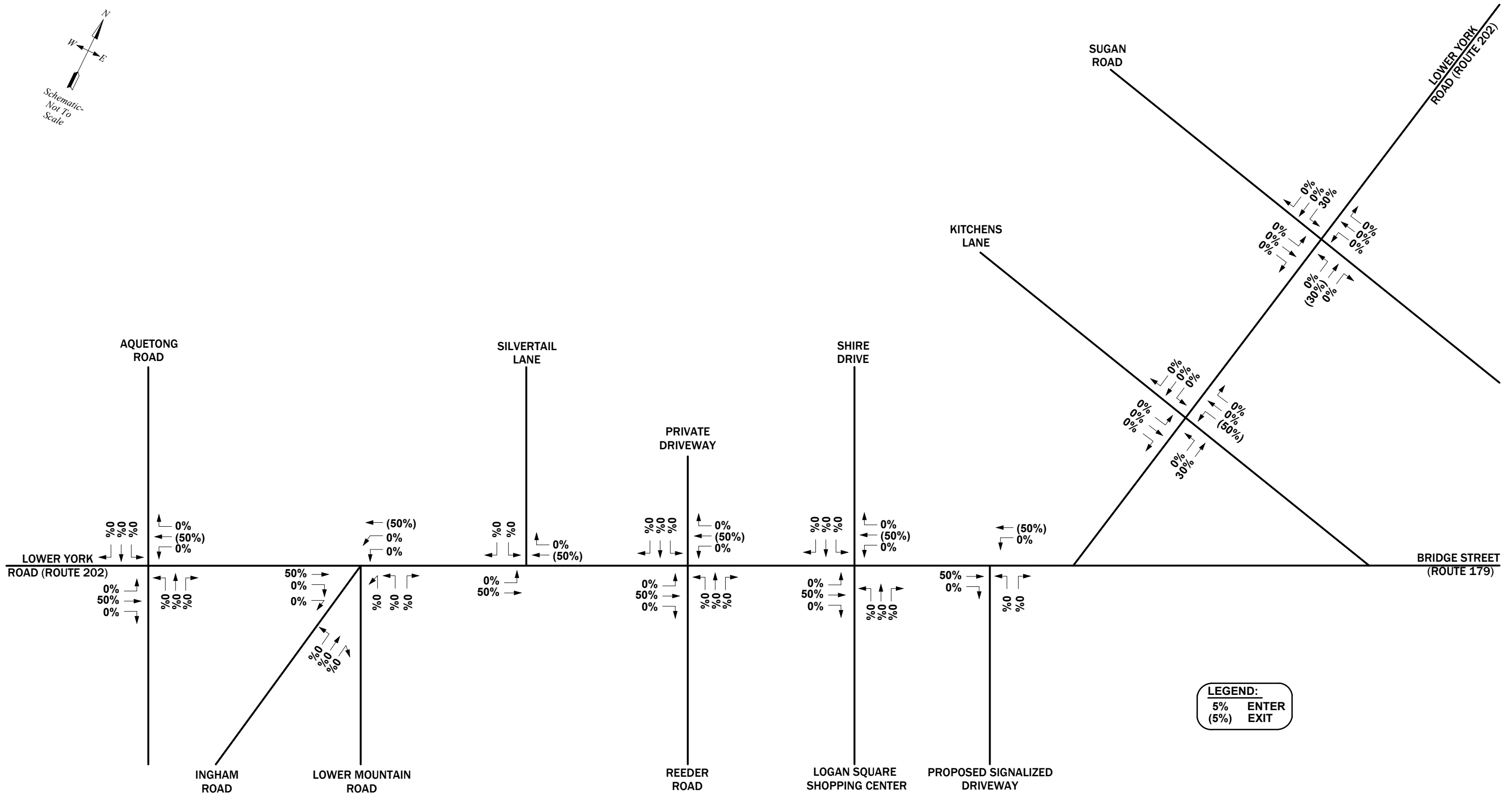


FIGURE 4I
Build Alternative 1 - Trip Distribution Parcel 4
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

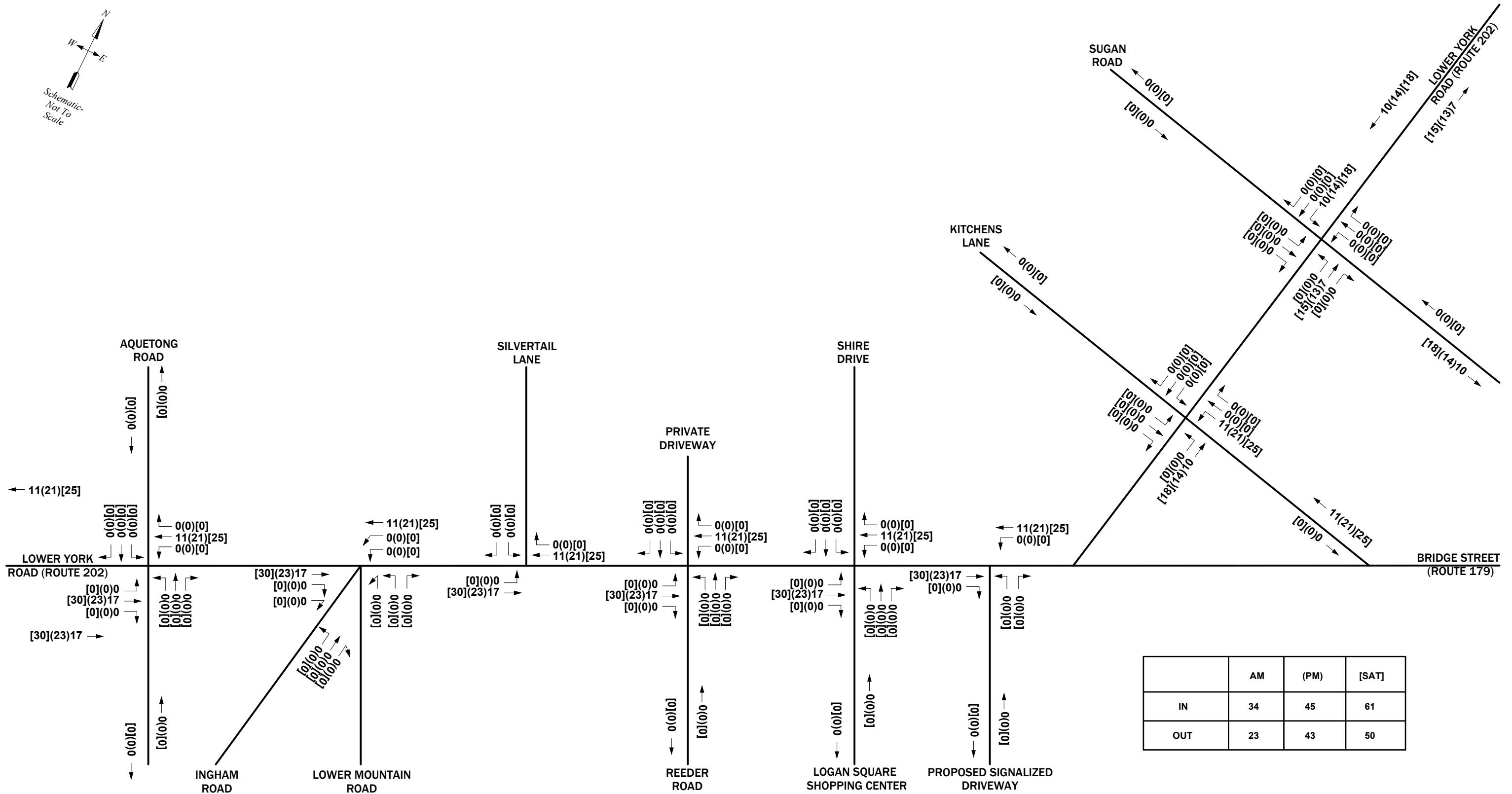


FIGURE 4J
 Build Alternative 1 - Trip Assignment Parcel 4
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

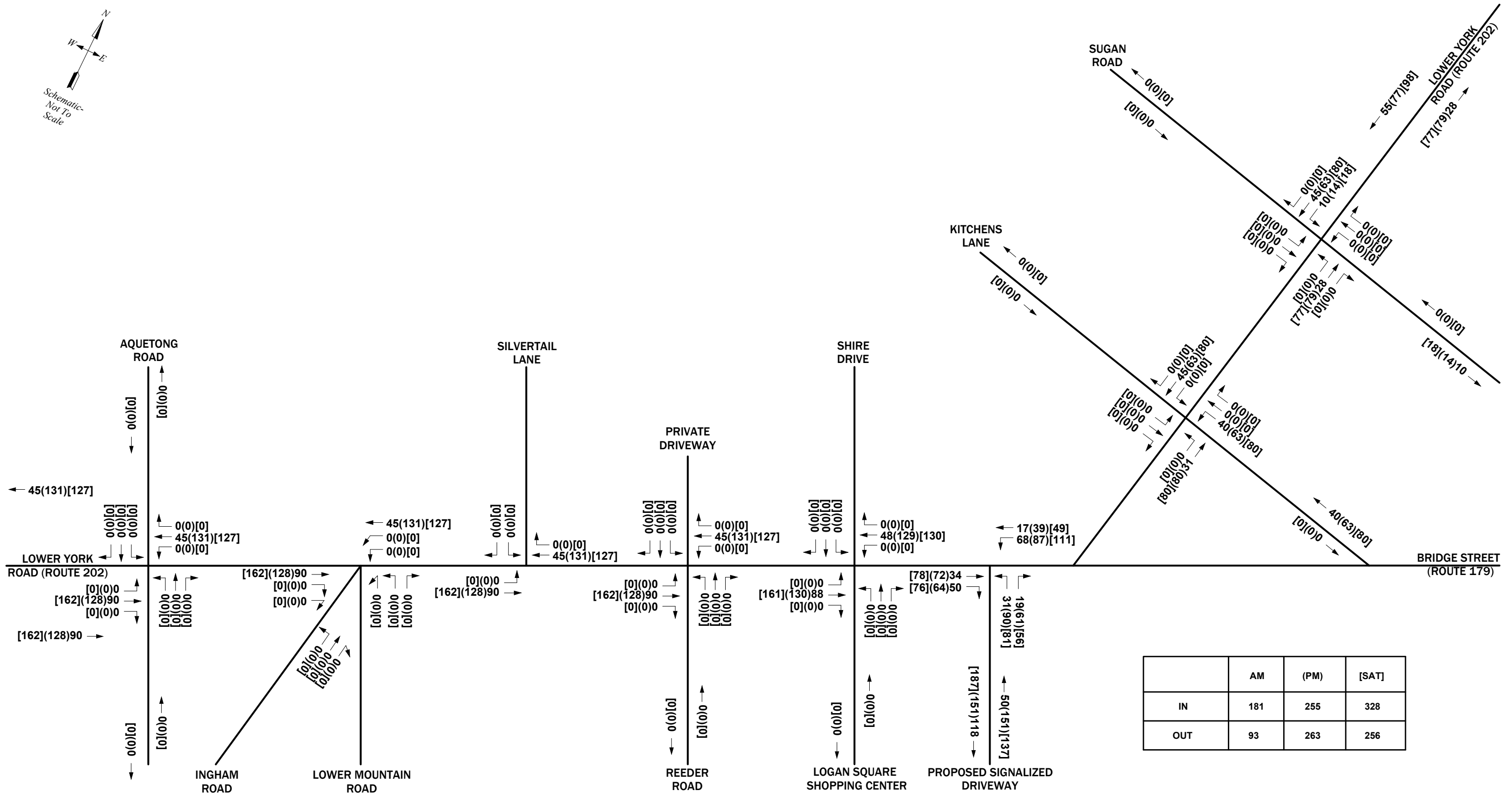


FIGURE 4K
 Build Alternative 1 - Total Trip Assignment
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

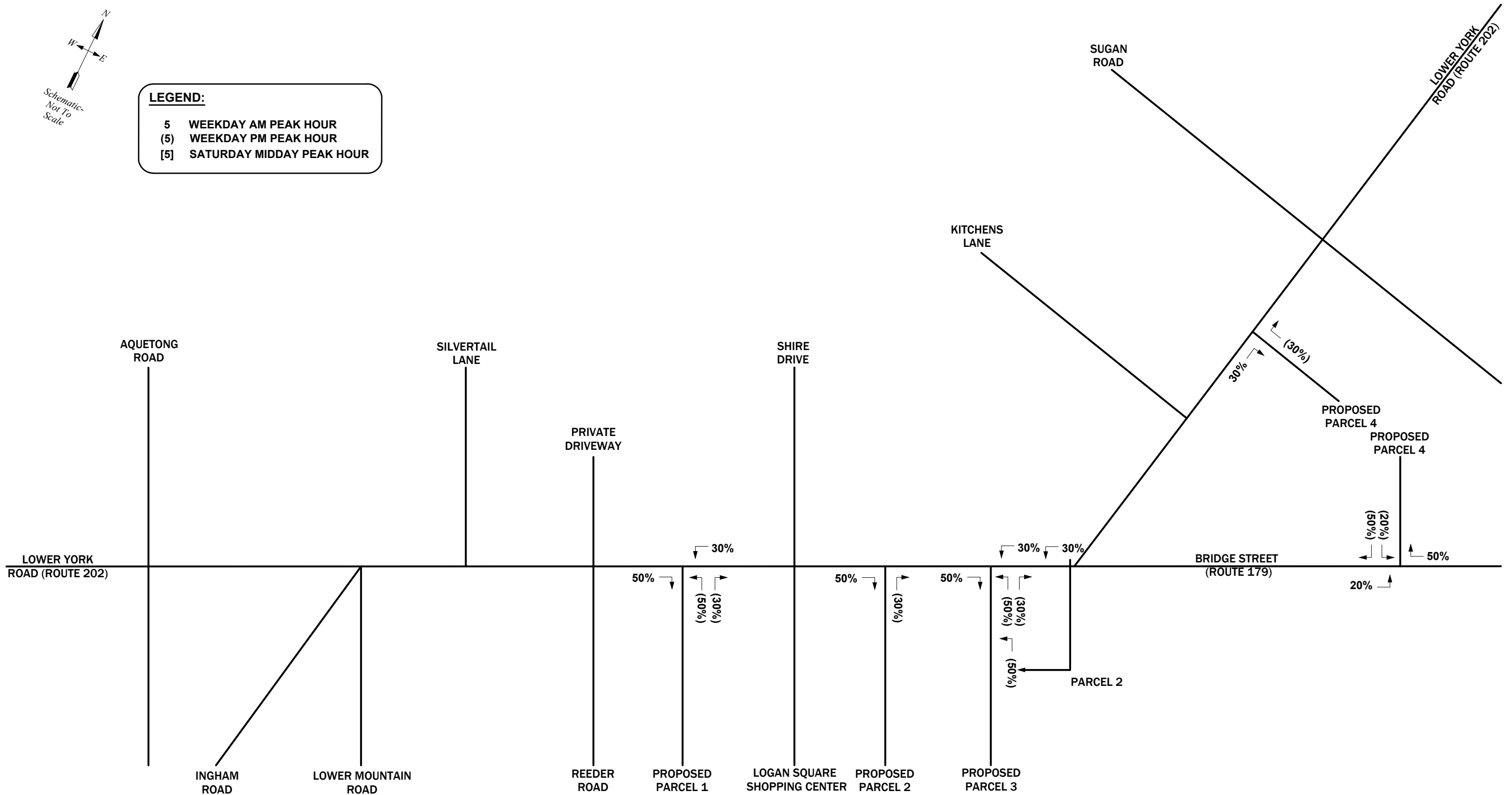


FIGURE 5A
 Build Alternative 2 - Trip Distribution for Each Parcel at Site Driveway
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA



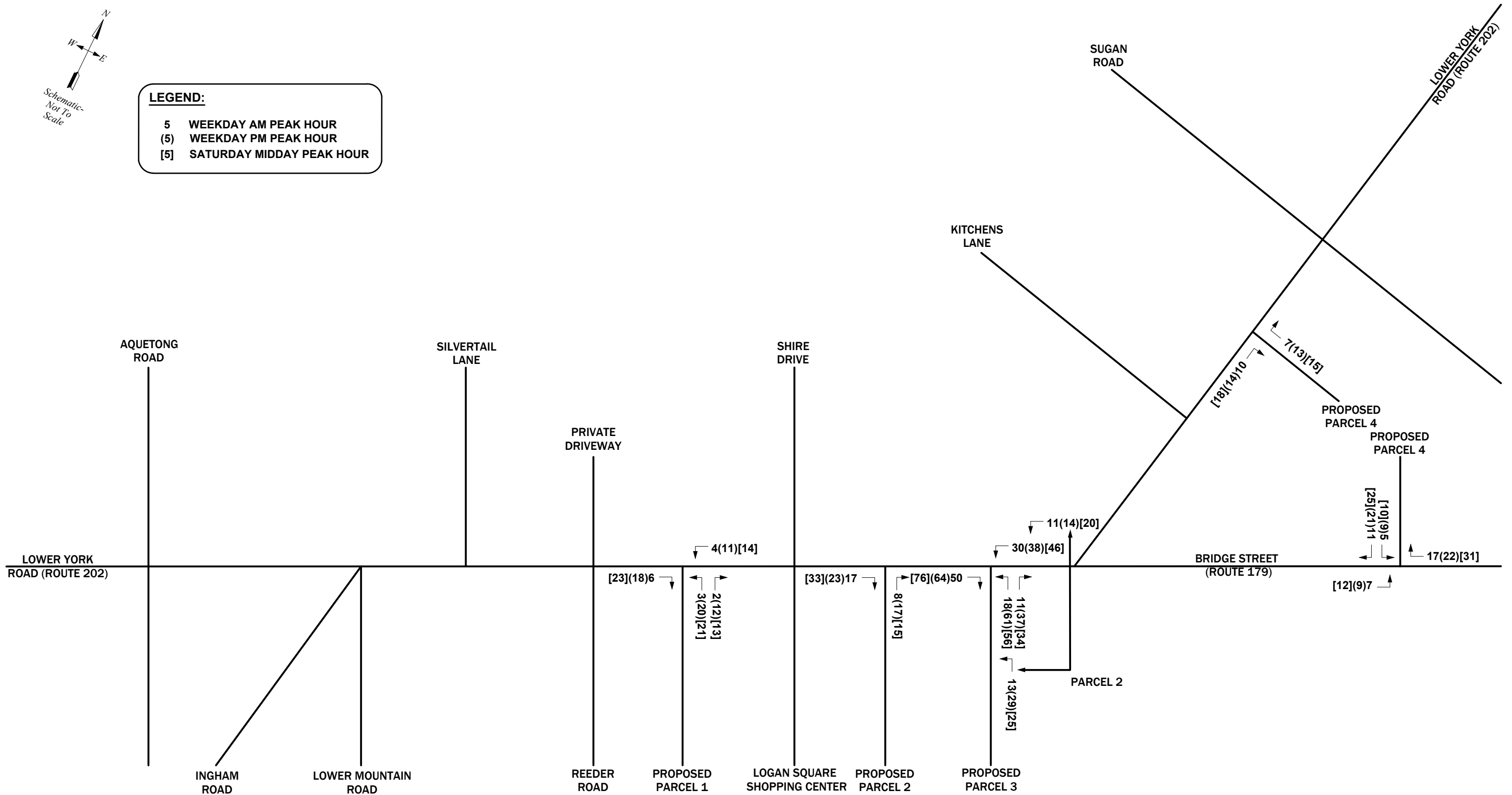


FIGURE 5B
 Build Alternative 2 - Trip Assignment for Each Parcel at Site Driveway
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA



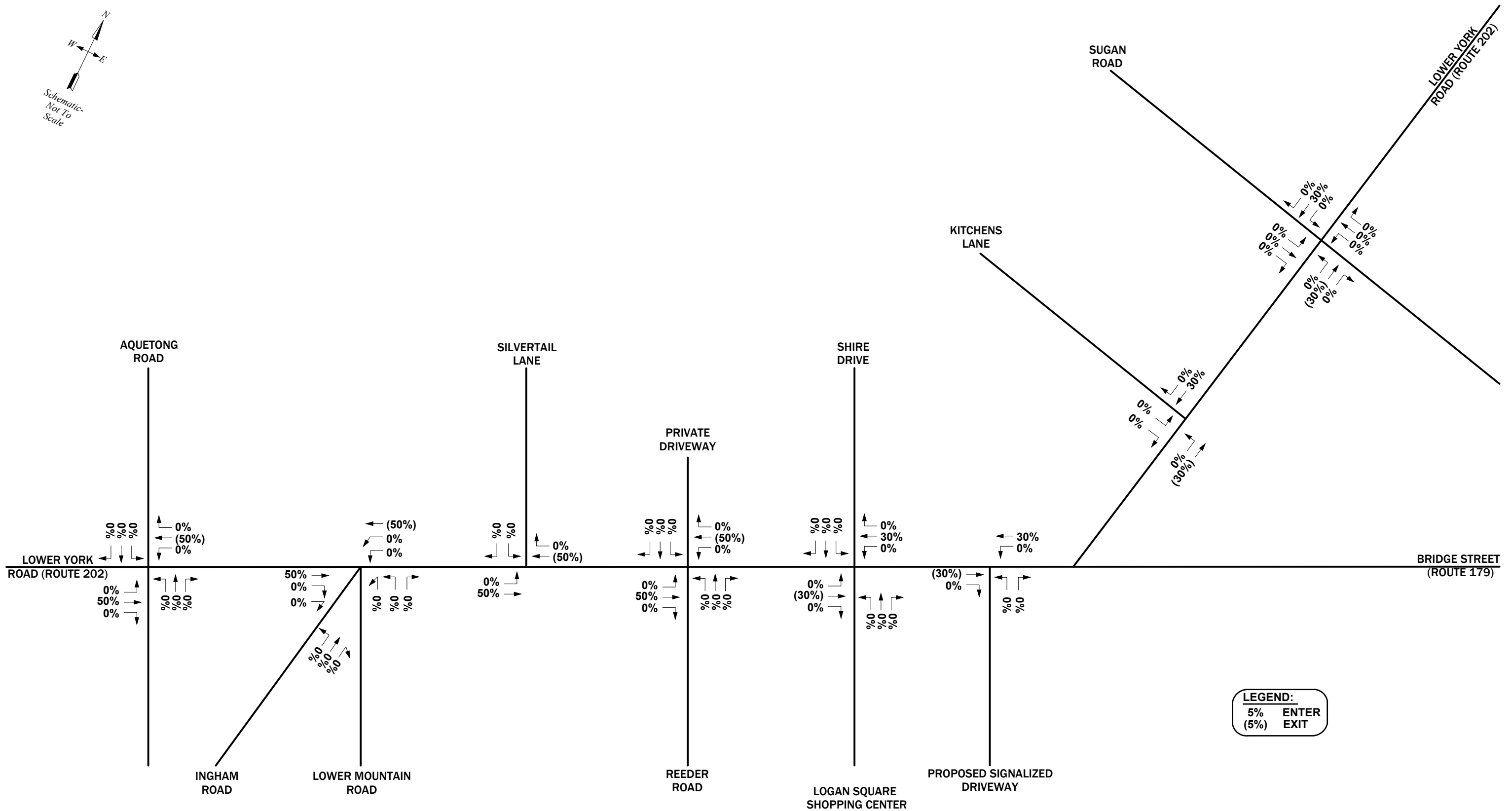


FIGURE 5C

Build Alternative 2 - Trip Distribution Parcel 1

Route 202 Corridor - Transportation Master Plan

SOLEBURY TOWNSHIP, BUCKS COUNTY, PA



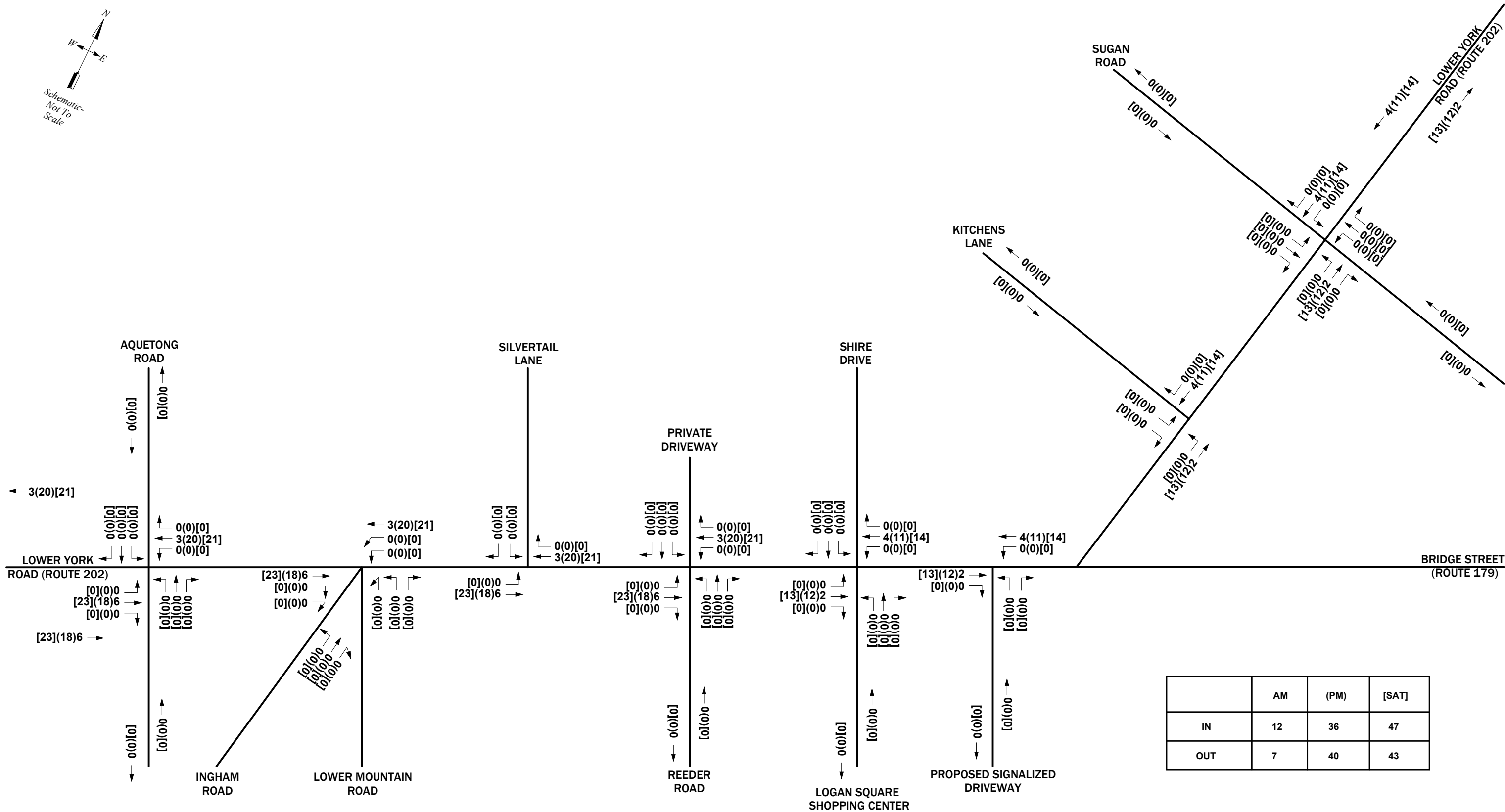


FIGURE 5D

Build Alternative 2 - Trip Assignment Parcel 1

Route 202 Corridor - Transportation Master Plan

SOLEBURY TOWNSHIP, BUCKS COUNTY, PA



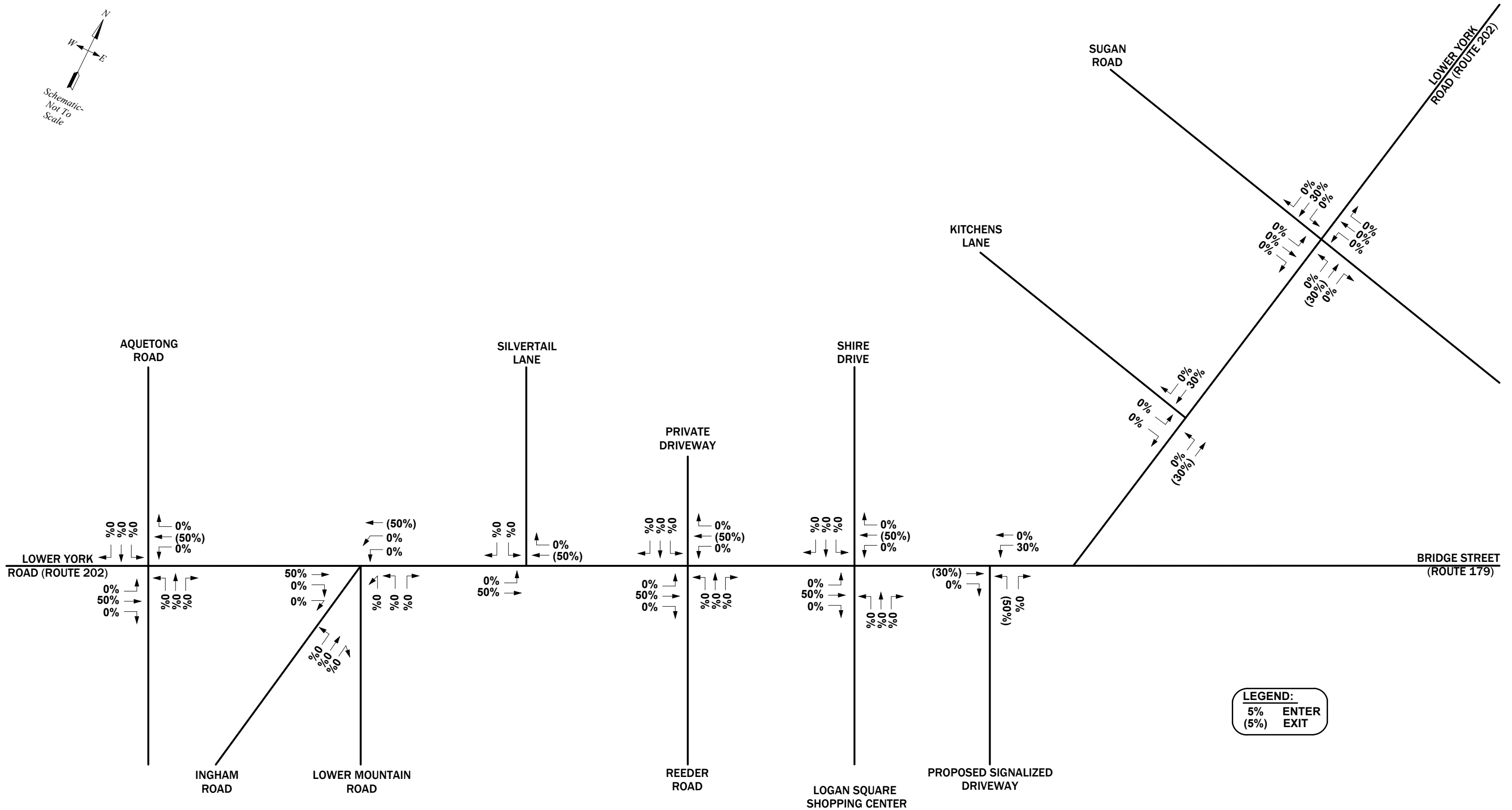


FIGURE 5E

Build Alternative 2 - Trip Distribution Parcel 2

Route 202 Corridor - Transportation Master Plan

SOLEBURY TOWNSHIP, BUCKS COUNTY, PA



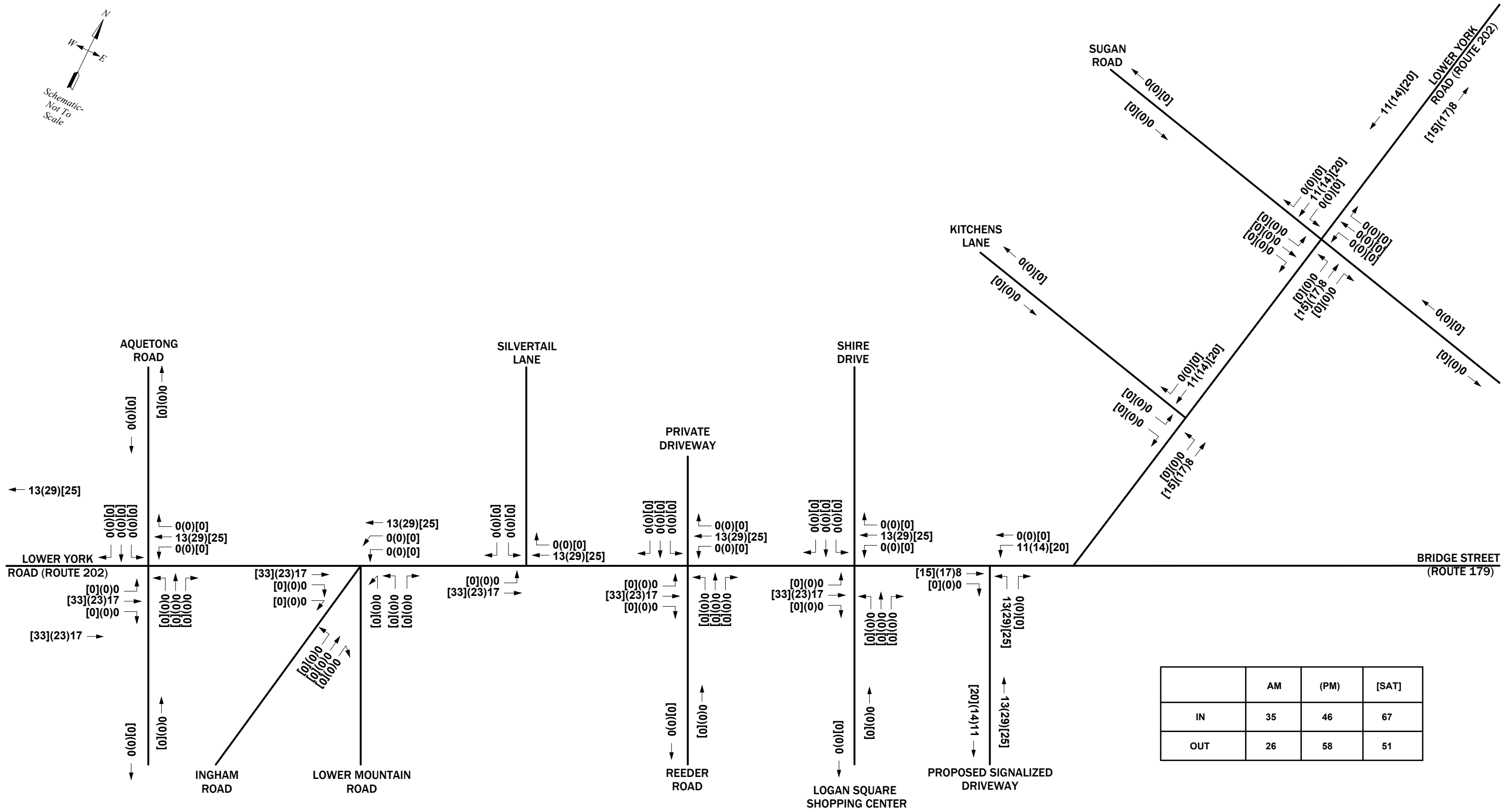


FIGURE 5F
 Build Alternative 2 - Trip Assignment Parcel 2
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

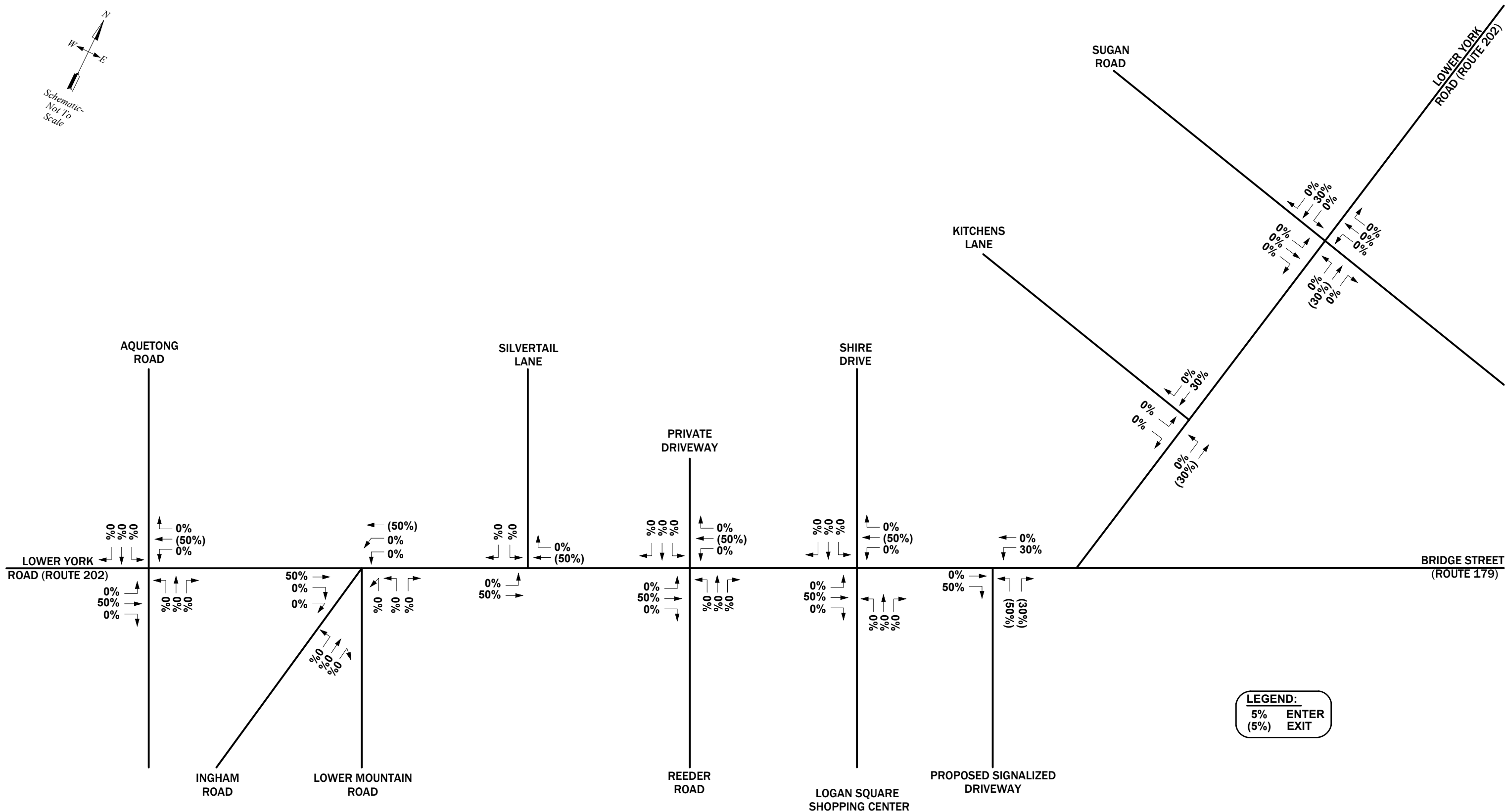


FIGURE 5G

Build Alternative 2 - Trip Distribution Parcel 3

Route 202 Corridor - Transportation Master Plan

SOLEBURY TOWNSHIP, BUCKS COUNTY, PA



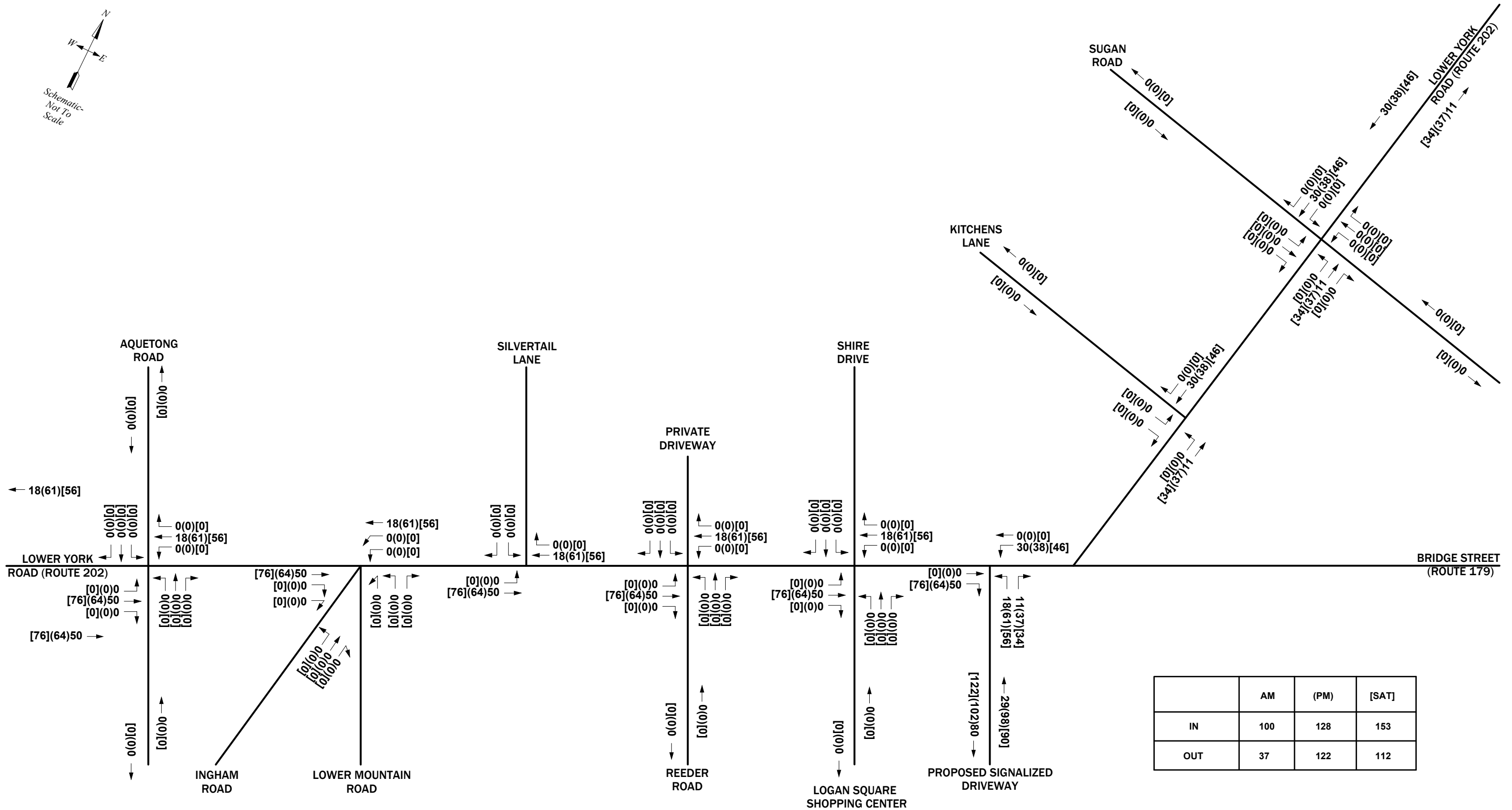


FIGURE 5H
 Build Alternative 2 - Trip Assignment Parcel 3
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

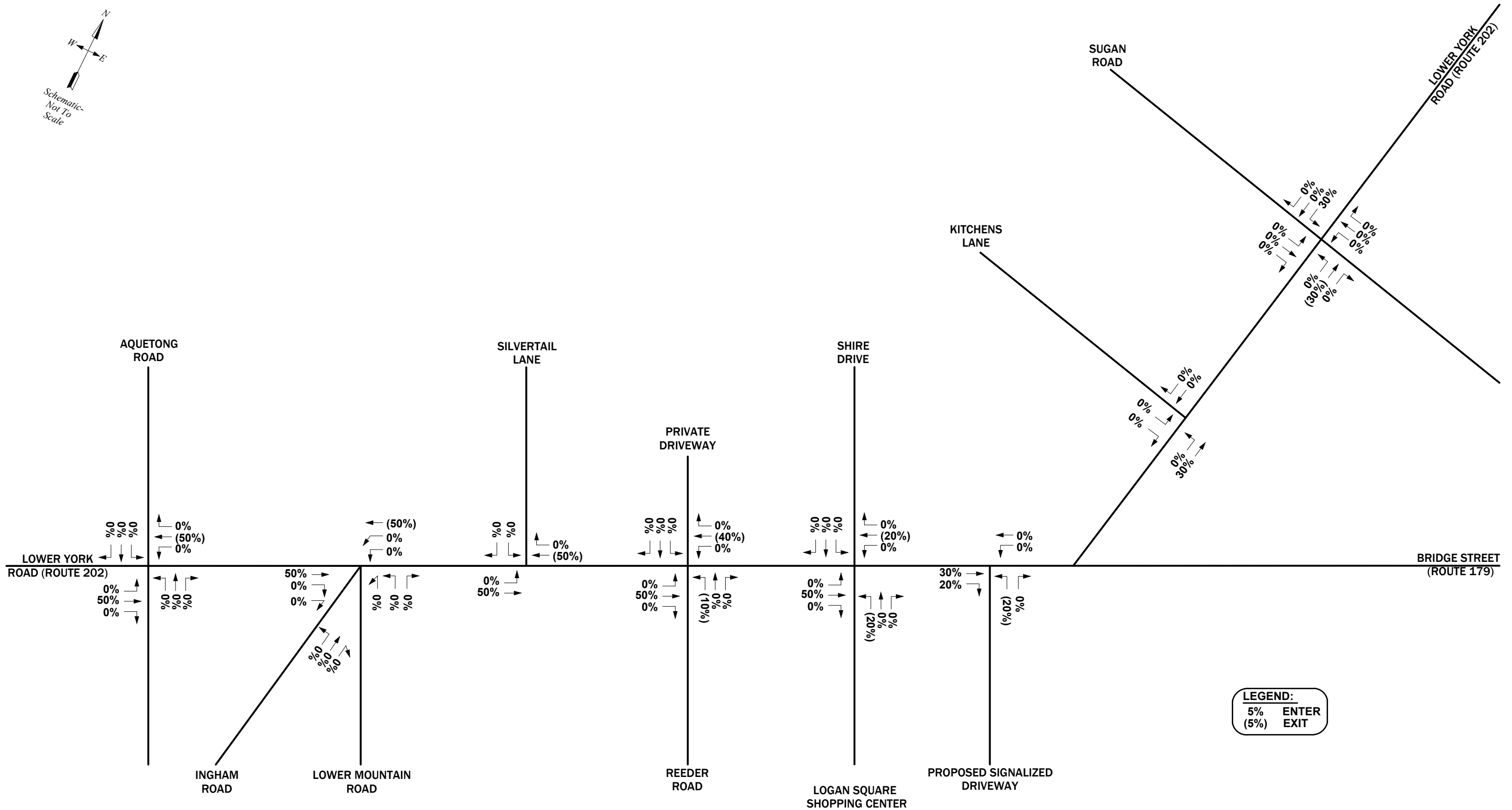


FIGURE 5I

Build Alternative 2 - Trip Distribution Parcel 4

Route 202 Corridor - Transportation Master Plan

SOLEBURY TOWNSHIP, BUCKS COUNTY, PA



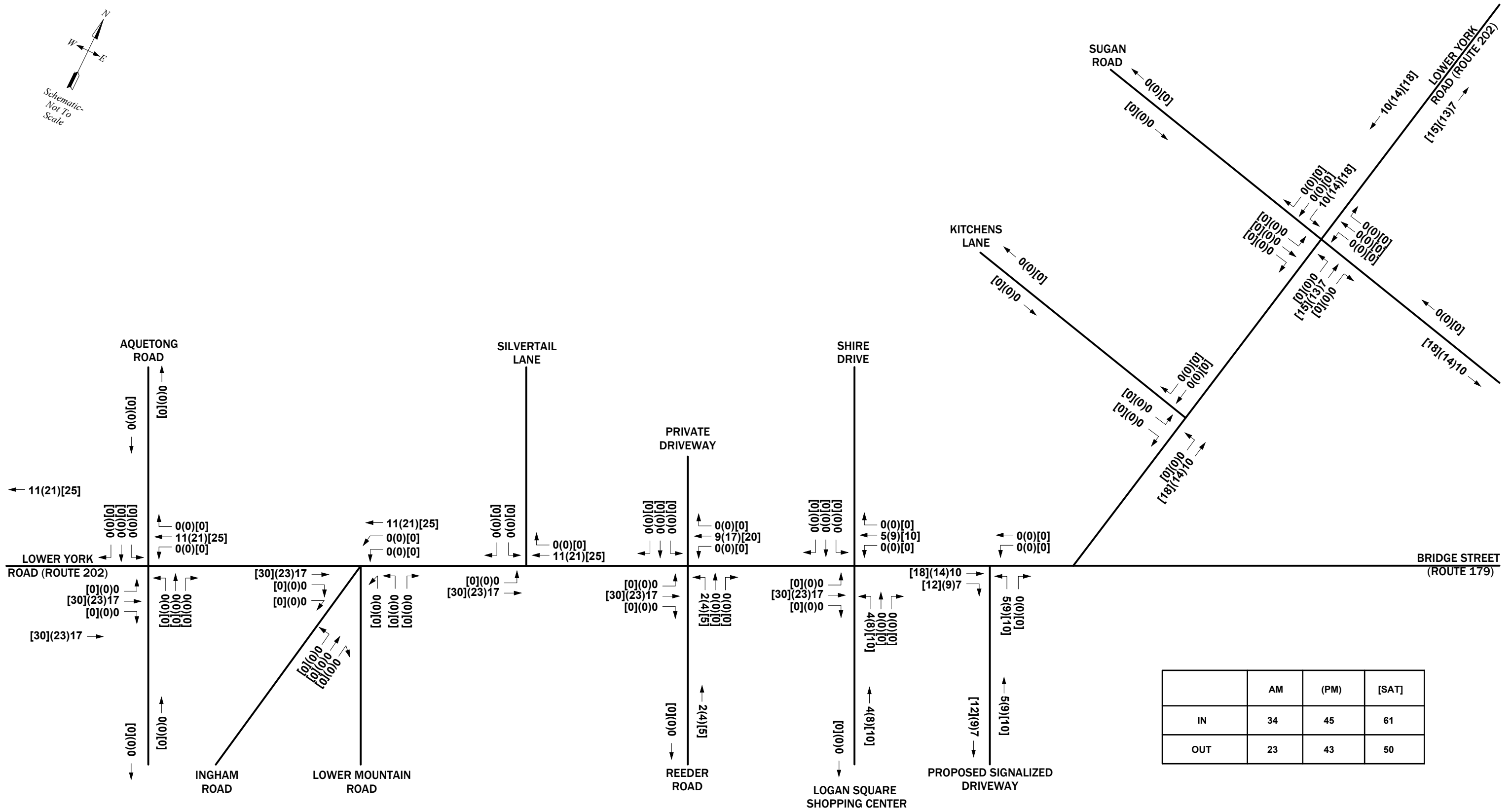


FIGURE 5J
 Build Alternative 2 - Trip Assignment Parcel 4
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

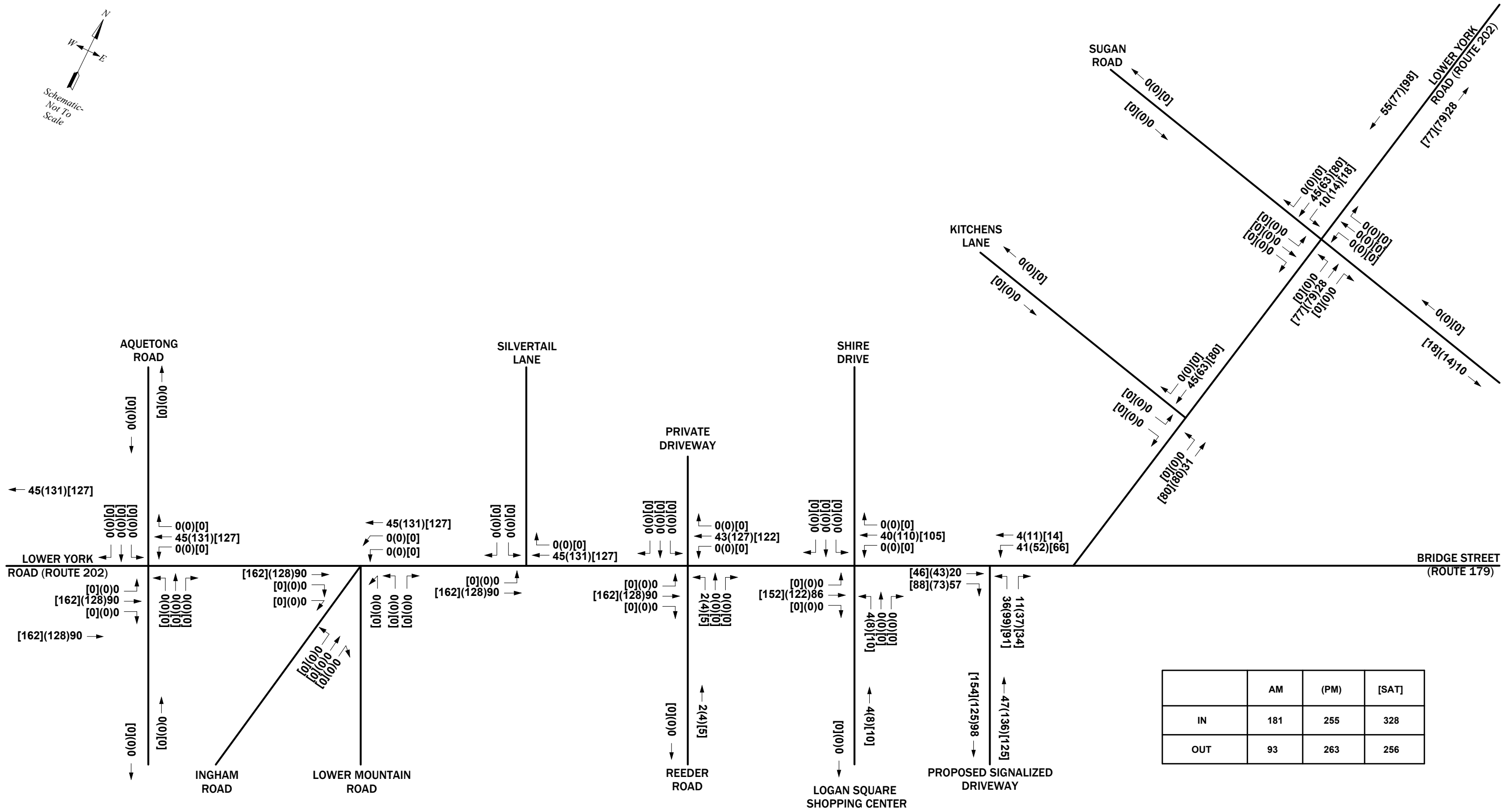


FIGURE 5K
 Build Alternative 2 - Total Trip Assignment
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

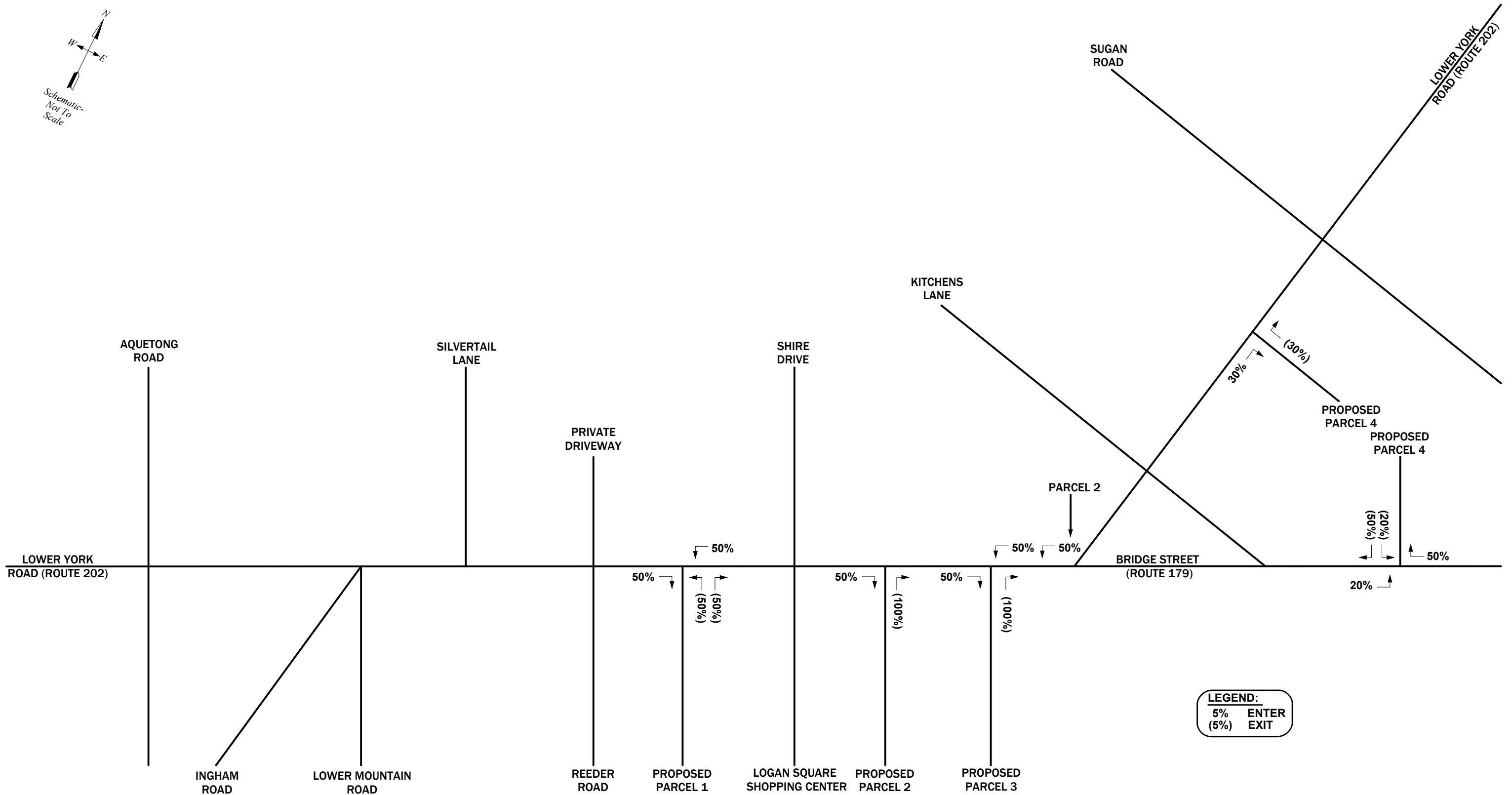


FIGURE 6A

Build Alternative 3 - Trip Distribution for Each Parcel at Site Driveway

Route 202 Corridor - Transportation Master Plan

SOLEBURY TOWNSHIP, BUCKS COUNTY, PA



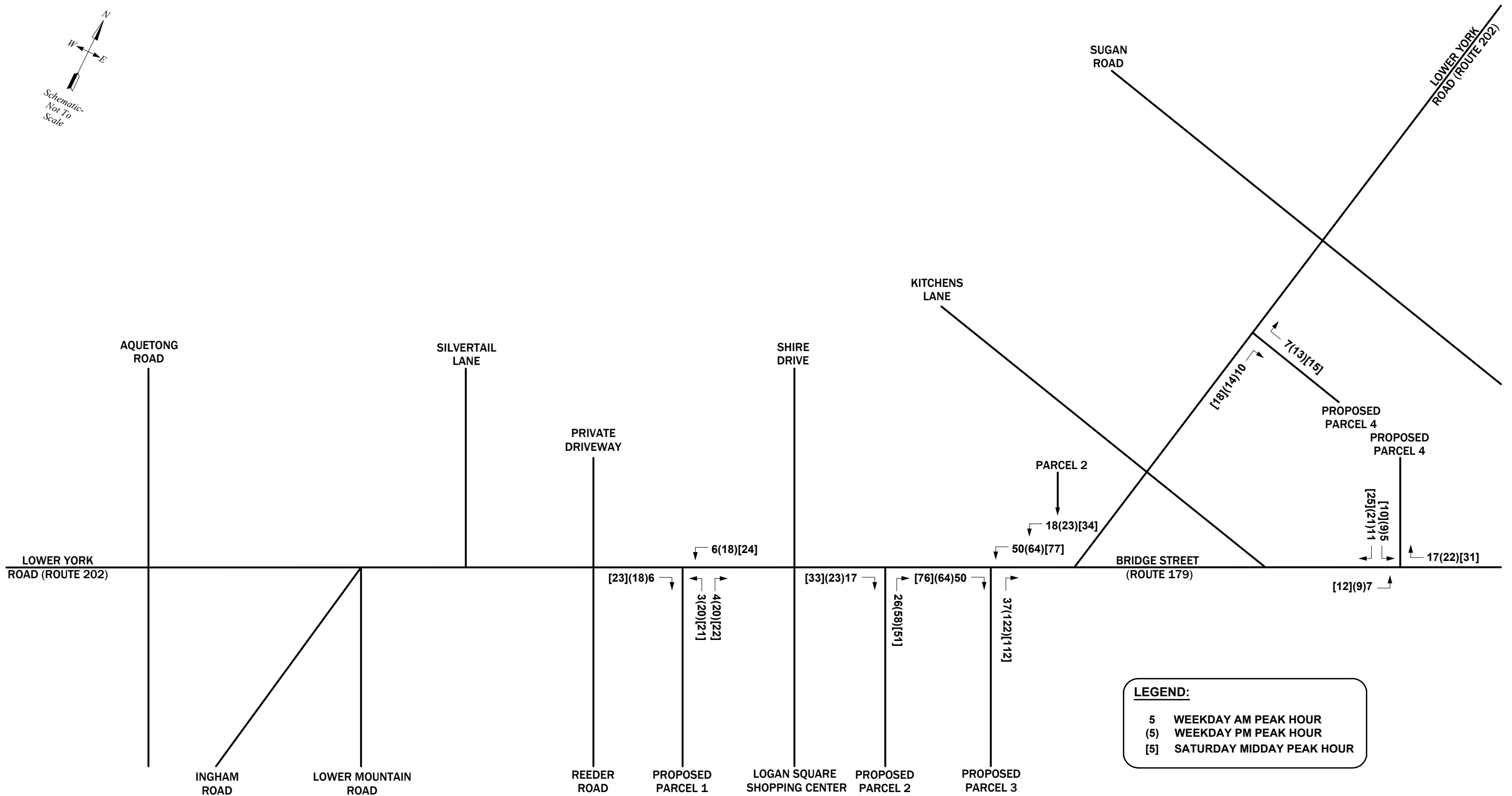


FIGURE 6B
 Build Alternative 3 - Trip Assignment for Each Parcel at Site Driveway
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

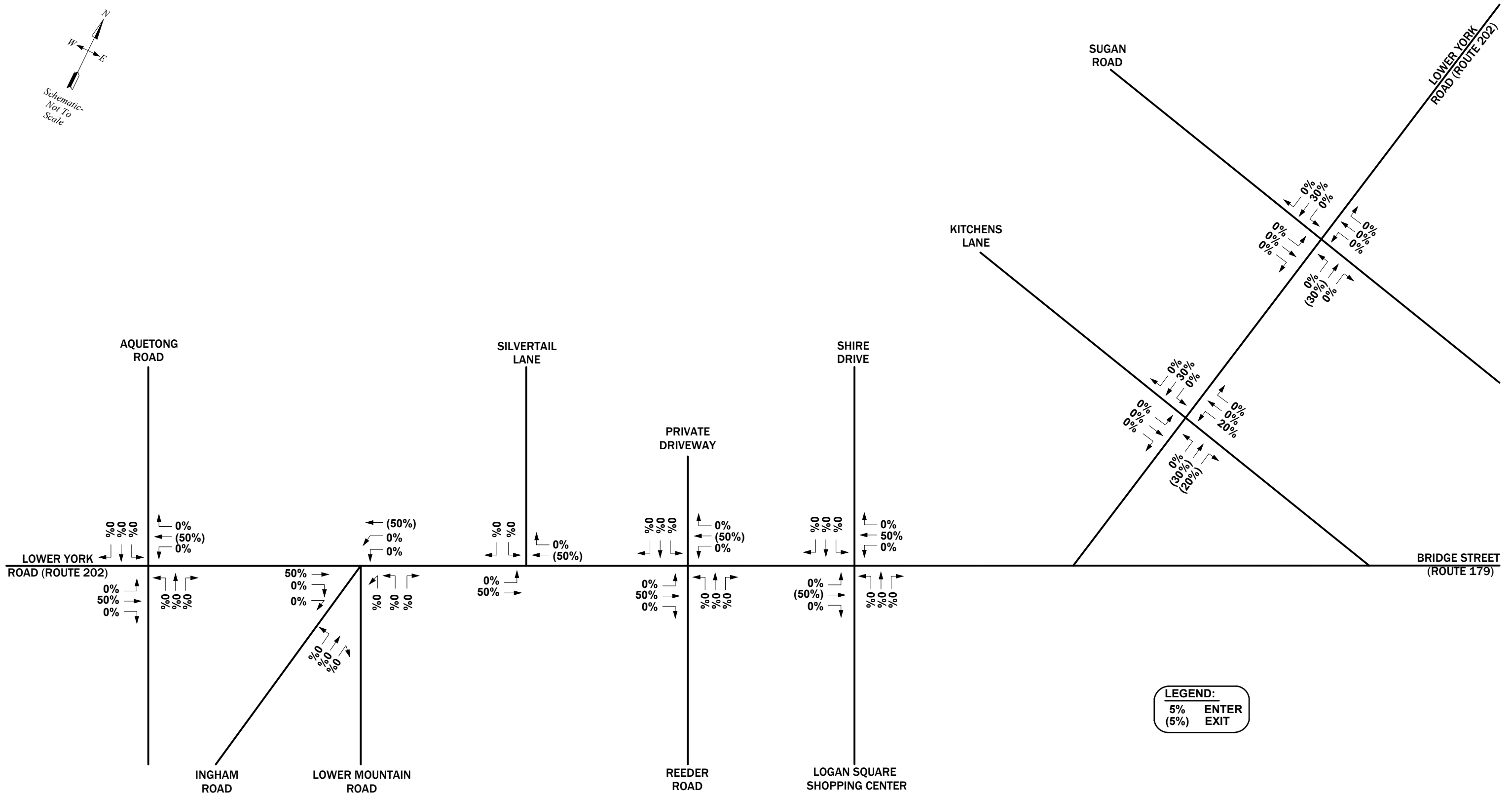


FIGURE 6C
 Build Alternative 3 - Trip Distribution Parcel 1
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

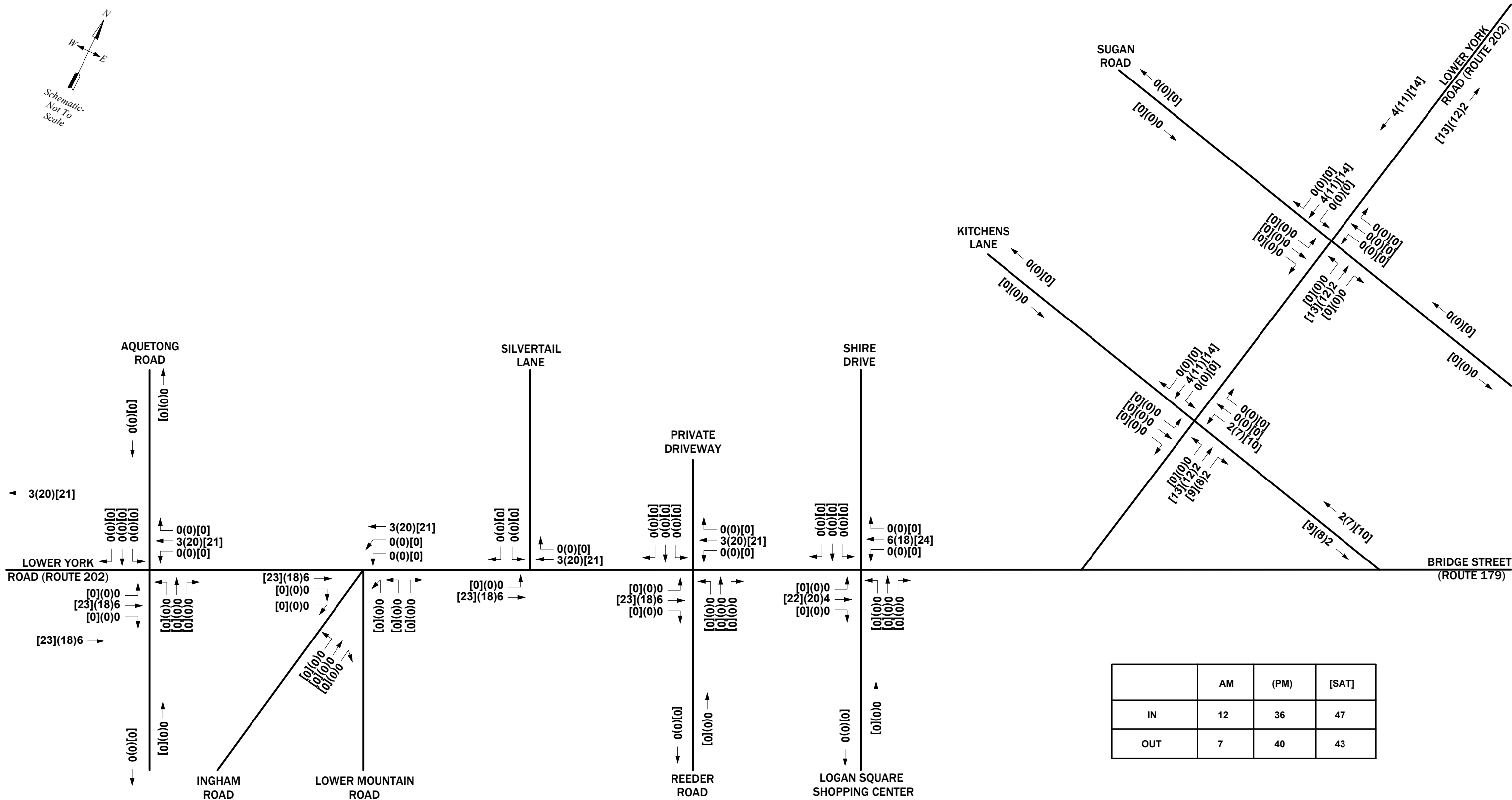


FIGURE 6D
 Build Alternative 3 - Trip Assignment Parcel 1
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA



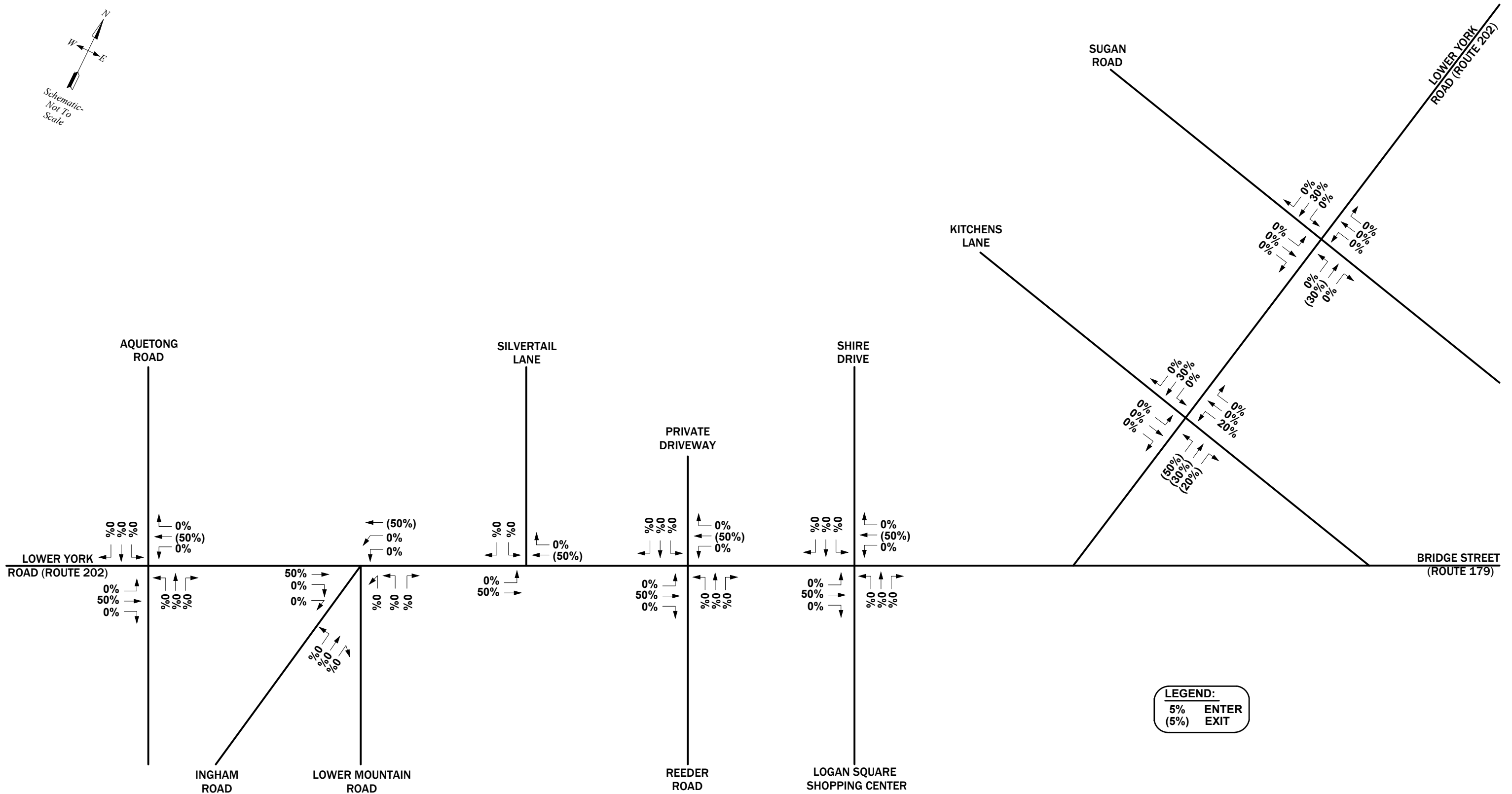


FIGURE 6E
 Build Alternative 3 - Trip Distribution Parcel 2
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

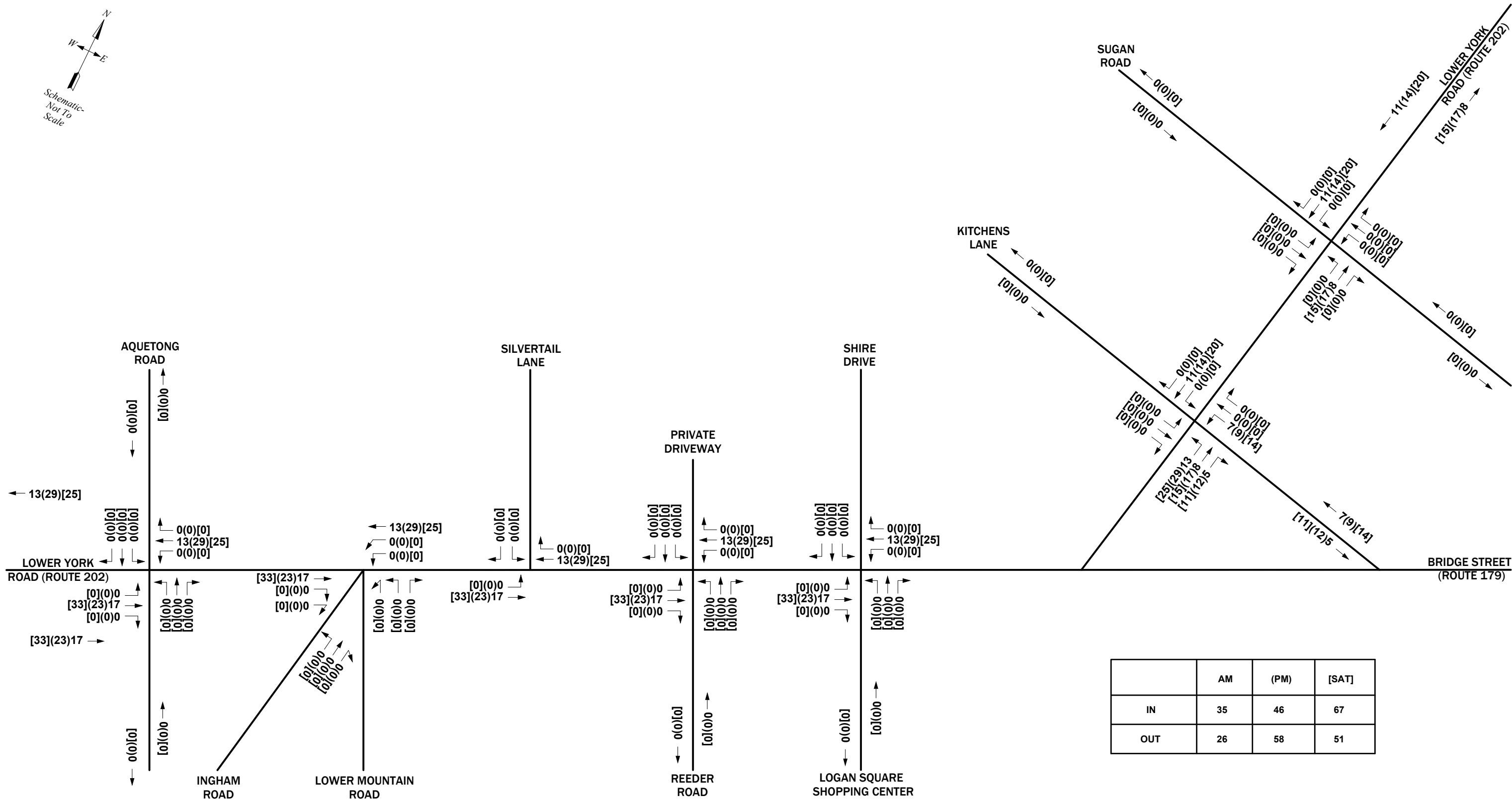


FIGURE 6F
 Build Alternative 3 - Trip Assignment Parcel 2
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

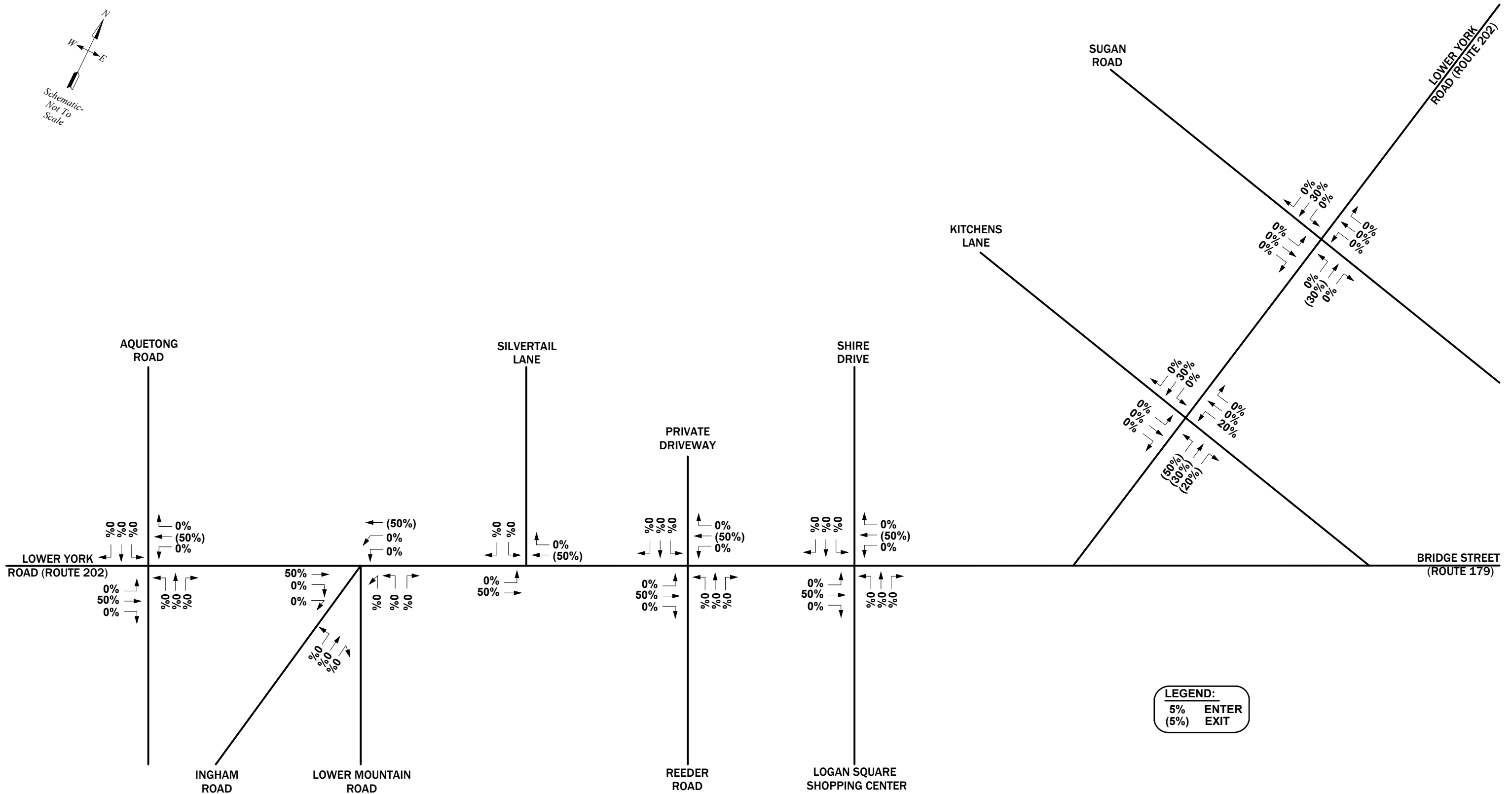


FIGURE 6G

Build Alternative 3 - Trip Distribution Parcel 3

Route 202 Corridor - Transportation Master Plan

SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

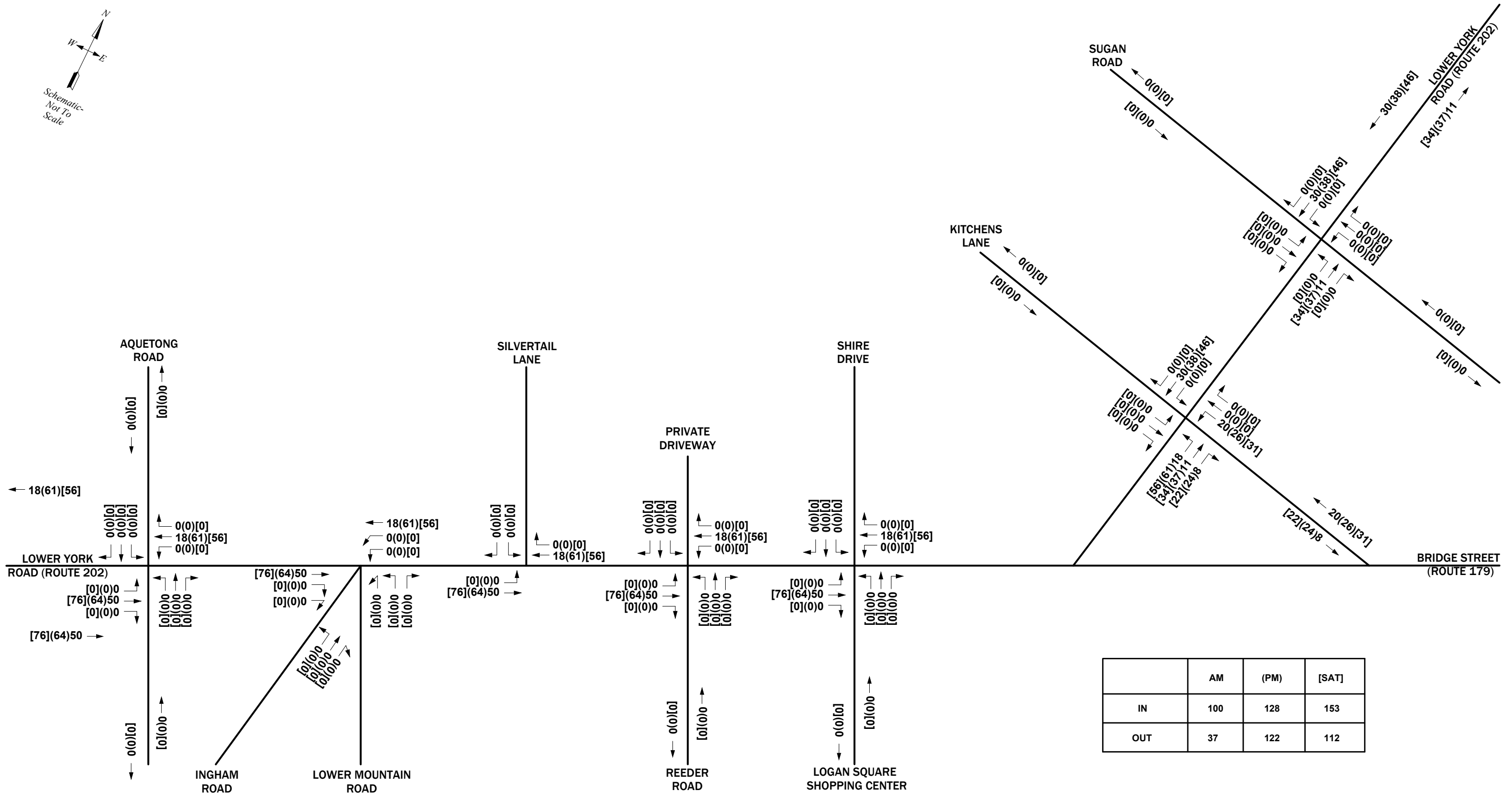


FIGURE 6H
 Build Alternative 3 - Trip Assignment Parcel 3
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

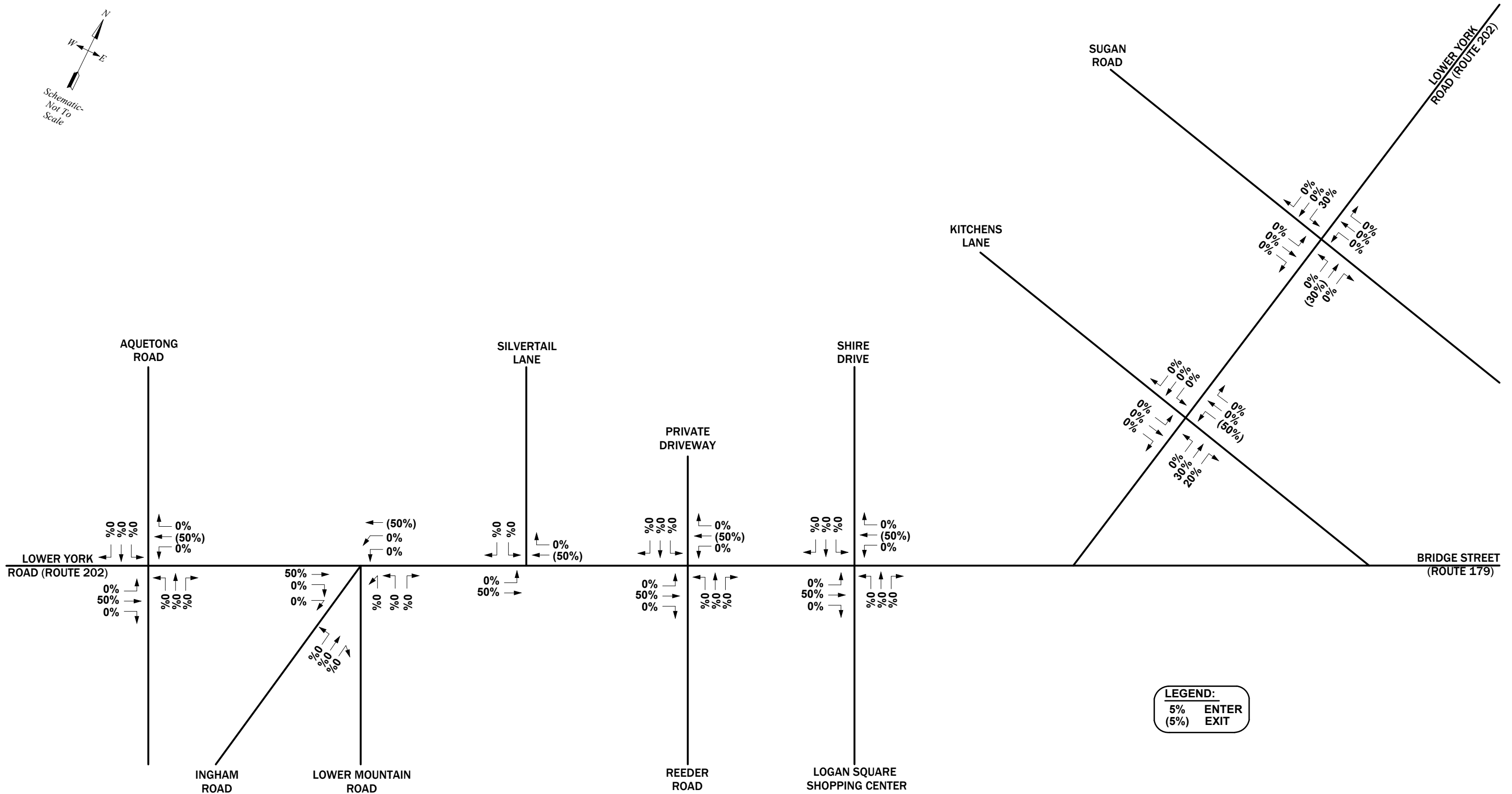
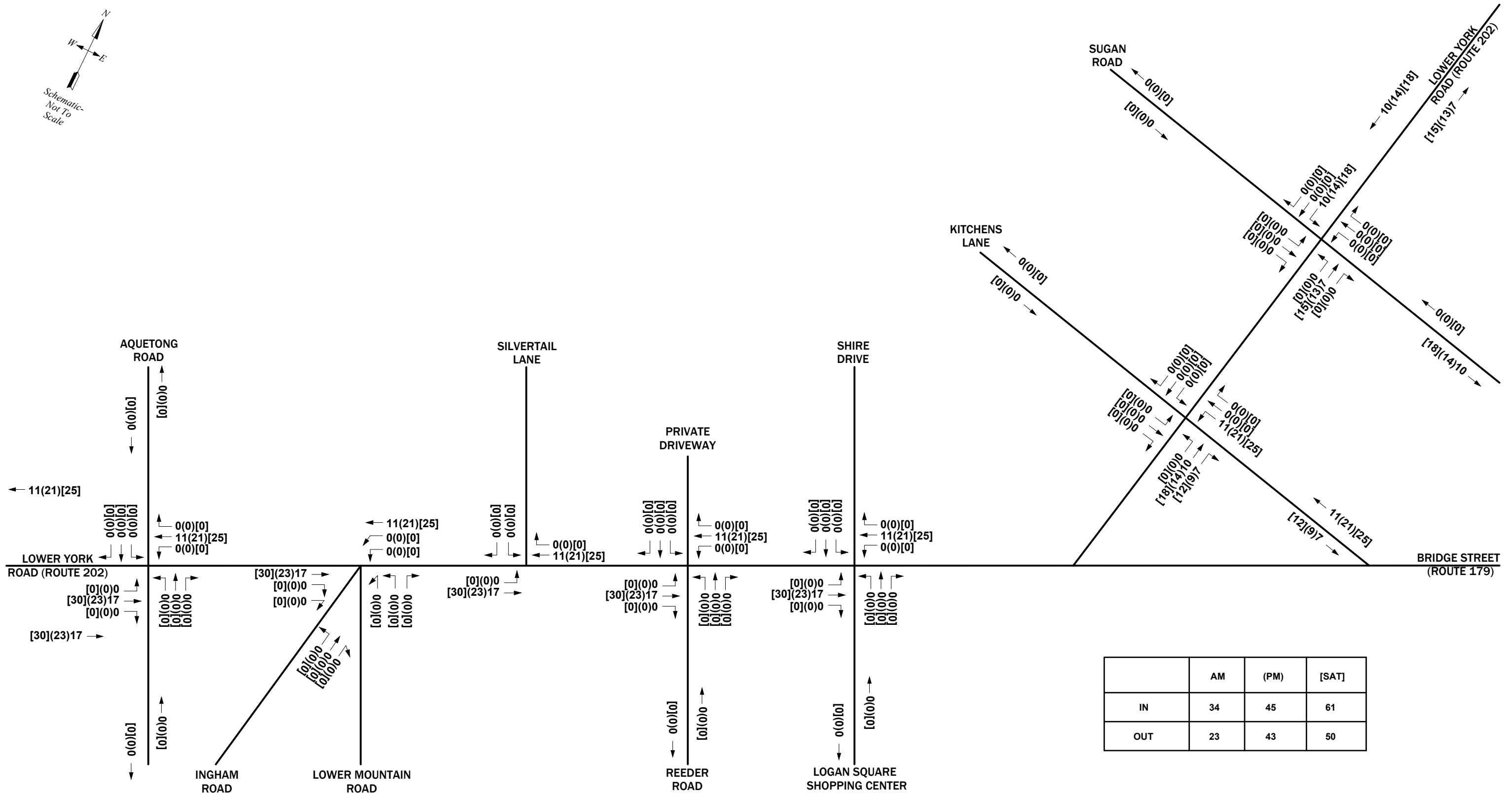


FIGURE 6I
Build Alternative 3 - Trip Distribution Parcel 4
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA



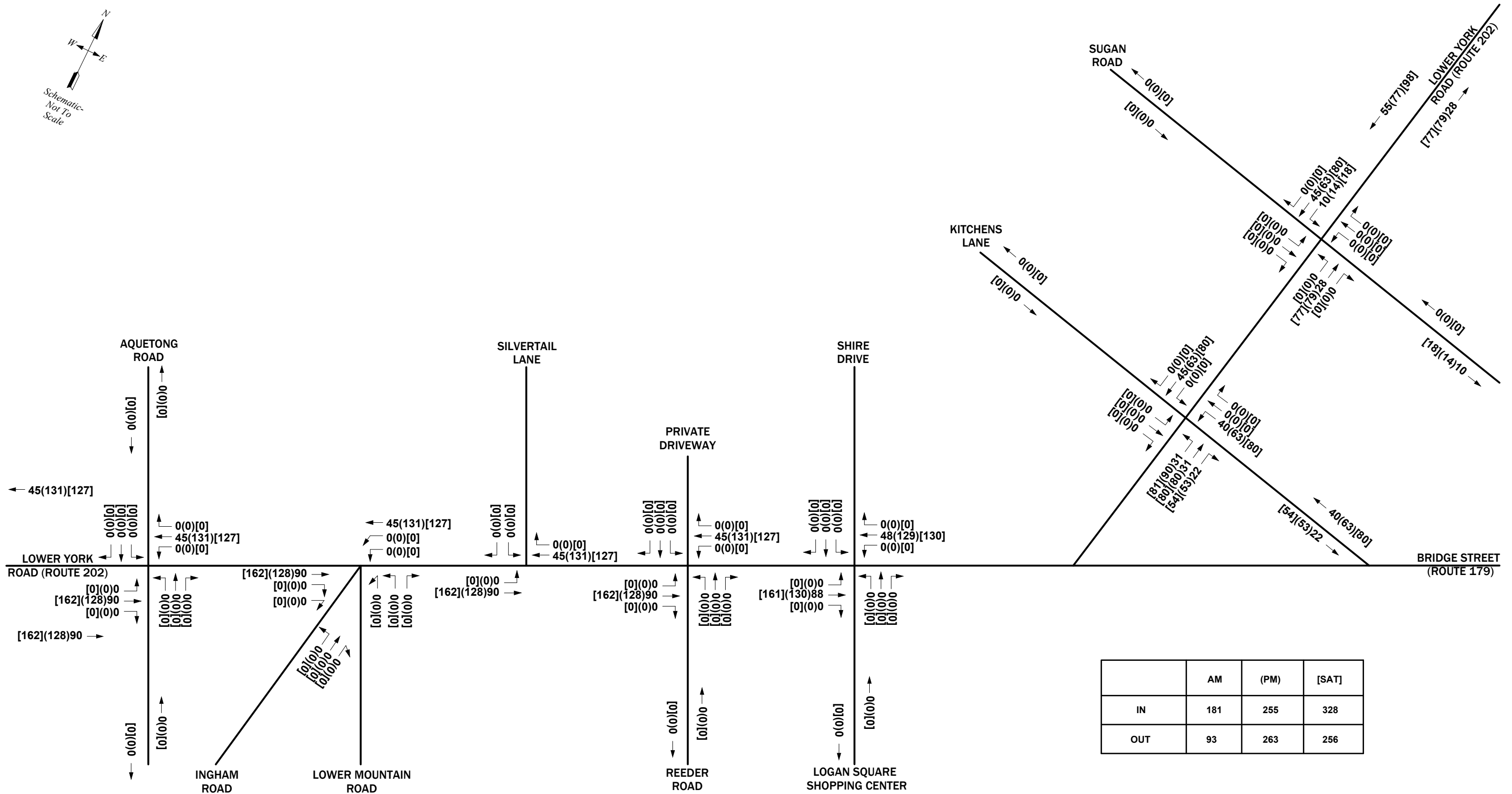
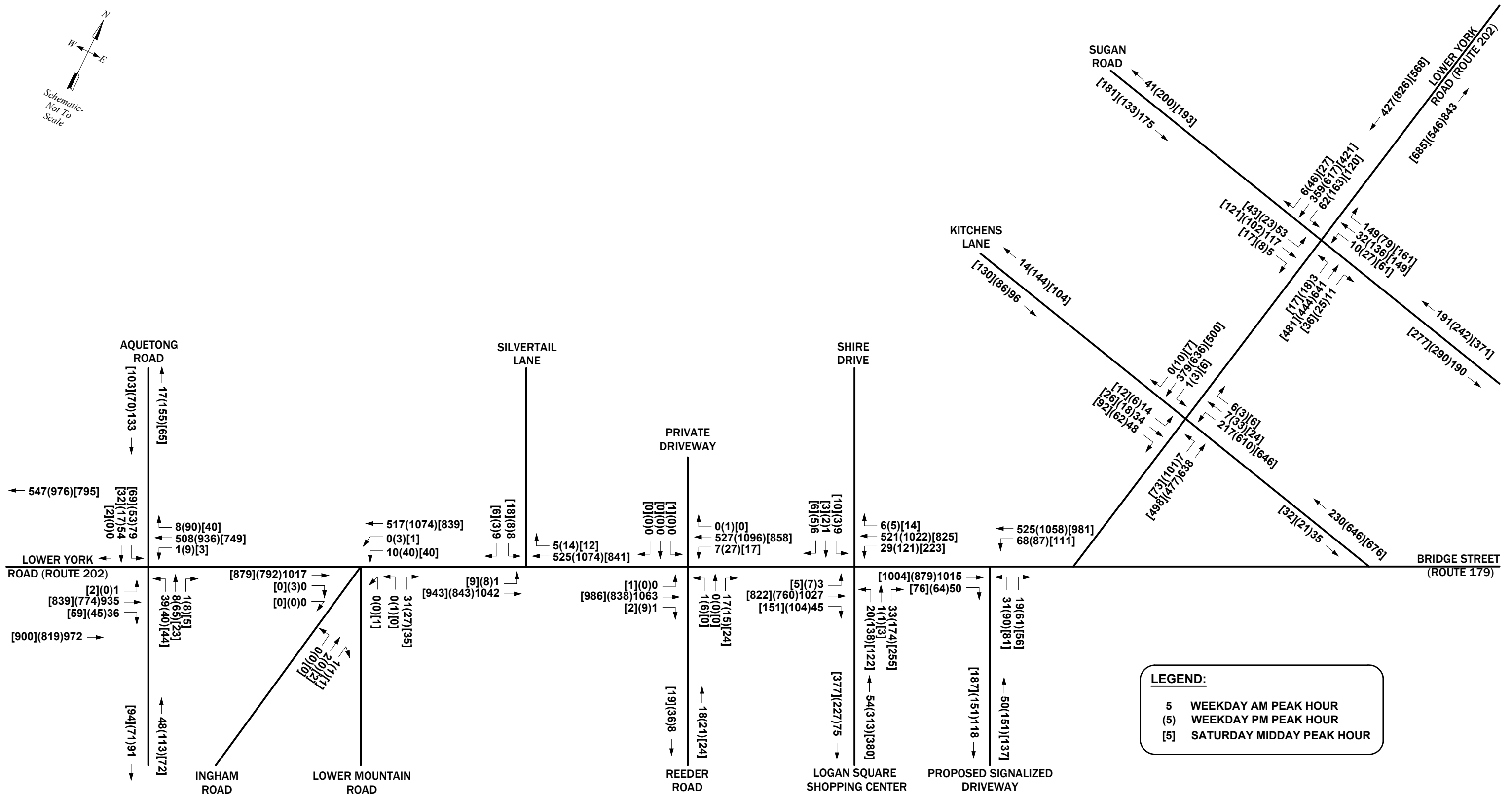


FIGURE 6K
 Build Alternative 3 - Total Trip Assignment
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA



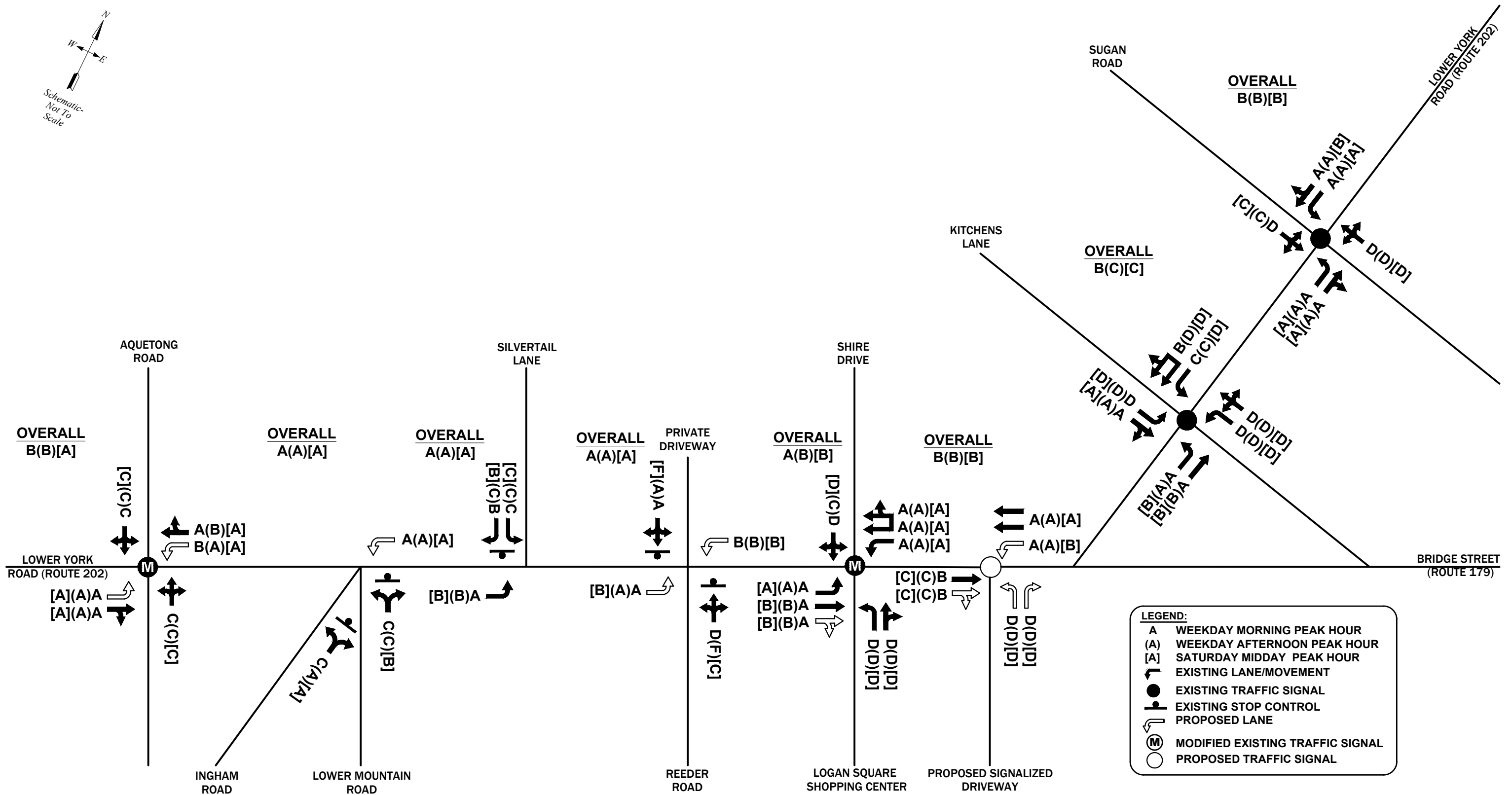


FIGURE 7B
 Build Alternative 1 - 2040 Future with Development Levels of Service
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

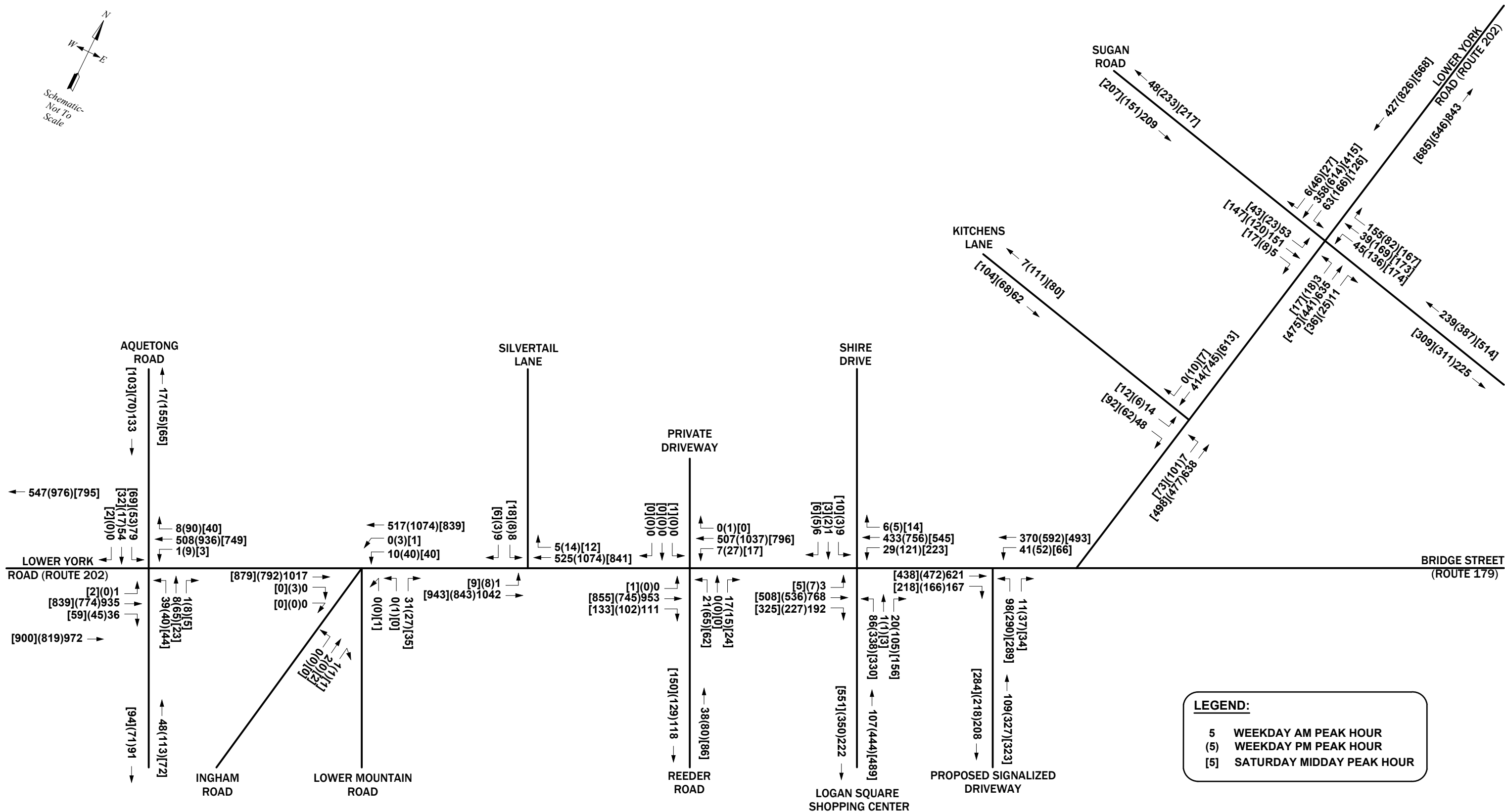


FIGURE 8A
 Build Alternative 2 - 2040 Future with Development Peak Hour Traffic Volumes
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA



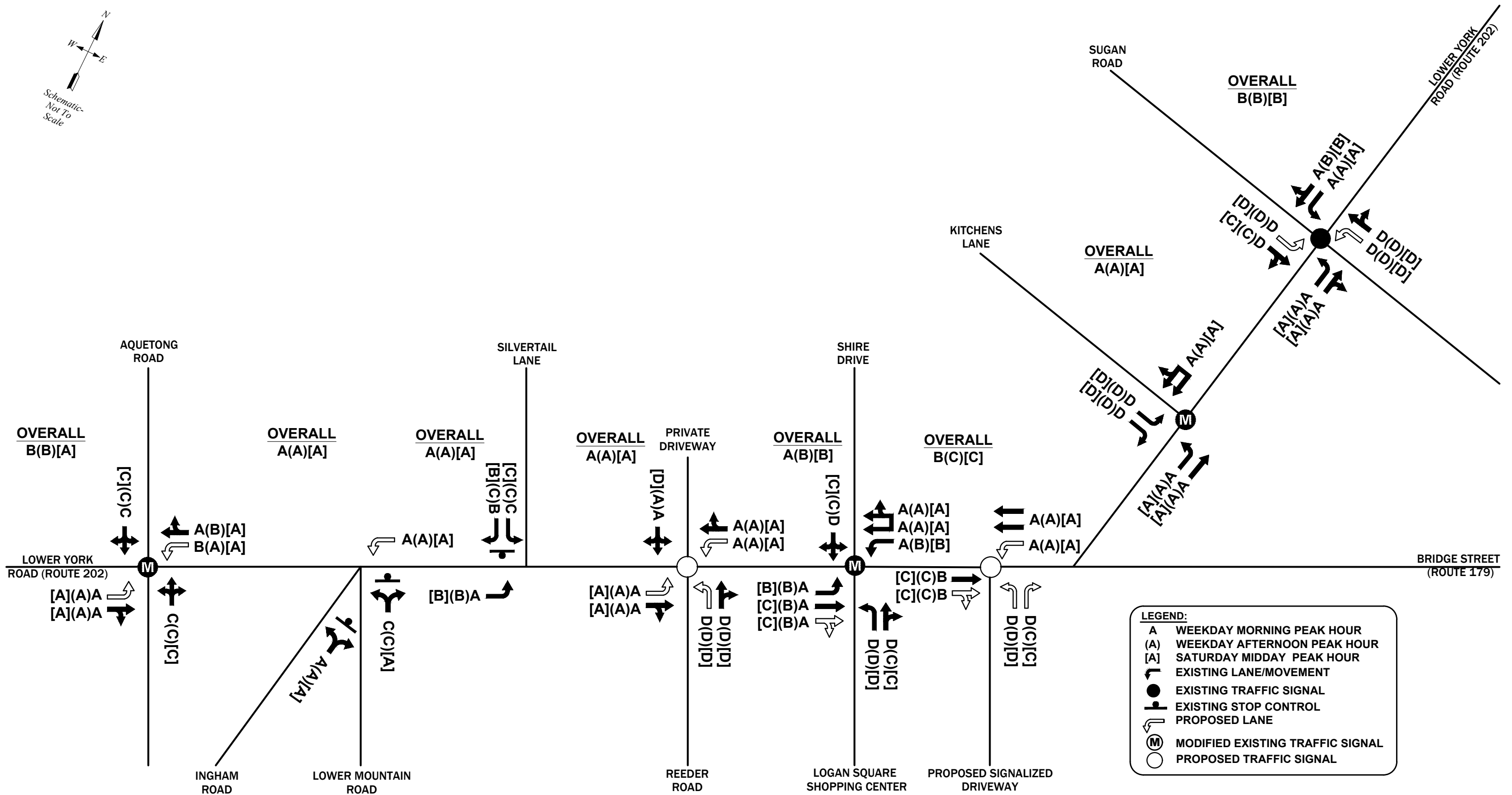


FIGURE 8B
 Build Alternative 2 - 2040 Future with Development Levels of Service
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

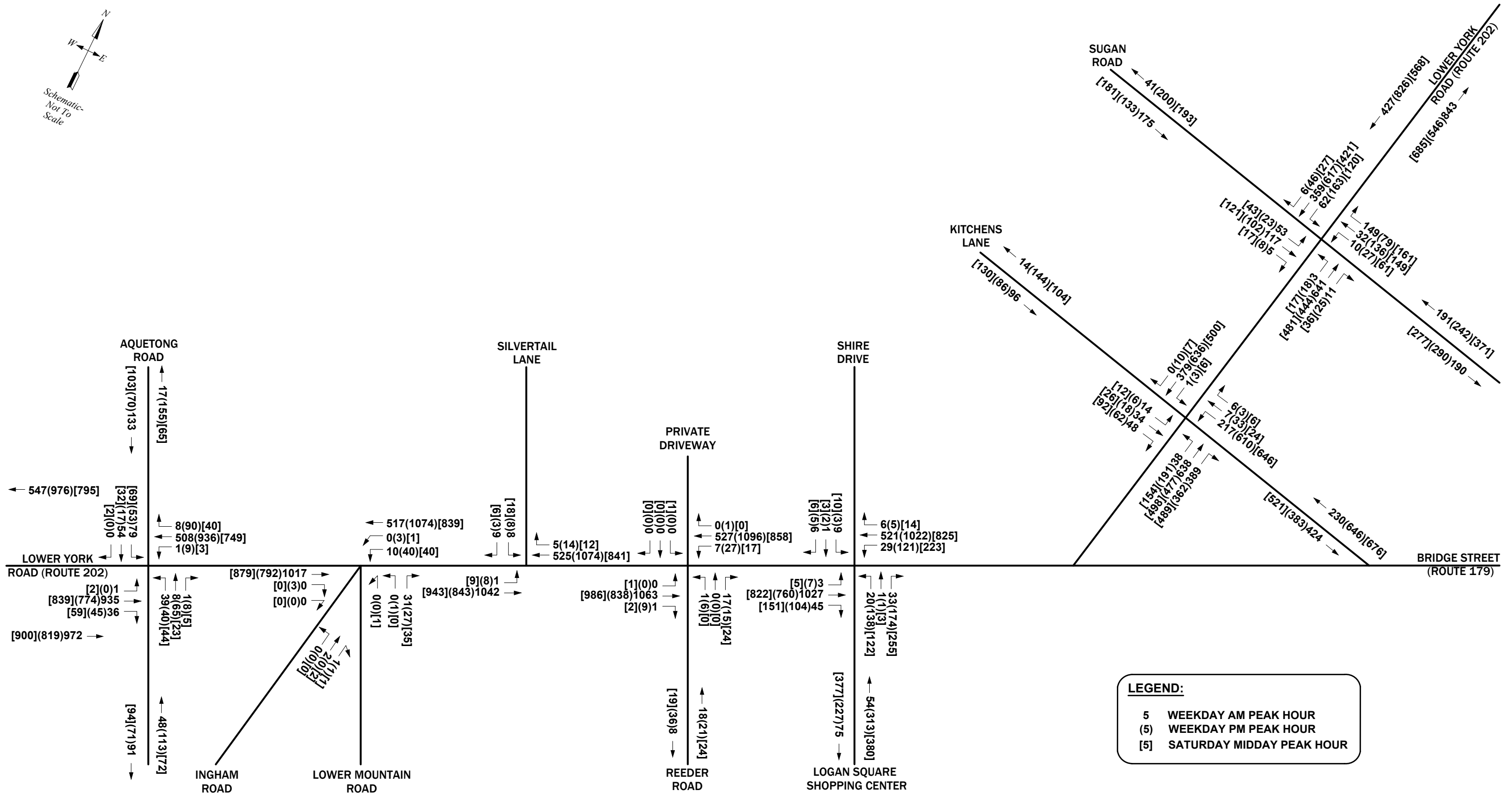


FIGURE 9A
 Build Alternative 3 - 2040 Future with Development Peak Hour Traffic Volumes
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

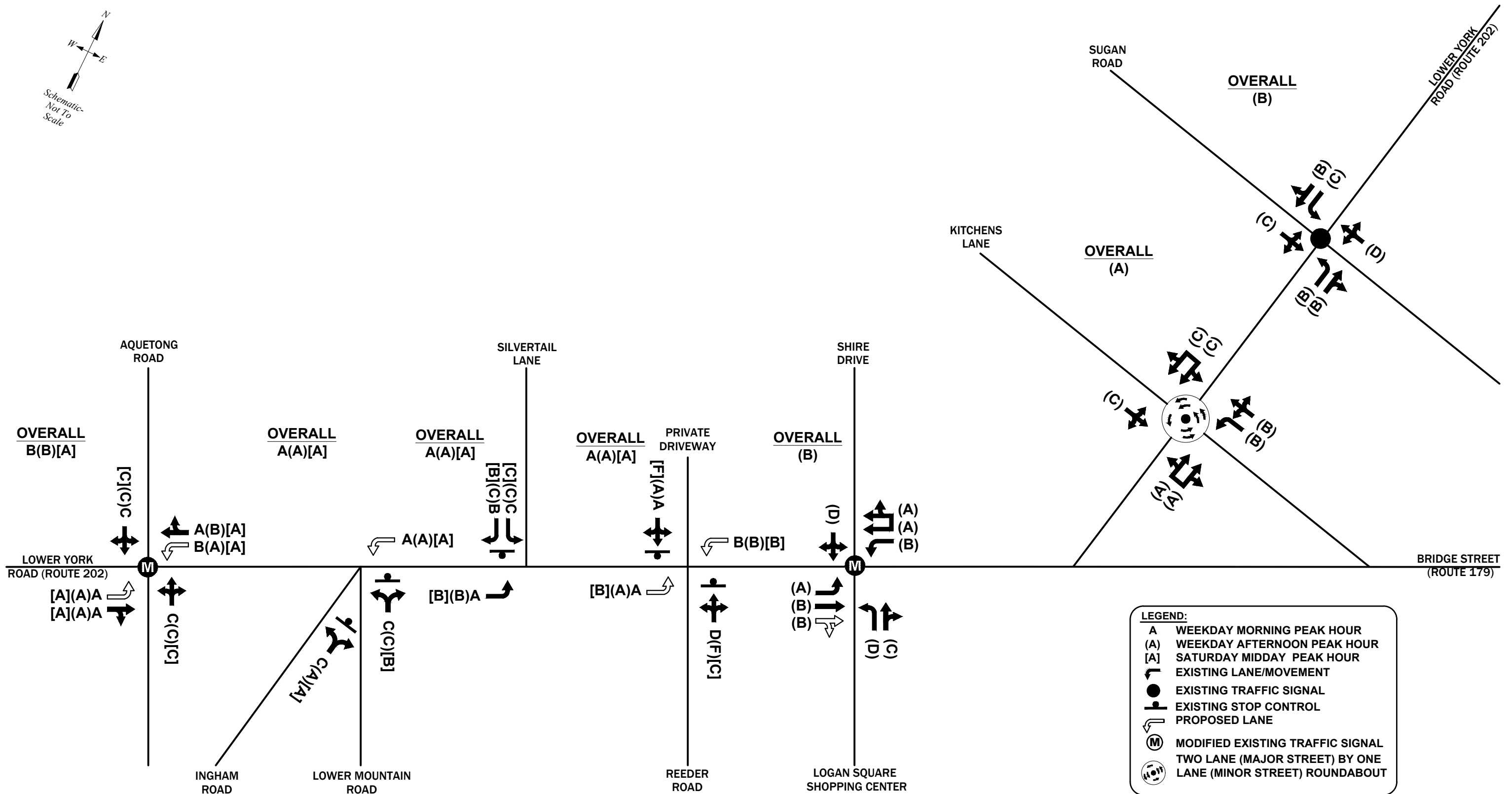


FIGURE 9B
 Build Alternative 3 - 2040 Future with Development Levels of Service
Route 202 Corridor - Transportation Master Plan
SOLEBURY TOWNSHIP, BUCKS COUNTY, PA

Table 1 - Level of Service Matrices
1. Lower York Road (Route 202) & Aquetong Road

Time Period		Weekday Morning Peak Hour					Weekday Afternoon Peak Hour					Saturday Midday Peak Hour				
Design Year		2019	2040 Build-Out Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year			
Development Condition		Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3
Aquetong Rd	Left EB Thru Right	D 46.1	D 46.4	C 33.0	C 33.0	C 33.0	D 49.6	D 49.8	C 31.1	C 31.1	C 31.1	D 48.2	D 48.4	C 32.9	C 32.9	C 32.9
	Left WB Thru Right	D 53.1	D 53.1	C 30.3	C 30.3	C 30.3	D 48.0	D 48.3	C 33.2	C 33.2	C 33.2	D 51.3	D 51.4	C 31.7	C 31.7	C 31.7
Lower York Rd (Rt 202)	Left NB Thru Right	B 10.6	B 13.7	A 5.7 A 9.9	A 5.7 A 9.9	A 5.7 A 9.9	A 8.5	B 10.3	A 0.0 A 6.7	A 0.0 A 6.7	A 0.0 A 6.7	A 8.9	B 11.1	A 8.6 A 7.5	A 8.6 A 7.5	A 8.6 A 7.5
	Left SB Thru Right	A 7.1	A 8.3	B 13.1 A 5.1	B 12.1 A 5.1	B 13.1 A 5.1	B 12.6	B 17.6	A 8.5 B 13.6	A 8.5 B 13.6	A 8.5 B 13.6	A 8.8	B 10.9	A 9.6 A 7.0	A 9.6 A 7.0	A 9.6 A 7.0
Overall		B 13.9	B 16.1	B 10.8	B 10.8	B 10.8	B 14.6	B 17.9	B 12.5	B 12.5	B 12.5	B 13.4	B 15.2	A 9.6	A 9.6	A 9.6

Table 1 - Level of Service Matrices

2. Lower York Road (Route 202) & Lower Mountain Road/Ingham Road

Time Period		Weekday Morning Peak Hour					Weekday Afternoon Peak Hour					Saturday Midday Peak Hour				
Design Year		2019	2040 Build-Out Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year			
Development Condition		Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3
Lower Mountain Rd/Ingham Rd	WB (Lower Mt Rd) Left	B	C	C	C	C	A	B	C	C	C	A	D	B	A	B
	WB (Lower Mt Rd) Right	13.6	17.7	19.2	19.0	19.2	9.7	10.6	19.6	20.8	19.6	9.1	25.6	12.1	9.8	12.1
Lower Mountain Rd/Ingham Rd	WB (Ingham Rd) Left	A	A	C	A	C	A	A	A	A	A	A	A	A	A	A
	WB (Ingham Rd) Right	0.0	0.0	15.8	0.0	15.8	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0
Lower York Rd (Rt 202)	NB Thru	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
	NB Right	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Lower York Rd (Rt 202)	SB Left	A	A	A 2.6	A 2.3	A 2.6	A	A	A 3.7	A 4.1	A 3.7	A	A	A 3.5	A 2.9	A 3.5
	SB Thru	2.3	6.1	(1)	(1)	(1)	6.1	5.2	(1)	(1)	(1)	5.7	5.0	(1)	(1)	(1)
Overall		A 3.1	A 4.5	A 3.6	A 3.6	A 3.6	A 4.5	A 4.2	A 3.5	A 3.8	A 3.5	A 4.0	A 4.2	A 3.5	A 3.1	A 3.5

(1) Movement operates at free-flow conditions.

Table 1 - Level of Service Matrices

3. Lower York Road (Route 202) & Silvertail Lane

Time Period		Weekday Morning Peak Hour					Weekday Afternoon Peak Hour					Saturday Midday Peak Hour				
Design Year		2019	2040 Build-Out Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year			
Development Condition		Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3
Silvertail Ln	Left	C	C	C	C	C	C	D	C	C	C	C	D	C	C	C
	Right	20.1	24.1	16.5	16.5	16.5	24.1	29.9	18.7	18.7	18.7	23.0	28.7	18.7	18.7	18.7
Lower York Rd (Rt 202)	NB	B	B	B	B	B	B	C	C	C	C	B	B	B	B	B
		10.4	10.8	11.2	11.2	11.2	13.8	15.1	17.0	17.0	17.0	12.1	12.9	14.4	14.4	14.4
	Thru	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B
		9.3	9.5	9.7	9.7	9.7	11.1	11.7	12.6	12.6	12.6	10.3	10.7	11.4	11.4	11.4
	SB	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
	Right	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Overall		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
		0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.4	0.4	0.3	0.3	0.3

(1) Movement operates at free-flow conditions.

Table 1 - Level of Service Matrices

4. Lower York Road (Rt 202) & Reeder Road/Private Driveway

Time Period		Weekday Morning Peak Hour					Weekday Afternoon Peak Hour					Saturday Midday Peak Hour				
Design Year		2019	2040 Build-Out Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year			
Development Condition		Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3
Reeder Rd/Private Driveway	Left EB Thru Right	A 0.0	A 0.0	A 0.0	A 0.0	A 0.0	A 0.0	A 0.0	A 0.0	A 0.0	A 0.0	E 40.0	F 55.7	F 88.8	D 40.1	F 88.8
	Left WB Thru Right	C 19.5	C 23.1	D 26.9	D 42.9 D 47.2	D 26.9	E 37.2	F 61.1	F 116.1	D 41.3 D 39.3	F 116.1	C 15.3	C 17.3	C 21.4	D 41.1 D 40.4	C 21.4
Lower York Rd (Rt 202)	Left NB Thru Right	A 0.0	A 0.0	A 0.0 (1)	A 0.0 A 5.2	A 0.0 (1)	A 0.0	A 0.0	A 0.0 (1)	A 0.0 5.3	A (1)	A 0.0	A 0.0	B 11.2 (1)	A 7.6 A 6.8	B 11.2 (1)
	Left SB Thru Right	A 0.2	A 0.2	B 12.3 (1)	A 6.7 A 2.6	B 12.3 (1)	A 0.3	A 0.3	B 11.3 (1)	A 7.2 A 9.9	B 11.3 (1)	A 0.2	A 0.3	B 12.1 (1)	A 9.7 A 6.0	B 12.1 (1)
Overall		A 0.3	A 0.3	A 0.4	A 5.3	A 0.4	A 0.6	A 0.9	A 1.4	A 9.1	A 1.4	A 0.3	A 0.4	A 0.4	A 8.1	A 0.4

(1) Movement operates at free-flow conditions.

Table 1 - Level of Service Matrices

5. Lower York Road (Route 202) & Shire Drive/Logan Square Shopping Center

Time Period		Weekday Morning Peak Hour					Weekday Afternoon Peak Hour					Saturday Midday Peak Hour				
Design Year		2019	2040 Build-Out Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year			
Development Condition		Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3
Shire Dr/Logan Square SC	EB	Left	A	A	D	D	A	A	C	C		A	A	D	C	
		Thru	0.3	0.3	44.6	37.1	0.1	0.2	34.2	24.2	(2)	0.4	0.4	35.1	25.1	(2)
	WB (Shire Dr)	Left	D	D			D	D				D	D			
		Thru	48.0	48.0	(1)	(1)	43.0	43.0	(1)	(1)	(2)	49.1	49.4	(1)	(1)	(2)
	WB (Logan Square)	Left	D	D	D	D	F	E	D	D		F	E	D	D	
		Right	51.7	52.3	43.1	41.0	82.8	57.4	39.1	37.6		108.2	59.2	38.9	35.6	
Lower York Rd (Rt 202)	NB	Left	A	A	D	D	A	A	D	D		B	B	D	C	
		Thru	0.6	0.7			5.4	5.8			(2)	18.9	12.6			(2)
		Thru	(1)	(1)	46.4	36.9	(1)	(1)	36.6	24.7		(1)	(1)	41.0	26.2	
	SB	Left	B	B	A	A	B	B	A	B		B	B	A	B	
		Thru	12.0	12.0	3.2	4.9	11.8	13.9	7.1	13.3		12.2	16.8	7.7	13.7	
		Thru/Right	B	C	A	A	B	C	B	B	(2)	B	C	B	C	(2)
	Overall	Left	18.3	21.3	5.8	8.2	16.5	22.0	10.7	19.6		17.0	26.9	12.5	21.6	
		Thru	B	B	A	A	A	A	B	B		A	A	B	C	
		Thru/Right	10.5	10.5	5.7	8.2	0.2	0.2	10.7	19.8		0.3	1.0	12.6	22.0	
	Overall	Left	A	A	A	A	A	A	A	B		B	B	A	B	
		Thru	4.8	4.5	3.2	4.8	3.8	3.7	6.2	11.9		10.9	18.6	8.0	13.8	
		Thru/Right	A	A	A	A	A	A	A	A	(2)	A	A	A	A	(2)
Overall	Overall	Left	4.4	2.8	1.8	3.0	5.3	2.8	5.1	10.0		7.9	3.2	4.5	8.7	
		Thru			A	A			A	A				A	A	
		Thru/Right			1.8	3.0			5.1	10.0				4.5	8.7	
Overall	Overall	Left	B	B	A	A	B	B	B	B		B	B	B	B	
		Thru	13.4	14.8	5.6	8.9	13.5	12.5	10.4	18.7	(2)	17.7	16.4	12.3	19.7	(2)
		Thru/Right														

(1) Movement does not exist.

(2) VISSIM traffic simulation results were utilized for Alternative 3.

Table 1 - Level of Service Matrices

6. Lower York Road (Route 202) & Kitchens Lane/Route 179

Time Period		Weekday Morning Peak Hour					Weekday Afternoon Peak Hour					Saturday Midday Peak Hour				
Design Year		2019	2040 Build-Out Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year			
Development Condition		Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3
Kitchens Ln/Rt 179	EB	D 49.6	D 50.0	D 39.3	D 41.5	(2)	D 43.2	D 43.3	D 38.2	D 39.5	(2)	D 49.4	D 49.8	D 39.2	D 37.5	(2)
		A	A	A	D 51.1		A	A	A	D 51.5		A	A	A	D 48.9	
		2.4	2.9	1.8	(1)		2.0	2.4	1.9	(1)		5.6	8.1	3.6	(1)	
	WB	D 53.5	D 53.8	D 51.7	(1)	(2)	D 46.5	D 47.0	D 51.2	(1)	(2)	D 52.0	D 52.9	D 51.6	(1)	(2)
		D	D	D			D	D	D			D	D	D		
		51.7	51.4	50.5			46.4	47.2	50.5			50.6	51.4	52.0		
Lower York Rd (Rt 202)	NB	A 1.0	A 0.9	A 2.3	A 2.2	(2)	A 9.7	A 7.0	A 7.8	A 2.7	(2)	B 13.4	A 7.1	B 11.9	A 3.2	(2)
		A 4.6	A 4.0	A 8.8	A 3.3		B 13.9	B 10.6	B 11.7	A 3.0		C 22.0	B 12.1	B 17.8	A 3.8	
	SB	E 71.0	D 44.0	C 35.0	(1)	(2)	D 49.0	E 59.3	C 29.3	(1)	(2)	E 58.2	E 57.5	D 35.7	(1)	(2)
		A	A	B	A		B	B	D	A		B	B	D	A	
		7.3	8.3	12.7	0.1		19.8	18.0	38.7	0.6		15.0	16.9	37.0	0.5	
	Right	B 13.0	B 13.1	B 17.0	A 4.7	(2)	C 26.0	C 24.8	C 33.0	A 4.0	(2)	C 29.5	C 27.7	C 34.2	A 5.7	(2)
Overall																

(1) Movement does not exist.

(2) VISSIM traffic simulation results were utilized for Alternative 3.

Table 1 - Level of Service Matrices
7. Lower York Road (Route 202) & Sугan Road

Time Period		Weekday Morning Peak Hour					Weekday Afternoon Peak Hour					Saturday Midday Peak Hour				
Design Year		2019	2040 Build-Out Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year			
Development Condition		Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3
Sугan Rd	Left	D	D	D	D 40.1	(1)	D	D	C	D 37.4	(1)	D	C	C	D 40.3	(1)
	EB Thru Right				D 36.1					C 30.5					C 26.9	
	Left	D	D	D	D 39.5	(1)	D	D	D	D 37.9	(1)	D	D	D	D 35.9	(1)
	WB Thru Right				D 37.6					D 35.5					D 36.9	
Lower York Rd (Rt 202)	Left	A 0.2	A 0.3	A 0.4	A 0.5	(1)	A 0.9	A 1.6	A 2.2	A 3.2	(1)	A 0.6	A 1.0	A 1.5	A 1.5	(1)
	NB Thru Right	A 1.0	A 1.3	A 1.4	A 1.8		A 0.5	A 0.6	A 0.7	A 1.0		A 0.8	A 1.0	A 1.3	A 1.6	
	Left	A 3.7	A 4.5	A 4.5	A 5.2	(1)	A 4.6	A 5.5	A 5.7	A 7.5	(1)	A 7.8	A 9.5	A 9.2	A 9.3	(1)
	SB Thru Right	A 4.4	A 5.4	A 5.5	A 6.4		A 6.2	A 7.7	A 8.4	B 10.9		A 8.9	B 11.0	B 11.1	B 11.0	
Overall		B 13.0	B 13.4	B 11.2	B 12.5	(1)	B 13.0	B 13.7	B 12.2	B 14.7	(1)	B 18.4	B 18.6	B 15.9	B 17.2	(1)

(1) VISSIM traffic simulation results were utilized for Alternative 3.

Table 1 - Level of Service Matrices
8. Lower York Road (Route 202) & Proposed Signalized Driveway

Time Period		Weekday Morning Peak Hour		Weekday Afternoon Peak Hour		Saturday Midday Peak Hour	
Design Year		2040 Build-Out Year		2040 Build-Out Year		2040 Build-Out Year	
Development Condition		Build Alt #1	Build Alt #2	Build Alt #1	Build Alt #2	Build Alt #1	Build Alt #2
Proposed Signalized Driveway	Left	D	D	D	D	D	D
	WB	45.3	43.4	42.7	42.7	42.9	41.8
	Right	D	D	D	C	D	C
		43.8	37.2	40.8	28.0	41.3	27.9
Lower York Road (Rt 202)	Thru	B	B	C	C	C	C
	NB	13.7	13.7	22.7	25.3	24.3	25.8
	Thru	B	B	C	C	C	C
	Right	13.7	13.9	22.7	25.5	24.3	26.1
	Left	A	A	A	A	B	A
	SB	5.9	5.4	8.1	9.6	10.2	9.9
	Thru	A	A	A	A	A	A
		1.9	2.8	3.8	7.2	3.5	6.9
Overall		B	B	B	C	B	C
		10.7	12.8	14.5	21.4	15.9	22.2

Table 2 - 95th Percentile Queue Matrices

1. Lower York Road (Route 202) & Aquetong Road

Time Period			Current Storage ⁽¹⁾	Future Storage ⁽²⁾	Weekday Morning Peak Hour					Weekday Afternoon Peak Hour					Saturday Midday Peak Hour				
Design Year					2019	2040 Build-Out Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year			
Development Condition					Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3
Aquetong Rd	Left		1000+		135	155	113	113	113	73	85	55	55	55	105	123	85	85	85
	EB Thru Right																		
	Left		1000+		53	60	38	38	38	113	130	93	93	93	78	88	58	58	58
	WB Thru Right																		
Lower York Rd (Rt 202)	Left		1000+		318	420	25	25	25	220	278	0	0	0	248	318	25	25	25
	NB Thru Right	255					255	255	165			165	165	190			190	190	
	Left		1000+		143	188	25	25	25	358	490	25	25	25	225	288	25	25	25
	SB Thru Right	93					93	93	305			305	305	160			160	160	

(1) Distance to adjacent intersections shown in italics.

(2) Future storage/distance to adjacent intersections shown if different/improved from existing conditions.

Table 2 - 95th Percentile Queue Matrices

2. Lower York Road (Route 202) & Lower Mountain Road/Ingham Road

Time Period		Current Storage ⁽¹⁾	Future Storage ⁽²⁾	Weekday Morning Peak Hour					Weekday Afternoon Peak Hour					Saturday Midday Peak Hour				
Design Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year			
Development Condition				Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3
Lower Mountain Rd/Ingham Rd	WB (Lower Mt Rd) Left	1000+		25	25	25	25	25	25	25	25	25	25	25	25	25	25	
	WB (Ingham Rd) Right			25	25	25	25	25	25	25	25	25	25	25	25	25	25	
Lower York Rd (Rt 202)	NB Thru Right	1000+		(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	
	SB Left Thru			37	212	25 (3)	30 (3)	25 (3)	160	144	43 (3)	49 (3)	43 (3)	144	129	48 (3)	46 (3)	48 (3)

(1) Distance to adjacent intersections shown in italics.

(2) Future storage/distance to adjacent intersections shown if different/improved from existing conditions.

(3) Movement operates at free-flow conditions.

Table 2 - 95th Percentile Queue Matrices

3. Lower York Road (Route 202) & Silvertail Lane

Time Period		Current Storage ⁽¹⁾	Future Storage ⁽²⁾	Weekday Morning Peak Hour					Weekday Afternoon Peak Hour					Saturday Midday Peak Hour				
Design Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year			
Development Condition				Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3
Silvertail Ln	Left	500+		25	25	25	25	25	25	25	25	25	25	25	25	25	25	
	Right	100		25	25	25	25	25	25	25	25	25	25	25	25	25	25	
Lower York Rd (Rt 202)	NB	Left	175		25	25	25	25	25	25	25	25	25	25	25	25	25	
		Thru	1000+		(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	
	SB	Thru	1000+		(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	
		Right	250		(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	

(1) Distance to adjacent intersections shown in italics.

(2) Future storage/distance to adjacent intersections shown if different/improved from existing conditions.

(3) Movement operates at free-flow conditions.

Table 2 - 95th Percentile Queue Matrices

4. Lower York Road (Rt 202) & Reeder Road/Private Driveway

Time Period		Current Storage ⁽¹⁾	Future Storage ⁽²⁾	Weekday Morning Peak Hour					Weekday Afternoon Peak Hour					Saturday Midday Peak Hour				
Design Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year			
Development Condition				Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3
Reeder Rd/Private Driveway	Left	1000+		0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EB Thru Right																	
	Left	1000		25	25	25	25	25	38	65	38	25	25	25	65	25		
	WB Thru Right						25			25					25			
Lower York Rd (Rt 202)	Left	1000+		0	0	0	0	0	0	0	0	0	0	25	25	25	25	25
	NB Thru Right					(3)	125	(3)			(3)	158	(3)			(3)	218	(3)
	Left	100		25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
	SB Thru Right					(3)	38	(3)			(3)	275	(3)			(3)	163	(3)

(1) Distance to adjacent intersections shown in italics.

(2) Future storage/distance to adjacent intersections shown if different/improved from existing conditions.

(3) Movement operates at free-flow conditions.

Table 2 - 95th Percentile Queue Matrices

5. Lower York Road (Route 202) & Shire Drive/Logan Square Shopping Center

Time Period			Current Storage ⁽¹⁾	Future Storage ⁽²⁾	Weekday Morning Peak Hour					Weekday Afternoon Peak Hour					Saturday Midday Peak Hour				
Design Year					2019	2040 Build-Out Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year			
Development Condition					Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3
Shire Dr/Logan Square SC	EB	Left	700		25	25	25	25	(4)	25	25	25	25	(4)	25	25	25	25	(4)
		Thru																	
		Right																	
	WB (Shire Dr)	Left	500+		25	25	(3)	(3)	(4)	25	25	(3)	(3)	(4)	25	25	(3)	(3)	(4)
		Thru																	
		Right																	
	WB (Logan Square)	Left	180		36	39	25	90	(4)	180	162	140	313	(4)	189	149	123	293	(4)
		Right	180		25	25	25	25		25	28	63	30		81	74	128	63	
		Thru	(3)		(3)			(3)		(3)	63	30	(3)		(3)				
Lower York Rd (Rt 202)	NB	Left	120		25	25	25	25	(4)	25	25	25	25	(4)	25	25	25	25	(4)
		Thru	1000+		812	985	128	165		415	589	185	243		413	643	223	273	
		Right	150		32	35	130	163		25	25	188	235		25	25	223	258	
	SB	Left	200		25	25	25	25	(4)	25	25	25	48	(4)	53	105	50	88	(4)
		Thru	1000+		87	72	25	30		113	142	110	153		54	84	83	98	
		Right					25	30				115	160				85	103	

(1) Distance to adjacent intersections shown in italics.

(2) Future storage/distance to adjacent intersections shown if different/improved from existing conditions.

(3) Movement does not exist.

(4) VISSIM traffic simulation results were utilized for Alternative 3.

Table 2 - 95th Percentile Queue Matrices

6. Lower York Road (Route 202) & Kitchens Lane/Route 179

Time Period		Current Storage ⁽¹⁾	Future Storage ⁽²⁾	Weekday Morning Peak Hour					Weekday Afternoon Peak Hour					Saturday Midday Peak Hour					
Design Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year				
Development Condition				Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	
Kitchens Ln/Rt 179	Left	75		28	30	26	25	(4)	25	25	25	25	(4)	26	29	25	25	(4)	
		EB Thru	600+		25	25	25		58	25	25	75		25	25	108			
	Right								(3)			(3)				(3)			
	WB	Left	1000+		110	121	127	(3)	(4)	238	272	328	(3)	(4)	268	306	341	(3)	(4)
		Left	350		106	116	125			241	275	326			262	301	345		
		Thru																	
Lower York Rd (Rt 202)	Left	100		25	25	25	25	(4)	25	25	27	25	(4)	39	25	40	25	(4)	
		NB Thru	1000+		49	29	477		63	185	226	427		50	375	246	458		75
	Left	200		25	25	25	(3)		(4)	25	25	25		(3)	(4)	25	25		25
		SB Thru	1000+		50	74	120	25		148	118	276	25	88		112	210	25	
	Right																		

(1) Distance to adjacent intersections shown in italics.

(2) Future storage/distance to adjacent intersections shown if different/improved from existing conditions.

(3) Movement does not exist.

(4) VISSIM traffic simulation results were utilized for Alternative 3.

Table 2 - 95th Percentile Queue Matrices

7. Lower York Road (Route 202) & Sугan Road

Time Period			Current Storage ⁽¹⁾	Future Storage ⁽²⁾	Weekday Morning Peak Hour					Weekday Afternoon Peak Hour					Saturday Midday Peak Hour				
Design Year					2019	2040 Build-Out Year				2019	2040 Build-Out Year				2019	2040 Build-Out Year			
Development Condition					Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3	Existing	No-Build	Build Alt #1	Build Alt #2	Build Alt #3
Sugan Rd	Left	EB Thru	1000+		213	235	200	60	(3)	123	135	120	25	(3)	160	180	143	45	(3)
								163					105					123	
	Right	WB Thru	750		145	178	145	50	(3)	213	238	218	138	(3)	348	385	338	173	(3)
								143					208					290	
Lower York Rd (Rt 202)	Left	NB Thru	75		25	25	25	25	(3)	25	25	25	25	(3)	25	25	25	25	(3)
			1000+		25	25	25	28		25	25	25	25		25				
	Right	SB Thru	140		25	25	25	25	(3)	30	40	40	53	(3)	35	45	48	50	(3)
			1000+		73	98	93	108		145	198	208	250		138	183	193	190	

(1) Distance to adjacent intersections shown in italics.

(2) Future storage/distance to adjacent intersections shown if different/improved from existing conditions.

(3) VISSIM traffic simulation results were utilized for Alternative 3.

Table 2 - 95th Percentile Queue Matrices

8. Lower York Road (Route 202) & Proposed Signalized Driveway

Time Period		Current Storage ⁽¹⁾	Future Storage ⁽²⁾	Weekday Morning Peak Hour		Weekday Afternoon Peak Hour		Saturday Midday Peak Hour	
Design Year				2040 Build-Out Year		2040 Build-Out Year		2040 Build-Out Year	
Development Condition				Build Alt #1	Build Alt #2	Build Alt #1	Build Alt #2	Build Alt #1	Build Alt #2
Proposed Signalized Driveway	Left			38	110	100	300	90	295
	Right			25	25	65	33	63	30
Lower York Road (Rt 202)	Thru			323	255	393	293	443	300
	NB Thru			330	253	400	285	453	288
	Right								
	Left			25	25	25	25	35	25
	SB Thru			25	25	88	98	75	78

(1) Distance to adjacent intersections shown in italics.

(2) Future storage/distance to adjacent intersections shown if different/improved from existing conditions.

Route 202 Transportation Master Plan
2040 Future Traffic Conditions - Build Alternative 3
Vissim Traffic Simulation Results for Adjacent Intersections

INTERSECTION	MOVEMENT		TURN LANE STORAGE (FEET)	MAX QUEUE (FEET)	AVERAGE OF FIVE SIMULATION RUNS	
					LOS	VEHICLE DELAY (SECONDS)
Lower York Road (S.R. 0202) and Logan Square Shopping Center/Shire Drive	Shire Drive	EBL		60.07	D	50.47
		EBT			C	34.47
		EBR			C	23.31
	Logan Square Shopping Center Access	WBL	300	174.05	D	35.89
		WBT		178.65	C	34.27
		WBR			B	10.56
	Lower York Road (S.R. 0202)	NBL	200	52.67	A	4.35
		NBT		235.1	B	12.75
		NBR			B	10.98
		SBL	200	148.69	B	12.41
		SBT		238.82	A	8.73
		SBR			A	8.82
		Overall			B	13.45
Lower York Road (S.R. 0202) and Suga n Road	Suga n Road	EBL		203.21	C	31.14
		EBT			C	28.63
		EBR			C	22.21
		WBL		340.5	C	26.51
		WBT			D	35.18
		WBR			D	42.85
	Lower York Road (S.R. 0202)	NBL	75	72.93	B	11.16
		NBT		369.81	B	11.4
		NBR			A	9.52
		SBL	140	270.31	C	26.94
		SBT		594.42	B	10.92
		SBR			A	9.59
		Overall			B	16.58

Route 202 Transportation Master Plan
2040 Future Traffic Conditions - Build Alternative 3
Vissim Traffic Simulation Results
Roundabout at Lower York Road (S.R. 0202) and Bridge Street (S.R. 0179)/Kitchens Lane

APPROACH	LANES	MAX QUEUE (FEET)	TURN LANE STORAGE (FEET)	MOVEMENT	AVERAGE OF FIVE SIMULATION RUNS		
					LOS	VEHICLE DELAY (SECONDS)	
Kitchens Lane	EB L/T/R	167.47		EBL	C	24.75	
				EBT	C	24.18	
				EBR	B	10.18	
Bridge Street (S.R. 0179)	WBL	255.23	150	WBL	B	13.53	
	WB L/T/R	269.01		WBL	B	13.53	
				WBT	B	13.14	
				WBR	B	13.07	
Lower York Road (S.R. 0202)	NB U/L/T	228.77		NBU	A	2.01	
				NBL	A	2.84	
				NBT	A	2.29	
	NB T/R	252.63		NBT	A	2.29	
				NBR	A	2.63	
	SB L/T	256.32		200	SBL	C	23.76
					SBT	C	16.67
	SB T/R	268.89			SBT	C	16.67
SBR			C		20.66		
Overall					A	9.2	