

Corridor Analysis

For

COUNTY LINE ROAD (S.R. 1001) CORRIDOR

located in

**Radnor Township
Delaware County**



**Lower Merion Township
Montgomery County**

File No. 16-11060-02

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Prepared For:

Radnor Township & Lower Merion Township

Prepared By:

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EXECUTIVE SUMMARY

Gilmore & Associates, Inc. (G&A) was retained through a cooperative effort between Radnor Township and Lower Merion Township to perform a transportation evaluation of traffic and pedestrian improvements along the County Line Road corridor from Lancaster Avenue (S.R. 0030) to Haverford Road (S.R. 1001) & County Line Road/ Landover Road (S.R. 1009). The County Line Road Corridor is a four-lane roadway that experiences heavy vehicular volumes as well as high pedestrian traffic due to the proximity of residential homes and apartments, the SEPTA Bryn Mawr Station, various restaurants and retail stores, the Bryn Mawr Hospital and the north/south movement of pedestrian traffic moving to and from the Lancaster Avenue (S.R. 0030) corridor. The report identifies improvements along the corridor to improve the traffic flow and overall safety for all roadway users. For purposes of this evaluation, County Line Road, Old Lancaster Road are considered north/south roadways and Lancaster Avenue, Conestoga Road and all other County Line Road cross-streets were considered east/west roadways. The posted 35 mile per hour speed limit compares favorably to the obtained 85th percentile speeds ranging from 33.6 to 42.7 miles per hour.

The following improvements were identified and recommended for the corridor study:

Corridor Improvements

- Provide speed limit signs at ½ mile increments along the corridor as required by Title 75 of the Pennsylvania Vehicle Code §3362(b)(1).
- Continue to restrict parking for a minimum of 50 feet in advance of all intersections.
- Provide upgraded pedestrian equipment at signalized intersections, as needed
- Implement a roadway diet and re-stripe the corridor between Arthur Road and Landover Road from a four lane facility to three lane facility (two-way center left-turn lane with one (1) lane in each direction) with five foot shoulders in both directions of travel
- Following implementation of a roadway diet from a four lane cross-section to a three lane cross-section, consider reducing the speed from 35 MPH to 25 MPH.
- Upgrade curb ramps at signalized and unsignalized intersections for Americans with Disabilities Act (ADA) compliancy as needed
- Refresh pavement markings and pedestrian crossings throughout the corridor
- Upgrade pedestrian and vehicle clearance times at all signalized intersections as needed
- Lower Merion Township obtained a Green Light Go grant to install a traffic adaptive system on County Line Road at the intersections of Lindsay Avenue, Bryn Mawr Avenue and Landover Road. Extending the traffic adaptive system in the future to include the intersections of Conestoga Road/Glenbrook Avenue and Roberts Road should be considered.



Intersection Improvements

County Line Road and Lancaster Avenue

- Install an advanced warning signage for RED SIGNAL AHEAD
- Include curve warning signage for both directions of travel near Arthur Road
- Modify the length of the concrete median nose on County Line Road at Lancaster Avenue to provide improved left turn movements from Lancaster Avenue

County Line Road and Montrose Avenue

- Construct a traffic signal at the intersection of County Line Road and Montrose Avenue

County Line Road and Roberts Road

Upon construction of the traffic signal at County Line Road and Montrose Avenue and the center turn lane along County Line Road, re-evaluate left turn movements at Roberts Road.

County Line Road and Conestoga Road/Glenbrook Avenue

- Construct a dedicated left-turn lane along the northbound approach of County Line Road at Conestoga Road & Thomas Avenue/Glenbrook Avenue
- Implement signal timing adjustments at the intersection of County Line Road and Conestoga Road/Thomas Avenue/Glenbrook Avenue to improve the traffic flow on the major approaches

County Line Road and Old Lancaster Road

- Realign Old Lancaster Road between the northern and southern legs of the intersection to provide a safer through movement for vehicles
- Investigate the installation of a Rectangular Rapid Flashing Beacon (RRFB) for pedestrians to cross County Line Road at this location adjacent to the Warner Avenue Park and Playground

County Line Road and Bryn Mawr Avenue/Railroad Avenue

- Provide a dotted extension line between the northbound left-turn lane and the inside northbound through lane to provide improved lane assignment for motorists
- Install a nearside traffic signal head for the northbound left turn lane

County Line Road and Landover Road/Haverford Road

- Provide advanced dilemma zone radar detection at the intersection of County Line Road/Haverford Road & Landover Road
- Provide an emergency pre-emption system

County Line Road and S. Warner Avenue/Old Lancaster Road

- Reduce the number of driveways servicing the shopping center opposite S. Warner Avenue and Old Lancaster Road



With the construction of the identified roadway improvements, it is anticipated the study corridor will experience a marked improvement in traffic flow and overall safety. In addition to the identified roadway improvements, areas to the north and south of the corridor were also studied for potential improvements and are noted in the report. Additional studies are required to further evaluate the issues encountered during this evaluation that were not included in this project scope and are as follows:

Lancaster Avenue and Montrose Avenue

- Install additional warning signage on Lancaster Avenue (both directions) in advance of the existing pedestrian crossing at Lancaster Avenue and Montrose Avenue
- Investigate the installation of a Rectangular Rapid Flashing Beacon (RRFB) for pedestrians to cross Lancaster Avenue at this location.

Conestoga Road and Montrose Avenue

- Construct sidewalk along the north side of Conestoga Road between Montrose Avenue and Roberts Road
- Install a crosswalk and pedestrian warning signs for pedestrians to cross Conestoga Road
- Investigate the installation of a Rectangular Rapid Flashing Beacon (RRFB) for pedestrians to cross Conestoga Road at this location.

Conestoga Road and Roberts Road

- Install “DON’T BLOCK THE BOX” signage and striping at the intersection.



I. INTRODUCTION AND BACKGROUND

A corridor analysis was performed along County Line Road (S.R. 1001) within Radnor and Lower Merion Townships in an effort to identify traffic and pedestrian improvements for providing a safer environment for both vehicular and pedestrian traffic. The 0.8 mile corridor lies along County Line Road (S.R. 1001) from the intersection of County Line Road (S.R. 1001) & Lancaster Avenue (S.R. 0030) to Haverford Road (S.R. 1001) & County Line Road/ Landover Road (S.R. 1009). For purposes of this evaluation, County Line Road was considered a north/south roadway and Lancaster Avenue, Montrose Avenue and all other County Line Road cross-streets were considered east/west roadways.

County Line Road (S.R. 1001) is a four-lane roadway that experiences heavy vehicular traffic. According to PennDOT's Traffic Information Repository (TIRe) system, the average daily traffic along the corridor varies from 19,260 vehicles near Mondella Avenue to 20,533 vehicles near County Line Road/Landover Road. Villanova University and access to I-476 via Lancaster Avenue (S.R. 0030) is within two miles of the study corridor. No significant development has occurred along the corridor; however, minor intersection improvements were implemented to mitigate traffic over the years. The report will identify recommended improvements along the corridor to accommodate pedestrians and existing traffic volumes while considering stakeholders' and known safety concerns. The report was conducted at a macro level; as such, improvements identified in this report have neither been designed nor fully engineered. Engineering, along with additional analyses, may be necessary prior to implementation of any subsequent improvements.

A meeting was scheduled on August 23, 2018 with Lower Merion Township and Radnor Township where stakeholders were invited to discuss their concerns for the area surrounding the studied corridor. A second public meeting was held on January 29, 2019 to present the draft report to both Townships. The concerns noted at both meetings were taken into account throughout the course of this study and are summarized in **Appendix A**.

STUDY AREA

The following ten intersections were identified by Radnor and Lower Merion Townships for this comprehensive analysis:

1. County Line Road (S.R. 1001) & Lancaster Avenue (S.R. 0030)/ McDonalds Driveway
2. County Line Road (S.R. 1001) & Montrose Avenue
3. County Line Road (S.R. 1001) & Roberts Road
4. County Line Road (S.R. 1001) & Conestoga Road (S.R. 1019) & Thomas Avenue/ Glenbrook Avenue
5. County Line Road (S.R. 1001) & South Warner Avenue
6. County Line Road (S.R. 1001) & Old Lancaster Road
7. County Line Road (S.R. 1001) & Mondella Avenue
8. County Line Road (S.R. 1001) & Lindsay Avenue
9. County Line Road/ Haverford Road (S.R. 1001) & South Bryn Mawr Avenue (S.R. 1032/ S.R. 3038) & Railroad Avenue (S.R. 3047) & Glenbrook Avenue



10. County Line Road/ Haverford Road (S.R. 1001) & Landover Road (S.R. 1009)

A project location map is provided in **Figure 1**.

II. EXISTING ROADWAY NETWORK

County Line Road (S.R. 1001) is a four lane roadway with an approximate cartway width of 40 feet with four 10' travel lanes; two lanes in both directions, a right-of-way width that varies from 50-80 feet, and a posted speed limit of 35 miles per hour. Curb and pedestrian facilities exist along the entire corridor from Lancaster Avenue to Haverford Road/ Landover Road. A four foot sidewalk is provided along both sides of County Line Road. The corridor is approximately 0.8 miles with a mix of residential and commercial uses. A more detailed description of each study area intersection and existing pedestrian facilities is provided below. For purposes of this discussion, County Line Road is considered to run north/south.

Lancaster Avenue (S.R. 0030) & County Line Road (S.R. 1001)/ McDonald's Driveway

The intersection is signalized with a median island along the northbound County Line Road (S.R. 1001) approach. Lancaster Avenue (S.R. 0030) is a four lane roadway with 11 foot travel lanes and a posted speed limit of 25 miles per hour (MPH). Pedestrian facilities are provided for crossing all four legs of the intersection; however, the curb ramps do not appear to meet the latest ADA standards.

Montrose Avenue & County Line Road (S.R. 1001)

Montrose Avenue is stop controlled at County Line Road and provides access to an apartment complex, single family residential housing and commercial buildings. A varying cartway width of 21-28 feet is provided with sidewalk on both sides of Montrose Avenue with a posted speed limit of 25 mph. Curb ramps are provided to cross all legs of the intersection; however, the curb ramps do not appear to up to the latest ADA standards and no pedestrian crosswalks are present. Based on information from stakeholders, Montrose Avenue also serves as a connection between Conestoga Road and Lancaster Avenue with high volumes of cross traffic present at County Line Road. On-street parking is permitted on one side of the roadway.

S. Roberts Road & County Line Road (S.R. 1001)

S. Roberts Road is a two-lane roadway with a posted speed limit of 25 MPH that is stop controlled at County Line Road and provides access to single family residential homes. A cartway width of approximately 22 feet is provided with sidewalks along both sides of Roberts Road east of County Line Road. However, west of County Line Road, sidewalk is only provided on the north side. Pedestrian facilities are provided on all legs of the intersection with the exception of the southwest side of Roberts Road. No crosswalk pavement markings are present and all existing curb ramps do not appear to be up to the latest ADA standards.

Conestoga Road (S.R. 1019)/ Thomas Avenue/ Glenbrook Avenue & County Line Road (S.R. 1001) is a five-legged signalized intersection with ADA compliant pedestrian accommodations including push buttons, pedestrian countdown signals and curb ramps. Painted crosswalks are provided on all legs of the intersection with the exception of Conestoga Road west of Glenbrook Avenue where pedestrians are prohibited from



crossing. Conestoga Road has a 26 foot cartway width and a posted speed limit of 35 miles per hour while Thomas Avenue and Glenbrook Avenue have a cartway width of 24 feet and a speed limit of 25 miles per hour. Glenbrook Avenue provides access to the Bryn Mawr SEPTA station and includes two directions of travel from County Line Road to the SEPTA station where the road changes to one way northbound from County Line Road/S. Bryn Mawr Avenue intersection to the SEPTA station.

S. Warner Avenue & County Line Road (S.R. 1001)

S. Warner Avenue is a one-way roadway departing County Line Road in the eastbound direction towards Lancaster Avenue. The cartway width is 21 feet with a posted speed limit of 25 mph. Pedestrian facilities are provided on all legs of the intersection; however, the existing curb ramps appear to be non-compliant with current ADA standards and there are no marked pedestrian crosswalks.

Old Lancaster Road & County Line Road (S.R. 1001)

Old Lancaster Road is stop controlled at a skewed T-intersection with County Line Road. Old Lancaster Road has a posted speed limit of 30 MPH and provides a 28 foot cartway width with street parking on the south side of the roadway between County Line Road and Mondella Avenue. Sidewalks are provided on all legs of the intersection in addition it appears the curb ramps are non-compliant with current ADA standards for crossing Old Lancaster Road. Access to Bryn Mawr Hospital is provided from Old Lancaster Road.

Mondella Avenue & County Line Road (S.R. 1001)

Mondella Avenue intersects County Line Road at a stop-controlled T-intersection and provides a connection to Old Lancaster Road. The cartway width is 24 feet with street parking permitted on the southeast side of the street. Sidewalks are provided on all legs of the intersection and it appears the curb ramps are non-compliant with current ADA standards for crossing Mondella Avenue.

Lindsay Avenue & County Line Road (S.R. 1001)

Lindsay Avenue is a three-legged signalized intersection that provides access to Bryn Mawr Hospital. Pedestrians are currently only permitted to cross the northbound leg of County Line Road and the westbound leg of Lindsay Avenue via marked crosswalks, ADA compliant curb ramps, push buttons and pedestrian (hand/man) signals. The cartway width along Lindsay Avenue is 30 feet.

S. Bryn Mawr Avenue (S.R. 1032/ S.R. 3038)/ Haverford Road (S.R. 1001)/ W. Railroad Avenue (S.R. 3047)/ Glenbrook Avenue & County Line Road (S.R. 1001)

is a five-legged signalized intersection with ADA compliant pedestrian accommodations along all legs of the intersection. Railroad Avenue is a one-way road departing the intersection toward the southeast with a 24 foot cartway width and parking permitted on the southwest side of the street. Bryn Mawr Avenue is a two-lane road with a posted speed limit of 40 miles per hour to the west and 30 miles per hour to the east while County Line Road/Haverford Road has a posted speed limit of 35 miles per hour. The cartway width along Bryn Mawr Avenue varies from 28 feet to 47 feet. Glenbrook Avenue is a one-way road departing the intersection toward the northwest providing access to the Bryn Mawr SEPTA Station where the one-way road changes to two directions of travel and intersects County Line Road approximately 160 feet north of the S. Bryn Mawr Avenue/County Line Road intersection. The Glenbrook Avenue leg is



incorporated in the signalized intersection. The cartway width along Glenbrook Avenue is 22 feet with parking permitted on the western side. Updated pedestrian accommodations are provided for crossing Glenbrook Avenue; however, pedestrians are restricted via signage from crossing County Line Road at this location.

Haverford Road & County Line Road/ Landover Road is a four-legged signalized intersection with ADA compliant curb ramps. However, updated pedestrian hand/man signals and push buttons are not currently provided at the intersection. Landover Road is a two lane road with a cartway width of 26 feet and a posted speed limit of 35 mph. Sidewalk is not present along Landover Road, and the sidewalk along the east side of County Line Road terminates just south of the intersection.

County Line Road/ Lower Merion Township

Lower Merion Township recently obtained a PennDOT Green Light Go grant to install a traffic adaptive system on County Line Road at the intersections of Lindsay Avenue, Bryn Mawr Avenue and Landover Road.

The existing roadway characteristics of the County Line Road corridor are summarized in **Table 1**. The posted 35 mile per hour speed limit compares favorably to the obtained 85th percentile speeds ranging from 33.6 to 42.7 miles per hour along the corridor.

Table 1: Existing Roadway Summary

ROAD	CARTWAY WIDTH	RIGHT-OF-WAY WIDTH	POSTED SPEED	85 th PERCENTILE SPEED	AVERAGE DAILY TRAFFIC ³
County Line Rd between Montrose Ave and Roberts Rd	40'	50-60'	35 MPH	42.7 ¹ / 37.6 ²	8,165 ¹ / 7,547 ²
County Line Rd between Roberts Rd and Thomas Ave	40'	50-60'	35 MPH	42.2 ¹ / 33.6 ²	7,799 ¹ / 7,711 ²
County Line Rd between Thomas Ave and Mondella Ave	40'	50-54'	35 MPH	38 ¹ / 40 ²	9,475 ¹ / 10,138 ²

¹Southbound ²Northbound

³PennDOT Traffic Information Repository Data (**Appendix L**)

FIELD OBSERVATIONS

During the field investigation, the following observations should be resolved by Radnor Township and/or Lower Merion Township:

- Install R4-7 KEEP RIGHT and OM1-3 OBJECT MARKER signs at both ends of the median located at the intersection of Lancaster Avenue and County Line Road. The signs are noted on the signal permit plan and may have been knocked down.
- Eliminate the WAIT FOR GREEN BALL sign at the intersection of Conestoga Road & Glenbrook Avenue/Thomas Avenue. This sign is no longer supported by PennDOT and is not included on the most current signal permit plan.
- For improved visibility, replace the faded R3-2 NO LEFT TURN signs at the intersection of Conestoga Road & Glenbrook Avenue/Thomas Avenue.



- Overhead Street Name (OSN) signs at: Lancaster Avenue & County Line Road; Conestoga Road & Glenbrook Avenue/Thomas Avenue; and Landover Road & Haverford Road should be replaced to meet current Manual of Uniform Traffic Control Devices (MUTCD) and PennDOT standards.

SIGHT DISTANCE ANALYSIS

Sight distance was measured at each of the unsignalized study intersections to identify potential issues. The sight distance evaluation was performed utilizing PennDOT standards with the sight line measured from a point 10 feet from the through travel lane of the main street from a position 3 ½ feet above the road to an object height of 3 ½ feet above the pavement. As shown in **Table 2**, all of the unsignalized intersections meet the minimum sight distance criteria with the exception of northbound Montrose Avenue and Old Lancaster Road. However, appropriate sight distance can be achieved by trimming some of the adjacent vegetation. Calculations and photos at each of the studied intersections are provided in **Appendix B**.

Table 2: Sight Distance Summary

Intersection Approach	Looking Left (in Feet)		Looking Right (in Feet)		Remarks
	Calculated ¹	Available/Existing	Calculated ¹	Available/Existing	
Southbound Montrose Ave	280	300+	374	400+	No deficiency
Northbound Montrose Ave	374	190	280	300+	Trim vegetation & re-evaluate periodically.
Northbound Roberts Ave	283	300+	378	400+	No deficiency
Southbound Roberts Ave	378	400+	283	300+	No deficiency
Old Lancaster Road	354	250	244	300+	Trim vegetation & re-evaluate periodically.
Mondella Ave	283	300+	366	400+	No deficiency

¹Based on PennDOT and AASHTO Minimum Stopping Sight Distance and the 85th Percentile speed of the roadway.

CRASH ANALYSIS

As part of the analysis, crash data was obtained from Radnor and Lower Merion Townships, as well as PennDOT, for each of the study intersections. Reportable and non-reportable crash information was reviewed for the most recent five-year period and is tabulated in **Table 3**. Reportable crashes are those in which either the vehicle sustained enough damage that it must be towed or there is any type of injury or death. Non-reportable crashes are all other incidents and are considered “fender benders”. During the most recent five years of data collected, no fatalities occurred along the corridor. Collision diagrams were prepared for each study intersection and are provided in **Appendix C**.

In accordance with MUTCD and PennDOT, the threshold to consider improvements at an intersection is the occurrence of 5 or more reported crashes within a continuous 12 month period. Therefore, each of the study area intersections warrant some mitigation to improve the safety of the corridor, with the exception of the Mondella Avenue, and



Lindsay Avenue intersections. However, all locations were reviewed to identify even minor modifications that could improve the safety of the corridor.

Many of the crashes along County Line Road in the vicinity of Lancaster Avenue involved negotiating the curve near the intersection of County Line Road at Arthur Road. Additional signage along County Line Road would provide advanced warning for drivers of the upcoming change in horizontal alignment such as W1-8 CHEVRON ALIGNMENT signs and W1-6 LARGE SINGLE ARROW signs. In an effort to reduce rear end crashes, the Townships may want to consider implementation of a dynamic “RED SIGNAL AHEAD” sign for northbound County Line Road to alert drivers when the signal at the intersection is red for the northbound approach.



Table 3: Crash Summary

LOCATION	Number of Crashes – Reportable and Non-Reportable				
	2013	2014	2015	2016	2017
County Line Road & Lancaster Ave	6	13	3	5	12
County Line Road & Montrose Ave	4	4	5	9	9
County Line Road & Roberts Ave	14	7	12	7	9
County Line Road & Thomas Ave/ Conestoga Road	7	4	5	5	5
County Line Road & South Warner Ave	1	2	5	3	--
County Line Road & Old Lancaster Road	1	2	4	6	4
County Line Road & Mondella Ave	0	2	0	4	2
County Line Road & Lindsay Ave	1	2	0	1	0
County Line Road & Bryn Mawr Ave/ Glenbrook Ave/ Railroad Ave	4	10	5	7	6
County Line Road & Haverford Road/ Landover Road	9	6	5	8	5

Between Arthur Road and Montrose Avenue, there were a number of crashes that involved improper entrances to County Line Road. This could be attributed to the high number of curb cuts along the northeast side of County Line Road associated with the many businesses along this stretch such as CVS Pharmacy, Sunoco and the Ferrari Dealership. In addition to the number of curb cuts, the sidewalk and driveway aprons blend together making it difficult to clearly identify the location of the driveways. Installing a separation material such as a two-foot grass verge between the roadway and the sidewalk could improve the visibility and better define the location of these driveways as indicated below. As an alternative, the Township may want to consider creating a continuous contrasting sidewalk through the driveways to more prominently note the presence of pedestrians.

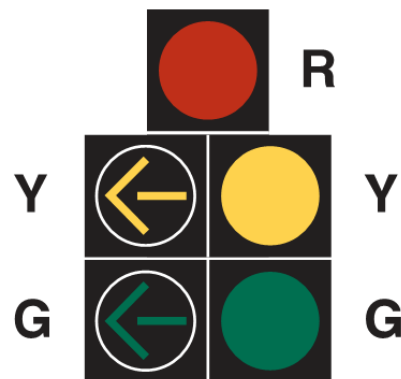
There were a high number of crashes (31) at the Montrose Avenue intersection which were attributable to motorists not stopping at the stop sign and/or turning without proper



clearance, many of which were through movements from Montrose Avenue attempting to cross over County Line Road. 27 of the 31 crashes at the intersection were directly related to crossover traffic. Based on the results of the sight distance analysis, eastbound Montrose Avenue motorists looking left do not have adequate sight distance due to vegetation along the adjacent property frontage. A traffic signal warrant was reviewed to determine if a traffic signal could be installed at this location. The results of the analysis indicate that under existing conditions, a traffic signal is warranted based upon the Manual for Uniform Traffic Control Devices (MUTCD) Warrant 1-Eight-Hour Vehicular Volume. The signal warrant analysis can be found in **Appendix D**.

Similarly, there were a high number of crashes (49) at the Roberts Road intersection, most of which involved vehicles proceeding from the stop-controlled approaches of Roberts Road without proper clearance along County Line Road. Most of the incidents (39) involved vehicles from Roberts Road attempting to cross County Line Road, likely to access the traffic signal at Lancaster Avenue. Due to the right turn only at the Conestoga Road/County Line Road intersection, vehicles must cut through Roberts Road to gain access to Lancaster Avenue. Based on the number of incidents, a signal warrant was reviewed to determine if a traffic signal could be installed at this location to improve the safety of the intersection. The results of the analysis indicate that under existing conditions, a signal is warranted based upon the Manual for Uniform Traffic Control Devices (MUTCD) Warrant 1 Eight-Hour Vehicular Volume and Warrant 2 Four-Hour Vehicular Volume.

Review of the crash data at the Conestoga Road/Thomas Avenue/Glenbrook Avenue intersection did not reveal common patterns in crashes that could be mitigated with roadway improvements. However, there were some crashes involving northbound left-turning vehicles that may be reduced by updating the signal head to a traditional 5-section head rather than a 4-section head. The existing 4-section signal displays a green arrow during the protected phase that is extinguished after the phase is completed to allow the southbound movement. Additional crashes may be associated with vehicles accelerating to “beat the light”.



Installing a 5-section signal would provide an additional clearance interval during the yellow arrow indication therefore warning drivers when the opposing traffic will begin moving through the intersection.

The crash data revealed that the crashes in the vicinity of South Warner Avenue and Old Lancaster Road involved vehicles exiting the plaza on the west side of County Line Road. There are currently three access driveways within 200' along County Line Road beginning from the northern limits of the shopping center as follows: a one-way entrance, a one-way exit and one full access driveway. Consolidating the driveways into one shared access may be effective in reducing the number of crashes. In addition, property owners should consider removing the one-way entrance and the one-way exit driveways at the plaza to reduce the number of turn conflicts in the 200' frontage along the roadway. During the field investigation, several motorists were observed traveling between County Line Road and Glenbrook Avenue through the narrow driveway running

along the north side of the shopping center building in both directions; given the narrow width of the driveway (approximately 10' wide), a safer operation would include altering the driveway movement to one direction only to prohibit motorists from using this narrow drive as a cut-through between the two roadways. The existing one-way driveway along the south side of the shopping center building should remain to provide a means of circulation around the entire building.



Old Lancaster Road intersects County Line Road at a less than ideal skewed angle making turning movements from Old Lancaster Road awkward and difficult. Drivers must turn almost completely around to view oncoming vehicles from the south and alternatively, motorists traveling southbound along County Line Road only have to turn slightly to access Old Lancaster Road. The crash data shows that motorists from

southbound County Line Road make careless turns in front of other vehicles while attempting to perform this turn maneuver. Reconfiguring the alignment of Old Lancaster Road to a more perpendicular alignment with County Line Road and narrowing down the cartway width on Old Lancaster Road at County Line Road could reduce the crash incidents at this location. An intersection realignment would provide better sight lines for vehicles turning from Old Lancaster Road to County Line Road and would require southbound motorists to turn more slowly from County Line Road.





There were a total of four (4) crashes at Lindsay Avenue; this road provides access to Bryn Mawr Hospital. No clear patterns were observed and therefore, no improvements are recommended at this location.

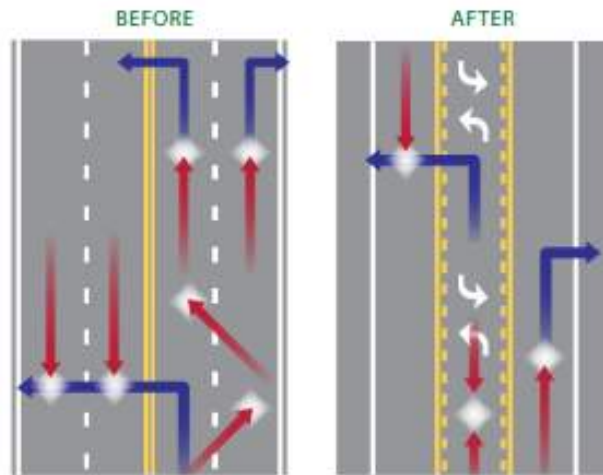
There were a total of eight (8) crashes, five (5) of which were attributed to southbound rear-end collisions at the intersection of County Line Road and Mondella Avenue. The collisions were mostly a result of collisions with southbound left-turning vehicles. The recommended mitigation at this location would be to provide a dedicated left-turn lane; however, implementing a center left-turn lane at this location would serve the same purpose.

At the County Line Road & Bryn Mawr Avenue/Railroad Avenue intersection, there is a high number of crashes involving rear-end collisions on the northbound County Line Road movement. This is likely due to the inadequate left turn lane length, the absence of a shadow lane, the absence of a full-length/full-width taper, interjected with the left turn movements into the Wawa driveway. Motorists may be stopping quickly or prematurely to enter the Wawa driveway, thereby causing rear-end collisions with motorists that are proceeding through to turn left at the intersection and are not anticipating the left turn into the Wawa driveway. Although extending the left-turn lane would be favorable; this is not feasible due to the available cartway and right-of-way width. The recommended improvement includes providing a dotted extension line at the beginning of the development of the left turn lane taper to more clearly define the dedicated left turn lane from the inside through lane along with the installation of a nearside traffic signal head for the benefit of motorists in the northbound left turn lane.

The crash data indicates that more than half of the crashes at the County Line Road/Haverford Road & Landover Road intersection were caused by motorists running a red light. This could be alleviated by providing advanced dilemma zone detection via radar. Based on the speed of the approaching vehicle, the radar detector can extend the green interval if a vehicle is in the dilemma zone before displaying the yellow clearance interval. Motorists are then able to travel through the dilemma zone or zone of indecision, without having to make a quick decision of whether to stop or proceed through the yellow indication. This has proven to significantly reduce the occurrence of crashes due to red light running. The clearance intervals at this intersection were evaluated and found to be appropriate; therefore, extending the yellow/red time is not recommended as a countermeasure.

Due to the high number of crashes specifically between Lancaster Avenue and Roberts Road, the benefits of a road diet were examined for the entire length of the corridor. A road diet reduces the number of lanes on a roadway which can improve safety for motorists, bicyclists and pedestrians. According to the Federal Highway Administration (FHWA), reasons to consider converting from a four-lane roadway to a three-lane roadway with a center turn lane include a high crash rate involving left turn movements, sideswipes, rear-end collisions, and crossing traffic. Typically, a four-lane roadway operates as two travel lanes in either direction with two “defacto” left turn lanes as motorists tend to “bob and weave” to avoid impending left turning vehicles. A roadway diet can reduce automobile crashes from 20% to 50% by reducing the number of conflict points in half and greatly reducing the number of left turning, rear-end, sideswipe and head-on collisions. Three-lane roads also reduce speeds which are a concern along this

portion of the corridor. The implementation of a three-lane roadway will greatly improve safety along the corridor and reduce the number of conflicts a pedestrian must contend with when crossing the roadway. An added benefit for the roadway diet is the center turn lane provides a refuge for left turning vehicles from County Line Road to the minor streets and also provides a two-stage left turn refuge area for motorists turning left from the minor side streets to gain access to County Line Road.



III. EXISTING CONDITIONS

The study area intersections were analyzed during the AM peak, PM peak and Saturday Midday peak periods for the Existing (2018) conditions. The majority of existing traffic volume information for the AM and PM peak periods (7:00AM-9:00AM) and (4:00PM-6:00PM) was obtained from various traffic studies conducted along the corridor in recent years. Data was also collected during the Saturday Midday peak period (11:00AM-1:00PM) for all study intersections. The existing traffic count data is included in **Appendix E**. The yearly growth factor provided by PennDOT's Bureau of Planning and Research for Urban Non-Interstate roadways within Delaware County and Montgomery County for 2018/2019 is 0.00 and 0.34, respectively. To provide a more conservative analysis, the counts were factored to the existing analysis year (2018) utilizing a yearly growth factor of 0.34 per Montgomery County. The resultant current year traffic volumes are shown on **Figures 2A-2C** for the AM Peak Hour, PM Peak Hour, and Saturday Midday peak hour.

LEVEL OF SERVICE ANALYSIS

The volumes were subjected to a detailed Level of Service (LOS) analysis according to standard procedures found in *Highway Capacity Manual 6th Edition (HCM)* published by the Transportation Research Board, Washington DC and provided in **Appendix F**. At the signalized intersections, the analysis utilized the existing signal timings as identified on the signal permit plans provided by PennDOT and in **Appendix G**. The detailed analysis reports for the Existing conditions are provided in **Appendix H**. The LOS results are summarized on **Figures 3A-3C** for each of the analysis periods.

Typically, PennDOT considers LOS D to be an acceptable overall level of service for intersections within an urban area. As noted in **Appendix H**, all of the study intersections



meet this criteria; however, there are several movements throughout the corridor that operate at LOS E or F. These movements were examined to determine if improvements could be identified to achieve improved operation.

The eastbound and westbound stop-controlled approaches of Montrose Avenue operate at deficient levels of service during the AM and PM peak periods. At Roberts Road, the eastbound approach operates at a LOS F during the AM peak period. In addition, the following queues were noted. Along Lancaster Avenue, the eastbound queue extends beyond the adjacent intersection at County Line Road by approximately 160 feet during the PM peak period. At the intersection of Bryn Mawr Avenue and Haverford Road the northbound left queue extends beyond the available storage by less than a cars length during the AM and PM peak periods. At the intersection of Glenbrook Avenue the southbound queue extends beyond the adjacent intersection at Lindsay Avenue approximately 65 and 315 feet during the AM and PM peak periods, respectively. **Table 4** provides a summary of the deficient movements detailed above.

Table 4: Existing Roadway Deficiencies

Intersection w/ County Line Road	Movement	Levels of Service (seconds)			95 th Percentile Queue (feet)		
		AM Peak Hour	PM Peak Hour	SAT Peak Hour LOS	AM Peak Hour	PM Peak Hour	SAT Peak Hour
Lancaster Ave	EB	-	-	-	-	497	-
Montrose Ave	EB	F (51.7)	F (88.1)	-	-	-	-
	WB	E (38.4)	F (62.0)	-	-	-	-
Roberts Road	EB	F (109.7)	-	-	-	-	-
Bryn Mawr Ave & Haverford Road	NBL	-	-	-	80	81	-
Glenbrook Ave	SB	-	-	-	299	550	-

A detailed Level of Service analysis was also performed along the corridor with the implementation of the noted improvements. Two analyses were conducted; one evaluating a center left turn lane along the corridor excluding the intersections of Conestoga Road and Bryn Mawr Avenue, and one evaluating a center turn lane at all study intersections. Apart from safety improvements and minor signal timing revisions, the impact of installing a center left turn lane through the intersections of Conestoga Road and Bryn Mawr Avenue can be seen in **Tables 5 and 6**. As shown in Tables 5 and 6, the level of service and queue are negatively impacted when reducing the number of lanes servicing the northbound and southbound approaches at these intersections. **Figure 7** provides a sketch detailing the failing movements noted in Tables 5 and 6.

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Table 5: Level of Service Analysis - Center Turn Lane Through Entire Study Area

	Movement	Existing Conditions			Proposed w/ TWTL ¹ Corridor Improvements Excluding Conestoga Rd & Bryn Mawr Ave			Proposed w/ TWTL ¹ Corridor Improvements Including Conestoga Rd & Bryn Mawr Ave		
		AM Peak Hour LOS (seconds)	PM Peak Hour LOS (seconds)	SAT Peak Hour LOS (seconds)	AM Peak Hour LOS (seconds)	PM Peak Hour LOS (seconds)	SAT Peak Hour LOS (seconds)	AM Peak Hour LOS (seconds)	PM Peak Hour LOS (seconds)	SAT Peak Hour LOS (seconds)
Conestoga Road/ Thomas Ave/ Glenbrook Ave	Thomas WB	C (25.5)	C (30.7)	C (27.1)	C (28.8)	D (42.9)	C (29.4)	C (28.8)	D (42.9)	C (29.4)
	Glenbrook NEB	C (28.2)	C (30.9)	C (29.6)	C (33.2)	D (44.9)	C (32.6)	C (33.2)	D (44.9)	C (32.6)
	Conestoga SEB	C (27.9)	C (31.8)	B (25.4)	C (22.8)	D (35.1)	C (24.2)	C (22.8)	D (35.1)	C (24.2)
	County Line NB Left	A (8.1)	A (5.3)	A (3.9)	A (5.8)	A (3.5)	A (2.8)	B (12.9)	B (12.5)	A (3.9)
	County Line NB Thru/Right				A (6.6)	A (3.2)	A (4.4)	A (6.6)	A (3.2)	A (4.4)
	County Line SB Left	B (16.7)	C (24.2)	B (16.9)	A (0.0)	B (15.7)	B (10.5)	A (0.0)	B (15.7)	B (10.5)
	County Line SB Thru/Right				B (16.9)	B (12.9)	A (9.7)	E (75.2)	C (26.1)	B (14.9)
	Overall	B (15.8)	B (19.1)	B (13.8)	B (14.3)	B (17.0)	B (12.1)	C (30.3)	C (22.6)	B (13.5)
Bryn Mawr Ave/ Haverford Road/ Railroad Ave	Bryn Mawr EB Left	C (21.6)	C (23.9)	B (18.6)	C (21.6)	C (23.9)	B (18.5)	C (21.6)	C (23.9)	B (18.5)
	Bryn Mawr EB Thru/Right	D (41.5)	D (46.2)	C (30.5)	D (41.5)	D (46.2)	C (30.4)	D (41.5)	D (46.2)	C (30.4)
	Bryn Mawr WB Left	C (23.8)	D (40.9)	C (20.0)	C (23.8)	D (40.9)	C (20.3)	C (23.8)	D (40.9)	C (20.3)
	Bryn Mawr WB Thru	C (30.6)	D (38.2)	C (27.7)	C (30.6)	D (38.2)	C (28.1)	C (30.6)	D (38.2)	C (28.1)
	Bryn Mawr WB Right	C (25.1)	C (28.2)	C (24.2)	C (25.1)	C (28.2)	C (24.4)	C (25.1)	C (28.2)	C (24.4)
	County Line NB Left	B (13.0)	C (22.1)	B (10.5)	C (21.8)	C (24.5)	B (12.7)	C (32.3)	D (37.1)	B (15.7)
	County Line NB Thru/Right	C (24.0)	B (16.7)	B (18.2)	D (37.5)	C (21.7)	C (21.5)	F (282.3)	D (35.2)	D (42.4)
	County Line SB Left	C (36.6)	A (4.4)	B (10.6)	C (30.5)	A (5.9)	B (12.5)	E (55.6)	B (12.0)	C (34.0)
	County Line SB Thru/Right	A (2.9)	A (6.5)	A (2.9)	A (3.7)	A (8.0)	A (3.7)	C (24.8)	F (227.3)	B (13.7)
	Overall	C (23.1)	C (22.4)	B (16.7)	C (28.2)	C (24.1)	B (18.0)	F (118.4)	F (101.9)	C (26.9)
Glenbrook Ave	County Line NB Left/Thru	A (0.4)	A (0.2)	A (0.1)	A (0.4)	A (0.2)	A (0.3)	C (32.5)	C (23.2)	C (22.2)
	County Line NB Thru/Right							A (1.4)	C (31.4)	C (31.3)
	County Line SB Thru	C (31.3)	D (36.7)	C (22.7)	C (30.4)	C (34.6)	C (22.8)	F (110.2)	F (298.2)	E (64.8)
	County Line SB Thru/Right							D (41.5)	F (191.4)	D (46.1)
	Overall	B (11.8)	C (22.1)	B (10.2)	B (11.5)	C (20.9)	B (10.4)	D (41.5)	F (191.4)	D (46.1)

¹ TWTL= Two Way Turn Lane or Center Turn Lane



Table 6: Queue Analysis - Center Turn Lane Through Entire Study Area

	Movement	Storage (feet)	Existing Conditions			Proposed w/ TWTL Corridor Improvements Excluding Conestoga Rd & Bryn Mawr Ave			Proposed w/ TWTL ¹ Corridor Improvements Including Conestoga Rd & Bryn Mawr Ave		
			AM Peak Hour LOS (seconds)	PM Peak Hour LOS (seconds)	SAT Peak Hour LOS (seconds)	AM Peak Hour LOS (seconds)	PM Peak Hour LOS (seconds)	SAT Peak Hour LOS (seconds)	AM Peak Hour LOS (seconds)	PM Peak Hour LOS (seconds)	SAT Peak Hour LOS (seconds)
Conestoga Road/ Thomas Ave/ Glenbrook Ave	Thomas WB	285	27	97	34	31	120	38	31	120	38
	Glenbrook NEB	325	107	103	96	125	130	108	125	130	108
	Conestoga SEB	415	350	347	206	259	345	201	259	345	201
	County Line NB Left	175	202	151	121	87	61	50	159	155	50
	County Line NB Thru/Right	300				216	91	144	216	91	144
	County Line SB Left	360	136	228	122	103	121	71	476	468	264
	County Line SB Thru/Right										
Bryn Mawr Ave/ Haverford Road/ Railroad Ave	Bryn Mawr EB Left	135	96	73	89	96	73	89	96	73	89
	Bryn Mawr EB Thru/Right	545	416	387	211	416	387	211	416	387	211
	Bryn Mawr WB Left	185	47	159	67	47	159	67	47	159	67
	Bryn Mawr WB Thru		230	328	147	230	328	148	230	328	148
	Bryn Mawr WB Right	160	0	0	0	0	0	0	0	0	0
	County Line NB Left	70	80	81	66	77	82	66	85	100	66
	County Line NB Thru/Right	440	500	147	180	482	195	180	1302	687	569
	County Line SB Left	120	52	5	16	48	8	20	18	4	16
	County Line SB Thru/Right	120	0	0	0	0	1	0	84	86	93
Glenbrook Ave	County Line NB Left/Thru	120	0	0	0	7	0	0	14	12	18
	County Line NB Thru/Right	120							181	23	49
	County Line SB Thru	235	299	550	219	257	542	219	883	1493	660
	County Line SB Thru/Right	235									

¹ TWTL= Two Way Turn Lane or Center Turn Lane

Based on the findings noted above regarding queues extending beyond adjacent intersections and excessive delays, no center turn lane should be provided through the intersections of Conestoga Road and Bryn Mawr Avenue. A summary of the overall level of service at each of the study area intersections can be found in **Table 7** and a detailed summary of the level of service and 95th percentile queue results are provided in **Appendix I and J**, respectively. In addition, the LOS results with recommended improvements are shown on **Figures 6A-6C** for each of the analysis periods.



Table 7: Level of Service Analysis - Center Turn Lane Excluding Conestoga Road and Bryn Mawr Avenue

Intersection	Existing LOS			Existing w/ Center Turn Lane Excluding Conestoga & Bryn Mawr		
	AM Peak Hour LOS (seconds)	PM Peak Hour LOS (seconds)	SAT Peak Hour LOS (seconds)	AM Peak Hour LOS (seconds)	PM Peak Hour LOS (seconds)	SAT Peak Hour LOS (seconds)
Lancaster Avenue (S.R. 0030) ²	C (20.3)	C (23.0)	B (16.0)	C (20.4)	C (24.3)	B (16.0)
Montrose Avenue ^{1/2}	B (7.8)	B (12.4)	A (2.7)	B (11.7)	B (10.4)	A (6.9)
South Roberts Road ¹	B (16.2)	A (3.4)	A (3.0)	C (26.3)	A (4.3)	A (3.8)
Conestoga Road (S.R. 1019) & Glenbrook Avenue & Thomas Avenue ²	B (15.8)	B (19.1)	B (13.8)	B (14.3)	B (17.0)	B (12.1)
South Warner Avenue ¹	A (0.1)	A (0.2)	A (0.1)	A (0.1)	A (0.2)	A (0.1)
Old Lancaster Avenue ¹	A (4.4)	A (3.9)	A (2.4)	A (3.8)	A (3.9)	A (2.2)
Mondella Avenue ¹	A (0.5)	A (0.4)	A (0.1)	A (0.4)	A (0.4)	A (0.3)
Lindsay Avenue ²	A (1.9)	A (1.5)	A (0.2)	B (15.0)	A (7.6)	A (0.7)
S. Bryn Mawr Avenue (S.R. 3038) & Haverford Road & W. Railroad Avenue & Glenbrook Avenue ²	C (23.1)	C (22.4)	B (16.7)	C (28.2)	C (24.1)	B (18.0)
Glenbrook Avenue ²	B (11.7)	C (22.1)	B (10.4)	B (11.5)	C (20.9)	B (10.4)
Haverford Road (S.R. 1009) & Landover Road ²	B (16.0)	B (13.7)	B (10.5)	C (22.8)	E (56.8)	B (12.8)

¹ Analyzed as stop controlled ² Analyzed as signal

In general, the traffic signal operations of minor approaches will degrade slightly for the benefit of the major through movements along a corridor with optimizing signal timings for progression through a corridor. However, if desired, minor adjustments to the signal timings could be made at the signalized intersections to reduce the delay on the minor approaches if the delays are found to be too significant. The level of service for County Line Road may be minimally impacted at these locations, but are still within industry standard for acceptable LOS and delay levels.

TRAVEL TIME ANALYSIS

The corridor was subjected to a detailed travel time analysis using SimTraffic software. SimTraffic provides an animated simulation of the corridor modeled in Synchro which is the software used to develop the capacity analyses. The corridor was analyzed during the AM peak, PM peak and Saturday Midday peak periods for the existing conditions as well as with the implementation of the recommended improvements. **Table 8** shows five simulated travel time runs through the corridor, both north and south, which were then averaged for comparison purposes. The overall travel time improvement from the existing conditions compared to the corridor with recommended improvements is outlined in **Table 9**. With the exception of the southbound movement during the PM peak hour, both the northbound and southbound travel times through the corridor improve slightly during the AM, PM and Saturday Peak hours. The detailed travel time analysis reports are provided in **Appendix H**.



Table 8: Corridor Travel Times

	AM PEAK				PM PEAK				SAT PEAK			
	EXISTING		W/ IMPROVEMENTS		EXISTING		W/ IMPROVEMENTS		EXISTING		W/ IMPROVEMENTS	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
Run 1	200.8	334.6	258.8	318.6	199.3	1063.7	218.0	882.7	150.4	201.6	204.1	251.1
Run 2	209.0	230.4	266.0	298.4	200.7	1346.8	212.3	925.3	161.4	215.1	206.1	237.2
Run 3	223.9	250.5	283.7	299.9	213.2	1034.4	205.5	824.1	163.2	204.0	210.4	238.6
Run 4	234.1	241.5	273.4	279.2	202.7	995.5	207.2	810.7	153.3	200.3	204.9	238.0
Run 5	228.5	226.1	267.1	309.8	194.4	906.7	218.4	851.8	165.3	208.2	223.8	243.1
Average Run	219.3	256.6	269.8	301.2	202.1	1069.4	212.3	858.9	158.7	205.8	209.9	241.6

Table 9: Overall Corridor Travel Time Improvement

AM PEAK		PM PEAK		SAT PEAK	
NB	+50.5 (s)	NB	+10.2 (s)	NB	+51.1 (s)
SB	+44.6 (s)	SB	-210.5 (s)	SB	+35.8 (s)

IV. PEDESTRIAN AND BICYCLE FACILITY EVALUATION

PEDESTRIAN FACILITIES

There are existing pedestrian facilities along the entire length of the studied corridor from Lancaster Avenue to Landover Road. Four (4) foot sidewalks are provided on both the east and west sides of County Line Road directly adjacent to the curb and travel lane. Most of the studied cross streets include sidewalk along both sides of the roadway with the exception of Conestoga Road, Roberts Road and Haverford Road.

Conestoga Road does not provide sidewalk on the north side of the road; in addition, pedestrian crossings are only provided at the intersection of Roberts Road and Glenbrook Avenue. Residents raised concerns that due to the lack of sidewalk on the north side of the street, pedestrians are forced to cross Conestoga Road in order to reach the sidewalk on the southern side. Locations of greatest concerns are the specific crossings at Montrose Avenue and Petrie Avenue. To improve safety for pedestrians, provide a crosswalk across Conestoga Road along with W11-2 PEDESTRIAN signs and advanced warning signs on both approaches. In addition, construct a sidewalk along the north side of Conestoga Road in order to provide a more obvious and improved crossing between Montrose Avenue and Roberts Road. Extending the sidewalk from Roberts Road to County Line Road in front of the Yangming parcel may be difficult due to the need for an extensive retaining wall and the presence of mature trees along the north side of County Line Road. An additional study may need to be conducted at this location to further investigate other potential safety improvements such as the installation of a Rectangular Rapid Flashing Beacon (RRFB).



Residents noted that vehicles often do not yield to pedestrians at the intersection of Lancaster Avenue and Montrose Avenue. During a field investigation it was observed there is a marked mid-block crosswalk for pedestrians to cross Lancaster Avenue; however no pedestrian signal is provided and a W11-2 PEDESTRIAN warning sign is only provided on the eastbound approach immediately adjacent to the existing crosswalk. To improve the safety for pedestrians the recommended improvement includes installing W11-2 PEDESTRIAN signs along both the eastbound and westbound approaches of Lancaster Avenue at the crosswalk and 100' in advance of the crosswalk. Given this location is outside the identified study area but of great importance, an additional study should be initiated to investigate the installation of a Rectangular Rapid Flashing Beacon (RRFB) for the pedestrian crossing.



Residents noted that due to the location of the Warner Avenue Park & Playground and the 958/968 Lancaster Ave. Shopping Center located near Old Lancaster Road and County Line Road, increased pedestrian traffic at this intersection and crossing County Line Road could benefit from a dedicated crosswalk, compliant curb ramps and potentially a Rectangular Rapid Flashing Beacon. An additional study should be conducted at this location in order to investigate other potential safety improvements.

In order to increase the safety of pedestrians at each of the intersections, continental crosswalks (piano keys) and pedestrian countdown timers should be installed where needed. The continental style crosswalk is more visible to approaching vehicles and alerts drivers to the potential for pedestrians within the intersection. The pedestrian countdown timers inform pedestrians how many seconds remain to safely cross the road before the "DON'T WALK" symbol is displayed; this allows the pedestrian to make better decisions about whether to begin to cross the road. Both of these measures could improve the safety of the intersections for motorists and pedestrians alike.

The intersections of County Line Road & Landover Road as well as County Line Road & Lancaster Avenue should be upgraded with pedestrian countdown timers and pushbuttons. In addition, upgraded ADA accessible curb ramps should be constructed at the intersections of County Line Road and: Lancaster Avenue; Montrose Avenue; Roberts Road; South Warner Avenue; Old Lancaster Road; and Mondella Avenue.





BICYCLE FACILITIES

There are currently no bicycle facilities located along the County Line Road corridor or on any surrounding roadways in the vicinity of the study area. The traffic counts obtained for the purposes of this analysis show that bicyclists do utilize the corridor. Local residents have expressed concerns regarding bicycles traveling along the current corridor. Reducing County Line Road to include two 10' travel lanes with a shared 10' center left-turn lane would provide two 5 feet wide shoulders on the north and southbound approaches of County Line Road. The shoulders would provide the additional safety benefit for not only bicycle riders in a more protected environment, but would also provide an additional 5 feet of buffer between pedestrians on the sidewalks and vehicles traveling on the roadway; and also improve motorists' visibility of pedestrians crossing County Line Road from the minor cross streets along the corridor.

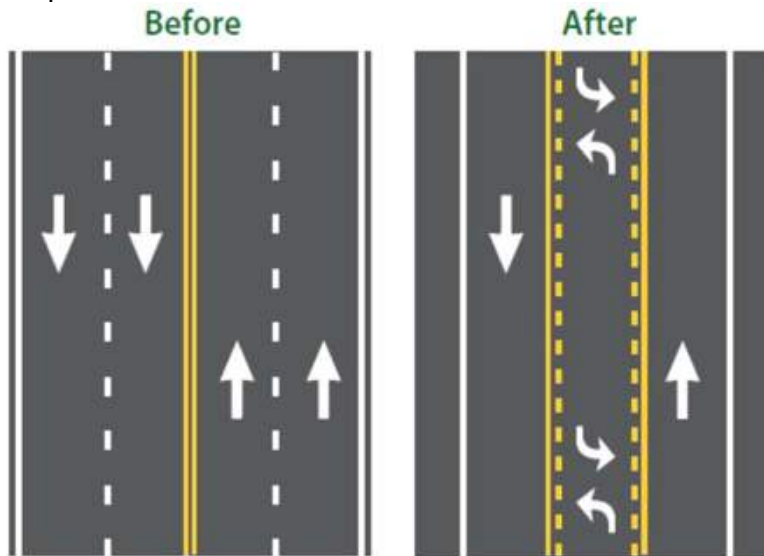
V. RECOMMENDED IMPROVEMENTS

Based on a review of the level of service results, the crash data and the sight distance analysis, there are some improvements that can be implemented to provide improved progression and a safer environment for both vehicular and pedestrian traffic. **Figures 5A – 5D** provide a conceptual sketch of the recommended improvements.

As noted in the sight distance analysis summary table, the existing vegetation on the eastbound **Montrose Avenue** and westbound **Old Lancaster Road** approaches to County Line Road impedes the line of sight for drivers at those locations. Both Townships should trim the vegetation to ensure adequate sight distance is available. The legal right-of-way should be identified in these locations to determine if a sight line easement is necessary to clear the vegetation and to maintain the sight distance in the future. Once trimmed, another evaluation should be performed to ensure adequate sight distance is available. The vegetation should be monitored bi-annually to maintain the necessary sight distance. The approximate cost of this improvement is \$5,000.

In an effort to improve safety along **County Line Road between Lancaster Avenue and Landover Road**, the County Line Road corridor should alter from a four lane assignment to a three lane assignment with 5' shoulders on both sides of the corridor. The three lane assignment would include a shared center turn lane along with one travel lane in both directions of travel. The three lane section would terminate at County Line Road and Roberts Road and return to a four-lane roadway alignment. Due to the high volumes on both County Line Road and Conestoga Road in addition to the three-phase signal control at the intersection of County Line Road & Conestoga Road/Thomas Ave/Glenbrook Ave, two lanes are necessary on County Line Road in order to effectively move traffic through the intersection. The three lane section would then pick back up after the intersection of County Line Road and Old Lancaster Avenue and continue through to Lindsay Avenue. The existing roadway configuration would remain through the intersection of County Line Road & Bryn Mawr Avenue/Glenbrook Avenue due to the complexity of the signal phasing, associated auxiliary turn lanes, and high volumes. It is important to note that the implementation of a three lane cross section as described above is conditioned on the assumption that PennDOT would permit reduced lane reduction tapers based on a speed limit of 25 miles per hour. The advanced warning distance and lane reduction tapers required at 35 miles per hour are nearly double those

required at 25 MPH and there is insufficient distance to provide the taper adjustments from a 4 lane to a 3 lane alignment. Reducing the corridor speed from 35 MPH to 25 MPH should be considered with the corridor lane reassignment discussed with PennDOT as part of the proposed changes to the entire corridor. The approximate cost to install these improvements is \$680,000.



The traffic signal at **Lancaster Avenue** is not visible to drivers traveling northbound along County Line Road due to the horizontal and vertical geometry of the roadway and surrounding parcels. Therefore, to improve the safety of the approach to the intersection, a dynamic “Red Signal Ahead” sign should be installed to warn motorists of the upcoming red signal indication. This could reduce the number of rear-end accidents approaching the intersection. Alternatively, additional warning signs should be installed along southbound County Line Road to warn them of the horizontal curve in the vicinity of the intersection. This could include curve warning signs (W1-2) or several chevron signs (W1-8) along the curve. It was also noted that the pedestrian facilities at the intersection are not ADA-compliant and therefore, updated curb ramps, crosswalks, push buttons and pedestrian countdown signal heads should be installed. The approximate cost of these improvements is \$175,000.

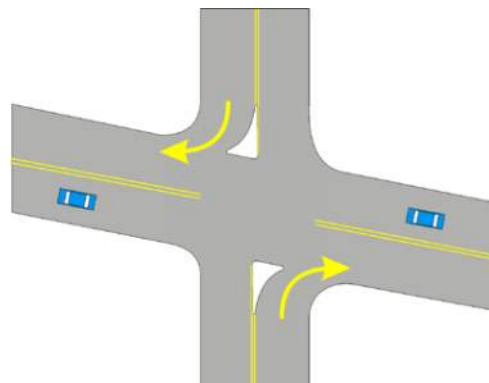
Montrose Avenue is an unsignalized intersection that provides access between Conestoga Road and Lancaster Avenue. Therefore a majority of the traffic is through traffic that must cross the four lanes of traffic. A signal warrant analysis was reviewed and determined that a traffic signal is warranted. Additionally, the existing vegetation should be cleared to allow for proper sight distance for the eastbound approach of Montrose Avenue. The curb ramps should also be upgraded to be ADA-compliant along with the installation of crosswalks crossing both legs of Montrose Avenue to provide safer crossings for pedestrians. In the event that a signal is installed at this location, push buttons and pedestrian signal heads should also be provided. The approximate cost to install these improvements (without the installation of a traffic signal) is \$55,000.

A similar situation occurs at **Roberts Road** where the unsignalized intersection also provides access between Conestoga Road and Lancaster Avenue and most of the minor

street traffic is through traffic crossing over County Line Road. With the number of incidents at the intersection, a signal warrant was conducted and determined that a traffic signal is also warranted at this location. Therefore, the townships should discuss with PennDOT whether the installation of a traffic signal at this location is appropriate. It was noted that the pedestrian accommodations are not ADA-compliant and should, therefore, be upgraded along with the installation of crosswalks crossing both legs of Roberts Road. In the event that a signal is installed at this location, push buttons, pedestrian signal heads and crosswalks for all four crossings should be provided. The approximate cost to install these improvements (without the installation of a traffic signal) is \$55,000.

Although a traffic signal was warranted at both Montrose Avenue and Roberts Road, the signal should be installed at the intersection of **Montrose Avenue** and **County Line Road** because of the additional cartway width and the greater separation from other signalized intersections. Installing the traffic signal at this location along County Line Road could potentially alleviate some of the congestion along southeastbound Conestoga Road by providing a more favorable and efficient crossing of County Line Road. In addition, it would allow for the protected movement of cross traffic as well as a centralized location for a protected pedestrian crossing between Lancaster Avenue and Conestoga Road. The new signal should be coordinated with the adjacent signalized intersection at County Line Road and Conestoga Road. The approximate cost to signalize the intersection of Montrose Avenue is \$360,000.

Upon construction of a signal at Montrose Avenue and implementation of a three-lane roadway cross section, further review should be considered regarding the need to restrict left turns and through traffic along the eastbound and westbound approaches of **Roberts Road**. Once the other improvements have been implemented, cross traffic may reduce because of the signal at Montrose. Additionally, the three-lane cross section only requires vehicles to cross two lanes of oncoming traffic instead of four lanes and left turns from County Line Road to Roberts Road will move to the more protected center turn lane. If the need for a restriction is still apparent after the noted improvements have been constructed, cross traffic movement on Roberts may need to be prohibited by constructing a channelized concrete island or the installation of flexible delineator posts. The approximate cost of installing the concrete island would be \$28,000 and the cost for delineators would be \$7,000. It is important to note that while delineators are the less expensive option, delineators require frequent maintenance.





A review of the crash data at the **County Line Road & Conestoga Road/Thomas Avenue/Glenbrook Avenue** intersection revealed that there were crashes involving northbound left-turning vehicles. Updating the signal head to a traditional 5-section signal head rather than a 4-section signal head may help reduce the occurrence of accidents. The existing 4-section signal displays a green arrow during the protected phase that is extinguished after the phase is complete to allow the southbound (green ball) movement. This may encourage motorists to accelerate to “beat the light”. Installing a 5-section signal would provide drivers with more warning that the opposing approach will be moving through the inclusion of a yellow arrow indication and phasing. In addition, the intersection would benefit from the installation of a northbound County Line Road dedicated left turn lane with signal timings adjustments to provide more green time for both Conestoga Road and County Line Road. A review of the vehicle clearance intervals and crash records indicate that adjustments should be made to increase the all red interval from 2 seconds to 3 seconds for the major approaches. The calculations are provided in **Appendix K**. The approximate cost to install these improvements is \$55,000.

Due to the proximity to the existing park, the pedestrian ramps at **South Warner Avenue** should be upgraded to be ADA-compliant. Additionally, a crosswalk should be installed crossing South Warner Avenue to allow a more prominent location to access the park. The approximate cost of these improvements is \$24,000. Based on the analysis of the crash data, the incidents in the vicinity of the intersection appear to be related to the access driveways for the retail shopping plaza opposite the Old Lancaster Road intersection. There is an existing full access driveway as well as a one-way entrance and one-way exit driveway within the approximately 200' frontage. Eliminating both one-way driveways would serve to reduce the number of conflict points and concentrate vehicular access from one shared full-access driveway to County Line Road. It is understood this improvement requires cooperation with the property owners; concerns related to conflicts with turn movements at the intersection of Old Lancaster Road and County Line Road could be alleviated if the full access driveway for the retail shopping plaza was shifted to the eastern most corner of the parcels. The approximate cost of the driveway improvements is approximately \$167,000.

Old Lancaster Road meets **County Line Road** at a skewed angle with a wide cartway width at the intersection. The skewed angle makes it difficult for exiting drivers to view oncoming vehicles and requires motorists to turn their heads greater than 90 degrees to view approaching vehicles on County Line Road. The excessively wide cartway width on Old Lancaster Road at County Line Road effectively encourages southbound left turning motorists on County Line Road to perform left turns at a relatively high speed compared to more traditional alignments with less cartway widths. Realigning Old Lancaster Road to a 90 degree angle and reducing the cartway width at County Line Road would improve the sight line for motorists on Old Lancaster Road and would also reduce the speed of motorists traveling southbound to make a more traditional 90 degree left-turn onto Old Lancaster Road. The improvements could be done within the existing right-of-way for the intersection and depending on the available funds, there are a number of options to improve the intersection geometry such as a concrete channelized island with mountable curbs, a robust Qwick Kurb installation or flexible delineator posts..



Additionally, as noted in the sight distance analysis, the existing vegetation obstructs the line of sight for drivers at this location. Therefore, it is recommended the Township trim the existing vegetation to ensure adequate sight distance. Due to the proximity of the existing park, pedestrian ramps should be upgraded to comply with ADA requirements while also providing a pedestrian crosswalk on Old Lancaster Road. The approximate cost of installing these improvements is \$97,000 for the mountable curb option, \$73,000 for the Quick Kurb option, and \$68,000 for the delineator post option.

The unsignalized intersection of **Mondella Avenue** provides access between County Line Road and Old Lancaster Road; the Township should consider upgrading the pedestrian ramps to be ADA-compliant and installing a crosswalk for the pedestrian crossing at Mondella Avenue. The approximate cost of installing these improvements is \$24,000.

Lindsay Avenue provides access to Bryn Mawr Hospital and the intersection is presently equipped with compliant pedestrian facilities; however, the existing crosswalks should be upgraded to continental style crosswalks for improved visibility. Furthermore, a six month post-construction re-evaluation of the traffic signal timing should be performed to ensure proper timing of the traffic signal. The approximate cost to update the pavement markings is \$3,000 and the signal timing re-evaluation should be the responsibility of the land development Applicant.

Bryn Mawr Avenue/Railroad Avenue/Glenbrook Avenue intersection would benefit from including a dotted white extension line to more clearly define the left turn lane from the inside northbound through lane along County Line Road and a nearside traffic signal indication centered over the northbound left turn lane on the backside of the mast arm located in the southwest corner of County Line Road/Haverford Road and Bryn Mawr Avenue intersection. This improvement may help reduce rear-end collisions occurring along this approach and provide advance notice of the impending left turn lane for approaching motorists. In addition, upgrading the existing crosswalks with continental style crosswalks would provide a pedestrian safety improvement to the intersection. The approximate cost to install these improvements is \$16,000.

In addition to the above, residents raised concerns that westbound traffic is unable to turn left into the Wawa site on the southwest corner of **Bryn Mawr Avenue and County Line Road/Haverford Road**. The eastbound queues on Bryn Mawr Avenue do not allow for gaps in traffic to allow the lefts into the site, thereby causing traffic to backup into the intersection. The Township may want to facilitate a discussion between PennDOT and the property owners of the Wawa site in order to restrict lefts into the site via westbound Bryn Mawr Avenue and prohibit left turns out of the same driveway minimally during the peak hours.

Based on a review of the crash information, there were several instances of vehicles running the red light at the **County Line Road/Landover Road** intersection. This could be alleviated by providing advanced dilemma zone detection via radar. Additionally, the pedestrian facilities at the intersection do not appear to be include ADA-compliant facilities; the crosswalks, pedestrian push buttons and pedestrian signals should be upgraded to include ADA accessible equipment. It was also noted that this intersection is not equipped with emergency pre-emption. Due to the near proximity of Bryn Mawr



Hospital, the traffic signal should be upgraded to include emergency pre-emption to allow emergency vehicles more efficient and safer access to the hospital. The approximate cost to install these improvements is \$83,000.

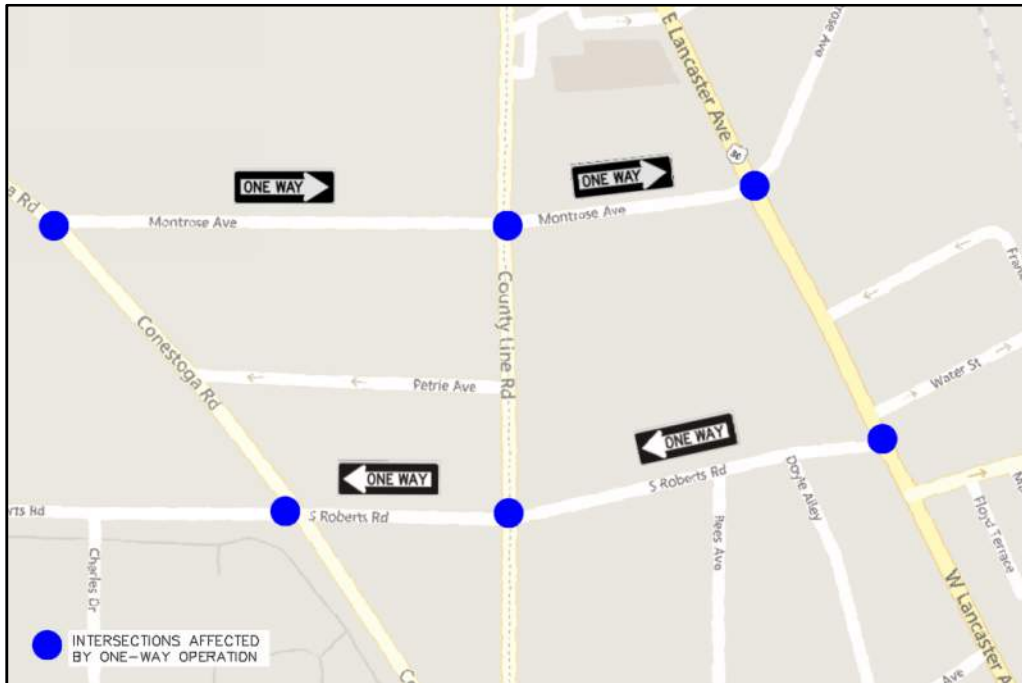
A review of signage along the corridor revealed that there is a lack of R2-1 35 MPH SPEED LIMIT signs along northbound County Line Road. Additional signs should be posted at half mile increments along the corridor between Roberts Road and Landover Road.

OUT OF SCOPE INVESTIGATIONS

In addition to the recommended improvements noted above, thought was taken into considering altering the current traffic flow along **Montrose Avenue and Roberts Road** to provide one-way pairs between Lancaster Avenue and Conestoga Road. Residents raised concerns that the cartway width along Roberts Road is narrow and does not allow for two vehicles to pass at the same time while also permitting parking on one side of the street. And while Montrose Avenue is slightly wider than Roberts Road, the same issue occurs with the presence of on-street parking. Changing the streets from two-way to one-way operation would not only affect County Line Road but also, the four (4) additional intersections along Lancaster Avenue and Conestoga Road. This would require additional investigation including manual traffic counts at the intersections noted above and capacity analyses at all six (6) intersections to fully evaluate the impact of altering the traffic flow.

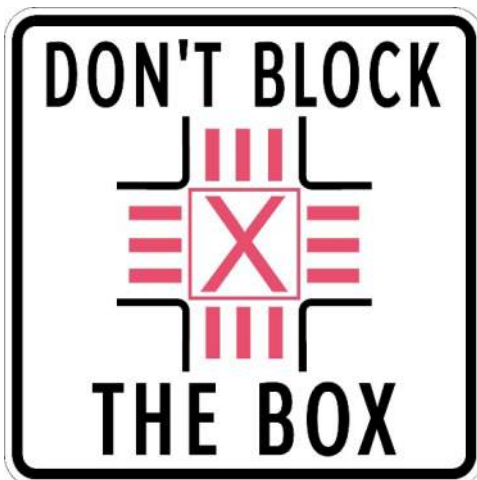
The following characteristics are often paired with one-way operation:

- Increased speeds due to the absence of opposing traffic and the feeling of driving on a wider roadway.
- Double the volume in each direction because all eastbound traffic would be re-distributed to one roadway and westbound traffic to the other.
- The additional cartway width can be dedicated to providing separate turn lanes at the intersections (i.e. a dedicated left turn lane and a through/right turn lane).



Conestoga Road does not include sidewalks along the north side of the road and the only pedestrian crossings are provided at the intersection of Roberts Road and Glenbrook Avenue. Construction of a sidewalk along the north side of Conestoga Road would provide a safe connection from Montrose Avenue to Roberts Road. The approximate cost to install the sidewalk is \$320,000.

Residents noted the intersection of **Roberts Road and Conestoga Road** becomes blocked by vehicles stacked on Conestoga Road from the traffic signal located at the intersection of County Line Road and Conestoga Road/Glenbrook Avenue/Thomas Avenue. Along with enforcement, installing “DON’T BLOCK THE BOX” signage and pavement markings would discourage vehicles from entering the Roberts Road/Conestoga Road intersection when the queue extends from the next adjacent intersection.





VI. CONCLUSIONS

As comprehensive as this study is, the noted improvements could be implemented over time with or without grant funding. Overall, including a roadway diet along the corridor to move from a four lane cartway to two lanes with a center turn lane and shoulders with a reduced travel speed would likely provide the greatest safety improvement with the least amount of cost. PennDOT may be willing to install the recommended pavement markings on County Line Road from Arthur Road to Landover Road and reduce the speed limit along the entire corridor from 35 MPH to 25 MPH based on information included in this study along with more detailed drawings noting the pavement marking colors, tapers, dimensions and required sign locations.

Other improvements were noted for Lancaster Avenue and Conestoga Road that were apparent during the development of this study that should be reevaluated outside the report.

In all, this report provides a reference for implementing safety improvements along the County Line Road corridor to the benefit of all roadway users in both Radnor and Lower Merion Township.



Table 10: Improvement Costs Summary

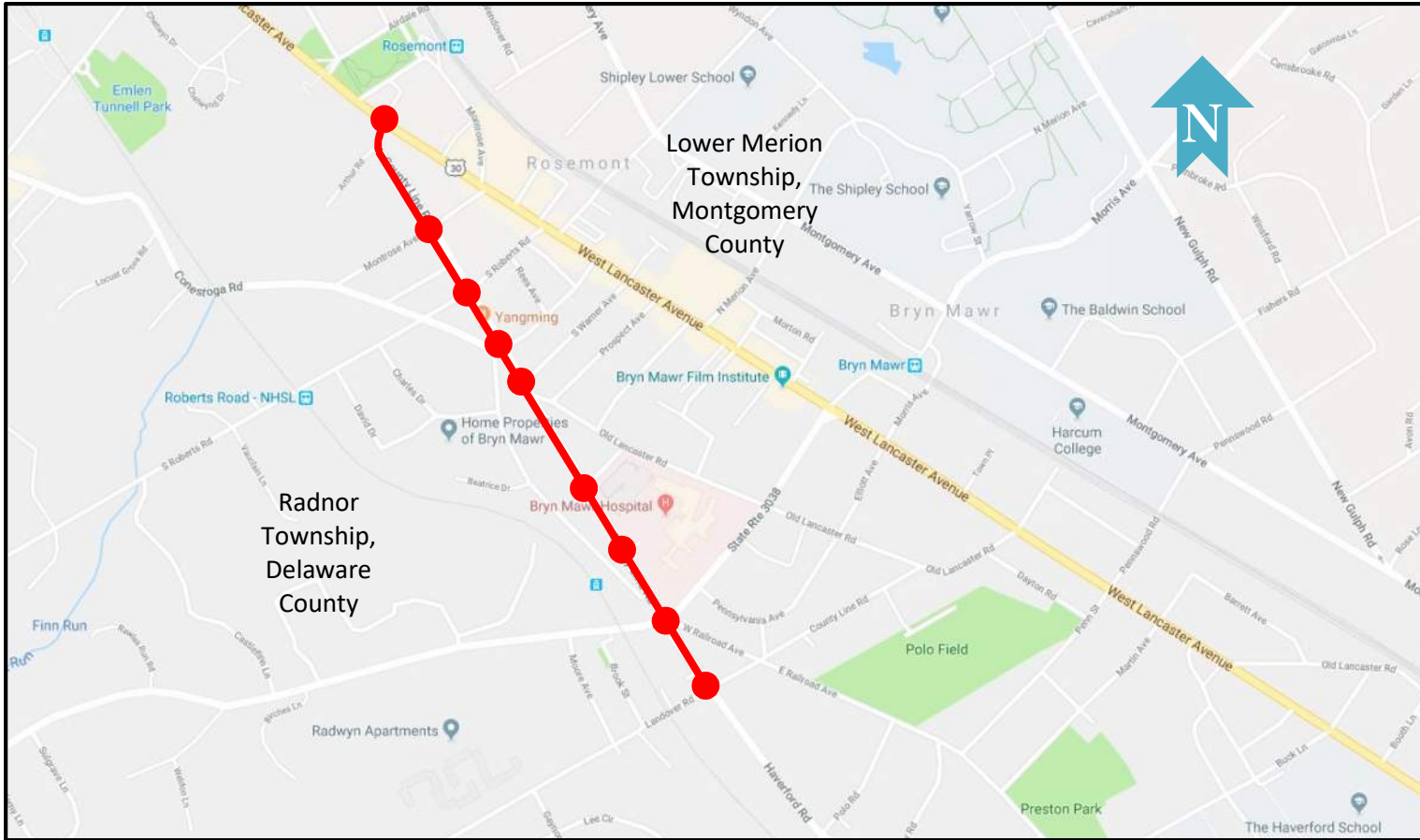
Improvement	Construction Cost	Responsibility	Grant
Center Turn Lane	\$680,000.00	Municipality/ PennDOT	ARLE
Tree Trimming	\$5,000.00	Property Owner/ Municipality	ARLE
Lancaster Avenue Intersection Improvements	\$175,000.00	Municipality	ARLE, GLG, MTF
Roberts Road Intersection Improvements	\$55,000.00	Municipality	MTF
Option 1 – Mountable Curb	\$28,000.00		
Option 2 – Delineator Posts	\$7,000.00		
Montrose Avenue Signalization	\$360,000.00	Municipality	GLG
Thomas Ave/ Glenbrook Ave Dedicated Left Turn Lane	\$55,000.00	Municipality	ARLE, GLG, MTF
S. Warner Ave Pedestrian Improvements	\$24,000.00	Municipality	MTF
S. Warner Ave Shopping Center Driveway Improvements	\$167,000.00	Property Owner/ Municipality	MTF
Old Lancaster Ave Intersection Improvements		Municipality	MTF
Option 1 – Curbed Realignment	\$120,000.00		
Option 2 – Concrete Island	\$97,000.00		
Option 3 – Quick Kurb	\$73,000.00		
Option 4 – Flexible Delineators	\$68,000.00		
Modella Ave Intersection Improvements	\$24,000.00	Municipality	MTF
Lindsay Ave Intersection Improvements	\$3,000.00	Municipality	MTF
Bryn Mawr Ave Intersection Improvements	\$16,000.00	Municipality	MTF, GLG, ARLE
Landover Road Intersection Improvements	\$83,000.00	Municipality	GLG, ARLE, MTF
Montrose & Conestoga RRFB	\$55,000.00	Radnor Township	MTF
Montrose & Lancaster RRFB	\$100,000.00	Lower Merion Township	MTF
County Line & Old Lancaster RRFB	\$75,000.00	Lower Merion Township	MTF
Conestoga Road Sidewalk	\$320,000.00	Radnor Township	MTF
All Corridor Related Improvements	\$2,340,000.00		TA Set Aside

¹PennDOT Green Light Go (GLG) – Typically open late Fall to early Winter

²PennDOT Transportation Alternatives Set-Aside – Last open 7/10/2017-9/22/2017 for 2018 awards

³Multimodal Transportation Fund (MTF) - DCED: Annually, 3-1 thru 7-31; PennDOT: Last open March, 2018

⁴Automated Red Light Enforcement Program (ARLE) – Open annually the month of June



Corridor

Intersections Evaluated



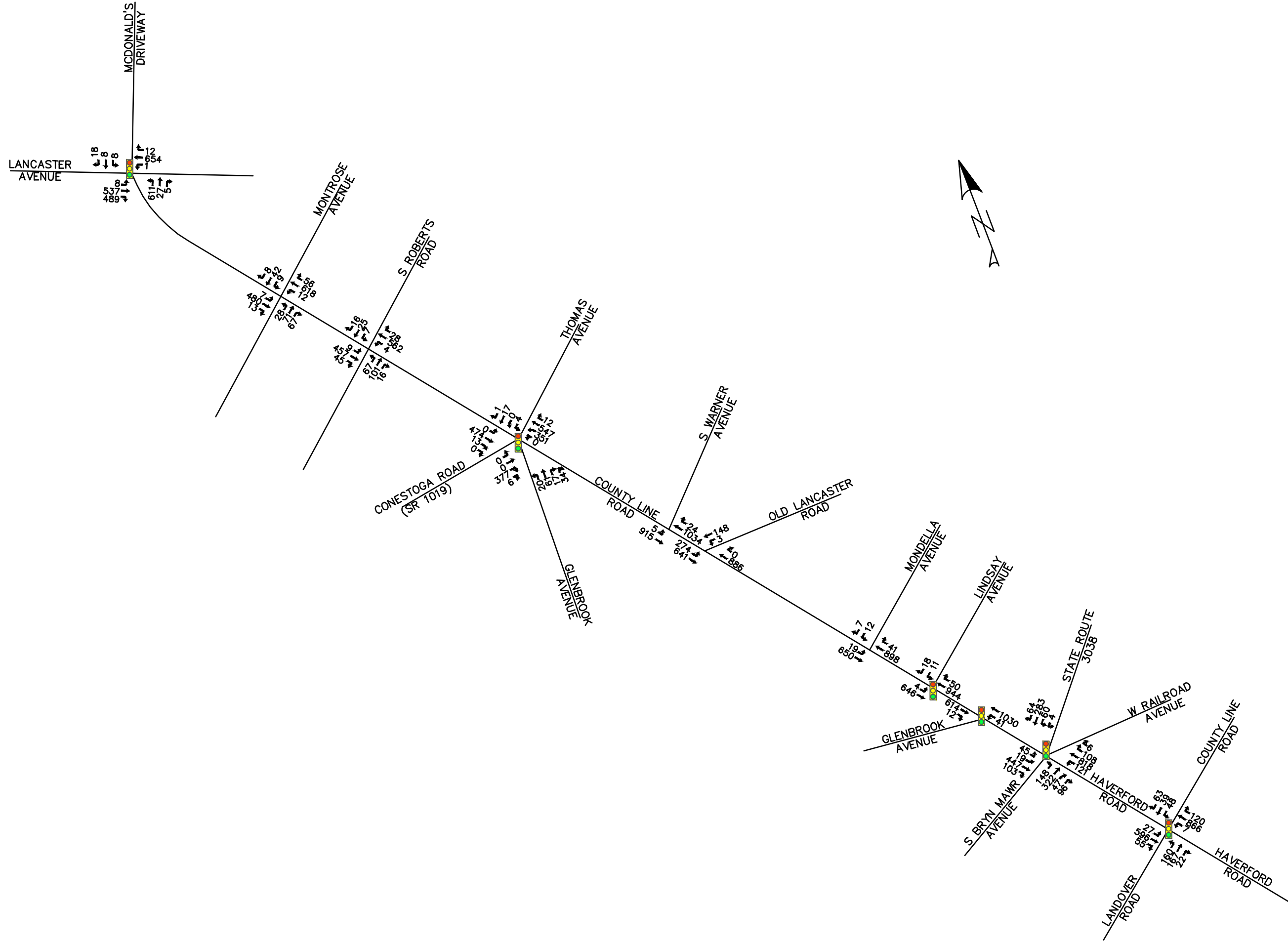
Figure 1

Project Location Map

County Line Road Corridor Transportation Evaluation

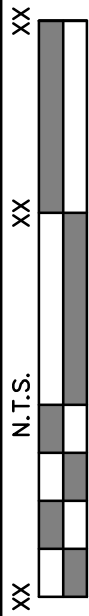
Radnor Township & Lower Merion Township
 Delaware County & Montgomery County, Pennsylvania

March 2018



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CORRIDOR ANALYSIS

FIGURE 2A
EXISTING AM VOLUMES
COUNTY LINE ROAD (S.R. 1001)

RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

JOB NO.:

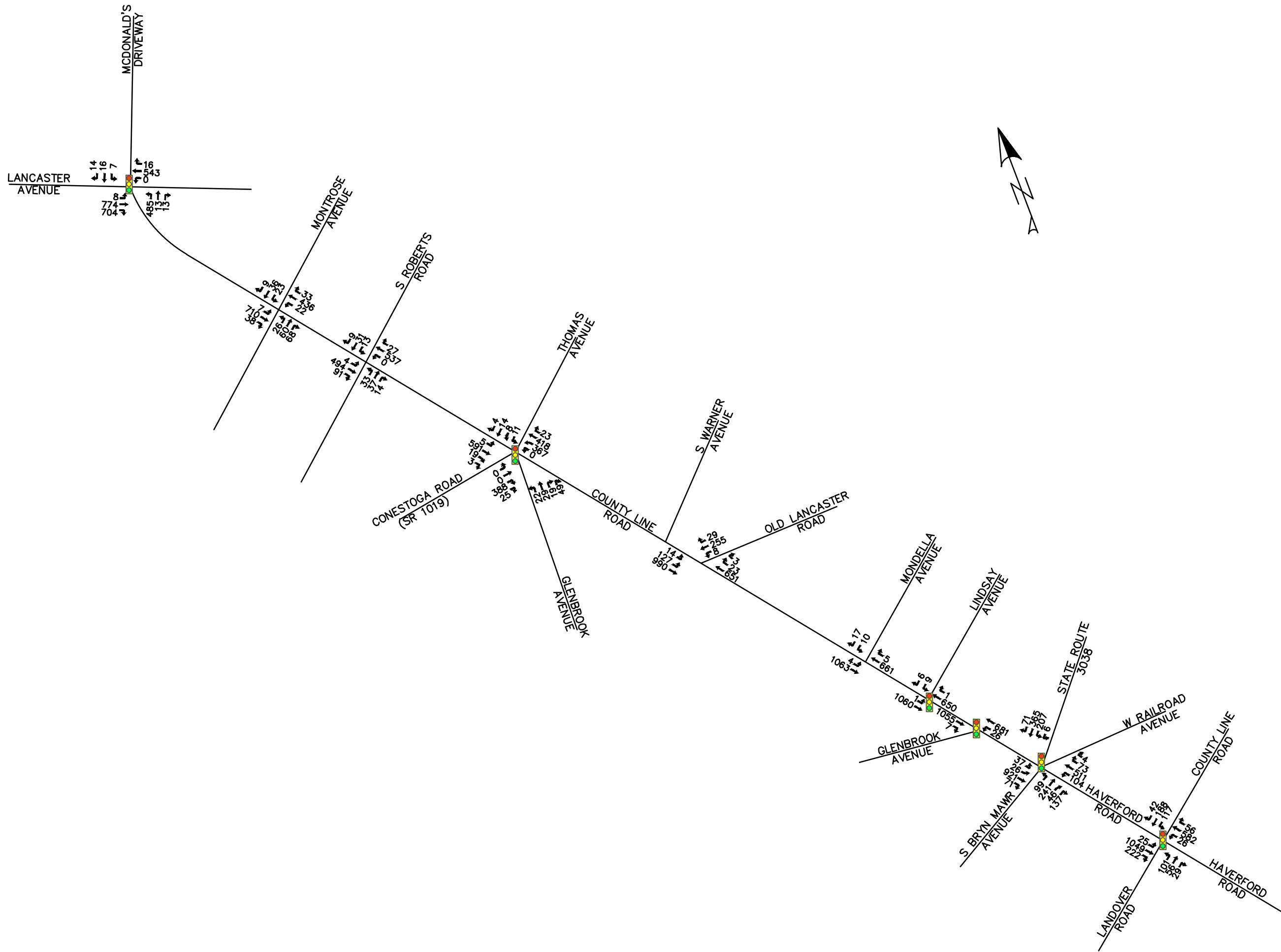
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MARCH, 2019

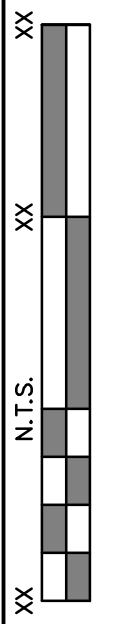
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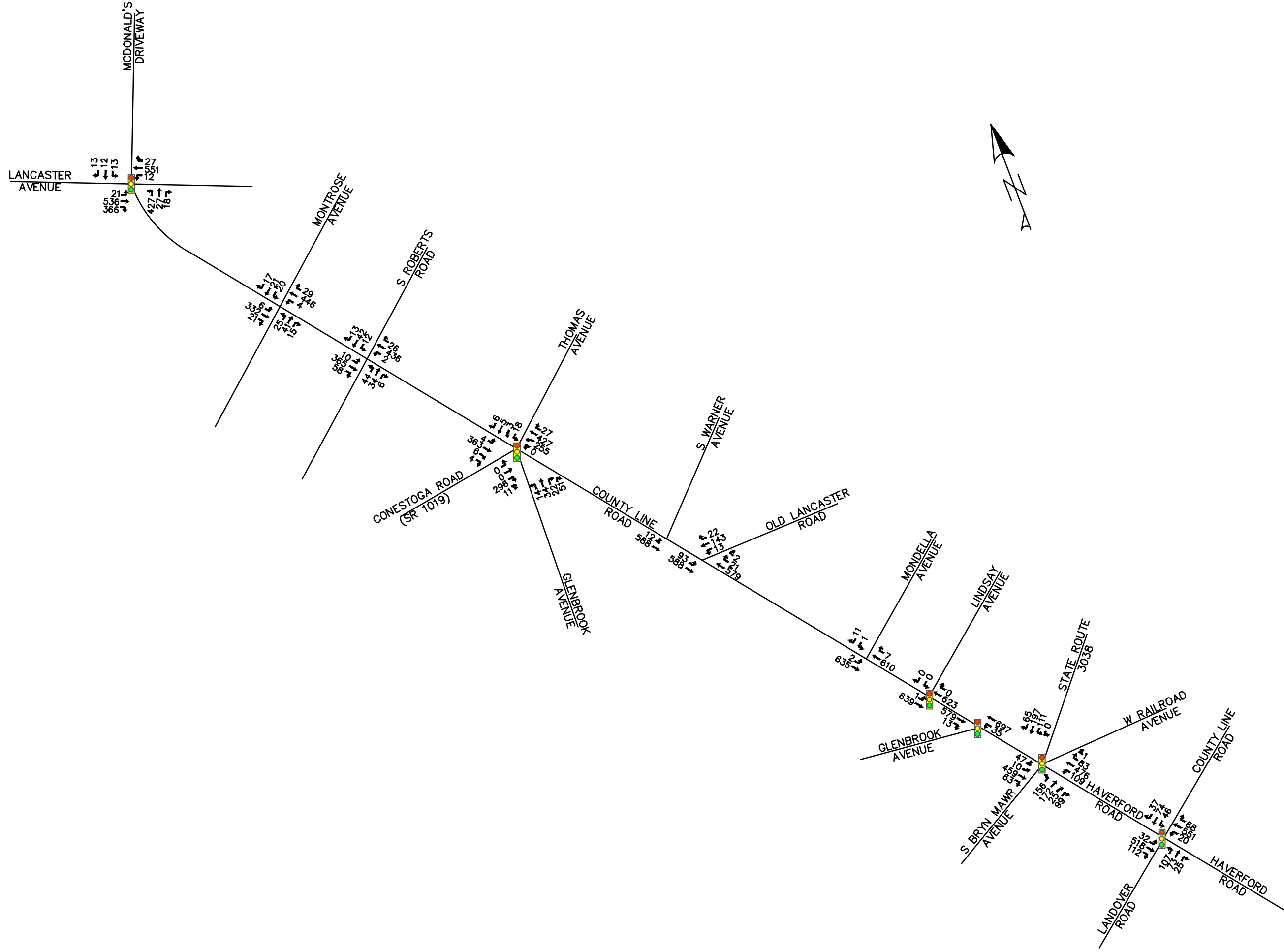
FIGURE 2B
EXISTING PM VOLUMES
COUNTY LINE ROAD (S.R. 1001)

RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

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 2016-11060-02

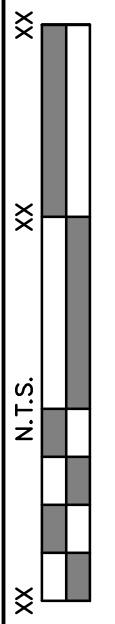
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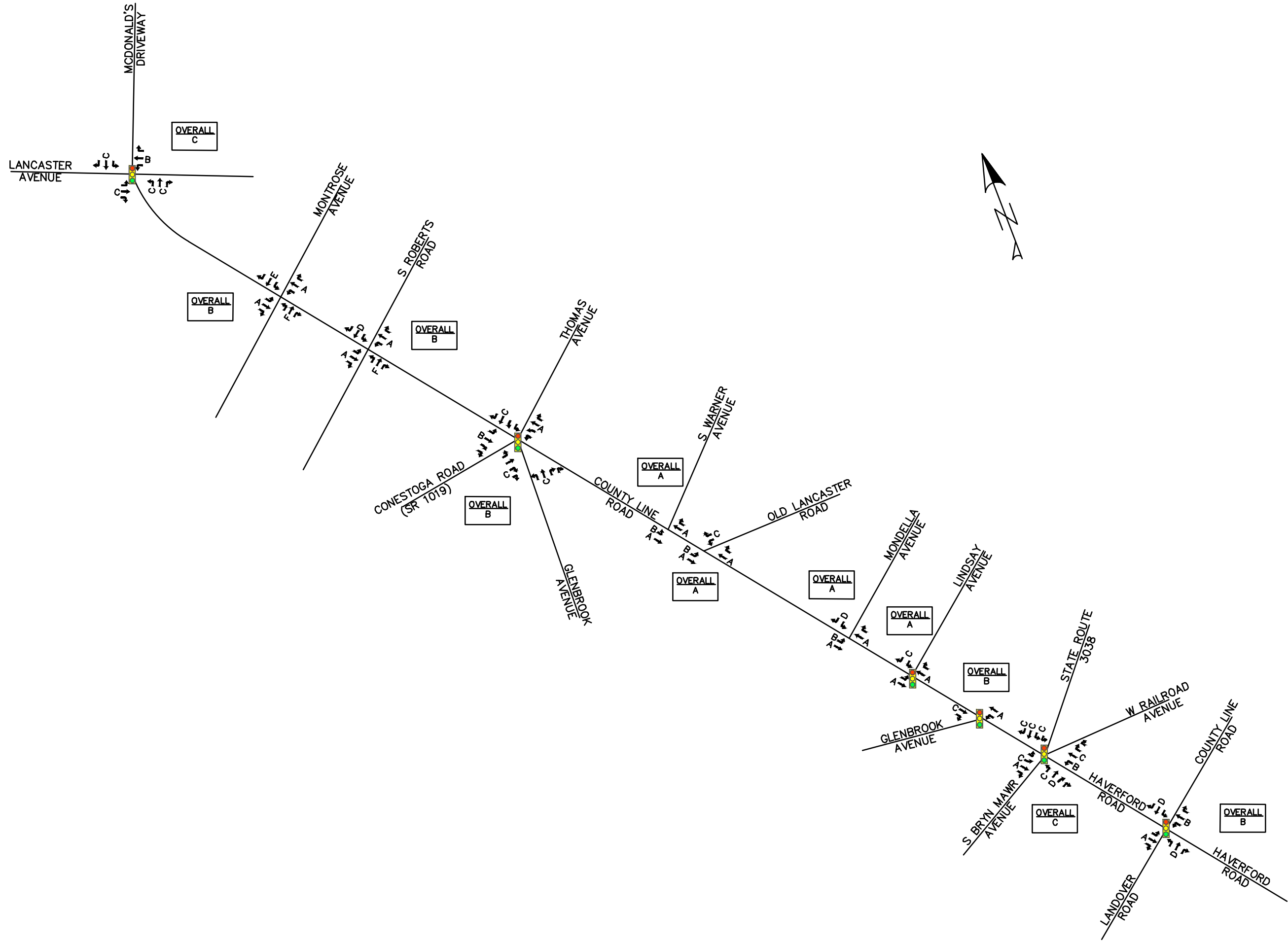


CORRIDOR ANALYSIS

FIGURE 2C
EXISTING SAT VOLUMES
COUNTY LINE ROAD (S.R. 1001)

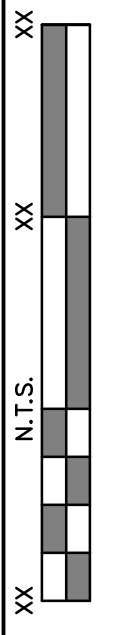
RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

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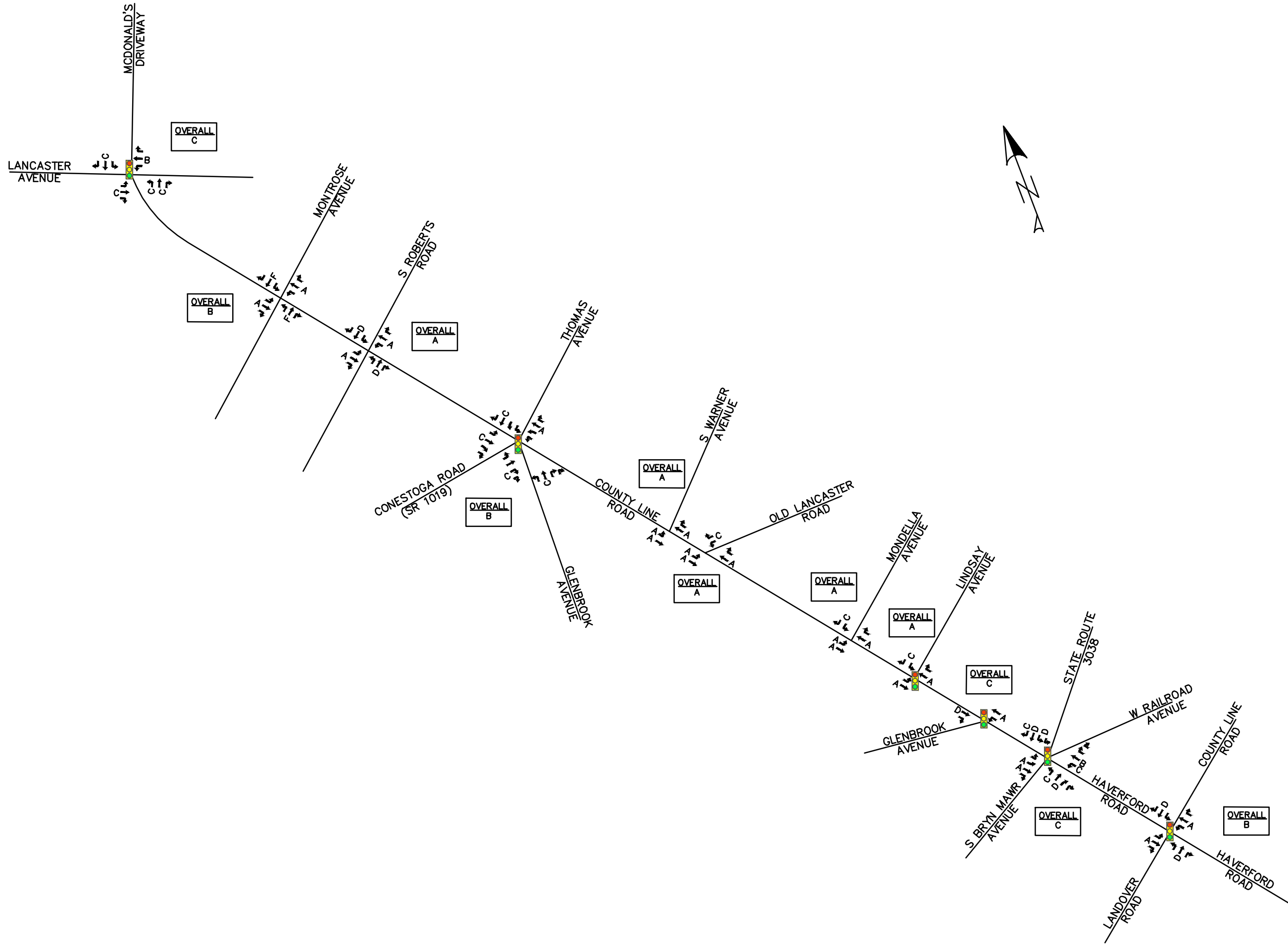
FIGURE 3A
EXISTING AM LEVELS OF SERVICE
COUNTY LINE ROAD (S.R. 1001)

RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

JOB NO.:
 2016-11060-02

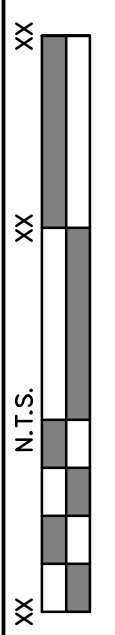
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CORRIDOR ANALYSIS

FIGURE 3B
EXISTING PM LEVELS OF SERVICE
COUNTY LINE ROAD (S.R. 1001)

RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

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SCALE:	NOT TO SCALE



JOB NO.: 2016-11060-02
DATE: MARCH, 2019
SCALE: 1"=100'

CORRIDOR ANALYSIS
FIGURE 4A: EXISTING CONDITIONS
COUNTY LINE ROAD
(S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

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SCALE
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 FEET
 IN



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SCALE:	1"=100'

CORRIDOR ANALYSIS

FIGURE 4B: EXISTING CONDITIONS

COUNTY LINE ROAD

(S.R. 1001)

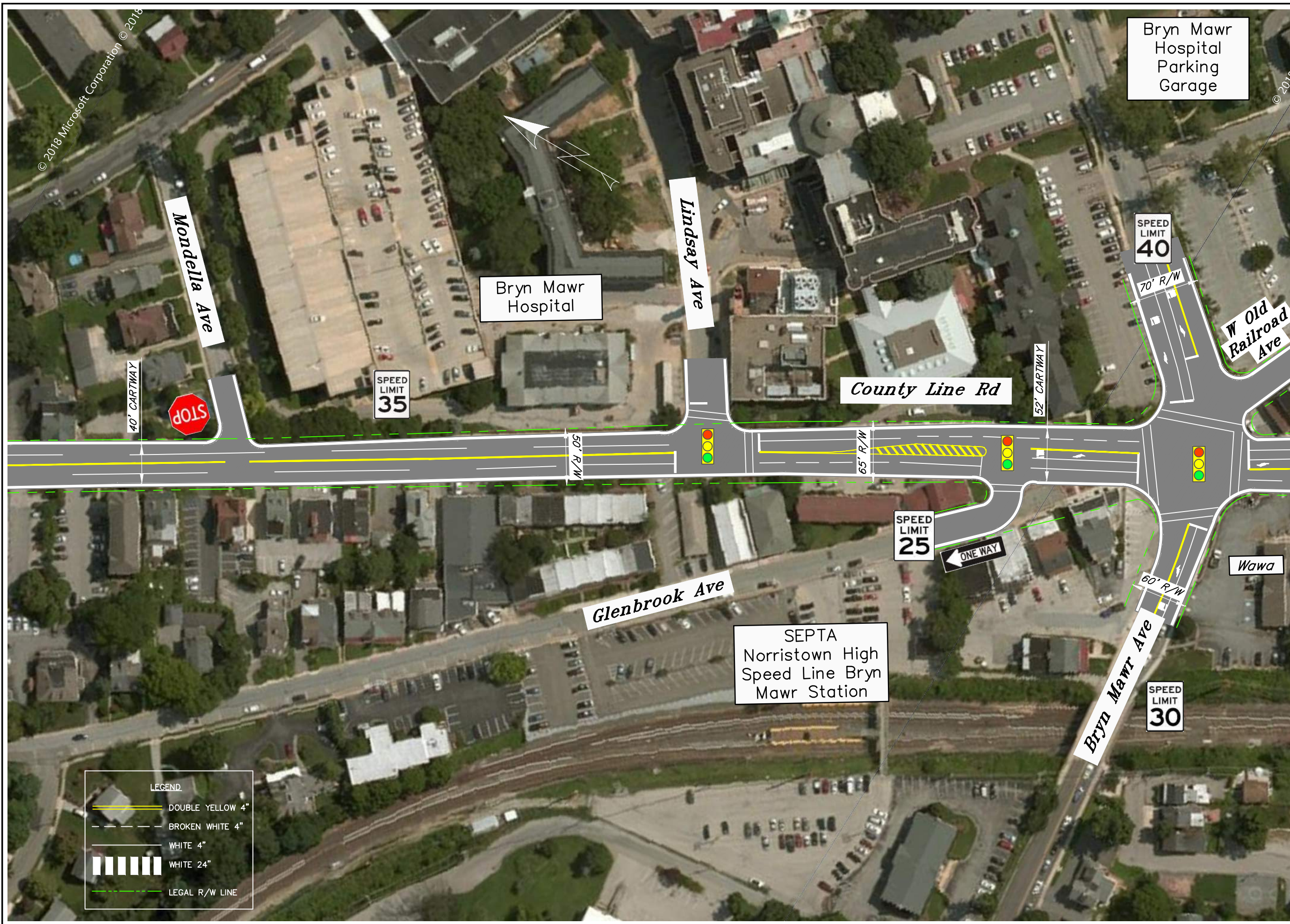
RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

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IN FEET



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SCALE:	1"=100'

CORRIDOR ANALYSIS
FIGURE 4C: EXISTING CONDITIONS
COUNTY LINE ROAD
(S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

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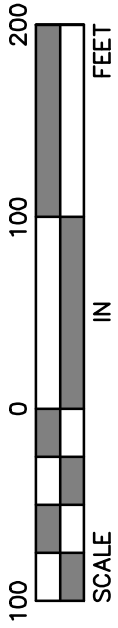
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LEGEND

	DOUBLE YELLOW 4"
	BROKEN WHITE 4"
	WHITE 4"
	WHITE 24"
	LEGAL R/W LINE

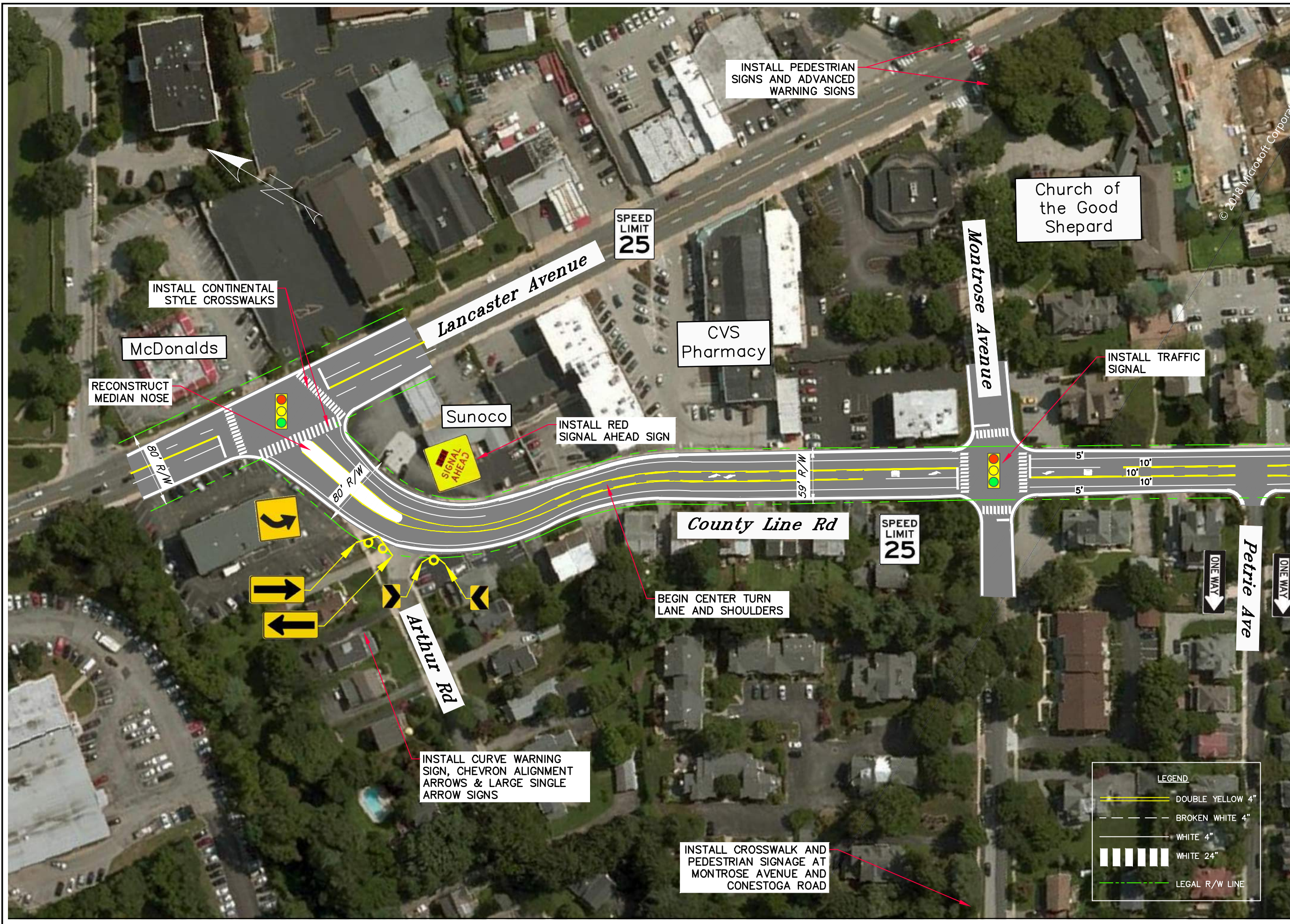
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FIGURE 4D: EXISTING CONDITIONS
COUNTY LINE ROAD
(S.R. 1001)
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 MARCH, 2019
SCALE:
 1"=100'



JOB NO.:	2016-11060-02
DATE:	MARCH, 2019
SCALE:	1"=100'

CORRIDOR ANALYSIS
FIGURE 5A: RECOMMENDED IMPROVEMENTS
COUNTY LINE
ROAD (S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

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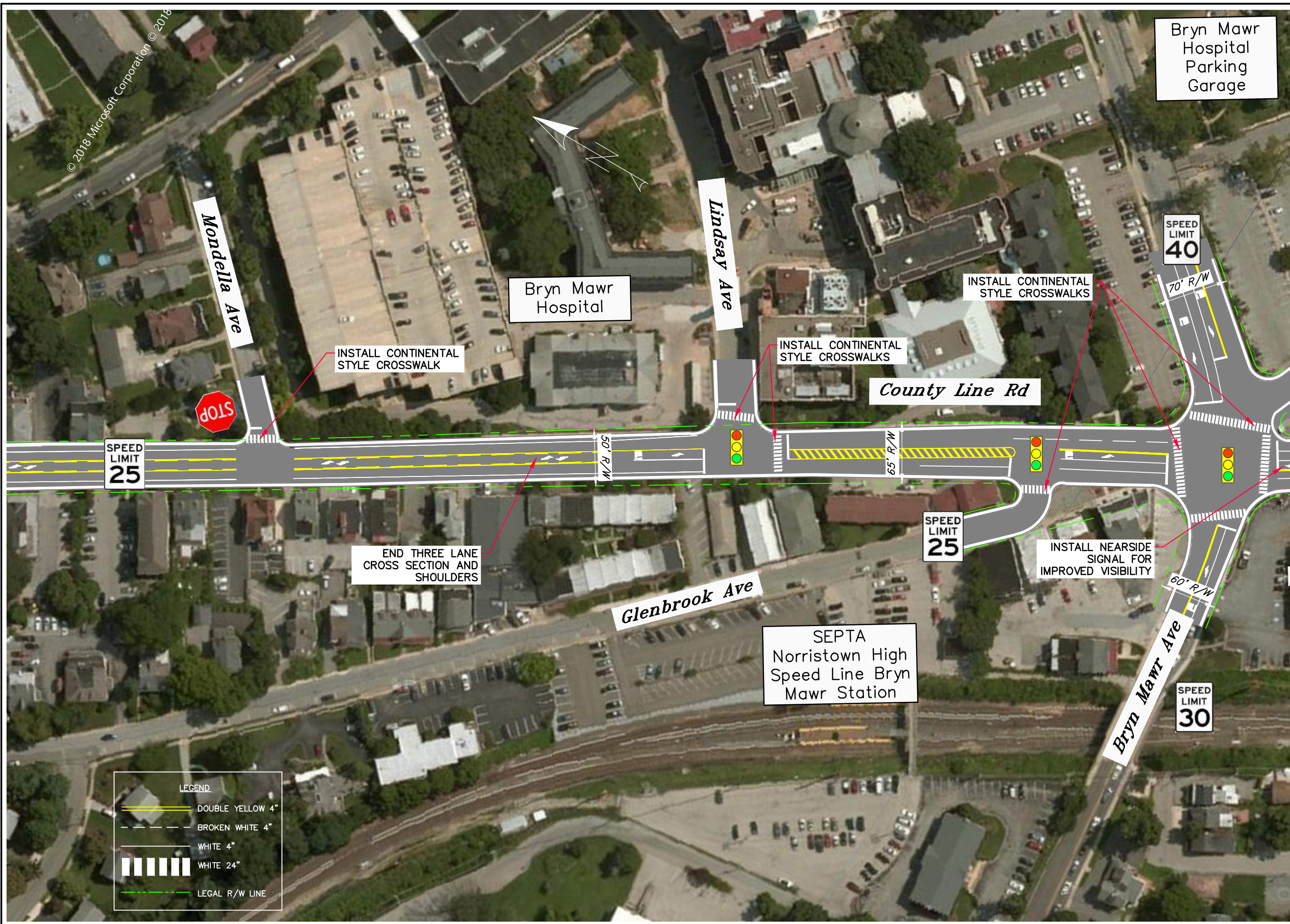
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CORRIDOR ANALYSIS
FIGURE 5B: RECOMMENDED IMPROVEMENTS
COUNTY LINE
ROAD (S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

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SCALE:	1"=100'

CORRIDOR ANALYSIS

FIGURE 5C: RECOMMENDED IMPROVEMENTS

COUNTY LINE ROAD (S.R. 1001)

RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

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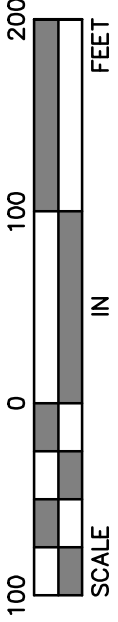
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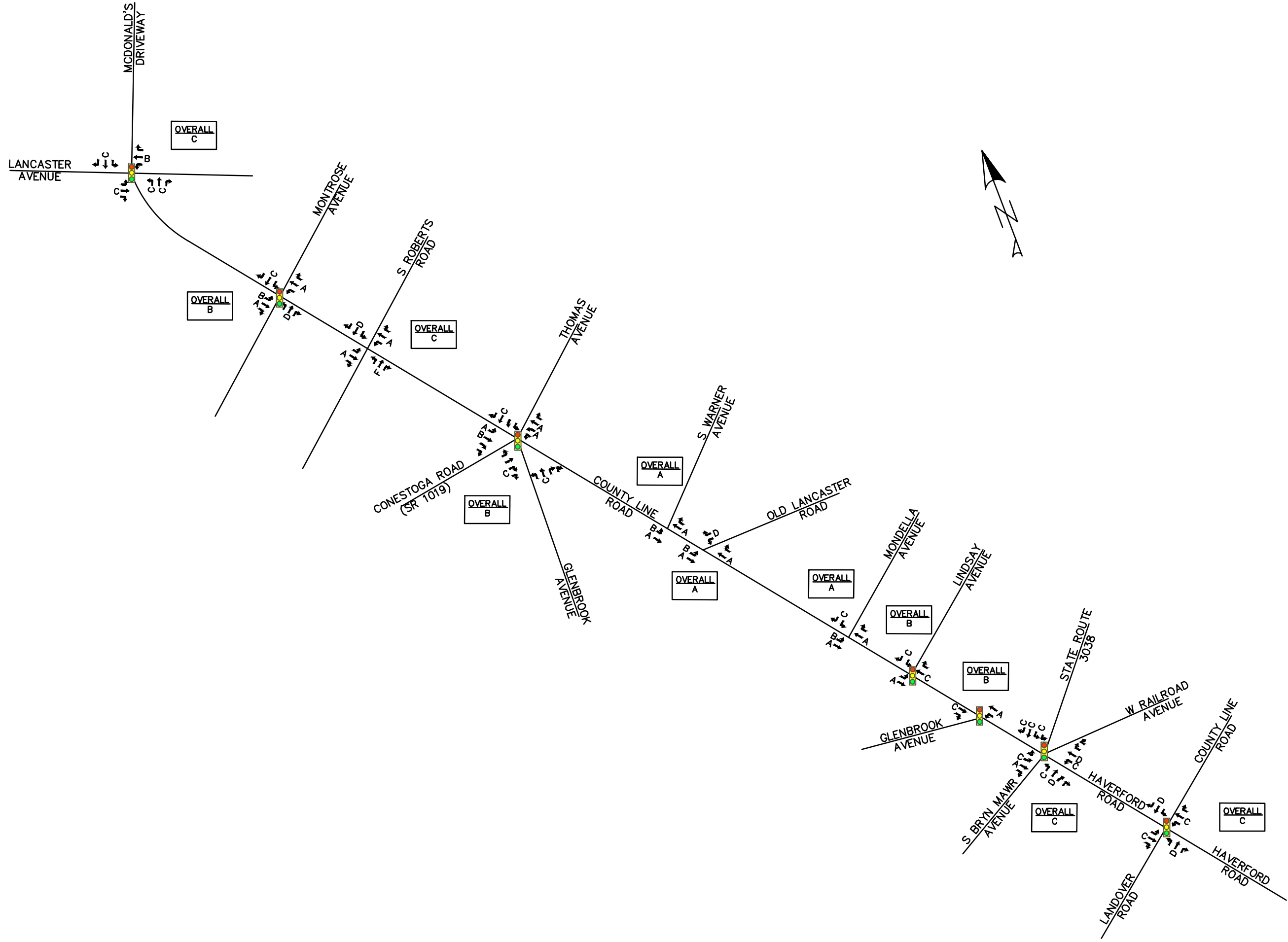
CORRIDOR ANALYSIS

FIGURE 5D: RECOMMENDED IMPROVEMENTS
COUNTY LINE ROAD (S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

JOB NO.:
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SCALE:
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CORRIDOR ANALYSIS

FIGURE 6A - AM LEVELS OF SERVICE W/ IMPROVEMENTS COUNTY LINE ROAD (S.R. 1001)

RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

JOB NO.:

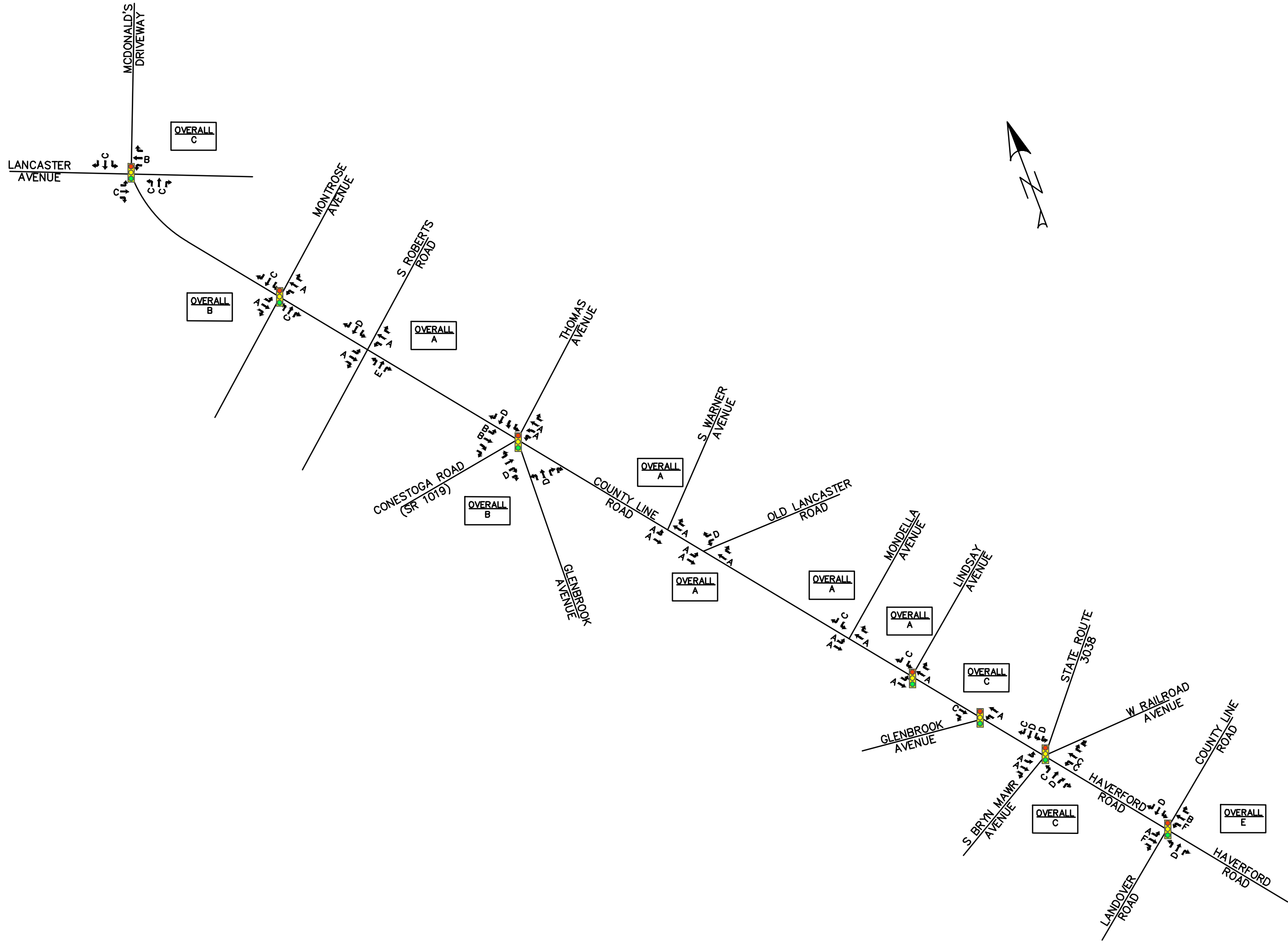
2016-11060-02

DATE:

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CORRIDOR ANALYSIS

FIGURE 6B - PM LEVELS OF SERVICE W/ IMPROVEMENTS
COUNTY LINE ROAD (S.R. 1001)

RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

JOB NO.:

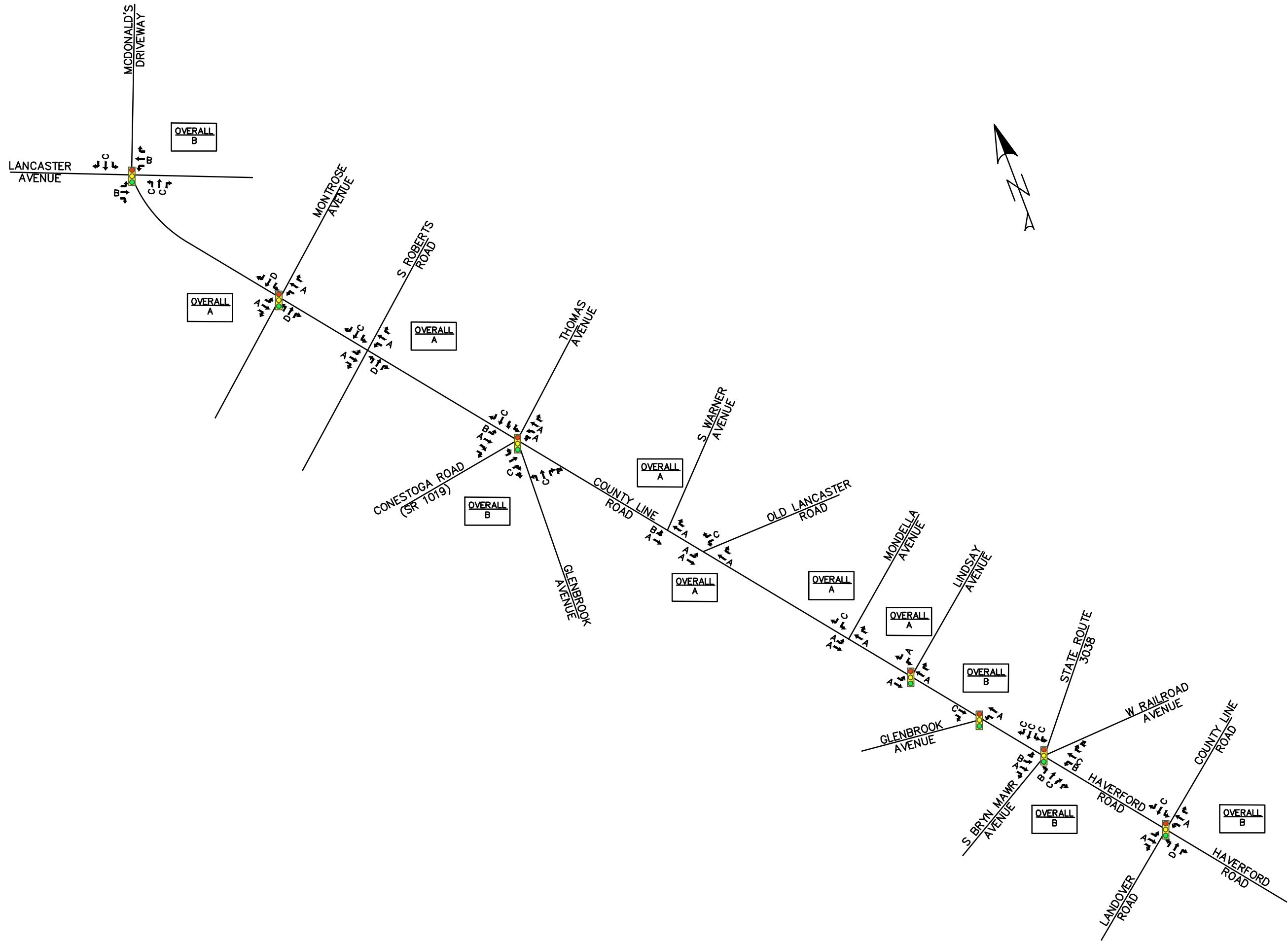
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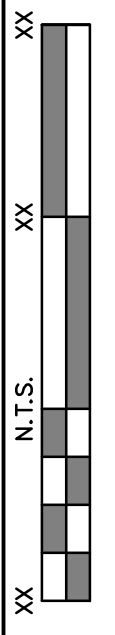
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CORRIDOR ANALYSIS

FIGURE 6C - SAT LEVELS OF SERVICE W/ IMPROVEMENTS COUNTY LINE ROAD (S.R. 1001)

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JOB NO.:
 2016-11060-02

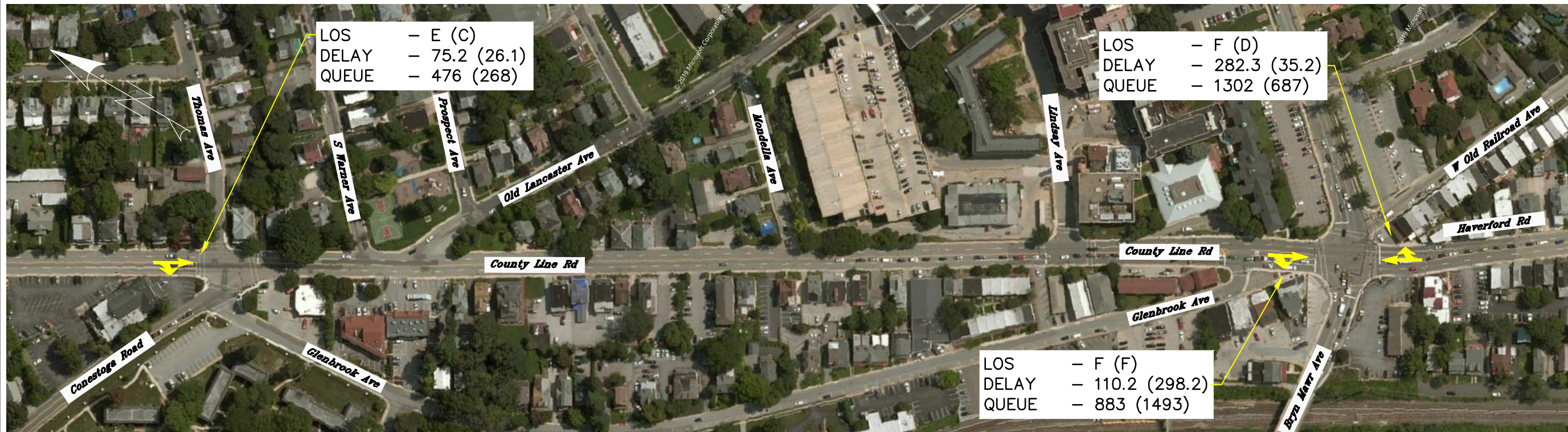
DATE:
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SCALE:
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EXISTING CONDITIONS



CENTER TURN LANE THROUGH CORRIDOR



LEGEND	
LOS	- AM (PM)
DELAY	- AM (PM)
QUEUE	- AM (PM)

JOB NO.: 2016-11060-02
 DATE: MARCH, 2019
 SCALE: NOT TO SCALE

CORRIDOR ANALYSIS
FIGURE 7: LEVEL OF SERVICE, DELAY & QUEUE COMPARISON
COUNTY LINE ROAD
 (S.R. 1001)
 RADNOR TOWNSHIP AND LOWER MERION TOWNSHIP

GILMORE & ASSOCIATES, INC.
 ENGINEERING & CONSULTING SERVICES
 65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

DRAWN BY: LAS

APPENDIX

APPENDIX A

Stakeholder's Meeting Minutes





MEETING NOTES

Date of Meeting: August 23, 2018

Time of Meeting: 6:00 PM

Location: Church of the Good Shepard
1116 Lancaster Ave.
Bryn Mawr, PA

Project: County Line Road Corridor Study
County Line Road (S.R. 1001)
Radnor & Lower Merion Townships;
Delaware & Montgomery Counties
G&A Job #16-11060.02

Notes Prepared By: Amy Kaminski

Date Finalized: September 11, 2018

Attendees:

Commissioner John Nagle/W-5	RT Commissioner W-5	610-527-5913	jnagle@radnor.org
Superintendent Chris Flanagan	RTPD	610-688-5606 X108	cflanagan@radnor.org
Leslie Salsbury, E.I.T.	Gilmore & Assoc. Inc.	215-345-4330	lsalsbury@gilmore-assoc.com
Amy Kaminski, P.E., PTOE	Gilmore & Assoc. Inc.	267-337-6979	akaminski@gilmore-assoc.com
31 residents from Radnor and Lower Merion Township			

A meeting was held to review the corridor project and obtain stakeholder input on noted problems and safety concerns along the corridor. The following summarizes the discussion:

1. Superintendent Flanagan opened the meeting with a brief discussion regarding the history of the project. He explained both Lower Merion Township and Radnor Township had safety concerns and discussed installing traffic signals at various intersections along County Line Road. Further discussions continued that led both Townships to consider a comprehensive corridor analysis to develop mitigation measures. S. Flanagan introduced Commissioner Nagel and apologized to attendees from Lower Merion Township because LMTPD had an emergency call that required all staff to address the call.
2. Amy Kaminski discussed the data collection process including traffic counts, speed data, traffic volume data and historical crash records along with field investigations which included: sidewalks, pavement markings, traffic control measures, pedestrian accommodations and sight distance evaluations.

3. The following comments were provided during the question and answer period of the meeting:
 - Consider installing a signal at Montrose & Lancaster
 - Sight lines are poor at Conestoga and Montrose; parked vehicles reduce visibility
 - Pedestrian crossing at Montrose and Lancaster is very difficult
 - PD should consider a patrol in the area to deter speeding particularly on Montrose
 - Motorists do not stop for school busses
 - There is a bottleneck at Montrose & County Line Road; consider peak hour parking prohibition
 - Provide a pedestrian crosswalk placard at Montrose and County Line Road
 - Consider traffic calming on County Line Road near this section and near railroad tracks
 - Montrose high pedestrian traffic to and from Conestoga
 - High pedestrian traffic to and from the train/trolley: Norristown High Speed Line (NHSL) at both S. Roberts Road and S. Bryn Mawr Ave/Glenbrook Ave:
 - Residents noted the disparity of 2 hr. parking (LMT) and 4 hr. parking (RT) on Montrose.
 - Residents have concerns with nearby apartments parking on Montrose
 - Residents questioned why Lancaster is posted at 25 MPH where Conestoga is posted at 35 MPH
 - Visibility on Montrose is poor due to grade differential (negative from Lancaster to County Line Road to Conestoga on average -4%)
 - Petrie Ave (1 way southwest bound) is narrower but appears to have higher speeds
 - No sidewalks along north side of Conestoga
 - Motorists do not stop for pedestrians at Montrose/Lancaster crosswalk (only one sign at the crosswalk on the eastbound, south side of crossing.) No advanced warning signs on both approaches of Lancaster Avenue.
 - Delay along both Conestoga Road and County Line Road encourages motorists to cut through on Montrose and Roberts Road.
4. Residents were provided a corridor plan set and were asked to provide their safety concerns on the plan with post it notes. Any repeats were to be check marked if others shared similar concerns.
5. Residents asked if there would be an email list prepared to keep stakeholders informed of the project progress.



MEETING NOTES

Date of Meeting: January 29, 2019

Time of Meeting: 7:00 PM

Location: Ludington Library
5 S. Bryn Mawr Avenue
Bryn Mawr, PA

Project: County Line Road Corridor Study
County Line Road (S.R. 1001)
Radnor & Lower Merion Townships;
Delaware & Montgomery Counties
G&A Job #16-11060.02

Notes Prepared By: Leslie Salsbury

Date Finalized: February 1, 2019

Attendees:

Commissioner John Nagle/W-5	RT Commissioner W-5	610-527-5913	jnagle@radnor.org
Superintendent Chris Flanagan	RTPD	610-688-5606	cflanagan@radnor.org
Steve Norcini, P.E.	RT Engineer	610-688-5600	snorcini@radnor.org
Brian Keaveney	Pennoni	610-422-2368	bkeaveney@pennoni.com
Ernie McNeely	LMT Manager	610-645-6103	emcneely@lowermerion.org
Commissioner Scott Zelov	LMT Commissioner W-10	610-256-4120	vscozzelov@lowermerion.org
Superintendent Michael McGrath	LMT PD	610-645-6270	mmcgrath@lowermerion.org
Leslie Salsbury, P.E.	Gilmore & Assoc. Inc.	215-345-4330	lsalsbury@gilmore-assoc.com
Amy Kaminski, P.E., PTOE	Gilmore & Assoc. Inc.	267-337-6979	akaminski@gilmore-assoc.com

Residents of Radnor and Lower Merion Township attended this meeting

A meeting was held to present the draft report for the corridor project and obtain input on noted problems and safety concerns along the corridor. The following summarizes the discussion:

1. Commissioner Scott Zelov and Commissioner John Nagle opened the meeting with a brief discussion regarding the history of the project. They explained that a draft report was created and that additional input from this meeting would be addressed in the final report. They then introduced Amy Kaminski and Leslie Salsbury to begin the presentation.
2. Amy Kaminski discussed the data collection process including traffic counts, speed data, traffic volume data and historical crash records along with field investigations which included: sidewalks, pavement markings, traffic control measures, pedestrian accommodations and sight distance evaluations.

3. The following comments were provided during the question and answer period of the meeting:

- Parking on Roberts & Montrose does not allow for two cars to pass at one time
- Many pedestrians cross at Old Lancaster Road from the park to the shopping center across the street, potential location for an RRFB
- When cars turn left onto Roberts they pull onto driveway/sidewalk to allow westbound cars to pass
- Consider investigating channelized islands at Montrose or Roberts after the signal gets installed
- An advantage of installing a signal at Montrose is that it provides a central crossing location between Lancaster and Conestoga
- Concerns with RRFB's being ignored and the flash seen as more of a recommendation
- Roundabout at Thomas/Glenbrook/Conestoga intersection
- There is more room for cars to pass on Montrose than Roberts
- Utilize the green space at Warner Avenue Park to widen County Line Road and allow for bikes lanes
- Difficult for pedestrians to walk along Roberts Road west of County Line Road, shrubs, poles and sometimes snow forces them into the cartway
- County Line Road seems to be the only section in the area that is not posted at 25 mph
- High speeds on Conestoga between overpass and Glenbrook
- Does a center left turn lane cause people to slow down or speed up?
- Will emergency vehicles have more difficulty getting to the hospital with a three lane cross section?
- Residents noted that there are multiple locations where brush covers/blocks sidewalks and/or signs. Township representatives noted that they should be informed right away and this would be taken care of
- Difficult to make the left turn from westbound Lancaster onto County Line
- Queues at Sunoco back-up towards CVS
- Which improvements are eligible for grants?

APPENDIX B

Sight Distance Evaluation



Minimum Stopping Sight Distance

Job No. 16-11060
 County: Delaware County
 Municipality: Radnor Township
 Location: County Line Road & Montrose Avenue



PA Code Title 67; § 441
 SSD = $1.47VT + (V^2)/30(f \pm g)$

SSD = Stopping Sight Distance
 V = 85th Percentile Speed (miles per hour)
 T = Perception Time of Driver (2.5 seconds)
 f = Coefficient of Friction for Wet Pavements
 g = Percent of Grade of Roadway Divided by 100

Eastbound Exiting Motorist

LEFT- SSD	
Minimum	Existing in Field
Calc.	
SSD = 280	190
V = 38	
T = 2.5	
f = 0.32	
g = 2.3	

RIGHT-SSD	
Minimum	Existing in Field
Calc.	
SSD = 374	400+
V = 43	
T = 2.5	
f = 0.31	
g = -2.5	

PennDOT Form M-950 "A"

Westbound Exiting Motorist

LEFT- SSD	
Minimum	Existing in Field
Calc.	
SSD = 374	400+
V = 43	
T = 2.5	
f = 0.31	
g = -2.5	

RIGHT-SSD	
Minimum	Existing in Field
Calc.	
SSD = 280	300+
V = 38	
T = 2.5	
f = 0.32	
g = 2.3	

Minimum Stopping Sight Distance (feet)

85th Percentile Speed	Coefficient of Friction	Grade =				
		-10%	-5%	0%	5%	10%
25	0.38	166	155	147	140	135
30	0.35	230	210	196	185	177
35	0.34	299	269	249	233	221
40	0.32	389	345	314	291	274
45	0.31	487	425	383	353	330
50	0.3	600	517	462	422	392
55	0.3	706	605	538	490	454
60	0.29	852	721	634	573	528

Conclusion:

Eastbound left sight distance is deficient due to shrubs and vegetation along the adjacent property frontage. Consider trimming the vegetation to improve sight distance.

Date: 7/9/2018 Compiled by: LAS Checked by: ABK

Minimum Stopping Sight Distance

Job No. 16-11060
 County: Delaware County
 Municipality: Radnor Township
 Location: County Line Road & Roberts Road



PA Code Title 67; § 441
 SSD = $1.47VT + (V^2)/30(f \pm g)$

SSD = Stopping Sight Distance
 V = 85th Percentile Speed (miles per hour)
 T = Perception Time of Driver (2.5 seconds)
 f = Coefficient of Friction for Wet Pavements
 g = Percent of Grade of Roadway Divided by 100

Eastbound Exiting Motorist

LEFT- SSD			RIGHT-SSD		
	Minimum	Existing in Field		Minimum	Existing in Field
	Calc.			Calc.	Field
SSD =	283	300+	SSD =	378	400+
V =	38		V =	43	
T =	2.5		T =	2.5	
f =	0.32		f =	0.31	
g =	1.5		g =	-3.0	

PennDOT Form M-950 "A"

Westbound Exiting Motorist

LEFT- SSD			RIGHT-SSD		
	Minimum	Existing in Field		Minimum	Existing in Field
	Calc.			Calc.	Field
SSD =	378	400+	SSD =	283	300+
V =	43		V =	38	
T =	2.5		T =	2.5	
f =	0.31		f =	0.32	
g =	-3		g =	1.5	

Minimum Stopping Sight Distance (feet)

85th Percentile Speed	Coefficient of Friction	Grade =				
		-10%	-5%	0%	5%	10%
25	0.38	166	155	147	140	135
30	0.35	230	210	196	185	177
35	0.34	299	269	249	233	221
40	0.32	389	345	314	291	274
45	0.31	487	425	383	353	330
50	0.3	600	517	462	422	392
55	0.3	706	605	538	490	454
60	0.29	852	721	634	573	528

Conclusion:

No sight distance deficiencies noted.

Date: 7/9/2018 Compiled by: LAS Checked by: ABK

Minimum Stopping Sight Distance

Job No. 16-11060
 County: Delaware County
 Municipality: Radnor Township
 Location: County Line Road & Old Lancaster Road



PA Code Title 67; § 441
 SSD = $1.47VT + (V^2)/30(f \pm g)$

SSD = Stopping Sight Distance
 V = 85th Percentile Speed (miles per hour)
 T = Perception Time of Driver (2.5 seconds)
 f = Coefficient of Friction for Wet Pavements
 g = Percent of Grade of Roadway Divided by 100

Westbound Exiting Motorist

LEFT-SSD			RIGHT-SSD		
	Minimum Calc.	Existing in Field		Minimum Calc.	Existing in Field
SSD =	328	250	SSD =	288	300+
V =	40		V =	38	
T =	2.5		T =	2.5	
f =	0.32		f =	0.31	
g =	-2.5		g =	1.5	

PennDOT Form M-950 "A"

Minimum Stopping Sight Distance (feet)

85th Percentile Speed	Coefficient of Friction	Grade =				
		-10%	-5%	0%	5%	10%
25	0.38	166	155	147	140	135
30	0.35	230	210	196	185	177
35	0.34	299	269	249	233	221
40	0.32	389	345	314	291	274
45	0.31	487	425	383	353	330
50	0.3	600	517	462	422	392
55	0.3	706	605	538	490	454
60	0.29	852	721	634	573	528

Conclusion:

Westbound left sight distance is deficient due to existing vegetation along County Line Road. Consider trimming the vegetation to improve sight distance.

Date: 7/9/2018 Compiled by: LAS Checked by: ABK

Minimum Stopping Sight Distance

Job No. 16-11060
 County: Delaware County
 Municipality: Radnor Township
 Location: County Line Road & Modella Avenue



PA Code Title 67; § 441
 $SSD = 1.47VT + (V^2)/30(f \pm g)$

SSD = Stopping Sight Distance
 V = 85th Percentile Speed (miles per hour)
 T = Perception Time of Driver (2.5 seconds)
 f = Coefficient of Friction for Wet Pavements
 g = Percent of Grade of Roadway Divided by 100

Westbound Exiting Motorist

LEFT-SSD			RIGHT-SSD		
	Minimum Calc.	Existing in Field		Minimum Calc.	Existing in Field
SSD =	306	350+	SSD =	302	400+
V =	40		V =	38	
T =	2.5		T =	2.5	
f =	0.32		f =	0.31	
g =	1.6		g =	-1.3	

PennDOT Form M-950 "A"

Minimum Stopping Sight Distance (feet)

85th Percentile Speed	Coefficient of Friction	Grade =				
		-10%	-5%	0%	5%	10%
25	0.38	166	155	147	140	135
30	0.35	230	210	196	185	177
35	0.34	299	269	249	233	221
40	0.32	389	345	314	291	274
45	0.31	487	425	383	353	330
50	0.3	600	517	462	422	392
55	0.3	706	605	538	490	454
60	0.29	852	721	634	573	528

Conclusion:

No sight distance deficiencies noted.

Date: 7/9/2018 Compiled by: LAS Checked by: ABK

Project Photo Sheet

County: Delaware County
Municipality: Radnor Township
Intersection: County Line Road

Job Number: 16-11060-02



Photo 1: Eastbound Montrose Ave, looking left.



Photo 2: Eastbound Montrose Ave, looking right.



Photo 3: Westbound Montrose Ave, looking left.



Photo 4: Westbound Montrose Ave, looking right.



Photo 5: Eastbound Roberts Road, looking left.



Photo 6: Eastbound Roberts Road, looking right.

Project Photo Sheet

County: Delaware County
Municipality: Radnor Township
Intersection: County Line Road

Job Number: 16-11060-02



Photo 7: Westbound Roberts Road, looking left.



Photo 8: Westbound Roberts Road, looking right.



Photo 9: Westbound Old Lancaster Rd, looking left.



Photo 10: Westbound Old Lancaster Rd, looking right.



Photo 11: Westbound Mondella Ave, looking left.



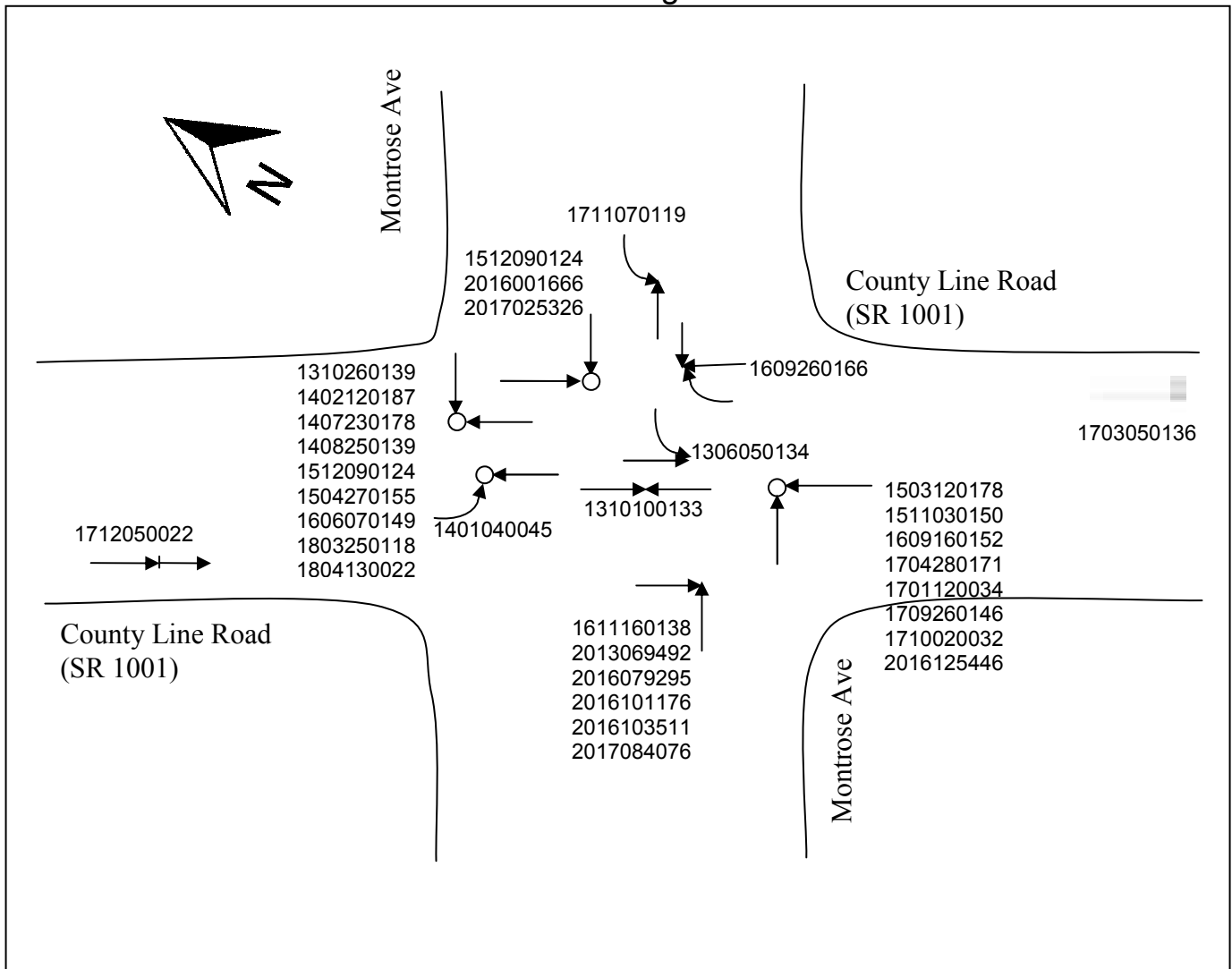
Photo 12: Westbound Mondella Ave, looking right.

APPENDIX C

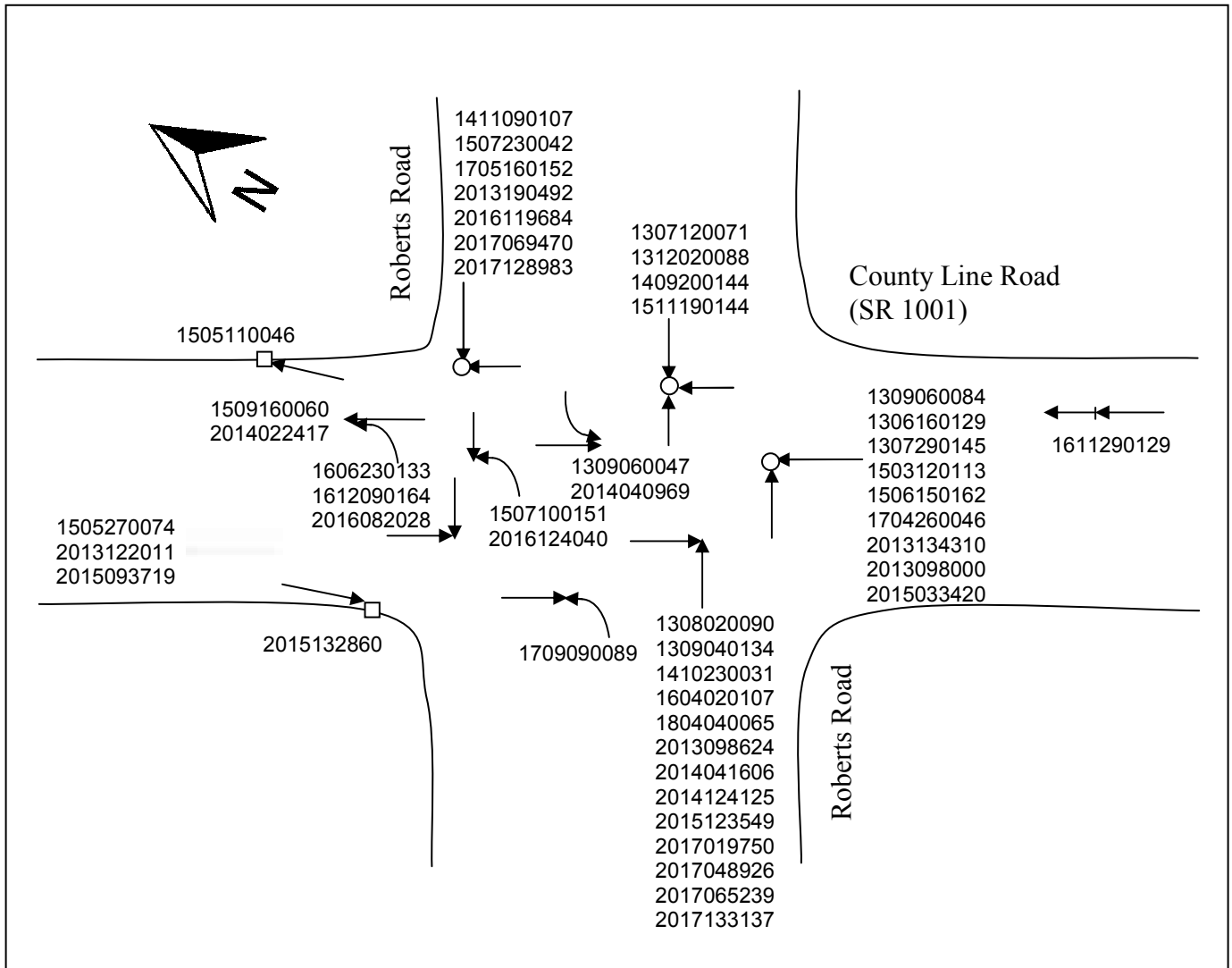
Collision Diagrams



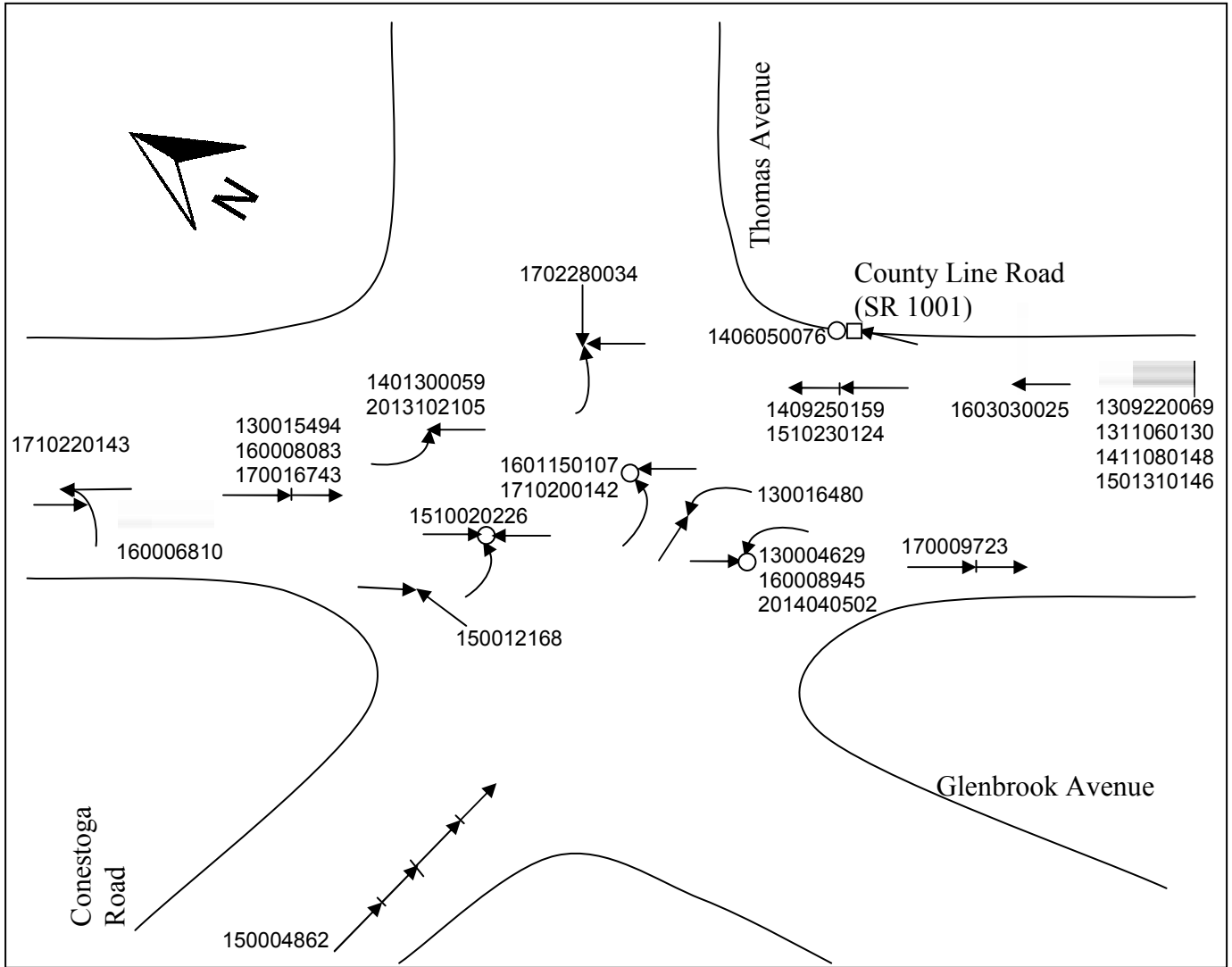
County Line Road (SR 1001) & Montrose Avenue Collision Diagram



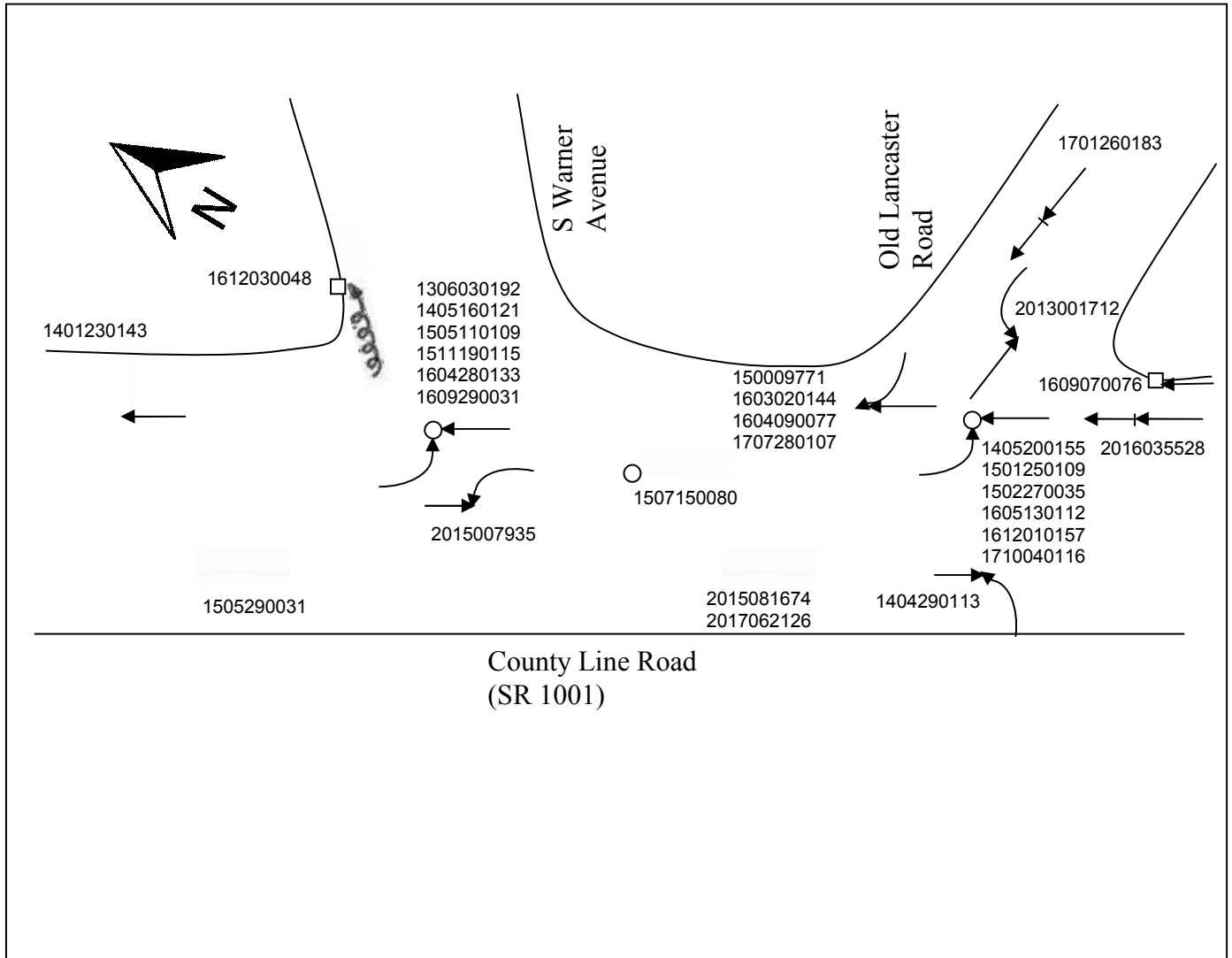
County Line Road (SR 1001) & Roberts Road Collision Diagram



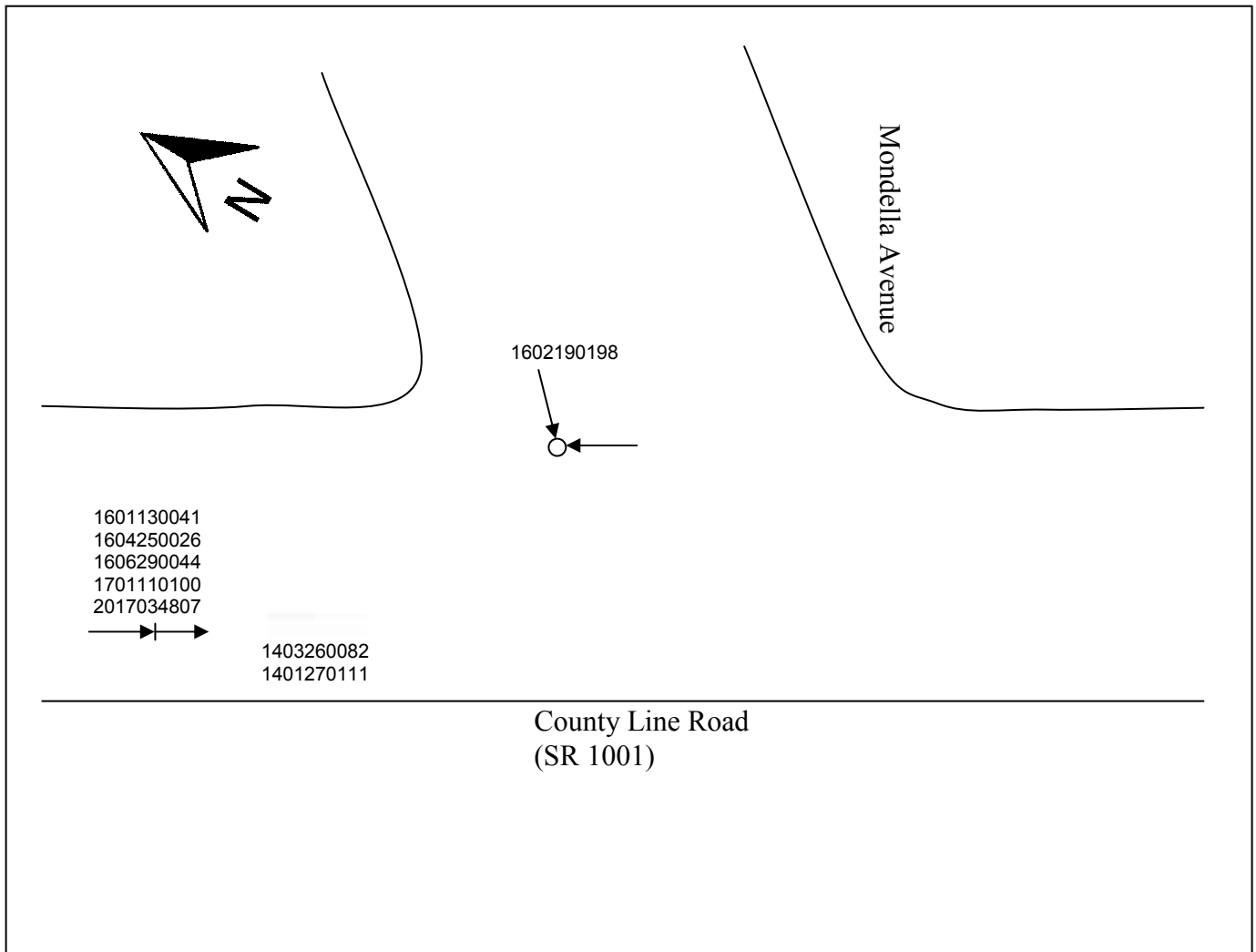
County Line Road (SR 1001) & Conestoga Road & Glenbrook Avenue & Thomas Avenue Collision Diagram



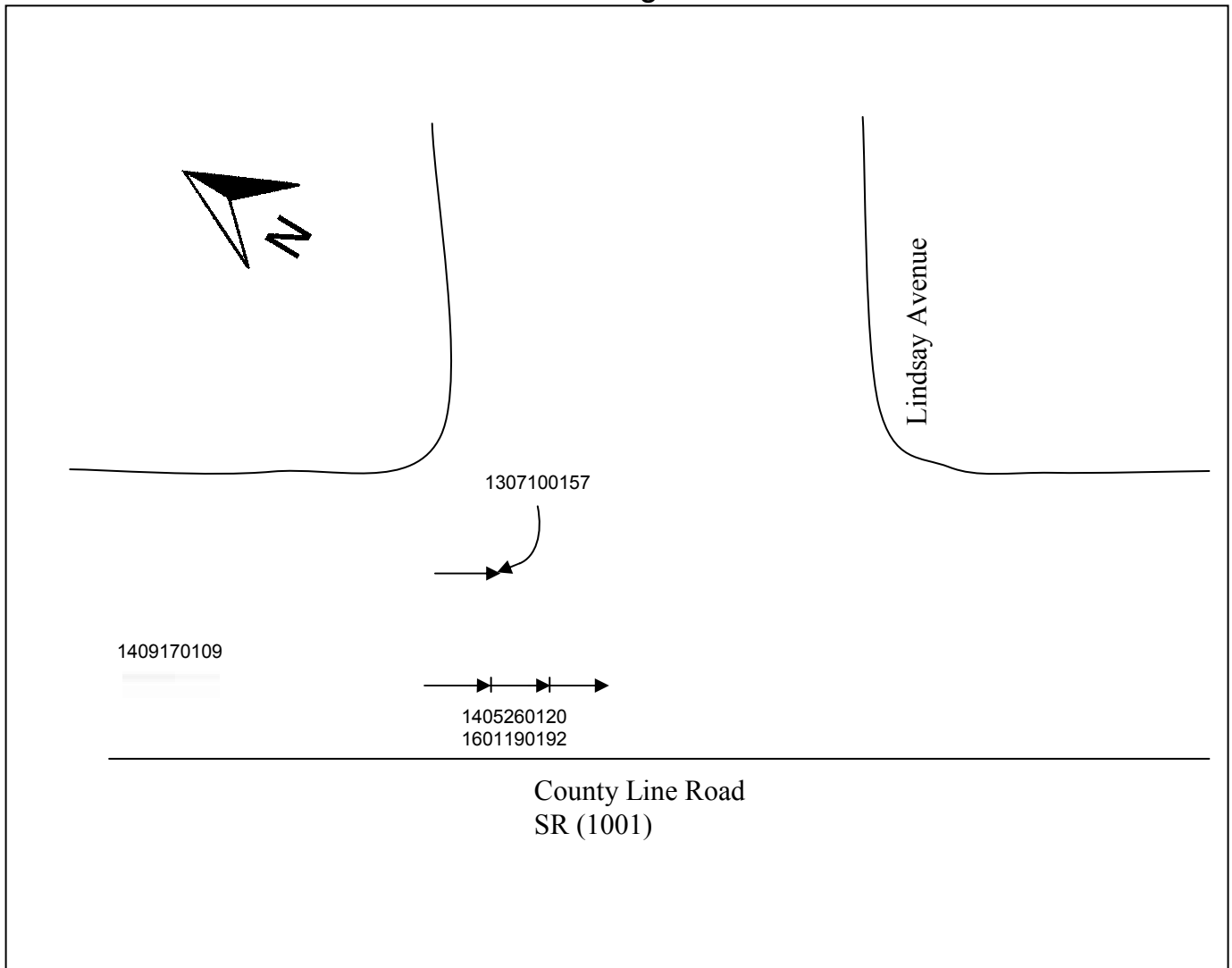
County Line Road (SR 1001) & S Warner Avenue & Old Lancaster Road Collision Diagram



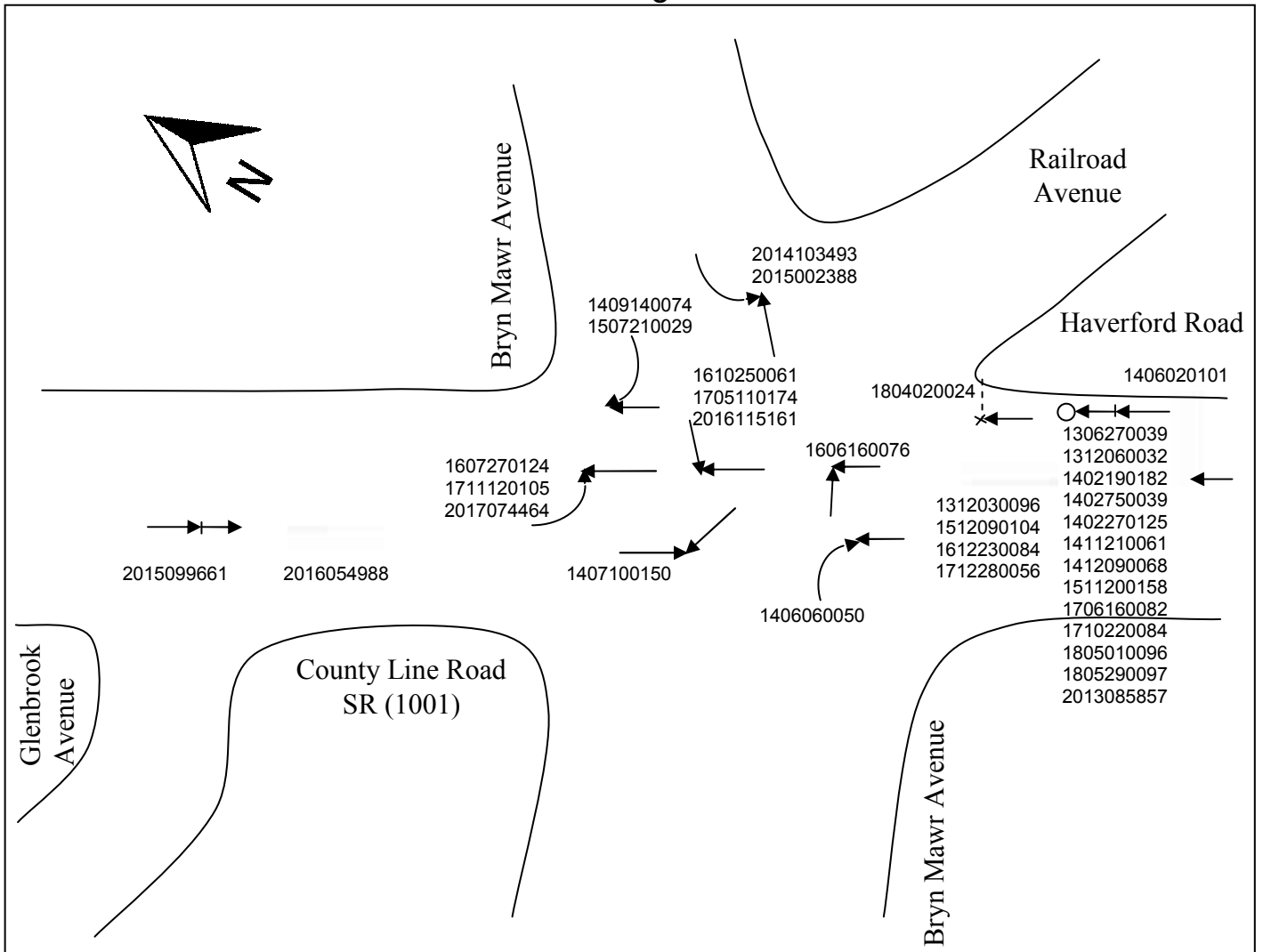
County Line Road (SR 1001) & Mondella Avenue Collision Diagram



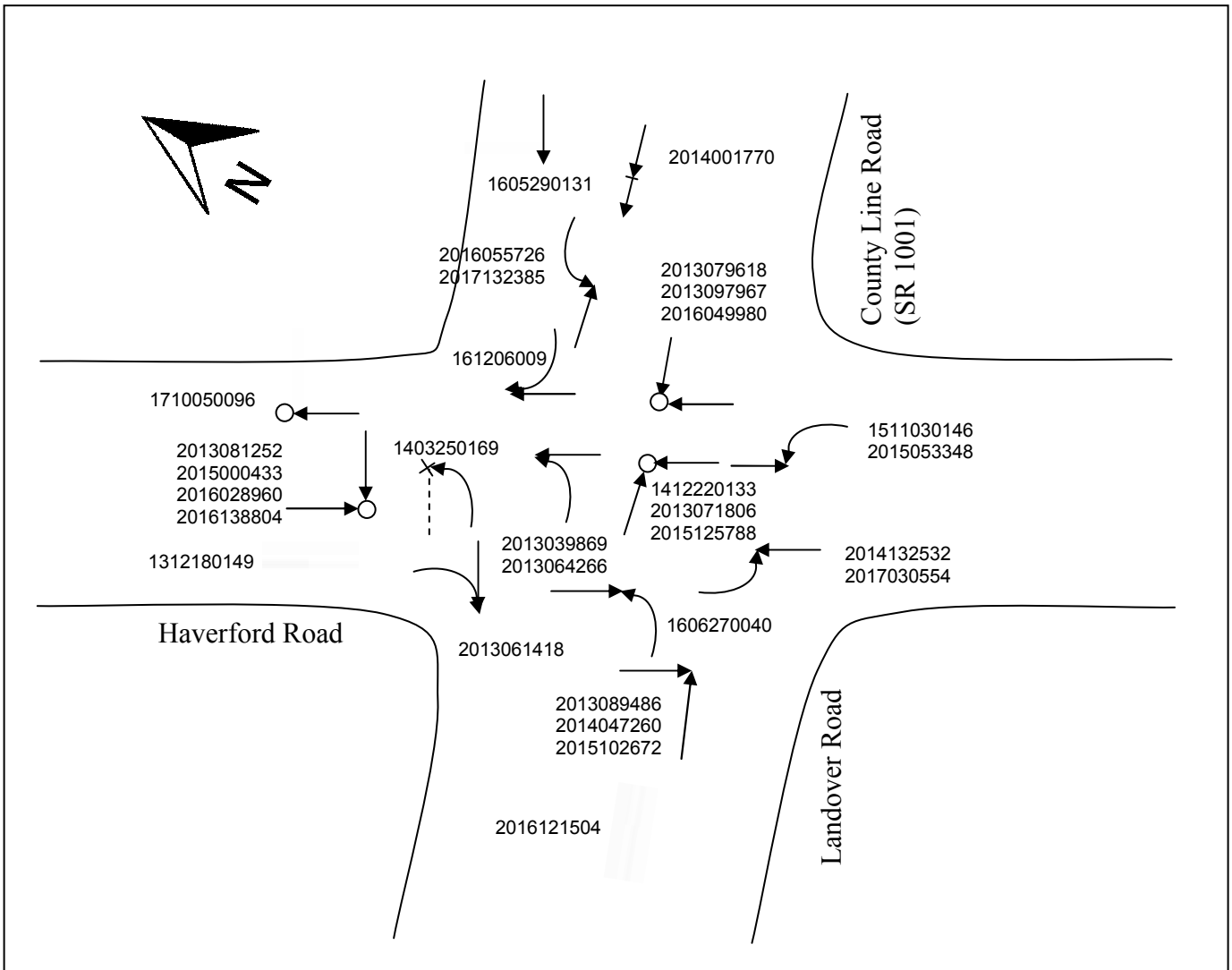
County Line Road (SR 1001) & Lindsay Avenue Collision Diagram



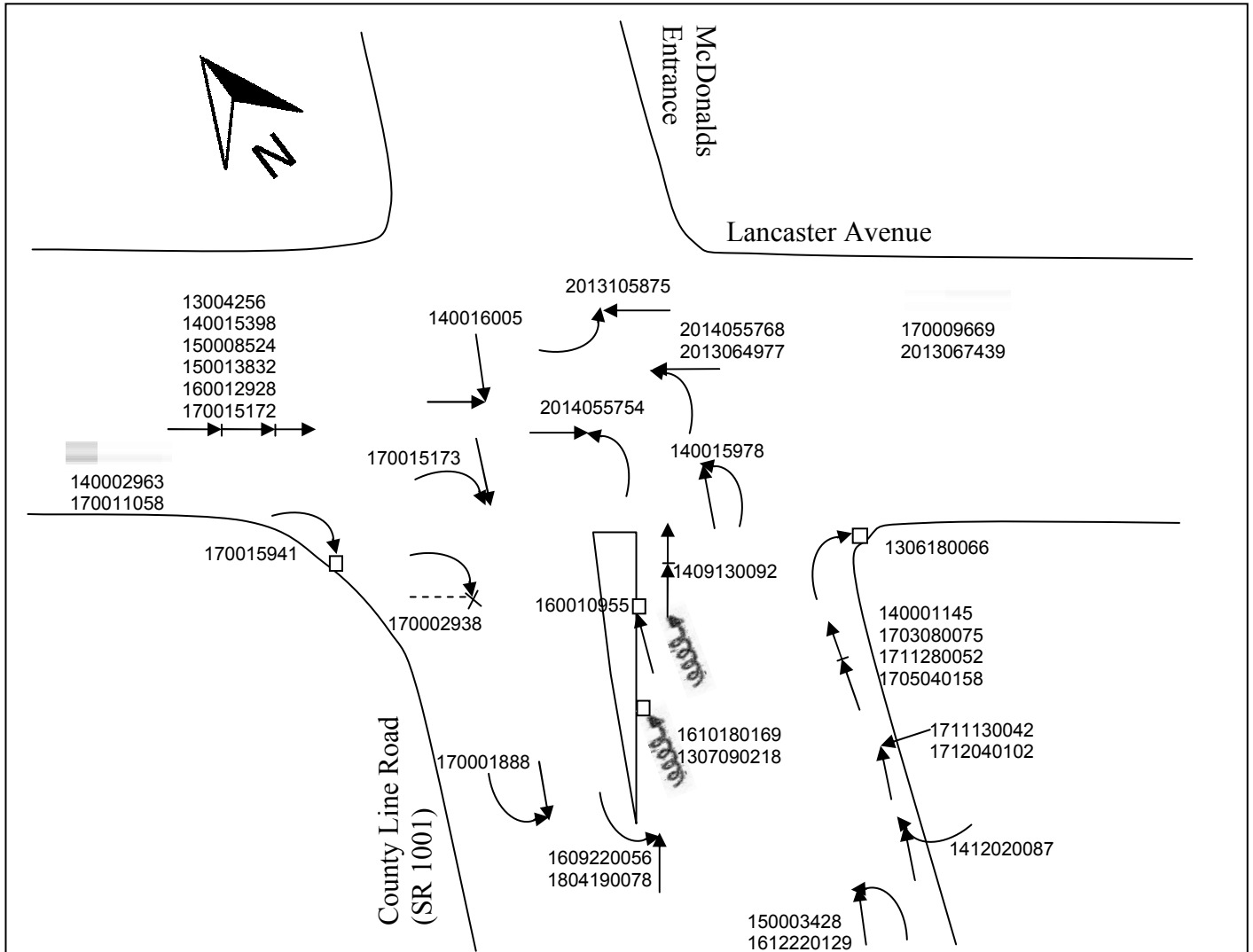
County Line Road (SR 1001) & Bryn Mawr Avenue & Glenbrook Ave & Railroad Ave & Haverford Road Collision Diagram



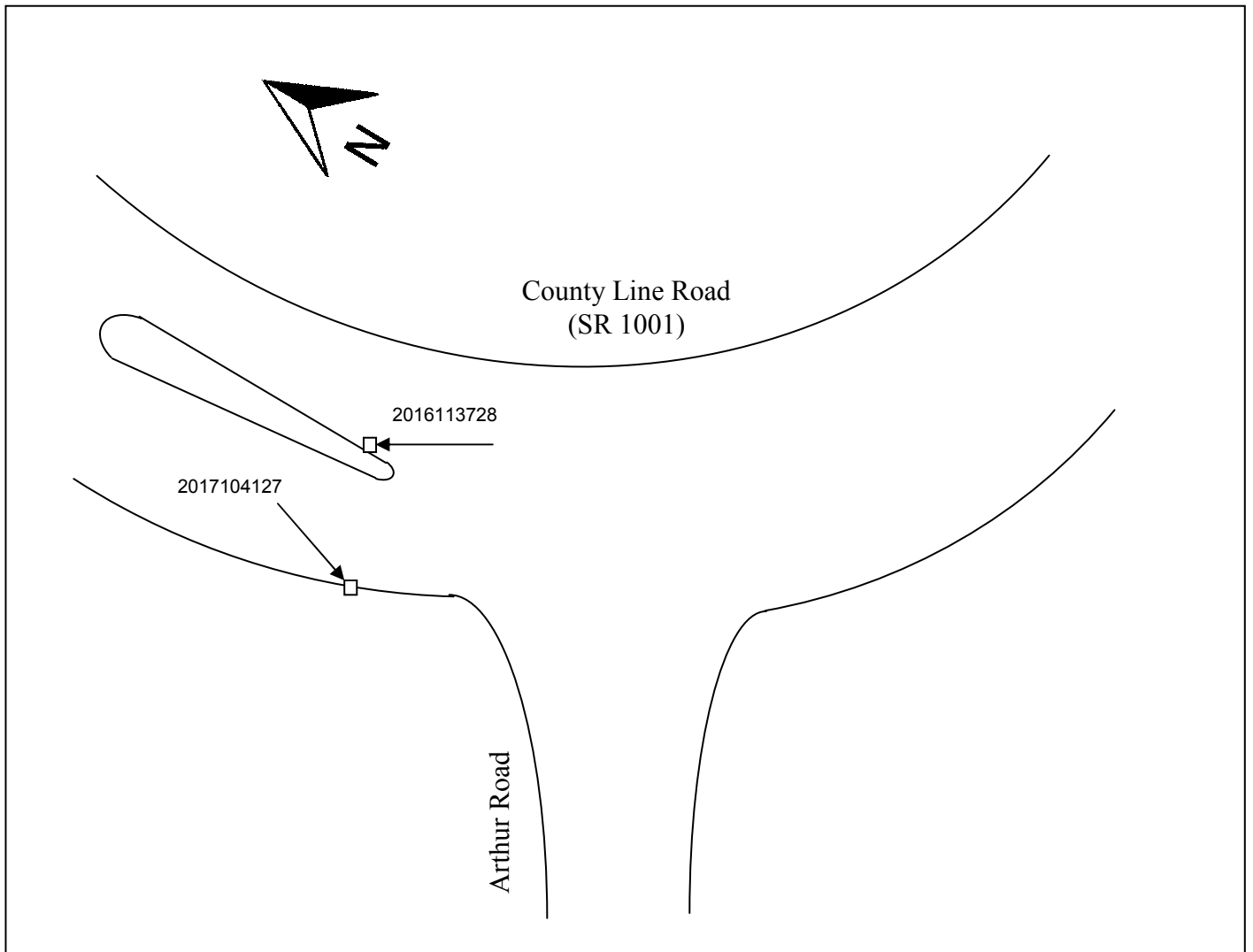
County Line Road (SR 1001) & Haverford Road & Landover Road Collision Diagram



County Line Road (SR 1001) & Lancaster Avenue Collision Diagram



County Line Road (SR 1001) & Arthur Avenue Collision Diagram



APPENDIX D

Traffic Signal Warrant Analyses



STUDY AND ANALYSIS INFORMATION

Municipality: Radnor Township
 County: Delaware County
 PennDOT Engineering District: 6

Analysis Date: 8/27/2018
 Conducted By: LAS
 Agency/Company Name: G&A

Analysis Information

Data Collection Date: 12/1/2016
 Day of the Week: Tuesday

Is the intersection in a built-up area of an isolated community of <10,000 population? No

Major Street Information

Major Street Name and Route Number: County Line Road
 Major Street Approach #1 Direction: N-Bound
 Major Street Approach #2 Direction: S-Bound

Number of Lanes for Moving Traffic on Each Major Street Approach: 2 LANE(S)
 Speed Limit or 85th Percentile Speed on the Major Street: 40.5 MPH

Minor Street Information

Minor Street Name and Route Number: Montrose Ave
 Minor Street Approach #1 Direction: E-Bound
 Minor Street Approach #2 Direction: W-Bound

Number of Lanes for Moving Traffic on Each Minor Street Approach: 1 LANE(S)

TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS

	Applicable?	Warrant Met?
Warrant 1, Eight-Hour Vehicular Volume	Yes	Yes
Warrant 2, Four-Hour Vehicular Volume	Yes	Yes
Warrant 3, Peak Hour	Yes	No
Warrant 4, Pedestrian Volume	Yes	No
Warrant 5, School Crossing	No	N/A
Warrant 6, Coordinated Signal System	No	N/A
Warrant 7, Crash Experience	Yes	No
Warrant 8, Roadway Network	No	N/A
Warrant 9, Intersection Near a Grade Crossing	No	N/A
Warrant PA-1, ADT Volume Warrant	No	N/A
Warrant PA-2, Midblock and Trail Crossings	No	N/A

ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH						
Time Interval		Major Street Approach #1 (N-Bound)	Major Street Approach #2 (S-Bound)	Major Street Combined	Minor Street Approach #1 (E-Bound)	Minor Street Approach #2 (W-Bound)
Begin At	End Of	Volume	Volume	Total Volume	Volume	Volume
12:00 AM	12:14 AM			0		
12:15 AM	12:29 AM			0		
12:30 AM	12:44 AM			0		
12:45 AM	12:59 AM			0		
1:00 AM	1:14 AM			0		
1:15 AM	1:29 AM			0		
1:30 AM	1:44 AM			0		
1:45 AM	1:59 AM			0		
2:00 AM	2:14 AM			0		
2:15 AM	2:29 AM			0		
2:30 AM	2:44 AM			0		
2:45 AM	2:59 AM			0		
3:00 AM	3:14 AM			0		
3:15 AM	3:29 AM			0		
3:30 AM	3:44 AM			0		
3:45 AM	3:59 AM			0		
4:00 AM	4:14 AM			0		
4:15 AM	4:29 AM			0		
4:30 AM	4:44 AM			0		
4:45 AM	4:59 AM			0		
5:00 AM	5:14 AM			0		
5:15 AM	5:29 AM			0		
5:30 AM	5:44 AM			0		
5:45 AM	5:59 AM			0		
6:00 AM	6:14 AM	33	42	75	3	3
6:15 AM	6:29 AM	60	55	115	2	7
6:30 AM	6:44 AM	75	89	164	4	8
6:45 AM	6:59 AM	97	98	195	3	8
7:00 AM	7:14 AM	96	110	206	3	16
7:15 AM	7:29 AM	92	136	228	7	19
7:30 AM	7:44 AM	118	148	266	6	28
7:45 AM	7:59 AM	123	162	285	14	40
8:00 AM	8:14 AM	134	164	298	20	54
8:15 AM	8:29 AM	126	192	318	15	29
8:30 AM	8:44 AM	114	164	278	10	43
8:45 AM	8:59 AM	110	159	269	12	21
9:00 AM	9:14 AM	101	143	244	11	21
9:15 AM	9:29 AM	96	156	252	10	20
9:30 AM	9:44 AM	99	173	272	17	18
9:45 AM	9:59 AM	98	148	246	10	21
10:00 AM	10:14 AM	83	105	188	13	10
10:15 AM	10:29 AM	92	88	180	14	13
10:30 AM	10:44 AM	93	99	192	8	23
10:45 AM	10:59 AM	85	109	194	10	18
11:00 AM	11:14 AM	94	115	209	19	18
11:15 AM	11:29 AM	102	109	211	9	10
11:30 AM	11:44 AM	98	120	218	14	12
11:45 AM	11:59 AM	134	126	260	13	20

Traffic Signal Warrant Analysis Workbook

10/11/2018

ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH						
Time Interval		Major Street Approach #1 (N-Bound)	Major Street Approach #2 (S-Bound)	Major Street Combined	Minor Street Approach #1 (E-Bound)	Minor Street Approach #2 (W-Bound)
Begin At	End Of	Volume	Volume	Total Volume	Volume	Volume
12:00 PM	12:14 PM	102	102	204	13	16
12:15 PM	12:29 PM	99	135	234	17	20
12:30 PM	12:44 PM	101	117	218	23	11
12:45 PM	12:59 PM	123	103	226	13	21
1:00 PM	1:14 PM	89	117	206	14	12
1:15 PM	1:29 PM	109	119	228	15	14
1:30 PM	1:44 PM	117	134	251	19	12
1:45 PM	1:59 PM	113	92	205	15	15
2:00 PM	2:14 PM	93	114	207	13	16
2:15 PM	2:29 PM	132	142	274	14	12
2:30 PM	2:44 PM	143	103	246	21	17
2:45 PM	2:59 PM	137	130	267	32	12
3:00 PM	3:14 PM	135	152	287	20	18
3:15 PM	3:29 PM	144	117	261	21	20
3:30 PM	3:44 PM	152	150	302	17	17
3:45 PM	3:59 PM	144	122	266	30	14
4:00 PM	4:14 PM	167	143	310	11	19
4:15 PM	4:29 PM	165	143	308	15	21
4:30 PM	4:44 PM	167	123	290	26	32
4:45 PM	4:59 PM	157	117	274	23	33
5:00 PM	5:14 PM	173	105	278	8	44
5:15 PM	5:29 PM	192	134	326	20	42
5:30 PM	5:44 PM	198	141	339	19	46
5:45 PM	5:59 PM	187	108	295	21	22
6:00 PM	6:14 PM	165	95	260	30	27
6:15 PM	6:29 PM	179	94	273	17	28
6:30 PM	6:44 PM	132	97	229	17	21
6:45 PM	6:59 PM	129	94	223	16	16
7:00 PM	7:14 PM			0		
7:15 PM	7:29 PM			0		
7:30 PM	7:44 PM			0		
7:45 PM	7:59 PM			0		
8:00 PM	8:14 PM			0		
8:15 PM	8:29 PM			0		
8:30 PM	8:44 PM			0		
8:45 PM	8:59 PM			0		
9:00 PM	9:14 PM			0		
9:15 PM	9:29 PM			0		
9:30 PM	9:44 PM			0		
9:45 PM	9:59 PM			0		
10:00 PM	10:14 PM			0		
10:15 PM	10:29 PM			0		
10:30 PM	10:44 PM			0		
10:45 PM	10:59 PM			0		
11:00 PM	11:14 PM			0		
11:15 PM	11:29 PM			0		
11:30 PM	11:44 PM			0		
11:45 PM	11:59 PM			0		
Approach Totals:		6297	6353	12650	767	1078

MUTCD WARRANT 1, EIGHT-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
---	-----

Combination of Conditions A and B Necessary?*: **No**

**Only applicable for Warrant 1 if after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems. See Section 4C.02 of the 2009 MUTCD for application.*

Condition A - Minimum Vehicular Volume									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or More	1	600	480	420	336	150	120	105	84
2 or More	2 or More	600	480	420	336	200	160	140	112
1	2 or More	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or More	1	900	720	630	504	75	60	53	42
2 or More	2 or More	900	720	630	504	100	80	70	56
1	2 or More	750	600	525	420	100	80	70	56

Condition A Evaluation

Number of Unique Hours Met: **4** Condition A Satisfied? **No**

Condition B Evaluation

Number of Unique Hours Met: **12** Condition B Satisfied? **Yes**

Combination of Condition A and Condition B Evaluation

Number of Unique Hours Met for Condition A: **N/A**

Number of Unique Hours Met for Condition B: **N/A**

Combination of Condition A and Condition B Satisfied? **N/A**

MUTCD WARRANT 2, FOUR-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Total Number of Unique Hours Met On Figure 4C-2
10

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
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Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	75	3	
5:30 AM	190	10	
5:45 AM	354	18	
6:00 AM	549	26	
6:15 AM	680	39	
6:30 AM	793	51	
6:45 AM	895	71	Met
7:00 AM	985	103	Met
7:15 AM	1077	141	Met
7:30 AM	1167	151	Met
7:45 AM	1179	166	Met
8:00 AM	1163	147	Met
8:15 AM	1109	114	Met
8:30 AM	1043	105	Met
8:45 AM	1037	80	Met
9:00 AM	1014	80	Met
9:15 AM	958	69	Met
9:30 AM	886	62	
9:45 AM	806	67	
10:00 AM	754	64	
10:15 AM	775	72	
10:30 AM	806	69	
10:45 AM	832	58	
11:00 AM	898	60	
11:15 AM	893	58	
11:30 AM	916	68	Met
11:45 AM	916	67	Met

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 PM	882	68	Met
12:15 PM	884	67	Met
12:30 PM	878	65	Met
12:45 PM	911	61	Met
1:00 PM	890	63	Met
1:15 PM	891	62	
1:30 PM	937	61	Met
1:45 PM	932	63	Met
2:00 PM	994	80	Met
2:15 PM	1074	87	Met
2:30 PM	1061	94	Met
2:45 PM	1117	90	Met
3:00 PM	1116	88	Met
3:15 PM	1139	79	Met
3:30 PM	1186	73	Met
3:45 PM	1174	86	Met
4:00 PM	1182	105	Met
4:15 PM	1150	130	Met
4:30 PM	1168	151	Met
4:45 PM	1217	165	Met
5:00 PM	1238	154	Met
5:15 PM	1220	137	Met
5:30 PM	1167	123	Met
5:45 PM	1057	98	Met
6:00 PM	985	92	Met
6:15 PM	725	65	
6:30 PM	452	37	
6:45 PM	223	16	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

MUTCD WARRANT 3, PEAK HOUR

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
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Is this signal warrant being applied for an unusual case, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time?	No
---	----

Indicate whether all three of the following conditions for the same 1 hour (any four consecutive 15-minute periods) of an average day are present*	
Does the total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceed 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach?	N/A
Does the volume on the same minor-street approach (one direction only) equal or exceed 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes?	N/A
Does the total entering volume serviced during the hour equal or exceed 650 vehicles per hour for intersection with three approaches or 800 vehicles per hour for intersections with four or more approaches?	N/A
<i>*If applicable, attach all supporting calculations and documentation.</i>	

Total Number of Unique Hours Met On Figure 4C-4
4

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	75	3	
5:30 AM	190	10	
5:45 AM	354	18	
6:00 AM	549	26	
6:15 AM	680	39	
6:30 AM	793	51	
6:45 AM	895	71	
7:00 AM	985	103	
7:15 AM	1077	141	Met
7:30 AM	1167	151	Met
7:45 AM	1179	166	Met
8:00 AM	1163	147	Met
8:15 AM	1109	114	Met

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
8:30 AM	1043	105	
8:45 AM	1037	80	
9:00 AM	1014	80	
9:15 AM	958	69	
9:30 AM	886	62	
9:45 AM	806	67	
10:00 AM	754	64	
10:15 AM	775	72	
10:30 AM	806	69	
10:45 AM	832	58	
11:00 AM	898	60	
11:15 AM	893	58	
11:30 AM	916	68	
11:45 AM	916	67	
12:00 PM	882	68	
12:15 PM	884	67	
12:30 PM	878	65	
12:45 PM	911	61	
1:00 PM	890	63	
1:15 PM	891	62	
1:30 PM	937	61	
1:45 PM	932	63	
2:00 PM	994	80	
2:15 PM	1074	87	
2:30 PM	1061	94	
2:45 PM	1117	90	
3:00 PM	1116	88	
3:15 PM	1139	79	
3:30 PM	1186	73	
3:45 PM	1174	86	Met
4:00 PM	1182	105	Met
4:15 PM	1150	130	Met
4:30 PM	1168	151	Met
4:45 PM	1217	165	Met
5:00 PM	1238	154	Met
5:15 PM	1220	137	Met
5:30 PM	1167	123	Met
5:45 PM	1057	98	
6:00 PM	985	92	
6:15 PM	725	65	
6:30 PM	452	37	
6:45 PM	223	16	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

MUTCD WARRANT 4, PEDESTRIAN VOLUME

Built-up Isolated Community With Less Than 10,000 Population or Above 35 MPH on Major Street? Yes

15th Percentile Pedestrian Crossing Speed Less than 3.5 f/s?* No
**If applicable, attach all supporting calculations, documentation, and findings.*

Is the distance to the nearest traffic control signal or STOP sign controlling the major street that pedestrians desire to cross less than 300 feet? No

If the distance to the nearest traffic control signal or STOP sign controlling the major street that pedestrians desire to cross is less than 300 feet, will the proposed traffic control signal restrict the progressive movement of traffic?* No
**If applicable, attach supporting justification.*

Total Number of Unique Hours Met for Criterion A: 0

Total Number of Unique Hours Met for Criterion B: 0

Hourly Vehicular & Pedestrian Volume				
Hour Interval	Major Street Combined	Total of All Pedestrians Crossing Major Street	Criterion A: 4-Hour	Criterion B: 1-Hour
Beginning At	Vehicles Per Hour (VPH)	Pedestrians Per Hour (PPH)	Hour Met on Figure 4C-6?	Hour Met on Figure 4C-8?
12:00 AM	0			
12:15 AM	0			
12:30 AM	0			
12:45 AM	0			
1:00 AM	0			
1:15 AM	0			
1:30 AM	0			
1:45 AM	0			
2:00 AM	0			
2:15 AM	0			
2:30 AM	0			
2:45 AM	0			
3:00 AM	0			
3:15 AM	0			
3:30 AM	0			
3:45 AM	0			
4:00 AM	0			
4:15 AM	0			
4:30 AM	0			
4:45 AM	0			
5:00 AM	0			
5:15 AM	75			
5:30 AM	190			
5:45 AM	354			
6:00 AM	549			
6:15 AM	680			
6:30 AM	793			
6:45 AM	895			
7:00 AM	985	3		
7:15 AM	1077			
7:30 AM	1167			
7:45 AM	1179			
8:00 AM	1163	6		
8:15 AM	1109			
8:30 AM	1043			
8:45 AM	1037			
9:00 AM	1014	7		
9:15 AM	958			
9:30 AM	886			
9:45 AM	806			

Hourly Vehicular & Pedestrian Volume				
Hour Interval	Major Street Combined	Total of All Pedestrians Crossing Major Street	Criterion A: 4-Hour	Criterion B: 1-Hour
Beginning At	Vehicles Per Hour (VPH)	Pedestrians Per Hour (PPH)	Hour Met on Figure 4C-6?	Hour Met on Figure 4C-8?
10:00 AM	754	1		
10:15 AM	775			
10:30 AM	806			
10:45 AM	832			
11:00 AM	898	2		
11:15 AM	893			
11:30 AM	916			
11:45 AM	916			
12:00 PM	882	7		
12:15 PM	884			
12:30 PM	878			
12:45 PM	911			
1:00 PM	890	6		
1:15 PM	891			
1:30 PM	937			
1:45 PM	932			
2:00 PM	994	13		
2:15 PM	1074			
2:30 PM	1061			
2:45 PM	1117			
3:00 PM	1116	3		
3:15 PM	1139			
3:30 PM	1186			
3:45 PM	1174			
4:00 PM	1182	10		
4:15 PM	1150			
4:30 PM	1168			
4:45 PM	1217			
5:00 PM	1238	10		
5:15 PM	1220			
5:30 PM	1167			
5:45 PM	1057			
6:00 PM	985	3		
6:15 PM	725			
6:30 PM	452			
6:45 PM	223			
7:00 PM	0	7		
7:15 PM	0			
7:30 PM	0			
7:45 PM	0			
8:00 PM	0			
8:15 PM	0			
8:30 PM	0			
8:45 PM	0			
9:00 PM	0			
9:15 PM	0			
9:30 PM	0			
9:45 PM	0			
10:00 PM	0			
10:15 PM	0			
10:30 PM	0			
10:45 PM	0			
11:00 PM	0			

MUTCD WARRANT 7, CRASH EXPERIENCE

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Has adequate trial of alternatives with satisfactory observance and enforcement failed to reduce the crash frequency?

Five or more reportable and/or non-reportable crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period during the most recent 3 years of available crash data.*
**If applicable, attach a summary of the crash data analysis used for this criterion.*

For each of any 8 hours of an average day, the vehicles per hour given in both the 80% columns of Condition A in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection.

For each of any 8 hours of an average day, the vehicles per hour given in both the 80% columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection.

The volume of pedestrian traffic is not less than 80% of the requirements specified in Warrant 4, the Pedestrian Volume warrant.*
**If applicable, attach all supporting calculations and documentation.*

MUTCD WARRANT 8, ROADWAY NETWORK*

Is the major street classified as an Urban Extension, Principal Arterial, or Minor Arterial that is a reasonable connection between two Principal Arterials and/or Urban Extensions as shown on the official Functional Classification Map?

Does the intersection have a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1,2, and 3 during an average weekday?

Does the intersection have a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday)?

Is the major street part of the street or highway system that serves as the principal roadway network for through traffic flow?

Does the major street include rural or suburban highways outside, entering, or traversing a city?

Does the major street appear as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study?

**Refer to Section 4.3 of PennDOT Publication 46 (Traffic Engineering Manual) for additional Department documentation requirements to justify the installation of a signal under Warrant 8. Attach all supplementary documentation and calculations, especially those relating to traffic volume projections and subsequent Warrant analyses.*

STUDY AND ANALYSIS INFORMATION

Municipality: Radnor Township
 County: Delaware County
 PennDOT Engineering District: 6

Analysis Date: 8/27/2018
 Conducted By: LAS
 Agency/Company Name: G&A

Analysis Information

Data Collection Date: 1/31/2017
 Day of the Week: Thursday

Is the intersection in a built-up area of an isolated community of <10,000 population? No

Major Street Information

Major Street Name and Route Number: County Line Road
 Major Street Approach #1 Direction: N-Bound
 Major Street Approach #2 Direction: S-Bound

Number of Lanes for Moving Traffic on Each Major Street Approach: 2 LANE(S)
 Speed Limit or 85th Percentile Speed on the Major Street: 40.5 MPH

Minor Street Information

Minor Street Name and Route Number: Roberts Road
 Minor Street Approach #1 Direction: E-Bound
 Minor Street Approach #2 Direction: W-Bound

Number of Lanes for Moving Traffic on Each Minor Street Approach: 1 LANE(S)

TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS

	Applicable?	Warrant Met?
Warrant 1, Eight-Hour Vehicular Volume	Yes	Yes
Warrant 2, Four-Hour Vehicular Volume	Yes	Yes
Warrant 3, Peak Hour	Yes	No
Warrant 4, Pedestrian Volume	Yes	No
Warrant 5, School Crossing	No	N/A
Warrant 6, Coordinated Signal System	No	N/A
Warrant 7, Crash Experience	Yes	No
Warrant 8, Roadway Network	No	N/A
Warrant 9, Intersection Near a Grade Crossing	No	N/A
Warrant PA-1, ADT Volume Warrant	No	N/A
Warrant PA-2, Midblock and Trail Crossings	No	N/A

ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH						
Time Interval		Major Street Approach #1 (N-Bound)	Major Street Approach #2 (S-Bound)	Major Street Combined	Minor Street Approach #1 (E-Bound)	Minor Street Approach #2 (W-Bound)
Begin At	End Of	Volume	Volume	Total Volume	Volume	Volume
12:00 AM	12:14 AM			0		
12:15 AM	12:29 AM			0		
12:30 AM	12:44 AM			0		
12:45 AM	12:59 AM			0		
1:00 AM	1:14 AM			0		
1:15 AM	1:29 AM			0		
1:30 AM	1:44 AM			0		
1:45 AM	1:59 AM			0		
2:00 AM	2:14 AM			0		
2:15 AM	2:29 AM			0		
2:30 AM	2:44 AM			0		
2:45 AM	2:59 AM			0		
3:00 AM	3:14 AM			0		
3:15 AM	3:29 AM			0		
3:30 AM	3:44 AM			0		
3:45 AM	3:59 AM			0		
4:00 AM	4:14 AM			0		
4:15 AM	4:29 AM			0		
4:30 AM	4:44 AM			0		
4:45 AM	4:59 AM			0		
5:00 AM	5:14 AM			0		
5:15 AM	5:29 AM			0		
5:30 AM	5:44 AM			0		
5:45 AM	5:59 AM			0		
6:00 AM	6:14 AM	55	33	88	3	1
6:15 AM	6:29 AM	60	62	122	5	1
6:30 AM	6:44 AM	79	92	171	6	3
6:45 AM	6:59 AM	110	74	184	13	9
7:00 AM	7:14 AM	131	84	215	16	8
7:15 AM	7:29 AM	135	141	276	13	5
7:30 AM	7:44 AM	148	110	258	34	7
7:45 AM	7:59 AM	141	160	301	54	7
8:00 AM	8:14 AM	161	130	291	54	19
8:15 AM	8:29 AM	145	99	244	45	14
8:30 AM	8:44 AM	145	120	265	31	8
8:45 AM	8:59 AM	135	109	244	21	8
9:00 AM	9:14 AM	129	101	230	20	4
9:15 AM	9:29 AM	162	96	258	25	7
9:30 AM	9:44 AM	178	98	276	43	12
9:45 AM	9:59 AM	106	96	202	27	8
10:00 AM	10:14 AM	91	91	182	18	2
10:15 AM	10:29 AM	88	83	171	16	9
10:30 AM	10:44 AM	91	98	189	13	9
10:45 AM	10:59 AM	107	78	185	18	11
11:00 AM	11:14 AM	114	75	189	20	17
11:15 AM	11:29 AM	98	102	200	21	8
11:30 AM	11:44 AM	111	96	207	19	10
11:45 AM	11:59 AM	87	93	180	11	8

Traffic Signal Warrant Analysis Workbook

10/11/2018

ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH						
Time Interval		Major Street Approach #1 (N-Bound)	Major Street Approach #2 (S-Bound)	Major Street Combined	Minor Street Approach #1 (E-Bound)	Minor Street Approach #2 (W-Bound)
Begin At	End Of	Volume	Volume	Total Volume	Volume	Volume
12:00 PM	12:14 PM	95	87	182	16	12
12:15 PM	12:29 PM	106	94	200	13	9
12:30 PM	12:44 PM	121	112	233	25	17
12:45 PM	12:59 PM	120	103	223	19	12
1:00 PM	1:14 PM	91	98	189	6	16
1:15 PM	1:29 PM	109	84	193	11	8
1:30 PM	1:44 PM	90	93	183	8	11
1:45 PM	1:59 PM	109	91	200	12	11
2:00 PM	2:14 PM	97	102	199	17	19
2:15 PM	2:29 PM	111	137	248	17	13
2:30 PM	2:44 PM	105	157	262	19	11
2:45 PM	2:59 PM	115	145	260	21	14
3:00 PM	3:14 PM	123	167	290	17	7
3:15 PM	3:29 PM	127	140	267	21	11
3:30 PM	3:44 PM	158	150	308	28	5
3:45 PM	3:59 PM	137	155	292	18	21
4:00 PM	4:14 PM	140	142	282	17	16
4:15 PM	4:29 PM	105	149	254	26	19
4:30 PM	4:44 PM	120	160	280	20	15
4:45 PM	4:59 PM	119	161	280	25	16
5:00 PM	5:14 PM	83	206	289	17	24
5:15 PM	5:29 PM	24	162	186	29	17
5:30 PM	5:44 PM	0	179	179	28	19
5:45 PM	5:59 PM	0	136	136	24	22
6:00 PM	6:14 PM			0		
6:15 PM	6:29 PM			0		
6:30 PM	6:44 PM			0		
6:45 PM	6:59 PM			0		
7:00 PM	7:14 PM			0		
7:15 PM	7:29 PM			0		
7:30 PM	7:44 PM			0		
7:45 PM	7:59 PM			0		
8:00 PM	8:14 PM			0		
8:15 PM	8:29 PM			0		
8:30 PM	8:44 PM			0		
8:45 PM	8:59 PM			0		
9:00 PM	9:14 PM			0		
9:15 PM	9:29 PM			0		
9:30 PM	9:44 PM			0		
9:45 PM	9:59 PM			0		
10:00 PM	10:14 PM			0		
10:15 PM	10:29 PM			0		
10:30 PM	10:44 PM			0		
10:45 PM	10:59 PM			0		
11:00 PM	11:14 PM			0		
11:15 PM	11:29 PM			0		
11:30 PM	11:44 PM			0		
11:45 PM	11:59 PM			0		
Approach Totals:		5212	5531	10743	1000	540

MUTCD WARRANT 1, EIGHT-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
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Combination of Conditions A and B Necessary?*: **No**

**Only applicable for Warrant 1 if after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems. See Section 4C.02 of the 2009 MUTCD for application.*

Condition A - Minimum Vehicular Volume									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or More	1	600	480	420	336	150	120	105	84
2 or More	2 or More	600	480	420	336	200	160	140	112
1	2 or More	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or More	1	900	720	630	504	75	60	53	42
2 or More	2 or More	900	720	630	504	100	80	70	56
1	2 or More	750	600	525	420	100	80	70	56

Condition A Evaluation

Number of Unique Hours Met: **3** Condition A Satisfied? **No**

Condition B Evaluation

Number of Unique Hours Met: **10** Condition B Satisfied? **Yes**

Combination of Condition A and Condition B Evaluation

Number of Unique Hours Met for Condition A: **N/A**

Number of Unique Hours Met for Condition B: **N/A**

Combination of Condition A and Condition B Satisfied? **N/A**

MUTCD WARRANT 2, FOUR-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Total Number of Unique Hours Met On Figure 4C-2
7

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
---	-----

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	88	3	
5:30 AM	210	8	
5:45 AM	381	14	
6:00 AM	565	27	
6:15 AM	692	40	
6:30 AM	846	48	
6:45 AM	933	76	Met
7:00 AM	1050	117	Met
7:15 AM	1126	155	Met
7:30 AM	1094	187	Met
7:45 AM	1101	184	Met
8:00 AM	1044	151	Met
8:15 AM	983	117	Met
8:30 AM	997	97	Met
8:45 AM	1008	109	Met
9:00 AM	966	115	Met
9:15 AM	918	113	Met
9:30 AM	831	104	Met
9:45 AM	744	74	
10:00 AM	727	65	
10:15 AM	734	67	
10:30 AM	763	72	
10:45 AM	781	78	
11:00 AM	776	71	
11:15 AM	769	67	
11:30 AM	769	59	
11:45 AM	795	65	

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 PM	838	73	
12:15 PM	845	63	
12:30 PM	838	61	
12:45 PM	788	47	
1:00 PM	765	46	
1:15 PM	775	49	
1:30 PM	830	54	
1:45 PM	909	65	Met
2:00 PM	969	74	Met
2:15 PM	1060	74	Met
2:30 PM	1079	78	Met
2:45 PM	1125	87	Met
3:00 PM	1157	84	Met
3:15 PM	1149	84	Met
3:30 PM	1136	89	Met
3:45 PM	1108	81	Met
4:00 PM	1096	88	Met
4:15 PM	1103	88	Met
4:30 PM	1035	91	Met
4:45 PM	934	99	Met
5:00 PM	790	98	Met
5:15 PM	501	81	
5:30 PM	315	52	
5:45 PM	136	24	
6:00 PM	0	0	
6:15 PM	0	0	
6:30 PM	0	0	
6:45 PM	0	0	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

MUTCD WARRANT 3, PEAK HOUR

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	2 or More Lanes
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
---	-----

Is this signal warrant being applied for an unusual case, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time?	No
---	----

Indicate whether all three of the following conditions for the same 1 hour (any four consecutive 15-minute periods) of an average day are present*	
Does the total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceed 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach?	N/A
Does the volume on the same minor-street approach (one direction only) equal or exceed 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes?	N/A
Does the total entering volume serviced during the hour equal or exceed 650 vehicles per hour for intersection with three approaches or 800 vehicles per hour for intersections with four or more approaches?	N/A
<i>*If applicable, attach all supporting calculations and documentation.</i>	

Total Number of Unique Hours Met On Figure 4C-4
3

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	88	3	
5:30 AM	210	8	
5:45 AM	381	14	
6:00 AM	565	27	
6:15 AM	692	40	
6:30 AM	846	48	
6:45 AM	933	76	
7:00 AM	1050	117	Met
7:15 AM	1126	155	Met
7:30 AM	1094	187	Met
7:45 AM	1101	184	Met
8:00 AM	1044	151	Met
8:15 AM	983	117	

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
8:30 AM	997	97	
8:45 AM	1008	109	
9:00 AM	966	115	
9:15 AM	918	113	
9:30 AM	831	104	
9:45 AM	744	74	
10:00 AM	727	65	
10:15 AM	734	67	
10:30 AM	763	72	
10:45 AM	781	78	
11:00 AM	776	71	
11:15 AM	769	67	
11:30 AM	769	59	
11:45 AM	795	65	
12:00 PM	838	73	
12:15 PM	845	63	
12:30 PM	838	61	
12:45 PM	788	47	
1:00 PM	765	46	
1:15 PM	775	49	
1:30 PM	830	54	
1:45 PM	909	65	
2:00 PM	969	74	
2:15 PM	1060	74	
2:30 PM	1079	78	
2:45 PM	1125	87	
3:00 PM	1157	84	Met
3:15 PM	1149	84	
3:30 PM	1136	89	Met
3:45 PM	1108	81	
4:00 PM	1096	88	
4:15 PM	1103	88	
4:30 PM	1035	91	
4:45 PM	934	99	
5:00 PM	790	98	
5:15 PM	501	81	
5:30 PM	315	52	
5:45 PM	136	24	
6:00 PM	0	0	
6:15 PM	0	0	
6:30 PM	0	0	
6:45 PM	0	0	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

APPENDIX E

Existing Traffic Count Data





Imperial Traffic & Data Collection
 www.imperialtdc.com
 PO BOX 4673
 Cherry Hill, New Jersey, United States 08034
 609-706-6100 lklein@imperialtdc.com

Project: County Line Road
 Municipality: Radnor Township, Delaware
 County
 Setup: MAK
 Location: 40.02644, -75.328411

Count Name: 1. County Line Road & Lancaster Ave/McDonalds Driveway
 Site Code: 1
 Start Date: 04/28/2018
 Page No: 6

Turning Movement Peak Hour Data (7:45 AM)

Start Time	Lancaster Avenue Eastbound						Lancaster Avenue Westbound						County Line Road Northbound						McDonalds Driveway Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
7:45 AM	0	3	143	121	0	267	0	1	162	4	1	167	0	149	6	1	0	156	0	2	1	6	2	9	599
8:00 AM	0	4	152	143	0	299	0	0	188	3	1	191	0	146	2	2	2	150	0	2	5	4	0	11	651
8:15 AM	0	1	114	120	0	235	0	0	162	2	1	164	0	150	9	1	1	160	0	3	0	5	0	8	567
8:30 AM	0	0	128	105	0	233	0	0	142	3	2	145	0	166	10	1	5	177	0	1	2	3	2	6	561
Total	0	8	537	489	0	1034	0	1	654	12	5	667	0	611	27	5	8	643	0	8	8	18	4	34	2378
Approach %	0.0	0.8	51.9	47.3	-	-	0.0	0.1	98.1	1.8	-	-	0.0	95.0	4.2	0.8	-	-	0.0	23.5	23.5	52.9	-	-	-
Total %	0.0	0.3	22.6	20.6	-	43.5	0.0	0.0	27.5	0.5	-	28.0	0.0	25.7	1.1	0.2	-	27.0	0.0	0.3	0.3	0.8	-	1.4	-
PHF	0.000	0.500	0.883	0.855	-	0.865	0.000	0.250	0.870	0.750	-	0.873	0.000	0.920	0.675	0.625	-	0.908	0.000	0.667	0.400	0.750	-	0.773	0.913
Lights	0	8	510	457	-	975	0	0	623	10	-	633	0	592	26	5	-	623	0	8	8	18	-	34	2265
% Lights	-	100.0	95.0	93.5	-	94.3	-	0.0	95.3	83.3	-	94.9	-	96.9	96.3	100.0	-	96.9	-	100.0	100.0	100.0	-	100.0	95.2
Mediums	0	0	21	28	-	49	0	1	27	1	-	29	0	18	1	0	-	19	0	0	0	0	-	0	97
% Mediums	-	0.0	3.9	5.7	-	4.7	-	100.0	4.1	8.3	-	4.3	-	2.9	3.7	0.0	-	3.0	-	0.0	0.0	0.0	-	0.0	4.1
Articulated Trucks	0	0	6	4	-	10	0	0	4	1	-	5	0	1	0	0	-	1	0	0	0	0	-	0	16
% Articulated Trucks	-	0.0	1.1	0.8	-	1.0	-	0.0	0.6	8.3	-	0.7	-	0.2	0.0	0.0	-	0.2	-	0.0	0.0	0.0	-	0.0	0.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	20.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	8	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	80.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Imperial Traffic & Data Collection
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 PO BOX 4673
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 609-706-6100 lklein@imperialtdc.com

Project: County Line Road
 Municipality: Radnor Township, Delaware
 County
 Setup: MAK
 Location: 40.02644, -75.328411

Count Name: 1. County Line Road & Lancaster Ave/McDonalds Driveway
 Site Code: 1
 Start Date: 04/28/2018
 Page No: 8

Turning Movement Peak Hour Data (5:00 PM)

Start Time	Lancaster Avenue Eastbound						Lancaster Avenue Westbound						County Line Road Northbound						McDonalds Driveway Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
5:00 PM	0	2	169	166	5	337	0	5	152	3	2	160	0	132	5	2	9	139	0	1	6	2	5	9	645
5:15 PM	0	0	209	187	1	396	0	5	129	5	3	139	0	126	3	5	8	134	0	3	5	7	6	15	684
5:30 PM	0	1	185	183	3	369	0	2	125	4	4	131	0	117	3	4	13	124	0	0	2	1	6	3	627
5:45 PM	0	5	211	168	1	384	0	4	137	3	2	144	1	110	2	2	10	115	0	3	3	4	2	10	653
Total	0	8	774	704	10	1486	0	16	543	15	11	574	1	485	13	13	40	512	0	7	16	14	19	37	2609
Approach %	0.0	0.5	52.1	47.4	-	-	0.0	2.8	94.6	2.6	-	-	0.2	94.7	2.5	2.5	-	-	0.0	18.9	43.2	37.8	-	-	-
Total %	0.0	0.3	29.7	27.0	-	57.0	0.0	0.6	20.8	0.6	-	22.0	0.0	18.6	0.5	0.5	-	19.6	0.0	0.3	0.6	0.5	-	1.4	-
PHF	0.000	0.400	0.917	0.941	-	0.938	0.000	0.800	0.893	0.750	-	0.897	0.250	0.919	0.650	0.650	-	0.921	0.000	0.583	0.667	0.500	-	0.617	0.954
Lights	0	8	769	700	-	1477	0	16	535	15	-	566	1	479	13	13	-	506	0	7	16	14	-	37	2586
% Lights	-	100.0	99.4	99.4	-	99.4	-	100.0	98.5	100.0	-	98.6	100.0	98.8	100.0	100.0	-	98.8	-	100.0	100.0	100.0	-	100.0	99.1
Mediums	0	0	4	4	-	8	0	0	8	0	-	8	0	5	0	0	-	5	0	0	0	0	-	0	21
% Mediums	-	0.0	0.5	0.6	-	0.5	-	0.0	1.5	0.0	-	1.4	0.0	1.0	0.0	0.0	-	1.0	-	0.0	0.0	0.0	-	0.0	0.8
Articulated Trucks	0	0	1	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	2
% Articulated Trucks	-	0.0	0.1	0.0	-	0.1	-	0.0	0.0	0.0	-	0.0	0.0	0.2	0.0	0.0	-	0.2	-	0.0	0.0	0.0	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	10	-	-	-	-	-	11	-	-	-	-	-	40	-	-	-	-	-	19	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Project: County Line Road
 Municipality: Radnor Township, Delaware
 County
 Setup: MAK
 Location: 40.02644, -75.328411

Count Name: 1. County Line Road & Lancaster
 Ave/McDonalds Driveway
 Site Code: 1
 Start Date: 04/28/2018
 Page No: 4

Turning Movement Peak Hour Data (11:45 AM)

Start Time	Lancaster Avenue Eastbound						Lancaster Avenue Westbound						County Line Road Northbound						McDonalds Driveway Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
11:45 AM	0	3	157	86	2	246	0	1	148	6	3	155	0	116	5	5	13	126	0	2	1	5	4	8	535
12:00 PM	0	4	135	100	0	239	0	4	119	3	1	126	0	103	8	5	6	116	0	3	2	1	1	6	487
12:15 PM	0	6	126	72	0	204	0	4	147	9	4	160	0	110	8	4	14	122	0	2	3	4	6	9	495
12:30 PM	0	8	118	108	1	234	0	3	137	9	0	149	0	98	6	4	2	108	0	6	6	3	0	15	506
Total	0	21	536	366	3	923	0	12	551	27	8	590	0	427	27	18	35	472	0	13	12	13	11	38	2023
Approach %	0.0	2.3	58.1	39.7	-	-	0.0	2.0	93.4	4.6	-	-	0.0	90.5	5.7	3.8	-	-	0.0	34.2	31.6	34.2	-	-	-
Total %	0.0	1.0	26.5	18.1	-	45.6	0.0	0.6	27.2	1.3	-	29.2	0.0	21.1	1.3	0.9	-	23.3	0.0	0.6	0.6	0.6	-	1.9	-
PHF	0.000	0.656	0.854	0.847	-	0.938	0.000	0.750	0.931	0.750	-	0.922	0.000	0.920	0.844	0.900	-	0.937	0.000	0.542	0.500	0.650	-	0.633	0.945
Lights	0	20	529	361	-	910	0	12	544	27	-	583	0	418	27	18	-	463	0	13	12	13	-	38	1994
% Lights	-	95.2	98.7	98.6	-	98.6	-	100.0	98.7	100.0	-	98.8	-	97.9	100.0	100.0	-	98.1	-	100.0	100.0	100.0	-	100.0	98.6
Mediums	0	1	6	4	-	11	0	0	5	0	-	5	0	9	0	0	-	9	0	0	0	0	-	0	25
% Mediums	-	4.8	1.1	1.1	-	1.2	-	0.0	0.9	0.0	-	0.8	-	2.1	0.0	0.0	-	1.9	-	0.0	0.0	0.0	-	0.0	1.2
Articulated Trucks	0	0	1	1	-	2	0	0	2	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	4
% Articulated Trucks	-	0.0	0.2	0.3	-	0.2	-	0.0	0.4	0.0	-	0.3	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	0.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	8	-	-	-	-	-	35	-	-	-	-	-	11	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

Montgomery County, PA
County Line Rd/Montrose Ave
Thursday, December 1, 2016
Location: 40.0245, -75.327214

Count Name: County Line
Rd/Montrose Ave
Site Code:
Start Date: 12/01/2016
Page No: 4

Turning Movement Peak Hour Data (7:45 AM)

Start Time	County Line Rd Southbound						Montrose Ave Westbound						County Line Rd Northbound						Montrose Ave Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:45 AM	4	118	1	0	0	123	0	11	3	0	1	14	20	141	1	0	0	162	18	18	4	0	2	40	339
8:00 AM	1	132	1	0	0	134	2	13	5	0	0	20	11	148	5	0	0	164	24	22	8	0	1	54	372
8:15 AM	5	117	4	0	1	126	5	10	0	0	3	15	12	176	4	0	1	192	9	13	7	0	1	29	362
8:30 AM	3	110	1	0	2	114	1	8	1	0	1	10	13	149	2	0	0	164	16	18	9	0	0	43	331
Total	13	477	7	0	3	497	8	42	9	0	5	59	56	614	12	0	1	682	67	71	28	0	4	166	1404
Approach %	2.6	96.0	1.4	0.0	-	-	13.6	71.2	15.3	0.0	-	-	8.2	90.0	1.8	0.0	-	-	40.4	42.8	16.9	0.0	-	-	-
Total %	0.9	34.0	0.5	0.0	-	35.4	0.6	3.0	0.6	0.0	-	4.2	4.0	43.7	0.9	0.0	-	48.6	4.8	5.1	2.0	0.0	-	11.8	-
PHF	0.650	0.903	0.438	0.000	-	0.927	0.400	0.808	0.450	0.000	-	0.738	0.700	0.872	0.600	0.000	-	0.888	0.698	0.807	0.778	0.000	-	0.769	0.944
Lights	13	445	7	0	-	465	8	41	9	0	-	58	52	597	12	0	-	661	66	70	28	0	-	164	1348
% Lights	100.0	93.3	100.0	-	-	93.6	100.0	97.6	100.0	-	-	98.3	92.9	97.2	100.0	-	-	96.9	98.5	98.6	100.0	-	-	98.8	96.0
Buses	0	10	0	0	-	10	0	0	0	0	-	0	1	8	0	0	-	9	0	1	0	0	-	1	20
% Buses	0.0	2.1	0.0	-	-	2.0	0.0	0.0	0.0	-	-	0.0	1.8	1.3	0.0	-	-	1.3	0.0	1.4	0.0	-	-	0.6	1.4
Trucks	0	22	0	0	-	22	0	1	0	0	-	1	3	9	0	0	-	12	1	0	0	0	-	1	36
% Trucks	0.0	4.6	0.0	-	-	4.4	0.0	2.4	0.0	-	-	1.7	5.4	1.5	0.0	-	-	1.8	1.5	0.0	0.0	-	-	0.6	2.6
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	5	-	-	-	-	-	1	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Montgomery County, PA
County Line Rd/Montrose Ave
Thursday, December 1, 2016
Location: 40.0245, -75.327214

Count Name: County Line Rd/Montrose Ave
Site Code:
Start Date: 12/01/2016
Page No: 8

Turning Movement Peak Hour Data (5:00 PM)

Start Time	County Line Rd Southbound						Montrose Ave Westbound						County Line Rd Northbound						Montrose Ave Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
5:00 PM	6	166	1	0	0	173	4	1	3	0	0	8	5	98	2	0	0	105	21	15	8	0	0	44	330
5:15 PM	13	178	1	0	0	192	1	11	8	0	1	20	8	118	8	0	1	134	19	18	5	0	0	42	388
5:30 PM	8	186	4	0	0	198	3	9	7	0	0	19	13	121	7	0	0	141	20	18	8	0	2	46	404
5:45 PM	11	175	1	0	1	187	1	15	5	0	0	21	7	96	5	0	0	108	8	9	5	0	0	22	338
Total	38	705	7	0	1	750	9	36	23	0	1	68	33	433	22	0	1	488	68	60	26	0	2	154	1460
Approach %	5.1	94.0	0.9	0.0	-	-	13.2	52.9	33.8	0.0	-	-	6.8	88.7	4.5	0.0	-	-	44.2	39.0	16.9	0.0	-	-	-
Total %	2.6	48.3	0.5	0.0	-	51.4	0.6	2.5	1.6	0.0	-	4.7	2.3	29.7	1.5	0.0	-	33.4	4.7	4.1	1.8	0.0	-	10.5	-
PHF	0.731	0.948	0.438	0.000	-	0.947	0.563	0.600	0.719	0.000	-	0.810	0.635	0.895	0.688	0.000	-	0.865	0.810	0.833	0.813	0.000	-	0.837	0.903
Lights	38	700	7	0	-	745	9	36	23	0	-	68	32	430	22	0	-	484	66	58	26	0	-	150	1447
% Lights	100.0	99.3	100.0	-	-	99.3	100.0	100.0	100.0	-	-	100.0	97.0	99.3	100.0	-	-	99.2	97.1	96.7	100.0	-	-	97.4	99.1
Buses	0	2	0	0	-	2	0	0	0	0	-	0	0	2	0	0	-	2	1	0	0	0	-	1	5
% Buses	0.0	0.3	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	-	-	0.4	1.5	0.0	0.0	-	-	0.6	0.3
Trucks	0	3	0	0	-	3	0	0	0	0	-	0	1	1	0	0	-	2	1	2	0	0	-	3	8
% Trucks	0.0	0.4	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	3.0	0.2	0.0	-	-	0.4	1.5	3.3	0.0	-	-	1.9	0.5
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Imperial Traffic & Data Collection
 www.imperialtdc.com
 PO BOX 4673
 Cherry Hill, New Jersey, United States 08034
 609-706-6100 lklein@imperialtdc.com

Project: County Line Road
 Municipality: Radnor Township, Delaware
 County, PA
 Setup: MAK
 Location: 40.024514, -75.327197

Count Name: 2. County Line Road & Montrose Avenue
 Site Code: 2
 Start Date: 04/28/2018
 Page No: 1

Turning Movement Data

PHF
0.961

Start Time	Montrose Avenue Eastbound						Montrose Avenue Westbound						County Line Road Northbound						County Line Road Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
11:00 AM	0	6	7	2	3	15	0	4	7	4	0	15	0	1	96	7	0	104	0	2	76	5	2	83	217
11:15 AM	0	7	13	4	2	24	0	4	3	8	0	15	0	0	105	4	5	109	0	3	89	2	0	94	242
11:30 AM	0	7	11	6	0	24	0	6	3	4	2	13	0	2	116	7	2	125	0	1	78	8	0	87	249
11:45 AM	1	5	10	3	1	19	0	6	8	1	4	15	0	1	129	11	1	141	0	0	89	6	0	95	270
12:00 PM	0	8	8	5	3	21	0	14	6	1	0	21	0	2	114	11	1	127	0	2	104	6	0	112	281
12:15 PM	0	8	5	5	2	18	0	7	15	6	1	28	0	0	116	3	1	119	0	1	77	6	0	84	249
12:30 PM	0	5	6	2	0	13	0	9	6	3	1	18	0	2	107	9	0	118	0	0	119	12	0	131	280
12:45 PM	1	26	29	15		71	0	36	35	11	6	82	0	5	466	34	3	505	0	3	389	30	0	422	1080
Hourly Total	0	20	20	10	0	60	0	32	31	14	4	77	0	4	401	33	0	406	0	0	390	27	0	431	1002
1:00 PM	0	1	10	3	1	14	0	5	9	2	0	16	0	6	89	6	0	101	0	4	77	8	1	89	220
1:15 PM	0	3	7	2	1	12	0	7	9	1	0	17	0	1	106	1	0	108	0	2	93	3	1	98	235
1:30 PM	0	6	10	6	3	22	0	7	9	3	0	19	0	3	93	7	0	103	0	1	103	8	2	112	256
1:45 PM	0	4	5	6	0	15	0	6	8	1	0	15	0	2	118	4	2	124	0	1	100	3	2	104	258
Hourly Total	0	14	32	17	5	63	0	25	35	7	0	67	0	12	406	18	2	436	0	8	373	22	6	403	969
Grand Total	1	64	99	47	17	211	0	77	87	38	10	202	0	20	1303	80	16	1403	0	20	1103	70	8	1193	3009
Approach %	0.5	30.3	46.9	22.3	-	-	0.0	38.1	43.1	18.8	-	-	0.0	1.4	92.9	5.7	-	-	0.0	1.7	92.5	5.9	-	-	-
Total %	0.0	2.1	3.3	1.6	-	7.0	0.0	2.6	2.9	1.3	-	6.7	0.0	0.7	43.3	2.7	-	46.6	0.0	0.7	36.7	2.3	-	39.6	-
Lights	1	64	98	47	-	210	0	76	87	38	-	201	0	20	1287	79	-	1386	0	20	1089	69	-	1178	2975
% Lights	100.0	100.0	99.0	100.0	-	99.5	-	98.7	100.0	100.0	-	99.5	-	100.0	98.8	98.8	-	98.8	-	100.0	98.7	98.6	-	98.7	98.9
Mediums	0	0	1	0	-	1	0	1	0	0	-	1	0	0	16	1	-	17	0	0	13	1	-	14	33
% Mediums	0.0	0.0	1.0	0.0	-	0.5	-	1.3	0.0	0.0	-	0.5	-	0.0	1.2	1.3	-	1.2	-	0.0	1.2	1.4	-	1.2	1.1
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	1	0	-	1	1
% Articulated Trucks	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	-	0.0	0.1	0.0	-	0.1	0.0
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	11.8	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	15	-	-	-	-	-	10	-	-	-	-	-	16	-	-	-	-	-	8	-	-
% Pedestrians	-	-	-	-	88.2	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

County Line Rd/Roberts Road - TMC

Tue Jan 31, 2017

AM Peak (7:45AM - 8:45AM) - Overall Peak Hour

All Classes (Articulated Trucks and Single-Unit Trucks, Bicycles on Crosswalk, Buses, Lights, Pedestrians)

All Movements

ID: 380498, Location: 40.023344, -75.326278



Provided by: Tri-State Traffic Data, Inc.
184 Baker Road, Coatesville, PA, 19320, US

Leg Direction	Roberts Road Southbound						County Line Road Westbound						Roberts Road Northbound						County Line Road Eastbound						Int
	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	
2017-01-31 7:45AM	3	3	1	0	7	1	6	133	2	0	141	0	10	25	19	0	54	1	14	141	5	0	160	2	362
8:00AM	6	10	3	0	19	0	7	153	1	0	161	0	4	33	17	0	54	1	8	120	2	0	130	0	364
8:15AM	5	6	3	0	14	2	6	138	1	0	145	0	1	28	16	0	45	0	13	86	0	0	99	0	303
8:30AM	2	6	0	0	8	1	9	136	0	0	145	0	1	15	15	0	31	0	10	108	2	0	120	0	304
Total	16	25	7	0	48	4	28	560	4	0	592	0	16	101	67	0	184	2	45	455	9	0	509	2	1333
% Approach	33.3%	52.1%	14.6%	0%	-	-	4.7%	94.6%	0.7%	0%	-	-	8.7%	54.9%	36.4%	0%	-	-	8.8%	89.4%	1.8%	0%	-	-	-
% Total	1.2%	1.9%	0.5%	0%	3.6%	-	2.1%	42.0%	0.3%	0%	44.4%	-	1.2%	7.6%	5.0%	0%	13.8%	-	3.4%	34.1%	0.7%	0%	38.2%	-	-
PHF	0.667	0.625	0.583	-	0.632	-	0.778	0.915	0.500	-	0.919	-	0.400	0.765	0.882	-	0.852	-	0.804	0.807	0.450	-	0.795	-	0.916
Lights	16	25	7	0	48	-	27	549	4	0	580	-	16	99	61	0	176	-	45	436	9	0	490	-	1294
% Lights	100%	100%	100%	0%	100%	-	96.4%	98.0%	100%	0%	98.0%	-	100%	98.0%	91.0%	0%	95.7%	-	100%	95.8%	100%	0%	96.3%	-	97.1%
Articulated Trucks and Single-Unit Trucks	0	0	0	0	0	-	1	5	0	0	6	-	0	2	0	0	2	-	0	8	0	0	8	-	16
% Articulated Trucks and Single-Unit Trucks	0%	0%	0%	0%	0%	-	3.6%	0.9%	0%	0%	1.0%	-	0%	2.0%	0%	0%	1.1%	-	0%	1.8%	0%	0%	1.6%	-	1.2%
Buses	0	0	0	0	0	-	0	6	0	0	6	-	0	0	6	0	6	-	0	11	0	0	11	-	23
% Buses	0%	0%	0%	0%	0%	-	0%	1.1%	0%	0%	1.0%	-	0%	0%	9.0%	0%	3.3%	-	0%	2.4%	0%	0%	2.2%	-	1.7%
Pedestrians	-	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	50.0%	-	-	-	-	-	100%	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	50.0%	-	-	-	-	-	0%	

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn.

County Line Rd/Roberts Road - TMC

Tue Jan 31, 2017

PM Peak (3:15PM - 4:15PM)

All Classes (Articulated Trucks and Single-Unit Trucks, Bicycles on Crosswalk, Buses, Lights, Pedestrians)

All Movements

ID: 380498, Location: 40.023344, -75.326278



Provided by: Tri-State Traffic Data, Inc.
184 Baker Road, Coatesville, PA, 19320, US

Leg Direction	Roberts Road Southbound						County Line Road Westbound						Roberts Road Northbound						County Line Road Eastbound						Int
	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	
2017-01-31 3:15PM	2	6	3	0	11	0	4	123	0	0	127	0	5	6	10	0	21	1	20	117	3	0	140	1	299
3:30PM	1	3	1	0	5	2	6	152	0	0	158	2	2	14	12	0	28	1	19	131	0	0	150	0	341
3:45PM	3	14	4	0	21	4	7	130	0	0	137	0	4	8	6	0	18	3	28	126	1	0	155	3	331
4:00PM	3	8	5	0	16	1	10	130	0	0	140	0	3	9	5	0	17	0	24	118	0	0	142	0	315
Total	9	31	13	0	53	7	27	535	0	0	562	2	14	37	33	0	84	5	91	492	4	0	587	4	1286
% Approach	17.0%	58.5%	24.5%	0%	-	-	4.8%	95.2%	0%	0%	-	-	16.7%	44.0%	39.3%	0%	-	-	15.5%	83.8%	0.7%	0%	-	-	-
% Total	0.7%	2.4%	1.0%	0%	4.1%	-	2.1%	41.6%	0%	0%	43.7%	-	1.1%	2.9%	2.6%	0%	6.5%	-	7.1%	38.3%	0.3%	0%	45.6%	-	-
PHF	0.750	0.554	0.650	-	0.631	-	0.675	0.880	-	-	0.889	-	0.700	0.661	0.688	-	0.750	-	0.813	0.939	0.333	-	0.947	-	0.943
Lights	9	31	13	0	53	-	27	516	0	0	543	-	13	37	29	0	79	-	87	480	4	0	571	-	1246
% Lights	100%	100%	100%	0%	100%	-	100%	96.4%	0%	0%	96.6%	-	92.9%	100%	87.9%	0%	94.0%	-	95.6%	97.6%	100%	0%	97.3%	-	96.9%
Articulated Trucks and Single-Unit Trucks	0	0	0	0	0	-	0	6	0	0	6	-	0	0	0	0	0	-	0	1	0	0	1	-	7
% Articulated Trucks and Single-Unit Trucks	0%	0%	0%	0%	0%	-	0%	1.1%	0%	0%	1.1%	-	0%	0%	0%	0%	0%	-	0%	0.2%	0%	0%	0.2%	-	0.5%
Buses	0	0	0	0	0	-	0	13	0	0	13	-	1	0	4	0	5	-	4	11	0	0	15	-	33
% Buses	0%	0%	0%	0%	0%	-	0%	2.4%	0%	0%	2.3%	-	7.1%	0%	12.1%	0%	6.0%	-	4.4%	2.2%	0%	0%	2.6%	-	2.6%
Pedestrians	-	-	-	-	-	7	-	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	4	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	60.0%	-	-	-	-	-	100%	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	40.0%	-	-	-	-	-	0%	

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn.



Imperial Traffic & Data Collection
 www.imperialtdc.com
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 Cherry Hill, New Jersey, United States 08034
 609-706-6100 lklein@imperialtdc.com

Project: County Line Road
 Municipality: Radnor Township, Delaware
 County, PA
 Setup: MAK
 Location: 40.02337, -75.326307

Count Name: 3. County Line Road & Robert's
 Road
 Site Code: 3
 Start Date: 04/28/2018
 Page No: 3

Turning Movement Peak Hour Data (11:45 AM)

Start Time	S Roberts Road Eastbound						S Roberts Road Westbound						County Line Road Northbound						County Line Road Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
11:45 AM	0	12	8	4	3	24	0	3	9	2	0	14	0	0	123	7	0	130	0	2	81	15	0	98	266
12:00 PM	0	11	10	2	3	23	0	1	9	4	0	14	0	1	105	9	0	115	0	4	104	15	0	123	275
12:15 PM	0	5	10	0	2	15	0	5	16	2	1	23	0	1	110	4	0	115	0	3	76	10	0	89	242
12:30 PM	0	16	6	0	0	22	0	3	8	5	1	16	0	0	98	6	0	104	0	1	104	18	0	123	265
Total	0	44	34	6	8	84	0	12	42	13	2	67	0	2	436	26	0	464	0	10	365	58	0	433	1048
Approach %	0.0	52.4	40.5	7.1	-	-	0.0	17.9	62.7	19.4	-	-	0.0	0.4	94.0	5.6	-	-	0.0	2.3	84.3	13.4	-	-	-
Total %	0.0	4.2	3.2	0.6	-	8.0	0.0	1.1	4.0	1.2	-	6.4	0.0	0.2	41.6	2.5	-	44.3	0.0	1.0	34.8	5.5	-	41.3	-
PHF	0.000	0.688	0.850	0.375	-	0.875	0.000	0.600	0.656	0.650	-	0.728	0.000	0.500	0.886	0.722	-	0.892	0.000	0.625	0.877	0.806	-	0.880	0.953
Lights	0	44	34	6	-	84	0	12	42	13	-	67	0	2	431	24	-	457	0	9	361	58	-	428	1036
% Lights	-	100.0	100.0	100.0	-	100.0	-	100.0	100.0	100.0	-	100.0	-	100.0	98.9	92.3	-	98.5	-	90.0	98.9	100.0	-	98.8	98.9
Mediums	0	0	0	0	-	0	0	0	0	0	-	0	0	0	5	2	-	7	0	1	4	0	-	5	12
% Mediums	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	-	0.0	1.1	7.7	-	1.5	-	10.0	1.1	0.0	-	1.2	1.1
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

County Line Rd/Thomas Ave - TMC

Tue Jan 31, 2017

AM Peak (7:30AM - 8:30AM)

All Classes (Articulated Trucks and Single-Unit Trucks, Buses, Lights, Pedestrians)

All Movements

ID: 380500, Location: 40.022271, -75.325591



Provided by: Tri-State Traffic Data, Inc.
184 Baker Road, Coatesville, PA, 19320, US

Leg Direction	Thomas Ave Southbound								County Line Road Westbound								Glenbrook Ave Northwestbound								
	R	T	BL	L	U	RR	App	Ped*	R	T	L	HL	U	RR	App	Ped*	HR	BR	BL	HL	U	HRR	BRR	App	Ped*
2017-01-31 7:30AM	0	4	0	1	0	0	5	0	4	154	93	0	0	0	251	0	4	3	7	4	0	0	0	18	0
7:45AM	0	3	0	0	0	0	3	1	2	122	87	0	0	0	211	0	5	5	11	5	0	0	0	26	0
8:00AM	0	6	0	2	0	0	8	0	1	144	98	0	0	0	243	2	15	7	23	4	0	0	0	49	0
8:15AM	1	4	0	1	0	0	6	0	5	125	72	0	0	1	203	2	10	2	20	7	0	1	0	40	0
Total	1	17	0	4	0	0	22	1	12	545	350	0	0	1	908	4	34	17	61	20	0	1	0	133	0
% Approach	4.5%	77.3%	0%	18.2%	0%	0%	-	-	1.3%	60.0%	38.5%	0%	0%	0.1%	-	-	25.6%	12.8%	45.9%	15.0%	0%	0.8%	0%	-	-
% Total	0.1%	0.9%	0%	0.2%	0%	0%	1.1%	-	0.6%	28.2%	18.1%	0%	0%	0.1%	47.0%	-	1.8%	0.9%	3.2%	1.0%	0%	0.1%	0%	6.9%	-
PHF	0.250	0.708	-	0.500	-	-	0.688	-	0.600	0.885	0.893	-	-	0.250	0.904	-	0.567	0.607	0.663	0.714	-	0.250	-	0.679	-
Lights	1	16	0	4	0	0	21	-	11	530	341	0	0	1	883	-	33	17	61	19	0	1	0	131	-
% Lights	100%	94.1%	0%	100%	0%	0%	95.5%	-	91.7%	97.2%	97.4%	0%	0%	100%	97.2%	-	97.1%	100%	100%	95.0%	0%	100%	0%	98.5%	-
Articulated Trucks and Single-Unit Trucks	0	0	0	0	0	0	0	-	1	9	7	0	0	0	17	-	0	0	0	0	0	0	0	0	-
% Articulated Trucks and Single-Unit Trucks	0%	0%	0%	0%	0%	0%	0%	-	8.3%	1.7%	2.0%	0%	0%	0%	1.9%	-	0%	0%	0%	0%	0%	0%	0%	0%	-
Buses	0	1	0	0	0	0	1	-	0	6	2	0	0	0	8	-	1	0	0	1	0	0	0	2	-
% Buses	0%	5.9%	0%	0%	0%	0%	4.5%	-	0%	1.1%	0.6%	0%	0%	0%	0.9%	-	2.9%	0%	0%	5.0%	0%	0%	0%	1.5%	-
Pedestrians	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	0
% Pedestrians	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, BRR: Bear right on red, HL: Hard left, HR: Hard right, HRR: Hard right on red, L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn.

County Line Rd/Thomas Ave - TMC

Tue Jan 31, 2017

AM Peak (7:30AM - 8:30AM)

All Classes (Articulated Trucks and Single-Unit Trucks, Buses, Lights, Pedestrians)

All Movements

ID: 380500, Location: 40.022271, -75.325591



Provided by: Tri-State Traffic Data, Inc.
184 Baker Road, Coatesville, PA, 19320, US

Leg Direction	Conestoga Road Northbound										County Line Road Eastbound										Int
	HR	R	T	L	U	HRR	RR	App	Ped*	R	BR	T	L	U	RR	BRR	App	Ped*			
2017-01-31 7:30AM	1	89	0	0	0	0	0	90	2	0	6	111	0	0	0	0	117	0	481		
7:45AM	1	103	0	0	0	0	0	104	0	0	0	138	0	0	0	0	138	0	482		
8:00AM	2	102	0	0	0	0	0	104	0	0	4	126	0	0	0	0	130	0	534		
8:15AM	2	82	0	0	0	0	0	84	0	0	3	97	0	0	0	0	100	0	433		
Total	6	376	0	0	0	0	0	382	2	0	13	472	0	0	0	0	485	0	1930		
% Approach	1.6%	98.4%	0%	0%	0%	0%	0%	-	-	0%	2.7%	97.3%	0%	0%	0%	0%	-	-	-		
% Total	0.3%	19.5%	0%	0%	0%	0%	0%	19.8%	-	0%	0.7%	24.5%	0%	0%	0%	0%	25.1%	-	-		
PHF	0.750	0.913	-	-	-	-	-	0.918	-	-	0.542	0.855	-	-	-	-	0.879	-	0.904		
Lights	6	370	0	0	0	0	0	376	-	0	10	449	0	0	0	0	459	-	1870		
% Lights	100%	98.4%	0%	0%	0%	0%	0%	98.4%	-	0%	76.9%	95.1%	0%	0%	0%	0%	94.6%	-	96.9%		
Articulated Trucks and Single-Unit Trucks	0	2	0	0	0	0	0	2	-	0	0	10	0	0	0	0	10	-	29		
% Articulated Trucks and Single-Unit Trucks	0%	0.5%	0%	0%	0%	0%	0%	0.5%	-	0%	0%	2.1%	0%	0%	0%	0%	2.1%	-	1.5%		
Buses	0	4	0	0	0	0	0	4	-	0	3	13	0	0	0	0	16	-	31		
% Buses	0%	1.1%	0%	0%	0%	0%	0%	1.0%	-	0%	23.1%	2.8%	0%	0%	0%	0%	3.3%	-	1.6%		
Pedestrians	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	0		
% Pedestrians	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-		

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, BRR: Bear right on red, HL: Hard left, HR: Hard right, HRR: Hard right on red, L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn.

County Line Rd/Thomas Ave - TMC

Tue Jan 31, 2017

PM Peak (4:15PM - 5:15PM) - Overall Peak Hour

All Classes (Articulated Trucks and Single-Unit Trucks, Buses, Lights, Pedestrians)

All Movements

ID: 380500, Location: 40.022271, -75.325591



Provided by: Tri-State Traffic Data, Inc.
184 Baker Road, Coatesville, PA, 19320, US

Leg Direction	Thomas Ave Southbound								County Line Road Westbound								Glenbrook Ave Northwestbound								
	R	T	BL	L	U	RR	App	Ped*	R	T	L	HL	U	RR	App	Ped*	HR	BR	BL	HL	U	HRR	BRR	App	Ped*
2017-01-31 4:15PM	1	0	2	3	0	0	6	3	5	93	95	0	0	0	193	4	14	6	4	4	0	0	0	28	1
4:30PM	0	6	1	1	0	0	8	4	3	121	88	0	0	0	212	3	14	3	9	5	0	0	0	31	3
4:45PM	2	3	0	0	0	0	5	3	8	99	79	0	0	0	186	2	5	3	6	7	0	0	0	21	0
5:00PM	1	5	5	7	0	0	18	0	7	104	104	0	0	1	216	2	16	7	10	6	0	0	0	39	0
Total	4	14	8	11	0	0	37	10	23	417	366	0	0	1	807	11	49	19	29	22	0	0	0	119	4
% Approach	10.8%	37.8%	21.6%	29.7%	0%	0%	-	-	2.9%	51.7%	45.4%	0%	0%	0.1%	-	-	41.2%	16.0%	24.4%	18.5%	0%	0%	0%	-	-
% Total	0.2%	0.7%	0.4%	0.6%	0%	0%	1.9%	-	1.2%	20.9%	18.4%	0%	0%	0.1%	40.5%	-	2.5%	1.0%	1.5%	1.1%	0%	0%	0%	6.0%	-
PHF	0.500	0.583	0.400	0.393	-	-	0.514	-	0.719	0.862	0.880	-	-	0.250	0.934	-	0.766	0.679	0.725	0.786	-	-	-	0.763	-
Lights	3	14	8	10	0	0	35	-	22	410	366	0	0	1	799	-	49	19	29	22	0	0	0	119	-
% Lights	75.0%	100%	100%	90.9%	0%	0%	94.6%	-	95.7%	98.3%	100%	0%	0%	100%	99.0%	-	100%	100%	100%	100%	0%	0%	0%	100%	-
Articulated Trucks and Single-Unit Trucks	0	0	0	1	0	0	1	-	0	3	0	0	0	0	3	-	0	0	0	0	0	0	0	0	-
% Articulated Trucks and Single-Unit Trucks	0%	0%	0%	9.1%	0%	0%	2.7%	-	0%	0.7%	0%	0%	0%	0%	0.4%	-	0%	0%	0%	0%	0%	0%	0%	0%	-
Buses	1	0	0	0	0	0	1	-	1	4	0	0	0	0	5	-	0	0	0	0	0	0	0	0	-
% Buses	25.0%	0%	0%	0%	0%	0%	2.7%	-	4.3%	1.0%	0%	0%	0%	0%	0.6%	-	0%	0%	0%	0%	0%	0%	0%	0%	-
Pedestrians	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	11	-	-	-	-	-	-	-	-	4
% Pedestrians	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	100%

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, BRR: Bear right on red, HL: Hard left, HR: Hard right, HRR: Hard right on red, L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn.

County Line Rd/Thomas Ave - TMC

Tue Jan 31, 2017

PM Peak (4:15PM - 5:15PM) - Overall Peak Hour

All Classes (Articulated Trucks and Single-Unit Trucks, Buses, Lights, Pedestrians)

All Movements

ID: 380500, Location: 40.022271, -75.325591



Provided by: Tri-State Traffic Data, Inc.
184 Baker Road, Coatesville, PA, 19320, US

Leg Direction	Conestoga Road Northbound										County Line Road Eastbound										Int
	HR	R	T	L	U	HRR	RR	App	Ped*		R	BR	T	L	U	RR	BRR	App	Ped*		
2017-01-31 4:15PM	10	94	0	0	0	0	0	104	1		1	3	141	2	0	0	0	147	0	478	
4:30PM	5	106	0	0	0	0	0	111	0		2	3	132	0	0	0	0	137	0	499	
4:45PM	6	97	0	0	0	0	0	103	0		0	6	165	1	0	0	0	172	0	487	
5:00PM	4	90	0	0	0	0	0	94	0		0	7	151	2	0	0	0	160	0	527	
Total	25	387	0	0	0	0	0	412	1		3	19	589	5	0	0	0	616	0	1991	
% Approach	6.1%	93.9%	0%	0%	0%	0%	0%	-	-		0.5%	3.1%	95.6%	0.8%	0%	0%	0%	-	-	-	
% Total	1.3%	19.4%	0%	0%	0%	0%	0%	20.7%	-		0.2%	1.0%	29.6%	0.3%	0%	0%	0%	30.9%	-	-	
PHF	0.625	0.913	-	-	-	-	-	0.928	-		0.375	0.679	0.892	0.625	-	-	-	0.895	-	0.944	
Lights	25	383	0	0	0	0	0	408	-		3	18	587	5	0	0	0	613	-	1974	
% Lights	100%	99.0%	0%	0%	0%	0%	0%	99.0%	-		100%	94.7%	99.7%	100%	0%	0%	0%	99.5%	-	99.1%	
Articulated Trucks and Single-Unit Trucks	0	2	0	0	0	0	0	2	-		0	0	1	0	0	0	0	1	-	7	
% Articulated Trucks and Single-Unit Trucks	0%	0.5%	0%	0%	0%	0%	0%	0.5%	-		0%	0%	0.2%	0%	0%	0%	0%	0.2%	-	0.4%	
Buses	0	2	0	0	0	0	0	2	-		0	1	1	0	0	0	0	2	-	10	
% Buses	0%	0.5%	0%	0%	0%	0%	0%	0.5%	-		0%	5.3%	0.2%	0%	0%	0%	0%	0.3%	-	0.5%	
Pedestrians	-	-	-	-	-	-	-	-	1		-	-	-	-	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	100%		-	-	-	-	-	-	-	-	-	-	

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, BRR: Bear right on red, HL: Hard left, HR: Hard right, HRR: Hard right on red, L: Left, R: Right, RR: Right on red, T: Thru, U: U-Turn.

4. County Line Road & Conestoga Road/Thomas Avenue/Glenbrook Avenue - TMC

Provided by: Imperial Traffic & Data Collection
27 Imperial Drive,
Cherry Hill, NJ, 08003, US

Sat Apr 28, 2018

Midday Peak (WKND), Forced Peak (11:45AM - 12:45PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians,

Bicycles on Crosswalk)

All Movements

ID: 519503, Location: 40.022288, -75.325567, Site Code: 4

Leg Direction	Thomas Avenue Westbound								County Line Road Northbound								County Line Road Southbound							
	L	BL	BR	R	U	App	Ped*	HL	BL	T	R	U	App	Ped*	L	T	BR	HR	U	App	Ped*			
2018-04-28 11:45AM	4	0	0	0	0	4	2	0	65	116	4	0	185	2	1	78	3	0	0	82	2			
12:00PM	3	0	3	3	0	9	0	0	59	107	12	0	178	3	2	109	0	3	0	114	2			
12:15PM	6	1	1	2	0	10	1	0	67	106	4	0	177	10	1	74	0	1	0	76	1			
12:30PM	5	2	1	1	0	9	1	0	64	98	7	0	169	8	0	102	3	0	0	105	0			
Total	18	3	5	6	0	32	4	0	255	427	27	0	709	23	4	363	6	4	0	377	5			
% Approach	56.3%	9.4%	15.6%	18.8%	0%	-	-	0%	36.0%	60.2%	3.8%	0%	-	-	1.1%	96.3%	1.6%	1.1%	0%	-	-			
% Total	1.2%	0.2%	0.3%	0.4%	0%	2.1%	-	0%	16.5%	27.6%	1.7%	0%	45.9%	-	0.3%	23.5%	0.4%	0.3%	0%	24.4%	-			
PHF	0.750	0.375	0.417	0.500	-	0.800	-	-	0.951	0.920	0.563	-	0.958	-	0.500	0.833	0.500	0.333	-	0.827	-			
Lights	18	2	5	6	0	31	-	0	254	417	27	0	698	-	4	358	6	4	0	372	-			
% Lights	100%	66.7%	100%	100%	0%	96.9%	-	0%	99.6%	97.7%	100%	0%	98.4%	-	100%	98.6%	100%	100%	0%	98.7%	-			
Articulated Trucks	0	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	0	-			
% Articulated Trucks	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	-			
Buses and Single-Unit Trucks	0	1	0	0	0	1	-	0	1	10	0	0	11	-	0	5	0	0	0	5	-			
% Buses and Single-Unit Trucks	0%	33.3%	0%	0%	0%	3.1%	-	0%	0.4%	2.3%	0%	0%	1.6%	-	0%	1.4%	0%	0%	0%	1.3%	-			
Pedestrians	-	-	-	-	-	-	4	-	-	-	-	-	-	23	-	-	-	-	-	-	5			
% Pedestrians	-	-	-	-	-	-	-100%	-	-	-	-	-	-	-100%	-	-	-	-	-	-	-100%			
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0			
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%			

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

4. County Line Road & Conestoga Road/Thomas Avenue/Glenbrook

Provided by: Imperial Traffic & Data

Avenu - TMC

Collection

Sat Apr 28, 2018

27 Imperial Drive,

Midday Peak (WKND), Forced Peak (11:45AM - 12:45PM) - Overall Peak Hour

Cherry Hill, NJ, 08003, US

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians,

Bicycles on Crosswalk)

All Movements

ID: 519503, Location: 40.022288, -75.325567, Site Code: 4

Leg Direction	Conestoga Road Southeastbound								Glenbrook Avenue Northeastbound								Int
	HL	BL	BR	R	U	App	Ped*	L	BL	BR	HR	U	App	Ped*			
2018-04-28 11:45AM	0	0	87	5	0	92	3	2	15	9	12	0	38	1	401		
12:00PM	0	0	67	3	0	70	1	4	7	3	12	0	26	2	397		
12:15PM	0	0	67	3	0	70	0	2	7	3	11	0	23	1	356		
12:30PM	0	0	75	0	0	75	0	6	5	7	16	0	34	0	392		
Total	0	0	296	11	0	307	4	14	34	22	51	0	121	4	1546		
% Approach	0%	0%	96.4%	3.6%	0%	-	-	11.6%	28.1%	18.2%	42.1%	0%	-	-	-		
% Total	0%	0%	19.1%	0.7%	0%	19.9%	-	0.9%	2.2%	1.4%	3.3%	0%	7.8%	-	-		
PHF	-	-	0.851	0.550	-	0.834	-	0.583	0.567	0.611	0.797	-	0.796	-	0.964		
Lights	0	0	296	11	0	307	-	14	34	22	50	0	120	-	1528		
% Lights	0%	0%	100%	100%	0%	100%	-	100%	100%	100%	98.0%	0%	99.2%	-	98.8%		
Articulated Trucks	0	0	0	0	0	0	-	0	0	0	0	0	0	-	0		
% Articulated Trucks	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	-	0%		
Buses and Single-Unit Trucks	0	0	0	0	0	0	-	0	0	0	1	0	1	-	18		
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	2.0%	0%	0.8%	-	1.2%		
Pedestrians	-	-	-	-	-	-	4	-	-	-	-	-	-	-	4		
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	100%		
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	-	0		
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	-	0%		

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

5/6. County Line Road & S. Warner Avenue & Old Lancaster Road - TMC

Tue May 1, 2018

AM Peak (May 01 2018 7:30AM - 8:30AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 519507, Location: 40.021591, -75.32498, Site Code: 5, 6

Provided by: Imperial Traffic & Data

Collection

27 Imperial Drive,

Cherry Hill, NJ, 08003, US

Leg Direction	County Line Road Northbound					County Line Road Southbound					Old Lancaster Road Northwestbound					S. Warner Avenue Southwestbound		Int			
	T	BR	HR	U	App	Ped*	HL	BL	T	U	App	Ped*	HL	BR	R	U	App		Ped*		
2018-05-01 7:30AM	236	2	0	0	238	1	1	58	134	0	193	1	1	34	3	0	38	0	0	4	469
7:45AM	215	7	0	0	222	0	4	68	175	0	247	0	0	50	2	0	52	0	0	3	521
8:00AM	214	1	0	0	215	0	0	77	173	0	250	0	1	31	2	0	34	0	0	0	499
8:15AM	221	6	0	0	227	0	0	71	159	0	230	0	1	33	1	0	35	0	0	1	492
Total	886	16	0	0	902	1	5	274	641	0	920	1	3	148	8	0	159	0	0	8	1981
% Approach	98.2%	1.8%	0%	0%	-	-	0.5%	29.8%	69.7%	0%	-	-	1.9%	93.1%	5.0%	0%	-	-	-	-	-
% Total	44.7%	0.8%	0%	0%	45.5%	-	0.3%	13.8%	32.4%	0%	46.4%	-	0.2%	7.5%	0.4%	0%	8.0%	-	0%	-	-
PHF	0.939	0.571	-	-	0.947	-	0.313	0.890	0.916	-	0.920	-	0.750	0.740	0.667	-	0.764	-	-	-	0.951
Lights	858	14	0	0	872	-	5	272	613	0	890	-	2	145	7	0	154	-	0	-	1916
% Lights	96.8%	87.5%	0%	0%	96.7%	-	100%	99.3%	95.6%	0%	96.7%	-	66.7%	98.0%	87.5%	0%	96.9%	-	-	-	96.7%
Articulated Trucks	2	0	0	0	2	-	0	0	2	0	2	-	1	0	0	0	1	-	0	-	5
% Articulated Trucks	0.2%	0%	0%	0%	0.2%	-	0%	0%	0.3%	0%	0.2%	-	33.3%	0%	0%	0%	0.6%	-	-	-	0.3%
Buses and Single-Unit Trucks	26	2	0	0	28	-	0	2	26	0	28	-	0	3	1	0	4	-	0	-	60
% Buses and Single-Unit Trucks	2.9%	12.5%	0%	0%	3.1%	-	0%	0.7%	4.1%	0%	3.0%	-	0%	2.0%	12.5%	0%	2.5%	-	-	-	3.0%
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-	8
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	100%
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	0%

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, R: Right, T: Thru, U: U-Turn

5/6. County Line Road & S. Warner Avenue & Old Lancaster Road - TMC

Provided by: Imperial Traffic & Data

Tue May 1, 2018

Collection

PM Peak (May 01 2018 4:45PM - 5:45PM) - Overall Peak Hour

27 Imperial Drive,

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

Cherry Hill, NJ, 08003, US

All Movements

ID: 519507, Location: 40.021591, -75.32498, Site Code: 5, 6

Leg Direction	County Line Road Northbound						County Line Road Southbound						Old Lancaster Road Northwestbound						S. Warner Avenue Southwestbound		Int
	T	BR	HR	U	App	Ped*	HL	BL	T	U	App	Ped*	HL	BR	R	U	App	Ped*	App	Ped*	
2018-05-01 4:45PM	176	4	0	0	180	0	2	44	215	0	261	0	4	74	6	0	84	0	0	4	525
5:00PM	182	9	0	0	191	0	3	34	253	0	290	0	3	74	6	1	84	1	0	2	565
5:15PM	144	4	3	0	151	0	4	21	249	0	274	0	0	44	8	0	52	2	0	3	477
5:30PM	149	6	0	0	155	1	5	28	273	0	306	0	0	63	9	0	72	2	0	6	533
Total	651	23	3	0	677	1	14	127	990	0	1131	0	7	255	29	1	292	5	0	15	2100
% Approach	96.2%	3.4%	0.4%	0%	-	-	1.2%	11.2%	87.5%	0%	-	-	2.4%	87.3%	9.9%	0.3%	-	-	-	-	-
% Total	31.0%	1.1%	0.1%	0%	32.2%	-	0.7%	6.0%	47.1%	0%	53.9%	-	0.3%	12.1%	1.4%	0%	13.9%	-	0%	-	-
PHF	0.894	0.639	0.250	-	0.886	-	0.700	0.722	0.907	-	0.924	-	0.438	0.861	0.806	0.250	0.869	-	-	-	0.929
Lights	642	23	3	0	668	-	14	124	979	0	1117	-	7	253	28	1	289	-	0	-	2074
% Lights	98.6%	100%	100%	0%	98.7%	-	100%	97.6%	98.9%	0%	98.8%	-	100%	99.2%	96.6%	100%	99.0%	-	-	-	98.8%
Articulated Trucks	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-	0
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	-	0%
Buses and Single-Unit Trucks	9	0	0	0	9	-	0	3	11	0	14	-	0	2	1	0	3	-	0	-	26
% Buses and Single-Unit Trucks	1.4%	0%	0%	0%	1.3%	-	0%	2.4%	1.1%	0%	1.2%	-	0%	0.8%	3.4%	0%	1.0%	-	-	-	1.2%
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	4	-	14	-
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	80.0%	-	93.3%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	1	-
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	20.0%	-	6.7%	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, R: Right, T: Thru, U: U-Turn

5/6. County Line Road & S. Warner Avenue & Old Lancaster Road - TMC

Provided by: Imperial Traffic & Data

Sat Apr 28, 2018

Collection

Midday Peak (WKND) (Apr 28 2018 11:45AM - 12:45PM)

27 Imperial Drive,

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

Cherry Hill, NJ, 08003, US

All Movements

ID: 519507, Location: 40.021591, -75.32498, Site Code: 5, 6

Leg Direction	County Line Road Northbound						County Line Road Southbound						Old Lancaster Road Northwestbound						S. Warner Avenue Southwestbound		Int
	T	BR	HR	U	App	Ped*	HL	BL	T	U	App	Ped*	HL	BR	R	U	App	Ped*	App	Ped*	
2018-04-28 11:45AM	145	6	2	0	153	0	1	25	143	0	169	0	5	36	6	0	47	1	0	5	369
12:00PM	145	6	0	0	151	0	7	26	153	0	186	0	1	40	5	0	46	0	0	0	383
12:15PM	160	2	0	0	162	3	1	24	124	1	150	1	2	20	6	0	28	1	0	3	340
12:30PM	129	7	0	0	136	2	2	18	168	0	188	0	5	47	5	0	57	0	0	1	381
Total	579	21	2	0	602	5	11	93	588	1	693	1	13	143	22	0	178	2	0	9	1473
% Approach	96.2%	3.5%	0.3%	0%	-	-	1.6%	13.4%	84.8%	0.1%	-	-	7.3%	80.3%	12.4%	0%	-	-	-	-	-
% Total	39.3%	1.4%	0.1%	0%	40.9%	-	0.7%	6.3%	39.9%	0.1%	47.0%	-	0.9%	9.7%	1.5%	0%	12.1%	-	0%	-	-
PHF	0.905	0.750	0.250	-	0.929	-	0.393	0.894	0.875	0.250	0.922	-	0.650	0.761	0.917	-	0.781	-	-	-	0.961
Lights	571	21	2	0	594	-	9	92	583	1	685	-	13	141	21	0	175	-	0	-	1454
% Lights	98.6%	100%	100%	0%	98.7%	-	81.8%	98.9%	99.1%	100%	98.8%	-	100%	98.6%	95.5%	0%	98.3%	-	-	-	98.7%
Articulated Trucks	0	0	0	0	0	-	1	0	0	0	1	-	0	0	0	0	0	-	0	-	1
% Articulated Trucks	0%	0%	0%	0%	0%	-	9.1%	0%	0%	0%	0.1%	-	0%	0%	0%	0%	0%	-	-	-	0.1%
Buses and Single-Unit Trucks	8	0	0	0	8	-	1	1	5	0	7	-	0	2	1	0	3	-	0	-	18
% Buses and Single-Unit Trucks	1.4%	0%	0%	0%	1.3%	-	9.1%	1.1%	0.9%	0%	1.0%	-	0%	1.4%	4.5%	0%	1.7%	-	-	-	1.2%
Pedestrians	-	-	-	-	-	5	-	-	-	-	-	1	-	-	-	-	-	1	-	9	-
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	50.0%	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	50.0%	-	0%	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, R: Right, T: Thru, U: U-Turn



Imperial Traffic & Data Collection
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 Cherry Hill, New Jersey, United States 08034
 609-706-6100 lklein@imperialtdc.com

Project: County Line Road
 Municipality: Radnor Township, Delaware
 County, PA
 Setup: MAK
 Location: 40.019881, -75.323637

Count Name: 7. County Line Road & Mondella
 Avenue
 Site Code: 7
 Start Date: 04/28/2018
 Page No: 6

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Mondella Avenue Westbound					County Line Road Northbound					County Line Road Southbound					Int. Total
	U-Turn	Left	Right	Peds	App. Total	U-Turn	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Peds	App. Total	
7:30 AM	0	6	0	1	6	0	255	13	0	268	0	4	129	1	133	407
7:45 AM	0	0	1	1	1	0	208	8	0	216	0	4	173	0	177	394
8:00 AM	0	3	3	0	6	0	224	16	0	240	0	4	180	0	184	430
8:15 AM	0	3	3	1	6	0	211	4	0	215	0	7	168	1	175	396
Total	0	12	7	3	19	0	898	41	0	939	0	19	650	2	669	1627
Approach %	0.0	63.2	36.8	-	-	0.0	95.6	4.4	-	-	0.0	2.8	97.2	-	-	-
Total %	0.0	0.7	0.4	-	1.2	0.0	55.2	2.5	-	57.7	0.0	1.2	40.0	-	41.1	-
PHF	0.000	0.500	0.583	-	0.792	0.000	0.880	0.641	-	0.876	0.000	0.679	0.903	-	0.909	0.946
Lights	0	12	7	-	19	0	871	41	-	912	0	19	625	-	644	1575
% Lights	-	100.0	100.0	-	100.0	-	97.0	100.0	-	97.1	-	100.0	96.2	-	96.3	96.8
Mediums	0	0	0	-	0	0	27	0	-	27	0	0	19	-	19	46
% Mediums	-	0.0	0.0	-	0.0	-	3.0	0.0	-	2.9	-	0.0	2.9	-	2.8	2.8
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	6	-	6	6
% Articulated Trucks	-	0.0	0.0	-	0.0	-	0.0	0.0	-	0.0	-	0.0	0.9	-	0.9	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	3	-	-	-	-	0	-	-	-	-	2	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-



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Project: County Line Road
 Municipality: Radnor Township, Delaware
 County, PA
 Setup: MAK
 Location: 40.019881, -75.323637

Count Name: 7. County Line Road & Mondella
 Avenue
 Site Code: 7
 Start Date: 04/28/2018
 Page No: 8

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Mondella Avenue Westbound					County Line Road Northbound					County Line Road Southbound					Int. Total
	U-Turn	Left	Right	Peds	App. Total	U-Turn	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Peds	App. Total	
4:45 PM	0	4	5	0	9	0	170	2	0	172	0	3	242	0	245	426
5:00 PM	0	1	6	0	7	0	184	1	0	185	0	0	272	0	272	464
5:15 PM	0	1	3	0	4	0	151	1	0	152	0	0	272	0	272	428
5:30 PM	0	4	3	3	7	0	156	1	1	157	0	1	277	0	278	442
Total	0	10	17	3	27	0	661	5	1	666	0	4	1063	0	1067	1760
Approach %	0.0	37.0	63.0	-	-	0.0	99.2	0.8	-	-	0.0	0.4	99.6	-	-	-
Total %	0.0	0.6	1.0	-	1.5	0.0	37.6	0.3	-	37.8	0.0	0.2	60.4	-	60.6	-
PHF	0.000	0.625	0.708	-	0.750	0.000	0.898	0.625	-	0.900	0.000	0.333	0.959	-	0.960	0.948
Lights	0	9	17	-	26	0	652	4	-	656	0	4	1050	-	1054	1736
% Lights	-	90.0	100.0	-	96.3	-	98.6	80.0	-	98.5	-	100.0	98.8	-	98.8	98.6
Mediums	0	1	0	-	1	0	9	1	-	10	0	0	12	-	12	23
% Mediums	-	10.0	0.0	-	3.7	-	1.4	20.0	-	1.5	-	0.0	1.1	-	1.1	1.3
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	1	-	1	1
% Articulated Trucks	-	0.0	0.0	-	0.0	-	0.0	0.0	-	0.0	-	0.0	0.1	-	0.1	0.1
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	33.3	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	2	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	66.7	-	-	-	-	100.0	-	-	-	-	-	-	-



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Project: County Line Road
 Municipality: Radnor Township, Delaware
 County, PA
 Setup: MAK
 Location: 40.019881, -75.323637

Count Name: 7. County Line Road & Mondella
 Avenue
 Site Code: 7
 Start Date: 04/28/2018
 Page No: 4

Turning Movement Peak Hour Data (12:00 PM)

Start Time	Mondella Avenue Westbound					County Line Road Northbound					County Line Road Southbound					Int. Total
	U-Turn	Left	Right	Peds	App. Total	U-Turn	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Peds	App. Total	
12:00 PM	0	1	1	0	2	0	153	4	0	157	0	0	159	0	159	318
12:15 PM	0	0	3	6	3	0	155	1	0	156	0	0	136	0	136	295
12:30 PM	0	0	3	2	3	0	142	1	1	143	0	0	183	2	183	329
12:45 PM	0	0	4	2	4	0	160	1	0	161	0	2	157	0	159	324
Total	0	1	11	10	12	0	610	7	1	617	0	2	635	2	637	1266
Approach %	0.0	8.3	91.7	-	-	0.0	98.9	1.1	-	-	0.0	0.3	99.7	-	-	-
Total %	0.0	0.1	0.9	-	0.9	0.0	48.2	0.6	-	48.7	0.0	0.2	50.2	-	50.3	-
PHF	0.000	0.250	0.688	-	0.750	0.000	0.953	0.438	-	0.958	0.000	0.250	0.867	-	0.870	0.962
Lights	0	1	11	-	12	0	604	7	-	611	0	2	632	-	634	1257
% Lights	-	100.0	100.0	-	100.0	-	99.0	100.0	-	99.0	-	100.0	99.5	-	99.5	99.3
Mediums	0	0	0	-	0	0	6	0	-	6	0	0	3	-	3	9
% Mediums	-	0.0	0.0	-	0.0	-	1.0	0.0	-	1.0	-	0.0	0.5	-	0.5	0.7
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	-	0.0	0.0	-	0.0	-	0.0	0.0	-	0.0	-	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	10	-	-	-	-	1	-	-	-	-	2	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



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Project: County Line Road
 Municipality: Radnor Township, Delaware
 County, PA
 Setup: MAK
 Location: 40.018693, -75.322686

Count Name: 8. County Line Road & Lindsay
 Avenue
 Site Code: 8
 Start Date: 04/28/2018
 Page No: 6

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Lindsay Avenue Westbound					County Line Road Northbound					County Line Road Southbound					Int. Total
	U-Turn	Left	Right	Peds	App. Total	U-Turn	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Peds	App. Total	
7:30 AM	0	7	5	0	12	0	260	11	2	271	0	0	136	2	136	419
7:45 AM	0	3	0	2	3	0	224	17	2	241	0	0	167	2	167	411
8:00 AM	0	0	3	1	3	0	241	11	2	252	0	4	175	0	179	434
8:15 AM	0	1	0	0	1	0	219	11	2	230	0	0	168	0	168	399
Total	0	11	8	3	19	0	944	50	8	994	0	4	646	4	650	1663
Approach %	0.0	57.9	42.1	-	-	0.0	95.0	5.0	-	-	0.0	0.6	99.4	-	-	-
Total %	0.0	0.7	0.5	-	1.1	0.0	56.8	3.0	-	59.8	0.0	0.2	38.8	-	39.1	-
PHF	0.000	0.393	0.400	-	0.396	0.000	0.908	0.735	-	0.917	0.000	0.250	0.923	-	0.908	0.958
Lights	0	8	6	-	14	0	917	50	-	967	0	2	617	-	619	1600
% Lights	-	72.7	75.0	-	73.7	-	97.1	100.0	-	97.3	-	50.0	95.5	-	95.2	96.2
Mediums	0	3	2	-	5	0	26	0	-	26	0	1	24	-	25	56
% Mediums	-	27.3	25.0	-	26.3	-	2.8	0.0	-	2.6	-	25.0	3.7	-	3.8	3.4
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	0	1	5	-	6	7
% Articulated Trucks	-	0.0	0.0	-	0.0	-	0.1	0.0	-	0.1	-	25.0	0.8	-	0.9	0.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	3	-	-	-	-	8	-	-	-	-	4	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Imperial Traffic & Data Collection
 www.imperialtdc.com
 PO BOX 4673
 Cherry Hill, New Jersey, United States 08034
 609-706-6100 lklein@imperialtdc.com

Project: County Line Road
 Municipality: Radnor Township, Delaware
 County, PA
 Setup: MAK
 Location: 40.018693, -75.322686

Count Name: 8. County Line Road & Lindsay
 Avenue
 Site Code: 8
 Start Date: 04/28/2018
 Page No: 8

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Lindsay Avenue Westbound					County Line Road Northbound					County Line Road Southbound					Int. Total
	U-Turn	Left	Right	Peds	App. Total	U-Turn	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Peds	App. Total	
4:45 PM	0	3	1	0	4	0	177	0	0	177	0	0	243	0	243	424
5:00 PM	0	3	2	1	5	0	175	0	2	175	0	1	274	1	275	455
5:15 PM	0	1	2	0	3	0	147	1	0	148	0	0	266	1	266	417
5:30 PM	0	2	1	3	3	0	151	0	1	151	0	0	277	0	277	431
Total	0	9	6	4	15	0	650	1	3	651	0	1	1060	2	1061	1727
Approach %	0.0	60.0	40.0	-	-	0.0	99.8	0.2	-	-	0.0	0.1	99.9	-	-	-
Total %	0.0	0.5	0.3	-	0.9	0.0	37.6	0.1	-	37.7	0.0	0.1	61.4	-	61.4	-
PHF	0.000	0.750	0.750	-	0.750	0.000	0.918	0.250	-	0.919	0.000	0.250	0.957	-	0.958	0.949
Lights	0	9	6	-	15	0	640	1	-	641	0	1	1050	-	1051	1707
% Lights	-	100.0	100.0	-	100.0	-	98.5	100.0	-	98.5	-	100.0	99.1	-	99.1	98.8
Mediums	0	0	0	-	0	0	9	0	-	9	0	0	10	-	10	19
% Mediums	-	0.0	0.0	-	0.0	-	1.4	0.0	-	1.4	-	0.0	0.9	-	0.9	1.1
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Articulated Trucks	-	0.0	0.0	-	0.0	-	0.2	0.0	-	0.2	-	0.0	0.0	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	25.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	3	-	-	-	-	3	-	-	-	-	2	-	-
% Pedestrians	-	-	-	75.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-



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Project: County Line Road
 Municipality: Radnor Township, Delaware
 County, PA
 Setup: MAK
 Location: 40.018693, -75.322686

Count Name: 8. County Line Road & Lindsay
 Avenue
 Site Code: 8
 Start Date: 04/28/2018
 Page No: 4

Turning Movement Peak Hour Data (12:00 PM)

Start Time	Lindsay Avenue Westbound					County Line Road Northbound					County Line Road Southbound					Int. Total
	U-Turn	Left	Right	Peds	App. Total	U-Turn	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Peds	App. Total	
12:00 PM	0	0	0	0	0	0	154	0	13	154	0	0	157	0	157	311
12:15 PM	0	0	0	1	0	1	158	0	13	159	0	0	137	0	137	296
12:30 PM	0	0	0	2	0	0	146	0	1	146	0	0	187	0	187	333
12:45 PM	0	0	0	2	0	2	162	0	1	164	0	1	158	0	159	323
Total	0	0	0	5	0	3	620	0	28	623	0	1	639	0	640	1263
Approach %	0.0	0.0	0.0	-	-	0.5	99.5	0.0	-	-	0.0	0.2	99.8	-	-	-
Total %	0.0	0.0	0.0	-	0.0	0.2	49.1	0.0	-	49.3	0.0	0.1	50.6	-	50.7	-
PHF	0.000	0.000	0.000	-	0.000	0.375	0.957	0.000	-	0.950	0.000	0.250	0.854	-	0.856	0.948
Lights	0	0	0	-	0	3	613	0	-	616	0	1	635	-	636	1252
% Lights	-	-	-	-	-	100.0	98.9	-	-	98.9	-	100.0	99.4	-	99.4	99.1
Mediums	0	0	0	-	0	0	7	0	-	7	0	0	4	-	4	11
% Mediums	-	-	-	-	-	0.0	1.1	-	-	1.1	-	0.0	0.6	-	0.6	0.9
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	-	-	-	-	-	0.0	0.0	-	-	0.0	-	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	20.0	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	4	-	-	-	-	28	-	-	-	-	0	-	-
% Pedestrians	-	-	-	80.0	-	-	-	-	100.0	-	-	-	-	-	-	-

**9. County Line Road & S. Bryn Mawr Avenue/Haverford Road/W. Railroad Avenue/
Glenbrook Avenue - TMC**

Provided by: Imperial Traffic &
Data Collection
27 Imperial Drive,
Cherry Hill, NJ, 08003, US

Tue May 1, 2018

AM Peak (May 01 2018 7:30AM - 8:30AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on
Crosswalk)

All Movements

ID: 519729, Location: 40.01749, -75.321793, Site Code: 9

Leg Direction	S. Bryn Mawr Avenue Eastbound								Haverford Road Northbound								County Line Road Southbound							
	L	BL	BR	R	U	App	Ped*	L	T	BR	HR	U	App	Ped*	HL	BL	T	R	U	App	Ped*			
2018-05-01 7:30AM	36	95	11	19	0	161	4	30	225	19	1	0	275	7	10	0	100	23	0	133	5			
7:45AM	32	64	12	27	0	135	6	34	212	28	0	0	274	10	7	6	105	33	0	151	6			
8:00AM	47	93	11	26	0	177	8	34	185	25	3	0	247	6	16	6	112	35	0	169	9			
8:15AM	33	70	13	24	0	140	7	23	196	36	2	0	257	7	12	7	130	12	0	161	3			
Total	148	322	47	96	0	613	25	121	818	108	6	0	1053	30	45	19	447	103	0	614	23			
% Approach	24.1%	52.5%	7.7%	15.7%	0%	-	-	11.5%	77.7%	10.3%	0.6%	0%	-	-	7.3%	3.1%	72.8%	16.8%	0%	-	-			
% Total	5.5%	12.0%	1.7%	3.6%	0%	22.8%	-	4.5%	30.4%	4.0%	0.2%	0%	39.1%	-	1.7%	0.7%	16.6%	3.8%	0%	22.8%	-			
PHF	0.787	0.847	0.904	0.889	-	0.866	-	0.890	0.909	0.750	0.500	-	0.957	-	0.703	0.679	0.860	0.736	-	0.908	-			
Lights	139	315	47	94	0	595	-	115	803	108	6	0	1032	-	43	18	429	93	0	583	-			
% Lights	93.9%	97.8%	100%	97.9%	0%	97.1%	-	95.0%	98.2%	100%	100%	0%	98.0%	-	95.6%	94.7%	96.0%	90.3%	0%	95.0%	-			
Articulated Trucks	0	0	0	0	0	0	-	1	1	0	0	0	2	-	0	0	3	0	0	3	-			
% Articulated Trucks	0%	0%	0%	0%	0%	0%	-	0.8%	0.1%	0%	0%	0%	0.2%	-	0%	0%	0.7%	0%	0%	0.5%	-			
Buses and Single-Unit Trucks	9	7	0	2	0	18	-	5	14	0	0	0	19	-	2	1	15	10	0	28	-			
% Buses and Single-Unit Trucks	6.1%	2.2%	0%	2.1%	0%	2.9%	-	4.1%	1.7%	0%	0%	0%	1.8%	-	4.4%	5.3%	3.4%	9.7%	0%	4.6%	-			
Pedestrians	-	-	-	-	-	-	24	-	-	-	-	-	-	30	-	-	-	-	-	-	23			
% Pedestrians	-	-	-	-	-	-	96.0%	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%			
Bicycles on Crosswalk	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	0			
% Bicycles on Crosswalk	-	-	-	-	-	-	4.0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%			

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

9. County Line Road & S. Bryn Mawr Avenue/Haverford Road/ W. Railroad Avenue/ Glenbrook Avenue - TMC

Provided by: Imperial Traffic & Data Collection
27 Imperial Drive,
Cherry Hill, NJ, 08003, US

Tue May 1, 2018

AM Peak (May 01 2018 7:30AM - 8:30AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 519729, Location: 40.01749, -75.321793, Site Code: 9

Leg Direction	W. Old Railroad Avenue Northwestbound								S. Bryn Mawr Avenue Southwestbound						Int
	HL	BL	BR	R	U	App	Ped*	L	BL	BR	HR	U	App	Ped*	
2018-05-01 7:30AM	0	0	0	0	0	0	7	1	16	51	18	0	86	2	655
7:45AM	0	0	0	0	0	0	7	1	19	80	12	0	112	1	672
8:00AM	0	0	0	0	0	0	7	0	8	93	15	0	116	2	709
8:15AM	0	0	0	0	0	0	6	2	17	59	19	0	97	0	655
Total	0	0	0	0	0	0	27	4	60	283	64	0	411	5	2691
% Approach	0%	0%	0%	0%	0%	-	-	1.0%	14.6%	68.9%	15.6%	0%	-	-	-
% Total	0%	0%	0%	0%	0%	0%	-	0.1%	2.2%	10.5%	2.4%	0%	15.3%	-	-
PHF	-	-	-	-	-	-	-	0.500	0.789	0.761	0.842	-	0.886	-	0.949
Lights	0	0	0	0	0	0	-	3	58	274	58	0	393	-	2603
% Lights	0%	0%	0%	0%	0%	-	-	75.0%	96.7%	96.8%	90.6%	0%	95.6%	-	96.7%
Articulated Trucks	0	0	0	0	0	0	-	0	0	1	1	0	2	-	7
% Articulated Trucks	0%	0%	0%	0%	0%	-	-	0%	0%	0.4%	1.6%	0%	0.5%	-	0.3%
Buses and Single-Unit Trucks	0	0	0	0	0	0	-	1	2	8	5	0	16	-	81
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	-	-	25.0%	3.3%	2.8%	7.8%	0%	3.9%	-	3.0%
Pedestrians	-	-	-	-	-	-	26	-	-	-	-	-	-	-	5
% Pedestrians	-	-	-	-	-	-	96.3%	-	-	-	-	-	-	-	100%
Bicycles on Crosswalk	-	-	-	-	-	-	1	-	-	-	-	-	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	-	3.7%	-	-	-	-	-	-	-	0%

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

9. County Line Road & S. Bryn Mawr Avenue/Haverford Road/ W. Railroad Avenue/ Glenbrook Avenue - TMC

Tue May 1, 2018

PM Peak (May 01 2018 4:45PM - 5:45PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 519729, Location: 40.01749, -75.321793, Site Code: 9

Provided by: Imperial Traffic & Data Collection
27 Imperial Drive,
Cherry Hill, NJ, 08003, US

Leg Direction	S. Bryn Mawr Avenue Eastbound								Haverford Road Northbound								County Line Road Southbound							
	L	BL	BR	R	U	App	Ped*	L	T	BR	HR	U	App	Ped*	HL	BL	T	R	U	App	Ped*			
2018-05-01 4:45PM	18	51	11	43	0	123	1	29	147	22	2	0	200	9	12	7	223	20	0	262	2			
5:00PM	30	65	6	28	0	129	13	25	132	20	2	0	179	5	10	7	222	21	0	260	12			
5:15PM	25	68	13	31	0	137	4	21	121	15	0	0	157	3	7	5	234	17	0	263	6			
5:30PM	26	57	16	35	0	134	10	29	111	16	0	0	156	6	8	7	242	13	0	270	6			
Total	99	241	46	137	0	523	28	104	511	73	4	0	692	23	37	26	921	71	0	1055	26			
% Approach	18.9%	46.1%	8.8%	26.2%	0%	-	-	15.0%	73.8%	10.5%	0.6%	0%	-	-	3.5%	2.5%	87.3%	6.7%	0%	-	-			
% Total	3.4%	8.3%	1.6%	4.7%	0%	17.9%	-	3.6%	17.5%	2.5%	0.1%	0%	23.7%	-	1.3%	0.9%	31.6%	2.4%	0%	36.1%	-			
PHF	0.825	0.886	0.719	0.797	-	0.954	-	0.897	0.869	0.830	0.500	-	0.865	-	0.771	0.929	0.951	0.845	-	0.977	-			
Lights	98	240	45	134	0	517	-	100	505	72	4	0	681	-	36	26	915	68	0	1045	-			
% Lights	99.0%	99.6%	97.8%	97.8%	0%	98.9%	-	96.2%	98.8%	98.6%	100%	0%	98.4%	-	97.3%	100%	99.3%	95.8%	0%	99.1%	-			
Articulated Trucks	0	0	0	0	0	0	-	0	1	0	0	0	1	-	0	0	0	0	0	0	-			
% Articulated Trucks	0%	0%	0%	0%	0%	0%	-	0%	0.2%	0%	0%	0%	0.1%	-	0%	0%	0%	0%	0%	0%	-			
Buses and Single-Unit Trucks	1	1	1	3	0	6	-	4	5	1	0	0	10	-	1	0	6	3	0	10	-			
% Buses and Single-Unit Trucks	1.0%	0.4%	2.2%	2.2%	0%	1.1%	-	3.8%	1.0%	1.4%	0%	0%	1.4%	-	2.7%	0%	0.7%	4.2%	0%	0.9%	-			
Pedestrians	-	-	-	-	-	-	28	-	-	-	-	-	-	23	-	-	-	-	-	-	26			
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%			
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0			
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%			

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

9. County Line Road & S. Bryn Mawr Avenue/Haverford Road/ W. Railroad Avenue/ Glenbrook Avenue - TMC

Provided by: Imperial Traffic & Data Collection
27 Imperial Drive,
Cherry Hill, NJ, 08003, US

Tue May 1, 2018

PM Peak (May 01 2018 4:45PM - 5:45PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 519729, Location: 40.01749, -75.321793, Site Code: 9

Leg Direction	W. Old Railroad Avenue Northwestbound								S. Bryn Mawr Avenue Southwestbound								
Time	HL	BL	BR	R	U	App	Ped*	L	BL	BR	HR	U	App	Ped*	Int		
2018-05-01 4:45PM	0	0	0	0	0	0	7	3	42	89	18	0	152	0	737		
5:00PM	0	0	0	0	0	0	3	1	61	88	22	0	172	2	740		
5:15PM	0	0	0	0	0	0	1	1	58	100	15	0	174	1	731		
5:30PM	0	0	0	0	0	0	7	1	46	88	16	0	151	3	711		
Total	0	0	0	0	0	0	18	6	207	365	71	0	649	6	2919		
% Approach	0%	0%	0%	0%	0%	-	-	0.9%	31.9%	56.2%	10.9%	0%	-	-	-		
% Total	0%	0%	0%	0%	0%	0%	-	0.2%	7.1%	12.5%	2.4%	0%	22.2%	-	-		
PHF	-	-	-	-	-	-	-	0.500	0.848	0.913	0.807	-	0.932	-	0.986		
Lights	0	0	0	0	0	0	-	6	207	363	70	0	646	-	2889		
% Lights	0%	0%	0%	0%	0%	-	-	100%	100%	99.5%	98.6%	0%	99.5%	-	99.0%		
Articulated Trucks	0	0	0	0	0	0	-	0	0	0	0	0	0	-	1		
% Articulated Trucks	0%	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	0%	-	0%		
Buses and Single-Unit Trucks	0	0	0	0	0	0	-	0	0	2	1	0	3	-	29		
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	-	-	0%	0%	0.5%	1.4%	0%	0.5%	-	1.0%		
Pedestrians	-	-	-	-	-	-	18	-	-	-	-	-	-	-	6		
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	-	100%		
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	-	0		
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	-	0%		

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

9. County Line Road & S. Bryn Mawr Avenue/Haverford Road/W. Railroad Avenue / Glenbrook Avenue - TMC

Provided by: Imperial Traffic & Data Collection
27 Imperial Drive,
Cherry Hill, NJ, 08003, US

Sat Apr 28, 2018

Midday Peak (WKND) (Apr 28 2018 11:30AM - 12:30PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 519729, Location: 40.01749, -75.321793, Site Code: 9

Leg Direction	S. Bryn Mawr Avenue Eastbound								Haverford Road Northbound								County Line Road Southbound							
	L	BL	BR	R	U	App	Ped*	L	T	BR	HR	U	App	Ped*	HL	BL	T	R	U	App	Ped*			
2018-04-28 11:30AM	41	42	10	27	0	120	4	21	140	23	0	0	184	9	9	1	113	16	0	139	3			
11:45AM	41	48	5	18	0	112	29	33	117	21	1	0	172	11	15	2	118	19	0	154	7			
12:00PM	43	48	4	31	0	126	12	33	112	21	0	0	166	20	10	5	122	15	0	152	1			
12:15PM	31	34	6	23	0	94	6	22	107	18	0	0	147	9	13	2	106	13	0	134	1			
Total	156	172	25	99	0	452	51	109	476	83	1	0	669	49	47	10	459	63	0	579	12			
% Approach	34.5%	38.1%	5.5%	21.9%	0%	-	-	16.3%	71.2%	12.4%	0.1%	0%	-	-	8.1%	1.7%	79.3%	10.9%	0%	-	-			
% Total	7.5%	8.3%	1.2%	4.8%	0%	21.8%	-	5.3%	23.0%	4.0%	0%	0%	32.3%	-	2.3%	0.5%	22.1%	3.0%	0%	27.9%	-			
PHF	0.907	0.896	0.625	0.798	-	0.897	-	0.826	0.850	0.902	0.250	-	0.909	-	0.783	0.500	0.941	0.829	-	0.940	-			
Lights	154	172	25	99	0	450	-	107	473	80	1	0	661	-	46	10	456	62	0	574	-			
% Lights	98.7%	100%	100%	100%	0%	99.6%	-	98.2%	99.4%	96.4%	100%	0%	98.8%	-	97.9%	100%	99.3%	98.4%	0%	99.1%	-			
Articulated Trucks	0	0	0	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	0	-			
% Articulated Trucks	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	-			
Buses and Single-Unit Trucks	2	0	0	0	0	2	-	2	3	3	0	0	8	-	1	0	3	1	0	5	-			
% Buses and Single-Unit Trucks	1.3%	0%	0%	0%	0%	0.4%	-	1.8%	0.6%	3.6%	0%	0%	1.2%	-	2.1%	0%	0.7%	1.6%	0%	0.9%	-			
Pedestrians	-	-	-	-	-	-	51	-	-	-	-	-	-	49	-	-	-	-	-	-	12			
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%			
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0			
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%			

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

9. County Line Road & S. Bryn Mawr Avenue/Haverford Road/ W. Railroad Avenue/ Glenbrook Avenue - TMC

Provided by: Imperial Traffic & Data Collection
27 Imperial Drive,
Cherry Hill, NJ, 08003, US

Sat Apr 28, 2018

Midday Peak (WKND) (Apr 28 2018 11:30AM - 12:30PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 519729, Location: 40.01749, -75.321793, Site Code: 9

Leg Direction	W. Old Railroad Avenue Northwestbound								S. Bryn Mawr Avenue Southwestbound								Int
	HL	BL	BR	R	U	App	Ped*	L	BL	BR	HR	U	App	Ped*			
2018-04-28 11:30AM	0	0	0	0	0	0	10	0	27	41	14	0	82	1	525		
11:45AM	0	0	0	0	0	0	7	0	29	52	17	0	98	1	536		
12:00PM	0	0	0	0	0	0	14	0	27	42	9	0	78	2	522		
12:15PM	0	0	0	0	0	0	9	0	28	62	25	0	115	1	490		
Total	0	0	0	0	0	0	40	0	111	197	65	0	373	5	2073		
% Approach	0%	0%	0%	0%	0%	-	-	0%	29.8%	52.8%	17.4%	0%	-	-	-		
% Total	0%	0%	0%	0%	0%	0%	-	0%	5.4%	9.5%	3.1%	0%	18.0%	-	-		
PHF	-	-	-	-	-	-	-	-	0.957	0.794	0.650	-	0.811	-	0.967		
Lights	0	0	0	0	0	0	-	0	111	193	65	0	369	-	2054		
% Lights	0%	0%	0%	0%	0%	-	-	0%	100%	98.0%	100%	0%	98.9%	-	99.1%		
Articulated Trucks	0	0	0	0	0	0	-	0	0	0	0	0	0	-	0		
% Articulated Trucks	0%	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	0%	-	0%		
Buses and Single-Unit Trucks	0	0	0	0	0	0	-	0	0	4	0	0	4	-	19		
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	-	-	0%	0%	2.0%	0%	0%	1.1%	-	0.9%		
Pedestrians	-	-	-	-	-	-	40	-	-	-	-	-	-	5	-		
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%	-		
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-		
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-		

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

Study Name 9b. County Line Road & Glenbrook Avenue

Start Date 04/28/2018

Start Time 11:00 AM

Site Code 9b

Project Gilmore: County Line Road

Project County Line Road

Municipality Radnor Township, Delaware County

Setup MAK

Location 40.01749

-75.321793

Type Road

Classification Totals

Start Time	Glenbrook Avenue			County Line Road			County Line Road		
	Eastbound			Northbound			Southbound		
	U-Turn	Left	Right	U-Turn	Left	Thru	U-Turn	Thru	Right
11:00 AM		0	2		7				7
11:15 AM		0	0		6				10
11:30 AM		0	0		9				1
11:45 AM		0	0		10				5
12:00 PM		0	0		9				5
12:15 PM		0	0		7				2
12:30 PM		0	0		5				7
12:45 PM		0	0		4				6
1:00 PM		0	0		7				4
1:15 PM		0	0		14				5
1:30 PM		0	0		12				3
1:45 PM		0	0		5				2
7:00 AM		0	0		2				2
7:15 AM		0	0		3				0
7:30 AM		0	0		3				1
7:45 AM		0	0		10				4
8:00 AM		0	0		12				3
8:15 AM		0	0		16				4
8:30 AM		0	0		9				4
8:45 AM		0	0		8				2
4:00 PM		0	0		8				4
4:15 PM		0	0		5				0
4:30 PM		0	0		7				2
4:45 PM		0	0		9				5
5:00 PM		0	0		8				4
5:15 PM		0	0		6				0
5:30 PM		0	0		9				0
5:45 PM		0	0		3				3



Imperial Traffic & Data Collection
 www.imperialtdc.com
 PO BOX 4673
 Cherry Hill, New Jersey, United States 08034
 609-706-6100 lklein@imperialtdc.com

Project: County Line Road
 Municipality: Radnor Township, Delaware
 County
 Setup: MAK
 Location: 40.016223, -75.320706

Count Name: 10. County Line Road/ Haverford
 Road & County Line Road/Landover Road
 Site Code: 10
 Start Date: 04/28/2018
 Page No: 6

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Landover Road Eastbound						County Line Road Westbound						Haverford Road Northbound						County Line Road Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
7:30 AM	0	47	39	4	5	90	0	13	6	20	1	39	0	2	210	29	0	241	0	6	122	14	0	142	512
7:45 AM	0	39	43	4	7	86	0	6	8	17	1	31	0	2	224	31	1	257	0	8	161	14	0	183	557
8:00 AM	0	43	53	7	11	103	0	13	14	15	2	42	0	2	209	30	3	241	0	6	147	9	1	162	548
8:15 AM	0	31	32	7	6	70	0	16	11	11	1	38	0	1	223	30	0	254	0	7	166	18	0	191	553
Total	0	160	167	22	29	349	0	48	39	63	5	150	0	7	866	120	4	993	0	27	596	55	1	678	2170
Approach %	0.0	45.8	47.9	6.3	-	-	0.0	32.0	26.0	42.0	-	-	0.0	0.7	87.2	12.1	-	-	0.0	4.0	87.9	8.1	-	-	-
Total %	0.0	7.4	7.7	1.0	-	16.1	0.0	2.2	1.8	2.9	-	6.9	0.0	0.3	39.9	5.5	-	45.8	0.0	1.2	27.5	2.5	-	31.2	-
PHF	0.000	0.851	0.788	0.786	-	0.847	0.000	0.750	0.696	0.788	-	0.893	0.000	0.875	0.967	0.968	-	0.966	0.000	0.844	0.898	0.764	-	0.887	0.974
Lights	0	160	167	22	-	349	0	47	39	61	-	147	0	7	849	120	-	976	0	26	575	51	-	652	2124
% Lights	-	100.0	100.0	100.0	-	100.0	-	97.9	100.0	96.8	-	98.0	-	100.0	98.0	100.0	-	98.3	-	96.3	96.5	92.7	-	96.2	97.9
Mediums	0	0	0	0	-	0	0	1	0	2	-	3	0	0	16	0	-	16	0	1	15	4	-	20	39
% Mediums	-	0.0	0.0	0.0	-	0.0	-	2.1	0.0	3.2	-	2.0	-	0.0	1.8	0.0	-	1.6	-	3.7	2.5	7.3	-	2.9	1.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	1	0	-	1	0	0	6	0	-	6	7
% Articulated Trucks	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	-	0.0	0.1	0.0	-	0.1	-	0.0	1.0	0.0	-	0.9	0.3
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	29	-	-	-	-	-	5	-	-	-	-	-	4	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Imperial Traffic & Data Collection
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PO BOX 4673
Cherry Hill, New Jersey, United States 08034
609-706-6100 lklein@imperialtdc.com

Project: County Line Road
Municipality: Radnor Township, Delaware
County
Setup: MAK
Location: 40.016223, -75.320706

Count Name: 10. County Line Road/ Haverford
Road & County Line Road/Landover Road
Site Code: 10
Start Date: 04/28/2018
Page No: 8

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Landover Road Eastbound						County Line Road Westbound						Haverford Road Northbound						County Line Road Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
4:45 PM	0	21	13	7	1	41	0	30	41	14	2	85	0	7	168	14	0	189	0	7	270	65	4	342	657
5:00 PM	0	36	13	7	10	56	0	33	50	12	0	95	0	2	147	10	0	159	0	3	238	52	0	293	603
5:15 PM	0	18	17	5	3	40	0	35	42	10	0	87	0	8	135	19	1	162	0	6	279	55	2	340	629
5:30 PM	0	26	13	10	4	49	0	19	55	6	0	80	0	9	132	13	0	154	0	9	262	50	1	321	604
Total	0	101	56	29	18	186	0	117	188	42	2	347	0	26	582	56	1	664	0	25	1049	222	7	1296	2493
Approach %	0.0	54.3	30.1	15.6	-	-	0.0	33.7	54.2	12.1	-	-	0.0	3.9	87.7	8.4	-	-	0.0	1.9	80.9	17.1	-	-	-
Total %	0.0	4.1	2.2	1.2	-	7.5	0.0	4.7	7.5	1.7	-	13.9	0.0	1.0	23.3	2.2	-	26.6	0.0	1.0	42.1	8.9	-	52.0	-
PHF	0.000	0.701	0.824	0.725	-	0.830	0.000	0.836	0.855	0.750	-	0.913	0.000	0.722	0.866	0.737	-	0.878	0.000	0.694	0.940	0.854	-	0.947	0.949
Lights	0	101	55	29	-	185	0	117	188	39	-	344	0	26	575	55	-	656	0	25	1040	222	-	1287	2472
% Lights	-	100.0	98.2	100.0	-	99.5	-	100.0	100.0	92.9	-	99.1	-	100.0	98.8	98.2	-	98.8	-	100.0	99.1	100.0	-	99.3	99.2
Mediums	0	0	1	0	-	1	0	0	0	3	-	3	0	0	6	1	-	7	0	0	9	0	-	9	20
% Mediums	-	0.0	1.8	0.0	-	0.5	-	0.0	0.0	7.1	-	0.9	-	0.0	1.0	1.8	-	1.1	-	0.0	0.9	0.0	-	0.7	0.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	1	0	-	1	0	0	0	0	-	0	1
% Articulated Trucks	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	-	0.0	0.2	0.0	-	0.2	-	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	18	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



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Project: County Line Road
 Municipality: Radnor Township, Delaware
 County
 Setup: MAK
 Location: 40.016223, -75.320706

Count Name: 10. County Line Road/ Haverford
 Road & County Line Road/Landover Road
 Site Code: 10
 Start Date: 04/28/2018
 Page No: 4

Turning Movement Peak Hour Data (11:30 AM)

Start Time	Landover Road Eastbound						County Line Road Westbound						Haverford Road Northbound						County Line Road Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
11:30 AM	0	25	18	10	2	53	0	6	31	8	0	45	0	3	158	13	0	174	0	8	126	25	0	159	431
11:45 AM	0	26	16	6	0	48	0	6	16	11	0	33	0	5	129	23	1	157	0	9	128	28	1	165	403
12:00 PM	0	33	16	7	1	56	0	22	12	6	3	40	0	3	144	16	2	163	0	6	139	27	4	172	431
12:15 PM	0	23	23	2	0	48	0	12	15	12	0	39	0	9	120	16	0	145	0	9	125	32	0	166	398
Total	0	107	73	25	3	205	0	46	74	37	3	157	0	20	551	68	3	639	0	32	518	112	5	662	1663
Approach %	0.0	52.2	35.6	12.2	-	-	0.0	29.3	47.1	23.6	-	-	0.0	3.1	86.2	10.6	-	-	0.0	4.8	78.2	16.9	-	-	-
Total %	0.0	6.4	4.4	1.5	-	12.3	0.0	2.8	4.4	2.2	-	9.4	0.0	1.2	33.1	4.1	-	38.4	0.0	1.9	31.1	6.7	-	39.8	-
PHF	0.000	0.811	0.793	0.625	-	0.915	0.000	0.523	0.597	0.771	-	0.872	0.000	0.556	0.872	0.739	-	0.918	0.000	0.889	0.932	0.875	-	0.962	0.965
Lights	0	106	70	25	-	201	0	45	74	37	-	156	0	20	539	68	-	627	0	32	516	112	-	660	1644
% Lights	-	99.1	95.9	100.0	-	98.0	-	97.8	100.0	100.0	-	99.4	-	100.0	97.8	100.0	-	98.1	-	100.0	99.6	100.0	-	99.7	98.9
Mediums	0	1	3	0	-	4	0	1	0	0	-	1	0	0	10	0	-	10	0	0	2	0	-	2	17
% Mediums	-	0.9	4.1	0.0	-	2.0	-	2.2	0.0	0.0	-	0.6	-	0.0	1.8	0.0	-	1.6	-	0.0	0.4	0.0	-	0.3	1.0
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	2	0	-	2	0	0	0	0	-	0	2
% Articulated Trucks	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	-	0.0	0.4	0.0	-	0.3	-	0.0	0.0	0.0	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

APPENDIX F

Capacity Analysis Procedures



LEVEL OF SERVICE METHODOLOGY

As defined, vehicle capacity means “the maximum number of vehicles that can pass a given point during a specified period under prevailing roadway, traffic and control conditions.” The level at which an intersection or section of a lane or roadway functions can be expressed in terms of level of service. Level of service is defined as “qualitative measures that characterize operational conditions within a traffic stream and their perception by motorists and passengers.” Some measures that are included are “speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.”

The concept of stop-controlled or yield-controlled intersection analysis is based on the estimate of average total delay on minor streets. The methodology of the analysis relies on three elements: the distribution and size of gaps available in the major street traffic flow; the usefulness of these gaps to the minor stream drivers; and, the relative priority of the various traffic movements at the intersection. The results of the analysis provide an estimate of total average delay for the various critical movements at the unsignalized intersections. Correlation between average total delay and the respective levels of service are provided in **Table 1: Level of Service Criteria**.

Table 1: Level of Service Criteria

Level of Service	Unsignalized Intersections Control Delay per Vehicle (seconds)	Signalized Intersections Control Delay per Vehicle (seconds)
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

At signalized intersections, additional elements must be considered. These elements are green time allocations and volume/capacity relationships. Level of service is based primarily on the average control delay per vehicle for various movements within an intersection. Thus, both volume/capacity and delay are considered to evaluate the overall operation of a signalized intersection. Correlation between average delay per vehicle and the respective levels of service are provided for signalized intersections in **Table 1: Level of Service Criteria**.

APPENDIX G

Existing Traffic Signal Permit Plans



1. 7:00AM TO 8:00AM
2. 8:00AM TO 9:00AM
3. 9:00AM TO 10:00AM
4. 10:00AM TO 11:00AM
5. 11:00AM TO 12:00PM
6. 12:00PM TO 1:00PM
7. 1:00PM TO 2:00PM
8. 2:00PM TO 3:00PM
9. 3:00PM TO 4:00PM
10. 4:00PM TO 5:00PM
11. 5:00PM TO 6:00PM
12. 6:00PM TO 7:00PM

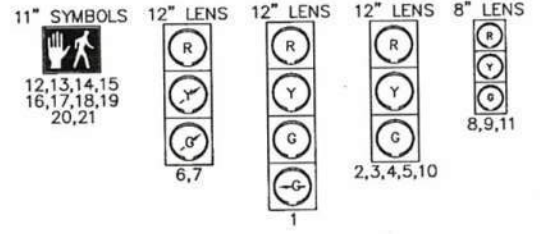
TOTALS			
11	348	1	0
11	383	0	0
7	417	0	0
3	291	1	0
14	317	0	0
16	302	0	0
10	323	0	0
12	435	0	0
16	363	0	0

TOTALS			
10	333	6	6
1	355	7	2
2	277	6	3
3	304	12	3
3	362	6	6
5	358	6	6
1	393	17	3
4	432	16	2
1	504	14	3

TOTALS			
1	2	1	7
2	10	18	14
9	2	10	3
6	1	12	4
7	3	6	4
8	1	4	2
11	3	18	12
10	12	1	14
11	5	0	19
12			

NOVEMBER 2004 VOLUMES

SIGNAL INDICATIONS



SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS 4,5,6,7

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	1+6+9	2+6	4+8	FLASH
1	G G G Y R	G G Y R	R R R R R Y	
2	G G Y R	G G Y R	R R R R R Y	
3	R R R R R G	R R R R R G	R R R R R Y	
4,5	R R R R G G	R R R R G G	R R R R R Y	
6,7	R R R R R R	R R R R R R	R R R R R Y	
8,9	R R R R R R	R R R R R R	R R R R R Y	
10,11	R R R R R R	R R R R R R	R R R R R Y	
12,13*	M FH H H	M FH H H	H H H H H OFF	
14,15*	M FH H H	M FH H H	H H H H H OFF	
16,17*	H H H H H H	H H H H H H	H H H H H OFF	
18,19*	H H H H H H	H H H H H H	M FH H H OFF	
20,21*	H H H H H H	H H H H H H	M FH H H OFF	

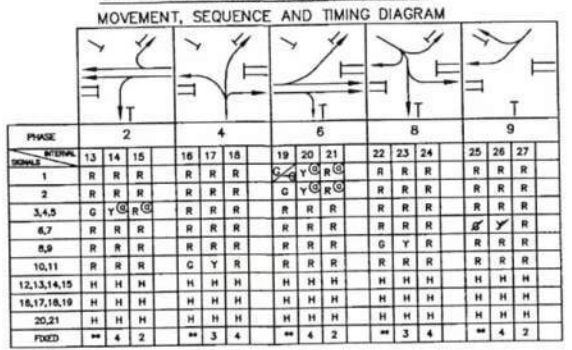
FIXED	20	4	2				3	4
MINIMUM PASSAGE				20	4	2	3	
MAX 1							20	
PEDESTRIAN*				7	16			
MEMORY							L	

PROGRAM 1 20 4 2 22 4 2 19 3 4 80 SECOND CYCLE
 PROGRAM 2 25 4 2 22 4 2 19 3 4 85 SECOND CYCLE

EMERGENCY PRE-EMPTION NOTES:

- * CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE NORTHEASTBOUND APPROACH OF CONESTOGA ROAD, THE NORTHWEST APPROACH OF GLENBROOK AVENUE, THE SOUTHWEST APPROACH OF THOMAS AVENUE AND THE EASTBOUND & WESTBOUND APPROACHES OF COUNTY LINE ROAD WITH FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.
- THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- LOCATION OF EMERGENCY VEHICLE DETECTORS ARE TO BE FIELD ADJUSTED TO ACHIEVE MAXIMUM OPERATION.
- * THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY, THEN THE GREEN INTERVAL FOR THE PRE-EMPTED PHASE SHALL FOLLOW.
- * THE SIGNALS, WHEN ACTIVATED BY THE APPROACHING EMERGENCY VEHICLE, SHALL TERMINATE IMMEDIATELY FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY, THEN THE GREEN INTERVAL FOR THE PRE-EMPTED PHASE SHALL FOLLOW.
- * IF THE SIGNAL HAS BEEN ACTUATED BY A PEDESTRIAN PUSH BUTTON AND THE SIGNAL IS PRE-EMPTED DURING THE "MAN" PHASE, THE "MAN" PHASE SHALL TERMINATE IMMEDIATELY FOLLOWED BY THE "FLASHING HAND" INDICATION IN ITS ENTIRETY, FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE PROCEEDING TO THE PRE-EMPTION PHASE.
- * IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ARE FLASHING ALL SIGNALS SHALL REMAIN FLASHING.
- * IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- * UPON COMPLETION OF PRE-EMPTION, PHASE 2+6 INTERVAL 5 SHALL FOLLOW TO NORMAL OPERATION, PHASE 2+6 INTERVAL 5 SHALL FOLLOW.
- * IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVED" OPERATION.

EMERGENCY PRE-EMPTION PHASING

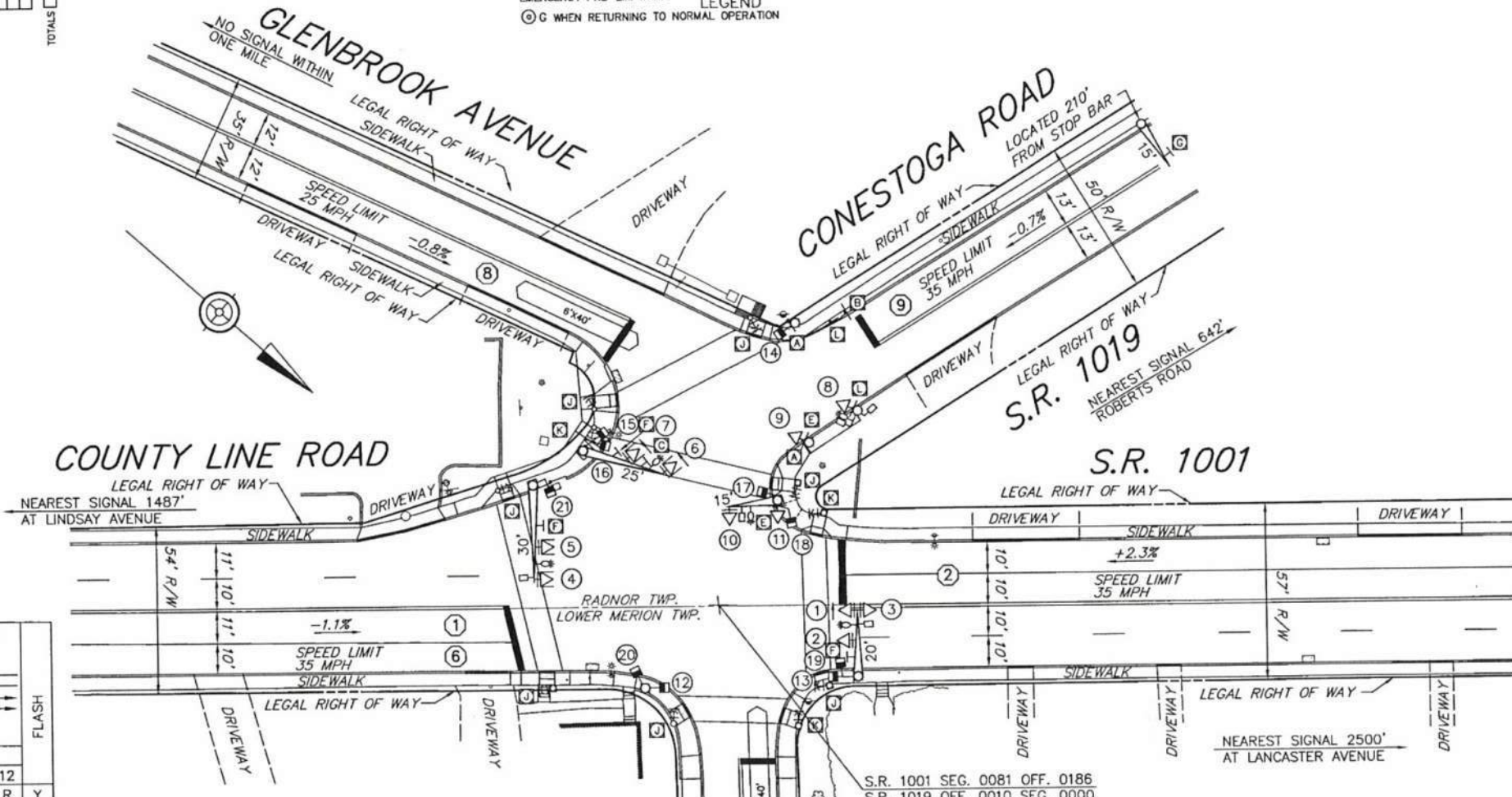


** FOR DURATION OF PRE-EMPTION
 NOTE: IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON, TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.
 LEGEND
 (G) WHEN RETURNING TO NORMAL OPERATION

SIGN TABULATION			
PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R3-2	24X24	NO LEFT TURN
B	R10-6L	24X30	STOP HERE ON RED
C	R3-7-1R	48X48	ALL TRAFFIC MUST TURN RIGHT
D	R10-11	24X30	NO TURN ON RED
E	R10-11	30X36	NO TURN ON RED
F	SPECIAL	30X36	DOUBLE RIGHT TURN
G	R10-3B(L)	9X12	EDUCATIONAL PUSH BUTTON FOR WALKING PERSON
H	R10-3B(R)	9X12	EDUCATIONAL PUSH BUTTON FOR WALKING PERSON
I	R9-3	18X18	NO PEDESTRIAN CROSSING

GENERAL NOTES

- NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.
- ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.
- ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.
- POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.
- SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.
- ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.
- THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.
- EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.
- CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.
- PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.
- THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.
- WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.
- PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.
- CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.



OPERATION NOTES:

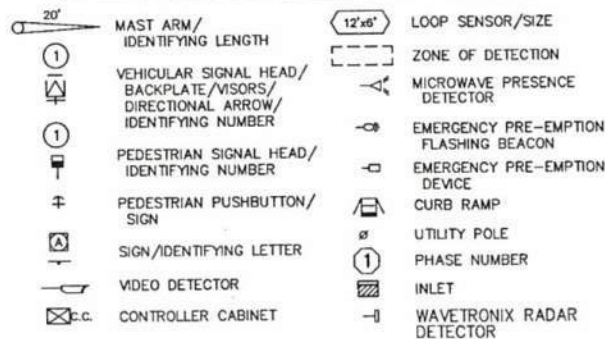
- 1 G IF FOLLOWED BY 2+6
- 2 M IF FOLLOWED BY 2+6
- 3 TIMING TO BE AS SHOWN IN PHASE 2+6. IT MAY TIME OUT IN THIS PHASE OR PHASE 2+6.

NOTE:

THIS SIGNAL TO BE COORDINATED WITH THE ADJACENT SIGNALS AT ROBERTS ROAD ALONG CONESTOGA ROAD

WEEKLY PROGRAM CHART					
EVENT	DAY	TIME	CYCLE	OFFSET	PROGRAM
1	1-7	00:00	-	-	FREE
2	1-5	06:00	80	56	1 AM PEAK
3	1-5	15:00	85	52	2 PM PEAK
4	1-5	19:00	-	-	FREE

MONDAY = DAY 1
 OFFSET REFERENCE TO START OF YELLOW ON BETHLEHEM PIKE (INTERVAL 2)



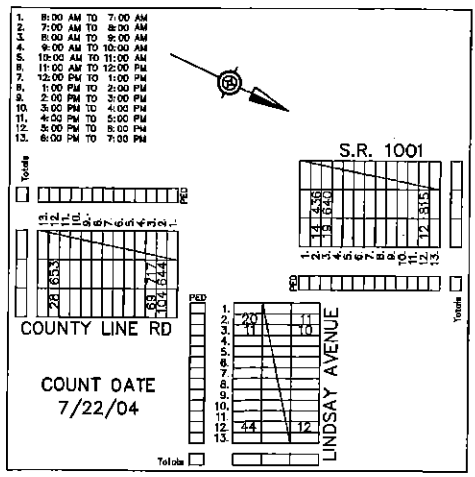
PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
 ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE & MONTGOMERY
 MUNICIPALITY: RADNOR & LOWER MERION TWPS
 INTERSECTION: COUNTY LINE RD (S.R. 1001) AND CONESTOGA RD (S.R. 1019), GLENBROOK AVE AND THOMAS AVENUE

REVIEWED: _____ DATE _____
 MUNICIPAL OFFICIAL: _____ DATE _____

RECOMMENDED: JEFFREY GREENE 7/30/19
 STEPHEN B. LESTER 7/30/19
 DISTRICT TRAFFIC ENGINEER

NO.	REVISION	DES./REV.	DATE	REV.	DATE	RECOM.	DATE
1	MODERNIZATION					WJE	1/22/85
2	ADDED H/M PED SIGNALS	RMC	11/18/02	MLK	11/18/02	LRB	11/21/02
3	NEW PLAN, ADDED PRE-EMPTION	WCM	5/20/05	MLK	5/22/05	LRB	6/8/05
4	ADD RAMP UNDER ST-04, RELOCATE PED BUTTONS, REVISE PED TIME	WCM	7/21/16	WJE	7/29/16	WJE	8/19/16



EMERGENCY PRE-EMPTION PHASING
MOVEMENT, SEQUENCE, AND TIMING DIAGRAM

PHASE INTERVAL	9	10	11	12	13	14	15	16	17
1,2	R	R	R	G	Y	R	R	R	R
3,4	G	Y	R	R	R	R	R	R	R
5,6	R	R	R	R	R	R	G	Y	R
7,8	H	H	H	H	H	H	H	H	H
9,10	H	H	H	H	H	H	H	H	H
FIXED	4	4	2	4	4	2	4	3	2

▲ FOR DURATION OF PRE-EMPTION
NOTE:
IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "DO" FEATURE ON, TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

EMERGENCY PRE-EMPTION OPERATION NOTES

- ⑥ SIGNAL TO INDICATE G WHEN RETURNING TO NORMAL OPERATION

EMERGENCY PRE-EMPTION NOTES:

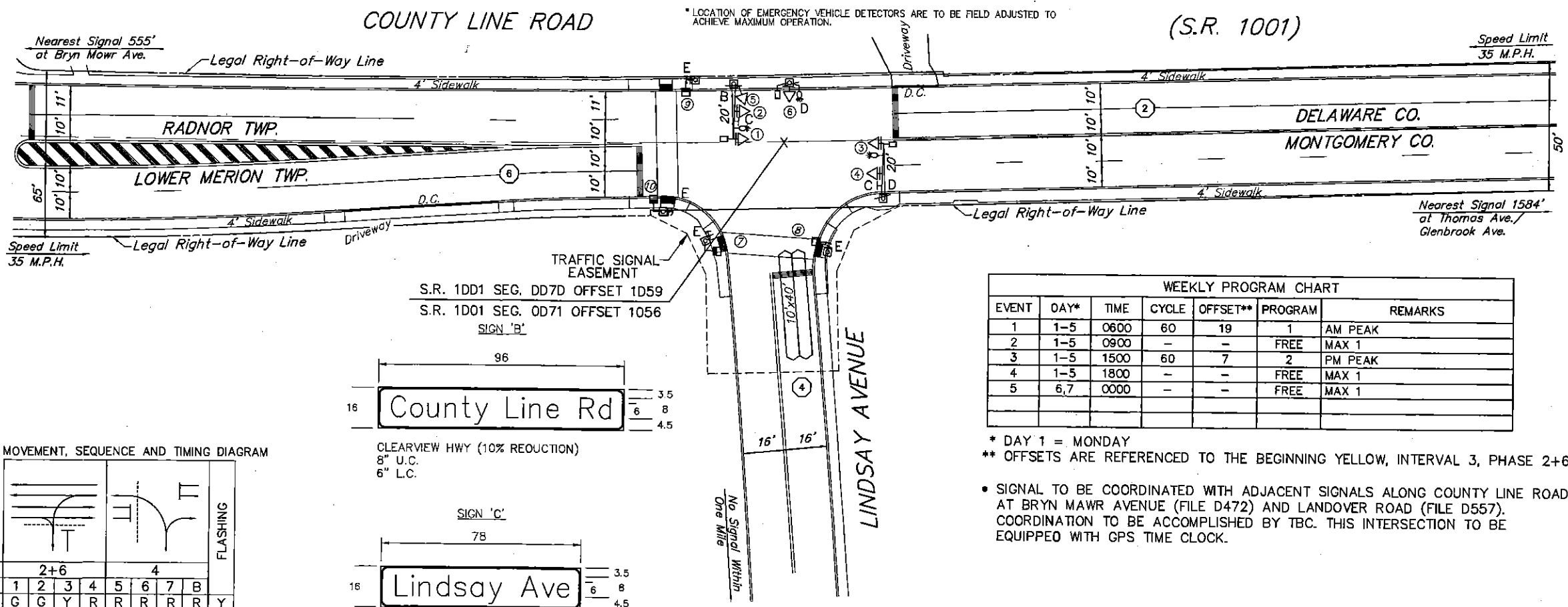
- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE NORTHBOUND AND SOUTHBOUND APPROACHES OF COUNTY LINE ROAD (SR 1001) AND THE WESTBOUND APPROACH OF LINDSAY AVE WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION. THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY. THEN THE GREEN INTERVAL FOR THE PRE-EMPTION PHASE SHALL FOLLOW. ONLY THOSE PHASES NOT POSING A YELLOW TRAP CONDITION MAY REMAIN GREEN (2 OR 4) WHEN GOVERNED BY APPROACHING EMERGENCY VEHICLE.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF THE SIGNAL HAS BEEN ACTUATED BY A PEDESTRIAN PUSH BUTTON AND THE SIGNAL IS PRE-EMPTED THE PEDESTRIAN TIME SHALL BE SPLIT BETWEEN "PED WALK" AND "PED CLEAR". THE "PED WALK" INTERVAL SHALL TERMINATE IMMEDIATELY FOLLOWED BY THE "PED CLEAR" INTERVAL. THIS INTERVAL SHALL TIME OUT FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE PROCEEDING TO THE PRE-EMPTION PHASE.
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- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- UPON COMPLETION OF PRE-EMPTION PHASE 2,4 OR 6 IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 1 SHALL FOLLOW.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED. PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.
- LOCATION OF EMERGENCY VEHICLE DETECTORS ARE TO BE FIELD ADJUSTED TO ACHIEVE MAXIMUM OPERATION.

SIGN TABULATION

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
B	03-4	96"x16"	STREET SIGN "County Line Rd"
C	03-4	78"x16"	STREET SIGN "Lindsay Ave"
O	R9-3A	18"x18"	NO PEDESTRIAN CROSSING
E	R10-3E	9"x14"	EDUCATIONAL PUSH BUTTON FOR WALK SIGNAL WITH COUNTDOWN TIMER

GENERAL NOTES

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- SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.
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- CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.



WEEKLY PROGRAM CHART

EVENT	DAY*	TIME	CYCLE	OFFSET**	PROGRAM	REMARKS
1	1-5	0600	60	19	1	AM PEAK
2	1-5	0900	-	-	FREE	MAX 1
3	1-5	1500	-	7	2	PM PEAK
4	1-5	1800	-	-	FREE	MAX 1
5	6,7	0000	-	-	FREE	MAX 1

* DAY 1 = MONDAY
** OFFSETS ARE REFERENCED TO THE BEGINNING YELLOW, INTERVAL 3, PHASE 2+6.

- SIGNAL TO BE COORDINATED WITH ADJACENT SIGNALS ALONG COUNTY LINE ROAD AT BRYN MAWR AVENUE (FILE D472) AND LANDOVER ROAD (FILE D557). COORDINATION TO BE ACCOMPLISHED BY TBC. THIS INTERSECTION TO BE EQUIPPED WITH GPS TIME CLOCK.

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

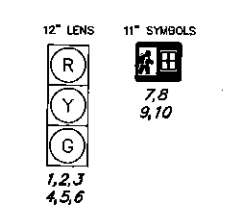
PHASE INTERVAL	2+6	4	FLASHING
SIGNALS	1 2 3 4 5 6 7 B		Y
1,2	G G Y R R R R R		
3,4	G G Y R R R R R		
5,6	R R R R G G Y R		
7,B	M FH H H H H H H		OFF
9,1D	H H H H M FH H H		OFF

FIXED	MINIMUM	PASSAGE	MAX. 1	MAX. 2	PEDESTRIAN*	MEMORY
15	3	3	30	30	7 12	MR
4	2	3	20	21	7 14	NL
3	2	3	10	3		
4	2	3	15	3		

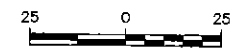
PROGRAM 1 → 39 → 4 2 → 10 → 3 2 → 6D SECONDS
PROGRAM 2 → 34 → 4 2 → 15 → 3 2 → 6D SECONDS

- OPERATION NOTES:**
- PEDESTRIAN COUNTDOWN TIMER TO COUNTDOWN DURING FLASHING HANO INTERVAL.
 - MINIMUM GREEN TIME, ACTUAL GREEN TIME TO BE DETERMINED BY CYCLE LENGTH AND TBC.

SIGNAL INDICATIONS



SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS
SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS & LOUVERS



LEGENO

- MAST ARM/IDENTIFYING LENGTH
- VEHICULAR SIGNAL HEAD/BACKPLATE/VISORS/DIRECTIONAL ARROW/IDENTIFYING NUMBER
- PEDESTRIAN SIGNAL HEAD/IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/SIGN
- SIGN/IDENTIFYING LETTER
- LOOP SENSOR/SIZE
- MICROWAVE DETECTOR
- EMERGENCY PREEMPTION BEACON
- EMERGENCY PREEMPTION DETECTOR
- CURB CUT RAMP
- UTILITY POLE
- PHASE NUMBER
- INLET

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE & MONTGOMERY
MUNICIPALITY: LOWER MERION & RAONOR TOWNSHIPS
INTERSECTION: COUNTY LINE ROAD (S.R. 1001)/
AND LINDSAY AVENUE

REVIEWED:
Stephen J. Plummer P.E. DATE 4/15/2003
MUNICIPAL OFFICIAL
RECOMMENDED:
Mark L. Kray DATE 5/18/94
Douglas May DATE 5/18/94
DISTRICT TRAFFIC ENGINEER

NO.	REVISION	DES./REV.	DATE	REV.	DATE	RECOM.	DATE
1	New Drawing	PAI	5/8/94	MLK	5/18/94	DWM	5/18/94
2	Relocate Stopbar	RFW	1/17/98	MLK	11/17/98	DWM	11/17/98
3	Change County Line Geometry, Retime, Add Curb Ramps	PAI	5/11/10	LUTZ	5/11/10	ABP	5/11/10
4	Revise Program Offsets	CAI	3/18/13	MLK	4/17/13	JOS	4/17/13
5							
6							
7							
8							

SIGN TABULATION			
PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R10-6AL	24"x30"	STOP HERE ON RED
B	R10-12	30"x36"	LEFT TURN YIELD ON GREEN
C	R6-1L	36"x12"	HORIZONTAL LEFT ONE-WAY
D	R6-1R	36"x12"	HORIZONTAL RIGHT ONE-WAY
E	R3-5L	30"x36"	LEFT TURN
F	R3-5S	30"x36"	STRAIGHT-THROUGH
G	R3-5R	30"x36"	RIGHT TURN
H	R3-6SR	30"x36"	OPTIONAL RIGHT TURN
J	R10-3E	9"x14"	EDUCATIONAL PUSH BUTTON FOR WALK SIGNAL WITH COUNTDOWN TIMER
K	R10-3E	9"x14"	EDUCATIONAL PUSH BUTTON FOR WALK SIGNAL WITH COUNTDOWN TIMER
L	D3-4	96"x16"	OVERHEAD STREET NAME
M	D3-5	96"x28"	OVERHEAD STREET NAME
N	D3-5	96"x28"	OVERHEAD STREET NAME
P	R3-8B	48"x30"	LANE USE CONTROL (L-S-SR)
R	R3-7L	30"x30"	LEFT LANE MUST TURN LEFT
S	D3-4	96"x16"	OVERHEAD STREET NAME
T	R9-3	18"x18"	NO PEDESTRIAN CROSSING

GENERAL NOTES

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POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

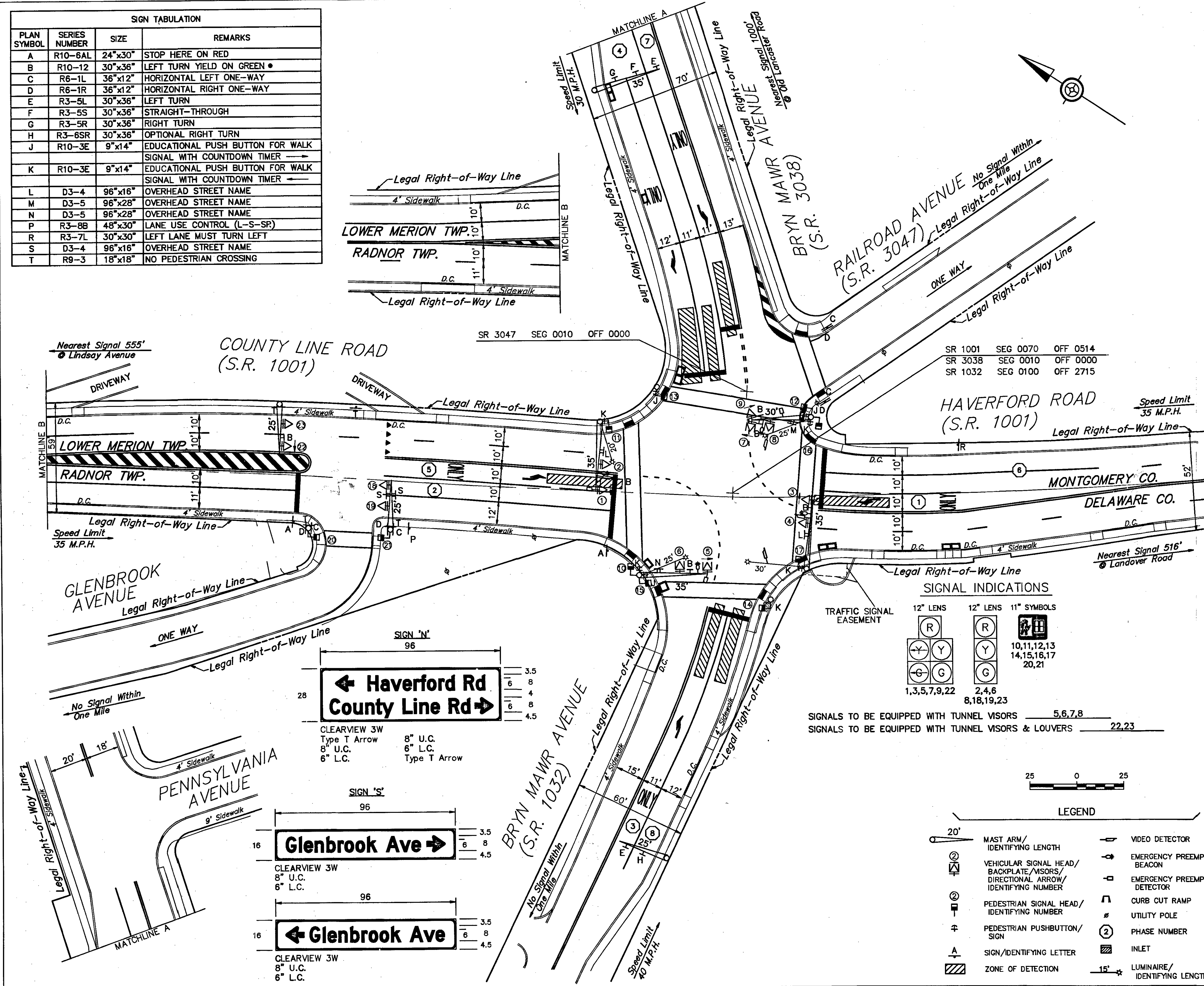
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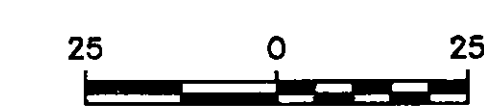
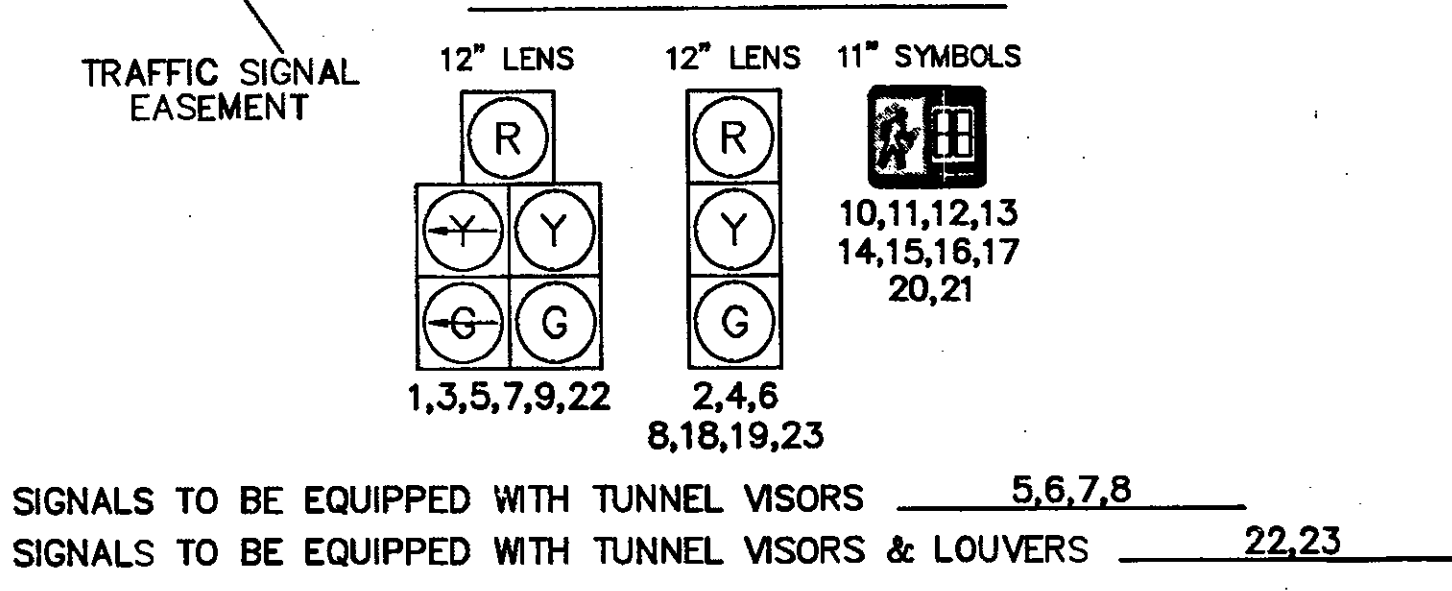
WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

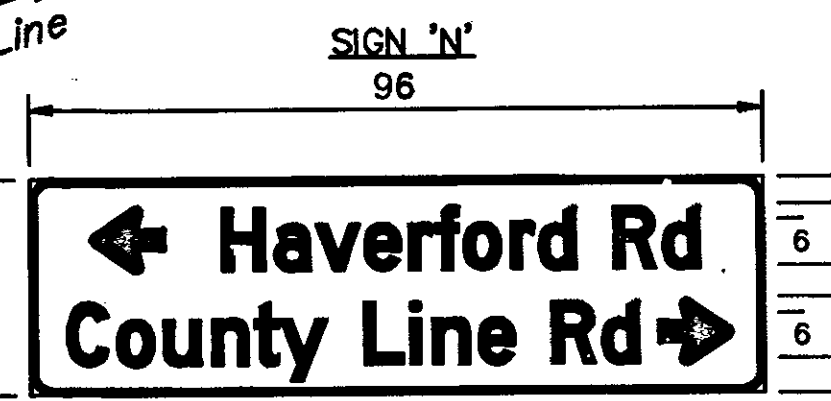


SIGNAL INDICATIONS

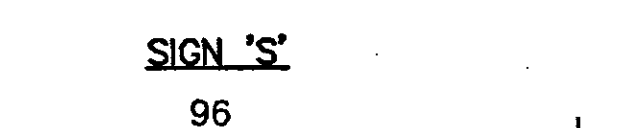


LEGEND

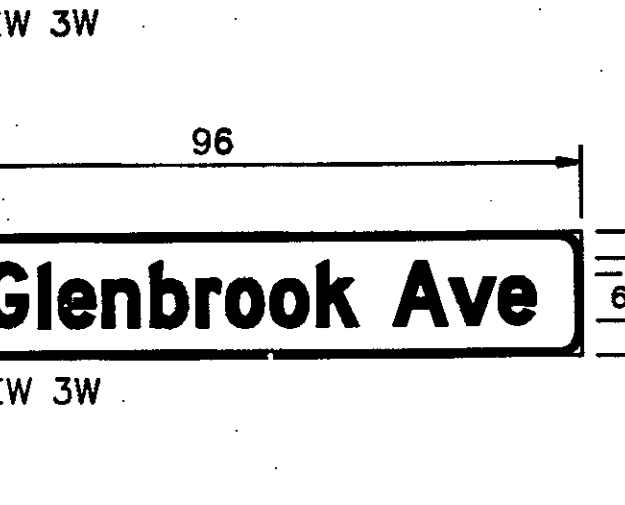
20'	MAST ARM/IDENTIFYING LENGTH	VIDEO DETECTOR	
(A)	VEHICULAR SIGNAL HEAD/BACKPLATE/VISORS/DIRECTIONAL ARROW/IDENTIFYING NUMBER	EMERGENCY PREEMPTION BEACON	
(P)	PEDESTRIAN SIGNAL HEAD/IDENTIFYING NUMBER	EMERGENCY PREEMPTION DETECTOR	
(+)	PEDESTRIAN PUSHBUTTON/SIGN	CURB CUT RAMP	
(A)	SIGN/IDENTIFYING LETTER	UTILITY POLE	
(Z)	ZONE OF DETECTION	(2)	PHASE NUMBER
		(I)	INLET
		15'	LUMINAIRE/IDENTIFYING LENGTH



CLEARVIEW 3W
Type T Arrow
8" U.C.
6" L.C.



CLEARVIEW 3W
8" U.C.
6" L.C.



CLEARVIEW 3W
8" U.C.
6" L.C.

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE & MONTGOMERY
 MUNICIPALITY: LOWER MERION & RADNOR TOWNSHIPS
 INTERSECTION: COUNTY LINE ROAD (S.R. 1001)/
 HAVERFORD ROAD (S.R. 1001) & BRYN MAWR AVENUE (S.R. 1032 & 3038)

REVIEWED:

DATE: 4/15/13
 Stephen F. Norcini, P.E.
 MUNICIPAL OFFICIAL

RECOMMENDED:

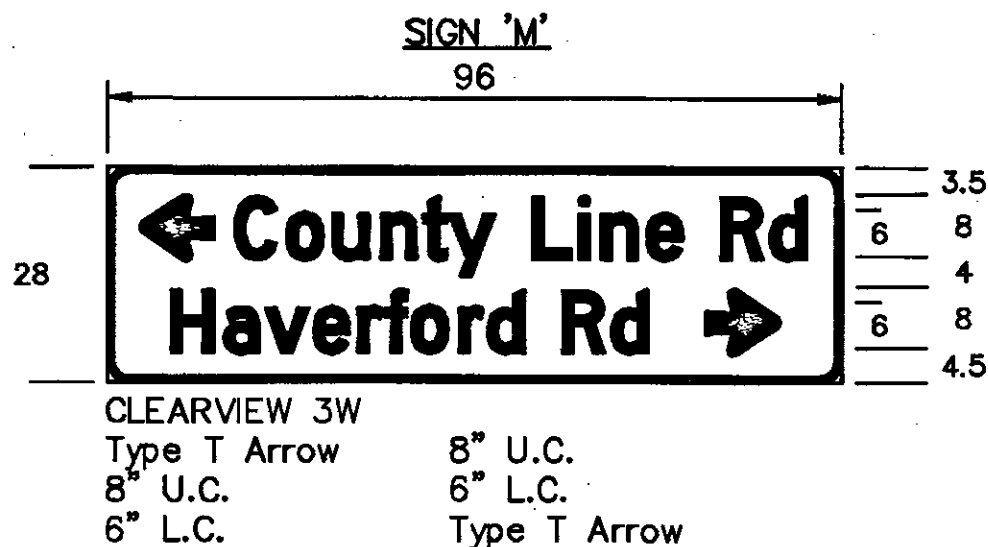
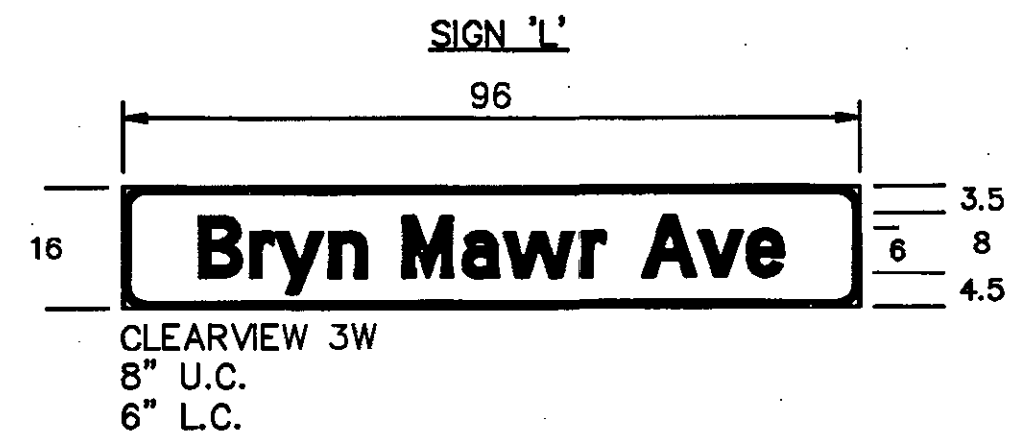
DATE: 5/18/94
 Mark L. Kray
 DISTRICT TRAFFIC ENGINEER

DATE: 5/18/94
 Douglas May
 DISTRICT TRAFFIC ENGINEER

NO.	REVISION	DES./REV.	DATE	REV.	DATE	RECOM.	DATE
1	New Drawing/Added Left Lane	PAI	5/4/10	LUTZ	5/24/10	ABP	5/28/10
2	As-Built	PAI	1/10/11				
3	Revise Timings	GAI	1/8/13	LUTZ	4/17/13	LRB	4/18/13
4	ADD 25' MAST ARM, SIGNAL HEADS 22&23	GAI	3/07/14	MDP	3/11/14	MDP	3/11/14
5							
6							
7							
8							

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE EASTBOUND & WESTBOUND APPROACHES OF COUNTY LINE ROAD/HAVERFORD ROAD (S.R. 1001), AND THE NORTHBOUND & SOUTHBOUND APPROACHES OF BRYN MAWR AVENUE (S.R. 1032/3038), WITH A FLASHING FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.
- THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS ACCORDINGLY, FOLLOWED BY THE GREEN INTERVAL, WITH THE FOLLOWING EXCEPTIONS IN THE CASE OF A PRE-EMPT DURING PHASE 2+5 OR 2+6: INTERVAL 4 MUST BE FOLLOWED BY INTERVAL 6 IN ITS ENTIRETY BEFORE COMPLETING THE YELLOW AND RED CLEARANCE INTERVALS. INTERVAL 12 MUST BE FOLLOWED BY INTERVAL 13 IN ITS ENTIRETY BEFORE COMPLETING THE YELLOW AND RED CLEARANCE INTERVALS.
- IF THE SIGNALS ARE IN EITHER YELLOW OR RED CLEARANCE, THE CLEARANCE TIMES SHALL BE COMPLETED BEFORE THE GREEN INTERVAL OF THE PRE-EMPTION PHASE OCCURS.
- IF THE SIGNALS ARE FLASHING WHEN ACTIVATED BY AN EMERGENCY VEHICLE ALL SIGNALS SHALL REMAIN FLASHING.
- UPON COMPLETION OF PRE-EMPTION PHASE 2, 4, 6, OR 8, RETURN TO NORMAL OPERATION, PHASE 2+6, INTERVAL 14.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVED" OPERATION.
- THE FIELD LOCATIONS OF THE PRE-EMPTION DETECTORS MAY DIFFER FROM THE LOCATIONS DEPICTED ON THE CONDITION DIAGRAM, AS THE DETECTORS MAY NEED TO BE RELOCATED AND/OR ADJUSTED TO PROVIDE ACCEPTABLE OPERATION AS DEEMED APPROPRIATE BY DEPARTMENT PERSONNEL.
- IF THE SIGNAL HAS BEEN ACTUATED BY A PEDESTRIAN PUSH BUTTON, AND THE SIGNAL IS PRE-EMPTED, THE PED "WALK (MAN)" INTERVAL SHALL TERMINATE IMMEDIATELY AND THE PED "CLEAR (FLASHING HAND AND COUNTDOWN TIMER)" INTERVAL SHALL TIME OUT THIS INTERVAL FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES, BEFORE GOING INTO EMERGENCY PRE-EMPTION PHASE.



EMERGENCY PRE-EMPTION PHASING MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2	6	4	8
INTERVAL	31 32 33	34 35 36	37 38 39	40 41 42
1	R R R	G Y R	R R R	R R R
2	R R R	G Y R	R R R	R R R
3	G Y R	R R R	R R R	R R R
4	G Y R	R R R	R R R	R R R
6	R R R	R R R	G Y R	R R R
7	R R R	R R R	R R R	G Y R
8	R R R	R R R	R R R	G Y R
5,9	R R R	R R R	G Y R	R R R
10,11,16,17	H H H	H H H	H H H	H H H
12,13,14,15	H H H	H H H	H H H	H H H
18,19	G Y R	R R R	R R R	R R R
20,21	H H H	H H H	H H H	H H H
22	G G G	G Y G	G Y G	G Y G
23	G G G	G G G	G G G	G G G
FIXED TIME	* 4 2	* 4 2	* 3 3	* 3 3

* FOR DURATION OF PRE-EMPTION

NOTE: IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

- ⓐ SIGNAL TO INDICATE G WHEN RETURNING TO NORMAL OPERATION.
- ⓑ SIGNAL TO INDICATE G/Y WHEN RETURNING TO NORMAL OPERATION.

SIGN 'M'

COUNT DATE 10/23/12

GENERAL NOTES

- NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.
- ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.
- ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.
- POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.
- SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.
- ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.
- THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.
- EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.
- CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.
- PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.
- THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.
- WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.
- PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.
- CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

WEEKLY PROGRAM CHART

EVENT	DAY*	TIME	CYCLE	OFFSET**	PROGRAM	REMARKS
1	1-5	0600	120	0	1	AM PEAK
2	1-5	0900	-	-	FREE	MAX 1
3	1-5	1500	120	0	2	PM PEAK
4	1-5	1800	-	-	FREE	MAX 1
5	6,7	0000	-	-	FREE	MAX 1

* DAY 1 = MONDAY
** OFFSETS ARE REFERENCED TO THE BEGINNING YELLOW, INTERVAL 14

- SIGNAL TO BE COORDINATED WITH ADJACENT SIGNALS ALONG COUNTY LINE ROAD AT LINDSAY AVENUE (FILE 1030) AND LANDOVER ROAD (FILE 0557). COORDINATION TO BE ACCOMPLISHED BY TBC. THIS INTERSECTION TO BE EQUIPPED WITH GPS TIME CLOCK.

OPERATION NOTES:

- ① PHASE 2+6, 3+7, 3+8, 4+7 OR 4+8 SHALL FOLLOW
- ② G IF FOLLOWED BY PHASE 3+7, 4+7, 3+8, OR 4+8
- ③ G IF FOLLOWED BY PHASE 2+6
- ④ G IF FOLLOWED BY PHASE 2+6
- ⑤ G IF FOLLOWED BY PHASE 3+8
- ⑥ G IF FOLLOWED BY PHASE 4+7
- ⑦ G IF FOLLOWED BY PHASE 4+8
- ⑧ G IF FOLLOWED BY PHASE 4+8
- ⑨ M IF FOLLOWED BY PHASE 2+6
- ⑩ M IF FOLLOWED BY PHASE 4+8
- ⑪ G IF FOLLOWED BY PHASE 3+8, 4+7, OR 4+8
- ⑫ G IF FOLLOWED BY PHASE 3+7, 4+7, 4+8, OR 1+6
- ⑬ G IF FOLLOWED BY PHASE 3+7, 3+8, 4+8, OR 1+6
- ⑭ G IF FOLLOWED BY PHASE 3+8, 4+7, 4+8, OR 1+6
- ⑮ G IF FOLLOWED BY PHASE 1+6, 3+7, 3+8, OR 4+7
- ⑯ PEDESTRIAN TIME TO BE AS SHOWN IN PHASE 2+6. PED TIME MAY TIME OUT IN THIS PHASE OR MAY BE COMPLETED IN PHASE 2+6.
- ⑰ PEDESTRIAN TIME TO BE AS SHOWN IN PHASE 4+8. PED TIME MAY TIME OUT IN THIS PHASE OR MAY BE COMPLETED IN PHASE 4+8.
- ⑱ PEDESTRIAN COUNTDOWN TIMER TO COUNTDOWN DURING FLASHING HAND INTERVAL.
- ⑳ SIGNAL TO DWELL IN PHASE 2+6 UNTIL ACTUATED BY PHASE 3,4,7 OR 8.

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

FIXED	4	2	4	4	2	4	4	2	3	3	3	3	3	3								
MINIMUM	3		3	3		10			3		3		3									
PASSAGE	3		3	3					3		3		3									
MAXIMUM 1	7		7	7		26			7		7		7									
MAXIMUM 2	7		7	7		26			7		7		7									
PEDESTRIAN						7	21						7	20								
MEMORY	NL		NL	NL		MR			NL		NL		NL									
PROGRAM 1	6	4	2	6	4	2	35	4	2	6	3	3	6	3	3	49	3	3	(120 SEC.)			
PROGRAM 2	6	4	2	6	4	2	41	4	2	8	3	3	11	3	3	8	3	3	41	3	3	(120 SEC.)

* UPON PEDESTRIAN ACTUATION ONLY, OTHERWISE H AT ALL TIMES

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION ENGINEERING DISTRICT 6-0

COUNTY: DELAWARE & MONTGOMERY
MUNICIPALITY: LOWER MERION & RADNOR TOWNSHIP
INTERSECTION: COUNTY LINE ROAD (S.R. 1001)/
HAVERFORD ROAD (S.R. 1001) & BRYN MAWR AVENUE (S.R. 1032 & 3038)

REVIEWED:
DATE
Stephen F. Norcini, P.E. 4/15/13
MUNICIPAL OFFICIAL
RECOMMENDED:
DATE
Mark L. Kray 5/18/94
DATE
Douglas May 5/18/94
DISTRICT TRAFFIC ENGINEER

NO.	REVISION	DES/REV.	DATE	REV.	DATE	RECOM.	DATE
1	New Drawing/Added Left Lane	PAI	5/4/10	LUTZ	5/24/10	ABP	5/29/10
2	As-Built	PAI	1/10/11				
3	Revise Timings	GAI	1/8/13	LUTZ	4/17/13	LRB	4/19/13
4	ADD 25' MAST ARM, SIGNAL HEADS 22&23	GAI	3/07/14				
5							
6							
7							
8							

TIME	LANDOVER RD. (S.R. 1009)	COUNTY LINE RD. (S.R. 1009)	HAVERFORD ROAD (S.R. 1001)
1. 7:00AM TO 8:00AM	62	35	55
2. 8:00AM TO 9:00AM	40	87	63
3. 9:00AM TO 10:00AM	35	77	40
4. 10:00AM TO 11:00AM	30	62	60
5. 11:00AM TO 12:00PM	28	58	60
6. 12:00PM TO 1:00PM	28	59	75
7. 1:00PM TO 2:00PM	22	73	138
8. 2:00PM TO 3:00PM	25	76	126
9. 3:00PM TO 4:00PM	25	66	116
10. 4:00PM TO 5:00PM	20	107	135
11. 5:00PM TO 6:00PM	24	91	135
12. 6:00PM TO 7:00PM			
TOTALS	452	1001	1350

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
(A)	D3-4	96X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)
(B)	D3-4	78X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)
(C)	D3-4	84X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)
(D)	D3-4	98X16	OVERHEAD STREET NAME SIGN (SEE DETAIL)

EVENT	DAY*	TIME	CYCLE	OFFSET**	PROGRAM	REMARKS
1	1-7	0000	80	-	3	OFF PEAK
2	1-5	0600	120	18	1	AM PEAK
3	1-5	0900	80	-	3	OFF PEAK
4	1-5	1500	120	22	2	PM PEAK
5	1-5	1800	80	-	3	OFF PEAK

- * DAY 1 = MONDAY
- ** OFFSETS ARE REFERENCED TO THE BEGINNING YELLOW, INTERVAL 2
- SIGNAL TO BE COORDINATED WITH ADJACENT SIGNALS ALONG HAVERFORD ROAD AT BRYN MAWR AVENUE (FILE 0472) AND BUCKS LANE (FILE 0553). COORDINATION BY TBC. THIS INTERSECTION TO BE EQUIPPED WITH A GPS TIME CLOCK.

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 18 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 40B.

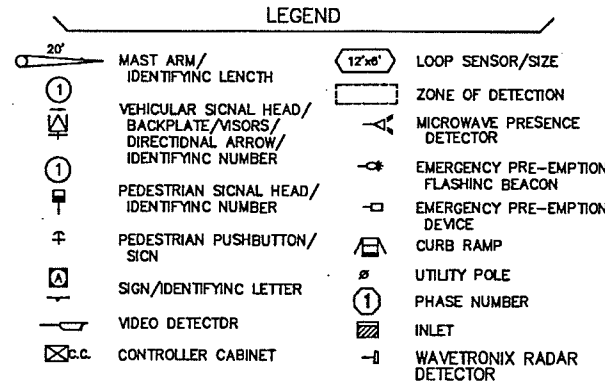
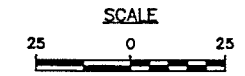
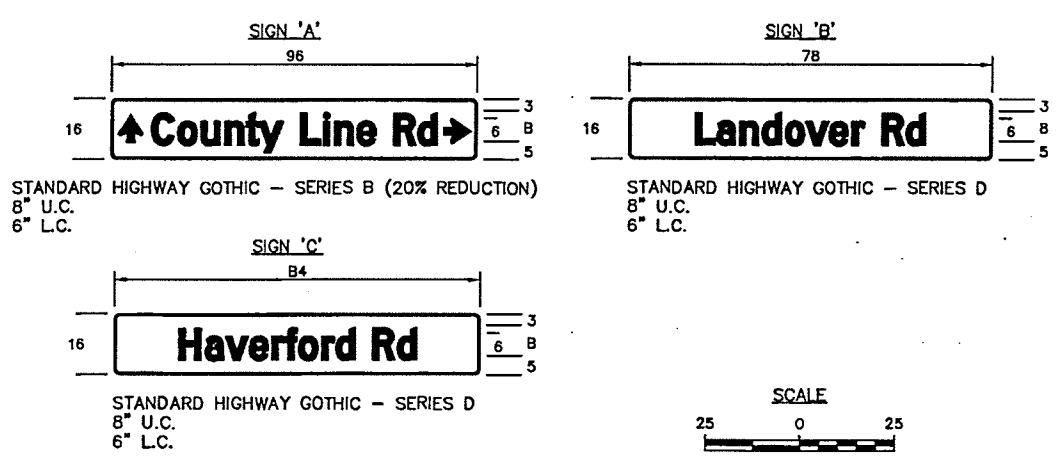
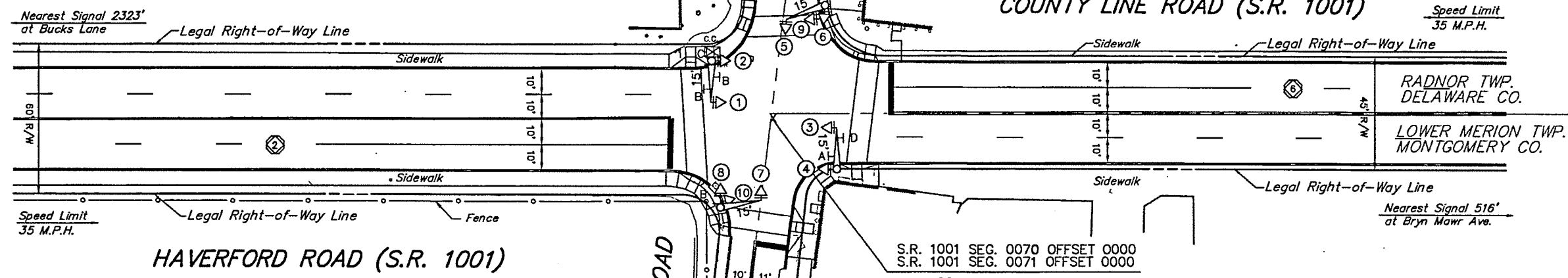
PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 40B AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

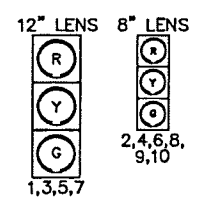


MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2+6			4+8			FLASHING
	1	2	3	4	5	6	
1,2,3,4	G	Y	R	R	R	R	Y
5,6,7,8	R	R	R	G	Y	R	R
9,10	G	Y	R	R	R	R	OFF

PROGRAM 1	75	3	2	35	3	2	(120 SEC.)
PROGRAM 2	75	3	2	35	3	2	(120 SEC.)
PROGRAM 3	55	3	2	15	3	2	(80 SEC.)

SIGNAL INDICATIONS



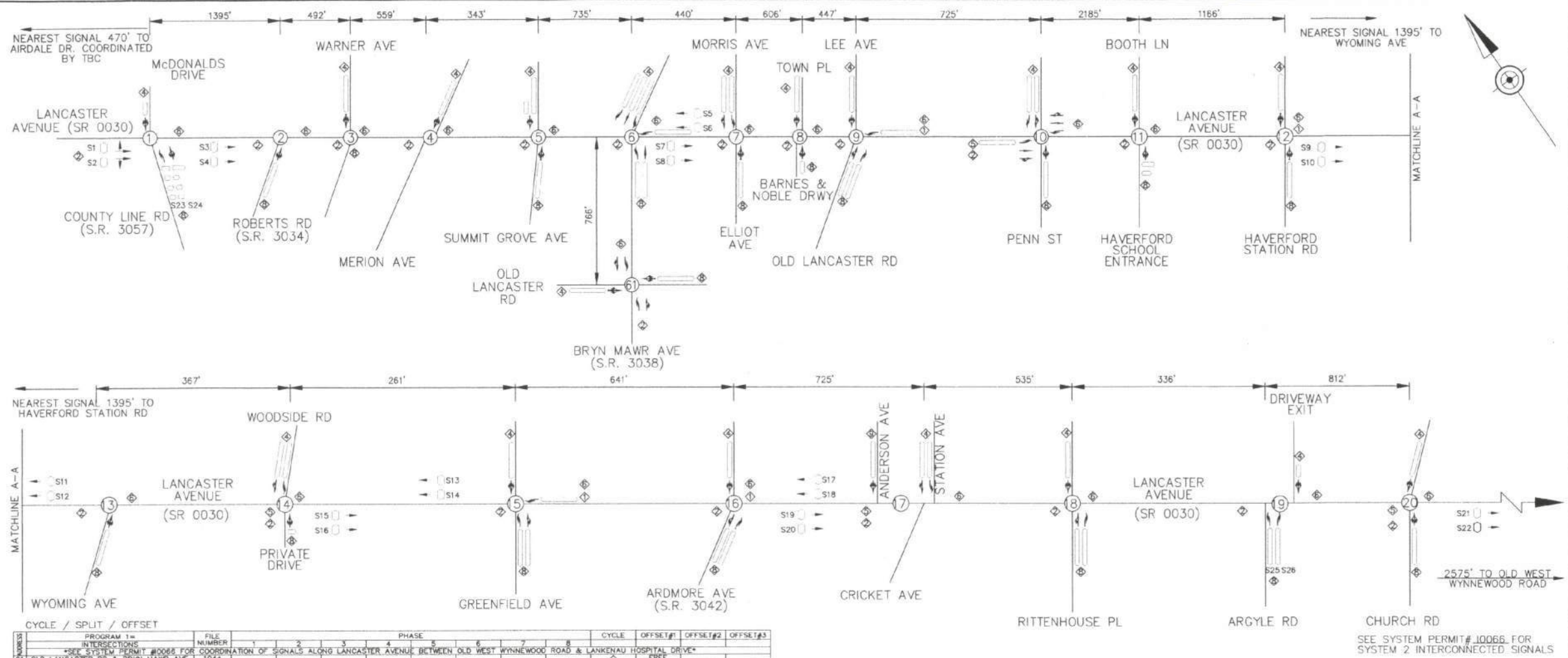
SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS
 SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS & LOUVERS

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
 ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY/DELAWARE
 MUNICIPALITY: LOWER MERION/RADNOR TWP. & HAVERFORD TOWNSHIP
 INTERSECTION: HAVERFORD ROAD (S.R. 1001) & COUNTY LINE ROAD/LANDOVER ROAD (S.R. 1009)

REVIEWED: _____ DATE _____
 MUNICIPAL OFFICIAL _____ DATE _____
 RECOMMENDED: MARK L. KRAY 5/18/94
 DOUGLAS MAY 5/18/94
 DISTRICT TRAFFIC ENGINEER

NO.	REVISION	DES./REV.	DATE	REV.	DATE	REC'D.	DATE
1	NEW DRAWING	J.J.L.	5/13/94	MK	5/18/94	DWM	5/18/94
2	REVISE COORDINATION TIMING	PAI	11/16/10	PAL	11/23/10	ABP	11/23/10
3	REVISED CURB RAMPS	MCN	2/3/13	LUTZ	2/3/13	LRB	2/6/13
4	REVISE COORDINATION TIMING	GAI	2/15/13	LUTZ	4/17/13	LRB	4/18/13
5	REVISE SIGNS A & D	KPL	7/12/16	D.L.A.	7/13/16	dpk	11/13/16
6							
7							
B							



GENERAL NOTES

- NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.
- REFER TO TRAFFIC SIGNAL PERMIT DRAWING FOR INDIVIDUAL INTERSECTION OPERATION, GEOMETRY, PHASING AND CRITICAL TIMES.
- FOR CONSTRUCTION AND INSPECTION THE SYSTEM PERMIT SHOULD ALWAYS BE ACCOMPANIED WITH TRAFFIC SIGNAL PERMIT DRAWING.
- TEST THE SYSTEM AT LOCAL INTERSECTION LEVEL, SUBSYSTEM LEVEL MASTER CONTROLLER LEVEL AND PERSONAL COMPUTER REMOTE DIAL UP LEVEL.
- GATHER THE SYSTEM FAILURE CRITICAL ALARMS REPORT AND ARCHIVE THEM WHERE APPLICABLE.
- SET UP PENNDOT DISTRICT 6-0 COMPUTER WITH THE SYSTEM DATABASE AND GRAPHICS. MODIFY THE DATABASE AND GRAPHICS FOR SYSTEMS REVISIONS.
- ASSIGN LOOP DETECTORS AND PROGRAM THE CONTROLLERS TO GATHER TRAFFIC VOLUMES IN 15 MINUTE INTERVAL, WHERE APPLICABLE.
- EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.
- OBTAIN POLE ATTACHMENT PERMIT FOR AERIAL FIBER OPTIC INSTALLATION.
- MAINTAIN MASTER CONTROLLER COMMUNICATION SUCH AS PHONE DROPS.
- PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.
- THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITEE COMPLY WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287 PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.
- WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT FOR REVIEW PRIOR TO BIDDING.
- PERMITEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.
- CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.



CYCLE / SPLIT / OFFSET

NO	PROGRAM #	INTERSECTIONS	FILE NUMBER	PHASE								CYCLE	OFFSET#1	OFFSET#2	OFFSET#3
				1	2	3	4	5	6	7	8				
SEE SYSTEM PERMIT #0065 FOR COORDINATION OF SIGNALS ALONG LANCASTER AVENUE BETWEEN OLD WEST WYNEWOOD ROAD & LANKENAU HOSPITAL DRIVE															
19	1044	LANCASTER AVE & BRYN MAWR AVE	0468				33	13 (LEAD)	44		33	90		10	
20	0468	LANCASTER AVE & CHURCH RD	0468				33	13 (LEAD)	44		33	90		10	
18	0465	LANCASTER AVE & ARDRE BOULEVARDWAY DR	0465			24 (SPLIT)					24 (SPLIT)	90		33	
17	0464	LANCASTER AVE & RITTENHOUSE PLACE	0464			29**	18 (LEAD)	46			29	90		44	
16	0462	LANCASTER AVE & ARDMORE AVE	0462	13 (LEAD)	35	21 (SPLIT)					21 (SPLIT)	90		48	
15	0461	LANCASTER AVE & WOODSIDE RD	0461			30					30	90		48	
14	0460	LANCASTER AVE & GREENFIELD AVE	0460			42	19 (LEAD)	29			42	90		87	
13	0421	LANCASTER AVE & WYOMING RD	0421	15 (LEAD)	51						51	90		87	
12	0420	LANCASTER AVE & HAVSFORD STATION RD	0420			34					34	90		87	
11	0421	LANCASTER AVE & BOOTH LANE	0421			25					25	90		50	
10	0837	LANCASTER AVE & PENN ST	0837			29	12 (LEAD)	49			29	90		0	
9	0459	LANCASTER AVE & OLD LANCASTER AVE / IVE AVE	0459	13 (LEAD)	61						61	90		0	
8	0458	LANCASTER AVE & DOWN BARNES & NOBLE DR	0458			22 (SPLIT)					22 (SPLIT)	90		22	
7	0458	LANCASTER AVE & MORRIS AVE / ELLIOT AVE	0458			31					31	90		26	
6	0455	LANCASTER AVE & BRYN MAWR AVE	0455	13 (LEAD)	55	26 (PED)					55	90		2	
5	0454	LANCASTER AVE & SUMMIT GROVE AVE	0454			35					35	90		2	
4	0453	LANCASTER AVE & MERION AVE	0453			35					35	90		75	
3	1509	LANCASTER AVE & WARNER AVE	1509			25 (PED)					25	90		60	
2	0318	LANCASTER AVE & ROBERTS RD	0318			31					31	90		75	
1	0452	LANCASTER AVE & COUNTY LINE RD	0452			42					42	90		80	
SEE SYSTEM PERMIT #0066 FOR COORDINATION OF SIGNALS ALONG LANCASTER AVENUE BETWEEN OLD WEST WYNEWOOD ROAD & LANKENAU HOSPITAL DRIVE															
18	1044	LANCASTER AVE & BRYN MAWR AVE	1044				39	13 (LEAD)	48		39	90		10	
19	0465	LANCASTER AVE & ARDRE BOULEVARDWAY DR	0465			23 (SPLIT)					23 (SPLIT)	90		33	
17	0464	LANCASTER AVE & RITTENHOUSE PLACE	0464			32					32	90		48	
16	0462	LANCASTER AVE & ARDMORE AVE	0462	13 (LEAD)	35	21 (SPLIT)					21 (SPLIT)	90		57	
15	0461	LANCASTER AVE & WOODSIDE RD	0461			31					31	90		78	
14	0460	LANCASTER AVE & GREENFIELD AVE	0460			42	13 (LEAD)	27			42	90		78	
13	0421	LANCASTER AVE & WYOMING RD	0421			31					31	90		10	
12	0420	LANCASTER AVE & HAVSFORD STATION RD	0420	15 (LEAD)	61						61	90		14	
11	0421	LANCASTER AVE & BOOTH LANE	0421			24					24	90		0	
10	0837	LANCASTER AVE & PENN ST	0837			27	12 (LEAD)	41			27	90		27	
9	0459	LANCASTER AVE & OLD LANCASTER AVE / IVE AVE	0459	18 (LEAD)	57						57	90		8	
8	0458	LANCASTER AVE & DOWN BARNES & NOBLE DR	0458			21 (SPLIT)					21 (SPLIT)	90		8	
7	0458	LANCASTER AVE & MORRIS AVE / ELLIOT AVE	0458			29					29	90		0	
6	0455	LANCASTER AVE & BRYN MAWR AVE	0455	13 (LEAD)	55	26 (PED)					55	90		32	
5	0454	LANCASTER AVE & SUMMIT GROVE AVE	0454			35					35	90		11	
4	0453	LANCASTER AVE & MERION AVE	0453			35					35	90		17	
3	1509	LANCASTER AVE & WARNER AVE	1509			25 (PED)					25	90		94	
2	0318	LANCASTER AVE & ROBERTS RD	0318			31					31	90		94	
1	0452	LANCASTER AVE & COUNTY LINE RD	0452			42					42	90		04	

SYSTEM NOTES

- PROGRAM TO BE SELECTED BY CLOSED LOOP SYSTEM (TIME OF DAY) OR TBC BACKUP.
- OFFSETS ARE REFERENCED TO NEMA TS2 1ST GREEN, ON LANCASTER AVENUE.
- SYSTEM LIMITS:
LANCASTER AVENUE - FROM COUNTY LINE ROAD TO CHURCH ROAD,
BRYN MAWR AVENUE - FROM LANCASTER AVENUE TO OLD LANCASTER AVENUE.
MASTER CONTROLLER:
RADIO TOWER AT TOWNSHIP BUILDING NEAR LANCASTER AVENUE & ARGYLE ROAD.
- PRIMARY COORDINATION: CLOSED LOOP SYSTEM -
SPREAD SPECTRUM RADIO COMMUNICATION.
SECONDARY COORDINATION: TBC (DEFAULT TO BACKUP TBC).
- SYSTEM IS DESIGNED FOR THE SYSTEM SOFTWARE: MARC NX.
- CYCLES, SPLITS & OFFSETS ARE IN SECONDS.

WEEKLY PROGRAM CHART

EVENT	Δ DAY	TIME	PROGRAM*	REMARKS
1	1-7	0000	---	FLASH
2	1-5	0600	1	AM PEAK
3	1-5	0900	2	MD PEAK
4	1-5	1500	3	PM PEAK
5	1-5	2000	---	FREE
6	6,7	0600	2	MD PEAK
7	6,7	1900	---	FREE

- LEGEND
- ④ INTERSECTION ADDRESS
 - S## SYSTEM LOOP/IDENTIFYING NUMBER
 - LOOP SENSOR
 - ◇ PHASE NUMBER

NOTES:
- ALL SPLIT TIMES INCLUDE YELLOW AND RED TIMES FOR A GIVEN PHASE.
- REFER TO SIGNAL PERMIT PLAN FOR MAX 1, MAX 2 AND CLEARANCE AND PED TIMES.
- REFER TO SIGNAL PERMIT PLAN FOR WEEKLY PROGRAM SCHEDULE.
- COORDINATED WITH AIRDALE DR AND LANCASTER AVENUE
- INCLUDES PHASE 9 AS SHOWN ON PERMIT PLAN

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY
MUNICIPALITY: LOWER MERION TOWNSHIP
INTERSECTION: LANCASTER AVENUE (SR 0030) CORRIDOR
BETWEEN COUNTY LINE RD TO CHURCH RD

REVIEWED: _____ DATE _____
MUNICIPAL OFFICIAL: _____ DATE _____

RECOMMENDED: A B PATEL 03/05/04
L R BELMONTE 03/08/04
DISTRICT TRAFFIC ENGINEER DATE

NO	REVISION	DES/REVW	DATE	REVW	DATE	RECOM	DATE
1	ADD OLD LANCASTER RD & OLD BRYN MAWR AVE	TPD		DLA	02/27/09	ABP	02/27/09
2	ADD RT LANE TO SB & ADD LT LANE TO EB & WB AT INT #10	TPD	04/14/11	LUTZ	04/14/11	ABP	04/14/11
3	REVISED INT. 3 TWINGS, INT. 15 AND 16 OFFSETS	BJD	11/26/12	W.A. King	12/10/12		

SYSTEM PERMIT # 1-0065

NOT TO SCALE

APPENDIX H

Capacity Analysis Results



Existing Analysis



Lanes, Volumes, Timings
 1: County Line Rd & Lancaster Ave

Existing AM Peak
 02/25/2019



Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1136	733	356	350	38
v/c Ratio	0.74	0.49	0.65	0.66	0.19
Control Delay	13.4	14.8	28.9	29.3	21.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.4	14.8	28.9	29.3	21.7
Queue Length 50th (ft)	144	121	135	134	8
Queue Length 95th (ft)	224	167	#325	#322	34
Internal Link Dist (ft)	417	551		90	80
Turn Bay Length (ft)					
Base Capacity (vph)	1540	1506	545	530	379
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.74	0.49	0.65	0.66	0.10

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: County Line Rd & Lancaster Ave

Existing AM Peak
02/25/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↕			↕	
Traffic Volume (vph)	8	537	489	1	654	12	611	27	5	8	8	18
Future Volume (vph)	8	537	489	1	654	12	611	27	5	8	8	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Total Lost time (s)		2.5			2.5		2.5	2.5				2.5
Lane Util. Factor		0.95			0.95		0.95	0.95				1.00
Frt		0.93			1.00		1.00	1.00				0.93
Flt Protected		1.00			1.00		0.95	0.96				0.99
Satd. Flow (prot)		2854			3197		1561	1516				1573
Flt Permitted		0.95			0.95		0.95	0.96				0.99
Satd. Flow (perm)		2709			3050		1561	1516				1573
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	9	590	537	1	719	13	671	30	5	9	9	20
RTOR Reduction (vph)	0	213	0	0	2	0	0	1	0	0	18	0
Lane Group Flow (vph)	0	923	0	0	731	0	356	349	0	0	20	0
Heavy Vehicles (%)	0%	5%	6%	0%	5%	17%	3%	4%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)		34.0			34.0		24.5	24.5				4.5
Effective Green, g (s)		37.5			37.5		28.0	28.0				7.0
Actuated g/C Ratio		0.47			0.47		0.35	0.35				0.09
Clearance Time (s)		6.0			6.0		6.0	6.0				5.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0				3.0
Lane Grp Cap (vph)		1269			1429		546	530				137
v/s Ratio Prot							0.23	c0.23				c0.01
v/s Ratio Perm		c0.34			0.24							
v/c Ratio		0.73			0.51		0.65	0.66				0.14
Uniform Delay, d1		17.1			14.9		21.9	22.0				33.7
Progression Factor		1.00			1.00		0.90	0.90				1.00
Incremental Delay, d2		3.7			0.3		2.5	2.6				0.5
Delay (s)		20.8			15.2		22.1	22.4				34.2
Level of Service		C			B		C	C				C
Approach Delay (s)		20.8			15.2			22.2				34.2
Approach LOS		C			B			C				C

Intersection Summary		
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.67	B
Actuated Cycle Length (s)	80.0	Sum of lost time (s)
Intersection Capacity Utilization	70.7%	10.0
Analysis Period (min)	15	ICU Level of Service
		C
c	Critical Lane Group	

Intersection												
Int Delay, s/veh	7.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	28	71	67	9	42	8	12	618	56	7	480	13
Future Vol, veh/h	28	71	67	9	42	8	12	618	56	7	480	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	1	0	0	2	0	0	3	7	0	7	0
Mvmt Flow	30	76	71	10	45	9	13	657	60	7	511	14

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	909	1275	263	1021	1252	359	525	0	0	717	0	0
Stage 1	532	532	-	713	713	-	-	-	-	-	-	-
Stage 2	377	743	-	308	539	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.52	6.9	7.5	6.54	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.52	-	6.5	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.52	-	6.5	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.01	3.3	3.5	4.02	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	233	167	742	193	171	643	1052	-	-	893	-	-
Stage 1	504	526	-	394	434	-	-	-	-	-	-	-
Stage 2	622	422	-	683	520	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	178	162	742	108	166	643	1052	-	-	893	-	-
Mov Cap-2 Maneuver	178	162	-	108	166	-	-	-	-	-	-	-
Stage 1	493	520	-	386	425	-	-	-	-	-	-	-
Stage 2	538	413	-	522	514	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	51.7		38.4		0.2		0.1	
HCM LOS	F		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1052	-	-	242	169	893	-	-
HCM Lane V/C Ratio	0.012	-	-	0.73	0.371	0.008	-	-
HCM Control Delay (s)	8.5	0.1	-	51.7	38.4	9.1	0	-
HCM Lane LOS	A	A	-	F	E	A	A	-
HCM 95th %tile Q(veh)	0	-	-	5	1.6	0	-	-

Intersection												
Int Delay, s/veh	16.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	67	101	16	7	25	16	4	562	28	9	457	45
Future Vol, veh/h	67	101	16	7	25	16	4	562	28	9	457	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	9	2	0	0	0	0	0	2	4	0	4	0
Mvmt Flow	73	110	17	8	27	17	4	611	30	10	497	49

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	869	1191	273	958	1200	321	546	0	0	641	0	0
Stage 1	542	542	-	634	634	-	-	-	-	-	-	-
Stage 2	327	649	-	324	566	-	-	-	-	-	-	-
Critical Hdwy	7.68	6.54	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.68	5.54	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.68	5.54	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.02	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	235	186	731	215	187	681	1033	-	-	953	-	-
Stage 1	475	518	-	439	476	-	-	-	-	-	-	-
Stage 2	641	464	-	668	511	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	200	182	731	108	183	681	1033	-	-	953	-	-
Mov Cap-2 Maneuver	200	182	-	108	183	-	-	-	-	-	-	-
Stage 1	472	510	-	436	473	-	-	-	-	-	-	-
Stage 2	585	461	-	504	503	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	109.7		27.3		0.1		0.2	
HCM LOS	F		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1033	-	-	202	213	953	-
HCM Lane V/C Ratio	0.004	-	-	0.99	0.245	0.01	-
HCM Control Delay (s)	8.5	0	-	109.7	27.3	8.8	0.1
HCM Lane LOS	A	A	-	F	D	A	A
HCM 95th %tile Q(veh)	0	-	-	8.5	0.9	0	-

Lanes, Volumes, Timings
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

Existing AM Peak
 02/25/2019



Lane Group	WBL	NBT	SBT	SER	NEL
Lane Group Flow (vph)	24	1000	535	421	145
v/c Ratio	0.08	0.66	0.56	0.70	0.42
Control Delay	24.0	7.9	19.3	30.7	30.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	7.9	19.3	30.7	30.3
Queue Length 50th (ft)	10	110	122	174	63
Queue Length 95th (ft)	27	202	167	#350	107
Internal Link Dist (ft)	270	237	338		313
Turn Bay Length (ft)					
Base Capacity (vph)	439	1504	956	598	481
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.66	0.56	0.70	0.30

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

Existing AM Peak
 02/25/2019



Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBT	SBR	SER	SER2	NEL2
Lane Configurations												
Traffic Volume (vph)	4	0	17	1	351	547	12	474	13	377	6	20
Future Volume (vph)	4	0	17	1	351	547	12	474	13	377	6	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	11	10	10	10	10	13	13	12
Grade (%)		2%				-1%		2%				
Total Lost time (s)		2.5				2.5		2.5		2.5		
Lane Util. Factor		1.00				*0.81		0.95		1.00		
Frt		0.89				1.00		1.00		0.86		
Flt Protected		0.99				0.98		1.00		1.00		
Satd. Flow (prot)		1497				2599		3002		1586		
Flt Permitted		0.99				0.56		1.00		1.00		
Satd. Flow (perm)		1497				1496		3002		1586		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	4	0	19	1	386	601	13	521	14	414	7	22
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	24	0	0	0	1000	0	535	0	421	0	0
Heavy Vehicles (%)	0%	0%	6%	0%	3%	3%	8%	5%	0%	2%	0%	5%
Parking (#/hr)												
Turn Type	Perm	Perm			pm+pt	NA		NA		Perm		Perm
Protected Phases					1	6		2				
Permitted Phases	8	8			6			2		1		4
Actuated Green, G (s)		12.3				54.7		22.0		26.7		
Effective Green, g (s)		16.8				58.2		25.5		30.2		
Actuated g/C Ratio		0.21				0.73		0.32		0.38		
Clearance Time (s)		7.0				6.0		6.0		6.0		
Vehicle Extension (s)		3.0				3.0		3.0		3.0		
Lane Grp Cap (vph)		314				1504		956		598		
v/s Ratio Prot						0.25		0.18				
v/s Ratio Perm		0.02				c0.23				c0.27		
v/c Ratio		0.08				0.66		0.56		0.70		
Uniform Delay, d1		25.4				5.8		22.6		21.1		
Progression Factor		1.00				1.00		0.76		1.00		
Incremental Delay, d2		0.1				2.3		1.9		6.8		
Delay (s)		25.5				8.1		19.0		27.9		
Level of Service		C				A		B		C		
Approach Delay (s)		25.5				8.1		19.0				
Approach LOS		C				A		B				
Intersection Summary												
HCM 2000 Control Delay			16.3			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			15.5			
Intersection Capacity Utilization			68.5%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

Existing AM Peak
 02/25/2019



Movement	NEL	NER	NER2
Lane Configurations			
Traffic Volume (vph)	61	17	34
Future Volume (vph)	61	17	34
Ideal Flow (vphpl)	1800	1800	1800
Lane Width	12	12	12
Grade (%)	-1%		
Total Lost time (s)	2.5		
Lane Util. Factor	1.00		
Frt	0.95		
Flt Protected	0.97		
Satd. Flow (prot)	1639		
Flt Permitted	0.97		
Satd. Flow (perm)	1639		
Peak-hour factor, PHF	0.91	0.91	0.91
Adj. Flow (vph)	67	19	37
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	145	0	0
Heavy Vehicles (%)	0%	0%	3%
Parking (#/hr)		0	
Turn Type	Perm		
Protected Phases			
Permitted Phases	4		
Actuated Green, G (s)	12.3		
Effective Green, g (s)	16.8		
Actuated g/C Ratio	0.21		
Clearance Time (s)	7.0		
Vehicle Extension (s)	3.0		
Lane Grp Cap (vph)	344		
v/s Ratio Prot			
v/s Ratio Perm	c0.09		
v/c Ratio	0.42		
Uniform Delay, d1	27.4		
Progression Factor	1.00		
Incremental Delay, d2	0.8		
Delay (s)	28.2		
Level of Service	C		
Approach Delay (s)	28.2		
Approach LOS	C		
Intersection Summary			

Intersection						
Int Delay, s/veh	0.1					
Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	1034	24	5	915	0	0
Future Vol, veh/h	1034	24	5	915	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	12	0	4	0	0
Mvmt Flow	1088	25	5	963	0	0

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	1113	0	1593	557
Stage 1	-	-	-	-	1101	-
Stage 2	-	-	-	-	492	-
Critical Hdwy	-	-	4.1	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	635	-	100	479
Stage 1	-	-	-	-	284	-
Stage 2	-	-	-	-	586	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	635	-	98	479
Mov Cap-2 Maneuver	-	-	-	-	98	-
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	586	-

Approach	NB	SB	SW
HCM Control Delay, s	0	0.2	0
HCM LOS			A

Minor Lane/Major Mvmt	NBT	NBR	SBL	SBT	SWLn1
Capacity (veh/h)	-	-	635	-	-
HCM Lane V/C Ratio	-	-	0.008	-	-
HCM Control Delay (s)	-	-	10.7	0.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	-	-

Intersection						
Int Delay, s/veh	4.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↓			↑↓
Traffic Vol, veh/h	3	148	886	0	274	641
Future Vol, veh/h	3	148	886	0	274	641
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	33	2	3	0	1	4
Mvmt Flow	3	156	933	0	288	675

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1847	467	0	0	933
Stage 1	933	-	-	-	-
Stage 2	914	-	-	-	-
Critical Hdwy	7.46	6.94	-	-	4.12
Critical Hdwy Stg 1	6.46	-	-	-	-
Critical Hdwy Stg 2	6.46	-	-	-	-
Follow-up Hdwy	3.83	3.32	-	-	2.21
Pot Cap-1 Maneuver	47	542	-	-	736
Stage 1	278	-	-	-	-
Stage 2	285	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	18	542	-	-	736
Mov Cap-2 Maneuver	18	-	-	-	-
Stage 1	104	-	-	-	-
Stage 2	285	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.2	0	5.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	343	736
HCM Lane V/C Ratio	-	-	0.463	0.392
HCM Control Delay (s)	-	-	24.2	13
HCM Lane LOS	-	-	C	B
HCM 95th %tile Q(veh)	-	-	2.4	1.9

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	TT		TT			TT
Traffic Vol, veh/h	12	7	898	41	19	650
Future Vol, veh/h	12	7	898	41	19	650
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	3	0	0	4
Mvmt Flow	13	7	945	43	20	684

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1349	494	0	0	988
Stage 1	967	-	-	-	-
Stage 2	382	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	144	526	-	-	708
Stage 1	334	-	-	-	-
Stage 2	665	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	137	526	-	-	708
Mov Cap-2 Maneuver	137	-	-	-	-
Stage 1	319	-	-	-	-
Stage 2	665	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.4	0	0.5
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	188	708
HCM Lane V/C Ratio	-	-	0.106	0.028
HCM Control Delay (s)	-	-	26.4	10.2
HCM Lane LOS	-	-	D	B
HCM 95th %tile Q(veh)	-	-	0.4	0.1



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	19	1035	677
v/c Ratio	0.09	0.35	0.24
Control Delay	18.0	1.2	1.0
Queue Delay	0.0	0.0	0.0
Total Delay	18.0	1.2	1.0
Queue Length 50th (ft)	4	0	0
Queue Length 95th (ft)	19	141	43
Internal Link Dist (ft)	231	260	414
Turn Bay Length (ft)			
Base Capacity (vph)	315	2926	2765
Starvation Cap Reductn	0	104	0
Spillback Cap Reductn	0	0	118
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.06	0.37	0.26
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
8: County Line Rd & Lindsay Ave

Existing AM Peak
02/25/2019



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	11	8	944	50	4	646
Future Volume (vph)	11	8	944	50	4	646
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	16	16	10	10	10	10
Total Lost time (s)	2.5		2.5			2.5
Lane Util. Factor	1.00		0.95			0.95
Frt	0.94		0.99			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	1482		3080			3060
Flt Permitted	0.97		1.00			0.95
Satd. Flow (perm)	1482		3080			2911
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	8	983	52	4	673
RTOR Reduction (vph)	7	0	3	0	0	0
Lane Group Flow (vph)	12	0	1032	0	0	677
Heavy Vehicles (%)	27%	25%	3%	0%	50%	4%
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Actuated Green, G (s)	1.5		47.5			47.5
Effective Green, g (s)	4.0		51.0			51.0
Actuated g/C Ratio	0.07		0.85			0.85
Clearance Time (s)	5.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	98		2618			2474
v/s Ratio Prot	c0.01		c0.33			
v/s Ratio Perm						0.23
v/c Ratio	0.12		0.39			0.27
Uniform Delay, d1	26.3		1.0			0.9
Progression Factor	1.00		1.14			1.00
Incremental Delay, d2	0.5		0.4			0.3
Delay (s)	26.9		1.6			1.2
Level of Service	C		A			A
Approach Delay (s)	26.9		1.6			1.2
Approach LOS	C		A			A

Intersection Summary

HCM 2000 Control Delay	1.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

Existing AM Peak
 02/25/2019



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	156	489	67	298	67	127	981	67	579
v/c Ratio	0.39	0.80	0.26	0.50	0.11	0.44	0.77	0.30	0.50
Control Delay	21.1	43.1	18.6	32.3	0.3	19.5	29.9	28.1	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1
Total Delay	21.1	43.1	18.6	32.3	0.3	19.5	30.0	28.4	2.9
Queue Length 50th (ft)	68	325	28	173	0	44	230	10	0
Queue Length 95th (ft)	96	416	47	230	0	m80	#538	m46	0
Internal Link Dist (ft)		467		428			446		118
Turn Bay Length (ft)	140		180		160	70			
Base Capacity (vph)	400	721	256	746	768	289	1277	223	1155
Starvation Cap Reductn	0	0	0	0	0	0	16	20	76
Spillback Cap Reductn	4	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.68	0.26	0.40	0.09	0.44	0.78	0.33	0.54

Intersection Summary

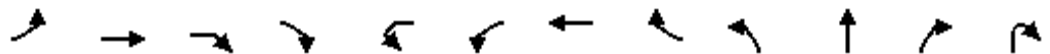
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

Existing AM Peak
 02/25/2019



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	148	322	47	96	4	60	283	64	121	818	108	6
Future Volume (vph)	148	322	47	96	4	60	283	64	121	818	108	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	15	11	12	12	12	11	11	13	10	10	10	10
Total Lost time (s)	2.5	2.5					2.5	2.5	2.5	2.5		
Lane Util. Factor	1.00	1.00					1.00	1.00	1.00	1.00	0.95	
Flt	1.00	0.95					1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1775	1631					1653	1706	1581	1277	3041	
Flt Permitted	0.40	1.00					0.21	1.00	1.00	0.29	1.00	
Satd. Flow (perm)	738	1631					362	1706	1581	396	3041	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	156	339	49	101	4	63	298	67	127	861	114	6
RTOR Reduction (vph)	0	9	0	0	0	0	0	43	0	1	0	0
Lane Group Flow (vph)	156	480	0	0	0	67	298	24	127	980	0	0
Heavy Vehicles (%)	6%	2%	0%	2%	0%	0%	2%	0%	25%	3%	3%	9%
Turn Type	pm+pt	NA			pm+pt	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	3	8			7	7	4		1		6	
Permitted Phases	8	8			4	4	4	4	6		6	
Actuated Green, G (s)	46.7	40.7				44.3	39.5	39.5	53.3		44.4	
Effective Green, g (s)	53.7	44.2				51.3	43.0	43.0	60.0		47.9	
Actuated g/C Ratio	0.45	0.37				0.43	0.36	0.36	0.50		0.40	
Clearance Time (s)	6.0	6.0				6.0	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0				3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	412	600				244	611	566	289		1213	
v/s Ratio Prot	c0.03	c0.29				0.02	0.17		c0.05		c0.32	
v/s Ratio Perm	0.14					0.10		0.02	0.17			
v/c Ratio	0.38	0.80				0.27	0.49	0.04	0.44		0.81	
Uniform Delay, d1	21.0	33.9				23.2	29.9	25.1	17.9		32.0	
Progression Factor	1.00	1.00				1.00	1.00	1.00	0.77		0.74	
Incremental Delay, d2	0.6	7.5				0.6	0.6	0.0	0.9		4.9	
Delay (s)	21.6	41.5				23.8	30.6	25.1	14.7		28.7	
Level of Service	C	D				C	C	C	B		C	
Approach Delay (s)		36.7					28.7				27.1	
Approach LOS		D					C				C	

Intersection Summary

HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

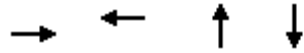
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

Existing AM Peak
 02/25/2019



Movement	SBL2	SBL	SBT	SBR
Lane Configurations		↔	↕↔	
Traffic Volume (vph)	45	19	447	103
Future Volume (vph)	45	19	447	103
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width	10	10	10	10
Total Lost time (s)		2.5	2.5	
Lane Util. Factor		1.00	0.95	
Fr _t		1.00	0.97	
Fl _t Protected		0.95	1.00	
Satd. Flow (prot)		1530	2952	
Fl _t Permitted		0.14	1.00	
Satd. Flow (perm)		223	2952	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	20	471	108
RTOR Reduction (vph)	0	0	15	0
Lane Group Flow (vph)	0	67	564	0
Heavy Vehicles (%)	4%	5%	4%	10%
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	5	5	2	
Permitted Phases	2	2	2	
Actuated Green, G (s)		47.7	41.6	
Effective Green, g (s)		54.7	45.1	
Actuated g/C Ratio		0.46	0.38	
Clearance Time (s)		6.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		206	1109	
v/s Ratio Prot		0.03	0.19	
v/s Ratio Perm		0.12		
v/c Ratio		0.33	0.51	
Uniform Delay, d ₁		21.3	28.9	
Progression Factor		1.34	0.05	
Incremental Delay, d ₂		0.8	1.4	
Delay (s)		29.3	2.9	
Level of Service		C	A	
Approach Delay (s)			5.6	
Approach LOS			A	
Intersection Summary				



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	360	154	1024	699
v/c Ratio	0.90	0.38	0.53	0.40
Control Delay	66.6	28.7	11.7	4.9
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	66.6	28.7	11.8	4.9
Queue Length 50th (ft)	259	72	204	43
Queue Length 95th (ft)	#431	133	257	60
Internal Link Dist (ft)	206	213	421	446
Turn Bay Length (ft)				
Base Capacity (vph)	421	426	1948	1767
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	1	94	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.86	0.36	0.55	0.40

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 10: County Line Rd & Landover Rd

Existing AM Peak
 02/25/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	160	167	22	48	39	63	7	866	120	27	596	55
Future Volume (veh/h)	160	167	22	48	39	63	7	866	120	27	596	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1872	1872	1872	1800	1800	1800	1772	1772	1772	1744	1744	1744
Adj Flow Rate, veh/h	165	172	23	49	40	65	7	893	124	28	614	57
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	2	2	2	4	4	4
Cap, veh/h	232	205	27	143	121	164	35	1960	271	90	1868	172
Arrive On Green	0.26	0.28	0.26	0.26	0.28	0.28	0.66	0.68	0.68	1.00	1.00	1.00
Sat Flow, veh/h	669	727	95	366	431	583	7	2897	400	84	2761	254
Grp Volume(v), veh/h	360	0	0	154	0	0	547	0	477	353	0	346
Grp Sat Flow(s),veh/h/ln	1491	0	0	1380	0	0	1763	0	1540	1558	0	1541
Q Serve(g_s), s	18.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	28.4	0.0	0.0	10.3	0.0	0.0	17.6	0.0	17.4	0.0	0.0	0.0
Prop In Lane	0.46		0.06	0.32		0.42	0.01		0.26	0.08		0.16
Lane Grp Cap(c), veh/h	433	0	0	400	0	0	1187	0	1042	1054	0	1043
V/C Ratio(X)	0.83	0.00	0.00	0.39	0.00	0.00	0.46	0.00	0.46	0.33	0.00	0.33
Avail Cap(c_a), veh/h	481	0	0	445	0	0	1187	0	1042	1054	0	1043
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.88	0.00	0.88
Uniform Delay (d), s/veh	42.4	0.0	0.0	34.7	0.0	0.0	9.1	0.0	9.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	10.9	0.0	0.0	0.6	0.0	0.0	1.3	0.0	1.5	0.8	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	17.5	0.0	0.0	6.9	0.0	0.0	11.4	0.0	9.7	0.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.3	0.0	0.0	35.3	0.0	0.0	10.4	0.0	10.5	0.8	0.0	0.8
LnGrp LOS	D	A	A	D	A	A	B	A	B	A	A	A
Approach Vol, veh/h		360			154			1024				699
Approach Delay, s/veh		53.3			35.3			10.5				0.8
Approach LOS		D			D			B				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		83.7		36.3		83.7		36.3				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		75.0		35.0		75.0		35.0				
Max Q Clear Time (g_c+I1), s		19.6		30.4		2.0		12.3				
Green Ext Time (p_c), s		8.3		0.9		5.2		0.9				
Intersection Summary												
HCM 6th Ctrl Delay				16.0								
HCM 6th LOS				B								

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	1127	659
v/c Ratio	0.39	0.56
Control Delay	0.8	32.6
Queue Delay	0.9	0.6
Total Delay	1.7	33.2
Queue Length 50th (ft)	0	227
Queue Length 95th (ft)	6	299
Internal Link Dist (ft)	118	260
Turn Bay Length (ft)		
Base Capacity (vph)	2882	1184
Starvation Cap Reductn	1370	214
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.75	0.68
Intersection Summary		

HCM Signalized Intersection Capacity Analysis
 11: County Line Rd & Glenbrook Ave

Existing AM Peak
 02/25/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	
Traffic Volume (vph)	0	0	41	1030	614	12
Future Volume (vph)	0	0	41	1030	614	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	10	10	10	11
Total Lost time (s)				2.5	2.5	
Lane Util. Factor				0.95	0.95	
Fr _t				1.00	1.00	
Fl _t Protected				1.00	1.00	
Satd. Flow (prot)				3123	3061	
Fl _t Permitted				0.92	1.00	
Satd. Flow (perm)				2874	3061	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	43	1084	646	13
RTOR Reduction (vph)	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	1127	658	0
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%
Turn Type			pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases			6	1 3 4 7	2	
Actuated Green, G (s)				110.8	41.6	
Effective Green, g (s)				117.5	45.1	
Actuated g/C Ratio				0.98	0.38	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				2913	1150	
v/s Ratio Prot				c0.15	c0.21	
v/s Ratio Perm				c0.22		
v/c Ratio				0.39	0.57	
Uniform Delay, d ₁				0.0	29.8	
Progression Factor				7.18	0.98	
Incremental Delay, d ₂				0.1	2.0	
Delay (s)				0.4	31.3	
Level of Service				A	C	
Approach Delay (s)	0.0			0.4	31.3	
Approach LOS	A			A	C	
Intersection Summary						
HCM 2000 Control Delay			11.8	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			120.0	Sum of lost time (s)	20.5	
Intersection Capacity Utilization			56.3%	ICU Level of Service	B	
Analysis Period (min)			15			

c Critical Lane Group

Lanes, Volumes, Timings
1: County Line Rd & Lancaster Ave

Existing PM Peak
02/25/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕			↕	
Traffic Volume (vph)	8	774	704	16	543	15	485	13	13	7	16	14
Future Volume (vph)	8	774	704	16	543	15	485	13	13	7	16	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35				35
Link Distance (ft)		497			631			170				160
Travel Time (s)		13.6			17.2			3.3				3.1
Lane Group Flow (vph)	0	1564	0	0	605	0	271	268	0	0	39	0
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	29.0	29.0		29.0	29.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		10.0	10.0		9.0	9.0	
Total Split (s)	42.0	42.0		42.0	42.0		17.0	17.0		21.0	21.0	
Total Split (%)	52.5%	52.5%		52.5%	52.5%		21.3%	21.3%		26.3%	26.3%	
Maximum Green (s)	36.0	36.0		36.0	36.0		11.0	11.0		16.0	16.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		2.0	2.0	
Lost Time Adjust (s)		-3.5			-3.5		-3.5	-3.5			-2.5	
Total Lost Time (s)		2.5			2.5		2.5	2.5			2.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	None		None	None		None	None	
Act Effct Green (s)		45.1			45.1		22.2	22.2				9.4
Actuated g/C Ratio		0.56			0.56		0.28	0.28				0.12
v/c Ratio		0.88			0.39		0.61	0.62				0.19
Control Delay		20.6			11.9		32.1	32.3				24.3
Queue Delay		0.0			0.0		0.0	0.0				0.0
Total Delay		20.6			11.9		32.1	32.3				24.3
LOS		C			B		C	C				C
Approach Delay		20.6			11.9			32.2				24.3
Approach LOS		C			B			C				C
Queue Length 50th (ft)		307			96		120	117				11
Queue Length 95th (ft)		#497			137		211	209				37
Internal Link Dist (ft)		417			551			90				80
Turn Bay Length (ft)												
Base Capacity (vph)		1774			1565		442	430				383
Starvation Cap Reductn		0			0		0	0				0
Spillback Cap Reductn		0			0		0	0				0
Storage Cap Reductn		0			0		0	0				0
Reduced v/c Ratio		0.88			0.39		0.61	0.62				0.10

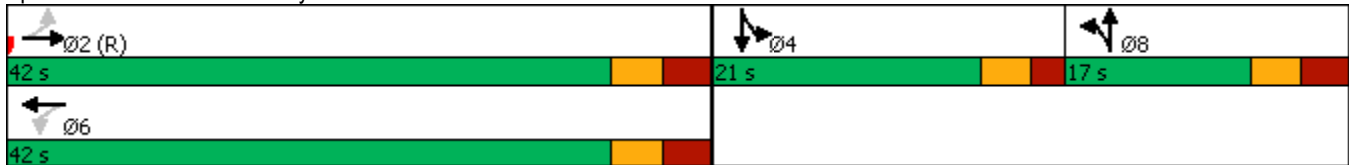
Intersection Summary

Lanes, Volumes, Timings
 1: County Line Rd & Lancaster Ave

Existing PM Peak
 02/25/2019


















Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88
 Intersection Signal Delay: 21.0 Intersection LOS: C
 Intersection Capacity Utilization 81.1% ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: County Line Rd & Lancaster Ave



HCM Signalized Intersection Capacity Analysis
1: County Line Rd & Lancaster Ave

Existing PM Peak
02/25/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	774	704	16	543	15	485	13	13	7	16	14
Future Volume (vph)	8	774	704	16	543	15	485	13	13	7	16	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Total Lost time (s)		2.5			2.5		2.5	2.5			2.5	
Lane Util. Factor		0.95			0.95		0.95	0.95			1.00	
Frt		0.93			1.00		1.00	0.99			0.95	
Flt Protected		1.00			1.00		0.95	0.96			0.99	
Satd. Flow (prot)		2979			3292		1592	1540			1610	
Flt Permitted		0.95			0.84		0.95	0.96			0.99	
Satd. Flow (perm)		2837			2775		1592	1540			1610	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	815	741	17	572	16	511	14	14	7	17	15
RTOR Reduction (vph)	0	185	0	0	2	0	0	2	0	0	14	0
Lane Group Flow (vph)	0	1379	0	0	603	0	271	266	0	0	25	0
Heavy Vehicles (%)	0%	1%	1%	0%	2%	0%	1%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)		39.6			39.6		18.7	18.7			4.7	
Effective Green, g (s)		43.1			43.1		22.2	22.2			7.2	
Actuated g/C Ratio		0.54			0.54		0.28	0.28			0.09	
Clearance Time (s)		6.0			6.0		6.0	6.0			5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		1528			1495		441	427			144	
v/s Ratio Prot							0.17	c0.17			c0.02	
v/s Ratio Perm		c0.49			0.22							
v/c Ratio		0.90			0.40		0.61	0.62			0.18	
Uniform Delay, d1		16.6			10.9		25.2	25.2			33.7	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		9.0			0.2		2.5	2.8			0.6	
Delay (s)		25.6			11.0		27.7	28.1			34.2	
Level of Service		C			B		C	C			C	
Approach Delay (s)		25.6			11.0		27.9	27.9			34.2	
Approach LOS		C			B		C	C			C	
Intersection Summary												
HCM 2000 Control Delay			23.0				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			80.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			81.1%				ICU Level of Service				D	
Analysis Period (min)			15									
c	Critical Lane Group											

Lanes, Volumes, Timings
 2: County Line Rd & Montrose Ave

Existing PM Peak
 02/25/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	26	60	68	23	36	9	22	436	33	7	710	38
Future Volume (vph)	26	60	68	23	36	9	22	436	33	7	710	38
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	14	14	14	14	14	14	10	10	10	10	10	10
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		456			431			492			667	
Travel Time (s)		12.4			11.8			9.6			13.0	
Lane Group Flow (vph)	0	172	0	0	76	0	0	545	0	0	839	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	48.1%
ICU Level of Service	A
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	12.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	26	60	68	23	36	9	22	436	33	7	710	38
Future Vol, veh/h	26	60	68	23	36	9	22	436	33	7	710	38
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	3	3	0	0	0	0	1	3	0	1	0
Mvmt Flow	29	67	76	26	40	10	24	484	37	8	789	42

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1136	1395	416	995	1398	261	831	0	0	521	0	0
Stage 1	826	826	-	551	551	-	-	-	-	-	-	-
Stage 2	310	569	-	444	847	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.56	6.96	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.56	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.56	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.03	3.33	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	159	139	583	202	142	744	810	-	-	1056	-	-
Stage 1	337	382	-	491	519	-	-	-	-	-	-	-
Stage 2	681	502	-	568	381	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	116	131	583	101	134	744	810	-	-	1056	-	-
Mov Cap-2 Maneuver	116	131	-	101	134	-	-	-	-	-	-	-
Stage 1	323	377	-	470	497	-	-	-	-	-	-	-
Stage 2	592	481	-	401	376	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	88.1		62		0.6		0.2	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	810	-	-	193	134	1056	-
HCM Lane V/C Ratio	0.03	-	-	0.887	0.564	0.007	-
HCM Control Delay (s)	9.6	0.2	-	88.1	62	8.4	0.1
HCM Lane LOS	A	A	-	F	F	A	A
HCM 95th %tile Q(veh)	0.1	-	-	6.8	2.8	0	-

Lanes, Volumes, Timings
 3: County Line Rd & Roberts Rd

Existing PM Peak
 02/25/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	33	37	14	13	31	9	0	537	27	4	494	91
Future Volume (vph)	33	37	14	13	31	9	0	537	27	4	494	91
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	10	10	10	10	10	10
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		268			463			418			492	
Travel Time (s)		7.3			12.6			8.1			9.6	
Lane Group Flow (vph)	0	89	0	0	57	0	0	600	0	0	627	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	35.2%
Analysis Period (min)	15
	ICU Level of Service A

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	33	37	14	13	31	9	0	537	27	4	494	91
Future Vol, veh/h	33	37	14	13	31	9	0	537	27	4	494	91
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	12	0	7	0	0	0	0	4	0	0	2	4
Mvmt Flow	35	39	15	14	33	10	0	571	29	4	526	97

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	885	1183	312	877	1217	300	623	0	0	600	0	0
Stage 1	583	583	-	586	586	-	-	-	-	-	-	-
Stage 2	302	600	-	291	631	-	-	-	-	-	-	-
Critical Hdwy	7.74	6.5	7.04	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.74	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.62	4	3.37	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	224	191	669	246	182	702	968	-	-	987	-	-
Stage 1	441	502	-	468	500	-	-	-	-	-	-	-
Stage 2	655	493	-	698	477	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	189	190	669	201	181	702	968	-	-	987	-	-
Mov Cap-2 Maneuver	189	190	-	201	181	-	-	-	-	-	-	-
Stage 1	441	499	-	468	500	-	-	-	-	-	-	-
Stage 2	603	493	-	625	474	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	33.2		27.9		0		0.1	
HCM LOS	D		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	968	-	-	215	213	987	-	-
HCM Lane V/C Ratio	-	-	-	0.416	0.265	0.004	-	-
HCM Control Delay (s)	0	-	-	33.2	27.9	8.7	0	-
HCM Lane LOS	A	-	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.9	1	0	-	-

Lanes, Volumes, Timings
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

Existing PM Peak
 02/25/2019



Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Traffic Volume (vph)	80	11	14	4	367	418	23	5	591	19	3	388
Future Volume (vph)	80	11	14	4	367	418	23	5	591	19	3	388
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Right Turn on Red				No			No				No	
Link Speed (mph)		25				35			35			
Link Distance (ft)		350				317			418			
Travel Time (s)		9.5				6.2			8.1			
Lane Group Flow (vph)	0	116	0	0	0	859	0	0	657	0	0	440
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA			Perm
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2			1
Detector Phase	8	8			6	6		2	2			1
Switch Phase												
Minimum Initial (s)	3.0	3.0			20.0	20.0		20.0	20.0			20.0
Minimum Split (s)	10.0	10.0			26.0	26.0		26.0	26.0			26.0
Total Split (s)	26.0	26.0			31.0	59.0		28.0	28.0			31.0
Total Split (%)	30.6%	30.6%			36.5%	69.4%		32.9%	32.9%			36.5%
Maximum Green (s)	19.0	19.0			25.0	53.0		22.0	22.0			25.0
Yellow Time (s)	3.0	3.0			4.0	4.0		4.0	4.0			4.0
All-Red Time (s)	4.0	4.0			2.0	2.0		2.0	2.0			2.0
Lost Time Adjust (s)		-4.5				-3.5			-3.5			-3.5
Total Lost Time (s)		2.5				2.5			2.5			2.5
Lead/Lag					Lead			Lag	Lag			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			3.0
Recall Mode	None	None			None	C-Max		C-Max	C-Max			None
Act Effct Green (s)		16.4				63.6			31.3			29.8
Actuated g/C Ratio		0.19				0.75			0.37			0.35
v/c Ratio		0.39				0.57			0.60			0.78
Control Delay		32.9				6.1			26.2			35.6
Queue Delay		0.0				0.0			0.0			0.0
Total Delay		32.9				6.1			26.2			35.6
LOS		C				A			C			D
Approach Delay		32.9				6.1			26.2			
Approach LOS		C				A			C			
Queue Length 50th (ft)		55				83			153			198
Queue Length 95th (ft)		97				151			228			#347
Internal Link Dist (ft)		270				237			338			
Turn Bay Length (ft)												
Base Capacity (vph)		430				1498			1095			580
Starvation Cap Reductn		0				0			0			0
Spillback Cap Reductn		0				0			0			0
Storage Cap Reductn		0				0			0			0
Reduced v/c Ratio		0.27				0.57			0.60			0.76

Intersection Summary

Lanes, Volumes, Timings
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

Existing PM Peak
 02/25/2019



Lane Group	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Traffic Volume (vph)	25	22	29	19	49
Future Volume (vph)	25	22	29	19	49
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width (ft)	13	12	12	12	12
Grade (%)			-1%		
Right Turn on Red	No				No
Link Speed (mph)			25		
Link Distance (ft)			393		
Travel Time (s)			10.7		
Lane Group Flow (vph)	0	0	126	0	0
Turn Type		Perm	Perm		
Protected Phases					
Permitted Phases		4	4		
Detector Phase		4	4		
Switch Phase					
Minimum Initial (s)		3.0	3.0		
Minimum Split (s)		10.0	10.0		
Total Split (s)		26.0	26.0		
Total Split (%)		30.6%	30.6%		
Maximum Green (s)		19.0	19.0		
Yellow Time (s)		3.0	3.0		
All-Red Time (s)		4.0	4.0		
Lost Time Adjust (s)			-4.5		
Total Lost Time (s)			2.5		
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)		3.0	3.0		
Recall Mode		None	None		
Act Effct Green (s)			16.4		
Actuated g/C Ratio			0.19		
v/c Ratio			0.41		
Control Delay			33.1		
Queue Delay			0.0		
Total Delay			33.1		
LOS			C		
Approach Delay			33.1		
Approach LOS			C		
Queue Length 50th (ft)			59		
Queue Length 95th (ft)			103		
Internal Link Dist (ft)			313		
Turn Bay Length (ft)					
Base Capacity (vph)			448		
Starvation Cap Reductn			0		
Spillback Cap Reductn			0		
Storage Cap Reductn			0		
Reduced v/c Ratio			0.28		

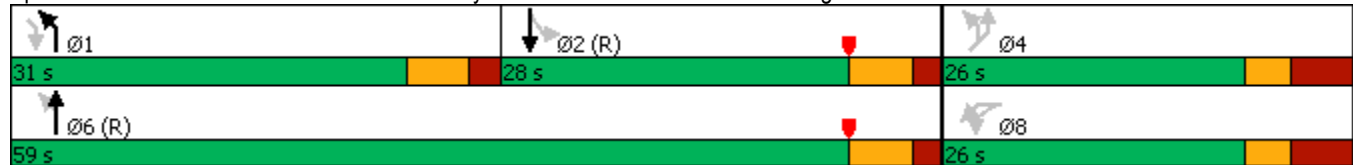
Intersection Summary

Lanes, Volumes, Timings
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

Existing PM Peak
 02/25/2019

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 85
 Offset: 53 (62%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 21.0 Intersection LOS: C
 Intersection Capacity Utilization 69.6% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd



HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

Existing PM Peak
 02/25/2019



Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Traffic Volume (vph)	80	11	14	4	367	418	23	5	591	19	3	388
Future Volume (vph)	80	11	14	4	367	418	23	5	591	19	3	388
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Total Lost time (s)		2.5				2.5			2.5			2.5
Lane Util. Factor		1.00				*0.81			0.95			1.00
Frt		0.98				1.00			0.99			0.86
Flt Protected		0.96				0.98			1.00			1.00
Satd. Flow (prot)		1557				2633			3138			1602
Flt Permitted		0.96				0.54			0.95			1.00
Satd. Flow (perm)		1557				1445			2973			1602
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	85	12	15	4	390	445	24	5	629	20	3	413
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	116	0	0	0	859	0	0	657	0	0	440
Heavy Vehicles (%)	9%	0%	0%	25%	0%	2%	4%	0%	0%	5%	0%	1%
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA			Perm
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2			1
Actuated Green, G (s)		11.9				60.1			27.8			26.3
Effective Green, g (s)		16.4				63.6			31.3			29.8
Actuated g/C Ratio		0.19				0.75			0.37			0.35
Clearance Time (s)		7.0				6.0			6.0			6.0
Vehicle Extension (s)		3.0				3.0			3.0			3.0
Lane Grp Cap (vph)		300				1497			1094			561
v/s Ratio Prot						0.20						
v/s Ratio Perm		0.07				c0.23			0.22			c0.27
v/c Ratio		0.39				0.57			0.60			0.78
Uniform Delay, d1		29.9				4.7			21.8			24.7
Progression Factor		1.00				1.00			1.00			1.00
Incremental Delay, d2		0.8				0.5			2.4			7.1
Delay (s)		30.7				5.3			24.2			31.8
Level of Service		C				A			C			C
Approach Delay (s)		30.7				5.3			24.2			
Approach LOS		C				A			C			

Intersection Summary

HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

Existing PM Peak
 02/25/2019



Movement	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Traffic Volume (vph)	25	22	29	19	49
Future Volume (vph)	25	22	29	19	49
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width	13	12	12	12	12
Grade (%)			-1%		
Total Lost time (s)			2.5		
Lane Util. Factor			1.00		
Frt			0.92		
Flt Protected			0.98		
Satd. Flow (prot)			1621		
Flt Permitted			0.98		
Satd. Flow (perm)			1621		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	27	23	31	20	52
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	0	0	126	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	2%
Turn Type		Perm	Perm		
Protected Phases					
Permitted Phases		4	4		
Actuated Green, G (s)			11.9		
Effective Green, g (s)			16.4		
Actuated g/C Ratio			0.19		
Clearance Time (s)			7.0		
Vehicle Extension (s)			3.0		
Lane Grp Cap (vph)			312		
v/s Ratio Prot					
v/s Ratio Perm			c0.08		
v/c Ratio			0.40		
Uniform Delay, d1			30.0		
Progression Factor			1.00		
Incremental Delay, d2			0.9		
Delay (s)			30.9		
Level of Service			C		
Approach Delay (s)			30.9		
Approach LOS			C		
Intersection Summary					

Intersection						
Int Delay, s/veh	0.2					
Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	651	31	14	1117	0	0
Future Vol, veh/h	651	31	14	1117	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	1	3	2	1	0	0
Mvmt Flow	700	33	15	1201	0	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	733	0	1348 367
Stage 1	-	-	-	-	717 -
Stage 2	-	-	-	-	631 -
Critical Hdwy	-	-	4.14	-	6.8 6.9
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	-	-	2.22	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	868	-	145 636
Stage 1	-	-	-	-	450 -
Stage 2	-	-	-	-	498 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	868	-	137 636
Mov Cap-2 Maneuver	-	-	-	-	137 -
Stage 1	-	-	-	-	427 -
Stage 2	-	-	-	-	498 -

Approach	NB	SB	SW
HCM Control Delay, s	0	0.3	0
HCM LOS			A

Minor Lane/Major Mvmt	NBT	NBR	SBL	SBT	SWLn1
Capacity (veh/h)	-	-	868	-	-
HCM Lane V/C Ratio	-	-	0.017	-	-
HCM Control Delay (s)	-	-	9.2	0.2	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	-	-

Intersection						
Int Delay, s/veh	3.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑↓			↔
Traffic Vol, veh/h	8	255	651	3	127	990
Future Vol, veh/h	8	255	651	3	127	990
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	1	1	0	2	1
Mvmt Flow	9	274	700	3	137	1065

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1509	352	0	0	703	0
Stage 1	702	-	-	-	-	-
Stage 2	807	-	-	-	-	-
Critical Hdwy	6.8	6.92	-	-	4.14	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.31	-	-	2.22	-
Pot Cap-1 Maneuver	113	647	-	-	890	-
Stage 1	458	-	-	-	-	-
Stage 2	404	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	70	647	-	-	890	-
Mov Cap-2 Maneuver	70	-	-	-	-	-
Stage 1	285	-	-	-	-	-
Stage 2	404	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.1	0	2.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	517	890
HCM Lane V/C Ratio	-	-	0.547	0.153
HCM Control Delay (s)	-	-	20.1	9.8
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	3.3	0.5

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↓			↑↓
Traffic Vol, veh/h	10	17	661	5	4	1063
Future Vol, veh/h	10	17	661	5	4	1063
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	0	1	20	0	1
Mvmt Flow	11	18	696	5	4	1119

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1267	351	0	0	701
Stage 1	699	-	-	-	-
Stage 2	568	-	-	-	-
Critical Hdwy	7	6.9	-	-	4.1
Critical Hdwy Stg 1	6	-	-	-	-
Critical Hdwy Stg 2	6	-	-	-	-
Follow-up Hdwy	3.6	3.3	-	-	2.2
Pot Cap-1 Maneuver	150	651	-	-	905
Stage 1	434	-	-	-	-
Stage 2	509	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	148	651	-	-	905
Mov Cap-2 Maneuver	148	-	-	-	-
Stage 1	429	-	-	-	-
Stage 2	509	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.9	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	288	905
HCM Lane V/C Ratio	-	-	0.099	0.005
HCM Control Delay (s)	-	-	18.9	9
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.3	0

Lanes, Volumes, Timings
8: County Line Rd & Lindsay Ave

Existing PM Peak
02/25/2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	6	650	1	1	1060
Future Volume (vph)	9	6	650	1	1	1060
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	16	16	10	10	10	10
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		35			35
Link Distance (ft)	311		340			494
Travel Time (s)	8.5		6.6			9.6
Lane Group Flow (vph)	15	0	685	0	0	1117
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Detector Phase	4		6		2	2
Switch Phase						
Minimum Initial (s)	3.0		15.0		15.0	15.0
Minimum Split (s)	8.0		21.0		21.0	21.0
Total Split (s)	20.0		40.0		40.0	40.0
Total Split (%)	33.3%		66.7%		66.7%	66.7%
Maximum Green (s)	15.0		34.0		34.0	34.0
Yellow Time (s)	3.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-3.5		-3.5			-3.5
Total Lost Time (s)	1.5		2.5			2.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		C-Max	C-Max
Act Effct Green (s)	9.5		57.1			57.1
Actuated g/C Ratio	0.16		0.95			0.95
v/c Ratio	0.05		0.23			0.39
Control Delay	17.6		0.6			1.3
Queue Delay	0.0		0.0			0.2
Total Delay	17.6		0.6			1.4
LOS	B		A			A
Approach Delay	17.6		0.6			1.4
Approach LOS	B		A			A
Queue Length 50th (ft)	3		0			0
Queue Length 95th (ft)	16		40			79
Internal Link Dist (ft)	231		260			414
Turn Bay Length (ft)						
Base Capacity (vph)	581		2980			2873
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			740
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	0.03		0.23			0.52

Intersection Summary

Area Type: Other

HCM Signalized Intersection Capacity Analysis
8: County Line Rd & Lindsay Ave

Existing PM Peak
02/25/2019



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	6	650	1	1	1060
Future Volume (vph)	9	6	650	1	1	1060
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	16	16	10	10	10	10
Total Lost time (s)	1.5		2.5			2.5
Lane Util. Factor	1.00		0.95			0.95
Frt	0.95		1.00			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	1874		3129			3160
Flt Permitted	0.97		1.00			0.95
Satd. Flow (perm)	1874		3129			3017
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	6	684	1	1	1116
RTOR Reduction (vph)	6	0	0	0	0	0
Lane Group Flow (vph)	9	0	685	0	0	1117
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Actuated Green, G (s)	1.4		47.6			47.6
Effective Green, g (s)	4.9		51.1			51.1
Actuated g/C Ratio	0.08		0.85			0.85
Clearance Time (s)	5.0		6.0			6.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	153		2664			2569
v/s Ratio Prot	c0.01		0.22			
v/s Ratio Perm						c0.37
v/c Ratio	0.06		0.26			0.43
Uniform Delay, d1	25.4		0.8			1.0
Progression Factor	1.00		0.69			1.00
Incremental Delay, d2	0.2		0.2			0.5
Delay (s)	25.6		0.8			1.6
Level of Service	C		A			A
Approach Delay (s)	25.6		0.8			1.6
Approach LOS	C		A			A

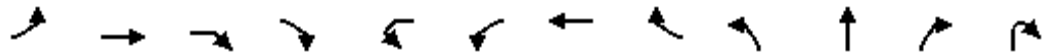
Intersection Summary

HCM 2000 Control Delay	1.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

Existing PM Peak
 02/25/2019



Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	99	241	46	137	6	207	365	71	104	511	73	4
Future Volume (vph)	99	241	46	137	6	207	365	71	104	511	73	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	15	11	12	12	12	11	11	13	10	10	10	10
Storage Length (ft)	140		0			185		160	70		0	
Storage Lanes	1		0			1		1	1		0	
Taper Length (ft)	25					25			25			
Right Turn on Red				Yes				Yes				Yes
Link Speed (mph)		40					30			35		
Link Distance (ft)		547					508			526		
Travel Time (s)		9.3					11.5			10.2		
Lane Group Flow (vph)	100	427	0	0	0	215	369	72	105	594	0	0
Turn Type	pm+pt	NA			pm+pt	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	3	8			7	7	4		1	6		
Permitted Phases	8	8			4	4	4	4	6	6		
Detector Phase	3	8			7	7	4	4	1	6		
Switch Phase												
Minimum Initial (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0	10.0		
Minimum Split (s)	9.0	9.0			9.0	9.0	9.0	9.0	9.0	16.0		
Total Split (s)	14.0	47.0			14.0	14.0	47.0	47.0	12.0	47.0		
Total Split (%)	11.7%	39.2%			11.7%	11.7%	39.2%	39.2%	10.0%	39.2%		
Maximum Green (s)	8.0	41.0			8.0	8.0	41.0	41.0	6.0	41.0		
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0	3.0	4.0	4.0		
All-Red Time (s)	3.0	3.0			3.0	3.0	3.0	3.0	2.0	2.0		
Lost Time Adjust (s)	-3.5	-3.5					-3.5	-3.5	-3.5	-3.5		
Total Lost Time (s)	2.5	2.5					2.5	2.5	2.5	2.5		
Lead/Lag	Lead	Lag			Lead	Lead	Lag	Lag	Lead	Lag		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0	3.0		
Recall Mode	None	None			None	None	None	None	None	C-Max		
Act Effct Green (s)	49.4	38.2					49.9	38.4	38.4	61.5	52.4	
Actuated g/C Ratio	0.41	0.32					0.42	0.32	0.32	0.51	0.44	
v/c Ratio	0.29	0.81					0.79	0.66	0.12	0.46	0.44	
Control Delay	21.0	47.5					43.4	40.8	0.4	27.7	20.0	
Queue Delay	0.0	0.0					0.0	0.0	0.0	0.0	0.0	
Total Delay	21.0	47.5					43.4	40.8	0.4	27.7	20.0	
LOS	C	D					D	D	A	C	B	
Approach Delay		42.4						37.2			21.1	
Approach LOS		D						D			C	
Queue Length 50th (ft)	45	284					104	243	0	33	125	
Queue Length 95th (ft)	73	387					#159	328	0	m85	m157	
Internal Link Dist (ft)		467						428			446	
Turn Bay Length (ft)	140						185		160	70		
Base Capacity (vph)	354	612					272	645	665	226	1353	
Starvation Cap Reductn	0	0					0	0	0	0	0	
Spillback Cap Reductn	0	0					0	0	0	0	0	
Storage Cap Reductn	0	0					0	0	0	0	0	
Reduced v/c Ratio	0.28	0.70					0.79	0.57	0.11	0.46	0.44	

Lanes, Volumes, Timings
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

Existing PM Peak
 02/25/2019

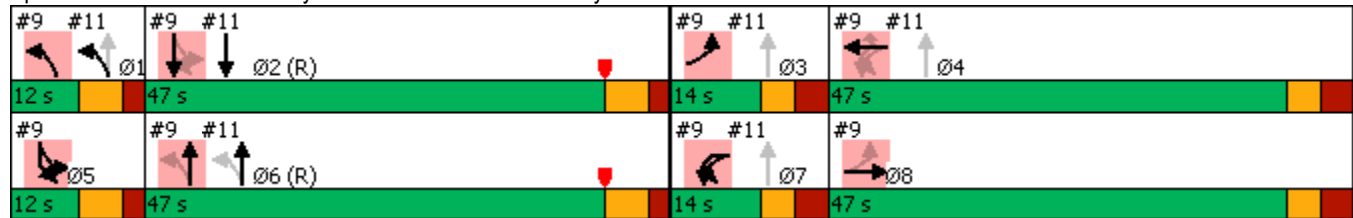


Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations		↔	↕↔	
Traffic Volume (vph)	37	26	921	71
Future Volume (vph)	37	26	921	71
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10
Storage Length (ft)		0		0
Storage Lanes		1		0
Taper Length (ft)		25		
Right Turn on Red				Yes
Link Speed (mph)			35	
Link Distance (ft)			198	
Travel Time (s)			3.9	
Lane Group Flow (vph)	0	63	1002	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	5	5	2	
Permitted Phases	2	2	2	
Detector Phase	5	5	2	
Switch Phase				
Minimum Initial (s)	3.0	3.0	10.0	
Minimum Split (s)	9.0	9.0	16.0	
Total Split (s)	12.0	12.0	47.0	
Total Split (%)	10.0%	10.0%	39.2%	
Maximum Green (s)	6.0	6.0	41.0	
Yellow Time (s)	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	
Lost Time Adjust (s)		-3.5	-3.5	
Total Lost Time (s)		2.5	2.5	
Lead/Lag	Lead	Lead	Lag	
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	
Act Effct Green (s)		59.5	49.3	
Actuated g/C Ratio		0.50	0.41	
v/c Ratio		0.17	0.78	
Control Delay		4.6	7.3	
Queue Delay		0.2	0.4	
Total Delay		4.8	7.7	
LOS		A	A	
Approach Delay			7.6	
Approach LOS			A	
Queue Length 50th (ft)		2	0	
Queue Length 95th (ft)		m5	1	
Internal Link Dist (ft)			118	
Turn Bay Length (ft)				
Base Capacity (vph)		365	1285	
Starvation Cap Reductn		76	53	
Spillback Cap Reductn		0	27	
Storage Cap Reductn		0	0	
Reduced v/c Ratio		0.22	0.81	

Intersection Summary

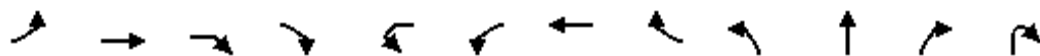
Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 41 (34%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 23.6 Intersection LOS: C
 Intersection Capacity Utilization 86.3% ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: County Line Rd & Railroad Ave & Bryn Mawr Ave



HCM Signalized Intersection Capacity Analysis
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

Existing PM Peak
 02/25/2019



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	99	241	46	137	6	207	365	71	104	511	73	4
Future Volume (vph)	99	241	46	137	6	207	365	71	104	511	73	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	15	11	12	12	12	11	11	13	10	10	10	10
Total Lost time (s)	2.5	2.5					2.5	2.5	2.5	2.5		
Lane Util. Factor	1.00	1.00					1.00	1.00	1.00	1.00	0.95	
Fr _t	1.00	0.94					1.00	1.00	0.85	1.00	0.98	
Fl _t Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1862	1614					1653	1740	1565	1535	3098	
Fl _t Permitted	0.28	1.00					0.20	1.00	1.00	0.13	1.00	
Satd. Flow (perm)	552	1614					355	1740	1565	203	3098	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	100	243	46	138	6	209	369	72	105	516	74	4
RTOR Reduction (vph)	0	16	0	0	0	0	0	49	0	1	0	0
Lane Group Flow (vph)	100	411	0	0	0	215	369	23	105	593	0	0
Heavy Vehicles (%)	1%	0%	2%	2%	0%	0%	0%	1%	4%	1%	1%	0%
Turn Type	pm+pt	NA			pm+pt	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	3	8			7	7	4		1	6		
Permitted Phases	8	8			4	4	4	4	6	6		
Actuated Green, G (s)	42.5	34.7				42.9	34.9	34.9	55.2	47.7		
Effective Green, g (s)	49.5	38.2				49.9	38.4	38.4	62.2	51.2		
Actuated g/C Ratio	0.41	0.32				0.42	0.32	0.32	0.52	0.43		
Clearance Time (s)	6.0	6.0				6.0	6.0	6.0	6.0	6.0		
Vehicle Extension (s)	3.0	3.0				3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	351	513				272	556	500	227	1321		
v/s Ratio Prot	0.03	c0.25				c0.08	0.21		c0.04	0.19		
v/s Ratio Perm	0.09					0.25		0.01	0.20			
v/c Ratio	0.28	0.80				0.79	0.66	0.05	0.46	0.45		
Uniform Delay, d1	23.4	37.4				26.5	35.2	28.2	19.4	24.4		
Progression Factor	1.00	1.00				1.00	1.00	1.00	1.31	0.74		
Incremental Delay, d2	0.4	8.8				14.4	3.0	0.0	1.4	1.0		
Delay (s)	23.9	46.2				40.9	38.2	28.2	26.7	19.0		
Level of Service	C	D				D	D	C	C	B		
Approach Delay (s)		42.0					38.0			20.2		
Approach LOS		D					D			C		

Intersection Summary

HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

Existing PM Peak
 02/25/2019



Movement	SBL2	SBL	SBT	SBR
Lane Configurations		↔	↕↔	
Traffic Volume (vph)	37	26	921	71
Future Volume (vph)	37	26	921	71
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width	10	10	10	10
Total Lost time (s)		2.5	2.5	
Lane Util. Factor		1.00	0.95	
Fr _t		1.00	0.99	
Fl _t Protected		0.95	1.00	
Satd. Flow (prot)		1568	3120	
Fl _t Permitted		0.34	1.00	
Satd. Flow (perm)		562	3120	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99
Adj. Flow (vph)	37	26	930	72
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	63	997	0
Heavy Vehicles (%)	3%	0%	1%	4%
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	5	5	2	
Permitted Phases	2	2	2	
Actuated Green, G (s)		51.4	45.8	
Effective Green, g (s)		58.4	49.3	
Actuated g/C Ratio		0.49	0.41	
Clearance Time (s)		6.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		349	1281	
v/s Ratio Prot		0.01	c0.32	
v/s Ratio Perm		0.07		
v/c Ratio		0.18	0.78	
Uniform Delay, d1		16.9	30.6	
Progression Factor		0.25	0.13	
Incremental Delay, d2		0.1	2.6	
Delay (s)		4.3	6.5	
Level of Service		A	A	
Approach Delay (s)			6.4	
Approach LOS			A	
Intersection Summary				

Lanes, Volumes, Timings
10: County Line Rd & Landover Rd

Existing PM Peak
02/25/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	101	56	29	117	188	42	26	582	56	25	1049	222
Future Volume (vph)	101	56	29	117	188	42	26	582	56	25	1049	222
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	13	13	13	11	11	11	10	10	10	10	10	10
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		286			293			501			526	
Travel Time (s)		5.6			5.7			9.8			10.2	
Lane Group Flow (vph)	0	196	0	0	365	0	0	699	0	0	1364	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	40.0	40.0		40.0	40.0		80.0	80.0		80.0	80.0	
Total Split (s)	40.0	40.0		40.0	40.0		80.0	80.0		80.0	80.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		66.7%	66.7%		66.7%	66.7%	
Maximum Green (s)	35.0	35.0		35.0	35.0		75.0	75.0		75.0	75.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.5			-2.5			-2.5			-2.5	
Total Lost Time (s)		2.5			2.5			2.5			2.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		35.3			35.3			79.7			79.7	
Actuated g/C Ratio		0.29			0.29			0.66			0.66	
v/c Ratio		0.61			0.89			0.39			0.71	
Control Delay		43.4			63.9			10.1			6.1	
Queue Delay		0.0			0.0			0.0			1.4	
Total Delay		43.4			63.9			10.1			7.5	
LOS		D			E			B			A	
Approach Delay		43.4			63.9			10.1			7.5	
Approach LOS		D			E			B			A	
Queue Length 50th (ft)		122			259			123			81	
Queue Length 95th (ft)		205			#426			161			107	
Internal Link Dist (ft)		206			213			421			446	
Turn Bay Length (ft)												
Base Capacity (vph)		340			435			1773			1917	
Starvation Cap Reductn		0			0			0			338	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.58			0.84			0.39			0.86	
Intersection Summary												
Area Type:	Other											

HCM 6th Signalized Intersection Summary
 10: County Line Rd & Landover Rd

Existing PM Peak
 02/25/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	101	56	29	117	188	42	26	582	56	25	1049	222
Future Volume (veh/h)	101	56	29	117	188	42	26	582	56	25	1049	222
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1843	1843	1843	1800	1800	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	106	59	31	123	198	44	27	613	59	26	1104	234
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	0	0	0	1	1	1	1	1	1
Cap, veh/h	188	102	46	173	240	51	85	1856	177	55	1797	376
Arrive On Green	0.26	0.29	0.26	0.26	0.29	0.29	0.65	0.67	0.67	1.00	1.00	1.00
Sat Flow, veh/h	495	356	160	464	841	179	79	2759	263	35	2671	559
Grp Volume(v), veh/h	196	0	0	365	0	0	345	0	354	725	0	639
Grp Sat Flow(s),veh/h/ln	1012	0	0	1484	0	0	1523	0	1578	1740	0	1525
Q Serve(g_s), s	0.0	0.0	0.0	7.3	0.0	0.0	0.0	0.0	11.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	21.6	0.0	0.0	29.0	0.0	0.0	9.5	0.0	11.3	0.0	0.0	0.0
Prop In Lane	0.54		0.16	0.34		0.12	0.08		0.17	0.04		0.37
Lane Grp Cap(c), veh/h	314	0	0	433	0	0	1026	0	1062	1165	0	1026
V/C Ratio(X)	0.62	0.00	0.00	0.84	0.00	0.00	0.34	0.00	0.33	0.62	0.00	0.62
Avail Cap(c_a), veh/h	351	0	0	475	0	0	1026	0	1062	1165	0	1026
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.53	0.00	0.53
Uniform Delay (d), s/veh	38.5	0.0	0.0	41.5	0.0	0.0	8.0	0.0	8.3	0.0	0.0	0.0
Incr Delay (d2), s/veh	2.9	0.0	0.0	12.1	0.0	0.0	0.9	0.0	0.8	1.3	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.5	0.0	0.0	17.8	0.0	0.0	7.0	0.0	6.9	0.8	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.4	0.0	0.0	53.6	0.0	0.0	8.9	0.0	9.1	1.3	0.0	1.5
LnGrp LOS	D	A	A	D	A	A	A	A	A	A	A	A
Approach Vol, veh/h		196			365			699			1364	
Approach Delay, s/veh		41.4			53.6			9.0			1.4	
Approach LOS		D			D			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		83.2		36.8		83.2		36.8				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		75.0		35.0		75.0		35.0				
Max Q Clear Time (g_c+I1), s		13.3		23.6		2.0		31.0				
Green Ext Time (p_c), s		5.4		0.8		14.3		0.8				
Intersection Summary												
HCM 6th Ctrl Delay				13.7								
HCM 6th LOS				B								

Lanes, Volumes, Timings
11: County Line Rd & Glenbrook Ave

Existing PM Peak
02/25/2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3	Ø4	Ø5	Ø7	Ø8
Lane Configurations				↕↕	↕↕						
Traffic Volume (vph)	0	0	26	681	1055	7					
Future Volume (vph)	0	0	26	681	1055	7					
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800					
Lane Width (ft)	12	12	10	12	10	12					
Right Turn on Red		Yes				Yes					
Link Speed (mph)	35			35	35						
Link Distance (ft)	228			198	340						
Travel Time (s)	4.4			3.9	6.6						
Lane Group Flow (vph)	0	0	0	714	1073	0					
Turn Type			pm+pt	NA	NA						
Protected Phases			1	6	2		3	4	5	7	8
Permitted Phases			6	1 3 4 7							
Detector Phase			1	6	2						
Switch Phase											
Minimum Initial (s)			3.0	10.0	10.0		3.0	3.0	3.0	3.0	3.0
Minimum Split (s)			9.0	16.0	16.0		9.0	9.0	9.0	9.0	9.0
Total Split (s)			12.0	47.0	47.0		14.0	47.0	12.0	14.0	47.0
Total Split (%)			10.0%	39.2%	39.2%		12%	39%	10%	12%	39%
Maximum Green (s)			6.0	41.0	41.0		8.0	41.0	6.0	8.0	41.0
Yellow Time (s)			4.0	4.0	4.0		3.0	3.0	4.0	3.0	3.0
All-Red Time (s)			2.0	2.0	2.0		3.0	3.0	2.0	3.0	3.0
Lost Time Adjust (s)				-3.5	-3.5						
Total Lost Time (s)				2.5	2.5						
Lead/Lag			Lead	Lag	Lag		Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)			3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode			None	C-Max	C-Max		None	None	None	None	None
Act Effct Green (s)				115.4	49.3						
Actuated g/C Ratio				0.96	0.41						
v/c Ratio				0.23	0.83						
Control Delay				0.2	38.4						
Queue Delay				0.2	4.0						
Total Delay				0.4	42.4						
LOS				A	D						
Approach Delay				0.4	42.4						
Approach LOS				A	D						
Queue Length 50th (ft)				0	404						
Queue Length 95th (ft)				1	#550						
Internal Link Dist (ft)	148			118	260						
Turn Bay Length (ft)											
Base Capacity (vph)				3087	1297						
Starvation Cap Reductn				1501	154						
Spillback Cap Reductn				0	0						
Storage Cap Reductn				0	0						
Reduced v/c Ratio				0.45	0.94						

Intersection Summary

Area Type: Other

HCM Signalized Intersection Capacity Analysis
 11: County Line Rd & Glenbrook Ave

Existing PM Peak
 02/25/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	
Traffic Volume (vph)	0	0	26	681	1055	7
Future Volume (vph)	0	0	26	681	1055	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	10	12	10	12
Total Lost time (s)				2.5	2.5	
Lane Util. Factor				0.95	0.95	
Fr _t				1.00	1.00	
Fl _t Protected				1.00	1.00	
Satd. Flow (prot)				3348	3157	
Fl _t Permitted				0.92	1.00	
Satd. Flow (perm)				3101	3157	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	0	26	688	1066	7
RTOR Reduction (vph)	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	714	1072	0
Heavy Vehicles (%)	0%	0%	1%	2%	1%	2%
Turn Type			pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases			6	1 3 4 7		
Actuated Green, G (s)				104.1	45.8	
Effective Green, g (s)				114.6	49.3	
Actuated g/C Ratio				0.95	0.41	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3066	1297	
v/s Ratio Prot				c0.10	c0.34	
v/s Ratio Perm				c0.12		
v/c Ratio				0.23	0.83	
Uniform Delay, d1				0.2	31.5	
Progression Factor				0.53	0.98	
Incremental Delay, d2				0.0	5.8	
Delay (s)				0.1	36.7	
Level of Service				A	D	
Approach Delay (s)	0.0			0.1	36.7	
Approach LOS	A			A	D	

Intersection Summary

HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1: County Line Rd & Lancaster Ave

Existing SAT Midday Peak
02/25/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↕↕			↕↕	
Traffic Volume (vph)	21	536	366	12	551	27	427	27	18	13	12	13
Future Volume (vph)	21	536	366	12	551	27	427	27	18	13	12	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35				35
Link Distance (ft)		497			631			170				160
Travel Time (s)		13.6			17.2			3.3				3.1
Lane Group Flow (vph)	0	981	0	0	628	0	250	252	0	0	41	0
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	29.0	29.0		29.0	29.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		10.0	10.0		9.0	9.0	
Total Split (s)	42.0	42.0		42.0	42.0		17.0	17.0		21.0	21.0	
Total Split (%)	52.5%	52.5%		52.5%	52.5%		21.3%	21.3%		26.3%	26.3%	
Maximum Green (s)	36.0	36.0		36.0	36.0		11.0	11.0		16.0	16.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		2.0	2.0	
Lost Time Adjust (s)		-4.5			-3.5		-3.5	-3.5			-2.5	
Total Lost Time (s)		1.5			2.5		2.5	2.5			2.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	None		None	None		None	None	
Act Effct Green (s)		46.6			45.6		21.6	21.6				9.5
Actuated g/C Ratio		0.58			0.57		0.27	0.27				0.12
v/c Ratio		0.55			0.35		0.61	0.62				0.20
Control Delay		9.6			11.2		32.5	32.8				25.3
Queue Delay		0.0			0.0		0.0	0.0				0.0
Total Delay		9.6			11.2		32.5	32.8				25.3
LOS		A			B		C	C				C
Approach Delay		9.6			11.2			32.7				25.3
Approach LOS		A			B			C				C
Queue Length 50th (ft)		122			97		109	109				12
Queue Length 95th (ft)		182			137		196	197				40
Internal Link Dist (ft)		417			551			90				80
Turn Bay Length (ft)												
Base Capacity (vph)		1776			1779		412	404				381
Starvation Cap Reductn		0			0		0	0				0
Spillback Cap Reductn		0			0		0	0				0
Storage Cap Reductn		0			0		0	0				0
Reduced v/c Ratio		0.55			0.35		0.61	0.62				0.11

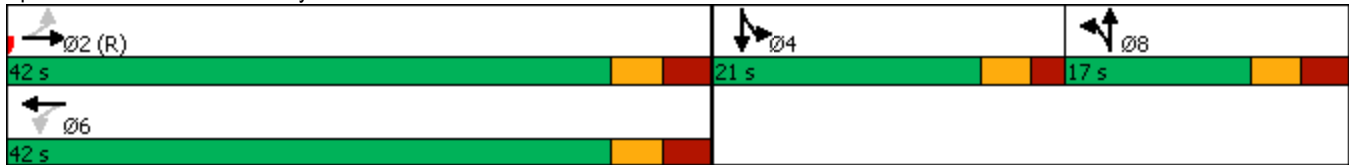
Intersection Summary

Lanes, Volumes, Timings
 1: County Line Rd & Lancaster Ave

Existing SAT Midday Peak
 02/25/2019


















Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	15.8
Intersection LOS:	B
Intersection Capacity Utilization:	72.0%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 1: County Line Rd & Lancaster Ave



HCM Signalized Intersection Capacity Analysis
1: County Line Rd & Lancaster Ave

Existing SAT Midday Peak
02/25/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	536	366	12	551	27	427	27	18	13	12	13
Future Volume (vph)	21	536	366	12	551	27	427	27	18	13	12	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%			3%	
Total Lost time (s)		1.5			2.5		2.5	2.5			2.5	
Lane Util. Factor		0.95			0.95		0.95	0.95			1.00	
Frt		0.94			0.99		1.00	0.99			0.95	
Flt Protected		1.00			1.00		0.95	0.96			0.98	
Satd. Flow (prot)		3042			3345		1532	1492			1602	
Flt Permitted		0.93			0.93		0.95	0.96			0.98	
Satd. Flow (perm)		2848			3116		1532	1492			1602	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	22	570	389	13	586	29	454	29	19	14	13	14
RTOR Reduction (vph)	0	123	0	0	4	0	0	3	0	0	13	0
Lane Group Flow (vph)	0	858	0	0	624	0	250	249	0	0	28	0
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	5%	1%	1%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)		40.1			40.1		18.1	18.1			4.8	
Effective Green, g (s)		44.6			43.6		21.6	21.6			7.3	
Actuated g/C Ratio		0.56			0.55		0.27	0.27			0.09	
Clearance Time (s)		6.0			6.0		6.0	6.0			5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		1587			1698		413	402			146	
v/s Ratio Prot							0.16	c0.17			c0.02	
v/s Ratio Perm		c0.30			0.20							
v/c Ratio		0.54			0.37		0.61	0.62			0.19	
Uniform Delay, d1		11.2			10.4		25.5	25.6			33.6	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		1.3			0.1		2.5	2.8			0.7	
Delay (s)		12.5			10.5		28.0	28.4			34.3	
Level of Service		B			B		C	C			C	
Approach Delay (s)		12.5			10.5			28.2			34.3	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			16.0				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			80.0				Sum of lost time (s)				10.0	
Intersection Capacity Utilization			72.0%				ICU Level of Service				C	
Analysis Period (min)			15									
c	Critical Lane Group											

Lanes, Volumes, Timings
 2: County Line Rd & Montrose Ave

Existing SAT Midday Peak
 02/25/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	14	14	14	14	14	14	10	10	10	10	10	10
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		456			431			492			667	
Travel Time (s)		12.4			11.8			9.6			13.0	
Lane Group Flow (vph)	0	87	0	0	61	0	0	509	0	0	381	0

Intersection Summary

Area Type: Other

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	41	15	20	21	17	4	446	29	6	332	21
Future Vol, veh/h	25	41	15	20	21	17	4	446	29	6	332	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	1	3	0	1	0
Mvmt Flow	27	44	16	21	22	18	4	474	31	6	353	22

















Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	632	889	188	709	885	253	375	0	0	505	0	0
Stage 1	376	376	-	498	498	-	-	-	-	-	-	-
Stage 2	256	513	-	211	387	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	369	285	828	325	286	753	1195	-	-	1070	-	-
Stage 1	623	620	-	528	548	-	-	-	-	-	-	-
Stage 2	732	539	-	777	613	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	335	282	828	279	283	753	1195	-	-	1070	-	-
Mov Cap-2 Maneuver	335	282	-	279	283	-	-	-	-	-	-	-
Stage 1	620	616	-	525	545	-	-	-	-	-	-	-
Stage 2	682	536	-	703	609	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	19.1		17.7		0.1		0.1	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1195	-	-	340	344	1070	-
HCM Lane V/C Ratio	0.004	-	-	0.253	0.179	0.006	-
HCM Control Delay (s)	8	0	-	19.1	17.7	8.4	0
HCM Lane LOS	A	A	-	C	C	A	A
HCM 95th %tile Q(veh)	0	-	-	1	0.6	0	-

Lanes, Volumes, Timings
 3: County Line Rd & Roberts Rd

Existing SAT Midday Peak
 02/25/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	10	10	10	10	10	10
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		268			463			418			492	
Travel Time (s)		7.3			12.6			8.1			9.6	
Lane Group Flow (vph)	0	88	0	0	71	0	0	488	0	0	456	0

Intersection Summary

Area Type: Other

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↻			↻			↻			↻	
Traffic Vol, veh/h	44	34	6	12	42	13	2	436	26	10	365	58
Future Vol, veh/h	44	34	6	12	42	13	2	436	26	10	365	58
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	1	8	10	1	0
Mvmt Flow	46	36	6	13	44	14	2	459	27	11	384	61

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	693	927	223	709	944	243	445	0	0	486	0	0
Stage 1	437	437	-	477	477	-	-	-	-	-	-	-
Stage 2	256	490	-	232	467	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.3	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.3	-	-
Pot Cap-1 Maneuver	334	270	787	325	264	764	1126	-	-	1019	-	-
Stage 1	574	583	-	543	559	-	-	-	-	-	-	-
Stage 2	732	552	-	756	565	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	282	266	787	286	260	764	1126	-	-	1019	-	-
Mov Cap-2 Maneuver	282	266	-	286	260	-	-	-	-	-	-	-
Stage 1	573	575	-	542	558	-	-	-	-	-	-	-
Stage 2	661	551	-	693	557	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.2	20.4	0	0.3
HCM LOS	C	C		

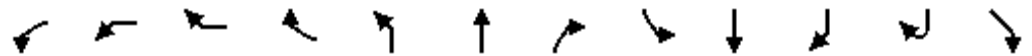
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1126	-	-	295	304	1019	-
HCM Lane V/C Ratio	0.002	-	-	0.143	0.232	0.01	-
HCM Control Delay (s)	8.2	0	-	19.2	20.4	8.6	0.1
HCM Lane LOS	A	A	-	C	C	A	A
HCM 95th %tile Q(veh)	0	-	-	0.5	0.9	0	-

Lanes, Volumes, Timings

Existing SAT Midday Peak

4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

02/25/2019



Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Traffic Volume (vph)	18	3	5	6	255	427	27	4	363	6	4	296
Future Volume (vph)	18	3	5	6	255	427	27	4	363	6	4	296
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Right Turn on Red				No			No				No	
Link Speed (mph)		25				35			35			
Link Distance (ft)		350				317			418			
Travel Time (s)		9.5				6.2			8.1			
Lane Group Flow (vph)	0	33	0	0	0	739	0	0	392	0	0	319
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA			Perm
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2			1
Detector Phase	8	8			6	6		2	2			1
Switch Phase												
Minimum Initial (s)	3.0	3.0			20.0	20.0		20.0	20.0			20.0
Minimum Split (s)	10.0	10.0			26.0	26.0		26.0	26.0			26.0
Total Split (s)	27.0	27.0			26.0	52.0		26.0	26.0			26.0
Total Split (%)	34.2%	34.2%			32.9%	65.8%		32.9%	32.9%			32.9%
Maximum Green (s)	20.0	20.0			20.0	46.0		20.0	20.0			20.0
Yellow Time (s)	3.0	3.0			4.0	4.0		4.0	4.0			4.0
All-Red Time (s)	4.0	4.0			2.0	2.0		2.0	2.0			2.0
Lost Time Adjust (s)		-4.5				-3.5			-3.5			-3.5
Total Lost Time (s)		2.5				2.5			2.5			2.5
Lead/Lag					Lead			Lag	Lag			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			3.0
Recall Mode	None	None			None	C-Max		C-Max	C-Max			None
Act Effct Green (s)		15.6				60.9			33.4			25.0
Actuated g/C Ratio		0.20				0.77			0.42			0.32
v/c Ratio		0.10				0.46			0.31			0.62
Control Delay		24.8				5.0			18.6			28.9
Queue Delay		0.0				0.0			0.0			0.0
Total Delay		24.8				5.0			18.6			28.9
LOS		C				A			B			C
Approach Delay		24.8				5.0			18.6			
Approach LOS		C				A			B			
Queue Length 50th (ft)		13				66			68			136
Queue Length 95th (ft)		34				121			122			206
Internal Link Dist (ft)		270				237			338			
Turn Bay Length (ft)												
Base Capacity (vph)		495				1620			1246			511
Starvation Cap Reductn		0				0			0			0
Spillback Cap Reductn		0				0			0			0
Storage Cap Reductn		0				0			0			0
Reduced v/c Ratio		0.07				0.46			0.31			0.62

Intersection Summary

Lanes, Volumes, Timings
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

Existing SAT Midday Peak
 02/25/2019



Lane Group	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Traffic Volume (vph)	11	14	34	22	51
Future Volume (vph)	11	14	34	22	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width (ft)	13	12	12	12	12
Grade (%)			-1%		
Right Turn on Red	No				No
Link Speed (mph)			25		
Link Distance (ft)			393		
Travel Time (s)			10.7		
Lane Group Flow (vph)	0	0	126	0	0
Turn Type		Perm	Perm		
Protected Phases					
Permitted Phases		4	4		
Detector Phase		4	4		
Switch Phase					
Minimum Initial (s)		3.0	3.0		
Minimum Split (s)		10.0	10.0		
Total Split (s)		27.0	27.0		
Total Split (%)		34.2%	34.2%		
Maximum Green (s)		20.0	20.0		
Yellow Time (s)		3.0	3.0		
All-Red Time (s)		4.0	4.0		
Lost Time Adjust (s)			-4.5		
Total Lost Time (s)			2.5		
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)		3.0	3.0		
Recall Mode		None	None		
Act Effct Green (s)			15.9		
Actuated g/C Ratio			0.20		
v/c Ratio			0.39		
Control Delay			30.0		
Queue Delay			0.0		
Total Delay			30.0		
LOS			C		
Approach Delay			30.0		
Approach LOS			C		
Queue Length 50th (ft)			54		
Queue Length 95th (ft)			96		
Internal Link Dist (ft)			313		
Turn Bay Length (ft)					
Base Capacity (vph)			501		
Starvation Cap Reductn			0		
Spillback Cap Reductn			0		
Storage Cap Reductn			0		
Reduced v/c Ratio			0.25		

Intersection Summary

Lanes, Volumes, Timings
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

Existing SAT Midday Peak
 02/25/2019

Area Type:	Other
Cycle Length:	79
Actuated Cycle Length:	79
Offset:	52 (66%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
Natural Cycle:	65
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	15.4
Intersection LOS:	B
Intersection Capacity Utilization	62.1%
ICU Level of Service	B
Analysis Period (min)	15

Splits and Phases: 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd



HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

Existing SAT Midday Peak
 02/25/2019



Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Traffic Volume (vph)	18	3	5	6	255	427	27	4	363	6	4	296
Future Volume (vph)	18	3	5	6	255	427	27	4	363	6	4	296
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Total Lost time (s)		2.5				2.5			2.5			2.5
Lane Util. Factor		1.00				*0.81			0.95			1.00
Frt		0.95				0.99			1.00			0.86
Flt Protected		0.97				0.98			1.00			1.00
Satd. Flow (prot)		1599				2640			3116			1617
Flt Permitted		0.97				0.64			0.95			1.00
Satd. Flow (perm)		1599				1731			2953			1617
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	19	3	5	6	266	445	28	4	378	6	4	308
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	33	0	0	0	739	0	0	392	0	0	319
Heavy Vehicles (%)	0%	33%	0%	0%	0%	2%	0%	0%	1%	0%	0%	0%
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA			Perm
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2			1
Actuated Green, G (s)		10.0				56.0			28.5			21.5
Effective Green, g (s)		14.5				59.5			32.0			25.0
Actuated g/C Ratio		0.18				0.75			0.41			0.32
Clearance Time (s)		7.0				6.0			6.0			6.0
Vehicle Extension (s)		3.0				3.0			3.0			3.0
Lane Grp Cap (vph)		293				1591			1196			511
v/s Ratio Prot						0.15						
v/s Ratio Perm		0.02				c0.20			0.13			c0.20
v/c Ratio		0.11				0.46			0.33			0.62
Uniform Delay, d1		26.9				3.7			16.1			23.0
Progression Factor		1.00				1.00			1.00			1.00
Incremental Delay, d2		0.2				0.2			0.7			2.4
Delay (s)		27.1				3.9			16.9			25.4
Level of Service		C				A			B			C
Approach Delay (s)		27.1				3.9			16.9			
Approach LOS		C				A			B			
Intersection Summary												
HCM 2000 Control Delay			13.8			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			79.0			Sum of lost time (s)			15.5			
Intersection Capacity Utilization			62.1%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

Existing SAT Midday Peak
 02/25/2019



Movement	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Traffic Volume (vph)	11	14	34	22	51
Future Volume (vph)	11	14	34	22	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width	13	12	12	12	12
Grade (%)			-1%		
Total Lost time (s)			2.5		
Lane Util. Factor			1.00		
Frt			0.92		
Flt Protected			0.98		
Satd. Flow (prot)			1616		
Flt Permitted			0.98		
Satd. Flow (perm)			1616		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	15	35	23	53
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	0	0	126	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	2%
Turn Type		Perm	Perm		
Protected Phases					
Permitted Phases		4	4		
Actuated Green, G (s)			10.0		
Effective Green, g (s)			14.5		
Actuated g/C Ratio			0.18		
Clearance Time (s)			7.0		
Vehicle Extension (s)			3.0		
Lane Grp Cap (vph)			296		
v/s Ratio Prot					
v/s Ratio Perm			c0.08		
v/c Ratio			0.43		
Uniform Delay, d1			28.6		
Progression Factor			1.00		
Incremental Delay, d2			1.0		
Delay (s)			29.6		
Level of Service			C		
Approach Delay (s)			29.6		
Approach LOS			C		
Intersection Summary					

Intersection						
Int Delay, s/veh	0.1					
Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	722	43	11	681	0	0
Future Vol, veh/h	722	43	11	681	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	0	18	1	0	0
Mvmt Flow	752	45	11	709	0	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	797	0	1152 399
Stage 1	-	-	-	-	775 -
Stage 2	-	-	-	-	377 -
Critical Hdwy	-	-	4.46	-	6.8 6.9
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	-	-	2.38	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	725	-	194 606
Stage 1	-	-	-	-	420 -
Stage 2	-	-	-	-	669 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	725	-	189 606
Mov Cap-2 Maneuver	-	-	-	-	189 -
Stage 1	-	-	-	-	410 -
Stage 2	-	-	-	-	669 -

Approach	NB	SB	SW
HCM Control Delay, s	0	0.3	0
HCM LOS			A

Minor Lane/Major Mvmt	NBT	NBR	SBL	SBT	SWLn1
Capacity (veh/h)	-	-	725	-	-
HCM Lane V/C Ratio	-	-	0.016	-	-
HCM Control Delay (s)	-	-	10	0.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	-	-

Intersection						
Int Delay, s/veh	2.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	TT		TT			TT
Traffic Vol, veh/h	13	143	579	2	93	588
Future Vol, veh/h	13	143	579	2	93	588
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	4	1	0	18	1
Mvmt Flow	14	149	603	2	97	613

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1105	303	0	0	605	0
Stage 1	604	-	-	-	-	-
Stage 2	501	-	-	-	-	-
Critical Hdwy	6.82	6.98	-	-	4.46	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.34	-	-	2.38	-
Pot Cap-1 Maneuver	207	687	-	-	867	-
Stage 1	511	-	-	-	-	-
Stage 2	577	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	172	687	-	-	867	-
Mov Cap-2 Maneuver	172	-	-	-	-	-
Stage 1	424	-	-	-	-	-
Stage 2	577	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.3	0	1.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	550	867
HCM Lane V/C Ratio	-	-	0.295	0.112
HCM Control Delay (s)	-	-	14.3	9.7
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	1.2	0.4

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑↓			↑↓
Traffic Vol, veh/h	1	11	610	7	2	635
Future Vol, veh/h	1	11	610	7	2	635
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	1	11	635	7	2	661

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	974	321	0	0	642	0
Stage 1	639	-	-	-	-	-
Stage 2	335	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	253	681	-	-	952	-
Stage 1	493	-	-	-	-	-
Stage 2	702	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	252	681	-	-	952	-
Mov Cap-2 Maneuver	252	-	-	-	-	-
Stage 1	492	-	-	-	-	-
Stage 2	702	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	596	952
HCM Lane V/C Ratio	-	-	0.021	0.002
HCM Control Delay (s)	-	-	11.2	8.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Lanes, Volumes, Timings
8: County Line Rd & Lindsay Ave

Existing SAT Midday Peak
02/25/2019



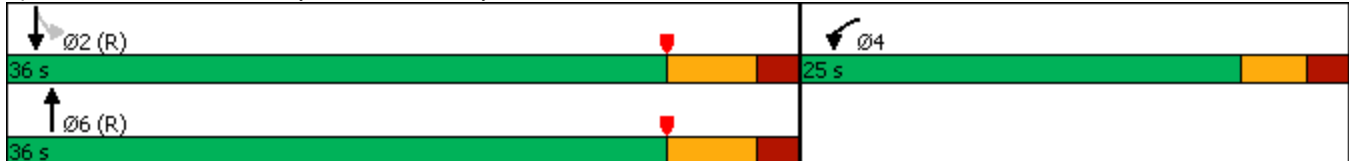
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	623	0	1	639
Future Volume (vph)	0	0	623	0	1	639
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	16	16	10	10	10	10
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		35			35
Link Distance (ft)	311		340			494
Travel Time (s)	8.5		6.6			9.6
Lane Group Flow (vph)	0	0	656	0	0	674
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Detector Phase	4		6		2	2
Switch Phase						
Minimum Initial (s)	3.0		15.0		15.0	15.0
Minimum Split (s)	8.0		21.0		21.0	21.0
Total Split (s)	25.0		36.0		36.0	36.0
Total Split (%)	41.0%		59.0%		59.0%	59.0%
Maximum Green (s)	20.0		30.0		30.0	30.0
Yellow Time (s)	3.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-3.5		-3.5			-3.5
Total Lost Time (s)	1.5		2.5			2.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		C-Max	C-Max
Act Effct Green (s)			61.0			61.0
Actuated g/C Ratio			1.00			1.00
v/c Ratio			0.21			0.22
Control Delay			0.1			0.2
Queue Delay			0.0			0.0
Total Delay			0.1			0.2
LOS			A			A
Approach Delay			0.1			0.2
Approach LOS			A			A
Queue Length 50th (ft)			0			0
Queue Length 95th (ft)			0			0
Internal Link Dist (ft)	231		260			414
Turn Bay Length (ft)						
Base Capacity (vph)			3160			3018
Starvation Cap Reductn			0			0
Spillback Cap Reductn			0			0
Storage Cap Reductn			0			0
Reduced v/c Ratio			0.21			0.22

Intersection Summary

Area Type: Other

Cycle Length: 61
 Actuated Cycle Length: 61
 Offset: 30 (49%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.22
 Intersection Signal Delay: 0.2
 Intersection LOS: A
 Intersection Capacity Utilization 22.7%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 8: County Line Rd & Lindsay Ave



HCM Signalized Intersection Capacity Analysis
8: County Line Rd & Lindsay Ave

Existing SAT Midday Peak
02/25/2019



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	623	0	1	639
Future Volume (vph)	0	0	623	0	1	639
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	16	16	10	10	10	10
Total Lost time (s)			2.5			2.5
Lane Util. Factor			0.95			0.95
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			3160			3160
Flt Permitted			1.00			0.95
Satd. Flow (perm)			3160			3018
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	656	0	1	673
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	656	0	0	674
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Actuated Green, G (s)			61.0			61.0
Effective Green, g (s)			61.0			61.0
Actuated g/C Ratio			1.00			1.00
Clearance Time (s)			6.0			6.0
Vehicle Extension (s)			3.0			3.0
Lane Grp Cap (vph)			3160			3018
v/s Ratio Prot			0.21			
v/s Ratio Perm						c0.22
v/c Ratio			0.21			0.22
Uniform Delay, d1			0.0			0.0
Progression Factor			1.00			1.00
Incremental Delay, d2			0.1			0.2
Delay (s)			0.1			0.2
Level of Service			A			A
Approach Delay (s)	0.0		0.1			0.2
Approach LOS	A		A			A

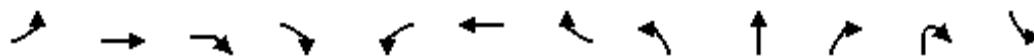
Intersection Summary

HCM 2000 Control Delay	0.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	22.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

Existing SAT Midday Peak
 02/25/2019



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Traffic Volume (vph)	156	172	25	99	111	197	65	109	476	83	1	47
Future Volume (vph)	156	172	25	99	111	197	65	109	476	83	1	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	15	11	12	12	11	11	13	10	10	10	10	10
Storage Length (ft)	140		0		185		160	70		0		
Storage Lanes	1		0		1		1	1		0		
Taper Length (ft)	25				25			25				
Right Turn on Red				Yes			Yes				Yes	
Link Speed (mph)		40				30			35			
Link Distance (ft)		547				508			526			
Travel Time (s)		9.3				11.5			10.2			
Lane Group Flow (vph)	161	305	0	0	114	203	67	112	578	0	0	0
Turn Type	pm+pt	NA			pm+pt	NA	Perm	pm+pt	NA			pm+pt
Protected Phases	3	8			7	4		1	6			5
Permitted Phases	8	8			4	4	4	6				2
Detector Phase	3	8			7	4	4	1	6			5
Switch Phase												
Minimum Initial (s)	3.0	2.5			3.0	3.0	3.0	3.0	10.0			3.0
Minimum Split (s)	9.0	9.0			9.0	9.0	9.0	9.0	16.0			9.0
Total Split (s)	13.0	32.0			13.0	32.0	32.0	13.0	32.0			13.0
Total Split (%)	14.4%	35.6%			14.4%	35.6%	35.6%	14.4%	35.6%			14.4%
Maximum Green (s)	7.0	25.5			7.0	26.0	26.0	7.0	26.0			7.0
Yellow Time (s)	3.0	3.5			3.0	3.0	3.0	4.0	4.0			4.0
All-Red Time (s)	3.0	3.0			3.0	3.0	3.0	2.0	2.0			2.0
Lost Time Adjust (s)	-3.5	-3.5			-3.5	-3.5	-3.5	-3.5	-3.5			
Total Lost Time (s)	2.5	3.0			2.5	2.5	2.5	2.5	2.5			
Lead/Lag	Lead	Lag			Lead	Lag	Lag	Lead	Lag			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			3.0
Recall Mode	None	None			None	None	None	None	C-Max			None
Act Effct Green (s)	34.3	25.4			33.7	23.3	23.3	47.2	38.0			
Actuated g/C Ratio	0.38	0.28			0.37	0.26	0.26	0.52	0.42			
v/c Ratio	0.36	0.63			0.32	0.46	0.12	0.27	0.44			
Control Delay	18.6	31.7			18.1	30.2	0.5	13.7	22.2			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	18.6	31.7			18.1	30.2	0.5	13.7	22.2			
LOS	B	C			B	C	A	B	C			
Approach Delay		27.1				21.4			20.9			
Approach LOS		C				C			C			
Queue Length 50th (ft)	57	139			39	95	0	31	129			
Queue Length 95th (ft)	89	211			67	147	0	66	195			
Internal Link Dist (ft)		467				428			446			
Turn Bay Length (ft)	140				185		160	70				
Base Capacity (vph)	451	545			359	559	640	424	1316			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.36	0.56			0.32	0.36	0.10	0.26	0.44			

Lanes, Volumes, Timings
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

Existing SAT Midday Peak
 02/25/2019

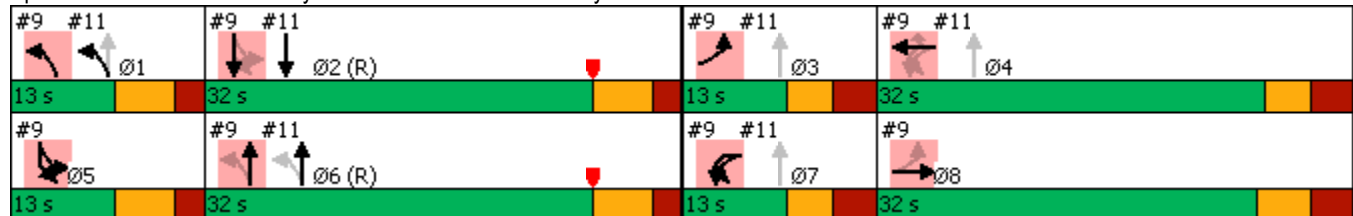


Lane Group	SBL	SBT	SBR
Lane Configurations	↔	↑↔	
Traffic Volume (vph)	10	459	63
Future Volume (vph)	10	459	63
Ideal Flow (vphpl)	1800	1800	1800
Lane Width (ft)	10	10	10
Storage Length (ft)	0		0
Storage Lanes	1		0
Taper Length (ft)	25		
Right Turn on Red			Yes
Link Speed (mph)		35	
Link Distance (ft)		198	
Travel Time (s)		3.9	
Lane Group Flow (vph)	58	538	0
Turn Type	pm+pt	NA	
Protected Phases	5	2	
Permitted Phases	2		
Detector Phase	5	2	
Switch Phase			
Minimum Initial (s)	3.0	10.0	
Minimum Split (s)	9.0	16.0	
Total Split (s)	13.0	32.0	
Total Split (%)	14.4%	35.6%	
Maximum Green (s)	7.0	26.0	
Yellow Time (s)	4.0	4.0	
All-Red Time (s)	2.0	2.0	
Lost Time Adjust (s)	3.0	-3.5	
Total Lost Time (s)	9.0	2.5	
Lead/Lag	Lead	Lag	
Lead-Lag Optimize?			
Vehicle Extension (s)	3.0	3.0	
Recall Mode	None	C-Max	
Act Effct Green (s)	34.4	37.5	
Actuated g/C Ratio	0.38	0.42	
v/c Ratio	0.24	0.42	
Control Delay	9.7	2.7	
Queue Delay	0.0	0.1	
Total Delay	9.7	2.8	
LOS	A	A	
Approach Delay		3.5	
Approach LOS		A	
Queue Length 50th (ft)	4	0	
Queue Length 95th (ft)	m16	0	
Internal Link Dist (ft)		118	
Turn Bay Length (ft)			
Base Capacity (vph)	249	1270	
Starvation Cap Reductn	0	107	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.23	0.46	

Intersection Summary

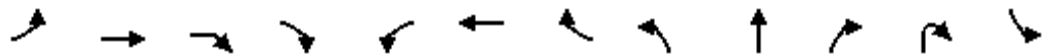
Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 26 (29%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 17.5 Intersection LOS: B
 Intersection Capacity Utilization 61.6% ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: County Line Rd & Railroad Ave & Bryn Mawr Ave



HCM Signalized Intersection Capacity Analysis
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

Existing SAT Midday Peak
 02/25/2019



Movement	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Traffic Volume (vph)	156	172	25	99	111	197	65	109	476	83	1	47
Future Volume (vph)	156	172	25	99	111	197	65	109	476	83	1	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	15	11	12	12	11	11	13	10	10	10	10	10
Total Lost time (s)	2.5	3.0			2.5	2.5	2.5	2.5	2.5			
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00	0.95			
Frt	1.00	0.94			1.00	1.00	0.85	1.00	0.98			
Flt Protected	0.95	1.00			0.95	1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1862	1630			1653	1706	1581	1565	3115			
Flt Permitted	0.45	1.00			0.37	1.00	1.00	0.35	1.00			
Satd. Flow (perm)	884	1630			641	1706	1581	570	3115			
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	161	177	26	102	114	203	67	112	491	86	1	48
RTOR Reduction (vph)	0	22	0	0	0	0	49	0	0	0	0	0
Lane Group Flow (vph)	161	283	0	0	114	203	18	112	578	0	0	0
Heavy Vehicles (%)	1%	0%	0%	0%	0%	2%	0%	2%	0%	1%	2%	2%
Turn Type	pm+pt	NA			pm+pt	NA	Perm	pm+pt	NA			pm+pt
Protected Phases	3	8			7	4		1	6			5
Permitted Phases	8	8			4	4	4	6				2
Actuated Green, G (s)	28.9	21.9			26.6	21.0	21.0	38.6	32.2			
Effective Green, g (s)	35.9	25.4			33.6	24.5	24.5	45.6	35.7			
Actuated g/C Ratio	0.40	0.28			0.37	0.27	0.27	0.51	0.40			
Clearance Time (s)	6.0	6.5			6.0	6.0	6.0	6.0	6.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	466	460			341	464	430	398	1235			
v/s Ratio Prot	c0.04	c0.17			0.03	0.12		c0.03	c0.19			
v/s Ratio Perm	0.10				0.09		0.01	0.11				
v/c Ratio	0.35	0.62			0.33	0.44	0.04	0.28	0.47			
Uniform Delay, d1	18.1	28.1			19.5	27.1	24.1	12.3	20.1			
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.4	2.5			0.6	0.7	0.0	0.4	1.3			
Delay (s)	18.6	30.5			20.0	27.7	24.2	12.6	21.4			
Level of Service	B	C			C	C	C	B	C			
Approach Delay (s)		26.4				24.8			20.0			
Approach LOS		C				C			B			

Intersection Summary

HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	10	459	63
Future Volume (vph)	10	459	63
Ideal Flow (vphpl)	1800	1800	1800
Lane Width	10	10	10
Total Lost time (s)	9.0	2.5	
Lane Util. Factor	1.00	0.95	
Fr _t	1.00	0.98	
Fl _t Protected	0.95	1.00	
Satd. Flow (prot)	1567	3028	
Fl _t Permitted	0.31	1.00	
Satd. Flow (perm)	518	3028	
Peak-hour factor, PHF	0.97	0.97	0.97
Adj. Flow (vph)	10	473	65
RTOR Reduction (vph)	0	11	0
Lane Group Flow (vph)	58	527	0
Heavy Vehicles (%)	1%	4%	0%
Turn Type	pm+pt	NA	
Protected Phases	5	2	
Permitted Phases	2		
Actuated Green, G (s)	37.4	31.6	
Effective Green, g (s)	31.4	35.1	
Actuated g/C Ratio	0.35	0.39	
Clearance Time (s)	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	213	1180	
v/s Ratio Prot	0.01	0.17	
v/s Ratio Perm	0.09		
v/c Ratio	0.27	0.45	
Uniform Delay, d ₁	20.2	20.3	
Progression Factor	0.46	0.09	
Incremental Delay, d ₂	0.6	1.1	
Delay (s)	9.9	2.9	
Level of Service	A	A	
Approach Delay (s)		3.6	
Approach LOS		A	
Intersection Summary			

Lanes, Volumes, Timings
10: County Line Rd & Landover Rd

Existing SAT Midday Peak
02/25/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	107	73	25	46	74	37	20	551	68	32	518	112
Future Volume (vph)	107	73	25	46	74	37	20	551	68	32	518	112
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	13	13	13	11	11	11	10	10	10	10	10	10
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		286			293			501			526	
Travel Time (s)		5.6			6.7			9.8			10.2	
Lane Group Flow (vph)	0	213	0	0	164	0	0	666	0	0	690	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		60.0	60.0		60.0	60.0	
Total Split (s)	20.0	20.0		20.0	20.0		60.0	60.0		60.0	60.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%		75.0%	75.0%		75.0%	75.0%	
Maximum Green (s)	15.0	15.0		15.0	15.0		55.0	55.0		55.0	55.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.5			-2.5			-2.5			-2.5	
Total Lost Time (s)		2.5			2.5			2.5			2.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		16.8			16.8			58.2			58.2	
Actuated g/C Ratio		0.21			0.21			0.73			0.73	
v/c Ratio		0.81			0.52			0.32			0.33	
Control Delay		53.8			31.3			4.2			4.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		53.8			31.3			4.2			4.0	
LOS		D			C			A			A	
Approach Delay		53.8			31.3			4.2			4.0	
Approach LOS		D			C			A			A	
Queue Length 50th (ft)		97			64			48			47	
Queue Length 95th (ft)		#209			124			68			68	
Internal Link Dist (ft)		206			213			421			446	
Turn Bay Length (ft)												
Base Capacity (vph)		274			327			2094			2073	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.78			0.50			0.32			0.33	
Intersection Summary												
Area Type:	Other											

HCM 6th Signalized Intersection Summary
 10: County Line Rd & Landover Rd

Existing SAT Midday Peak
 02/25/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	107	73	25	46	74	37	20	551	68	32	518	112
Future Volume (veh/h)	107	73	25	46	74	37	20	551	68	32	518	112
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1814	1814	1814	1800	1800	1800	1772	1772	1772	1800	1800	1800
Adj Flow Rate, veh/h	111	76	26	48	77	39	21	574	71	33	540	117
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	0	0	0	2	2	2	0	0	0
Cap, veh/h	208	118	36	126	177	76	87	2103	256	122	1895	403
Arrive On Green	0.17	0.20	0.17	0.17	0.20	0.17	0.71	0.74	0.71	0.71	0.74	0.71
Sat Flow, veh/h	697	588	179	338	884	381	54	2852	347	99	2569	546
Grp Volume(v), veh/h	213	0	0	164	0	0	349	0	317	360	0	330
Grp Sat Flow(s),veh/h/ln	1464	0	0	1603	0	0	1703	0	1550	1675	0	1540
Q Serve(g_s), s	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0.0	5.9
Cycle Q Clear(g_c), s	11.3	0.0	0.0	7.3	0.0	0.0	5.2	0.0	5.5	5.4	0.0	5.9
Prop In Lane	0.52		0.12	0.29		0.24	0.06		0.22	0.09		0.35
Lane Grp Cap(c), veh/h	316	0	0	329	0	0	1250	0	1143	1232	0	1135
V/C Ratio(X)	0.67	0.00	0.00	0.50	0.00	0.00	0.28	0.00	0.28	0.29	0.00	0.29
Avail Cap(c_a), veh/h	343	0	0	358	0	0	1250	0	1143	1232	0	1135
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.92	0.00	0.92
Uniform Delay (d), s/veh	30.8	0.0	0.0	29.0	0.0	0.0	3.5	0.0	3.6	3.5	0.0	3.7
Incr Delay (d2), s/veh	4.6	0.0	0.0	1.2	0.0	0.0	0.6	0.0	0.6	0.6	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.8	0.0	0.0	5.4	0.0	0.0	3.1	0.0	2.4	3.2	0.0	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.5	0.0	0.0	30.2	0.0	0.0	4.0	0.0	4.2	4.1	0.0	4.3
LnGrp LOS	D	A	A	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		213			164			666				690
Approach Delay, s/veh		35.5			30.2			4.1				4.2
Approach LOS		D			C			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		61.5		18.5		61.5		18.5				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		55.0		15.0		55.0		15.0				
Max Q Clear Time (g_c+I1), s		7.5		13.3		7.9		9.3				
Green Ext Time (p_c), s		4.7		0.2		5.0		0.4				

Intersection Summary

HCM 6th Ctrl Delay	10.5
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Lanes, Volumes, Timings
11: County Line Rd & Glenbrook Ave

Existing SAT Midday Peak
02/25/2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3	Ø4	Ø5	Ø7	Ø8
Lane Configurations				↕↕	↕↕						
Traffic Volume (vph)	0	0	35	697	579	13					
Future Volume (vph)	0	0	35	697	579	13					
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800					
Lane Width (ft)	12	12	10	12	10	10					
Right Turn on Red		Yes				Yes					
Link Speed (mph)	25			35	35						
Link Distance (ft)	228			198	340						
Travel Time (s)	6.2			3.9	6.6						
Lane Group Flow (vph)	0	0	0	796	643	0					
Turn Type			pm+pt	NA	NA						
Protected Phases			1	6	2		3	4	5	7	8
Permitted Phases			6	1 3 4 7							
Detector Phase			1	6	2						
Switch Phase											
Minimum Initial (s)			3.0	10.0	10.0		3.0	3.0	3.0	3.0	2.5
Minimum Split (s)			9.0	16.0	16.0		9.0	9.0	9.0	9.0	9.0
Total Split (s)			13.0	32.0	32.0		13.0	32.0	13.0	13.0	32.0
Total Split (%)			14.4%	35.6%	35.6%		14%	36%	14%	14%	36%
Maximum Green (s)			7.0	26.0	26.0		7.0	26.0	7.0	7.0	25.5
Yellow Time (s)			4.0	4.0	4.0		3.0	3.0	4.0	3.0	3.5
All-Red Time (s)			2.0	2.0	2.0		3.0	3.0	2.0	3.0	3.0
Lost Time Adjust (s)				-3.5	-3.5						
Total Lost Time (s)				2.5	2.5						
Lead/Lag			Lead	Lag	Lag		Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)			3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode			None	C-Max	C-Max		None	None	None	None	None
Act Effct Green (s)				85.6	37.5						
Actuated g/C Ratio				0.95	0.42						
v/c Ratio				0.26	0.49						
Control Delay				0.2	23.4						
Queue Delay				0.2	0.3						
Total Delay				0.4	23.7						
LOS				A	C						
Approach Delay				0.4	23.7						
Approach LOS				A	C						
Queue Length 50th (ft)				0	151						
Queue Length 95th (ft)				0	219						
Internal Link Dist (ft)	148			118	260						
Turn Bay Length (ft)											
Base Capacity (vph)				3054	1300						
Starvation Cap Reductn				1322	229						
Spillback Cap Reductn				0	0						
Storage Cap Reductn				0	0						
Reduced v/c Ratio				0.46	0.60						

Intersection Summary

Area Type: Other

HCM Signalized Intersection Capacity Analysis
 11: County Line Rd & Glenbrook Ave

Existing SAT Midday Peak
 02/25/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↕↕	↕↕	
Traffic Volume (vph)	0	0	35	697	579	13
Future Volume (vph)	0	0	35	697	579	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	10	12	10	10
Total Lost time (s)				2.5	2.5	
Lane Util. Factor				0.95	0.95	
Fr _t				1.00	1.00	
Fl _t Protected				1.00	1.00	
Satd. Flow (prot)				3345	3119	
Fl _t Permitted				0.93	1.00	
Satd. Flow (perm)				3105	3119	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	38	758	629	14
RTOR Reduction (vph)	0	0	0	0	2	0
Lane Group Flow (vph)	0	0	0	796	641	0
Turn Type			pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases			6	1 3 4 7		
Actuated Green, G (s)				78.6	31.6	
Effective Green, g (s)				85.6	35.1	
Actuated g/C Ratio				0.95	0.39	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3048	1216	
v/s Ratio Prot				c0.10	c0.21	
v/s Ratio Perm				c0.14		
v/c Ratio				0.26	0.53	
Uniform Delay, d ₁				0.1	21.1	
Progression Factor				0.59	1.00	
Incremental Delay, d ₂				0.0	1.6	
Delay (s)				0.1	22.7	
Level of Service				A	C	
Approach Delay (s)	0.0			0.1	22.7	
Approach LOS	A			A	C	
Intersection Summary						
HCM 2000 Control Delay			10.2	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.46			
Actuated Cycle Length (s)			90.0	Sum of lost time (s)		21.0
Intersection Capacity Utilization			45.4%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						

Analysis w/ Center Turn Lane Excluding Conestoga
Road and Bryn Mawr Avenue



Lanes, Volumes, Timings
1: County Line Rd & Lancaster Ave

AM Peak w/ Improvements
02/25/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕			↕	
Traffic Volume (vph)	8	537	489	1	654	12	611	27	5	8	8	18
Future Volume (vph)	8	537	489	1	654	12	611	27	5	8	8	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25				25
Link Distance (ft)		497			631			170				160
Travel Time (s)		13.6			17.2			4.6				4.4
Lane Group Flow (vph)	0	1136	0	0	733	0	356	350	0	0	38	0
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	29.0	29.0		29.0	29.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	36.0	36.0		36.0	36.0		11.0	11.0		11.0	11.0	
Total Split (s)	42.0	42.0		42.0	42.0		17.0	17.0		21.0	21.0	
Total Split (%)	52.5%	52.5%		52.5%	52.5%		21.3%	21.3%		26.3%	26.3%	
Maximum Green (s)	35.0	35.0		35.0	35.0		10.0	10.0		14.0	14.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		-4.5			-4.5		-4.5	-4.5			-4.5	
Total Lost Time (s)		2.5			2.5		2.5	2.5			2.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	None		None	None		None	None	
Act Effct Green (s)		39.5			39.5		26.8	26.8				11.2
Actuated g/C Ratio		0.49			0.49		0.34	0.34				0.14
v/c Ratio		0.74			0.49		0.68	0.69				0.16
Control Delay		13.4			14.8		29.8	30.3				19.9
Queue Delay		0.0			0.0		0.0	0.0				0.0
Total Delay		13.4			14.8		29.8	30.3				19.9
LOS		B			B		C	C				B
Approach Delay		13.4			14.8			30.0				19.9
Approach LOS		B			B			C				B
Queue Length 50th (ft)		144			121		154	151				8
Queue Length 95th (ft)		224			167		#347	#343				33
Internal Link Dist (ft)		417			551			90				80
Turn Bay Length (ft)												
Base Capacity (vph)		1539			1506		522	507				379
Starvation Cap Reductn		0			0		0	0				0
Spillback Cap Reductn		0			0		0	0				0
Storage Cap Reductn		0			0		0	0				0
Reduced v/c Ratio		0.74			0.49		0.68	0.69				0.10

Intersection Summary

Lanes, Volumes, Timings
 1: County Line Rd & Lancaster Ave

AM Peak w/ Improvements
 02/25/2019


















Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 18.4 Intersection LOS: B
 Intersection Capacity Utilization 70.7% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: County Line Rd & Lancaster Ave

 42 s	 21 s	 17 s
 42 s		

HCM Signalized Intersection Capacity Analysis
1: County Line Rd & Lancaster Ave

AM Peak w/ Improvements
02/25/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	537	489	1	654	12	611	27	5	8	8	18
Future Volume (vph)	8	537	489	1	654	12	611	27	5	8	8	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Total Lost time (s)		2.5			2.5		2.5	2.5				2.5
Lane Util. Factor		0.95			0.95		0.95	0.95				1.00
Frt		0.93			1.00		1.00	1.00				0.93
Flt Protected		1.00			1.00		0.95	0.96				0.99
Satd. Flow (prot)		2854			3197		1561	1516				1573
Flt Permitted		0.95			0.95		0.95	0.96				0.99
Satd. Flow (perm)		2707			3049		1561	1516				1573
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	9	590	537	1	719	13	671	30	5	9	9	20
RTOR Reduction (vph)	0	217	0	0	2	0	0	1	0	0	18	0
Lane Group Flow (vph)	0	919	0	0	731	0	356	349	0	0	20	0
Heavy Vehicles (%)	0%	5%	6%	0%	5%	17%	3%	4%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)		32.2			32.2		22.3	22.3				4.5
Effective Green, g (s)		36.7			36.7		26.8	26.8				9.0
Actuated g/C Ratio		0.46			0.46		0.34	0.34				0.11
Clearance Time (s)		7.0			7.0		7.0	7.0				7.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0				3.0
Lane Grp Cap (vph)		1241			1398		522	507				176
v/s Ratio Prot							0.23	c0.23				c0.01
v/s Ratio Perm		c0.34			0.24							
v/c Ratio		0.74			0.52		0.68	0.69				0.12
Uniform Delay, d1		17.7			15.4		22.9	23.0				31.9
Progression Factor		1.00			1.00		0.85	0.85				1.00
Incremental Delay, d2		4.0			0.4		2.9	3.1				0.3
Delay (s)		21.7			15.8		22.3	22.5				32.2
Level of Service		C			B		C	C				C
Approach Delay (s)		21.7			15.8			22.4				32.2
Approach LOS		C			B			C				C
Intersection Summary												
HCM 2000 Control Delay			20.4				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			80.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			70.7%				ICU Level of Service				C	
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: County Line Rd & Montrose Ave

AM Peak w/ Improvements

02/25/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	28	71	67	9	42	8	12	618	56	7	480	13
Future Volume (vph)	28	71	67	9	42	8	12	618	56	7	480	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	14	14	14	14	14	14	10	10	10	10	10	10
Storage Length (ft)	0		0	0		0	75		0	75		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		456			431			492			667	
Travel Time (s)		12.4			11.8			13.4			18.2	
Lane Group Flow (vph)	0	177	0	0	64	0	13	717	0	7	525	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0		55.0	55.0		55.0	55.0	
Total Split (%)	31.3%	31.3%		31.3%	31.3%		68.8%	68.8%		68.8%	68.8%	
Maximum Green (s)	18.0	18.0		18.0	18.0		49.0	49.0		49.0	49.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0			7.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		11.9			11.9		55.1	55.1		55.1	55.1	
Actuated g/C Ratio		0.15			0.15		0.69	0.69		0.69	0.69	
v/c Ratio		0.63			0.24		0.03	0.65		0.02	0.49	
Control Delay		34.1			27.3		5.0	9.0		2.1	5.4	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		34.1			27.3		5.0	9.0		2.1	5.4	
LOS		C			C		A	A		A	A	
Approach Delay		34.1			27.3			8.9			5.4	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)		65			25		2	135		0	28	
Queue Length 95th (ft)		119			55		m4	200		m1	265	
Internal Link Dist (ft)		376			351			412			587	
Turn Bay Length (ft)							75			75		
Base Capacity (vph)		407			392		500	1108		367	1080	
Starvation Cap Reductn		0			0		0	0		0	0	

HCM 6th Signalized Intersection Summary
2: County Line Rd & Montrose Ave

AM Peak w/ Improvements
02/25/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	28	71	67	9	42	8	12	618	56	7	480	13
Future Volume (veh/h)	28	71	67	9	42	8	12	618	56	7	480	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1857	1857	1857	1843	1843	1843	1800	1758	1758	1800	1702	1702
Adj Flow Rate, veh/h	30	76	71	10	45	9	13	657	60	7	511	14
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	2	2	2	0	3	3	0	7	7
Cap, veh/h	78	109	90	69	186	33	600	1118	102	460	1161	32
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.70	0.70	0.70	0.70	0.70	0.70
Sat Flow, veh/h	189	816	673	130	1399	250	892	1587	145	746	1648	45
Grp Volume(v), veh/h	177	0	0	64	0	0	13	0	717	7	0	525
Grp Sat Flow(s),veh/h/ln	1677	0	0	1779	0	0	892	0	1732	746	0	1694
Q Serve(g_s), s	4.7	0.0	0.0	0.0	0.0	0.0	0.5	0.0	16.7	0.4	0.0	10.6
Cycle Q Clear(g_c), s	8.1	0.0	0.0	2.6	0.0	0.0	11.1	0.0	16.7	17.1	0.0	10.6
Prop In Lane	0.17		0.40	0.16		0.14	1.00		0.08	1.00		0.03
Lane Grp Cap(c), veh/h	276	0	0	289	0	0	600	0	1220	460	0	1193
V/C Ratio(X)	0.64	0.00	0.00	0.22	0.00	0.00	0.02	0.00	0.59	0.02	0.00	0.44
Avail Cap(c_a), veh/h	428	0	0	444	0	0	600	0	1220	460	0	1193
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.5	0.0	0.0	31.2	0.0	0.0	7.5	0.0	6.0	10.3	0.0	5.1
Incr Delay (d2), s/veh	2.5	0.0	0.0	0.4	0.0	0.0	0.1	0.0	2.1	0.1	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.2	0.0	0.0	2.0	0.0	0.0	0.2	0.0	9.3	0.1	0.0	6.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.0	0.0	0.0	31.6	0.0	0.0	7.5	0.0	8.0	10.3	0.0	6.2
LnGrp LOS	D	A	A	C	A	A	A	A	A	B	A	A
Approach Vol, veh/h		177			64			730				532
Approach Delay, s/veh		36.0			31.6			8.0				6.3
Approach LOS		D			C			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		62.4		17.6		62.4		17.6				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		49.0		18.0		49.0		18.0				
Max Q Clear Time (g_c+I1), s		18.7		10.1		19.1		4.6				
Green Ext Time (p_c), s		6.3		0.6		4.1		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				11.7								
HCM 6th LOS				B								

Lanes, Volumes, Timings
3: County Line Rd & Roberts Rd

AM Peak w/ Improvements
02/25/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	67	101	16	7	25	16	4	562	28	9	457	45
Future Volume (vph)	67	101	16	7	25	16	4	562	28	9	457	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	10	10	10	10	10	10
Storage Length (ft)	0		0	0		0	75		0	75		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		268			463			418			492	
Travel Time (s)		7.3			12.6			11.4			13.4	
Lane Group Flow (vph)	0	200	0	0	52	0	0	645	0	0	556	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.1%
ICU Level of Service	B
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	26.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	67	101	16	7	25	16	4	562	28	9	457	45
Future Vol, veh/h	67	101	16	7	25	16	4	562	28	9	457	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	9	2	0	0	0	0	0	2	4	0	4	0
Mvmt Flow	73	110	17	8	27	17	4	611	30	10	497	49

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1198	1191	522	1239	1200	626	546	0	0	641	0	0
Stage 1	542	542	-	634	634	-	-	-	-	-	-	-
Stage 2	656	649	-	605	566	-	-	-	-	-	-	-
Critical Hdwy	7.19	6.52	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.19	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.19	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.581	4.018	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	157	187	559	154	187	488	1033	-	-	953	-	-
Stage 1	512	520	-	471	476	-	-	-	-	-	-	-
Stage 2	443	466	-	488	511	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	132	183	559	77	183	488	1033	-	-	953	-	-
Mov Cap-2 Maneuver	132	183	-	77	183	-	-	-	-	-	-	-
Stage 1	509	512	-	468	473	-	-	-	-	-	-	-
Stage 2	400	463	-	366	503	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	181.8		32.1		0.1		0.2	
HCM LOS	F		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1033	-	-	169	184	953	-
HCM Lane V/C Ratio	0.004	-	-	1.183	0.284	0.01	-
HCM Control Delay (s)	8.5	0	-	181.8	32.1	8.8	0
HCM Lane LOS	A	A	-	F	D	A	A
HCM 95th %tile Q(veh)	0	-	-	10.8	1.1	0	-

Lanes, Volumes, Timings

AM Peak w/ Improvements

4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

02/25/2019



Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations												
Traffic Volume (vph)	4	0	17	1	351	547	12	0	474	13	377	6
Future Volume (vph)	4	0	17	1	351	547	12	0	474	13	377	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	11	10	10	10	10	10	13	13
Grade (%)		2%				-1%			2%			
Storage Length (ft)		0	0		0		0	75		0	0	
Storage Lanes		1	0		1		0	1		0	1	
Taper Length (ft)		25			25			25				
Right Turn on Red				No			No					No
Link Speed (mph)		25			25			25				
Link Distance (ft)		350			317			418				
Travel Time (s)		9.5			8.6			11.4				
Lane Group Flow (vph)	0	24	0	0	386	614	0	0	535	0	421	0
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA		Perm	
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2		1	
Detector Phase	8	8			6	6		2	2		1	
Switch Phase												
Minimum Initial (s)	3.0	3.0			20.0	20.0		20.0	20.0		20.0	
Minimum Split (s)	11.0	11.0			27.0	27.0		27.0	27.0		27.0	
Total Split (s)	16.0	16.0			36.0	64.0		28.0	28.0		36.0	
Total Split (%)	20.0%	20.0%			45.0%	80.0%		35.0%	35.0%		45.0%	
Maximum Green (s)	8.0	8.0			29.0	57.0		21.0	21.0		29.0	
Yellow Time (s)	5.0	5.0			4.0	4.0		4.0	4.0		4.0	
All-Red Time (s)	3.0	3.0			3.0	3.0		3.0	3.0		3.0	
Lost Time Adjust (s)		-5.0			-4.5	-4.5		0.0	-4.5		-4.5	
Total Lost Time (s)		3.0			2.5	2.5		7.0	2.5		2.5	
Lead/Lag					Lead			Lag	Lag		Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0		3.0	
Recall Mode	None	None			C-Max	C-Max		Max	Max		C-Max	
Act Effct Green (s)		12.9			61.6	61.6		25.5	25.5		33.6	
Actuated g/C Ratio		0.16			0.77	0.77		0.32	0.32		0.42	
v/c Ratio		0.10			0.45	0.60		0.56	0.56		0.63	
Control Delay		29.8			5.1	7.0		17.2	17.2		23.6	
Queue Delay		0.0			0.0	0.0		0.0	0.0		0.0	
Total Delay		29.8			5.1	7.0		17.2	17.2		23.6	
LOS		C			A	A		B	B		C	
Approach Delay		29.8				6.3		17.2	17.2			
Approach LOS		C				A		B	B			
Queue Length 50th (ft)		10			44	123		72	72		162	
Queue Length 95th (ft)		31			87	216		103	103		259	
Internal Link Dist (ft)		270				237		338	338			
Turn Bay Length (ft)												
Base Capacity (vph)		243			849	1018		956	956		666	
Starvation Cap Reductn		0			0	0		0	0		0	
Spillback Cap Reductn		0			0	0		0	0		0	
Storage Cap Reductn		0			0	0		0	0		0	



Lane Group	NEL2	NEL	NER	NER2
Lane Configurations				
Traffic Volume (vph)	20	61	17	34
Future Volume (vph)	20	61	17	34
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12
Grade (%)		-1%		
Storage Length (ft)		0	0	
Storage Lanes		1	0	
Taper Length (ft)		25		
Right Turn on Red				No
Link Speed (mph)		25		
Link Distance (ft)		393		
Travel Time (s)		10.7		
Lane Group Flow (vph)	0	145	0	0
Turn Type	Perm	Perm		
Protected Phases				
Permitted Phases	4	4		
Detector Phase	4	4		
Switch Phase				
Minimum Initial (s)	3.0	3.0		
Minimum Split (s)	11.0	11.0		
Total Split (s)	16.0	16.0		
Total Split (%)	20.0%	20.0%		
Maximum Green (s)	8.0	8.0		
Yellow Time (s)	5.0	5.0		
All-Red Time (s)	3.0	3.0		
Lost Time Adjust (s)		-5.0		
Total Lost Time (s)		3.0		
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0		
Recall Mode	None	None		
Act Effct Green (s)		12.9		
Actuated g/C Ratio		0.16		
v/c Ratio		0.55		
Control Delay		39.6		
Queue Delay		0.0		
Total Delay		39.6		
LOS		D		
Approach Delay		39.6		
Approach LOS		D		
Queue Length 50th (ft)		67		
Queue Length 95th (ft)		125		
Internal Link Dist (ft)		313		
Turn Bay Length (ft)				
Base Capacity (vph)		266		
Starvation Cap Reductn		0		
Spillback Cap Reductn		0		
Storage Cap Reductn		0		

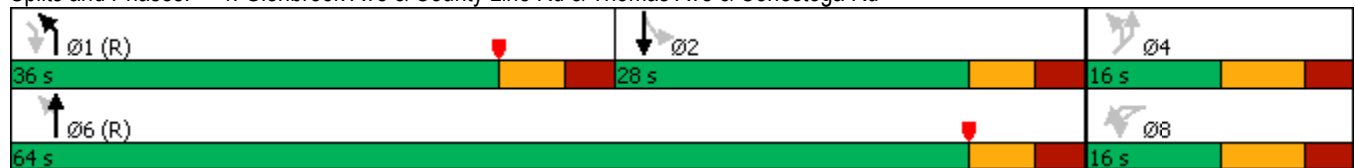


Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SER	SER2
Reduced v/c Ratio		0.10			0.45	0.60			0.56		0.63	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	47 (59%), Referenced to phase 1:NBL and 6:NBTL, Start of Yellow
Natural Cycle:	65
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	15.0
Intersection LOS:	B
Intersection Capacity Utilization	72.5%
ICU Level of Service	C
Analysis Period (min)	15

Splits and Phases: 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd





Lane Group	NEL2	NEL	NER	NER2
Reduced v/c Ratio		0.55		
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

AM Peak w/ Improvements
 02/25/2019



Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations												
Traffic Volume (vph)	4	0	17	1	351	547	12	0	474	13	377	6
Future Volume (vph)	4	0	17	1	351	547	12	0	474	13	377	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	11	10	10	10	10	10	13	13
Grade (%)		2%				-1%			2%			
Total Lost time (s)		3.0			2.5	2.5			2.5		2.5	
Lane Util. Factor		1.00			1.00	*0.81			0.95		1.00	
Frt		0.89			1.00	1.00			1.00		0.86	
Flt Protected		0.99			0.95	1.00			1.00		1.00	
Satd. Flow (prot)		1497			1613	1322			3002		1586	
Flt Permitted		0.99			0.29	1.00			1.00		1.00	
Satd. Flow (perm)		1497			491	1322			3002		1586	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	4	0	19	1	386	601	13	0	521	14	414	7
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	24	0	0	386	614	0	0	535	0	421	0
Heavy Vehicles (%)	0%	0%	6%	0%	3%	3%	8%	0%	5%	0%	2%	0%
Parking (#/hr)												
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA		Perm	
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2		1	
Actuated Green, G (s)		7.9			57.1	57.1			21.0		29.1	
Effective Green, g (s)		12.9			61.6	61.6			25.5		33.6	
Actuated g/C Ratio		0.16			0.77	0.77			0.32		0.42	
Clearance Time (s)		8.0			7.0	7.0			7.0		7.0	
Vehicle Extension (s)		3.0			3.0	3.0			3.0		3.0	
Lane Grp Cap (vph)		241			849	1017			956		666	
v/s Ratio Prot					0.19	c0.46			0.18			
v/s Ratio Perm		0.02			0.16						c0.27	
v/c Ratio		0.10			0.45	0.60			0.56		0.63	
Uniform Delay, d1		28.6			4.1	4.0			22.6		18.3	
Progression Factor		1.00			1.00	1.00			0.65		1.00	
Incremental Delay, d2		0.2			1.8	2.7			2.2		4.5	
Delay (s)		28.8			5.8	6.6			16.9		22.8	
Level of Service		C			A	A			B		C	
Approach Delay (s)		28.8				6.3			16.9			
Approach LOS		C				A			B			
Intersection Summary												
HCM 2000 Control Delay			14.3		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			80.0		Sum of lost time (s)					13.0		
Intersection Capacity Utilization			72.5%		ICU Level of Service					C		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

AM Peak w/ Improvements
 02/25/2019



Movement	NEL2	NEL	NER	NER2
Lane Configurations				
Traffic Volume (vph)	20	61	17	34
Future Volume (vph)	20	61	17	34
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width	12	12	12	12
Grade (%)		-1%		
Total Lost time (s)		3.0		
Lane Util. Factor		1.00		
Frt		0.95		
Flt Protected		0.97		
Satd. Flow (prot)		1639		
Flt Permitted		0.97		
Satd. Flow (perm)		1639		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91
Adj. Flow (vph)	22	67	19	37
RTOR Reduction (vph)	0	0	0	0
Lane Group Flow (vph)	0	145	0	0
Heavy Vehicles (%)	5%	0%	0%	3%
Parking (#/hr)			0	
Turn Type	Perm	Perm		
Protected Phases				
Permitted Phases	4	4		
Actuated Green, G (s)		7.9		
Effective Green, g (s)		12.9		
Actuated g/C Ratio		0.16		
Clearance Time (s)		8.0		
Vehicle Extension (s)		3.0		
Lane Grp Cap (vph)		264		
v/s Ratio Prot				
v/s Ratio Perm		c0.09		
v/c Ratio		0.55		
Uniform Delay, d1		30.9		
Progression Factor		1.00		
Incremental Delay, d2		2.3		
Delay (s)		33.2		
Level of Service		C		
Approach Delay (s)		33.2		
Approach LOS		C		
Intersection Summary				

Intersection						
Int Delay, s/veh	0.1					
Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	1034	24	5	915	0	0
Future Vol, veh/h	1034	24	5	915	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	12	0	4	0	0
Mvmt Flow	1088	25	5	963	0	0
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	1113	0	1593	557
Stage 1	-	-	-	-	1101	-
Stage 2	-	-	-	-	492	-
Critical Hdwy	-	-	4.1	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	635	-	100	479
Stage 1	-	-	-	-	284	-
Stage 2	-	-	-	-	586	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	635	-	98	479
Mov Cap-2 Maneuver	-	-	-	-	98	-
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	586	-
Approach	NB	SB	SW			
HCM Control Delay, s	0	0.2	0			
HCM LOS				A		
Minor Lane/Major Mvmt	NBT	NBR	SBL	SBT/SWLn1		
Capacity (veh/h)	-	-	635	-		
HCM Lane V/C Ratio	-	-	0.008	-		
HCM Control Delay (s)	-	-	10.7	0.1	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0	-		

Lanes, Volumes, Timings
 6: County Line Rd & Old Lancaster Rd

AM Peak w/ Improvements
 02/25/2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	148	886	0	274	641
Future Volume (vph)	0	148	886	0	274	641
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	15	15	10	10	10	10
Link Speed (mph)	30		25			25
Link Distance (ft)	236		497			259
Travel Time (s)	5.4		13.6			7.1
Lane Group Flow (vph)	0	156	933	0	288	675
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	71.9% ICU Level of Service C
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	3.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↘		↖	↗
Traffic Vol, veh/h	0	148	886	0	274	641
Future Vol, veh/h	0	148	886	0	274	641
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	33	2	3	0	1	4
Mvmt Flow	0	156	933	0	288	675

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	933	0	0	933
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	4.11
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	2.209
Pot Cap-1 Maneuver	0	323	-	-	738
Stage 1	0	-	-	-	-
Stage 2	0	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	-	323	-	-	738
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.1	0	3.9
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	323	738
HCM Lane V/C Ratio	-	-	0.482	0.391
HCM Control Delay (s)	-	-	26.1	13
HCM Lane LOS	-	-	D	B
HCM 95th %tile Q(veh)	-	-	2.5	1.9



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	15	7	898	41	19	650
Future Volume (vph)	15	7	898	41	19	650
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	13	13	10	10	10	10
Link Speed (mph)	25		25			25
Link Distance (ft)	325		494			497
Travel Time (s)	8.9		13.5			13.6
Lane Group Flow (vph)	23	0	988	0	0	704
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.5%
Analysis Period (min)	15
	ICU Level of Service B

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	7	898	41	19	650
Future Vol, veh/h	15	7	898	41	19	650
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	3	0	0	4
Mvmt Flow	16	7	945	43	20	684

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1691	967	0	0	988
Stage 1	967	-	-	-	-
Stage 2	724	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	104	311	-	-	708
Stage 1	372	-	-	-	-
Stage 2	484	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	99	311	-	-	708
Mov Cap-2 Maneuver	228	-	-	-	-
Stage 1	355	-	-	-	-
Stage 2	484	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.9	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	249	708
HCM Lane V/C Ratio	-	-	0.093	0.028
HCM Control Delay (s)	-	-	20.9	10.2
HCM Lane LOS	-	-	C	B
HCM 95th %tile Q(veh)	-	-	0.3	0.1

Lanes, Volumes, Timings
8: County Line Rd & Lindsay Ave

AM Peak w/ Improvements
02/25/2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	11	8	944	50	4	646
Future Volume (vph)	11	8	944	50	4	646
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	16	16	10	10	10	10
Storage Length (ft)	0	0		0	75	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		25			25
Link Distance (ft)	311		164			494
Travel Time (s)	8.5		4.5			13.5
Lane Group Flow (vph)	19	0	1035	0	4	673
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Detector Phase	4		6		2	2
Switch Phase						
Minimum Initial (s)	3.0		15.0		15.0	15.0
Minimum Split (s)	10.0		21.0		21.0	21.0
Total Split (s)	15.0		45.0		45.0	45.0
Total Split (%)	25.0%		75.0%		75.0%	75.0%
Maximum Green (s)	8.0		39.0		39.0	39.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	3.0		2.0		2.0	2.0
Lost Time Adjust (s)	-3.5		-3.5		0.0	-3.5
Total Lost Time (s)	3.5		2.5		6.0	2.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		C-Max	C-Max
Act Effct Green (s)	9.7		56.6		55.9	56.6
Actuated g/C Ratio	0.16		0.94		0.93	0.94
v/c Ratio	0.08		0.68		0.02	0.44
Control Delay	17.2		15.8		2.5	2.5
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	17.2		15.8		2.5	2.5
LOS	B		B		A	A
Approach Delay	17.2		15.8			2.5
Approach LOS	B		B			A
Queue Length 50th (ft)	3		388		0	0
Queue Length 95th (ft)	19		#652		3	157
Internal Link Dist (ft)	231		84			414
Turn Bay Length (ft)					75	
Base Capacity (vph)	290		1531		221	1523
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	34
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.07		0.68		0.02	0.45

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 39 (65%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 10.6 Intersection LOS: B
 Intersection Capacity Utilization 65.6% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 8: County Line Rd & Lindsay Ave



HCM Signalized Intersection Capacity Analysis
8: County Line Rd & Lindsay Ave

AM Peak w/ Improvements
02/25/2019



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	11	8	944	50	4	646
Future Volume (vph)	11	8	944	50	4	646
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	16	16	10	10	10	10
Total Lost time (s)	3.5		2.5		6.0	2.5
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.94		0.99		1.00	1.00
Flt Protected	0.97		1.00		0.95	1.00
Satd. Flow (prot)	1482		1622		1064	1615
Flt Permitted	0.97		1.00		0.21	1.00
Satd. Flow (perm)	1482		1622		238	1615
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	8	983	52	4	673
RTOR Reduction (vph)	7	0	2	0	0	0
Lane Group Flow (vph)	12	0	1033	0	4	673
Heavy Vehicles (%)	27%	25%	3%	0%	50%	4%
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Actuated Green, G (s)	1.5		45.5		45.5	45.5
Effective Green, g (s)	5.0		49.0		45.5	49.0
Actuated g/C Ratio	0.08		0.82		0.76	0.82
Clearance Time (s)	7.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	123		1324		180	1318
v/s Ratio Prot	c0.01		c0.64			0.42
v/s Ratio Perm					0.02	
v/c Ratio	0.09		0.78		0.02	0.51
Uniform Delay, d1	25.4		2.8		1.8	1.7
Progression Factor	1.00		6.59		1.00	1.00
Incremental Delay, d2	0.3		4.3		0.2	1.4
Delay (s)	25.7		22.6		2.0	3.1
Level of Service	C		C		A	A
Approach Delay (s)	25.7		22.6			3.1
Approach LOS	C		C			A

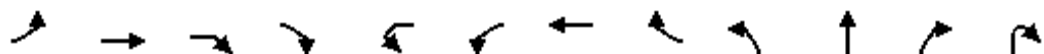
Intersection Summary

HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9: County Line Rd & Railroad Ave & Bryn Mawr Ave

AM Peak w/ Improvements
02/25/2019



Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	148	322	47	96	4	60	283	64	121	818	108	6
Future Volume (vph)	148	322	47	96	4	60	283	64	121	818	108	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	15	11	12	12	12	11	11	13	10	10	10	10
Storage Length (ft)	140		0			180		160	70		0	
Storage Lanes	1		0			1		1	1		0	
Taper Length (ft)	25					25			25			
Right Turn on Red				Yes				Yes				Yes
Link Speed (mph)		40					30			25		
Link Distance (ft)		547					508			361		
Travel Time (s)		9.3					11.5			9.8		
Lane Group Flow (vph)	156	489	0	0	0	67	298	67	127	981	0	0
Turn Type	pm+pt	NA			pm+pt	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	3	8			7	7	4		1	6		
Permitted Phases	8	8			4	4	4	4	6	6		
Detector Phase	3	8			7	7	4	4	1	6		
Switch Phase												
Minimum Initial (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0	10.0		
Minimum Split (s)	9.0	9.0			9.0	9.0	9.0	9.0	9.0	16.0		
Total Split (s)	12.0	55.0			12.0	12.0	55.0	55.0	12.0	41.0		
Total Split (%)	10.0%	45.8%			10.0%	10.0%	45.8%	45.8%	10.0%	34.2%		
Maximum Green (s)	6.0	49.0			6.0	6.0	49.0	49.0	6.0	35.0		
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0	3.0	4.0	4.0		
All-Red Time (s)	3.0	3.0			3.0	3.0	3.0	3.0	2.0	2.0		
Lost Time Adjust (s)	-3.5	-3.5			-3.5	-3.5	-3.5	-3.5	-3.5	-3.5		
Total Lost Time (s)	2.5	2.5			2.5	2.5	2.5	2.5	2.5	2.5		
Lead/Lag	Lead	Lag			Lead	Lead	Lag	Lag	Lead	Lag		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0	3.0		
Recall Mode	None	None			None	None	None	None	None	C-Max		
Act Effct Green (s)	51.8	44.2			51.3	41.8	41.8	60.2	50.4			
Actuated g/C Ratio	0.43	0.37			0.43	0.35	0.35	0.50	0.42			
v/c Ratio	0.39	0.80			0.26	0.50	0.11	0.44	0.77			
Control Delay	21.1	43.1			18.6	32.3	0.3	26.0	38.5			
Queue Delay	0.1	0.0			0.0	0.0	0.0	0.0	0.2			
Total Delay	21.1	43.1			18.6	32.3	0.3	26.0	38.7			
LOS	C	D			B	C	A	C	D			
Approach Delay		37.8					25.3		37.2			
Approach LOS		D					C		D			
Queue Length 50th (ft)	68	325			28	173	0	64	343			
Queue Length 95th (ft)	96	416			47	230	0	m77	m#482			
Internal Link Dist (ft)		467				428			281			
Turn Bay Length (ft)	140					180		160	70			
Base Capacity (vph)	400	721			256	746	768	289	1277			
Starvation Cap Reductn	0	0			0	0	0	0	35			
Spillback Cap Reductn	12	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.40	0.68			0.26	0.40	0.09	0.44	0.79			

Lanes, Volumes, Timings
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

AM Peak w/ Improvements
 02/25/2019

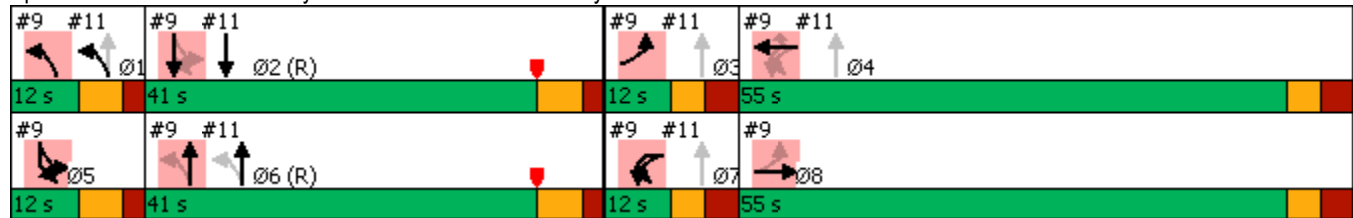


Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations		↔	↔	
Traffic Volume (vph)	45	19	447	103
Future Volume (vph)	45	19	447	103
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10
Storage Length (ft)		198		0
Storage Lanes		1		0
Taper Length (ft)		25		
Right Turn on Red				Yes
Link Speed (mph)			25	
Link Distance (ft)			198	
Travel Time (s)			5.4	
Lane Group Flow (vph)	0	67	579	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	5	5	2	
Permitted Phases	2	2	2	
Detector Phase	5	5	2	
Switch Phase				
Minimum Initial (s)	3.0	3.0	10.0	
Minimum Split (s)	9.0	9.0	16.0	
Total Split (s)	12.0	12.0	41.0	
Total Split (%)	10.0%	10.0%	34.2%	
Maximum Green (s)	6.0	6.0	35.0	
Yellow Time (s)	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	
Lost Time Adjust (s)		-3.5	-3.5	
Total Lost Time (s)		2.5	2.5	
Lead/Lag	Lead	Lead	Lag	
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	
Act Effct Green (s)		57.1	46.4	
Actuated g/C Ratio		0.48	0.39	
v/c Ratio		0.30	0.50	
Control Delay		29.2	3.7	
Queue Delay		0.3	0.1	
Total Delay		29.5	3.8	
LOS		C	A	
Approach Delay			6.4	
Approach LOS			A	
Queue Length 50th (ft)		10	0	
Queue Length 95th (ft)		m48	0	
Internal Link Dist (ft)			118	
Turn Bay Length (ft)		198		
Base Capacity (vph)		223	1155	
Starvation Cap Reductn		20	75	
Spillback Cap Reductn		0	0	
Storage Cap Reductn		0	0	
Reduced v/c Ratio		0.33	0.54	

Intersection Summary

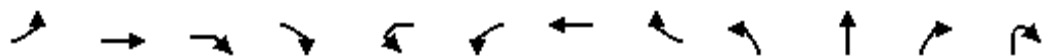
Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	35 (29%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
Natural Cycle:	75
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.80
Intersection Signal Delay:	28.5
Intersection LOS:	C
Intersection Capacity Utilization:	75.6%
ICU Level of Service:	D
Analysis Period (min):	15
#	95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: County Line Rd & Railroad Ave & Bryn Mawr Ave



HCM Signalized Intersection Capacity Analysis
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

AM Peak w/ Improvements
 02/25/2019



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	148	322	47	96	4	60	283	64	121	818	108	6
Future Volume (vph)	148	322	47	96	4	60	283	64	121	818	108	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	15	11	12	12	12	11	11	13	10	10	10	10
Total Lost time (s)	2.5	2.5					2.5	2.5	2.5	2.5		
Lane Util. Factor	1.00	1.00					1.00	1.00	1.00	1.00	0.95	
Fr _t	1.00	0.95					1.00	1.00	0.85	1.00	0.98	
Fl _t Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1775	1631					1653	1706	1581	1277	3041	
Fl _t Permitted	0.40	1.00					0.21	1.00	1.00	0.29	1.00	
Satd. Flow (perm)	738	1631					362	1706	1581	396	3041	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	156	339	49	101	4	63	298	67	127	861	114	6
RTOR Reduction (vph)	0	9	0	0	0	0	0	43	0	1	0	0
Lane Group Flow (vph)	156	480	0	0	0	67	298	24	127	980	0	0
Heavy Vehicles (%)	6%	2%	0%	2%	0%	0%	2%	0%	25%	3%	3%	9%
Turn Type	pm+pt	NA			pm+pt	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	3	8			7	7	4		1	6		
Permitted Phases	8	8			4	4	4	4	6	6		
Actuated Green, G (s)	46.7	40.7				44.3	39.5	39.5	53.3	44.4		
Effective Green, g (s)	53.7	44.2				51.3	43.0	43.0	60.0	47.9		
Actuated g/C Ratio	0.45	0.37				0.43	0.36	0.36	0.50	0.40		
Clearance Time (s)	6.0	6.0				6.0	6.0	6.0	6.0	6.0		
Vehicle Extension (s)	3.0	3.0				3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	412	600				244	611	566	289	1213		
v/s Ratio Prot	c0.03	c0.29				0.02	0.17		c0.05	c0.32		
v/s Ratio Perm	0.14					0.10		0.02	0.17			
v/c Ratio	0.38	0.80				0.27	0.49	0.04	0.44	0.81		
Uniform Delay, d1	21.0	33.9				23.2	29.9	25.1	17.9	32.0		
Progression Factor	1.00	1.00				1.00	1.00	1.00	1.19	1.09		
Incremental Delay, d2	0.6	7.5				0.6	0.6	0.0	0.4	2.5		
Delay (s)	21.6	41.5				23.8	30.6	25.1	21.8	37.5		
Level of Service	C	D				C	C	C	C	D		
Approach Delay (s)		36.7					28.7			35.7		
Approach LOS		D					C			D		

Intersection Summary

HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

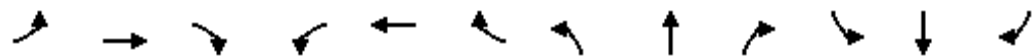
AM Peak w/ Improvements
 02/25/2019



Movement	SBL2	SBL	SBT	SBR
Lane Configurations		↔	↕↔	
Traffic Volume (vph)	45	19	447	103
Future Volume (vph)	45	19	447	103
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width	10	10	10	10
Total Lost time (s)		2.5	2.5	
Lane Util. Factor		1.00	0.95	
Fr _t		1.00	0.97	
Fl _t Protected		0.95	1.00	
Satd. Flow (prot)		1530	2952	
Fl _t Permitted		0.14	1.00	
Satd. Flow (perm)		223	2952	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	20	471	108
RTOR Reduction (vph)	0	0	15	0
Lane Group Flow (vph)	0	67	564	0
Heavy Vehicles (%)	4%	5%	4%	10%
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	5	5	2	
Permitted Phases	2	2	2	
Actuated Green, G (s)		47.7	41.6	
Effective Green, g (s)		54.7	45.1	
Actuated g/C Ratio		0.46	0.38	
Clearance Time (s)		6.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		206	1109	
v/s Ratio Prot		0.03	0.19	
v/s Ratio Perm		0.12		
v/c Ratio		0.33	0.51	
Uniform Delay, d ₁		21.3	28.9	
Progression Factor		1.39	0.08	
Incremental Delay, d ₂		0.8	1.4	
Delay (s)		30.5	3.7	
Level of Service		C	A	
Approach Delay (s)			6.5	
Approach LOS			A	
Intersection Summary				

Lanes, Volumes, Timings
10: County Line Rd & Landover Rd

AM Peak w/ Improvements
02/25/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	160	167	22	48	39	63	7	866	120	27	596	55
Future Volume (vph)	160	167	22	48	39	63	7	866	120	27	596	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	13	13	13	11	11	11	10	10	10	10	10	10
Storage Length (ft)	0		0	0		0	75		0	75		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			30			25				25
Link Distance (ft)		286			293			501				165
Travel Time (s)		5.6			6.7			13.7				4.5
Lane Group Flow (vph)	0	360	0	0	154	0	7	1017	0	28	671	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	40.0	40.0		40.0	40.0		80.0	80.0		80.0	80.0	
Total Split (s)	40.0	40.0		40.0	40.0		80.0	80.0		80.0	80.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		66.7%	66.7%		66.7%	66.7%	
Maximum Green (s)	35.0	35.0		35.0	35.0		75.0	75.0		75.0	75.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.5			-2.5		0.0	-2.5		0.0	-2.5	
Total Lost Time (s)		2.5			2.5		5.0	2.5		5.0	2.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		35.5			35.5		77.0	79.5		77.0	79.5	
Actuated g/C Ratio		0.30			0.30		0.64	0.66		0.64	0.66	
v/c Ratio		0.90			0.38		0.02	0.94		0.26	0.64	
Control Delay		66.6			28.7		8.9	36.8		10.9	10.3	
Queue Delay		0.0			0.0		0.0	12.4		0.0	1.6	
Total Delay		66.6			28.7		8.9	49.2		10.9	11.9	
LOS		E			C		A	D		B	B	
Approach Delay		66.6			28.7			49.0			11.9	
Approach LOS		E			C			D			B	
Queue Length 50th (ft)		259			72		2	683		5	100	
Queue Length 95th (ft)		#431			133		8	#1045		m9	126	
Internal Link Dist (ft)		206			213			421			85	
Turn Bay Length (ft)							75			75		
Base Capacity (vph)		421			426		318	1077		108	1055	
Starvation Cap Reductn		0			0		0	0		0	217	
Spillback Cap Reductn		0			1		0	74		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.86			0.36		0.02	1.01		0.26	0.80	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 75 (63%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 38.8 Intersection LOS: D
 Intersection Capacity Utilization 89.2% ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: County Line Rd & Landover Rd



HCM 6th Signalized Intersection Summary
 10: County Line Rd & Landover Rd

AM Peak w/ Improvements
 02/25/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	160	167	22	48	39	63	7	866	120	27	596	55
Future Volume (veh/h)	160	167	22	48	39	63	7	866	120	27	596	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1872	1872	1872	1800	1800	1800	1800	1772	1772	1744	1744	1744
Adj Flow Rate, veh/h	165	172	23	49	40	65	7	893	124	28	614	57
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0	0	2	2	4	4	4
Cap, veh/h	232	205	27	143	121	164	571	1030	143	167	1063	99
Arrive On Green	0.26	0.28	0.26	0.26	0.28	0.28	0.66	0.68	0.68	1.00	1.00	1.00
Sat Flow, veh/h	669	727	95	366	431	583	779	1522	211	546	1572	146
Grp Volume(v), veh/h	360	0	0	154	0	0	7	0	1017	28	0	671
Grp Sat Flow(s),veh/h/ln	1491	0	0	1380	0	0	779	0	1734	546	0	1718
Q Serve(g_s), s	18.2	0.0	0.0	0.0	0.0	0.0	0.4	0.0	55.1	4.7	0.0	0.0
Cycle Q Clear(g_c), s	28.4	0.0	0.0	10.3	0.0	0.0	0.4	0.0	55.1	59.7	0.0	0.0
Prop In Lane	0.46		0.06	0.32		0.42	1.00		0.12	1.00		0.08
Lane Grp Cap(c), veh/h	433	0	0	400	0	0	571	0	1173	167	0	1162
V/C Ratio(X)	0.83	0.00	0.00	0.39	0.00	0.00	0.01	0.00	0.87	0.17	0.00	0.58
Avail Cap(c_a), veh/h	481	0	0	445	0	0	571	0	1173	167	0	1162
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	42.4	0.0	0.0	34.7	0.0	0.0	7.2	0.0	15.2	20.9	0.0	0.0
Incr Delay (d2), s/veh	10.9	0.0	0.0	0.6	0.0	0.0	0.0	0.0	8.7	2.1	0.0	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	17.5	0.0	0.0	6.9	0.0	0.0	0.1	0.0	30.7	1.2	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.3	0.0	0.0	35.3	0.0	0.0	7.2	0.0	23.9	23.0	0.0	2.1
LnGrp LOS	D	A	A	D	A	A	A	A	C	C	A	A
Approach Vol, veh/h		360			154			1024				699
Approach Delay, s/veh		53.3			35.3			23.8				2.9
Approach LOS		D			D			C				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		83.7		36.3		83.7		36.3				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		75.0		35.0		75.0		35.0				
Max Q Clear Time (g_c+I1), s		57.1		30.4		61.7		12.3				
Green Ext Time (p_c), s		8.6		0.9		4.4		0.9				
Intersection Summary												
HCM 6th Ctrl Delay				22.8								
HCM 6th LOS				C								

Lanes, Volumes, Timings
11: County Line Rd & Glenbrook Ave

AM Peak w/ Improvements
02/25/2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3	Ø4	Ø5	Ø7	Ø8
Lane Configurations				↑↑	↑↑						
Traffic Volume (vph)	0	0	41	1030	614	12					
Future Volume (vph)	0	0	41	1030	614	12					
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800					
Lane Width (ft)	12	12	10	10	10	12					
Right Turn on Red		Yes				Yes					
Link Speed (mph)	30			25	25						
Link Distance (ft)	228			198	176						
Travel Time (s)	5.2			5.4	4.8						
Lane Group Flow (vph)	0	0	0	1127	659	0					
Turn Type			pm+pt	NA	NA						
Protected Phases			1	6	2		3	4	5	7	8
Permitted Phases			6	1 3 4 7	2						
Detector Phase			1	6	2						
Switch Phase											
Minimum Initial (s)			3.0	10.0	10.0		3.0	3.0	3.0	3.0	3.0
Minimum Split (s)			9.0	16.0	16.0		9.0	9.0	9.0	9.0	9.0
Total Split (s)			12.0	41.0	41.0		12.0	55.0	12.0	12.0	55.0
Total Split (%)			10.0%	34.2%	34.2%		10%	46%	10%	10%	46%
Maximum Green (s)			6.0	35.0	35.0		6.0	49.0	6.0	6.0	49.0
Yellow Time (s)			4.0	4.0	4.0		3.0	3.0	4.0	3.0	3.0
All-Red Time (s)			2.0	2.0	2.0		3.0	3.0	2.0	3.0	3.0
Lost Time Adjust (s)				-3.5	-3.5						
Total Lost Time (s)				2.5	2.5						
Lead/Lag			Lead	Lag	Lag		Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)			3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode			None	C-Max	C-Max		None	None	None	None	None
Act Effct Green (s)				116.0	46.4						
Actuated g/C Ratio				0.97	0.39						
v/c Ratio				0.39	0.56						
Control Delay				0.9	31.8						
Queue Delay				0.9	0.6						
Total Delay				1.8	32.4						
LOS				A	C						
Approach Delay				1.8	32.4						
Approach LOS				A	C						
Queue Length 50th (ft)				0	227						
Queue Length 95th (ft)				7	257						
Internal Link Dist (ft)	148			118	96						
Turn Bay Length (ft)											
Base Capacity (vph)				2882	1184						
Starvation Cap Reductn				1378	221						
Spillback Cap Reductn				495	0						
Storage Cap Reductn				0	0						
Reduced v/c Ratio				0.75	0.68						

Intersection Summary

Area Type: Other

HCM Signalized Intersection Capacity Analysis
11: County Line Rd & Glenbrook Ave

AM Peak w/ Improvements
02/25/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	
Traffic Volume (vph)	0	0	41	1030	614	12
Future Volume (vph)	0	0	41	1030	614	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	10	10	10	12
Total Lost time (s)				2.5	2.5	
Lane Util. Factor				0.95	0.95	
Fr _t				1.00	1.00	
Fl _t Protected				1.00	1.00	
Satd. Flow (prot)				3123	3061	
Fl _t Permitted				0.92	1.00	
Satd. Flow (perm)				2874	3061	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	43	1084	646	13
RTOR Reduction (vph)	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	1127	658	0
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%
Turn Type			pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases			6	1 3 4 7	2	
Actuated Green, G (s)				110.8	41.6	
Effective Green, g (s)				117.5	45.1	
Actuated g/C Ratio				0.98	0.38	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				2913	1150	
v/s Ratio Prot				c0.15	c0.21	
v/s Ratio Perm				c0.22		
v/c Ratio				0.39	0.57	
Uniform Delay, d1				0.0	29.8	
Progression Factor				8.09	0.96	
Incremental Delay, d2				0.1	1.9	
Delay (s)				0.4	30.4	
Level of Service				A	C	
Approach Delay (s)	0.0			0.4	30.4	
Approach LOS	A			A	C	

Intersection Summary

HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1: County Line Road & Lancaster Ave

PM Peak w/ Improvements
02/25/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕			↕	
Traffic Volume (vph)	8	774	704	16	543	15	485	13	13	7	16	14
Future Volume (vph)	8	774	704	16	543	15	485	13	13	7	16	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25				25
Link Distance (ft)		497			631			170				160
Travel Time (s)		13.6			17.2			4.6				4.4
Lane Group Flow (vph)	0	1564	0	0	605	0	271	268	0	0	39	0
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	29.0	29.0		29.0	29.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	36.0	36.0		36.0	36.0		11.0	11.0		10.0	10.0	
Total Split (s)	42.0	42.0		42.0	42.0		17.0	17.0		21.0	21.0	
Total Split (%)	52.5%	52.5%		52.5%	52.5%		21.3%	21.3%		26.3%	26.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		2.0	2.0	
Lost Time Adjust (s)		-4.5			-4.5		-4.5	-4.5			-4.5	
Total Lost Time (s)		2.5			2.5		2.5	2.5			1.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		None	None		None	None		None	None	
Act Effct Green (s)		44.7			44.7		22.0	22.0				11.4
Actuated g/C Ratio		0.56			0.56		0.28	0.28				0.14
v/c Ratio		0.89			0.40		0.62	0.63				0.16
Control Delay		21.1			12.2		33.0	33.3				22.4
Queue Delay		0.0			0.0		0.0	0.0				0.0
Total Delay		21.1			12.2		33.0	33.3				22.4
LOS		C			B		C	C				C
Approach Delay		21.1			12.2			33.1				22.4
Approach LOS		C			B			C				C
Queue Length 50th (ft)		307			97		122	120				11
Queue Length 95th (ft)		#497			138		#218	#229				36
Internal Link Dist (ft)		417			551			90				80
Turn Bay Length (ft)												
Base Capacity (vph)		1762			1516		437	425				403
Starvation Cap Reductn		0			0		0	0				0
Spillback Cap Reductn		0			0		0	0				0
Storage Cap Reductn		0			0		0	0				0
Reduced v/c Ratio		0.89			0.40		0.62	0.63				0.10

Intersection Summary

Area Type: Other
Cycle Length: 80

Lanes, Volumes, Timings
 1: County Line Road & Lancaster Ave

PM Peak w/ Improvements

02/25/2019

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 21.5

Intersection LOS: C

Intersection Capacity Utilization 81.1%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.


















Splits and Phases: 1: County Line Road & Lancaster Ave



HCM Signalized Intersection Capacity Analysis
1: County Line Road & Lancaster Ave

PM Peak w/ Improvements

02/25/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	774	704	16	543	15	485	13	13	7	16	14
Future Volume (vph)	8	774	704	16	543	15	485	13	13	7	16	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Total Lost time (s)		2.5			2.5		2.5	2.5				1.5
Lane Util. Factor		0.95			0.95		0.95	0.95				1.00
Frt		0.93			1.00		1.00	0.99				0.95
Flt Protected		1.00			1.00		0.95	0.96				0.99
Satd. Flow (prot)		2979			3292		1592	1540				1610
Flt Permitted		0.95			0.82		0.95	0.96				0.99
Satd. Flow (perm)		2836			2711		1592	1540				1610
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	815	741	17	572	16	511	14	14	7	17	15
RTOR Reduction (vph)	0	189	0	0	2	0	0	2	0	0	13	0
Lane Group Flow (vph)	0	1375	0	0	603	0	271	266	0	0	26	0
Heavy Vehicles (%)	0%	1%	1%	0%	2%	0%	1%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)		37.8			37.8		17.5	17.5				4.7
Effective Green, g (s)		42.3			42.3		22.0	22.0				9.2
Actuated g/C Ratio		0.53			0.53		0.28	0.28				0.11
Clearance Time (s)		7.0			7.0		7.0	7.0				6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0				3.0
Lane Grp Cap (vph)		1499			1433		437	423				185
v/s Ratio Prot							0.17	c0.17				c0.02
v/s Ratio Perm		c0.48			0.22							
v/c Ratio		0.92			0.42		0.62	0.63				0.14
Uniform Delay, d1		17.2			11.4		25.3	25.4				31.8
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		10.4			0.2		2.7	2.9				0.3
Delay (s)		27.6			11.6		28.1	28.3				32.2
Level of Service		C			B		C	C				C
Approach Delay (s)		27.6			11.6			28.2				32.2
Approach LOS		C			B			C				C
Intersection Summary												
HCM 2000 Control Delay			24.3				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			80.0				Sum of lost time (s)			11.0		
Intersection Capacity Utilization			81.1%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: County Line Road & Montrose Ave

PM Peak w/ Improvements

02/26/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	26	60	68	23	36	9	22	436	33	7	710	38
Future Volume (vph)	26	60	68	23	36	9	22	436	33	7	710	38
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	14	14	14	14	14	14	10	10	10	10	10	10
Storage Length (ft)	0		0	0		0	75		0	75		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		456			431			492			667	
Travel Time (s)		12.4			11.8			13.4			18.2	
Lane Group Flow (vph)	0	172	0	0	76	0	24	521	0	8	831	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		25.0	25.0		29.0	29.0	
Total Split (s)	30.0	30.0		30.0	30.0		45.0	45.0		45.0	45.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0			7.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effect Green (s)		10.8			10.8		51.2	51.2		51.2	51.2	
Actuated g/C Ratio		0.14			0.14		0.68	0.68		0.68	0.68	
v/c Ratio		0.61			0.34		0.08	0.46		0.02	0.74	
Control Delay		29.0			28.3		5.8	7.0		5.3	14.2	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		29.0			28.3		5.8	7.0		5.3	14.2	
LOS		C			C		A	A		A	B	
Approach Delay		29.0			28.3			7.0			14.1	
Approach LOS		C			C			A			B	
Queue Length 50th (ft)		51			28		3	86		1	205	
Queue Length 95th (ft)		102			60		m11	153		6	#531	
Internal Link Dist (ft)		376			351			412			587	
Turn Bay Length (ft)							75			75		
Base Capacity (vph)		536			470		291	1124		501	1128	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.32			0.16		0.08	0.46		0.02	0.74	

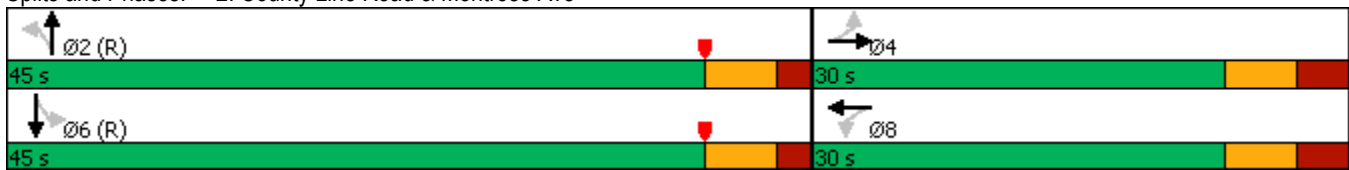
Intersection Summary

Lanes, Volumes, Timings
 2: County Line Road & Montrose Ave

PM Peak w/ Improvements
 02/26/2019

Area Type: Other
 Cycle Length: 75
 Actuated Cycle Length: 75
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 13.9 Intersection LOS: B
 Intersection Capacity Utilization 63.0% ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: County Line Road & Montrose Ave



HCM 6th Signalized Intersection Summary
2: County Line Road & Montrose Ave

















PM Peak w/ Improvements
02/26/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	26	60	68	23	36	9	22	436	33	7	710	38
Future Volume (veh/h)	26	60	68	23	36	9	22	436	33	7	710	38
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1828	1828	1828	1872	1872	1872	1800	1786	1786	1800	1786	1786
Adj Flow Rate, veh/h	29	67	76	26	40	10	24	484	37	8	789	42
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	0	0	0	0	1	1	0	1	1
Cap, veh/h	81	101	99	118	154	32	375	1130	86	713	1160	62
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	1.00	1.00	1.00	0.69	0.69	0.69
Sat Flow, veh/h	180	737	726	393	1130	231	671	1638	125	895	1680	89
Grp Volume(v), veh/h	172	0	0	76	0	0	24	0	521	8	0	831
Grp Sat Flow(s),veh/h/ln	1642	0	0	1753	0	0	671	0	1763	895	0	1770
Q Serve(g_s), s	4.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.2	0.0	20.6
Cycle Q Clear(g_c), s	7.5	0.0	0.0	2.8	0.0	0.0	21.7	0.0	0.0	0.2	0.0	20.6
Prop In Lane	0.17		0.44	0.34		0.13	1.00		0.07	1.00		0.05
Lane Grp Cap(c), veh/h	281	0	0	304	0	0	375	0	1217	713	0	1221
V/C Ratio(X)	0.61	0.00	0.00	0.25	0.00	0.00	0.06	0.00	0.43	0.01	0.00	0.68
Avail Cap(c_a), veh/h	555	0	0	576	0	0	375	0	1217	713	0	1221
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.2	0.0	0.0	29.2	0.0	0.0	4.3	0.0	0.0	3.6	0.0	6.8
Incr Delay (d2), s/veh	2.2	0.0	0.0	0.4	0.0	0.0	0.3	0.0	1.1	0.0	0.0	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.6	0.0	0.0	2.2	0.0	0.0	0.3	0.0	0.7	0.1	0.0	11.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.3	0.0	0.0	29.6	0.0	0.0	4.6	0.0	1.1	3.7	0.0	9.9
LnGrp LOS	C	A	A	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		172			76			545				839
Approach Delay, s/veh		33.3			29.6			1.3				9.8
Approach LOS		C			C			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		57.8		17.2		57.8		17.2				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		39.0		23.0		39.0		23.0				
Max Q Clear Time (g_c+I1), s		23.7		9.5		22.6		4.8				
Green Ext Time (p_c), s		3.4		0.8		6.1		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				10.4								
HCM 6th LOS				B								

Lanes, Volumes, Timings
 3: County Line Road & Roberts Rd

PM Peak w/ Improvements
 02/26/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	37	14	13	31	9	0	537	27	4	494	91
Future Volume (vph)	33	37	14	13	31	9	0	537	27	4	494	91
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	10	10	10	10	10	10
Storage Length (ft)	0		0	0		0	75		0	75		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		268			463			418			492	
Travel Time (s)		7.3			12.6			11.4			13.4	
Lane Group Flow (vph)	0	89	0	0	57	0	0	600	0	0	627	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.4%
ICU Level of Service	A
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	33	37	14	13	31	9	0	537	27	4	494	91
Future Vol, veh/h	33	37	14	13	31	9	0	537	27	4	494	91
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	12	0	7	0	0	0	0	4	0	0	2	4
Mvmt Flow	35	39	15	14	33	10	0	571	29	4	526	97

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1190	1183	575	1196	1217	586	623	0	0	600	0	0
Stage 1	583	583	-	586	586	-	-	-	-	-	-	-
Stage 2	607	600	-	610	631	-	-	-	-	-	-	-
Critical Hdwy	7.22	6.5	6.27	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.22	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.22	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.608	4	3.363	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	157	191	508	164	182	514	968	-	-	987	-	-
Stage 1	481	502	-	500	500	-	-	-	-	-	-	-
Stage 2	467	493	-	485	477	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	132	190	508	133	181	514	968	-	-	987	-	-
Mov Cap-2 Maneuver	132	190	-	133	181	-	-	-	-	-	-	-
Stage 1	481	499	-	500	500	-	-	-	-	-	-	-
Stage 2	428	493	-	431	474	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	44		32.8		0		0.1	
HCM LOS	E		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	968	-	-	178	185	987	-	-
HCM Lane V/C Ratio	-	-	-	0.502	0.305	0.004	-	-
HCM Control Delay (s)	0	-	-	44	32.8	8.7	0	-
HCM Lane LOS	A	-	-	E	D	A	A	-
HCM 95th %tile Q(veh)	0	-	-	2.5	1.2	0	-	-

Lanes, Volumes, Timings

PM Peak w/ Improvements

4: Glenbrook Ave & County Line Road & Thomas Ave & Conestoga Rd

02/25/2019









Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Traffic Volume (vph)	80	11	14	4	367	418	23	5	591	19	3	388
Future Volume (vph)	80	11	14	4	367	418	23	5	591	19	3	388
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Storage Length (ft)		0	0		0		0	75		0		0
Storage Lanes		1	0		1		0	1		0		1
Taper Length (ft)		25			25			25				
Right Turn on Red				No			No				No	
Link Speed (mph)		25				25			25			
Link Distance (ft)		350				317			418			
Travel Time (s)		9.5				8.6			11.4			
Lane Group Flow (vph)	0	116	0	0	390	469	0	5	652	0	0	440
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA			Perm
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2			1
Detector Phase	8	8			6	6		2	2			1
Switch Phase												
Minimum Initial (s)	3.0	3.0			20.0	20.0		20.0	20.0			20.0
Minimum Split (s)	12.0	12.0			27.0	27.0		27.0	27.0			27.0
Total Split (s)	12.0	12.0			27.0	63.0		36.0	36.0			27.0
Total Split (%)	16.0%	16.0%			36.0%	84.0%		48.0%	48.0%			36.0%
Yellow Time (s)	5.0	5.0			4.0	4.0		4.0	4.0			4.0
All-Red Time (s)	3.0	3.0			3.0	3.0		3.0	3.0			3.0
Lost Time Adjust (s)		-5.0			-4.5	-4.5		0.0	-4.5			-4.5
Total Lost Time (s)		3.0			2.5	2.5		7.0	2.5			2.5
Lead/Lag					Lead			Lag	Lag			Lead
Lead-Lag Optimize?												
Recall Mode	None	None			None	C-Max		C-Max	C-Max			None
Act Effct Green (s)		9.0			62.9	63.4		31.4	35.9			24.5
Actuated g/C Ratio		0.12			0.84	0.85		0.42	0.48			0.33
v/c Ratio		0.62			0.48	0.42		0.02	0.43			0.84
Control Delay		48.0			4.2	3.2		16.6	12.8			40.4
Queue Delay		0.0			0.0	0.0		0.0	0.0			0.0
Total Delay		48.0			4.2	3.2		16.6	12.8			40.4
LOS		D			A	A		B	B			D
Approach Delay		48.0				3.7			12.8			
Approach LOS		D				A			B			
Queue Length 50th (ft)		52			30	53		1	68			188
Queue Length 95th (ft)		#120			61	91		m4	121			#345
Internal Link Dist (ft)		270				237			338			
Turn Bay Length (ft)								75				
Base Capacity (vph)		186			810	1123		310	1502			523
Starvation Cap Reductn		0			0	0		0	0			0
Spillback Cap Reductn		0			0	0		0	0			0
Storage Cap Reductn		0			0	0		0	0			0
Reduced v/c Ratio		0.62			0.48	0.42		0.02	0.43			0.84

Intersection Summary

Area Type:	Other
Cycle Length:	75
Actuated Cycle Length:	75
Offset:	0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
Natural Cycle:	70
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.84
Intersection Signal Delay:	18.7
Intersection LOS:	B
Intersection Capacity Utilization:	69.9%
ICU Level of Service:	C
Analysis Period (min)	15
#	95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Glenbrook Ave & County Line Road & Thomas Ave & Conestoga Rd

 Ø1 27 s	 Ø2 (R) 36 s	 Ø4 12 s
 Ø6 (R) 63 s	 Ø2 (R) 36 s	 Ø8 12 s



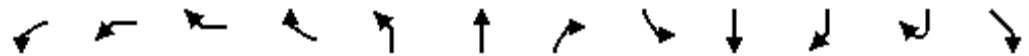
Lane Group	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Traffic Volume (vph)	25	22	29	19	49
Future Volume (vph)	25	22	29	19	49
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width (ft)	13	12	12	12	12
Grade (%)			-1%		
Storage Length (ft)			0	0	
Storage Lanes			1	0	
Taper Length (ft)			25		
Right Turn on Red	No				No
Link Speed (mph)			25		
Link Distance (ft)			393		
Travel Time (s)			10.7		
Lane Group Flow (vph)	0	0	126	0	0
Turn Type		Perm	Perm		
Protected Phases					
Permitted Phases		4	4		
Detector Phase		4	4		
Switch Phase					
Minimum Initial (s)		3.0	3.0		
Minimum Split (s)		12.0	12.0		
Total Split (s)		12.0	12.0		
Total Split (%)		16.0%	16.0%		
Yellow Time (s)		5.0	5.0		
All-Red Time (s)		3.0	3.0		
Lost Time Adjust (s)			-5.0		
Total Lost Time (s)			3.0		
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode		None	None		
Act Effct Green (s)			9.0		
Actuated g/C Ratio			0.12		
v/c Ratio			0.65		
Control Delay			49.1		
Queue Delay			0.0		
Total Delay			49.1		
LOS			D		
Approach Delay			49.1		
Approach LOS			D		
Queue Length 50th (ft)			57		
Queue Length 95th (ft)			#130		
Internal Link Dist (ft)			313		
Turn Bay Length (ft)					
Base Capacity (vph)			194		
Starvation Cap Reductn			0		
Spillback Cap Reductn			0		
Storage Cap Reductn			0		
Reduced v/c Ratio			0.65		

HCM Signalized Intersection Capacity Analysis

PM Peak w/ Improvements

4: Glenbrook Ave & County Line Road & Thomas Ave & Conestoga Rd

02/25/2019



Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Traffic Volume (vph)	80	11	14	4	367	418	23	5	591	19	3	388
Future Volume (vph)	80	11	14	4	367	418	23	5	591	19	3	388
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Total Lost time (s)		3.0			2.5	2.5		7.0	2.5			2.5
Lane Util. Factor		1.00			1.00	*0.81		1.00	0.95			1.00
Frt		0.98			1.00	0.99		1.00	0.99			0.86
Flt Protected		0.96			0.95	1.00		0.95	1.00			1.00
Satd. Flow (prot)		1557			1661	1329		1580	3139			1602
Flt Permitted		0.96			0.30	1.00		0.45	1.00			1.00
Satd. Flow (perm)		1557			522	1329		742	3139			1602
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	85	12	15	4	390	445	24	5	629	20	3	413
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	116	0	0	390	469	0	5	652	0	0	440
Heavy Vehicles (%)	9%	0%	0%	25%	0%	2%	4%	0%	0%	5%	0%	1%
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA			Perm
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2			1
Actuated Green, G (s)		3.2			56.8	56.8		29.8	29.8			20.0
Effective Green, g (s)		8.2			61.3	61.3		29.8	34.3			24.5
Actuated g/C Ratio		0.11			0.82	0.82		0.40	0.46			0.33
Clearance Time (s)		8.0			7.0	7.0		7.0	7.0			7.0
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0			3.0
Lane Grp Cap (vph)		170			798	1086		294	1435			523
v/s Ratio Prot					0.16	0.35			0.21			
v/s Ratio Perm		0.07			c0.24			0.01				c0.27
v/c Ratio		0.68			0.49	0.43		0.02	0.45			0.84
Uniform Delay, d1		32.1			3.0	1.9		13.7	13.9			23.4
Progression Factor		1.00			1.00	1.00		1.14	0.87			1.00
Incremental Delay, d2		10.7			0.5	1.3		0.1	0.9			11.7
Delay (s)		42.9			3.5	3.2		15.7	12.9			35.1
Level of Service		D			A	A		B	B			D
Approach Delay (s)		42.9				3.3			13.0			
Approach LOS		D				A			B			

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & County Line Road & Thomas Ave & Conestoga Rd

PM Peak w/ Improvements

02/25/2019



Movement	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Traffic Volume (vph)	25	22	29	19	49
Future Volume (vph)	25	22	29	19	49
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width	13	12	12	12	12
Grade (%)			-1%		
Total Lost time (s)			3.0		
Lane Util. Factor			1.00		
Frt			0.92		
Flt Protected			0.98		
Satd. Flow (prot)			1621		
Flt Permitted			0.98		
Satd. Flow (perm)			1621		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	27	23	31	20	52
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	0	0	126	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	2%
Turn Type		Perm	Perm		
Protected Phases					
Permitted Phases		4	4		
Actuated Green, G (s)			3.2		
Effective Green, g (s)			8.2		
Actuated g/C Ratio			0.11		
Clearance Time (s)			8.0		
Vehicle Extension (s)			3.0		
Lane Grp Cap (vph)			177		
v/s Ratio Prot					
v/s Ratio Perm			c0.08		
v/c Ratio			0.71		
Uniform Delay, d1			32.3		
Progression Factor			1.00		
Incremental Delay, d2			12.7		
Delay (s)			44.9		
Level of Service			D		
Approach Delay (s)			44.9		
Approach LOS			D		
Intersection Summary					

Lanes, Volumes, Timings
 5: County Line Road & S Warner Ave

PM Peak w/ Improvements
 02/26/2019

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑			↖↖		
Traffic Volume (vph)	651	31	14	1117	0	0
Future Volume (vph)	651	31	14	1117	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10	10	10
Link Speed (mph)	25			25	25	
Link Distance (ft)	259			317	333	
Travel Time (s)	7.1			8.6	9.1	
Lane Group Flow (vph)	733	0	0	1216	0	0
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	46.3%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	0.2					
Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	651	31	14	1117	0	0
Future Vol, veh/h	651	31	14	1117	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	1	3	2	1	0	0
Mvmt Flow	700	33	15	1201	0	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	733	0	1348 367
Stage 1	-	-	-	-	717 -
Stage 2	-	-	-	-	631 -
Critical Hdwy	-	-	4.14	-	6.8 6.9
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	-	-	2.22	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	868	-	145 636
Stage 1	-	-	-	-	450 -
Stage 2	-	-	-	-	498 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	868	-	137 636
Mov Cap-2 Maneuver	-	-	-	-	137 -
Stage 1	-	-	-	-	427 -
Stage 2	-	-	-	-	498 -

Approach	NB	SB	SW
HCM Control Delay, s	0	0.3	0
HCM LOS			A

Minor Lane/Major Mvmt	NBT	NBR	SBL	SBT	SWLn1
Capacity (veh/h)	-	-	868	-	-
HCM Lane V/C Ratio	-	-	0.017	-	-
HCM Control Delay (s)	-	-	9.2	0.2	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	-	-

Lanes, Volumes, Timings
 6: County Line Road & Old Lancaster Rd

PM Peak w/ Improvements
 02/26/2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	255	651	3	127	990
Future Volume (vph)	0	255	651	3	127	990
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	15	15	10	10	10	10
Link Speed (mph)	25		25			25
Link Distance (ft)	236		497			259
Travel Time (s)	6.4		13.6			7.1
Lane Group Flow (vph)	0	274	703	0	137	1065
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.7%
Analysis Period (min)	15
	ICU Level of Service B

Intersection						
Int Delay, s/veh	3.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↘		↗	↘
Traffic Vol, veh/h	0	255	651	3	127	990
Future Vol, veh/h	0	255	651	3	127	990
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	1	1	0	2	1
Mvmt Flow	0	274	700	3	137	1065

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	702	0	0	703
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.21	-	-	4.12
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.309	-	-	2.218
Pot Cap-1 Maneuver	0	440	-	-	895
Stage 1	0	-	-	-	-
Stage 2	0	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	-	440	-	-	895
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.8	0	1.1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	440	895
HCM Lane V/C Ratio	-	-	0.623	0.153
HCM Control Delay (s)	-	-	25.8	9.7
HCM Lane LOS	-	-	D	A
HCM 95th %tile Q(veh)	-	-	4.1	0.5



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	18	17	661	5	4	1063
Future Volume (vph)	18	17	661	5	4	1063
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	13	13	10	10	10	10
Link Speed (mph)	25		25			25
Link Distance (ft)	325		494			497
Travel Time (s)	8.9		13.5			13.6
Lane Group Flow (vph)	37	0	701	0	0	1123
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	72.4%
Analysis Period (min)	15
	ICU Level of Service C

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	18	17	661	5	4	1063
Future Vol, veh/h	18	17	661	5	4	1063
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	10	0	1	20	0	1
Mvmt Flow	19	18	696	5	4	1119

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1826	699	0	0	701	0
Stage 1	699	-	-	-	-	-
Stage 2	1127	-	-	-	-	-
Critical Hdwy	6.5	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	81	443	-	-	905	-
Stage 1	479	-	-	-	-	-
Stage 2	298	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	80	443	-	-	905	-
Mov Cap-2 Maneuver	200	-	-	-	-	-
Stage 1	473	-	-	-	-	-
Stage 2	298	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	273	905
HCM Lane V/C Ratio	-	-	0.135	0.005
HCM Control Delay (s)	-	-	20.2	9
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.5	0

Lanes, Volumes, Timings
8: County Line Road & Lindsay Ave

PM Peak w/ Improvements
02/25/2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	6	650	1	1	1060
Future Volume (vph)	9	6	650	1	1	1060
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	16	16	10	10	10	10
Storage Length (ft)	0	0		0	50	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		25			25
Link Distance (ft)	311		170			494
Travel Time (s)	8.5		4.6			13.5
Lane Group Flow (vph)	15	0	685	0	1	1116
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Detector Phase	4		6		2	2
Switch Phase						
Minimum Initial (s)	3.0		15.0		15.0	15.0
Minimum Split (s)	10.0		21.0		21.0	21.0
Total Split (s)	20.0		40.0		40.0	40.0
Total Split (%)	33.3%		66.7%		66.7%	66.7%
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-3.5		-3.5		0.0	-3.5
Total Lost Time (s)	2.5		2.5		6.0	2.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max		C-Max	C-Max
Act Effct Green (s)	9.5		56.9		56.2	56.9
Actuated g/C Ratio	0.16		0.95		0.94	0.95
v/c Ratio	0.05		0.44		0.00	0.71
Control Delay	17.6		5.5		2.0	6.7
Queue Delay	0.0		0.0		0.0	5.3
Total Delay	17.6		5.5		2.0	12.0
LOS	B		A		A	B
Approach Delay	17.6		5.5			12.0
Approach LOS	B		A			B
Queue Length 50th (ft)	3		81		0	0
Queue Length 95th (ft)	16		340		1	#599
Internal Link Dist (ft)	231		90			414
Turn Bay Length (ft)					50	
Base Capacity (vph)	550		1562		587	1578
Starvation Cap Reductn	0		27		0	0
Spillback Cap Reductn	0		0		0	395
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.03		0.45		0.00	0.94

Intersection Summary

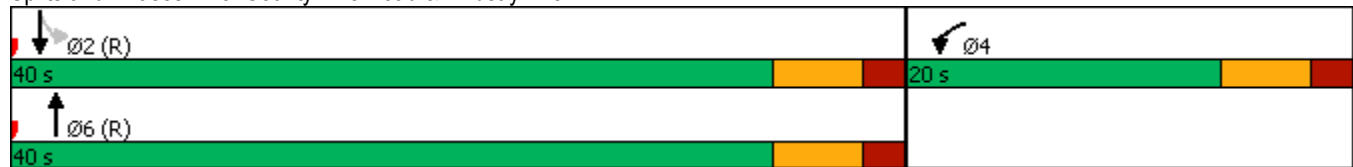
Lanes, Volumes, Timings
 8: County Line Road & Lindsay Ave

PM Peak w/ Improvements

02/25/2019

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 9.6 Intersection LOS: A
 Intersection Capacity Utilization 68.9% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 8: County Line Road & Lindsay Ave



HCM Signalized Intersection Capacity Analysis
8: County Line Road & Lindsay Ave

PM Peak w/ Improvements
02/25/2019



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	6	650	1	1	1060
Future Volume (vph)	9	6	650	1	1	1060
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	16	16	10	10	10	10
Total Lost time (s)	2.5		2.5		6.0	2.5
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.95		1.00		1.00	1.00
Flt Protected	0.97		1.00		0.95	1.00
Satd. Flow (prot)	1874		1647		1596	1663
Flt Permitted	0.97		1.00		0.37	1.00
Satd. Flow (perm)	1874		1647		627	1663
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	6	684	1	1	1116
RTOR Reduction (vph)	6	0	0	0	0	0
Lane Group Flow (vph)	9	0	685	0	1	1116
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Actuated Green, G (s)	1.4		46.6		46.6	46.6
Effective Green, g (s)	4.9		50.1		46.6	50.1
Actuated g/C Ratio	0.08		0.84		0.78	0.84
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	153		1375		486	1388
v/s Ratio Prot	c0.01		0.42			c0.67
v/s Ratio Perm					0.00	
v/c Ratio	0.06		0.50		0.00	0.80
Uniform Delay, d1	25.4		1.4		1.5	2.5
Progression Factor	1.00		4.37		1.00	1.00
Incremental Delay, d2	0.2		1.3		0.0	5.0
Delay (s)	25.6		7.4		1.5	7.5
Level of Service	C		A		A	A
Approach Delay (s)	25.6		7.4			7.5
Approach LOS	C		A			A

Intersection Summary

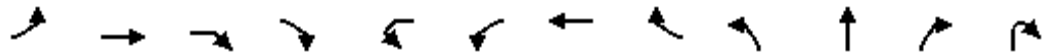
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9: County Line Road & Railroad Ave & Bryn Mawr Ave

PM Peak w/ Improvements

02/25/2019



Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	99	241	46	137	6	207	365	71	104	511	73	4
Future Volume (vph)	99	241	46	137	6	207	365	71	104	511	73	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	15	11	12	12	12	11	11	13	10	10	10	10
Storage Length (ft)	140		0			185		160	70		0	
Storage Lanes	1		0			1		1	1		0	
Taper Length (ft)	25					25			25			
Right Turn on Red				Yes				Yes				Yes
Link Speed (mph)		40					30			25		
Link Distance (ft)		547					508			338		
Travel Time (s)		9.3					11.5			9.2		
Lane Group Flow (vph)	100	427	0	0	0	215	369	72	105	594	0	0
Turn Type	pm+pt	NA			pm+pt	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	3	8			7	7	4		1	6		
Permitted Phases	8	8			4	4	4	4	6	6		
Detector Phase	3	8			7	7	4	4	1	6		
Switch Phase												
Minimum Initial (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0	10.0		
Minimum Split (s)	9.0	10.0			9.0	9.0	10.0	10.0	9.0	16.0		
Total Split (s)	14.0	47.0			14.0	14.0	47.0	47.0	12.0	47.0		
Total Split (%)	11.7%	39.2%			11.7%	11.7%	39.2%	39.2%	10.0%	39.2%		
Yellow Time (s)	3.0	4.0			3.0	3.0	4.0	4.0	3.0	3.0		
All-Red Time (s)	3.0	2.0			3.0	3.0	2.0	2.0	3.0	3.0		
Lost Time Adjust (s)	-3.5	-3.5					-3.5	-3.5	-3.5	-3.5		
Total Lost Time (s)	2.5	2.5					2.5	2.5	2.5	2.5		
Lead/Lag	Lead	Lag			Lead	Lead	Lag	Lag	Lead	Lag		
Lead-Lag Optimize?												
Recall Mode	None	None			None	None	None	None	None	C-Max		
Act Effct Green (s)	49.4	38.2					49.9	38.4	38.4	61.5	52.4	
Actuated g/C Ratio	0.41	0.32					0.42	0.32	0.32	0.51	0.44	
v/c Ratio	0.29	0.81					0.79	0.66	0.12	0.46	0.44	
Control Delay	21.0	47.5					43.4	40.8	0.4	25.1	22.7	
Queue Delay	0.0	0.0					0.0	0.0	0.0	0.0	0.0	
Total Delay	21.0	47.5					43.4	40.8	0.4	25.1	22.7	
LOS	C	D					D	D	A	C	C	
Approach Delay		42.4						37.2			23.1	
Approach LOS		D						D			C	
Queue Length 50th (ft)	45	284					104	243	0	32	129	
Queue Length 95th (ft)	73	387					#159	328	0	m82	m195	
Internal Link Dist (ft)		467						428			258	
Turn Bay Length (ft)	140						185		160	70		
Base Capacity (vph)	354	612					272	645	665	226	1353	
Starvation Cap Reductn	0	0					0	0	0	0	0	
Spillback Cap Reductn	0	1					0	0	0	0	0	
Storage Cap Reductn	0	0					0	0	0	0	0	
Reduced v/c Ratio	0.28	0.70					0.79	0.57	0.11	0.46	0.44	

Intersection Summary

Lanes, Volumes, Timings
 9: County Line Road & Railroad Ave & Bryn Mawr Ave

PM Peak w/ Improvements

02/25/2019



Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations		↔	↕↔	
Traffic Volume (vph)	37	26	921	71
Future Volume (vph)	37	26	921	71
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width (ft)	10	10	10	12
Storage Length (ft)		198		0
Storage Lanes		1		0
Taper Length (ft)		25		
Right Turn on Red				Yes
Link Speed (mph)			25	
Link Distance (ft)			198	
Travel Time (s)			5.4	
Lane Group Flow (vph)	0	63	1002	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	5	5	2	
Permitted Phases	2	2	2	
Detector Phase	5	5	2	
Switch Phase				
Minimum Initial (s)	3.0	3.0	10.0	
Minimum Split (s)	9.0	9.0	16.0	
Total Split (s)	12.0	12.0	47.0	
Total Split (%)	10.0%	10.0%	39.2%	
Yellow Time (s)	3.0	3.0	4.0	
All-Red Time (s)	3.0	3.0	2.0	
Lost Time Adjust (s)		-3.5	-3.5	
Total Lost Time (s)		2.5	2.5	
Lead/Lag	Lead	Lead	Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	C-Max	
Act Effct Green (s)		59.5	49.3	
Actuated g/C Ratio		0.50	0.41	
v/c Ratio		0.17	0.78	
Control Delay		6.2	8.9	
Queue Delay		0.2	13.9	
Total Delay		6.4	22.8	
LOS		A	C	
Approach Delay			21.8	
Approach LOS			C	
Queue Length 50th (ft)		2	0	
Queue Length 95th (ft)		m8	1	
Internal Link Dist (ft)			118	
Turn Bay Length (ft)		198		
Base Capacity (vph)		365	1285	
Starvation Cap Reductn		76	53	
Spillback Cap Reductn		0	282	
Storage Cap Reductn		0	0	
Reduced v/c Ratio		0.22	1.00	

Intersection Summary

Lanes, Volumes, Timings
 9: County Line Road & Railroad Ave & Bryn Mawr Ave

PM Peak w/ Improvements

02/25/2019

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 41 (34%), Referenced to phase 2:SBTL and 6:NBTl, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 29.2

Intersection LOS: C

Intersection Capacity Utilization 86.3%

ICU Level of Service E

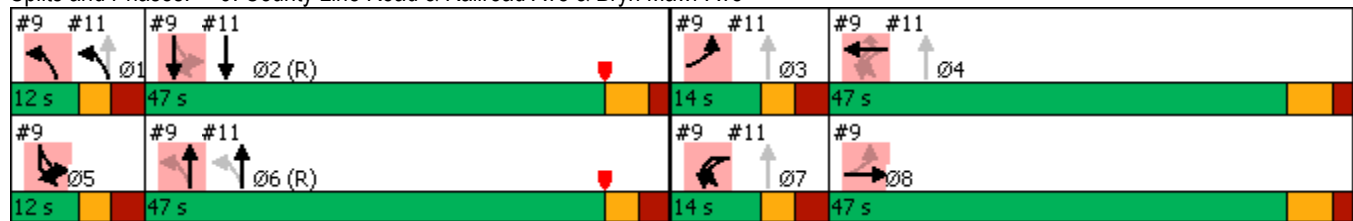
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

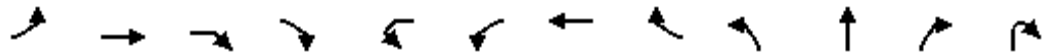
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: County Line Road & Railroad Ave & Bryn Mawr Ave



HCM Signalized Intersection Capacity Analysis
 9: County Line Road & Railroad Ave & Bryn Mawr Ave

PM Peak w/ Improvements
 02/25/2019



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	99	241	46	137	6	207	365	71	104	511	73	4
Future Volume (vph)	99	241	46	137	6	207	365	71	104	511	73	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	15	11	12	12	12	11	11	13	10	10	10	10
Total Lost time (s)	2.5	2.5					2.5	2.5	2.5	2.5		
Lane Util. Factor	1.00	1.00					1.00	1.00	1.00	1.00	0.95	
Fr _t	1.00	0.94					1.00	1.00	0.85	1.00	0.98	
Fl _t Protected	0.95	1.00					0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1862	1614					1653	1740	1565	1535	3098	
Fl _t Permitted	0.28	1.00					0.20	1.00	1.00	0.13	1.00	
Satd. Flow (perm)	552	1614					355	1740	1565	203	3098	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	100	243	46	138	6	209	369	72	105	516	74	4
RTOR Reduction (vph)	0	16	0	0	0	0	0	49	0	1	0	0
Lane Group Flow (vph)	100	411	0	0	0	215	369	23	105	593	0	0
Heavy Vehicles (%)	1%	0%	2%	2%	0%	0%	0%	1%	4%	1%	1%	0%
Turn Type	pm+pt	NA			pm+pt	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	3	8			7	7	4		1		6	
Permitted Phases	8	8			4	4	4	4	6		6	
Actuated Green, G (s)	42.5	34.7				42.9	34.9	34.9	55.2		47.7	
Effective Green, g (s)	49.5	38.2				49.9	38.4	38.4	62.2		51.2	
Actuated g/C Ratio	0.41	0.32				0.42	0.32	0.32	0.52		0.43	
Clearance Time (s)	6.0	6.0				6.0	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0				3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	351	513				272	556	500	227		1321	
v/s Ratio Prot	0.03	c0.25				c0.08	0.21		c0.04		0.19	
v/s Ratio Perm	0.09					0.25		0.01	0.20			
v/c Ratio	0.28	0.80				0.79	0.66	0.05	0.46		0.45	
Uniform Delay, d1	23.4	37.4				26.5	35.2	28.2	19.4		24.4	
Progression Factor	1.00	1.00				1.00	1.00	1.00	1.20		0.85	
Incremental Delay, d2	0.4	8.8				14.4	3.0	0.0	1.2		0.9	
Delay (s)	23.9	46.2				40.9	38.2	28.2	24.5		21.7	
Level of Service	C	D				D	D	C	C		C	
Approach Delay (s)		42.0					38.0				22.1	
Approach LOS		D					D				C	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: County Line Road & Railroad Ave & Bryn Mawr Ave

PM Peak w/ Improvements
 02/25/2019



Movement	SBL2	SBL	SBT	SBR
Lane Configurations		↵	↕↵	
Traffic Volume (vph)	37	26	921	71
Future Volume (vph)	37	26	921	71
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width	10	10	10	12
Total Lost time (s)		2.5	2.5	
Lane Util. Factor		1.00	0.95	
Fr _t		1.00	0.99	
Fl _t Protected		0.95	1.00	
Satd. Flow (prot)		1568	3120	
Fl _t Permitted		0.34	1.00	
Satd. Flow (perm)		562	3120	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99
Adj. Flow (vph)	37	26	930	72
RTOR Reduction (vph)	0	0	5	0
Lane Group Flow (vph)	0	63	997	0
Heavy Vehicles (%)	3%	0%	1%	4%
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	5	5	2	
Permitted Phases	2	2	2	
Actuated Green, G (s)		51.4	45.8	
Effective Green, g (s)		58.4	49.3	
Actuated g/C Ratio		0.49	0.41	
Clearance Time (s)		6.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		349	1281	
v/s Ratio Prot		0.01	c0.32	
v/s Ratio Perm		0.07		
v/c Ratio		0.18	0.78	
Uniform Delay, d ₁		16.9	30.6	
Progression Factor		0.34	0.18	
Incremental Delay, d ₂		0.1	2.6	
Delay (s)		5.9	8.0	
Level of Service		A	A	
Approach Delay (s)			7.9	
Approach LOS			A	
Intersection Summary				

Lanes, Volumes, Timings
10: County Line Road & Landover Rd/County Line Rd

PM Peak w/ Improvements
02/26/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	101	56	29	117	188	42	26	582	56	25	1049	222
Future Volume (vph)	101	56	29	117	188	42	26	582	56	25	1049	222
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	13	13	13	11	11	11	10	10	10	10	10	10
Storage Length (ft)	0		0	0		0	75		0	75		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			35			25				25
Link Distance (ft)		286			293			501				188
Travel Time (s)		5.6			5.7			13.7				5.1
Lane Group Flow (vph)	0	196	0	0	365	0	27	672	0	26	1338	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6		6
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		10.0	10.0		10.0		10.0
Minimum Split (s)	40.0	40.0		40.0	40.0		80.0	80.0		80.0		80.0
Total Split (s)	40.0	40.0		40.0	40.0		80.0	80.0		80.0		80.0
Total Split (%)	33.3%	33.3%		33.3%	33.3%		66.7%	66.7%		66.7%		66.7%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)		-3.5			-3.5		0.0	-3.5		0.0		-3.5
Total Lost Time (s)		2.5			2.5		6.0	2.5		6.0		2.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max		C-Max
Act Effct Green (s)		35.7			35.7		75.8	79.3		75.8		79.3
Actuated g/C Ratio		0.30			0.30		0.63	0.66		0.63		0.66
v/c Ratio		0.60			0.88		0.49	0.62		0.08		1.24
Control Delay		42.9			62.6		47.8	15.1		5.3		131.3
Queue Delay		0.0			0.0		0.0	0.0		0.0		0.4
Total Delay		42.9			62.6		47.8	15.1		5.3		131.7
LOS		D			E		D	B		A		F
Approach Delay		42.9			62.6			16.4				129.3
Approach LOS		D			E			B				F
Queue Length 50th (ft)		122			259		11	285		4		~1331
Queue Length 95th (ft)		205			#426		#64	407		m5		#1606
Internal Link Dist (ft)		206			213			421				108
Turn Bay Length (ft)							75			75		
Base Capacity (vph)		340			434		55	1086		309		1078
Starvation Cap Reductn		0			0		0	0		0		84
Spillback Cap Reductn		0			0		0	0		0		0
Storage Cap Reductn		0			0		0	0		0		0
Reduced v/c Ratio		0.58			0.84		0.49	0.62		0.08		1.35

Intersection Summary

Lanes, Volumes, Timings
 10: County Line Road & Landover Rd/County Line Rd

PM Peak w/ Improvements
 02/26/2019

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 74 (62%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.24
 Intersection Signal Delay: 83.5 Intersection LOS: F
 Intersection Capacity Utilization 100.8% ICU Level of Service G
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: County Line Road & Landover Rd/County Line Rd



HCM 6th Signalized Intersection Summary
 10: County Line Road & Landover Rd/County Line Rd

PM Peak w/ Improvements
 02/26/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	101	56	29	117	188	42	26	582	56	25	1049	222
Future Volume (veh/h)	101	56	29	117	188	42	26	582	56	25	1049	222
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1843	1843	1843	1800	1800	1800	1800	1786	1786	1800	1786	1786
Adj Flow Rate, veh/h	106	59	31	123	198	44	27	613	59	26	1104	234
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	0	0	0	0	1	1	0	1	1
Cap, veh/h	191	104	47	176	246	52	60	1068	103	394	951	202
Arrive On Green	0.26	0.29	0.26	0.26	0.29	0.28	0.64	0.67	0.66	1.00	1.00	1.00
Sat Flow, veh/h	494	356	160	464	841	179	415	1604	154	778	1429	303
Grp Volume(v), veh/h	196	0	0	365	0	0	27	0	672	26	0	1338
Grp Sat Flow(s),veh/h/ln	1009	0	0	1483	0	0	415	0	1758	778	0	1731
Q Serve(g_s), s	0.0	0.0	0.0	7.3	0.0	0.0	0.0	0.0	24.9	1.4	0.0	79.9
Cycle Q Clear(g_c), s	21.7	0.0	0.0	29.0	0.0	0.0	76.4	0.0	24.9	26.2	0.0	79.9
Prop In Lane	0.54		0.16	0.34		0.12	1.00		0.09	1.00		0.17
Lane Grp Cap(c), veh/h	312	0	0	431	0	0	60	0	1170	394	0	1153
V/C Ratio(X)	0.63	0.00	0.00	0.85	0.00	0.00	0.45	0.00	0.57	0.07	0.00	1.16
Avail Cap(c_a), veh/h	340	0	0	462	0	0	60	0	1170	394	0	1153
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.1	0.0	0.0	41.0	0.0	0.0	60.0	0.0	10.9	4.3	0.0	0.0
Incr Delay (d2), s/veh	3.2	0.0	0.0	13.0	0.0	0.0	22.5	0.0	2.1	0.3	0.0	82.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.6	0.0	0.0	18.1	0.0	0.0	2.2	0.0	15.1	0.4	0.0	39.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.4	0.0	0.0	54.0	0.0	0.0	82.5	0.0	12.9	4.6	0.0	82.3
LnGrp LOS	D	A	A	D	A	A	F	A	B	A	A	F
Approach Vol, veh/h		196			365			699				1364
Approach Delay, s/veh		41.4			54.0			15.6				80.8
Approach LOS		D			D			B				F
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		82.4		37.6		82.4		37.6				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		74.0		34.0		74.0		34.0				
Max Q Clear Time (g_c+I1), s		78.4		23.7		81.9		31.0				
Green Ext Time (p_c), s		0.0		0.8		0.0		0.6				
Intersection Summary												
HCM 6th Ctrl Delay				56.8								
HCM 6th LOS				E								

Lanes, Volumes, Timings
11: County Line Road & Glenbrook Ave

PM Peak w/ Improvements
02/25/2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3	Ø4	Ø5	Ø7	Ø8
Lane Configurations				↑↑	↑↑						
Traffic Volume (vph)	0	0	26	681	1055	7					
Future Volume (vph)	0	0	26	681	1055	7					
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800					
Lane Width (ft)	12	12	10	10	10	11					
Right Turn on Red		Yes				Yes					
Link Speed (mph)	35			25	25						
Link Distance (ft)	228			198	170						
Travel Time (s)	4.4			5.4	4.6						
Lane Group Flow (vph)	0	0	0	714	1073	0					
Turn Type			pm+pt	NA	NA						
Protected Phases			1	6	2		3	4	5	7	8
Permitted Phases			6	1 3 4 7	2						
Detector Phase			1	6	2						
Switch Phase											
Minimum Initial (s)			3.0	10.0	10.0		3.0	3.0	3.0	3.0	3.0
Minimum Split (s)			9.0	16.0	16.0		9.0	10.0	9.0	9.0	10.0
Total Split (s)			12.0	47.0	47.0		14.0	47.0	12.0	14.0	47.0
Total Split (%)			10.0%	39.2%	39.2%		12%	39%	10%	12%	39%
Yellow Time (s)			3.0	3.0	4.0		3.0	4.0	3.0	3.0	4.0
All-Red Time (s)			3.0	3.0	2.0		3.0	2.0	3.0	3.0	2.0
Lost Time Adjust (s)				-3.5	-3.5						
Total Lost Time (s)				2.5	2.5						
Lead/Lag			Lead	Lag	Lag		Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?											
Recall Mode			None	C-Max	C-Max		None	None	None	None	None
Act Effct Green (s)				115.4	49.3						
Actuated g/C Ratio				0.96	0.41						
v/c Ratio				0.25	0.83						
Control Delay				0.3	36.2						
Queue Delay				0.2	37.5						
Total Delay				0.5	73.8						
LOS				A	E						
Approach Delay				0.5	73.8						
Approach LOS				A	E						
Queue Length 50th (ft)				0	404						
Queue Length 95th (ft)				1	#542						
Internal Link Dist (ft)	148			118	90						
Turn Bay Length (ft)											
Base Capacity (vph)				2882	1297						
Starvation Cap Reductn				1302	297						
Spillback Cap Reductn				179	0						
Storage Cap Reductn				0	0						
Reduced v/c Ratio				0.45	1.07						

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120

Lanes, Volumes, Timings
 11: County Line Road & Glenbrook Ave

PM Peak w/ Improvements

02/25/2019

Offset: 41 (34%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 44.5

Intersection LOS: D

Intersection Capacity Utilization 43.2%

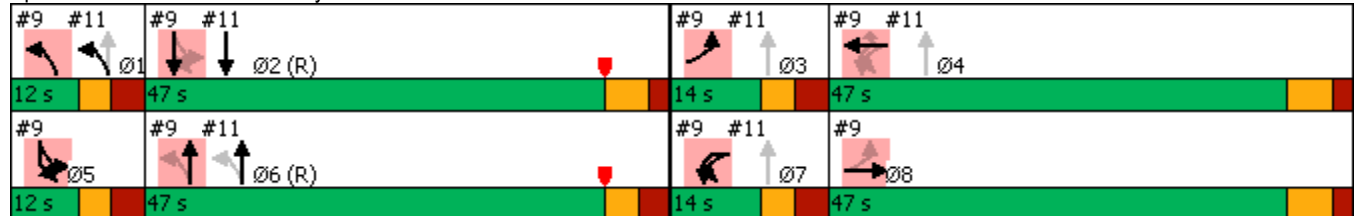
ICU Level of Service A

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 11: County Line Road & Glenbrook Ave



HCM Signalized Intersection Capacity Analysis
 11: County Line Road & Glenbrook Ave

PM Peak w/ Improvements
 02/25/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	
Traffic Volume (vph)	0	0	26	681	1055	7
Future Volume (vph)	0	0	26	681	1055	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	10	10	10	11
Total Lost time (s)				2.5	2.5	
Lane Util. Factor				0.95	0.95	
Fr _t				1.00	1.00	
Fl _t Protected				1.00	1.00	
Satd. Flow (prot)				3125	3157	
Fl _t Permitted				0.92	1.00	
Satd. Flow (perm)				2894	3157	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	0	26	688	1066	7
RTOR Reduction (vph)	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	714	1072	0
Heavy Vehicles (%)	0%	0%	1%	2%	1%	2%
Turn Type			pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases			6	1 3 4 7	2	
Actuated Green, G (s)				104.1	45.8	
Effective Green, g (s)				114.6	49.3	
Actuated g/C Ratio				0.95	0.41	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				2862	1297	
v/s Ratio Prot				c0.11	c0.34	
v/s Ratio Perm				c0.13		
v/c Ratio				0.25	0.83	
Uniform Delay, d ₁				0.2	31.5	
Progression Factor				0.96	0.95	
Incremental Delay, d ₂				0.0	4.5	
Delay (s)				0.2	34.6	
Level of Service				A	C	
Approach Delay (s)	0.0			0.2	34.6	
Approach LOS	A			A	C	


















Intersection Summary

HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1: County Line Rd & Lancaster Ave

SAT Peak w/ Improvements
02/25/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	536	366	12	551	27	427	27	18	13	12	13
Future Volume (vph)	21	536	366	12	551	27	427	27	18	13	12	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%			3%	
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		497			631			170			160	
Travel Time (s)		13.6			17.2			4.6			4.4	
Lane Group Flow (vph)	0	981	0	0	628	0	250	252	0	0	41	0
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	29.0	29.0		29.0	29.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		10.0	10.0		9.0	9.0	
Total Split (s)	42.0	42.0		42.0	42.0		17.0	17.0		21.0	21.0	
Total Split (%)	52.5%	52.5%		52.5%	52.5%		21.3%	21.3%		26.3%	26.3%	
Maximum Green (s)	36.0	36.0		36.0	36.0		11.0	11.0		16.0	16.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		2.0	2.0	
Lost Time Adjust (s)		-4.5			-3.5		-3.5	-3.5			-2.5	
Total Lost Time (s)		1.5			2.5		2.5	2.5			2.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	None		None	None		None	None	
Act Effct Green (s)		46.6			45.6		21.6	21.6			9.5	
Actuated g/C Ratio		0.58			0.57		0.27	0.27			0.12	
v/c Ratio		0.55			0.35		0.61	0.62			0.20	
Control Delay		9.6			11.2		32.4	32.7			25.3	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		9.6			11.2		32.4	32.7			25.3	
LOS		A			B		C	C			C	
Approach Delay		9.6			11.2			32.5			25.3	
Approach LOS		A			B			C			C	
Queue Length 50th (ft)		122			97		115	115			12	
Queue Length 95th (ft)		182			137		195	195			40	
Internal Link Dist (ft)		417			551			90			80	
Turn Bay Length (ft)												
Base Capacity (vph)		1776			1779		412	404			381	
Starvation Cap Reductn		0			0		0	0			0	
Spillback Cap Reductn		0			0		0	0			0	
Storage Cap Reductn		0			0		0	0			0	
Reduced v/c Ratio		0.55			0.35		0.61	0.62			0.11	
Intersection Summary												

Lanes, Volumes, Timings
 1: County Line Rd & Lancaster Ave

SAT Peak w/ Improvements
 02/25/2019

Area Type:	Other		
Cycle Length:	80		
Actuated Cycle Length:	80		
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle:	60		
Control Type:	Actuated-Coordinated		
Maximum v/c Ratio:	0.62		
Intersection Signal Delay:	15.7	Intersection LOS:	B
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		


















Splits and Phases: 1: County Line Rd & Lancaster Ave



HCM Signalized Intersection Capacity Analysis
1: County Line Rd & Lancaster Ave

SAT Peak w/ Improvements

02/25/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	536	366	12	551	27	427	27	18	13	12	13
Future Volume (vph)	21	536	366	12	551	27	427	27	18	13	12	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%			3%	
Total Lost time (s)		1.5			2.5		2.5	2.5			2.5	
Lane Util. Factor		0.95			0.95		0.95	0.95			1.00	
Frt		0.94			0.99		1.00	0.99			0.95	
Flt Protected		1.00			1.00		0.95	0.96			0.98	
Satd. Flow (prot)		3042			3345		1532	1492			1602	
Flt Permitted		0.93			0.93		0.95	0.96			0.98	
Satd. Flow (perm)		2848			3116		1532	1492			1602	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	22	570	389	13	586	29	454	29	19	14	13	14
RTOR Reduction (vph)	0	123	0	0	4	0	0	3	0	0	13	0
Lane Group Flow (vph)	0	858	0	0	624	0	250	249	0	0	28	0
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	5%	1%	1%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)		40.1			40.1		18.1	18.1			4.8	
Effective Green, g (s)		44.6			43.6		21.6	21.6			7.3	
Actuated g/C Ratio		0.56			0.55		0.27	0.27			0.09	
Clearance Time (s)		6.0			6.0		6.0	6.0			5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		1587			1698		413	402			146	
v/s Ratio Prot							0.16	c0.17			c0.02	
v/s Ratio Perm		c0.30			0.20							
v/c Ratio		0.54			0.37		0.61	0.62			0.19	
Uniform Delay, d1		11.2			10.4		25.5	25.6			33.6	
Progression Factor		1.00			1.00		1.01	1.01			1.00	
Incremental Delay, d2		1.3			0.1		2.4	2.7			0.7	
Delay (s)		12.5			10.5		28.1	28.5			34.3	
Level of Service		B			B		C	C			C	
Approach Delay (s)		12.5			10.5		28.3	28.3			34.3	
Approach LOS		B			B		C	C			C	
Intersection Summary												
HCM 2000 Control Delay			16.0				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			80.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			72.0%				ICU Level of Service			C		
Analysis Period (min)			15									
c	Critical Lane Group											

Lanes, Volumes, Timings
2: County Line Rd & Montrose Ave

SAT Peak w/ Improvements
02/25/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	25	41	15	20	21	17	4	446	29	6	332	21
Future Volume (vph)	25	41	15	20	21	17	4	446	29	6	332	21
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	14	14	14	14	14	14	10	10	10	10	10	10
Storage Length (ft)	0		0	0		0	75		0	75		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		456			431			492			667	
Travel Time (s)		12.4			11.8			13.4			18.2	
Lane Group Flow (vph)	0	87	0	0	61	0	4	505	0	6	375	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		24.0	24.0		24.0	24.0	
Total Split (s)	29.0	29.0		29.0	29.0		51.0	51.0		51.0	51.0	
Total Split (%)	36.3%	36.3%		36.3%	36.3%		63.8%	63.8%		63.8%	63.8%	
Maximum Green (s)	22.0	22.0		22.0	22.0		45.0	45.0		45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0			7.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		8.9			8.9		61.8	61.8		61.8	61.8	
Actuated g/C Ratio		0.11			0.11		0.77	0.77		0.77	0.77	
v/c Ratio		0.45			0.31		0.01	0.40		0.01	0.29	
Control Delay		34.9			28.3		3.8	4.8		1.0	2.2	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		34.9			28.3		3.8	4.8		1.0	2.2	
LOS		C			C		A	A		A	A	
Approach Delay		34.9			28.3			4.8			2.1	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)		35			20		0	70		0	11	
Queue Length 95th (ft)		74			52		m1	128		m0	16	
Internal Link Dist (ft)		376			351			412			587	
Turn Bay Length (ft)							75			75		
Base Capacity (vph)		459			455		699	1272		597	1275	
Starvation Cap Reductn		0			0		0	0		0	0	

Lanes, Volumes, Timings
 2: County Line Rd & Montrose Ave

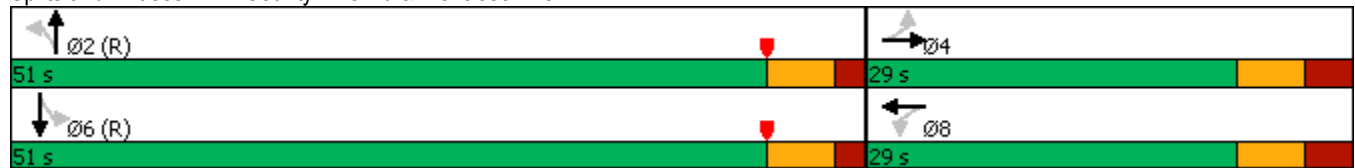


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.19			0.13		0.01	0.40		0.01	0.29	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle:	55
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.45
Intersection Signal Delay:	7.7
Intersection LOS:	A
Intersection Capacity Utilization	43.4%
ICU Level of Service	A
Analysis Period (min)	15
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 2: County Line Rd & Montrose Ave



HCM 6th Signalized Intersection Summary
2: County Line Rd & Montrose Ave

















SAT Peak w/ Improvements
02/25/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Volume (veh/h)	25	41	15	20	21	17	4	446	29	6	332	21
Future Volume (veh/h)	25	41	15	20	21	17	4	446	29	6	332	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1872	1872	1872	1872	1872	1872	1800	1786	1786	1800	1786	1786
Adj Flow Rate, veh/h	27	44	16	21	22	18	4	474	31	6	353	22
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	1	1	0	1	1
Cap, veh/h	91	73	24	94	58	38	806	1266	83	783	1270	79
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.07	1.00	1.00	1.00	0.76	0.76	0.76
Sat Flow, veh/h	427	990	319	447	781	514	1024	1658	108	908	1664	104
Grp Volume(v), veh/h	87	0	0	61	0	0	4	0	505	6	0	375
Grp Sat Flow(s),veh/h/ln	1736	0	0	1742	0	0	1024	0	1766	908	0	1767
Q Serve(g_s), s	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	5.1
Cycle Q Clear(g_c), s	3.8	0.0	0.0	2.6	0.0	0.0	5.1	0.0	0.0	0.1	0.0	5.1
Prop In Lane	0.31		0.18	0.34		0.30	1.00		0.06	1.00		0.06
Lane Grp Cap(c), veh/h	188	0	0	190	0	0	806	0	1349	783	0	1349
V/C Ratio(X)	0.46	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.37	0.01	0.00	0.28
Avail Cap(c_a), veh/h	522	0	0	513	0	0	806	0	1349	783	0	1349
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.0	0.0	0.0	35.5	0.0	0.0	0.2	0.0	0.0	2.3	0.0	2.8
Incr Delay (d2), s/veh	1.8	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.1	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.5	0.0	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.8	0.0	0.0	36.5	0.0	0.0	0.2	0.0	0.8	2.3	0.0	3.4
LnGrp LOS	D	A	A	D	A	A	A	A	A	A	A	A
Approach Vol, veh/h		87			61			509				381
Approach Delay, s/veh		37.8			36.5			0.8				3.3
Approach LOS		D			D			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		67.1		12.9		67.1		12.9				
Change Period (Y+Rc), s		6.0		7.0		6.0		7.0				
Max Green Setting (Gmax), s		45.0		22.0		45.0		22.0				
Max Q Clear Time (g_c+I1), s		7.1		5.8		7.1		4.6				
Green Ext Time (p_c), s		3.9		0.3		2.7		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				6.9								
HCM 6th LOS				A								

Lanes, Volumes, Timings
 3: County Line Rd & Roberts Rd

SAT Peak w/ Improvements
 02/25/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	34	6	12	42	13	2	436	26	10	365	58
Future Volume (vph)	44	34	6	12	42	13	2	436	26	10	365	58
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	10	10	10	10	10	10
Storage Length (ft)	0		0	0		0	75		0	75		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		268			463			418			492	
Travel Time (s)		7.3			12.6			11.4			13.4	
Lane Group Flow (vph)	0	88	0	0	71	0	0	488	0	0	456	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	49.8%
ICU Level of Service	A
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	3.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	44	34	6	12	42	13	2	436	26	10	365	58
Future Vol, veh/h	44	34	6	12	42	13	2	436	26	10	365	58
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	1	8	10	1	0
Mvmt Flow	46	36	6	13	44	14	2	459	27	11	384	61

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	943	927	415	935	944	473	445	0	0	486	0	0
Stage 1	437	437	-	477	477	-	-	-	-	-	-	-
Stage 2	506	490	-	458	467	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.2	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.29	-	-
Pot Cap-1 Maneuver	245	270	642	248	264	595	1126	-	-	1037	-	-
Stage 1	602	583	-	573	559	-	-	-	-	-	-	-
Stage 2	552	552	-	587	565	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	206	266	642	217	260	595	1126	-	-	1037	-	-
Mov Cap-2 Maneuver	206	266	-	217	260	-	-	-	-	-	-	-
Stage 1	601	575	-	572	558	-	-	-	-	-	-	-
Stage 2	496	551	-	537	557	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	28.6		22.1		0		0.2	
HCM LOS	D		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1126	-	-	239	281	1037	-	-
HCM Lane V/C Ratio	0.002	-	-	0.37	0.251	0.01	-	-
HCM Control Delay (s)	8.2	0	-	28.6	22.1	8.5	0	-
HCM Lane LOS	A	A	-	D	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.6	1	0	-	-

Lanes, Volumes, Timings

SAT Peak w/ Improvements

4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

02/25/2019



Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Traffic Volume (vph)	18	3	5	6	255	427	27	4	363	6	4	296
Future Volume (vph)	18	3	5	6	255	427	27	4	363	6	4	296
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Storage Length (ft)		0	0		0		0	75		0		0
Storage Lanes		1	0		1		0	1		0		1
Taper Length (ft)		25			25			25				
Right Turn on Red				No			No				No	
Link Speed (mph)		25				25			25			
Link Distance (ft)		350				317			418			
Travel Time (s)		9.5				8.6			11.4			
Lane Group Flow (vph)	0	33	0	0	266	473	0	4	388	0	0	319
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA			Perm
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2			1
Detector Phase	8	8			6	6		2	2			1
Switch Phase												
Minimum Initial (s)	3.0	3.0			20.0	20.0		20.0	20.0			20.0
Minimum Split (s)	10.0	10.0			27.0	27.0		27.0	27.0			27.0
Total Split (s)	17.0	17.0			32.0	63.0		31.0	31.0			32.0
Total Split (%)	21.3%	21.3%			40.0%	78.8%		38.8%	38.8%			40.0%
Maximum Green (s)	10.0	10.0			25.0	56.0		24.0	24.0			25.0
Yellow Time (s)	3.0	3.0			4.0	4.0		4.0	4.0			4.0
All-Red Time (s)	4.0	4.0			3.0	3.0		3.0	3.0			3.0
Lost Time Adjust (s)		-4.5			-4.5	-4.5		0.0	-4.5			-4.5
Total Lost Time (s)		2.5			2.5	2.5		7.0	2.5			2.5
Lead/Lag					Lead			Lag	Lag			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			3.0
Recall Mode	None	None			None	C-Max		C-Max	C-Max			None
Act Effct Green (s)		13.5			64.0	64.5		30.6	35.1			26.4
Actuated g/C Ratio		0.17			0.80	0.81		0.38	0.44			0.33
v/c Ratio		0.12			0.29	0.44		0.01	0.28			0.60
Control Delay		28.8			3.5	4.9		12.5	10.4			27.3
Queue Delay		0.0			0.0	0.0		0.0	0.0			0.0
Total Delay		28.8			3.5	4.9		12.5	10.4			27.3
LOS		C			A	A		B	B			C
Approach Delay		28.8				4.4			10.4			
Approach LOS		C				A			B			
Queue Length 50th (ft)		14			30	85		1	42			135
Queue Length 95th (ft)		38			50	144		m3	71			201
Internal Link Dist (ft)		270				237			338			
Turn Bay Length (ft)								75				
Base Capacity (vph)		289			907	1071		282	1366			596
Starvation Cap Reductn		0			0	0		0	0			0
Spillback Cap Reductn		0			0	0		0	0			0
Storage Cap Reductn		0			0	0		0	0			0



Lane Group	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Traffic Volume (vph)	11	14	34	22	51
Future Volume (vph)	11	14	34	22	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width (ft)	13	12	12	12	12
Grade (%)			-1%		
Storage Length (ft)			0	0	
Storage Lanes			1	0	
Taper Length (ft)			25		
Right Turn on Red	No				No
Link Speed (mph)			25		
Link Distance (ft)			393		
Travel Time (s)			10.7		
Lane Group Flow (vph)	0	0	126	0	0
Turn Type		Perm	Perm		
Protected Phases					
Permitted Phases		4	4		
Detector Phase		4	4		
Switch Phase					
Minimum Initial (s)		3.0	3.0		
Minimum Split (s)		10.0	10.0		
Total Split (s)		17.0	17.0		
Total Split (%)		21.3%	21.3%		
Maximum Green (s)		10.0	10.0		
Yellow Time (s)		3.0	3.0		
All-Red Time (s)		4.0	4.0		
Lost Time Adjust (s)			-4.5		
Total Lost Time (s)			2.5		
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)		3.0	3.0		
Recall Mode		None	None		
Act Effct Green (s)			13.8		
Actuated g/C Ratio			0.17		
v/c Ratio			0.45		
Control Delay			35.2		
Queue Delay			0.0		
Total Delay			35.2		
LOS			D		
Approach Delay			35.2		
Approach LOS			D		
Queue Length 50th (ft)			56		
Queue Length 95th (ft)			108		
Internal Link Dist (ft)			313		
Turn Bay Length (ft)					
Base Capacity (vph)			293		
Starvation Cap Reductn			0		
Spillback Cap Reductn			0		
Storage Cap Reductn			0		

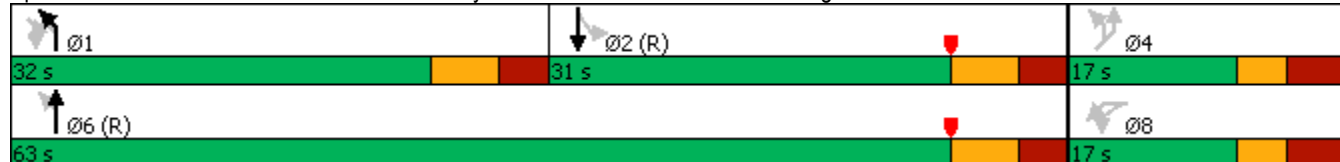


Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Reduced v/c Ratio		0.11			0.29	0.44		0.01	0.28			0.54

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
Natural Cycle:	65
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.60
Intersection Signal Delay:	13.3
Intersection LOS:	B
Intersection Capacity Utilization:	66.3%
ICU Level of Service:	C
Analysis Period (min):	15
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd





Lane Group	SER2	NEL2	NEL	NER	NER2
Reduced v/c Ratio			0.43		
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

SAT Peak w/ Improvements
 02/25/2019



Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Traffic Volume (vph)	18	3	5	6	255	427	27	4	363	6	4	296
Future Volume (vph)	18	3	5	6	255	427	27	4	363	6	4	296
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Total Lost time (s)		2.5			2.5	2.5		7.0	2.5			2.5
Lane Util. Factor		1.00			1.00	*0.81		1.00	0.95			1.00
Frt		0.95			1.00	0.99		1.00	1.00			0.86
Flt Protected		0.97			0.95	1.00		0.95	1.00			1.00
Satd. Flow (prot)		1599			1661	1330		1580	3117			1617
Flt Permitted		0.97			0.44	1.00		0.44	1.00			1.00
Satd. Flow (perm)		1599			764	1330		739	3117			1617
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	19	3	5	6	266	445	28	4	378	6	4	308
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	33	0	0	266	473	0	4	388	0	0	319
Heavy Vehicles (%)	0%	33%	0%	0%	0%	2%	0%	0%	1%	0%	0%	0%
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA			Perm
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2			1
Actuated Green, G (s)		7.9			58.1	58.1		29.2	29.2			21.9
Effective Green, g (s)		12.4			62.6	62.6		29.2	33.7			26.4
Actuated g/C Ratio		0.16			0.78	0.78		0.36	0.42			0.33
Clearance Time (s)		7.0			7.0	7.0		7.0	7.0			7.0
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0			3.0
Lane Grp Cap (vph)		247			893	1040		269	1313			533
v/s Ratio Prot					0.10	c0.36			0.12			
v/s Ratio Perm		0.02			0.13			0.01				c0.20
v/c Ratio		0.13			0.30	0.45		0.01	0.30			0.60
Uniform Delay, d1		29.2			2.6	2.9		16.2	15.3			22.4
Progression Factor		1.00			1.00	1.00		0.64	0.60			1.00
Incremental Delay, d2		0.2			0.2	1.4		0.1	0.6			1.8
Delay (s)		29.4			2.8	4.4		10.5	9.7			24.2
Level of Service		C			A	A		B	A			C
Approach Delay (s)		29.4				3.8			9.7			
Approach LOS		C				A			A			

Intersection Summary

HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

SAT Peak w/ Improvements
 02/25/2019



Movement	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Traffic Volume (vph)	11	14	34	22	51
Future Volume (vph)	11	14	34	22	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width	13	12	12	12	12
Grade (%)			-1%		
Total Lost time (s)			2.5		
Lane Util. Factor			1.00		
Frt			0.92		
Flt Protected			0.98		
Satd. Flow (prot)			1616		
Flt Permitted			0.98		
Satd. Flow (perm)			1616		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	15	35	23	53
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	0	0	126	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	2%
Turn Type		Perm	Perm		
Protected Phases					
Permitted Phases		4	4		
Actuated Green, G (s)			7.9		
Effective Green, g (s)			12.4		
Actuated g/C Ratio			0.16		
Clearance Time (s)			7.0		
Vehicle Extension (s)			3.0		
Lane Grp Cap (vph)			250		
v/s Ratio Prot					
v/s Ratio Perm			c0.08		
v/c Ratio			0.50		
Uniform Delay, d1			31.0		
Progression Factor			1.00		
Incremental Delay, d2			1.6		
Delay (s)			32.6		
Level of Service			C		
Approach Delay (s)			32.6		
Approach LOS			C		
Intersection Summary					

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑			↑↑		
Traffic Volume (vph)	722	43	11	681	0	0
Future Volume (vph)	722	43	11	681	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10	10	10
Link Speed (mph)	25			25	35	
Link Distance (ft)	259			317	333	
Travel Time (s)	7.1			8.6	6.5	
Lane Group Flow (vph)	797	0	0	720	0	0
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	31.4%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	0.1					
Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	722	43	11	681	0	0
Future Vol, veh/h	722	43	11	681	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	0	18	1	0	0
Mvmt Flow	752	45	11	709	0	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	797	0	1152 399
Stage 1	-	-	-	-	775 -
Stage 2	-	-	-	-	377 -
Critical Hdwy	-	-	4.46	-	6.8 6.9
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	-	-	2.38	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	725	-	194 606
Stage 1	-	-	-	-	420 -
Stage 2	-	-	-	-	669 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	725	-	189 606
Mov Cap-2 Maneuver	-	-	-	-	189 -
Stage 1	-	-	-	-	410 -
Stage 2	-	-	-	-	669 -

Approach	NB	SB	SW
HCM Control Delay, s	0	0.3	0
HCM LOS			A

Minor Lane/Major Mvmt	NBT	NBR	SBL	SBT	SWLn1
Capacity (veh/h)	-	-	725	-	-
HCM Lane V/C Ratio	-	-	0.016	-	-
HCM Control Delay (s)	-	-	10	0.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	-	-

Lanes, Volumes, Timings
6: County Line Rd & Old Lancaster Rd



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	143	579	2	93	588
Future Volume (vph)	0	143	579	2	93	588
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	15	15	10	10	10	10
Link Speed (mph)	25		25			25
Link Distance (ft)	236		497			259
Travel Time (s)	6.4		13.6			7.1
Lane Group Flow (vph)	0	149	605	0	97	613
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	48.3%
Analysis Period (min)	15
	ICU Level of Service A

Intersection						
Int Delay, s/veh	2.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↘		↖	↗
Traffic Vol, veh/h	0	143	579	2	93	588
Future Vol, veh/h	0	143	579	2	93	588
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	4	1	0	18	1
Mvmt Flow	0	149	603	2	97	613

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	604	0	0	605
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.24	-	-	4.28
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.336	-	-	2.362
Pot Cap-1 Maneuver	0	495	-	-	899
Stage 1	0	-	-	-	-
Stage 2	0	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	-	495	-	-	899
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.4	0	1.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	495	899
HCM Lane V/C Ratio	-	-	0.301	0.108
HCM Control Delay (s)	-	-	15.4	9.5
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	1.3	0.4



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	14	11	610	7	2	635
Future Volume (vph)	14	11	610	7	2	635
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	13	13	10	10	10	10
Link Speed (mph)	25		25			25
Link Distance (ft)	325		494			497
Travel Time (s)	8.9		13.5			13.6
Lane Group Flow (vph)	26	0	642	0	0	663
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	47.0% ICU Level of Service A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	11	610	7	2	635
Future Vol, veh/h	14	11	610	7	2	635
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	15	11	635	7	2	661











Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1304	639	0	0	642
Stage 1	639	-	-	-	-
Stage 2	665	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	179	480	-	-	952
Stage 1	530	-	-	-	-
Stage 2	515	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	178	480	-	-	952
Mov Cap-2 Maneuver	319	-	-	-	-
Stage 1	528	-	-	-	-
Stage 2	515	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	374	952
HCM Lane V/C Ratio	-	-	0.07	0.002
HCM Control Delay (s)	-	-	15.3	8.8
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.2	0

Lanes, Volumes, Timings
8: County Line Rd & Lindsay Ave

SAT Peak w/ Improvements
02/25/2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	623	0	1	639
Future Volume (vph)	0	0	623	0	1	639
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	16	16	10	10	10	10
Storage Length (ft)	0	0		0	75	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		25			25
Link Distance (ft)	311		164			494
Travel Time (s)	8.5		4.5			13.5
Lane Group Flow (vph)	0	0	656	0	1	673
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Detector Phase	4		6		2	2
Switch Phase						
Minimum Initial (s)	3.0		15.0		15.0	15.0
Minimum Split (s)	9.0		21.0		21.0	21.0
Total Split (s)	25.0		36.0		36.0	36.0
Total Split (%)	41.0%		59.0%		59.0%	59.0%
Maximum Green (s)	19.0		30.0		30.0	30.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-3.5		-3.5		0.0	-3.5
Total Lost Time (s)	2.5		2.5		6.0	2.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		C-Max	C-Max
Act Effct Green (s)			61.0		61.0	61.0
Actuated g/C Ratio			1.00		1.00	1.00
v/c Ratio			0.39		0.00	0.40
Control Delay			0.7		0.0	0.7
Queue Delay			0.0		0.0	0.0
Total Delay			0.7		0.0	0.7
LOS			A		A	A
Approach Delay			0.7			0.7
Approach LOS			A			A
Queue Length 50th (ft)			0		0	0
Queue Length 95th (ft)			0		0	0
Internal Link Dist (ft)	231		84			414
Turn Bay Length (ft)					75	
Base Capacity (vph)			1663		699	1663
Starvation Cap Reductn			0		0	0
Spillback Cap Reductn			0		0	0
Storage Cap Reductn			0		0	0
Reduced v/c Ratio			0.39		0.00	0.40

Intersection Summary

Area Type:	Other
Cycle Length:	61
Actuated Cycle Length:	61
Offset:	30 (49%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow
Natural Cycle:	40
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.40
Intersection Signal Delay:	0.7
Intersection LOS:	A
Intersection Capacity Utilization	38.8%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 8: County Line Rd & Lindsay Ave



HCM Signalized Intersection Capacity Analysis
8: County Line Rd & Lindsay Ave

SAT Peak w/ Improvements
02/25/2019



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T		L	R
Traffic Volume (vph)	0	0	623	0	1	639
Future Volume (vph)	0	0	623	0	1	639
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	16	16	10	10	10	10
Total Lost time (s)			2.5		6.0	2.5
Lane Util. Factor			1.00		1.00	1.00
Frt			1.00		1.00	1.00
Flt Protected			1.00		0.95	1.00
Satd. Flow (prot)			1663		1596	1663
Flt Permitted			1.00		0.42	1.00
Satd. Flow (perm)			1663		698	1663
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	656	0	1	673
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	656	0	1	673
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Actuated Green, G (s)			61.0		61.0	61.0
Effective Green, g (s)			61.0		61.0	61.0
Actuated g/C Ratio			1.00		1.00	1.00
Clearance Time (s)			6.0		6.0	6.0
Vehicle Extension (s)			3.0		3.0	3.0
Lane Grp Cap (vph)			1663		698	1663
v/s Ratio Prot			0.39			c0.40
v/s Ratio Perm					0.00	
v/c Ratio			0.39		0.00	0.40
Uniform Delay, d1			0.0		0.0	0.0
Progression Factor			1.00		1.00	1.00
Incremental Delay, d2			0.7		0.0	0.7
Delay (s)			0.7		0.0	0.7
Level of Service			A		A	A
Approach Delay (s)	0.0		0.7			0.7
Approach LOS	A		A			A

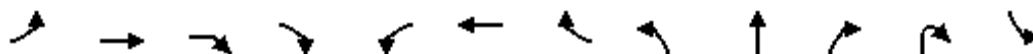
Intersection Summary

HCM 2000 Control Delay	0.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9: County Line Rd & Railroad Ave & Bryn Mawr Ave

SAT Peak w/ Improvements
02/25/2019



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Traffic Volume (vph)	156	172	25	99	111	197	65	109	476	83	1	47
Future Volume (vph)	156	172	25	99	111	197	65	109	476	83	1	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	15	11	12	12	11	11	13	10	10	10	10	10
Storage Length (ft)	140		0		185		160	70		0		
Storage Lanes	1		0		1		1	1		0		
Taper Length (ft)	25				25			25				
Right Turn on Red				Yes			Yes				Yes	
Link Speed (mph)		40				30			25			
Link Distance (ft)		547				508			354			
Travel Time (s)		9.3				11.5			9.7			
Lane Group Flow (vph)	161	305	0	0	114	203	67	112	578	0	0	0
Turn Type	pm+pt	NA			pm+pt	NA	Perm	pm+pt	NA			pm+pt
Protected Phases	3	8			7	4		1	6			5
Permitted Phases	8	8			4	4	4	6	6			2
Detector Phase	3	8			7	4	4	1	6			5
Switch Phase												
Minimum Initial (s)	3.0	2.5			3.0	2.5	2.5	3.0	10.0			3.0
Minimum Split (s)	9.0	9.0			9.0	9.0	9.0	9.0	16.0			9.0
Total Split (s)	13.0	32.0			13.0	32.0	32.0	13.0	32.0			13.0
Total Split (%)	14.4%	35.6%			14.4%	35.6%	35.6%	14.4%	35.6%			14.4%
Maximum Green (s)	7.0	25.5			7.0	25.5	25.5	7.0	26.0			7.0
Yellow Time (s)	3.0	3.5			3.0	3.5	3.5	4.0	4.0			4.0
All-Red Time (s)	3.0	3.0			3.0	3.0	3.0	2.0	2.0			2.0
Lost Time Adjust (s)	-3.5	-3.5			-3.5	-3.5	-3.5	-3.5	-3.5			
Total Lost Time (s)	2.5	3.0			2.5	3.0	3.0	2.5	2.5			
Lead/Lag	Lead	Lag			Lead	Lag	Lag	Lead	Lag			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			3.0
Recall Mode	None	None			None	None	None	None	C-Max			None
Act Effct Green (s)	34.4	25.5			33.8	22.9	22.9	47.1	37.9			
Actuated g/C Ratio	0.38	0.28			0.38	0.25	0.25	0.52	0.42			
v/c Ratio	0.35	0.63			0.32	0.47	0.12	0.27	0.44			
Control Delay	18.4	31.6			18.1	30.8	0.5	13.7	22.3			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	18.4	31.6			18.1	30.8	0.5	13.7	22.3			
LOS	B	C			B	C	A	B	C			
Approach Delay		27.0				21.7			20.9			
Approach LOS		C				C			C			
Queue Length 50th (ft)	57	139			39	96	0	31	129			
Queue Length 95th (ft)	89	211			67	148	0	66	195			
Internal Link Dist (ft)		467				428			274			
Turn Bay Length (ft)	140				185		160	70				
Base Capacity (vph)	458	545			358	549	632	422	1312			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.35	0.56			0.32	0.37	0.11	0.27	0.44			

Lanes, Volumes, Timings
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

SAT Peak w/ Improvements
 02/25/2019

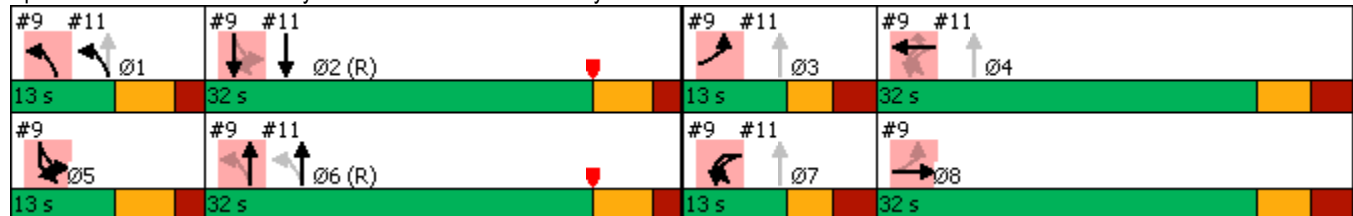


Lane Group	SBL	SBT	SBR
Lane Configurations	↔	↑↔	
Traffic Volume (vph)	10	459	63
Future Volume (vph)	10	459	63
Ideal Flow (vphpl)	1800	1800	1800
Lane Width (ft)	10	10	12
Storage Length (ft)	198		0
Storage Lanes	1		0
Taper Length (ft)	25		
Right Turn on Red			Yes
Link Speed (mph)		25	
Link Distance (ft)		198	
Travel Time (s)		5.4	
Lane Group Flow (vph)	58	538	0
Turn Type	pm+pt	NA	
Protected Phases	5	2	
Permitted Phases	2	2	
Detector Phase	5	2	
Switch Phase			
Minimum Initial (s)	3.0	10.0	
Minimum Split (s)	9.0	16.0	
Total Split (s)	13.0	32.0	
Total Split (%)	14.4%	35.6%	
Maximum Green (s)	7.0	26.0	
Yellow Time (s)	4.0	4.0	
All-Red Time (s)	2.0	2.0	
Lost Time Adjust (s)	3.0	-3.5	
Total Lost Time (s)	9.0	2.5	
Lead/Lag	Lead	Lag	
Lead-Lag Optimize?			
Vehicle Extension (s)	3.0	3.0	
Recall Mode	None	C-Max	
Act Effct Green (s)	34.3	37.4	
Actuated g/C Ratio	0.38	0.42	
v/c Ratio	0.24	0.42	
Control Delay	11.8	3.6	
Queue Delay	0.0	0.1	
Total Delay	11.8	3.7	
LOS	B	A	
Approach Delay		4.5	
Approach LOS		A	
Queue Length 50th (ft)	5	0	
Queue Length 95th (ft)	m20	0	
Internal Link Dist (ft)		118	
Turn Bay Length (ft)	198		
Base Capacity (vph)	247	1267	
Starvation Cap Reductn	0	107	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.23	0.46	

Intersection Summary

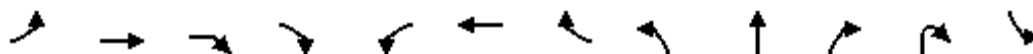
Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 26 (29%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 17.8 Intersection LOS: B
 Intersection Capacity Utilization 61.6% ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: County Line Rd & Railroad Ave & Bryn Mawr Ave



HCM Signalized Intersection Capacity Analysis
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

SAT Peak w/ Improvements
 02/25/2019



Movement	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Traffic Volume (vph)	156	172	25	99	111	197	65	109	476	83	1	47
Future Volume (vph)	156	172	25	99	111	197	65	109	476	83	1	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	15	11	12	12	11	11	13	10	10	10	10	10
Total Lost time (s)	2.5	3.0			2.5	3.0	3.0	2.5	2.5			
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00	0.95			
Frt	1.00	0.94			1.00	1.00	0.85	1.00	0.98			
Flt Protected	0.95	1.00			0.95	1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1862	1630			1653	1706	1581	1565	3115			
Flt Permitted	0.46	1.00			0.37	1.00	1.00	0.35	1.00			
Satd. Flow (perm)	907	1630			636	1706	1581	569	3115			
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	161	177	26	102	114	203	67	112	491	86	1	48
RTOR Reduction (vph)	0	22	0	0	0	0	49	0	0	0	0	0
Lane Group Flow (vph)	161	284	0	0	114	203	18	112	578	0	0	0
Heavy Vehicles (%)	1%	0%	0%	0%	0%	2%	0%	2%	0%	1%	2%	2%
Turn Type	pm+pt	NA			pm+pt	NA	Perm	pm+pt	NA			pm+pt
Protected Phases	3	8			7	4		1	6			5
Permitted Phases	8	8			4	4	4	6	6			2
Actuated Green, G (s)	29.0	22.0			26.2	20.6	20.6	38.5	32.1			
Effective Green, g (s)	36.0	25.5			33.2	24.1	24.1	45.5	35.6			
Actuated g/C Ratio	0.40	0.28			0.37	0.27	0.27	0.51	0.40			
Clearance Time (s)	6.0	6.5			6.0	6.5	6.5	6.0	6.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	474	461			337	456	423	397	1232			
v/s Ratio Prot	c0.04	c0.17			0.03	0.12		c0.03	c0.19			
v/s Ratio Perm	0.10				0.09		0.01	0.11				
v/c Ratio	0.34	0.61			0.34	0.45	0.04	0.28	0.47			
Uniform Delay, d1	18.0	28.0			19.7	27.4	24.4	12.3	20.2			
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.4	2.4			0.6	0.7	0.0	0.4	1.3			
Delay (s)	18.5	30.4			20.3	28.1	24.4	12.7	21.5			
Level of Service	B	C			C	C	C	B	C			
Approach Delay (s)		26.3				25.1			20.0			
Approach LOS		C				C			C			

Intersection Summary

HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

SAT Peak w/ Improvements
 02/25/2019



Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	10	459	63
Future Volume (vph)	10	459	63
Ideal Flow (vphpl)	1800	1800	1800
Lane Width	10	10	12
Total Lost time (s)	9.0	2.5	
Lane Util. Factor	1.00	0.95	
Fr _t	1.00	0.98	
Fl _t Protected	0.95	1.00	
Satd. Flow (prot)	1567	3028	
Fl _t Permitted	0.31	1.00	
Satd. Flow (perm)	516	3028	
Peak-hour factor, PHF	0.97	0.97	0.97
Adj. Flow (vph)	10	473	65
RTOR Reduction (vph)	0	11	0
Lane Group Flow (vph)	58	527	0
Heavy Vehicles (%)	1%	4%	0%
Turn Type	pm+pt	NA	
Protected Phases	5	2	
Permitted Phases	2	2	
Actuated Green, G (s)	37.3	31.5	
Effective Green, g (s)	31.3	35.0	
Actuated g/C Ratio	0.35	0.39	
Clearance Time (s)	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	212	1177	
v/s Ratio Prot	0.01	0.17	
v/s Ratio Perm	0.09		
v/c Ratio	0.27	0.45	
Uniform Delay, d ₁	20.3	20.3	
Progression Factor	0.58	0.13	
Incremental Delay, d ₂	0.6	1.1	
Delay (s)	12.5	3.7	
Level of Service	B	A	
Approach Delay (s)		4.6	
Approach LOS		A	
Intersection Summary			

Lanes, Volumes, Timings
10: County Line Rd & Landover Rd

SAT Peak w/ Improvements
02/25/2019

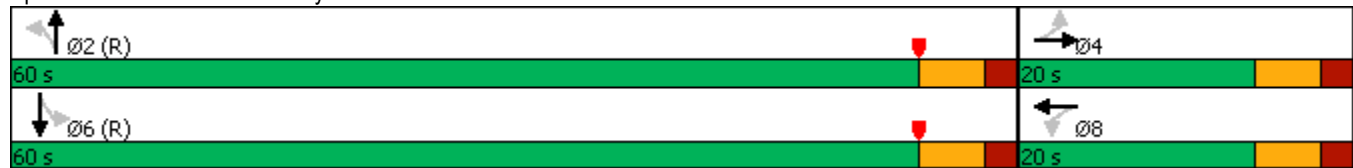


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	107	73	25	46	74	37	20	551	68	32	518	112
Future Volume (vph)	107	73	25	46	74	37	20	551	68	32	518	112
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	13	13	13	11	11	11	10	10	10	10	10	10
Storage Length (ft)	0		0	0		0	75		0	75		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		35			30			25				25
Link Distance (ft)		286			293			501				171
Travel Time (s)		5.6			6.7			13.7				4.7
Lane Group Flow (vph)	0	213	0	0	164	0	21	645	0	33	657	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		60.0	60.0		60.0	60.0	
Total Split (s)	20.0	20.0		20.0	20.0		60.0	60.0		60.0	60.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%		75.0%	75.0%		75.0%	75.0%	
Maximum Green (s)	14.0	14.0		14.0	14.0		54.0	54.0		54.0	54.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-3.5			3.0		0.0	-3.5		0.0	-3.5	
Total Lost Time (s)		2.5			9.0		6.0	2.5		6.0	2.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		16.7			10.2		54.8	58.3		54.8	58.3	
Actuated g/C Ratio		0.21			0.13		0.68	0.73		0.68	0.73	
v/c Ratio		0.71			0.89		0.05	0.54		0.08	0.55	
Control Delay		42.4			76.0		4.8	6.9		5.1	6.8	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.6	
Total Delay		42.4			76.0		4.8	6.9		5.1	7.4	
LOS		D			E		A	A		A	A	
Approach Delay		42.4			76.0			6.9			7.3	
Approach LOS		D			E			A			A	
Queue Length 50th (ft)		94			73		3	118		5	117	
Queue Length 95th (ft)		#187			#181		10	190		14	190	
Internal Link Dist (ft)		206			213			421			91	
Turn Bay Length (ft)							75			75		
Base Capacity (vph)		314			197		391	1188		398	1201	
Starvation Cap Reductn		0			0		0	0		0	227	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.68			0.83		0.05	0.54		0.08	0.67	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	54 (68%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.89
Intersection Signal Delay:	18.0
Intersection LOS:	B
Intersection Capacity Utilization:	61.2%
ICU Level of Service:	B
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 10: County Line Rd & Landover Rd



HCM 6th Signalized Intersection Summary
 10: County Line Rd & Landover Rd

SAT Peak w/ Improvements
 02/25/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	107	73	25	46	74	37	20	551	68	32	518	112
Future Volume (veh/h)	107	73	25	46	74	37	20	551	68	32	518	112
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1814	1814	1814	1800	1800	1800	1800	1772	1772	1800	1800	1800
Adj Flow Rate, veh/h	111	76	26	48	77	39	21	574	71	33	540	117
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	0	0	0	0	2	2	0	0	0
Cap, veh/h	216	124	38	102	116	50	494	1121	139	503	1040	225
Arrive On Green	0.17	0.21	0.17	0.17	0.13	0.17	0.68	0.73	0.68	0.68	0.73	0.68
Sat Flow, veh/h	693	585	178	337	883	381	789	1546	191	798	1434	311
Grp Volume(v), veh/h	213	0	0	164	0	0	21	0	645	33	0	657
Grp Sat Flow(s),veh/h/ln	1455	0	0	1601	0	0	789	0	1737	798	0	1744
Q Serve(g_s), s	3.9	0.0	0.0	0.0	0.0	0.0	1.1	0.0	13.2	1.7	0.0	13.6
Cycle Q Clear(g_c), s	11.4	0.0	0.0	7.5	0.0	0.0	14.6	0.0	13.2	14.8	0.0	13.6
Prop In Lane	0.52		0.12	0.29		0.24	1.00		0.11	1.00		0.18
Lane Grp Cap(c), veh/h	314	0	0	328	0	0	494	0	1260	503	0	1265
V/C Ratio(X)	0.68	0.00	0.00	0.50	0.00	0.00	0.04	0.00	0.51	0.07	0.00	0.52
Avail Cap(c_a), veh/h	323	0	0	338	0	0	494	0	1260	503	0	1265
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.3	0.0	0.0	32.6	0.0	0.0	9.8	0.0	4.9	9.7	0.0	5.0
Incr Delay (d2), s/veh	5.4	0.0	0.0	1.2	0.0	0.0	0.2	0.0	1.5	0.3	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.9	0.0	0.0	5.2	0.0	0.0	0.4	0.0	7.5	0.6	0.0	7.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.8	0.0	0.0	33.8	0.0	0.0	10.0	0.0	6.4	10.0	0.0	6.5
LnGrp LOS	D	A	A	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		213			164			666				690
Approach Delay, s/veh		35.8			33.8			6.5				6.7
Approach LOS		D			C			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		60.5		19.5		60.5		19.5				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		54.0		14.0		54.0		14.0				
Max Q Clear Time (g_c+I1), s		16.6		13.4		16.8		9.5				
Green Ext Time (p_c), s		5.7		0.1		6.0		0.3				

Intersection Summary

HCM 6th Ctrl Delay	12.8
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Lanes, Volumes, Timings
11: County Line Rd & Glenbrook Ave

SAT Peak w/ Improvements
02/25/2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3	Ø4	Ø5	Ø7	Ø8
Lane Configurations				↕↕	↕↕						
Traffic Volume (vph)	0	0	35	697	579	13					
Future Volume (vph)	0	0	35	697	579	13					
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800					
Lane Width (ft)	12	12	10	10	10	11					
Right Turn on Red		Yes				Yes					
Link Speed (mph)	25			25	25						
Link Distance (ft)	228			198	176						
Travel Time (s)	6.2			5.4	4.8						
Lane Group Flow (vph)	0	0	0	796	643	0					
Turn Type			pm+pt	NA	NA						
Protected Phases			1	6	2		3	4	5	7	8
Permitted Phases			6	1 3 4 7	2						
Detector Phase			1	6	2						
Switch Phase											
Minimum Initial (s)			3.0	10.0	10.0		3.0	2.5	3.0	3.0	2.5
Minimum Split (s)			9.0	16.0	16.0		9.0	9.0	9.0	9.0	9.0
Total Split (s)			13.0	32.0	32.0		13.0	32.0	13.0	13.0	32.0
Total Split (%)			14.4%	35.6%	35.6%		14%	36%	14%	14%	36%
Maximum Green (s)			7.0	26.0	26.0		7.0	25.5	7.0	7.0	25.5
Yellow Time (s)			4.0	4.0	4.0		3.0	3.5	4.0	3.0	3.5
All-Red Time (s)			2.0	2.0	2.0		3.0	3.0	2.0	3.0	3.0
Lost Time Adjust (s)				-3.5	-3.5						
Total Lost Time (s)				2.5	2.5						
Lead/Lag			Lead	Lag	Lag		Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)			3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode			None	C-Max	C-Max		None	None	None	None	None
Act Effct Green (s)				85.6	37.4						
Actuated g/C Ratio				0.95	0.42						
v/c Ratio				0.28	0.50						
Control Delay				0.3	23.4						
Queue Delay				0.2	0.4						
Total Delay				0.5	23.8						
LOS				A	C						
Approach Delay				0.5	23.8						
Approach LOS				A	C						
Queue Length 50th (ft)				0	151						
Queue Length 95th (ft)				0	219						
Internal Link Dist (ft)	148			118	96						
Turn Bay Length (ft)											
Base Capacity (vph)				2855	1296						
Starvation Cap Reductn				1132	229						
Spillback Cap Reductn				0	0						
Storage Cap Reductn				0	0						
Reduced v/c Ratio				0.46	0.60						
Intersection Summary											
Area Type:	Other										

HCM Signalized Intersection Capacity Analysis
 11: County Line Rd & Glenbrook Ave

SAT Peak w/ Improvements
 02/25/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↕↕	↕↕	
Traffic Volume (vph)	0	0	35	697	579	13
Future Volume (vph)	0	0	35	697	579	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	10	10	10	11
Total Lost time (s)				2.5	2.5	
Lane Util. Factor				0.95	0.95	
Fr _t				1.00	1.00	
Fl _t Protected				1.00	1.00	
Satd. Flow (prot)				3122	3119	
Fl _t Permitted				0.93	1.00	
Satd. Flow (perm)				2909	3119	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	38	758	629	14
RTOR Reduction (vph)	0	0	0	0	2	0
Lane Group Flow (vph)	0	0	0	796	641	0
Turn Type			pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases			6	1 3 4 7	2	
Actuated Green, G (s)				78.6	31.5	
Effective Green, g (s)				82.6	35.0	
Actuated g/C Ratio				0.92	0.39	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				2754	1212	
v/s Ratio Prot				c0.11	c0.21	
v/s Ratio Perm				c0.15		
v/c Ratio				0.29	0.53	
Uniform Delay, d ₁				0.4	21.2	
Progression Factor				0.61	1.00	
Incremental Delay, d ₂				0.1	1.7	
Delay (s)				0.3	22.8	
Level of Service				A	C	
Approach Delay (s)	0.0			0.3	22.8	
Approach LOS	A			A	C	
Intersection Summary						
HCM 2000 Control Delay			10.4	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.46			
Actuated Cycle Length (s)			90.0	Sum of lost time (s)		21.0
Intersection Capacity Utilization			45.4%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						

Analysis w/ Center Turn Lane Through Entire Study Area



Lanes, Volumes, Timings
1: County Line Rd & Lancaster Ave

AM Peak TWLT Entire Length
02/28/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↕			↕	
Traffic Volume (vph)	8	537	489	1	654	12	611	27	5	8	8	18
Future Volume (vph)	8	537	489	1	654	12	611	27	5	8	8	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25				25
Link Distance (ft)		497			631			170				160
Travel Time (s)		13.6			17.2			4.6				4.4
Lane Group Flow (vph)	0	1136	0	0	733	0	356	350	0	0	38	0
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	29.0	29.0		29.0	29.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	36.0	36.0		36.0	36.0		11.0	11.0		11.0	11.0	
Total Split (s)	42.0	42.0		42.0	42.0		17.0	17.0		21.0	21.0	
Total Split (%)	52.5%	52.5%		52.5%	52.5%		21.3%	21.3%		26.3%	26.3%	
Maximum Green (s)	35.0	35.0		35.0	35.0		10.0	10.0		14.0	14.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		-4.5			-4.5		-4.5	-4.5			-4.5	
Total Lost Time (s)		2.5			2.5		2.5	2.5			2.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	None		None	None		None	None	
Act Effct Green (s)		39.5			39.5		26.8	26.8				11.2
Actuated g/C Ratio		0.49			0.49		0.34	0.34				0.14
v/c Ratio		0.74			0.49		0.68	0.69				0.16
Control Delay		13.4			14.8		29.8	30.3				19.9
Queue Delay		0.0			0.0		0.0	0.0				0.0
Total Delay		13.4			14.8		29.8	30.3				19.9
LOS		B			B		C	C				B
Approach Delay		13.4			14.8			30.0				19.9
Approach LOS		B			B			C				B
Queue Length 50th (ft)		144			121		154	151				8
Queue Length 95th (ft)		224			167		#347	#343				33
Internal Link Dist (ft)		417			551			90				80
Turn Bay Length (ft)												
Base Capacity (vph)		1539			1506		522	507				379
Starvation Cap Reductn		0			0		0	0				0
Spillback Cap Reductn		0			0		0	0				0
Storage Cap Reductn		0			0		0	0				0
Reduced v/c Ratio		0.74			0.49		0.68	0.69				0.10

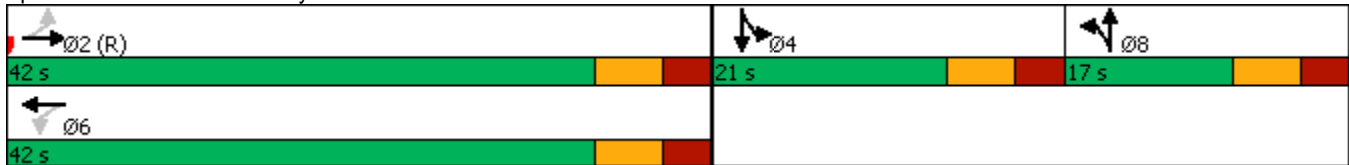
Intersection Summary

Lanes, Volumes, Timings
 1: County Line Rd & Lancaster Ave

AM Peak TWLT Entire Length
 02/28/2019


















Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 18.4 Intersection LOS: B
 Intersection Capacity Utilization 70.7% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: County Line Rd & Lancaster Ave



HCM Signalized Intersection Capacity Analysis
1: County Line Rd & Lancaster Ave

AM Peak TWLT Entire Length
02/28/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	537	489	1	654	12	611	27	5	8	8	18
Future Volume (vph)	8	537	489	1	654	12	611	27	5	8	8	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Total Lost time (s)		2.5			2.5		2.5	2.5				2.5
Lane Util. Factor		0.95			0.95		0.95	0.95				1.00
Frt		0.93			1.00		1.00	1.00				0.93
Flt Protected		1.00			1.00		0.95	0.96				0.99
Satd. Flow (prot)		2854			3197		1561	1516				1573
Flt Permitted		0.95			0.95		0.95	0.96				0.99
Satd. Flow (perm)		2707			3049		1561	1516				1573
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	9	590	537	1	719	13	671	30	5	9	9	20
RTOR Reduction (vph)	0	217	0	0	2	0	0	1	0	0	18	0
Lane Group Flow (vph)	0	919	0	0	731	0	356	349	0	0	20	0
Heavy Vehicles (%)	0%	5%	6%	0%	5%	17%	3%	4%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)		32.2			32.2		22.3	22.3				4.5
Effective Green, g (s)		36.7			36.7		26.8	26.8				9.0
Actuated g/C Ratio		0.46			0.46		0.34	0.34				0.11
Clearance Time (s)		7.0			7.0		7.0	7.0				7.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0				3.0
Lane Grp Cap (vph)		1241			1398		522	507				176
v/s Ratio Prot							0.23	c0.23				c0.01
v/s Ratio Perm		c0.34			0.24							
v/c Ratio		0.74			0.52		0.68	0.69				0.12
Uniform Delay, d1		17.7			15.4		22.9	23.0				31.9
Progression Factor		1.00			1.00		0.85	0.85				1.00
Incremental Delay, d2		4.0			0.4		2.9	3.1				0.3
Delay (s)		21.7			15.8		22.3	22.5				32.2
Level of Service		C			B		C	C				C
Approach Delay (s)		21.7			15.8			22.4				32.2
Approach LOS		C			B			C				C
Intersection Summary												
HCM 2000 Control Delay			20.4				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			80.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			70.7%				ICU Level of Service				C	
Analysis Period (min)			15									
c	Critical Lane Group											

Lanes, Volumes, Timings

AM Peak TWLT Entire Length

4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

02/28/2019



Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations												
Traffic Volume (vph)	4	0	17	1	351	547	12	0	474	13	377	6
Future Volume (vph)	4	0	17	1	351	547	12	0	474	13	377	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	11	10	10	10	10	10	13	13
Grade (%)		2%				-1%			2%			
Storage Length (ft)		0	0		200		0	75		0	0	
Storage Lanes		1	0		1		0	1		0	1	
Taper Length (ft)		25			25			25				
Right Turn on Red				No			No					No
Link Speed (mph)		25				25			25			
Link Distance (ft)		350				317			418			
Travel Time (s)		9.5				8.6			11.4			
Lane Group Flow (vph)	0	24	0	0	386	614	0	0	535	0	421	0
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA		Perm	
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2		1	
Detector Phase	8	8			6	6		2	2		1	
Switch Phase												
Minimum Initial (s)	3.0	3.0			20.0	20.0		20.0	20.0		20.0	
Minimum Split (s)	11.0	11.0			27.0	27.0		27.0	27.0		27.0	
Total Split (s)	16.0	16.0			36.0	64.0		28.0	28.0		36.0	
Total Split (%)	20.0%	20.0%			45.0%	80.0%		35.0%	35.0%		45.0%	
Maximum Green (s)	8.0	8.0			29.0	57.0		21.0	21.0		29.0	
Yellow Time (s)	5.0	5.0			4.0	4.0		4.0	4.0		4.0	
All-Red Time (s)	3.0	3.0			3.0	3.0		3.0	3.0		3.0	
Lost Time Adjust (s)		-5.0			-4.5	-4.5		0.0	-4.5		-4.5	
Total Lost Time (s)		3.0			2.5	2.5		7.0	2.5		2.5	
Lead/Lag					Lead			Lag	Lag		Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0		3.0	
Recall Mode	None	None			C-Max	C-Max		Max	Max		C-Max	
Act Effct Green (s)		12.9			61.6	61.6			25.5		33.6	
Actuated g/C Ratio		0.16			0.77	0.77			0.32		0.42	
v/c Ratio		0.10			0.51	0.60			1.06		0.63	
Control Delay		29.8			11.1	7.0			79.0		23.6	
Queue Delay		0.0			0.0	0.0			0.0		0.0	
Total Delay		29.8			11.1	7.0			79.0		23.6	
LOS		C			B	A			E		C	
Approach Delay		29.8				8.6			79.0			
Approach LOS		C				A			E			
Queue Length 50th (ft)		10			81	123			~302		162	
Queue Length 95th (ft)		31			159	216			#476		259	
Internal Link Dist (ft)		270				237			338			
Turn Bay Length (ft)					200							
Base Capacity (vph)		243			762	1018			503		666	
Starvation Cap Reductn		0			0	0			0		0	
Spillback Cap Reductn		0			0	0			0		0	
Storage Cap Reductn		0			0	0			0		0	



Lane Group	NEL2	NEL	NER	NER2
Lane Configurations				
Traffic Volume (vph)	20	61	17	34
Future Volume (vph)	20	61	17	34
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12
Grade (%)		-1%		
Storage Length (ft)		0	0	
Storage Lanes		1	0	
Taper Length (ft)		25		
Right Turn on Red				No
Link Speed (mph)		25		
Link Distance (ft)		393		
Travel Time (s)		10.7		
Lane Group Flow (vph)	0	145	0	0
Turn Type	Perm	Perm		
Protected Phases				
Permitted Phases	4	4		
Detector Phase	4	4		
Switch Phase				
Minimum Initial (s)	3.0	3.0		
Minimum Split (s)	11.0	11.0		
Total Split (s)	16.0	16.0		
Total Split (%)	20.0%	20.0%		
Maximum Green (s)	8.0	8.0		
Yellow Time (s)	5.0	5.0		
All-Red Time (s)	3.0	3.0		
Lost Time Adjust (s)		-5.0		
Total Lost Time (s)		3.0		
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0		
Recall Mode	None	None		
Act Effct Green (s)		12.9		
Actuated g/C Ratio		0.16		
v/c Ratio		0.55		
Control Delay		39.6		
Queue Delay		0.0		
Total Delay		39.6		
LOS		D		
Approach Delay		39.6		
Approach LOS		D		
Queue Length 50th (ft)		67		
Queue Length 95th (ft)		125		
Internal Link Dist (ft)		313		
Turn Bay Length (ft)				
Base Capacity (vph)		266		
Starvation Cap Reductn		0		
Spillback Cap Reductn		0		
Storage Cap Reductn		0		

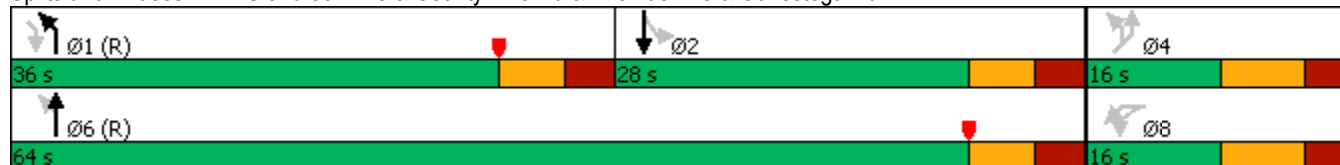


Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SER	SER2
Reduced v/c Ratio		0.10			0.51	0.60			1.06		0.63	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	47 (59%), Referenced to phase 1:NBL and 6:NBTL, Start of Yellow
Natural Cycle:	65
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.06
Intersection Signal Delay:	31.7
Intersection LOS:	C
Intersection Capacity Utilization	75.0%
ICU Level of Service	D
Analysis Period (min)	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd





Lane Group	NEL2	NEL	NER	NER2
Reduced v/c Ratio		0.55		
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

AM Peak TWLT Entire Length
 02/28/2019



Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SER	SER2	
Lane Configurations													
Traffic Volume (vph)	4	0	17	1	351	547	12	0	474	13	377	6	
Future Volume (vph)	4	0	17	1	351	547	12	0	474	13	377	6	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	
Lane Width	12	12	12	12	11	10	10	10	10	10	13	13	
Grade (%)		2%				-1%			2%				
Total Lost time (s)		3.0			2.5	2.5			2.5		2.5		
Lane Util. Factor		1.00			1.00	*0.81			1.00		1.00		
Frt		0.89			1.00	1.00			1.00		0.86		
Flt Protected		0.99			0.95	1.00			1.00		1.00		
Satd. Flow (prot)		1497			1613	1322			1580		1586		
Flt Permitted		0.99			0.14	1.00			1.00		1.00		
Satd. Flow (perm)		1497			243	1322			1580		1586		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Adj. Flow (vph)	4	0	19	1	386	601	13	0	521	14	414	7	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	0	24	0	0	386	614	0	0	535	0	421	0	
Heavy Vehicles (%)	0%	0%	6%	0%	3%	3%	8%	0%	5%	0%	2%	0%	
Parking (#/hr)													
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA		Perm		
Protected Phases					1	6			2				
Permitted Phases	8	8			6			2	2		1		
Actuated Green, G (s)		7.9			57.1	57.1			21.0		29.1		
Effective Green, g (s)		12.9			61.6	61.6			25.5		33.6		
Actuated g/C Ratio		0.16			0.77	0.77			0.32		0.42		
Clearance Time (s)		8.0			7.0	7.0			7.0		7.0		
Vehicle Extension (s)		3.0			3.0	3.0			3.0		3.0		
Lane Grp Cap (vph)		241			762	1017			503		666		
v/s Ratio Prot					0.21	0.46			c0.34				
v/s Ratio Perm		0.02			0.18						c0.27		
v/c Ratio		0.10			0.51	0.60			1.06		0.63		
Uniform Delay, d1		28.6			10.5	4.0			27.2		18.3		
Progression Factor		1.00			1.00	1.00			0.69		1.00		
Incremental Delay, d2		0.2			2.4	2.7			56.4		4.5		
Delay (s)		28.8			12.9	6.6			75.2		22.8		
Level of Service		C			B	A			E		C		
Approach Delay (s)		28.8				9.0			75.2				
Approach LOS		C				A			E				
Intersection Summary													
HCM 2000 Control Delay			30.3		HCM 2000 Level of Service					C			
HCM 2000 Volume to Capacity ratio			0.83										
Actuated Cycle Length (s)			80.0		Sum of lost time (s)					13.0			
Intersection Capacity Utilization			75.0%		ICU Level of Service					D			
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd











AM Peak TWLT Entire Length
 02/28/2019



Movement	NEL2	NEL	NER	NER2
Lane Configurations				
Traffic Volume (vph)	20	61	17	34
Future Volume (vph)	20	61	17	34
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width	12	12	12	12
Grade (%)		-1%		
Total Lost time (s)		3.0		
Lane Util. Factor		1.00		
Frt		0.95		
Flt Protected		0.97		
Satd. Flow (prot)		1639		
Flt Permitted		0.97		
Satd. Flow (perm)		1639		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91
Adj. Flow (vph)	22	67	19	37
RTOR Reduction (vph)	0	0	0	0
Lane Group Flow (vph)	0	145	0	0
Heavy Vehicles (%)	5%	0%	0%	3%
Parking (#/hr)			0	
Turn Type	Perm	Perm		
Protected Phases				
Permitted Phases	4	4		
Actuated Green, G (s)		7.9		
Effective Green, g (s)		12.9		
Actuated g/C Ratio		0.16		
Clearance Time (s)		8.0		
Vehicle Extension (s)		3.0		
Lane Grp Cap (vph)		264		
v/s Ratio Prot				
v/s Ratio Perm		c0.09		
v/c Ratio		0.55		
Uniform Delay, d1		30.9		
Progression Factor		1.00		
Incremental Delay, d2		2.3		
Delay (s)		33.2		
Level of Service		C		
Approach Delay (s)		33.2		
Approach LOS		C		
Intersection Summary				

Lanes, Volumes, Timings
8: County Line Rd & Lindsay Ave

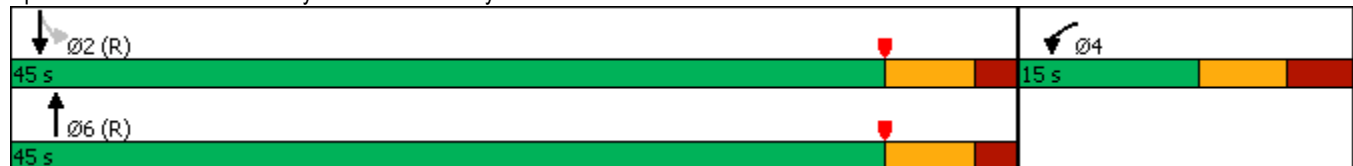
AM Peak TWLT Entire Length
02/28/2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	11	8	944	50	4	646
Future Volume (vph)	11	8	944	50	4	646
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	16	16	10	10	10	10
Storage Length (ft)	0	0		0	75	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		25			25
Link Distance (ft)	311		340			494
Travel Time (s)	8.5		9.3			13.5
Lane Group Flow (vph)	19	0	1035	0	4	673
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Detector Phase	4		6		2	2
Switch Phase						
Minimum Initial (s)	3.0		15.0		15.0	15.0
Minimum Split (s)	10.0		21.0		21.0	21.0
Total Split (s)	15.0		45.0		45.0	45.0
Total Split (%)	25.0%		75.0%		75.0%	75.0%
Maximum Green (s)	8.0		39.0		39.0	39.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	3.0		2.0		2.0	2.0
Lost Time Adjust (s)	-3.5		-3.5		0.0	-3.5
Total Lost Time (s)	3.5		2.5		6.0	2.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		C-Max	C-Max
Act Effct Green (s)	9.7		56.6		55.9	56.6
Actuated g/C Ratio	0.16		0.94		0.93	0.94
v/c Ratio	0.08		0.68		0.02	0.44
Control Delay	17.2		5.9		2.5	2.5
Queue Delay	0.4		0.0		0.0	1.4
Total Delay	17.6		5.9		2.5	3.9
LOS	B		A		A	A
Approach Delay	17.6		5.9			3.9
Approach LOS	B		A			A
Queue Length 50th (ft)	3		0		0	0
Queue Length 95th (ft)	19		#708		3	157
Internal Link Dist (ft)	231		260			414
Turn Bay Length (ft)					75	
Base Capacity (vph)	290		1531		221	1523
Starvation Cap Reductn	0		5		0	0
Spillback Cap Reductn	143		0		0	617
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.13		0.68		0.02	0.74

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 39 (65%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 5.2 Intersection LOS: A
 Intersection Capacity Utilization 65.6% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 8: County Line Rd & Lindsay Ave



HCM Signalized Intersection Capacity Analysis
8: County Line Rd & Lindsay Ave

AM Peak TWLT Entire Length
02/28/2019



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	11	8	944	50	4	646
Future Volume (vph)	11	8	944	50	4	646
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	16	16	10	10	10	10
Total Lost time (s)	3.5		2.5		6.0	2.5
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.94		0.99		1.00	1.00
Flt Protected	0.97		1.00		0.95	1.00
Satd. Flow (prot)	1482		1622		1064	1615
Flt Permitted	0.97		1.00		0.21	1.00
Satd. Flow (perm)	1482		1622		238	1615
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	8	983	52	4	673
RTOR Reduction (vph)	7	0	2	0	0	0
Lane Group Flow (vph)	12	0	1033	0	4	673
Heavy Vehicles (%)	27%	25%	3%	0%	50%	4%
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Actuated Green, G (s)	1.5		45.5		45.5	45.5
Effective Green, g (s)	5.0		49.0		45.5	49.0
Actuated g/C Ratio	0.08		0.82		0.76	0.82
Clearance Time (s)	7.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	123		1324		180	1318
v/s Ratio Prot	c0.01		c0.64			0.42
v/s Ratio Perm					0.02	
v/c Ratio	0.09		0.78		0.02	0.51
Uniform Delay, d1	25.4		2.8		1.8	1.7
Progression Factor	1.00		1.56		1.00	1.00
Incremental Delay, d2	0.3		3.5		0.2	1.4
Delay (s)	25.7		7.8		2.0	3.1
Level of Service	C		A		A	A
Approach Delay (s)	25.7		7.8			3.1
Approach LOS	C		A			A

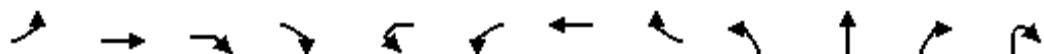
Intersection Summary

HCM 2000 Control Delay	6.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9: County Line Rd & Railroad Ave & Bryn Mawr Ave

AM Peak TWLT Entire Length
02/28/2019



Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	148	322	47	96	4	60	283	64	121	818	108	6
Future Volume (vph)	148	322	47	96	4	60	283	64	121	818	108	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	15	11	12	12	12	11	11	13	10	10	10	10
Storage Length (ft)	140		0			180		160	70		0	
Storage Lanes	1		0			1		1	1		0	
Taper Length (ft)	25					25			25			
Right Turn on Red				Yes				Yes				Yes
Link Speed (mph)		40					30			25		
Link Distance (ft)		547					508			526		
Travel Time (s)		9.3					11.5			14.3		
Lane Group Flow (vph)	156	489	0	0	0	67	298	67	127	981	0	0
Turn Type	pm+pt	NA			pm+pt	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	3	8			7	7	4		1	6		
Permitted Phases	8	8			4	4	4	4	6	6		
Detector Phase	3	8			7	7	4	4	1	6		
Switch Phase												
Minimum Initial (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0	10.0		
Minimum Split (s)	9.0	9.0			9.0	9.0	9.0	9.0	9.0	16.0		
Total Split (s)	12.0	55.0			12.0	12.0	55.0	55.0	12.0	41.0		
Total Split (%)	10.0%	45.8%			10.0%	10.0%	45.8%	45.8%	10.0%	34.2%		
Maximum Green (s)	6.0	49.0			6.0	6.0	49.0	49.0	6.0	35.0		
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0	3.0	4.0	4.0		
All-Red Time (s)	3.0	3.0			3.0	3.0	3.0	3.0	2.0	2.0		
Lost Time Adjust (s)	-3.5	-3.5			-3.5	-3.5	-3.5	-3.5	-3.5	-3.5		
Total Lost Time (s)	2.5	2.5			2.5	2.5	2.5	2.5	2.5	2.5		
Lead/Lag	Lead	Lag			Lead	Lead	Lag	Lag	Lead	Lag		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0	3.0		
Recall Mode	None	None			None	None	None	None	None	C-Max		
Act Effct Green (s)	51.8	44.2			51.3	41.8	41.8	60.2	50.4			
Actuated g/C Ratio	0.43	0.37			0.43	0.35	0.35	0.50	0.42			
v/c Ratio	0.39	0.80			0.26	0.50	0.11	0.65	1.46			
Control Delay	21.1	43.1			18.6	32.3	0.3	37.1	240.7			
Queue Delay	0.3	0.0			0.0	0.0	0.0	0.0	2.1			
Total Delay	21.3	43.1			18.6	32.3	0.3	37.1	242.8			
LOS	C	D			B	C	A	D	F			
Approach Delay		37.8					25.3		219.2			
Approach LOS		D					C		F			
Queue Length 50th (ft)	68	325			28	173	0	70	~1116			
Queue Length 95th (ft)	96	416			47	230	0	m85	m#1302			
Internal Link Dist (ft)		467				428			446			
Turn Bay Length (ft)	140					180		160	70			
Base Capacity (vph)	400	721			256	746	768	196	672			
Starvation Cap Reductn	0	0			0	0	0	0	11			
Spillback Cap Reductn	37	0			0	0	19	0	164			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.43	0.68			0.26	0.40	0.09	0.65	1.93			

Lanes, Volumes, Timings
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

AM Peak TWLT Entire Length
 02/28/2019

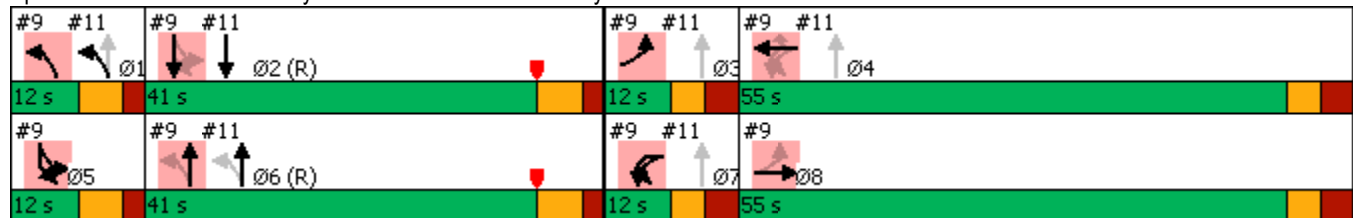


Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	45	19	447	103
Future Volume (vph)	45	19	447	103
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10
Storage Length (ft)		50		0
Storage Lanes		1		0
Taper Length (ft)		25		
Right Turn on Red				Yes
Link Speed (mph)			25	
Link Distance (ft)			198	
Travel Time (s)			5.4	
Lane Group Flow (vph)	0	67	579	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	5	5	2	
Permitted Phases	2	2	2	
Detector Phase	5	5	2	
Switch Phase				
Minimum Initial (s)	3.0	3.0	10.0	
Minimum Split (s)	9.0	9.0	16.0	
Total Split (s)	12.0	12.0	41.0	
Total Split (%)	10.0%	10.0%	34.2%	
Maximum Green (s)	6.0	6.0	35.0	
Yellow Time (s)	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	
Lost Time Adjust (s)		-3.5	-3.5	
Total Lost Time (s)		2.5	2.5	
Lead/Lag	Lead	Lead	Lag	
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	
Act Effct Green (s)		55.8	45.1	
Actuated g/C Ratio		0.46	0.38	
v/c Ratio		0.35	0.98	
Control Delay		40.6	25.4	
Queue Delay		0.5	18.5	
Total Delay		41.1	43.9	
LOS		D	D	
Approach Delay			43.6	
Approach LOS			D	
Queue Length 50th (ft)		22	~129	
Queue Length 95th (ft)		m18	m#84	
Internal Link Dist (ft)			118	
Turn Bay Length (ft)		50		
Base Capacity (vph)		192	589	
Starvation Cap Reductn		20	37	
Spillback Cap Reductn		0	0	
Storage Cap Reductn		0	0	
Reduced v/c Ratio		0.39	1.05	

Intersection Summary

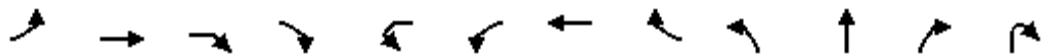
Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 35 (29%), Referenced to phase 2:SBTL and 6:NBTl, Start of Yellow
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.46
 Intersection Signal Delay: 108.2 Intersection LOS: F
 Intersection Capacity Utilization 100.6% ICU Level of Service G
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: County Line Rd & Railroad Ave & Bryn Mawr Ave



HCM Signalized Intersection Capacity Analysis
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

AM Peak TWLT Entire Length
 02/28/2019



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	148	322	47	96	4	60	283	64	121	818	108	6
Future Volume (vph)	148	322	47	96	4	60	283	64	121	818	108	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	15	11	12	12	12	11	11	13	10	10	10	10
Total Lost time (s)	2.5	2.5				2.5	2.5	2.5	2.5	2.5		
Lane Util. Factor	1.00	1.00				1.00	1.00	1.00	1.00	1.00		
Fr _t	1.00	0.95				1.00	1.00	0.85	1.00	0.98		
Fl _t Protected	0.95	1.00				0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1775	1631				1653	1706	1581	1277	1601		
Fl _t Permitted	0.40	1.00				0.21	1.00	1.00	0.10	1.00		
Satd. Flow (perm)	738	1631				362	1706	1581	132	1601		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	156	339	49	101	4	63	298	67	127	861	114	6
RTOR Reduction (vph)	0	9	0	0	0	0	0	43	0	0	0	0
Lane Group Flow (vph)	156	480	0	0	0	67	298	24	127	981	0	0
Heavy Vehicles (%)	6%	2%	0%	2%	0%	0%	2%	0%	25%	3%	3%	9%
Turn Type	pm+pt	NA			pm+pt	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	3	8			7	7	4		1	6		
Permitted Phases	8	8			4	4	4	4	6	6		
Actuated Green, G (s)	46.7	40.7				44.3	39.5	39.5	54.6	44.4		
Effective Green, g (s)	53.7	44.2				51.3	43.0	43.0	60.0	47.9		
Actuated g/C Ratio	0.45	0.37				0.43	0.36	0.36	0.50	0.40		
Clearance Time (s)	6.0	6.0				6.0	6.0	6.0	6.0	6.0		
Vehicle Extension (s)	3.0	3.0				3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	412	600				244	611	566	196	639		
v/s Ratio Prot	c0.03	c0.29				0.02	0.17		c0.07	c0.61		
v/s Ratio Perm	0.14					0.10		0.02	0.25			
v/c Ratio	0.38	0.80				0.27	0.49	0.04	0.65	1.54		
Uniform Delay, d ₁	21.0	33.9				23.2	29.9	25.1	23.6	36.0		
Progression Factor	1.00	1.00				1.00	1.00	1.00	1.24	1.06		
Incremental Delay, d ₂	0.6	7.5				0.6	0.6	0.0	3.1	244.2		
Delay (s)	21.6	41.5				23.8	30.6	25.1	32.3	282.3		
Level of Service	C	D				C	C	C	C	F		
Approach Delay (s)		36.7					28.7			253.7		
Approach LOS		D					C			F		

Intersection Summary			
HCM 2000 Control Delay	118.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

AM Peak TWLT Entire Length
 02/28/2019



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	45	19	447	103
Future Volume (vph)	45	19	447	103
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width	10	10	10	10
Total Lost time (s)		2.5	2.5	
Lane Util. Factor		1.00	1.00	
Fr _t		1.00	0.97	
Fl _t Protected		0.95	1.00	
Satd. Flow (prot)		1530	1553	
Fl _t Permitted		0.09	1.00	
Satd. Flow (perm)		147	1553	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	20	471	108
RTOR Reduction (vph)	0	0	6	0
Lane Group Flow (vph)	0	67	573	0
Heavy Vehicles (%)	4%	5%	4%	10%
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	5	5	2	
Permitted Phases	2	2	2	
Actuated Green, G (s)		46.4	40.3	
Effective Green, g (s)		53.4	43.8	
Actuated g/C Ratio		0.44	0.36	
Clearance Time (s)		6.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		176	566	
v/s Ratio Prot		0.03	0.37	
v/s Ratio Perm		0.14		
v/c Ratio		0.38	1.01	
Uniform Delay, d ₁		26.2	38.1	
Progression Factor		2.12	0.27	
Incremental Delay, d ₂		0.1	14.4	
Delay (s)		55.6	24.8	
Level of Service		E	C	
Approach Delay (s)			28.0	
Approach LOS			C	
Intersection Summary				

Lanes, Volumes, Timings
11: County Line Rd & Glenbrook Ave

AM Peak TWLT Entire Length
02/28/2019

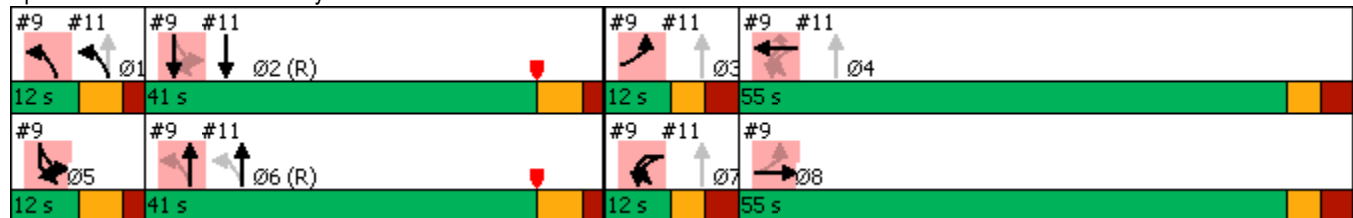


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3	Ø4	Ø5	Ø7	Ø8
Lane Configurations											
Traffic Volume (vph)	0	0	41	1030	614	12					
Future Volume (vph)	0	0	41	1030	614	12					
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800					
Lane Width (ft)	12	12	10	10	10	12					
Storage Length (ft)	0	0	45			0					
Storage Lanes	0	0	1			0					
Taper Length (ft)	25		25								
Right Turn on Red		Yes				Yes					
Link Speed (mph)	30			25	25						
Link Distance (ft)	228			198	340						
Travel Time (s)	5.2			5.4	9.3						
Lane Group Flow (vph)	0	0	43	1084	659	0					
Turn Type			pm+pt	NA	NA						
Protected Phases			1	6	2		3	4	5	7	8
Permitted Phases			6	1 3 4 7	2						
Detector Phase			1	6	2						
Switch Phase											
Minimum Initial (s)			3.0	10.0	10.0		3.0	3.0	3.0	3.0	3.0
Minimum Split (s)			9.0	16.0	16.0		9.0	9.0	9.0	9.0	9.0
Total Split (s)			12.0	41.0	41.0		12.0	55.0	12.0	12.0	55.0
Total Split (%)			10.0%	34.2%	34.2%		10%	46%	10%	10%	46%
Maximum Green (s)			6.0	35.0	35.0		6.0	49.0	6.0	6.0	49.0
Yellow Time (s)			4.0	4.0	4.0		3.0	3.0	4.0	3.0	3.0
All-Red Time (s)			2.0	2.0	2.0		3.0	3.0	2.0	3.0	3.0
Lost Time Adjust (s)			0.0	-3.5	-3.5						
Total Lost Time (s)			6.0	2.5	2.5						
Lead/Lag			Lead	Lag	Lag		Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)			3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode			None	C-Max	C-Max		None	None	None	None	None
Act Effct Green (s)			55.1	120.0	45.1						
Actuated g/C Ratio			0.46	1.00	0.38						
v/c Ratio			0.23	0.66	1.09						
Control Delay			27.4	10.9	98.5						
Queue Delay			0.0	0.1	4.6						
Total Delay			27.4	11.0	103.1						
LOS			C	B	F						
Approach Delay				11.6	103.1						
Approach LOS				B	F						
Queue Length 50th (ft)			12	386	~648						
Queue Length 95th (ft)			m14	m181	#883						
Internal Link Dist (ft)	148			118	260						
Turn Bay Length (ft)			45								
Base Capacity (vph)			188	1647	605						
Starvation Cap Reductn			0	0	30						
Spillback Cap Reductn			0	74	28						
Storage Cap Reductn			0	0	0						
Reduced v/c Ratio			0.23	0.69	1.15						

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	35 (29%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.46
Intersection Signal Delay:	45.4
Intersection LOS:	D
Intersection Capacity Utilization:	60.6%
ICU Level of Service:	B
Analysis Period (min):	15
~	Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.
#	95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: County Line Rd & Glenbrook Ave



HCM Signalized Intersection Capacity Analysis
11: County Line Rd & Glenbrook Ave

AM Peak TWLT Entire Length
02/28/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	41	1030	614	12
Future Volume (vph)	0	0	41	1030	614	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	10	10	10	12
Total Lost time (s)			6.0	2.5	2.5	
Lane Util. Factor			1.00	1.00	1.00	
Fr _t			1.00	1.00	1.00	
Fl _t Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1565	1647	1612	
Fl _t Permitted			0.09	1.00	1.00	
Satd. Flow (perm)			148	1647	1612	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	43	1084	646	13
RTOR Reduction (vph)	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	43	1084	658	0
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%
Turn Type			pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases			6	1 3 4 7	2	
Actuated Green, G (s)			54.6	112.1	40.3	
Effective Green, g (s)			54.6	117.5	43.8	
Actuated g/C Ratio			0.46	0.98	0.36	
Clearance Time (s)			6.0	6.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			187	1647	588	
v/s Ratio Prot			0.02	c0.26	c0.41	
v/s Ratio Perm			0.08	0.40		
v/c Ratio			0.23	0.66	1.12	
Uniform Delay, d1			25.3	0.1	38.1	
Progression Factor			1.28	1.00	0.97	
Incremental Delay, d2			0.1	0.1	73.2	
Delay (s)			32.5	0.2	110.2	
Level of Service			C	A	F	
Approach Delay (s)	0.0			1.4	110.2	
Approach LOS	A			A	F	

Intersection Summary			
HCM 2000 Control Delay	41.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1: County Line Road & Lancaster Ave

PM Peak TWLT Entire Length

02/25/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕			↕	
Traffic Volume (vph)	8	774	704	16	543	15	485	13	13	7	16	14
Future Volume (vph)	8	774	704	16	543	15	485	13	13	7	16	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25				25
Link Distance (ft)		497			631			170				160
Travel Time (s)		13.6			17.2			4.6				4.4
Lane Group Flow (vph)	0	1564	0	0	605	0	271	268	0	0	39	0
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	29.0	29.0		29.0	29.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	36.0	36.0		36.0	36.0		11.0	11.0		10.0	10.0	
Total Split (s)	42.0	42.0		42.0	42.0		17.0	17.0		21.0	21.0	
Total Split (%)	52.5%	52.5%		52.5%	52.5%		21.3%	21.3%		26.3%	26.3%	
Maximum Green (s)	35.0	35.0		35.0	35.0		10.0	10.0		15.0	15.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		2.0	2.0	
Lost Time Adjust (s)		-4.5			-4.5		-4.5	-4.5				-4.5
Total Lost Time (s)		2.5			2.5		2.5	2.5				1.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	None		None	None		None	None	
Act Effct Green (s)		44.7			44.7		22.0	22.0				11.4
Actuated g/C Ratio		0.56			0.56		0.28	0.28				0.14
v/c Ratio		0.89			0.40		0.62	0.63				0.16
Control Delay		21.1			12.2		33.0	33.3				22.4
Queue Delay		0.0			0.0		0.0	0.0				0.0
Total Delay		21.1			12.2		33.0	33.3				22.4
LOS		C			B		C	C				C
Approach Delay		21.1			12.2			33.1				22.4
Approach LOS		C			B			C				C
Queue Length 50th (ft)		307			97		122	120				11
Queue Length 95th (ft)		#497			138		#218	#229				36
Internal Link Dist (ft)		417			551			90				80
Turn Bay Length (ft)												
Base Capacity (vph)		1762			1516		437	425				403
Starvation Cap Reductn		0			0		0	0				0
Spillback Cap Reductn		0			0		0	0				0
Storage Cap Reductn		0			0		0	0				0
Reduced v/c Ratio		0.89			0.40		0.62	0.63				0.10

Intersection Summary

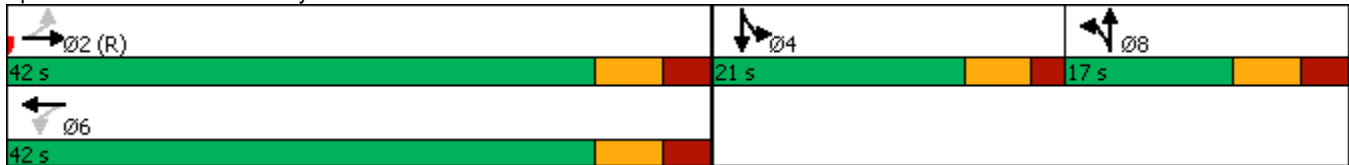
Lanes, Volumes, Timings
 1: County Line Road & Lancaster Ave

PM Peak TWLT Entire Length

02/25/2019

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 21.5 Intersection LOS: C
 Intersection Capacity Utilization 81.1% ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: County Line Road & Lancaster Ave



HCM Signalized Intersection Capacity Analysis
1: County Line Road & Lancaster Ave

PM Peak TWLT Entire Length
02/25/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕			↕	
Traffic Volume (vph)	8	774	704	16	543	15	485	13	13	7	16	14
Future Volume (vph)	8	774	704	16	543	15	485	13	13	7	16	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%				3%
Total Lost time (s)		2.5			2.5		2.5	2.5				1.5
Lane Util. Factor		0.95			0.95		0.95	0.95				1.00
Frt		0.93			1.00		1.00	0.99				0.95
Flt Protected		1.00			1.00		0.95	0.96				0.99
Satd. Flow (prot)		2979			3292		1592	1540				1610
Flt Permitted		0.95			0.82		0.95	0.96				0.99
Satd. Flow (perm)		2836			2711		1592	1540				1610
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	815	741	17	572	16	511	14	14	7	17	15
RTOR Reduction (vph)	0	189	0	0	2	0	0	2	0	0	13	0
Lane Group Flow (vph)	0	1375	0	0	603	0	271	266	0	0	26	0
Heavy Vehicles (%)	0%	1%	1%	0%	2%	0%	1%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)		37.8			37.8		17.5	17.5				4.7
Effective Green, g (s)		42.3			42.3		22.0	22.0				9.2
Actuated g/C Ratio		0.53			0.53		0.28	0.28				0.11
Clearance Time (s)		7.0			7.0		7.0	7.0				6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0				3.0
Lane Grp Cap (vph)		1499			1433		437	423				185
v/s Ratio Prot							0.17	c0.17				c0.02
v/s Ratio Perm		c0.48			0.22							
v/c Ratio		0.92			0.42		0.62	0.63				0.14
Uniform Delay, d1		17.2			11.4		25.3	25.4				31.8
Progression Factor		1.00			1.00		1.00	1.00				1.00
Incremental Delay, d2		10.4			0.2		2.7	2.9				0.3
Delay (s)		27.6			11.6		28.1	28.3				32.2
Level of Service		C			B		C	C				C
Approach Delay (s)		27.6			11.6			28.2				32.2
Approach LOS		C			B			C				C
Intersection Summary												
HCM 2000 Control Delay			24.3				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			80.0				Sum of lost time (s)			11.0		
Intersection Capacity Utilization			81.1%				ICU Level of Service				D	
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

PM Peak TWLT Entire Length

4: Glenbrook Ave & County Line Road & Thomas Ave & Conestoga Rd

02/25/2019



Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Traffic Volume (vph)	80	11	14	4	367	418	23	5	591	19	3	388
Future Volume (vph)	80	11	14	4	367	418	23	5	591	19	3	388
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Storage Length (ft)		0	0		215		0	75		0		0
Storage Lanes		1	0		1		0	1		0		1
Taper Length (ft)		25			25			25				
Right Turn on Red				No			No				No	
Link Speed (mph)		25				25			25			
Link Distance (ft)		350				317			418			
Travel Time (s)		9.5				8.6			11.4			
Lane Group Flow (vph)	0	116	0	0	390	469	0	5	652	0	0	440
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA			Perm
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2			1
Detector Phase	8	8			6	6		2	2			1
Switch Phase												
Minimum Initial (s)	3.0	3.0			20.0	20.0		20.0	20.0			20.0
Minimum Split (s)	12.0	12.0			27.0	27.0		27.0	27.0			27.0
Total Split (s)	12.0	12.0			27.0	63.0		36.0	36.0			27.0
Total Split (%)	16.0%	16.0%			36.0%	84.0%		48.0%	48.0%			36.0%
Maximum Green (s)	4.0	4.0			20.0	56.0		29.0	29.0			20.0
Yellow Time (s)	5.0	5.0			4.0	4.0		4.0	4.0			4.0
All-Red Time (s)	3.0	3.0			3.0	3.0		3.0	3.0			3.0
Lost Time Adjust (s)		-5.0			-4.5	-4.5		0.0	-4.5			-4.5
Total Lost Time (s)		3.0			2.5	2.5		7.0	2.5			2.5
Lead/Lag					Lead			Lag	Lag			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			3.0
Recall Mode	None	None			None	C-Max		C-Max	C-Max			None
Act Effct Green (s)		9.0			62.9	63.4		31.4	35.9			24.5
Actuated g/C Ratio		0.12			0.84	0.85		0.42	0.48			0.33
v/c Ratio		0.62			0.57	0.42		0.02	0.83			0.84
Control Delay		48.0			11.9	3.2		16.6	25.4			40.4
Queue Delay		0.0			0.0	0.0		0.0	0.0			0.0
Total Delay		48.0			11.9	3.2		16.6	25.4			40.4
LOS		D			B	A		B	C			D
Approach Delay		48.0				7.2			25.3			
Approach LOS		D				A			C			
Queue Length 50th (ft)		52			69	53		1	197			188
Queue Length 95th (ft)		#120			155	91		m4	#468			#345
Internal Link Dist (ft)		270				237			338			
Turn Bay Length (ft)					215			75				
Base Capacity (vph)		186			681	1123		310	790			523
Starvation Cap Reductn		0			0	0		0	0			0
Spillback Cap Reductn		0			0	0		0	0			0
Storage Cap Reductn		0			0	0		0	0			0



Lane Group	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Traffic Volume (vph)	25	22	29	19	49
Future Volume (vph)	25	22	29	19	49
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width (ft)	13	12	12	12	12
Grade (%)			-1%		
Storage Length (ft)			0	0	
Storage Lanes			1	0	
Taper Length (ft)			25		
Right Turn on Red	No				No
Link Speed (mph)			25		
Link Distance (ft)			393		
Travel Time (s)			10.7		
Lane Group Flow (vph)	0	0	126	0	0
Turn Type		Perm	Perm		
Protected Phases					
Permitted Phases		4	4		
Detector Phase		4	4		
Switch Phase					
Minimum Initial (s)		3.0	3.0		
Minimum Split (s)		12.0	12.0		
Total Split (s)		12.0	12.0		
Total Split (%)		16.0%	16.0%		
Maximum Green (s)		4.0	4.0		
Yellow Time (s)		5.0	5.0		
All-Red Time (s)		3.0	3.0		
Lost Time Adjust (s)			-5.0		
Total Lost Time (s)			3.0		
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)		3.0	3.0		
Recall Mode		None	None		
Act Effct Green (s)			9.0		
Actuated g/C Ratio			0.12		
v/c Ratio			0.65		
Control Delay			49.1		
Queue Delay			0.0		
Total Delay			49.1		
LOS			D		
Approach Delay			49.1		
Approach LOS			D		
Queue Length 50th (ft)			57		
Queue Length 95th (ft)			#130		
Internal Link Dist (ft)			313		
Turn Bay Length (ft)					
Base Capacity (vph)			194		
Starvation Cap Reductn			0		
Spillback Cap Reductn			0		
Storage Cap Reductn			0		

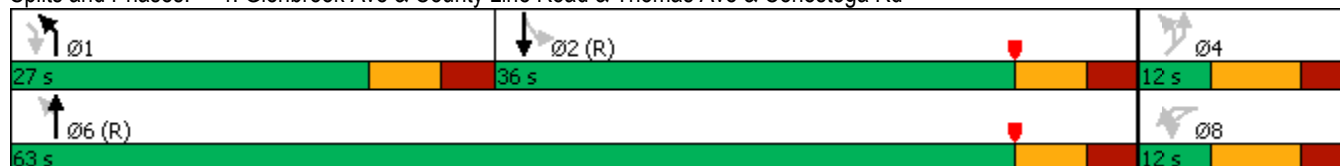


Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Reduced v/c Ratio		0.62			0.57	0.42		0.02	0.83			0.84

Intersection Summary

Area Type:	Other
Cycle Length:	75
Actuated Cycle Length:	75
Offset:	0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
Natural Cycle:	75
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.84
Intersection Signal Delay:	23.8
Intersection LOS:	C
Intersection Capacity Utilization	82.9%
ICU Level of Service	E
Analysis Period (min)	15
#	95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Glenbrook Ave & County Line Road & Thomas Ave & Conestoga Rd





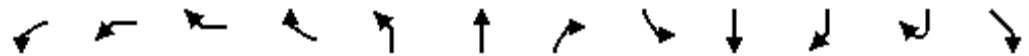
Lane Group	SER2	NEL2	NEL	NER	NER2
Reduced v/c Ratio			0.65		
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

PM Peak TWLT Entire Length

4: Glenbrook Ave & County Line Road & Thomas Ave & Conestoga Rd

02/25/2019



Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Traffic Volume (vph)	80	11	14	4	367	418	23	5	591	19	3	388
Future Volume (vph)	80	11	14	4	367	418	23	5	591	19	3	388
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Total Lost time (s)		3.0			2.5	2.5		7.0	2.5			2.5
Lane Util. Factor		1.00			1.00	*0.81		1.00	1.00			1.00
Frt		0.98			1.00	0.99		1.00	0.99			0.86
Flt Protected		0.96			0.95	1.00		0.95	1.00			1.00
Satd. Flow (prot)		1557			1661	1329		1580	1652			1602
Flt Permitted		0.96			0.16	1.00		0.45	1.00			1.00
Satd. Flow (perm)		1557			271	1329		742	1652			1602
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	85	12	15	4	390	445	24	5	629	20	3	413
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	116	0	0	390	469	0	5	652	0	0	440
Heavy Vehicles (%)	9%	0%	0%	25%	0%	2%	4%	0%	0%	5%	0%	1%
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA			Perm
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2			1
Actuated Green, G (s)		3.2			56.8	56.8		29.8	29.8			20.0
Effective Green, g (s)		8.2			61.3	61.3		29.8	34.3			24.5
Actuated g/C Ratio		0.11			0.82	0.82		0.40	0.46			0.33
Clearance Time (s)		8.0			7.0	7.0		7.0	7.0			7.0
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0			3.0
Lane Grp Cap (vph)		170			675	1086		294	755			523
v/s Ratio Prot					0.19	0.35			c0.39			
v/s Ratio Perm		0.07			0.28			0.01				c0.27
v/c Ratio		0.68			0.58	0.43		0.02	0.86			0.84
Uniform Delay, d1		32.1			11.3	1.9		13.7	18.3			23.4
Progression Factor		1.00			1.00	1.00		1.14	0.84			1.00
Incremental Delay, d2		10.7			1.2	1.3		0.1	10.8			11.7
Delay (s)		42.9			12.5	3.2		15.7	26.1			35.1
Level of Service		D			B	A		B	C			D
Approach Delay (s)		42.9				7.4			26.1			
Approach LOS		D				A			C			

Intersection Summary

HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & County Line Road & Thomas Ave & Conestoga Rd

PM Peak TWLT Entire Length
 02/25/2019



Movement	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Traffic Volume (vph)	25	22	29	19	49
Future Volume (vph)	25	22	29	19	49
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width	13	12	12	12	12
Grade (%)			-1%		
Total Lost time (s)			3.0		
Lane Util. Factor			1.00		
Frt			0.92		
Flt Protected			0.98		
Satd. Flow (prot)			1621		
Flt Permitted			0.98		
Satd. Flow (perm)			1621		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	27	23	31	20	52
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	0	0	126	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	2%
Turn Type		Perm	Perm		
Protected Phases					
Permitted Phases		4	4		
Actuated Green, G (s)			3.2		
Effective Green, g (s)			8.2		
Actuated g/C Ratio			0.11		
Clearance Time (s)			8.0		
Vehicle Extension (s)			3.0		
Lane Grp Cap (vph)			177		
v/s Ratio Prot					
v/s Ratio Perm			c0.08		
v/c Ratio			0.71		
Uniform Delay, d1			32.3		
Progression Factor			1.00		
Incremental Delay, d2			12.7		
Delay (s)			44.9		
Level of Service			D		
Approach Delay (s)			44.9		
Approach LOS			D		
Intersection Summary					

Lanes, Volumes, Timings
8: County Line Road & Lindsay Ave

PM Peak TWLT Entire Length
02/25/2019

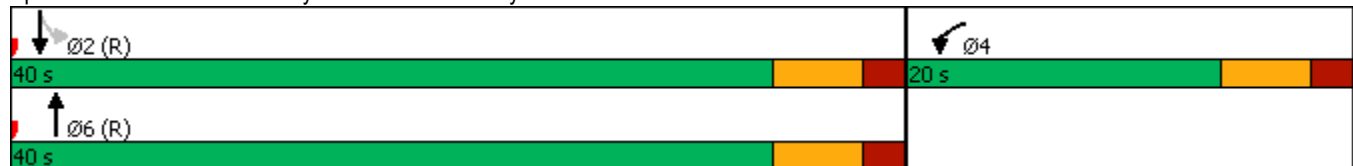


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	6	650	1	1	1060
Future Volume (vph)	9	6	650	1	1	1060
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	16	16	10	10	10	10
Storage Length (ft)	0	0		0	50	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		25			25
Link Distance (ft)	311		340			494
Travel Time (s)	8.5		9.3			13.5
Lane Group Flow (vph)	15	0	685	0	1	1116
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Detector Phase	4		6		2	2
Switch Phase						
Minimum Initial (s)	3.0		15.0		15.0	15.0
Minimum Split (s)	10.0		21.0		21.0	21.0
Total Split (s)	20.0		40.0		40.0	40.0
Total Split (%)	33.3%		66.7%		66.7%	66.7%
Maximum Green (s)	14.0		34.0		34.0	34.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-3.5		-3.5		0.0	-3.5
Total Lost Time (s)	2.5		2.5		6.0	2.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		C-Max	C-Max
Act Effct Green (s)	9.5		56.9		56.2	56.9
Actuated g/C Ratio	0.16		0.95		0.94	0.95
v/c Ratio	0.05		0.44		0.00	0.71
Control Delay	17.6		3.0		2.0	6.7
Queue Delay	0.0		0.0		0.0	50.7
Total Delay	17.6		3.0		2.0	57.4
LOS	B		A		A	E
Approach Delay	17.6		3.0			57.4
Approach LOS	B		A			E
Queue Length 50th (ft)	3		0		0	0
Queue Length 95th (ft)	16		365		1	#599
Internal Link Dist (ft)	231		260			414
Turn Bay Length (ft)					50	
Base Capacity (vph)	550		1562		587	1578
Starvation Cap Reductn	0		35		0	0
Spillback Cap Reductn	0		0		0	787
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.03		0.45		0.00	1.41

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	36.5
Intersection LOS:	D
Intersection Capacity Utilization:	68.9%
ICU Level of Service:	C
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 8: County Line Road & Lindsay Ave



HCM Signalized Intersection Capacity Analysis
8: County Line Road & Lindsay Ave

PM Peak TWLT Entire Length
02/25/2019



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	6	650	1	1	1060
Future Volume (vph)	9	6	650	1	1	1060
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	16	16	10	10	10	10
Total Lost time (s)	2.5		2.5		6.0	2.5
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.95		1.00		1.00	1.00
Flt Protected	0.97		1.00		0.95	1.00
Satd. Flow (prot)	1874		1647		1596	1663
Flt Permitted	0.97		1.00		0.37	1.00
Satd. Flow (perm)	1874		1647		627	1663
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	6	684	1	1	1116
RTOR Reduction (vph)	6	0	0	0	0	0
Lane Group Flow (vph)	9	0	685	0	1	1116
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Actuated Green, G (s)	1.4		46.6		46.6	46.6
Effective Green, g (s)	4.9		50.1		46.6	50.1
Actuated g/C Ratio	0.08		0.84		0.78	0.84
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	153		1375		486	1388
v/s Ratio Prot	c0.01		0.42			c0.67
v/s Ratio Perm					0.00	
v/c Ratio	0.06		0.50		0.00	0.80
Uniform Delay, d1	25.4		1.4		1.5	2.5
Progression Factor	1.00		2.01		1.00	1.00
Incremental Delay, d2	0.2		1.2		0.0	5.0
Delay (s)	25.6		4.0		1.5	7.5
Level of Service	C		A		A	A
Approach Delay (s)	25.6		4.0			7.5
Approach LOS	C		A			A

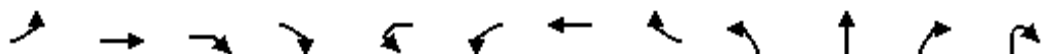
Intersection Summary

HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9: County Line Road & Railroad Ave & Bryn Mawr Ave

PM Peak TWLT Entire Length
02/25/2019



Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	99	241	46	137	6	207	365	71	104	511	73	4
Future Volume (vph)	99	241	46	137	6	207	365	71	104	511	73	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	15	11	12	12	12	11	11	13	10	10	10	10
Storage Length (ft)	140		0			185		160	70		0	
Storage Lanes	1		0			1		1	1		0	
Taper Length (ft)	25					25			25			
Right Turn on Red				Yes				Yes				Yes
Link Speed (mph)		40					30			25		
Link Distance (ft)		547					508			526		
Travel Time (s)		9.3					11.5			14.3		
Lane Group Flow (vph)	100	427	0	0	0	215	369	72	105	594	0	0
Turn Type	pm+pt	NA			pm+pt	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	3	8			7	7	4		1	6		
Permitted Phases	8	8			4	4	4	4	6	6		
Detector Phase	3	8			7	7	4	4	1	6		
Switch Phase												
Minimum Initial (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0	10.0		
Minimum Split (s)	9.0	10.0			9.0	9.0	10.0	10.0	9.0	16.0		
Total Split (s)	14.0	47.0			14.0	14.0	47.0	47.0	12.0	47.0		
Total Split (%)	11.7%	39.2%			11.7%	11.7%	39.2%	39.2%	10.0%	39.2%		
Maximum Green (s)	8.0	41.0			8.0	8.0	41.0	41.0	6.0	41.0		
Yellow Time (s)	3.0	4.0			3.0	3.0	4.0	4.0	3.0	3.0		
All-Red Time (s)	3.0	2.0			3.0	3.0	2.0	2.0	3.0	3.0		
Lost Time Adjust (s)	-3.5	-3.5					-3.5	-3.5	-3.5	-3.5		
Total Lost Time (s)	2.5	2.5					2.5	2.5	2.5	2.5		
Lead/Lag	Lead	Lag			Lead	Lead	Lag	Lag	Lead	Lag		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0	3.0		
Recall Mode	None	None			None	None	None	None	None	C-Max		
Act Effct Green (s)	49.4	38.2					49.9	38.4	38.4	61.5	52.4	
Actuated g/C Ratio	0.41	0.32					0.42	0.32	0.32	0.51	0.44	
v/c Ratio	0.29	0.81					0.79	0.66	0.12	0.54	0.84	
Control Delay	21.0	47.5					43.4	40.8	0.4	38.3	36.6	
Queue Delay	0.0	0.0					0.0	0.0	0.0	0.0	1.5	
Total Delay	21.1	47.5					43.4	40.8	0.4	38.3	38.2	
LOS	C	D					D	D	A	D	D	
Approach Delay		42.5						37.2			38.2	
Approach LOS		D						D			D	
Queue Length 50th (ft)	45	284					104	243	0	49	255	
Queue Length 95th (ft)	73	387					#159	328	0	m100	m#687	
Internal Link Dist (ft)		467						428			446	
Turn Bay Length (ft)	140						185		160	70		
Base Capacity (vph)	354	612					272	645	665	194	711	
Starvation Cap Reductn	0	0					0	0	0	0	34	
Spillback Cap Reductn	9	2					0	0	0	0	0	
Storage Cap Reductn	0	0					0	0	0	0	0	
Reduced v/c Ratio	0.29	0.70					0.79	0.57	0.11	0.54	0.88	

Lanes, Volumes, Timings
 9: County Line Road & Railroad Ave & Bryn Mawr Ave

PM Peak TWLT Entire Length
 02/25/2019

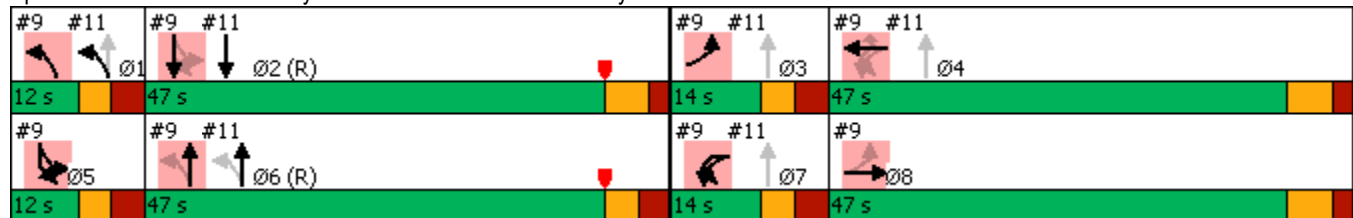


Lane Group	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	37	26	921	71
Future Volume (vph)	37	26	921	71
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width (ft)	10	10	10	12
Storage Length (ft)		50		0
Storage Lanes		1		0
Taper Length (ft)		25		
Right Turn on Red				Yes
Link Speed (mph)			25	
Link Distance (ft)			198	
Travel Time (s)			5.4	
Lane Group Flow (vph)	0	63	1002	0
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	5	5	2	
Permitted Phases	2	2	2	
Detector Phase	5	5	2	
Switch Phase				
Minimum Initial (s)	3.0	3.0	10.0	
Minimum Split (s)	9.0	9.0	16.0	
Total Split (s)	12.0	12.0	47.0	
Total Split (%)	10.0%	10.0%	39.2%	
Maximum Green (s)	6.0	6.0	41.0	
Yellow Time (s)	3.0	3.0	4.0	
All-Red Time (s)	3.0	3.0	2.0	
Lost Time Adjust (s)		-3.5	-3.5	
Total Lost Time (s)		2.5	2.5	
Lead/Lag	Lead	Lead	Lag	
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	
Act Effct Green (s)		59.5	49.3	
Actuated g/C Ratio		0.50	0.41	
v/c Ratio		0.25	1.48	
Control Delay		9.7	234.8	
Queue Delay		0.1	2.1	
Total Delay		9.9	236.9	
LOS		A	F	
Approach Delay			223.5	
Approach LOS			F	
Queue Length 50th (ft)		6	~562	
Queue Length 95th (ft)		m4	m#86	
Internal Link Dist (ft)			118	
Turn Bay Length (ft)		50		
Base Capacity (vph)		254	676	
Starvation Cap Reductn		19	29	
Spillback Cap Reductn		0	166	
Storage Cap Reductn		0	0	
Reduced v/c Ratio		0.27	1.96	

Intersection Summary

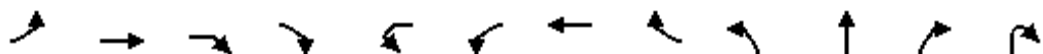
Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 41 (34%), Referenced to phase 2:SBTL and 6:NBTl, Start of Yellow
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.57
 Intersection Signal Delay: 105.7 Intersection LOS: F
 Intersection Capacity Utilization 112.8% ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: County Line Road & Railroad Ave & Bryn Mawr Ave



HCM Signalized Intersection Capacity Analysis
 9: County Line Road & Railroad Ave & Bryn Mawr Ave

PM Peak TWLT Entire Length
 02/25/2019



Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations	↖	↗				↘	↖	↗	↖	↗		
Traffic Volume (vph)	99	241	46	137	6	207	365	71	104	511	73	4
Future Volume (vph)	99	241	46	137	6	207	365	71	104	511	73	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	15	11	12	12	12	11	11	13	10	10	10	10
Total Lost time (s)	2.5	2.5				2.5	2.5	2.5	2.5	2.5		
Lane Util. Factor	1.00	1.00				1.00	1.00	1.00	1.00	1.00		
Fr _t	1.00	0.94				1.00	1.00	0.85	1.00	0.98		
Fl _t Protected	0.95	1.00				0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1862	1614				1653	1740	1565	1535	1631		
Fl _t Permitted	0.28	1.00				0.20	1.00	1.00	0.08	1.00		
Satd. Flow (perm)	552	1614				355	1740	1565	126	1631		
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	100	243	46	138	6	209	369	72	105	516	74	4
RTOR Reduction (vph)	0	16	0	0	0	0	0	49	0	0	0	0
Lane Group Flow (vph)	100	411	0	0	0	215	369	23	105	594	0	0
Heavy Vehicles (%)	1%	0%	2%	2%	0%	0%	0%	1%	4%	1%	1%	0%
Turn Type	pm+pt	NA			pm+pt	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	3	8			7	7	4		1	6		
Permitted Phases	8	8			4	4	4	4	6	6		
Actuated Green, G (s)	42.5	34.7				42.9	34.9	34.9	55.3	47.7		
Effective Green, g (s)	49.5	38.2				49.9	38.4	38.4	62.3	51.2		
Actuated g/C Ratio	0.41	0.32				0.42	0.32	0.32	0.52	0.43		
Clearance Time (s)	6.0	6.0				6.0	6.0	6.0	6.0	6.0		
Vehicle Extension (s)	3.0	3.0				3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	351	513				272	556	500	195	695		
v/s Ratio Prot	0.03	c0.25				c0.08	0.21		c0.05	0.36		
v/s Ratio Perm	0.09					0.25		0.01	0.23			
v/c Ratio	0.28	0.80				0.79	0.66	0.05	0.54	0.85		
Uniform Delay, d ₁	23.4	37.4				26.5	35.2	28.2	24.8	31.0		
Progression Factor	1.00	1.00				1.00	1.00	1.00	1.40	0.80		
Incremental Delay, d ₂	0.4	8.8				14.4	3.0	0.0	2.2	10.3		
Delay (s)	23.9	46.2				40.9	38.2	28.2	37.1	35.2		
Level of Service	C	D				D	D	C	D	D		
Approach Delay (s)		42.0					38.0			35.5		
Approach LOS		D					D			D		

Intersection Summary

HCM 2000 Control Delay	101.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	112.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: County Line Road & Railroad Ave & Bryn Mawr Ave

PM Peak TWLT Entire Length
 02/25/2019



Movement	SBL2	SBL	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	37	26	921	71
Future Volume (vph)	37	26	921	71
Ideal Flow (vphpl)	1800	1800	1800	1800
Lane Width	10	10	10	12
Total Lost time (s)		2.5	2.5	
Lane Util. Factor		1.00	1.00	
Fr _t		1.00	0.99	
Fl _t Protected		0.95	1.00	
Satd. Flow (prot)		1568	1642	
Fl _t Permitted		0.18	1.00	
Satd. Flow (perm)		293	1642	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99
Adj. Flow (vph)	37	26	930	72
RTOR Reduction (vph)	0	0	2	0
Lane Group Flow (vph)	0	63	1000	0
Heavy Vehicles (%)	3%	0%	1%	4%
Turn Type	pm+pt	pm+pt	NA	
Protected Phases	5	5	2	
Permitted Phases	2	2	2	
Actuated Green, G (s)		51.3	45.7	
Effective Green, g (s)		58.3	49.2	
Actuated g/C Ratio		0.49	0.41	
Clearance Time (s)		6.0	6.0	
Vehicle Extension (s)		3.0	3.0	
Lane Grp Cap (vph)		239	673	
v/s Ratio Prot		0.02	c0.61	
v/s Ratio Perm		0.11		
v/c Ratio		0.26	1.49	
Uniform Delay, d ₁		20.5	35.4	
Progression Factor		0.58	0.23	
Incremental Delay, d ₂		0.1	219.1	
Delay (s)		12.0	227.3	
Level of Service		B	F	
Approach Delay (s)			214.5	
Approach LOS			F	
Intersection Summary				

Lanes, Volumes, Timings
11: County Line Road & Glenbrook Ave

PM Peak TWLT Entire Length
02/25/2019

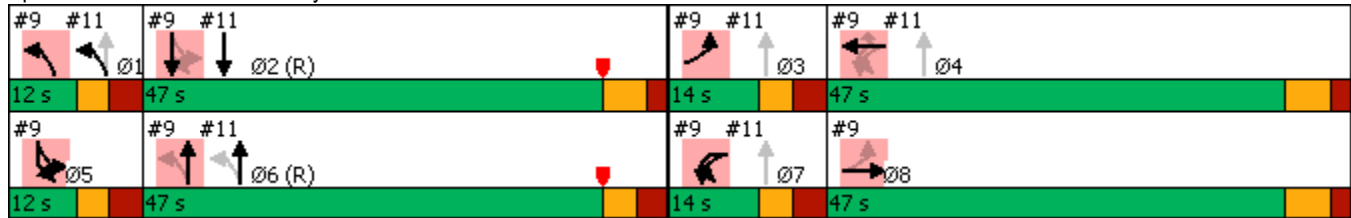


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3	Ø4	Ø5	Ø7	Ø8
Lane Configurations											
Traffic Volume (vph)	0	0	26	681	1055	7					
Future Volume (vph)	0	0	26	681	1055	7					
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800					
Lane Width (ft)	12	12	10	10	10	11					
Storage Length (ft)	0	0	45			0					
Storage Lanes	0	0	1			0					
Taper Length (ft)	25		25								
Right Turn on Red		Yes				Yes					
Link Speed (mph)	35			25	25						
Link Distance (ft)	228			198	340						
Travel Time (s)	4.4			5.4	9.3						
Lane Group Flow (vph)	0	0	26	688	1073	0					
Turn Type			pm+pt	NA	NA						
Protected Phases			1	6	2		3	4	5	7	8
Permitted Phases			6	1 3 4 7	2						
Detector Phase			1	6	2						
Switch Phase											
Minimum Initial (s)			3.0	10.0	10.0		3.0	3.0	3.0	3.0	3.0
Minimum Split (s)			9.0	16.0	16.0		9.0	10.0	9.0	9.0	10.0
Total Split (s)			12.0	47.0	47.0		14.0	47.0	12.0	14.0	47.0
Total Split (%)			10.0%	39.2%	39.2%		12%	39%	10%	12%	39%
Maximum Green (s)			6.0	41.0	41.0		8.0	41.0	6.0	8.0	41.0
Yellow Time (s)			3.0	3.0	4.0		3.0	4.0	3.0	3.0	4.0
All-Red Time (s)			3.0	3.0	2.0		3.0	2.0	3.0	3.0	2.0
Lost Time Adjust (s)			0.0	-3.5	-3.5						
Total Lost Time (s)			6.0	2.5	2.5						
Lead/Lag			Lead	Lag	Lag		Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)			3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode			None	C-Max	C-Max		None	None	None	None	None
Act Effct Green (s)			55.2	119.4	49.3						
Actuated g/C Ratio			0.46	1.00	0.41						
v/c Ratio			0.17	0.42	1.57						
Control Delay			18.0	1.1	290.7						
Queue Delay			0.0	0.4	2.3						
Total Delay			18.0	1.5	293.0						
LOS			B	A	F						
Approach Delay				2.1	293.0						
Approach LOS				A	F						
Queue Length 50th (ft)			7	0	~1218						
Queue Length 95th (ft)			m12	m23	#1493						
Internal Link Dist (ft)	148			118	260						
Turn Bay Length (ft)			45								
Base Capacity (vph)			155	1638	682						
Starvation Cap Reductn			0	442	12						
Spillback Cap Reductn			0	69	184						
Storage Cap Reductn			0	0	0						
Reduced v/c Ratio			0.17	0.58	2.15						

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	41 (34%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.57
Intersection Signal Delay:	176.8
Intersection LOS:	F
Intersection Capacity Utilization:	62.4%
ICU Level of Service:	B
Analysis Period (min)	15
~	Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.
#	95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: County Line Road & Glenbrook Ave



HCM Signalized Intersection Capacity Analysis
 11: County Line Road & Glenbrook Ave

PM Peak TWLT Entire Length
 02/25/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	26	681	1055	7
Future Volume (vph)	0	0	26	681	1055	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	10	10	10	11
Total Lost time (s)			6.0	2.5	2.5	
Lane Util. Factor			1.00	1.00	1.00	
Fr _t			1.00	1.00	1.00	
Fl _t Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1580	1647	1662	
Fl _t Permitted			0.08	1.00	1.00	
Satd. Flow (perm)			139	1647	1662	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	0	26	688	1066	7
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	26	688	1073	0
Heavy Vehicles (%)	0%	0%	1%	2%	1%	2%
Turn Type			pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases			6	1 3 4 7	2	
Actuated Green, G (s)			55.3	104.2	45.7	
Effective Green, g (s)			55.3	114.7	49.2	
Actuated g/C Ratio			0.46	0.96	0.41	
Clearance Time (s)			6.0	6.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			155	1608	681	
v/s Ratio Prot			0.01	c0.18	c0.65	
v/s Ratio Perm			0.07	0.24		
v/c Ratio			0.17	0.43	1.58	
Uniform Delay, d1			25.8	0.2	35.4	
Progression Factor			0.88	157.72	0.96	
Incremental Delay, d2			0.4	0.1	264.0	
Delay (s)			23.2	31.4	298.2	
Level of Service			C	C	F	
Approach Delay (s)	0.0			31.1	298.2	
Approach LOS	A			C	F	
Intersection Summary						
HCM 2000 Control Delay			191.4		HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			1.06			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	20.5
Intersection Capacity Utilization			62.4%		ICU Level of Service	B
Analysis Period (min)			15			

c Critical Lane Group

Lanes, Volumes, Timings
1: County Line Rd & Lancaster Ave

SAT Peak TWLT Entire Length

02/28/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↗	↕↕			↕↕	
Traffic Volume (vph)	21	536	366	12	551	27	427	27	18	13	12	13
Future Volume (vph)	21	536	366	12	551	27	427	27	18	13	12	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%			3%	
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		497			631			170			160	
Travel Time (s)		13.6			17.2			4.6			4.4	
Lane Group Flow (vph)	0	981	0	0	628	0	250	252	0	0	41	0
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	29.0	29.0		29.0	29.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		10.0	10.0		9.0	9.0	
Total Split (s)	42.0	42.0		42.0	42.0		17.0	17.0		21.0	21.0	
Total Split (%)	52.5%	52.5%		52.5%	52.5%		21.3%	21.3%		26.3%	26.3%	
Maximum Green (s)	36.0	36.0		36.0	36.0		11.0	11.0		16.0	16.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		2.0	2.0	
Lost Time Adjust (s)		-4.5			-3.5		-3.5	-3.5			-2.5	
Total Lost Time (s)		1.5			2.5		2.5	2.5			2.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	None		None	None		None	None	
Act Effct Green (s)		46.6			45.6		21.6	21.6			9.5	
Actuated g/C Ratio		0.58			0.57		0.27	0.27			0.12	
v/c Ratio		0.55			0.35		0.61	0.62			0.20	
Control Delay		9.6			11.2		32.4	32.7			25.3	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		9.6			11.2		32.4	32.7			25.3	
LOS		A			B		C	C			C	
Approach Delay		9.6			11.2			32.5			25.3	
Approach LOS		A			B			C			C	
Queue Length 50th (ft)		122			97		115	115			12	
Queue Length 95th (ft)		182			137		195	195			40	
Internal Link Dist (ft)		417			551			90			80	
Turn Bay Length (ft)												
Base Capacity (vph)		1776			1779		412	404			381	
Starvation Cap Reductn		0			0		0	0			0	
Spillback Cap Reductn		0			0		0	0			0	
Storage Cap Reductn		0			0		0	0			0	
Reduced v/c Ratio		0.55			0.35		0.61	0.62			0.11	

Intersection Summary

Lanes, Volumes, Timings
 1: County Line Rd & Lancaster Ave

SAT Peak TWLT Entire Length

02/28/2019


















Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 15.7 Intersection LOS: B
 Intersection Capacity Utilization 72.0% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1: County Line Rd & Lancaster Ave



HCM Signalized Intersection Capacity Analysis
 1: County Line Rd & Lancaster Ave

SAT Peak TWLT Entire Length
 02/28/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	536	366	12	551	27	427	27	18	13	12	13
Future Volume (vph)	21	536	366	12	551	27	427	27	18	13	12	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	12	11	11	11	11	11
Grade (%)		4%			-4%			2%			3%	
Total Lost time (s)		1.5			2.5		2.5	2.5			2.5	
Lane Util. Factor		0.95			0.95		0.95	0.95			1.00	
Frt		0.94			0.99		1.00	0.99			0.95	
Flt Protected		1.00			1.00		0.95	0.96			0.98	
Satd. Flow (prot)		3042			3345		1532	1492			1602	
Flt Permitted		0.93			0.93		0.95	0.96			0.98	
Satd. Flow (perm)		2848			3116		1532	1492			1602	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	22	570	389	13	586	29	454	29	19	14	13	14
RTOR Reduction (vph)	0	123	0	0	4	0	0	3	0	0	13	0
Lane Group Flow (vph)	0	858	0	0	624	0	250	249	0	0	28	0
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	5%	1%	1%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		2			6		8	8		4	4	
Permitted Phases	2			6								
Actuated Green, G (s)		40.1			40.1		18.1	18.1			4.8	
Effective Green, g (s)		44.6			43.6		21.6	21.6			7.3	
Actuated g/C Ratio		0.56			0.55		0.27	0.27			0.09	
Clearance Time (s)		6.0			6.0		6.0	6.0			5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		1587			1698		413	402			146	
v/s Ratio Prot							0.16	c0.17			c0.02	
v/s Ratio Perm		c0.30			0.20							
v/c Ratio		0.54			0.37		0.61	0.62			0.19	
Uniform Delay, d1		11.2			10.4		25.5	25.6			33.6	
Progression Factor		1.00			1.00		1.01	1.01			1.00	
Incremental Delay, d2		1.3			0.1		2.4	2.7			0.7	
Delay (s)		12.5			10.5		28.1	28.5			34.3	
Level of Service		B			B		C	C			C	
Approach Delay (s)		12.5			10.5		28.3	28.3			34.3	
Approach LOS		B			B		C	C			C	
Intersection Summary												
HCM 2000 Control Delay			16.0				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			80.0				Sum of lost time (s)			10.0		
Intersection Capacity Utilization			72.0%				ICU Level of Service			C		
Analysis Period (min)			15									
c	Critical Lane Group											

Lanes, Volumes, Timings

SAT Peak TWLT Entire Length

4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

02/28/2019



Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Traffic Volume (vph)	18	3	5	6	255	427	27	4	363	6	4	296
Future Volume (vph)	18	3	5	6	255	427	27	4	363	6	4	296
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Storage Length (ft)		0	0		200		0	75		0		0
Storage Lanes		1	0		1		0	1		0		1
Taper Length (ft)		25			25			25				
Right Turn on Red				No			No				No	
Link Speed (mph)		25				25			25			
Link Distance (ft)		350				317			418			
Travel Time (s)		9.5				8.6			11.4			
Lane Group Flow (vph)	0	33	0	0	266	473	0	4	388	0	0	319
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA			Perm
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2			1
Detector Phase	8	8			6	6		2	2			1
Switch Phase												
Minimum Initial (s)	3.0	3.0			20.0	20.0		20.0	20.0			20.0
Minimum Split (s)	10.0	10.0			27.0	27.0		27.0	27.0			27.0
Total Split (s)	17.0	17.0			32.0	63.0		31.0	31.0			32.0
Total Split (%)	21.3%	21.3%			40.0%	78.8%		38.8%	38.8%			40.0%
Maximum Green (s)	10.0	10.0			25.0	56.0		24.0	24.0			25.0
Yellow Time (s)	3.0	3.0			4.0	4.0		4.0	4.0			4.0
All-Red Time (s)	4.0	4.0			3.0	3.0		3.0	3.0			3.0
Lost Time Adjust (s)		-4.5			-4.5	-4.5		0.0	-4.5			-4.5
Total Lost Time (s)		2.5			2.5	2.5		7.0	2.5			2.5
Lead/Lag					Lead			Lag	Lag			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			3.0
Recall Mode	None	None			None	C-Max		C-Max	C-Max			None
Act Effct Green (s)		13.5			64.0	64.5		30.6	35.1			26.4
Actuated g/C Ratio		0.17			0.80	0.81		0.38	0.44			0.33
v/c Ratio		0.12			0.32	0.44		0.01	0.54			0.60
Control Delay		28.8			3.7	4.9		12.5	15.8			27.3
Queue Delay		0.0			0.0	0.0		0.0	0.0			0.0
Total Delay		28.8			3.7	4.9		12.5	15.8			27.3
LOS		C			A	A		B	B			C
Approach Delay		28.8				4.4			15.7			
Approach LOS		C				A			B			
Queue Length 50th (ft)		14			30	85		1	128			135
Queue Length 95th (ft)		38			50	144		m3	264			201
Internal Link Dist (ft)		270				237			338			
Turn Bay Length (ft)					200			75				
Base Capacity (vph)		289			831	1071		282	719			596
Starvation Cap Reductn		0			0	0		0	0			0
Spillback Cap Reductn		0			0	0		0	0			0
Storage Cap Reductn		0			0	0		0	0			0



Lane Group	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Traffic Volume (vph)	11	14	34	22	51
Future Volume (vph)	11	14	34	22	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width (ft)	13	12	12	12	12
Grade (%)			-1%		
Storage Length (ft)			0	0	
Storage Lanes			1	0	
Taper Length (ft)			25		
Right Turn on Red	No				No
Link Speed (mph)			25		
Link Distance (ft)			393		
Travel Time (s)			10.7		
Lane Group Flow (vph)	0	0	126	0	0
Turn Type		Perm	Perm		
Protected Phases					
Permitted Phases		4	4		
Detector Phase		4	4		
Switch Phase					
Minimum Initial (s)		3.0	3.0		
Minimum Split (s)		10.0	10.0		
Total Split (s)		17.0	17.0		
Total Split (%)		21.3%	21.3%		
Maximum Green (s)		10.0	10.0		
Yellow Time (s)		3.0	3.0		
All-Red Time (s)		4.0	4.0		
Lost Time Adjust (s)			-4.5		
Total Lost Time (s)			2.5		
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)		3.0	3.0		
Recall Mode		None	None		
Act Effct Green (s)			13.8		
Actuated g/C Ratio			0.17		
v/c Ratio			0.45		
Control Delay			35.2		
Queue Delay			0.0		
Total Delay			35.2		
LOS			D		
Approach Delay			35.2		
Approach LOS			D		
Queue Length 50th (ft)			56		
Queue Length 95th (ft)			108		
Internal Link Dist (ft)			313		
Turn Bay Length (ft)					
Base Capacity (vph)			293		
Starvation Cap Reductn			0		
Spillback Cap Reductn			0		
Storage Cap Reductn			0		

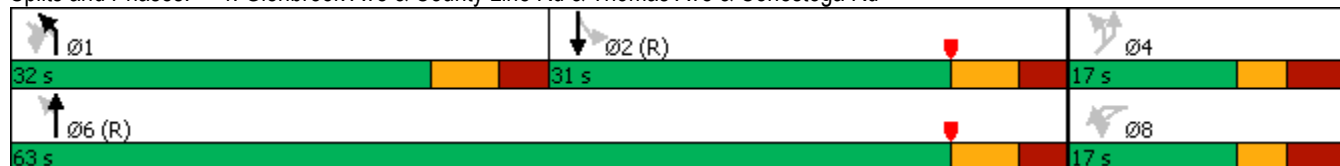


Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Reduced v/c Ratio		0.11			0.32	0.44		0.01	0.54			0.54

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
Natural Cycle:	65
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.60
Intersection Signal Delay:	14.6
Intersection LOS:	B
Intersection Capacity Utilization	68.8%
ICU Level of Service	C
Analysis Period (min)	15
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd





Lane Group	SER2	NEL2	NEL	NER	NER2
Reduced v/c Ratio			0.43		
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd

SAT Peak TWLT Entire Length
 02/28/2019



Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER
Lane Configurations												
Traffic Volume (vph)	18	3	5	6	255	427	27	4	363	6	4	296
Future Volume (vph)	18	3	5	6	255	427	27	4	363	6	4	296
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	11	10	10	10	10	10	10	13
Grade (%)		2%				-1%			2%			
Total Lost time (s)		2.5			2.5	2.5		7.0	2.5			2.5
Lane Util. Factor		1.00			1.00	*0.81		1.00	1.00			1.00
Frt		0.95			1.00	0.99		1.00	1.00			0.86
Flt Protected		0.97			0.95	1.00		0.95	1.00			1.00
Satd. Flow (prot)		1599			1661	1330		1580	1641			1617
Flt Permitted		0.97			0.35	1.00		0.44	1.00			1.00
Satd. Flow (perm)		1599			604	1330		739	1641			1617
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	19	3	5	6	266	445	28	4	378	6	4	308
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	33	0	0	266	473	0	4	388	0	0	319
Heavy Vehicles (%)	0%	33%	0%	0%	0%	2%	0%	0%	1%	0%	0%	0%
Turn Type	Perm	Perm			pm+pt	NA		Perm	NA			Perm
Protected Phases					1	6			2			
Permitted Phases	8	8			6			2	2			1
Actuated Green, G (s)		7.9			58.1	58.1		29.2	29.2			21.9
Effective Green, g (s)		12.4			62.6	62.6		29.2	33.7			26.4
Actuated g/C Ratio		0.16			0.78	0.78		0.36	0.42			0.33
Clearance Time (s)		7.0			7.0	7.0		7.0	7.0			7.0
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0			3.0
Lane Grp Cap (vph)		247			821	1040		269	691			533
v/s Ratio Prot					0.11	0.36			c0.24			
v/s Ratio Perm		0.02			0.15			0.01				c0.20
v/c Ratio		0.13			0.32	0.45		0.01	0.56			0.60
Uniform Delay, d1		29.2			3.7	2.9		16.2	17.5			22.4
Progression Factor		1.00			1.00	1.00		0.64	0.66			1.00
Incremental Delay, d2		0.2			0.2	1.4		0.1	3.2			1.8
Delay (s)		29.4			3.9	4.4		10.5	14.9			24.2
Level of Service		C			A	A		B	B			C
Approach Delay (s)		29.4				4.2			14.9			
Approach LOS		C				A			B			

Intersection Summary

HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 4: Glenbrook Ave & County Line Rd & Thomas Ave & Conestoga Rd











SAT Peak TWLT Entire Length
 02/28/2019



Movement	SER2	NEL2	NEL	NER	NER2
Lane Configurations					
Traffic Volume (vph)	11	14	34	22	51
Future Volume (vph)	11	14	34	22	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800
Lane Width	13	12	12	12	12
Grade (%)			-1%		
Total Lost time (s)			2.5		
Lane Util. Factor			1.00		
Frt			0.92		
Flt Protected			0.98		
Satd. Flow (prot)			1616		
Flt Permitted			0.98		
Satd. Flow (perm)			1616		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	15	35	23	53
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	0	0	126	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	2%
Turn Type		Perm	Perm		
Protected Phases					
Permitted Phases		4	4		
Actuated Green, G (s)			7.9		
Effective Green, g (s)			12.4		
Actuated g/C Ratio			0.16		
Clearance Time (s)			7.0		
Vehicle Extension (s)			3.0		
Lane Grp Cap (vph)			250		
v/s Ratio Prot					
v/s Ratio Perm			c0.08		
v/c Ratio			0.50		
Uniform Delay, d1			31.0		
Progression Factor			1.00		
Incremental Delay, d2			1.6		
Delay (s)			32.6		
Level of Service			C		
Approach Delay (s)			32.6		
Approach LOS			C		
Intersection Summary					

Lanes, Volumes, Timings
8: County Line Rd & Lindsay Ave

SAT Peak TWLT Entire Length
02/28/2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	623	0	1	639
Future Volume (vph)	0	0	623	0	1	639
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	16	16	10	10	10	10
Storage Length (ft)	0	0		0	75	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		25			25
Link Distance (ft)	311		340			494
Travel Time (s)	8.5		9.3			13.5
Lane Group Flow (vph)	0	0	656	0	1	673
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Detector Phase	4		6		2	2
Switch Phase						
Minimum Initial (s)	3.0		15.0		15.0	15.0
Minimum Split (s)	9.0		21.0		21.0	21.0
Total Split (s)	25.0		36.0		36.0	36.0
Total Split (%)	41.0%		59.0%		59.0%	59.0%
Maximum Green (s)	19.0		30.0		30.0	30.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-3.5		-3.5		0.0	-3.5
Total Lost Time (s)	2.5		2.5		6.0	2.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		C-Max	C-Max
Act Effct Green (s)			61.0		61.0	61.0
Actuated g/C Ratio			1.00		1.00	1.00
v/c Ratio			0.39		0.00	0.40
Control Delay			0.7		0.0	0.7
Queue Delay			0.0		0.0	0.0
Total Delay			0.7		0.0	0.7
LOS			A		A	A
Approach Delay			0.7			0.7
Approach LOS			A			A
Queue Length 50th (ft)			0		0	0
Queue Length 95th (ft)			0		0	0
Internal Link Dist (ft)	231		260			414
Turn Bay Length (ft)					75	
Base Capacity (vph)			1663		699	1663
Starvation Cap Reductn			0		0	0
Spillback Cap Reductn			0		0	0
Storage Cap Reductn			0		0	0
Reduced v/c Ratio			0.39		0.00	0.40

Intersection Summary











Area Type:	Other
Cycle Length:	61
Actuated Cycle Length:	61
Offset:	30 (49%), Referenced to phase 2:SBTL and 6:NBT, Start of Yellow
Natural Cycle:	40
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.40
Intersection Signal Delay:	0.7
Intersection LOS:	A
Intersection Capacity Utilization	38.8%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 8: County Line Rd & Lindsay Ave



HCM Signalized Intersection Capacity Analysis
8: County Line Rd & Lindsay Ave

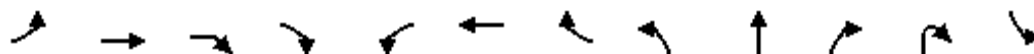
SAT Peak TWLT Entire Length
02/28/2019

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	623	0	1	639
Future Volume (vph)	0	0	623	0	1	639
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	16	16	10	10	10	10
Total Lost time (s)			2.5		6.0	2.5
Lane Util. Factor			1.00		1.00	1.00
Frt			1.00		1.00	1.00
Flt Protected			1.00		0.95	1.00
Satd. Flow (prot)			1663		1596	1663
Flt Permitted			1.00		0.42	1.00
Satd. Flow (perm)			1663		698	1663
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	656	0	1	673
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	656	0	1	673
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Actuated Green, G (s)			61.0		61.0	61.0
Effective Green, g (s)			61.0		61.0	61.0
Actuated g/C Ratio			1.00		1.00	1.00
Clearance Time (s)			6.0		6.0	6.0
Vehicle Extension (s)			3.0		3.0	3.0
Lane Grp Cap (vph)			1663		698	1663
v/s Ratio Prot			0.39			c0.40
v/s Ratio Perm					0.00	
v/c Ratio			0.39		0.00	0.40
Uniform Delay, d1			0.0		0.0	0.0
Progression Factor			1.00		1.00	1.00
Incremental Delay, d2			0.7		0.0	0.7
Delay (s)			0.7		0.0	0.7
Level of Service			A		A	A
Approach Delay (s)	0.0		0.7			0.7
Approach LOS	A		A			A
Intersection Summary						
HCM 2000 Control Delay			0.7		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.44			
Actuated Cycle Length (s)			61.0		Sum of lost time (s)	5.0
Intersection Capacity Utilization			38.8%		ICU Level of Service	A
Analysis Period (min)			15			

c Critical Lane Group

Lanes, Volumes, Timings
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

SAT Peak TWLT Entire Length
 02/28/2019



Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Traffic Volume (vph)	156	172	25	99	111	197	65	109	476	83	1	47
Future Volume (vph)	156	172	25	99	111	197	65	109	476	83	1	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	15	11	12	12	11	11	13	10	10	10	10	10
Storage Length (ft)	140		0		185		160	70		0		
Storage Lanes	1		0		1		1	1		0		
Taper Length (ft)	25				25			25				
Right Turn on Red				Yes			Yes				Yes	
Link Speed (mph)		40				30			25			
Link Distance (ft)		547				508			526			
Travel Time (s)		9.3				11.5			14.3			
Lane Group Flow (vph)	161	305	0	0	114	203	67	112	578	0	0	0
Turn Type	pm+pt	NA			pm+pt	NA	Perm	pm+pt	NA			pm+pt
Protected Phases	3	8			7	4		1	6			5
Permitted Phases	8	8			4	4	4	6	6			2
Detector Phase	3	8			7	4	4	1	6			5
Switch Phase												
Minimum Initial (s)	3.0	2.5			3.0	2.5	2.5	3.0	10.0			3.0
Minimum Split (s)	9.0	9.0			9.0	9.0	9.0	9.0	16.0			9.0
Total Split (s)	13.0	32.0			13.0	32.0	32.0	13.0	32.0			13.0
Total Split (%)	14.4%	35.6%			14.4%	35.6%	35.6%	14.4%	35.6%			14.4%
Maximum Green (s)	7.0	25.5			7.0	25.5	25.5	7.0	26.0			7.0
Yellow Time (s)	3.0	3.5			3.0	3.5	3.5	4.0	4.0			4.0
All-Red Time (s)	3.0	3.0			3.0	3.0	3.0	2.0	2.0			2.0
Lost Time Adjust (s)	-3.5	-3.5			-3.5	-3.5	-3.5	-3.5	-3.5			
Total Lost Time (s)	2.5	3.0			2.5	3.0	3.0	2.5	2.5			
Lead/Lag	Lead	Lag			Lead	Lag	Lag	Lead	Lag			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			3.0
Recall Mode	None	None			None	None	None	None	C-Max			None
Act Effct Green (s)	34.4	25.5			33.8	22.9	22.9	47.1	37.9			
Actuated g/C Ratio	0.38	0.28			0.38	0.25	0.25	0.52	0.42			
v/c Ratio	0.35	0.63			0.32	0.47	0.12	0.36	0.84			
Control Delay	18.4	31.6			18.1	30.8	0.5	15.3	40.1			
Queue Delay	0.1	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	18.6	31.6			18.1	30.8	0.5	15.3	40.1			
LOS	B	C			B	C	A	B	D			
Approach Delay		27.1				21.7			36.1			
Approach LOS		C				C			D			
Queue Length 50th (ft)	57	139			39	96	0	31	310			
Queue Length 95th (ft)	89	211			67	148	0	66	#569			
Internal Link Dist (ft)		467				428			446			
Turn Bay Length (ft)	140				185		160	70				
Base Capacity (vph)	458	545			358	549	632	316	690			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	30	0			0	0	2	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.38	0.56			0.32	0.37	0.11	0.35	0.84			

Lanes, Volumes, Timings
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

SAT Peak TWLT Entire Length
 02/28/2019



Lane Group	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	10	459	63
Future Volume (vph)	10	459	63
Ideal Flow (vphpl)	1800	1800	1800
Lane Width (ft)	10	10	12
Storage Length (ft)	50		0
Storage Lanes	1		0
Taper Length (ft)	25		
Right Turn on Red			Yes
Link Speed (mph)		25	
Link Distance (ft)		198	
Travel Time (s)		5.4	
Lane Group Flow (vph)	58	538	0
Turn Type	pm+pt	NA	
Protected Phases	5	2	
Permitted Phases	2	2	
Detector Phase	5	2	
Switch Phase			
Minimum Initial (s)	3.0	10.0	
Minimum Split (s)	9.0	16.0	
Total Split (s)	13.0	32.0	
Total Split (%)	14.4%	35.6%	
Maximum Green (s)	7.0	26.0	
Yellow Time (s)	4.0	4.0	
All-Red Time (s)	2.0	2.0	
Lost Time Adjust (s)	3.0	-3.5	
Total Lost Time (s)	9.0	2.5	
Lead/Lag	Lead	Lag	
Lead-Lag Optimize?			
Vehicle Extension (s)	3.0	3.0	
Recall Mode	None	C-Max	
Act Effct Green (s)	34.3	37.4	
Actuated g/C Ratio	0.38	0.42	
v/c Ratio	0.40	0.81	
Control Delay	27.5	17.0	
Queue Delay	0.0	2.7	
Total Delay	27.5	19.8	
LOS	C	B	
Approach Delay		20.5	
Approach LOS		C	
Queue Length 50th (ft)	13	0	
Queue Length 95th (ft)	m16	m#93	
Internal Link Dist (ft)		118	
Turn Bay Length (ft)	50		
Base Capacity (vph)	152	666	
Starvation Cap Reductn	0	57	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.38	0.88	

Intersection Summary

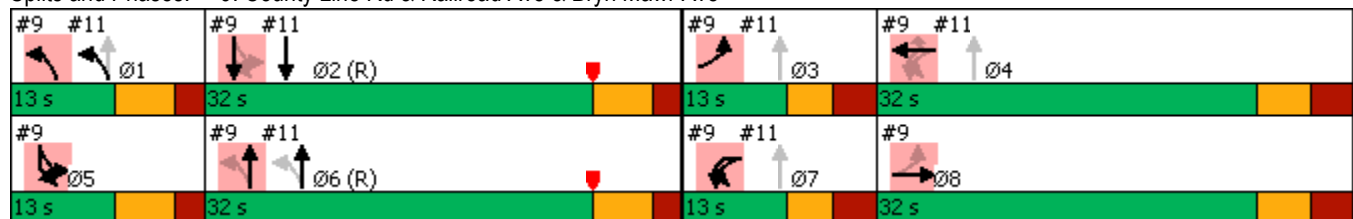
Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 26 (29%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 27.2 Intersection LOS: C
 Intersection Capacity Utilization 76.7% ICU Level of Service D
 Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.





















m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: County Line Rd & Railroad Ave & Bryn Mawr Ave



HCM Signalized Intersection Capacity Analysis
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

SAT Peak TWLT Entire Length
 02/28/2019

													
Movement	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	
Lane Configurations													
Traffic Volume (vph)	156	172	25	99	111	197	65	109	476	83	1	47	
Future Volume (vph)	156	172	25	99	111	197	65	109	476	83	1	47	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	
Lane Width	15	11	12	12	11	11	13	10	10	10	10	10	
Total Lost time (s)	2.5	3.0			2.5	3.0	3.0	2.5	2.5				
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00				
Frt	1.00	0.94			1.00	1.00	0.85	1.00	0.98				
Flt Protected	0.95	1.00			0.95	1.00	1.00	0.95	1.00				
Satd. Flow (prot)	1862	1630			1653	1706	1581	1565	1640				
Flt Permitted	0.46	1.00			0.37	1.00	1.00	0.18	1.00				
Satd. Flow (perm)	907	1630			636	1706	1581	301	1640				
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	161	177	26	102	114	203	67	112	491	86	1	48	
RTOR Reduction (vph)	0	22	0	0	0	0	49	0	0	0	0	0	
Lane Group Flow (vph)	161	284	0	0	114	203	18	112	578	0	0	0	
Heavy Vehicles (%)	1%	0%	0%	0%	0%	2%	0%	2%	0%	1%	2%	2%	
Turn Type	pm+pt	NA			pm+pt	NA	Perm	pm+pt	NA			pm+pt	
Protected Phases	3	8			7	4		1	6			5	
Permitted Phases	8	8			4	4	4	6	6			2	
Actuated Green, G (s)	29.0	22.0			26.2	20.6	20.6	38.5	32.1				
Effective Green, g (s)	36.0	25.5			33.2	24.1	24.1	45.5	35.6				
Actuated g/C Ratio	0.40	0.28			0.37	0.27	0.27	0.51	0.40				
Clearance Time (s)	6.0	6.5			6.0	6.5	6.5	6.0	6.0				
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0				
Lane Grp Cap (vph)	474	461			337	456	423	291	648				
v/s Ratio Prot	c0.04	c0.17			0.03	0.12		c0.04	c0.35				
v/s Ratio Perm	0.10				0.09		0.01	0.15					
v/c Ratio	0.34	0.61			0.34	0.45	0.04	0.38	0.89				
Uniform Delay, d1	18.0	28.0			19.7	27.4	24.4	14.9	25.4				
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	0.4	2.4			0.6	0.7	0.0	0.8	17.0				
Delay (s)	18.5	30.4			20.3	28.1	24.4	15.7	42.4				
Level of Service	B	C			C	C	C	B	D				
Approach Delay (s)		26.3				25.1			38.1				
Approach LOS		C				C			D				
Intersection Summary													
HCM 2000 Control Delay			26.9									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.79										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	20.5
Intersection Capacity Utilization			76.7%									ICU Level of Service	D
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 9: County Line Rd & Railroad Ave & Bryn Mawr Ave

SAT Peak TWLT Entire Length
 02/28/2019



Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	10	459	63
Future Volume (vph)	10	459	63
Ideal Flow (vphpl)	1800	1800	1800
Lane Width	10	10	12
Total Lost time (s)	9.0	2.5	
Lane Util. Factor	1.00	1.00	
Fr _t	1.00	0.98	
Fl _t Protected	0.95	1.00	
Satd. Flow (prot)	1567	1594	
Fl _t Permitted	0.14	1.00	
Satd. Flow (perm)	232	1594	
Peak-hour factor, PHF	0.97	0.97	0.97
Adj. Flow (vph)	10	473	65
RTOR Reduction (vph)	0	5	0
Lane Group Flow (vph)	58	533	0
Heavy Vehicles (%)	1%	4%	0%
Turn Type	pm+pt	NA	
Protected Phases	5	2	
Permitted Phases	2	2	
Actuated Green, G (s)	37.3	31.5	
Effective Green, g (s)	31.3	35.0	
Actuated g/C Ratio	0.35	0.39	
Clearance Time (s)	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	122	619	
v/s Ratio Prot	0.01	0.33	
v/s Ratio Perm	0.15		
v/c Ratio	0.48	0.86	
Uniform Delay, d ₁	22.9	25.3	
Progression Factor	1.44	0.32	
Incremental Delay, d ₂	1.0	5.6	
Delay (s)	34.0	13.7	
Level of Service	C	B	
Approach Delay (s)		15.6	
Approach LOS		B	
Intersection Summary			

Lanes, Volumes, Timings
11: County Line Rd & Glenbrook Ave

SAT Peak TWLT Entire Length

02/28/2019

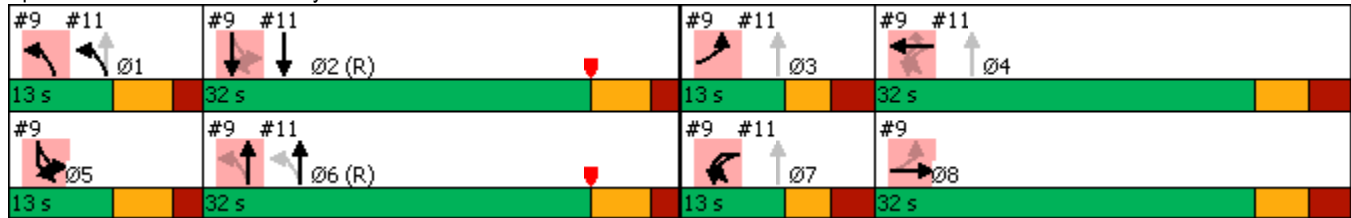


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3	Ø4	Ø5	Ø7	Ø8
Lane Configurations											
Traffic Volume (vph)	0	0	35	697	579	13					
Future Volume (vph)	0	0	35	697	579	13					
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800					
Lane Width (ft)	12	12	10	10	10	11					
Storage Length (ft)	0	0	45			0					
Storage Lanes	0	0	1			0					
Taper Length (ft)	25		25								
Right Turn on Red		Yes				Yes					
Link Speed (mph)	25			25	25						
Link Distance (ft)	228			198	340						
Travel Time (s)	6.2			5.4	9.3						
Lane Group Flow (vph)	0	0	38	758	643	0					
Turn Type			pm+pt	NA	NA						
Protected Phases			1	6	2		3	4	5	7	8
Permitted Phases			6	1 3 4 7	2						
Detector Phase			1	6	2						
Switch Phase											
Minimum Initial (s)			3.0	10.0	10.0		3.0	2.5	3.0	3.0	2.5
Minimum Split (s)			9.0	16.0	16.0		9.0	9.0	9.0	9.0	9.0
Total Split (s)			13.0	32.0	32.0		13.0	32.0	13.0	13.0	32.0
Total Split (%)			14.4%	35.6%	35.6%		14%	36%	14%	14%	36%
Maximum Green (s)			7.0	26.0	26.0		7.0	25.5	7.0	7.0	25.5
Yellow Time (s)			4.0	4.0	4.0		3.0	3.5	4.0	3.0	3.5
All-Red Time (s)			2.0	2.0	2.0		3.0	3.0	2.0	3.0	3.0
Lost Time Adjust (s)			0.0	-3.5	-3.5						
Total Lost Time (s)			6.0	2.5	2.5						
Lead/Lag			Lead	Lag	Lag		Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)			3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode			None	C-Max	C-Max		None	None	None	None	None
Act Effct Green (s)			40.8	89.1	37.4						
Actuated g/C Ratio			0.45	0.99	0.42						
v/c Ratio			0.18	0.47	0.94						
Control Delay			17.3	1.7	53.8						
Queue Delay			0.0	0.3	44.1						
Total Delay			17.3	2.0	97.9						
LOS			B	A	F						
Approach Delay				2.8	97.9						
Approach LOS				A	F						
Queue Length 50th (ft)			9	1	~413						
Queue Length 95th (ft)			m18	m49	#660						
Internal Link Dist (ft)	148			118	260						
Turn Bay Length (ft)			45								
Base Capacity (vph)			211	1630	682						
Starvation Cap Reductn			0	345	102						
Spillback Cap Reductn			0	0	11						
Storage Cap Reductn			0	0	0						
Reduced v/c Ratio			0.18	0.59	1.11						

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 26 (29%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 45.3 Intersection LOS: D
 Intersection Capacity Utilization 42.1% ICU Level of Service A
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: County Line Rd & Glenbrook Ave



HCM Signalized Intersection Capacity Analysis
 11: County Line Rd & Glenbrook Ave

SAT Peak TWLT Entire Length
 02/28/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	35	697	579	13
Future Volume (vph)	0	0	35	697	579	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	12	12	10	10	10	11
Total Lost time (s)			6.0	2.5	2.5	
Lane Util. Factor			1.00	1.00	1.00	
Fr _t			1.00	1.00	1.00	
Fl _t Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1565	1647	1642	
Fl _t Permitted			0.12	1.00	1.00	
Satd. Flow (perm)			205	1647	1642	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	38	758	629	14
RTOR Reduction (vph)	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	38	758	642	0
Turn Type			pm+pt	NA	NA	
Protected Phases			1	6	2	
Permitted Phases			6	1 3 4 7	2	
Actuated Green, G (s)			38.5	78.6	31.5	
Effective Green, g (s)			38.5	82.6	35.0	
Actuated g/C Ratio			0.43	0.92	0.39	
Clearance Time (s)			6.0	6.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			184	1557	638	
v/s Ratio Prot			0.01	c0.19	c0.39	
v/s Ratio Perm			0.07	0.27		
v/c Ratio			0.21	0.49	1.01	
Uniform Delay, d1			19.6	0.5	27.5	
Progression Factor			1.11	56.63	1.00	
Incremental Delay, d2			0.5	0.2	37.3	
Delay (s)			22.2	31.3	64.8	
Level of Service			C	C	E	
Approach Delay (s)	0.0			30.9	64.8	
Approach LOS	A			C	E	
Intersection Summary						
HCM 2000 Control Delay			46.1	HCM 2000 Level of Service		D
HCM 2000 Volume to Capacity ratio			0.86			
Actuated Cycle Length (s)			90.0	Sum of lost time (s)		21.0
Intersection Capacity Utilization			42.1%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						

Sim Traffic Travel Time Analysis



Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	20.2	29.0	0.1	7
Railroad Ave	9	44.9	54.0	0.1	7
Glenbrook Ave	11	4.7	9.4	0.0	14
Lindsay Ave	8	1.6	7.9	0.1	29
Mondella Ave	7	0.9	10.7	0.1	32
Old Lancaster Rd	6	0.9	10.6	0.1	32
S Warner Ave	5	1.0	6.2	0.0	29
Thomas Ave	4	5.8	11.3	0.1	19
Roberts Rd	3	1.9	10.4	0.1	28
Montrose Ave	2	0.9	10.2	0.1	33
	21	3.7	16.8	0.1	27
Lancaster Ave	1	22.1	24.3	0.0	5
Total		108.7	200.8	0.9	16

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	41.2	43.6	0.0	3
	21	2.5	5.5	0.0	21
	2	0.6	14.1	0.1	32
	3	0.7	9.9	0.1	34
Conestoga Rd	4	22.4	30.1	0.1	9
S Warner Ave	5	3.5	10.3	0.1	21
Old Lancaster Rd	6	2.5	7.4	0.0	24
Mondella Ave	7	37.5	47.4	0.1	7
Lindsay Ave	8	68.8	80.2	0.1	4
Glenbrook Ave	11	47.7	53.6	0.1	4
Bryn Mawr Ave	9	13.1	16.9	0.0	8
Landover Rd	10	5.7	15.6	0.1	23
Total		246.2	334.6	0.9	9

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	26.7	35.5	0.1	6
Railroad Ave	9	47.9	58.0	0.1	6
Glenbrook Ave	11	5.7	10.4	0.0	13
Lindsay Ave	8	2.1	8.3	0.1	28
Mondella Ave	7	1.3	11.0	0.1	31
Old Lancaster Rd	6	1.1	10.7	0.1	32
S Warner Ave	5	1.2	6.3	0.0	28
Thomas Ave	4	4.9	10.3	0.1	21
Roberts Rd	3	1.7	10.1	0.1	28
Montrose Ave	2	1.0	10.3	0.1	33
	21	3.6	16.6	0.1	27
Lancaster Ave	1	19.0	21.3	0.0	5
Total		116.2	209.0	0.9	15

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	59.0	61.5	0.0	2
	21	2.6	5.6	0.0	21
	2	0.5	14.1	0.1	32
	3	0.7	10.0	0.1	34
Conestoga Rd	4	21.8	29.5	0.1	10
S Warner Ave	5	3.7	10.5	0.1	21
Old Lancaster Rd	6	1.8	6.7	0.0	26
Mondella Ave	7	0.8	10.2	0.1	33
Lindsay Ave	8	8.5	18.1	0.1	19
Glenbrook Ave	11	29.9	35.8	0.1	6
Bryn Mawr Ave	9	9.0	12.7	0.0	11
Landover Rd	10	6.1	15.8	0.1	23
Total		144.5	230.4	0.9	13

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	39.3	47.8	0.1	4
Railroad Ave	9	47.5	57.9	0.1	6
Glenbrook Ave	11	5.5	10.2	0.0	13
Lindsay Ave	8	2.1	8.3	0.1	28
Mondella Ave	7	1.0	10.8	0.1	31
Old Lancaster Rd	6	1.1	10.8	0.1	31
S Warner Ave	5	1.1	6.3	0.0	28
Thomas Ave	4	6.2	11.6	0.1	19
Roberts Rd	3	2.0	10.5	0.1	27
Montrose Ave	2	1.0	10.3	0.1	33
	21	4.9	17.9	0.1	25
Lancaster Ave	1	19.2	21.4	0.0	5
Total		131.1	223.9	0.9	14

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	57.4	59.8	0.0	2
	21	2.6	5.8	0.0	20
	2	0.6	14.0	0.1	32
	3	0.8	10.2	0.1	33
Conestoga Rd	4	22.9	30.6	0.1	9
S Warner Ave	5	4.1	10.8	0.1	20
Old Lancaster Rd	6	1.7	6.6	0.0	27
Mondella Ave	7	1.6	11.1	0.1	30
Lindsay Ave	8	20.9	30.6	0.1	11
Glenbrook Ave	11	35.7	41.7	0.1	6
Bryn Mawr Ave	9	8.3	12.1	0.0	11
Landover Rd	10	7.4	17.1	0.1	21
Total		163.9	250.5	0.9	12

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	24.8	33.6	0.1	6
Railroad Ave	9	67.4	80.8	0.1	5
Glenbrook Ave	11	5.6	10.3	0.0	13
Lindsay Ave	8	2.3	8.4	0.1	28
Mondella Ave	7	1.2	10.9	0.1	31
Old Lancaster Rd	6	1.1	10.7	0.1	32
S Warner Ave	5	1.3	6.5	0.0	27
Thomas Ave	4	5.5	10.9	0.1	20
Roberts Rd	3	1.8	10.1	0.1	28
Montrose Ave	2	0.7	9.9	0.1	34
	21	3.5	16.6	0.1	27
Lancaster Ave	1	22.9	25.2	0.0	5
Total		137.9	234.1	0.9	14

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	43.1	45.5	0.0	2
	21	2.6	5.7	0.0	20
	2	0.6	14.1	0.1	32
	3	0.8	10.0	0.1	34
Conestoga Rd	4	22.3	30.0	0.1	9
S Warner Ave	5	3.7	10.5	0.1	21
Old Lancaster Rd	6	1.7	6.6	0.0	27
Mondella Ave	7	1.3	10.7	0.1	32
Lindsay Ave	8	25.7	35.3	0.1	10
Glenbrook Ave	11	37.2	43.2	0.1	5
Bryn Mawr Ave	9	9.1	12.9	0.0	11
Landover Rd	10	7.1	17.0	0.1	21
Total		155.2	241.5	0.9	13

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	28.5	37.1	0.1	5
Railroad Ave	9	57.6	67.6	0.1	5
Glenbrook Ave	11	5.4	10.1	0.0	13
Lindsay Ave	8	1.7	7.9	0.1	29
Mondella Ave	7	1.1	10.8	0.1	31
Old Lancaster Rd	6	1.0	10.6	0.1	32
S Warner Ave	5	1.1	6.2	0.0	28
Thomas Ave	4	6.2	11.6	0.1	19
Roberts Rd	3	1.9	10.3	0.1	28
Montrose Ave	2	0.8	10.1	0.1	33
	21	4.7	17.7	0.1	26
Lancaster Ave	1	26.1	28.4	0.0	4
Total		136.1	228.5	0.9	14

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	39.6	41.9	0.0	3
	21	2.9	6.0	0.0	19
	2	0.6	14.1	0.1	32
	3	0.7	9.9	0.1	34
Conestoga Rd	4	22.1	29.8	0.1	10
S Warner Ave	5	3.6	10.5	0.1	21
Old Lancaster Rd	6	1.9	6.9	0.0	26
Mondella Ave	7	0.9	10.3	0.1	33
Lindsay Ave	8	13.4	23.1	0.1	15
Glenbrook Ave	11	38.3	44.3	0.1	5
Bryn Mawr Ave	9	10.6	14.3	0.0	9
Landover Rd	10	5.2	15.0	0.1	24
Total		139.8	226.1	0.9	14

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	39.7	48.6	0.1	4
Railroad Ave	9	23.1	32.4	0.1	11
Glenbrook Ave	11	3.2	8.1	0.0	17
Lindsay Ave	8	1.0	7.2	0.1	32
Mondella Ave	7	0.6	10.3	0.1	33
Old Lancaster Rd	6	0.6	10.2	0.1	33
S Warner Ave	5	0.7	5.5	0.0	32
Thomas Ave	4	9.0	14.3	0.1	15
Roberts Rd	3	1.5	8.8	0.1	32
Montrose Ave	2	0.6	9.6	0.1	35
	21	2.4	15.6	0.1	29
Lancaster Ave	1	26.0	28.6	0.0	4
Total		108.3	199.3	0.9	16

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	47.5	50.0	0.0	2
	21	2.5	5.7	0.0	20
	2	20.6	33.9	0.1	13
	3	98.2	109.7	0.1	3
Conestoga Rd	4	155.6	350.8	0.1	2
S Warner Ave	5	48.3	56.2	0.1	4
Old Lancaster Rd	6	49.9	55.0	0.0	3
Mondella Ave	7	104.0	227.4	0.1	3
Lindsay Ave	8	84.6	94.1	0.1	4
Glenbrook Ave	11	45.9	51.9	0.1	4
Bryn Mawr Ave	9	11.4	15.2	0.0	9
Landover Rd	10	3.6	13.7	0.1	26
Total		672.0	1063.7	0.9	4

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	37.9	47.3	0.1	4
Railroad Ave	9	26.6	36.0	0.1	10
Glenbrook Ave	11	4.8	9.6	0.0	14
Lindsay Ave	8	1.3	7.5	0.1	31
Mondella Ave	7	0.7	10.2	0.1	33
Old Lancaster Rd	6	0.7	10.2	0.1	33
S Warner Ave	5	0.8	5.6	0.0	32
Thomas Ave	4	7.8	13.1	0.1	17
Roberts Rd	3	1.6	8.9	0.1	32
Montrose Ave	2	0.5	9.4	0.1	36
	21	3.0	16.1	0.1	28
Lancaster Ave	1	23.7	26.8	0.0	4
Total		109.2	200.7	0.9	16

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	43.4	46.1	0.0	2
	21	5.1	8.2	0.0	14
	2	91.7	109.7	0.1	4
	3	103.8	113.2	0.1	3
Conestoga Rd	4	174.6	502.9	0.1	2
S Warner Ave	5	52.3	61.2	0.1	4
Old Lancaster Rd	6	51.8	57.0	0.0	3
Mondella Ave	7	105.5	267.6	0.1	3
Lindsay Ave	8	87.9	97.3	0.1	3
Glenbrook Ave	11	50.1	56.2	0.1	4
Bryn Mawr Ave	9	10.5	14.3	0.0	9
Landover Rd	10	2.9	13.1	0.1	27
Total		779.6	1346.8	0.9	4

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	45.7	59.7	0.1	4
Railroad Ave	9	24.1	33.5	0.1	11
Glenbrook Ave	11	4.0	8.8	0.0	15
Lindsay Ave	8	1.5	7.7	0.1	30
Mondella Ave	7	0.7	10.3	0.1	33
Old Lancaster Rd	6	1.3	10.9	0.1	31
S Warner Ave	5	0.7	5.4	0.0	33
Thomas Ave	4	8.7	14.0	0.1	16
Roberts Rd	3	1.8	9.0	0.1	32
Montrose Ave	2	0.7	9.5	0.1	35
	21	2.5	15.6	0.1	29
Lancaster Ave	1	26.2	28.8	0.0	4
Total		117.9	213.2	0.9	15

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	36.9	39.3	0.0	3
	21	2.9	6.2	0.0	19
	2	48.2	61.9	0.1	7
	3	83.6	92.1	0.1	4
Conestoga Rd	4	145.2	282.4	0.1	2
S Warner Ave	5	48.9	56.2	0.1	4
Old Lancaster Rd	6	54.5	59.5	0.0	3
Mondella Ave	7	109.3	256.3	0.1	3
Lindsay Ave	8	88.4	98.0	0.1	3
Glenbrook Ave	11	48.6	54.6	0.1	4
Bryn Mawr Ave	9	10.7	14.6	0.0	9
Landover Rd	10	3.0	13.3	0.1	27
Total		680.1	1034.4	0.9	4

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	38.5	47.8	0.1	4
Railroad Ave	9	22.8	32.0	0.1	11
Glenbrook Ave	11	3.5	8.3	0.0	16
Lindsay Ave	8	0.9	7.0	0.1	33
Mondella Ave	7	0.5	10.0	0.1	34
Old Lancaster Rd	6	0.8	10.3	0.1	33
S Warner Ave	5	0.6	5.3	0.0	33
Thomas Ave	4	8.2	13.6	0.1	16
Roberts Rd	3	1.6	8.7	0.1	33
Montrose Ave	2	0.5	9.3	0.1	36
	21	2.3	15.5	0.1	29
Lancaster Ave	1	30.5	34.8	0.0	4
Total		110.7	202.7	0.9	16

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	47.4	49.9	0.0	2
	21	2.9	6.6	0.0	18
	2	51.3	65.1	0.1	7
	3	90.8	98.9	0.1	3
Conestoga Rd	4	153.8	294.3	0.1	2
S Warner Ave	5	48.1	55.8	0.1	4
Old Lancaster Rd	6	50.3	55.3	0.0	3
Mondella Ave	7	104.9	202.2	0.1	3
Lindsay Ave	8	81.1	90.7	0.1	4
Glenbrook Ave	11	44.6	50.6	0.1	5
Bryn Mawr Ave	9	8.8	12.5	0.0	11
Landover Rd	10	3.4	13.7	0.1	26
Total		687.5	995.5	0.9	4

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	35.9	44.9	0.1	5
Railroad Ave	9	24.7	34.2	0.1	10
Glenbrook Ave	11	4.0	8.8	0.0	15
Lindsay Ave	8	1.1	7.4	0.1	31
Mondella Ave	7	0.5	10.1	0.1	33
Old Lancaster Rd	6	0.6	10.1	0.1	33
S Warner Ave	5	0.6	5.3	0.0	33
Thomas Ave	4	8.4	13.7	0.1	16
Roberts Rd	3	2.0	9.2	0.1	31
Montrose Ave	2	0.6	9.5	0.1	35
	21	2.3	15.5	0.1	29
Lancaster Ave	1	23.1	25.7	0.0	5
Total		103.9	194.4	0.9	16

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	42.6	45.1	0.0	2
	21	2.6	6.1	0.0	19
	2	19.3	32.8	0.1	14
	3	73.0	81.4	0.1	4
Conestoga Rd	4	150.0	249.4	0.1	2
S Warner Ave	5	49.1	57.4	0.1	4
Old Lancaster Rd	6	50.2	55.1	0.0	3
Mondella Ave	7	109.8	201.3	0.1	3
Lindsay Ave	8	86.3	95.9	0.1	4
Glenbrook Ave	11	48.3	54.4	0.1	4
Bryn Mawr Ave	9	10.6	14.4	0.0	9
Landover Rd	10	3.2	13.4	0.1	27
Total		644.9	906.7	0.9	4

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	15.8	24.7	0.1	8
Railroad Ave	9	15.7	25.2	0.1	14
Glenbrook Ave	11	3.2	8.1	0.0	17
Lindsay Ave	8	0.6	6.7	0.1	35
Mondella Ave	7	0.4	10.1	0.1	33
Old Lancaster Rd	6	0.6	10.1	0.1	34
S Warner Ave	5	0.8	5.8	0.0	31
Thomas Ave	4	6.0	11.8	0.1	18
Roberts Rd	3	1.6	10.0	0.1	28
Montrose Ave	2	0.5	9.9	0.1	34
	21	3.2	16.2	0.1	28
Lancaster Ave	1	9.9	11.8	0.0	10
Total		58.3	150.4	0.9	21

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	35.8	38.3	0.0	3
	21	3.0	6.7	0.0	17
	2	0.6	13.6	0.1	34
	3	0.6	9.4	0.1	36
Conestoga Rd	4	22.1	29.6	0.1	10
S Warner Ave	5	2.7	9.9	0.1	22
Old Lancaster Rd	6	0.5	5.3	0.0	33
Mondella Ave	7	0.6	9.9	0.1	34
Lindsay Ave	8	4.9	14.6	0.1	23
Glenbrook Ave	11	29.5	35.4	0.1	7
Bryn Mawr Ave	9	8.7	12.5	0.0	11
Landover Rd	10	5.9	16.4	0.1	22
Total		114.7	201.6	0.9	15

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	22.2	31.1	0.1	6
Railroad Ave	9	17.5	27.0	0.1	13
Glenbrook Ave	11	3.6	8.4	0.0	16
Lindsay Ave	8	0.6	6.7	0.1	35
Mondella Ave	7	0.3	10.0	0.1	34
Old Lancaster Rd	6	0.5	10.0	0.1	34
S Warner Ave	5	0.6	5.7	0.0	31
Thomas Ave	4	5.2	11.0	0.1	20
Roberts Rd	3	1.5	9.9	0.1	29
Montrose Ave	2	0.4	9.9	0.1	34
	21	2.6	15.6	0.1	29
Lancaster Ave	1	14.3	16.3	0.0	7
Total		69.5	161.4	0.9	20

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	41.7	44.1	0.0	2
	21	2.8	6.2	0.0	19
	2	0.4	13.4	0.1	34
	3	0.8	9.7	0.1	35
Conestoga Rd	4	22.9	30.4	0.1	9
S Warner Ave	5	2.9	10.2	0.1	21
Old Lancaster Rd	6	0.6	5.5	0.0	32
Mondella Ave	7	0.7	10.0	0.1	34
Lindsay Ave	8	6.7	16.4	0.1	21
Glenbrook Ave	11	32.4	39.0	0.1	6
Bryn Mawr Ave	9	10.2	14.0	0.0	10
Landover Rd	10	6.0	16.3	0.1	22
Total		128.1	215.1	0.9	14

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	23.4	32.4	0.1	6
Railroad Ave	9	16.1	25.5	0.1	14
Glenbrook Ave	11	2.9	7.7	0.0	18
Lindsay Ave	8	0.5	6.5	0.1	35
Mondella Ave	7	0.3	10.1	0.1	34
Old Lancaster Rd	6	0.6	10.1	0.1	34
S Warner Ave	5	0.7	5.7	0.0	31
Thomas Ave	4	5.6	11.5	0.1	19
Roberts Rd	3	1.7	10.1	0.1	28
Montrose Ave	2	0.6	9.9	0.1	34
	21	3.0	15.8	0.1	29
Lancaster Ave	1	16.1	18.1	0.0	6
Total		71.6	163.2	0.9	20

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	23.3	25.8	0.0	4
	21	2.4	5.8	0.0	20
	2	0.5	13.3	0.1	34
	3	0.9	9.6	0.1	35
Conestoga Rd	4	21.9	29.3	0.1	10
S Warner Ave	5	2.9	10.0	0.1	22
Old Lancaster Rd	6	0.8	5.7	0.0	31
Mondella Ave	7	1.0	10.4	0.1	33
Lindsay Ave	8	13.4	23.0	0.1	15
Glenbrook Ave	11	32.3	40.2	0.1	6
Bryn Mawr Ave	9	10.3	14.0	0.0	10
Landover Rd	10	6.6	16.8	0.1	21
Total		116.2	204.0	0.9	15

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	13.3	22.2	0.1	9
Railroad Ave	9	16.2	25.7	0.1	14
Glenbrook Ave	11	3.3	8.1	0.0	17
Lindsay Ave	8	0.6	6.8	0.1	34
Mondella Ave	7	0.4	10.2	0.1	33
Old Lancaster Rd	6	0.6	10.1	0.1	34
S Warner Ave	5	0.8	5.9	0.0	30
Thomas Ave	4	5.5	11.3	0.1	19
Roberts Rd	3	1.8	10.2	0.1	28
Montrose Ave	2	0.6	10.1	0.1	33
	21	3.1	16.1	0.1	28
Lancaster Ave	1	14.7	16.7	0.0	7
Total		60.9	153.3	0.9	21

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	33.6	36.1	0.0	3
	21	2.5	6.0	0.0	19
	2	0.4	13.4	0.1	34
	3	0.7	9.5	0.1	35
Conestoga Rd	4	24.9	32.2	0.1	9
S Warner Ave	5	3.2	10.3	0.1	21
Old Lancaster Rd	6	0.8	5.7	0.0	31
Mondella Ave	7	0.7	10.0	0.1	34
Lindsay Ave	8	7.8	17.4	0.1	19
Glenbrook Ave	11	26.5	32.5	0.1	7
Bryn Mawr Ave	9	7.8	11.6	0.0	12
Landover Rd	10	5.2	15.6	0.1	23
Total		114.3	200.3	0.9	15

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	23.1	32.0	0.1	6
Railroad Ave	9	17.9	27.1	0.1	13
Glenbrook Ave	11	3.2	8.0	0.0	17
Lindsay Ave	8	0.6	6.6	0.1	35
Mondella Ave	7	0.3	10.0	0.1	34
Old Lancaster Rd	6	0.6	10.0	0.1	34
S Warner Ave	5	0.9	5.8	0.0	31
Thomas Ave	4	6.1	11.9	0.1	18
Roberts Rd	3	1.7	10.1	0.1	28
Montrose Ave	2	0.6	10.0	0.1	34
	21	2.9	15.9	0.1	29
Lancaster Ave	1	15.6	17.7	0.0	7
Total		73.4	165.3	0.9	19

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	41.8	44.2	0.0	2
	21	2.8	6.1	0.0	19
	2	0.4	13.4	0.1	34
	3	0.8	9.7	0.1	35
Conestoga Rd	4	21.4	28.8	0.1	10
S Warner Ave	5	3.0	10.2	0.1	21
Old Lancaster Rd	6	0.6	5.5	0.0	32
Mondella Ave	7	0.6	9.8	0.1	35
Lindsay Ave	8	5.6	15.3	0.1	22
Glenbrook Ave	11	30.6	36.9	0.1	6
Bryn Mawr Ave	9	9.1	12.8	0.0	11
Landover Rd	10	5.1	15.4	0.1	23
Total		121.7	208.2	0.9	15

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	22.1	31.1	0.1	6
	34	2.0	6.6	0.0	17
Railroad Ave	9	34.4	43.3	0.1	6
Glenbrook Ave	11	4.3	10.7	0.0	13
	36	5.7	10.5	0.0	11
Lindsay Ave	8	3.7	7.8	0.0	15
Mondella Ave	7	2.0	15.7	0.1	21
Old Lancaster Rd	6	1.5	15.3	0.1	22
S Warner Ave	5	0.4	7.5	0.0	23
Thomas Ave	4	3.8	11.4	0.1	19
Roberts Rd	3	1.7	13.6	0.1	21
Montrose Ave	2	6.7	19.9	0.1	17
	21	21.3	39.3	0.1	12
Lancaster Ave	1	22.7	26.1	0.0	4
Total		132.3	258.8	0.9	12

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	40.9	44.0	0.0	2
	21	2.1	7.3	0.0	16
	2	5.3	23.3	0.1	19
	3	2.4	15.5	0.1	22
Conestoga Rd	4	27.6	38.2	0.1	7
S Warner Ave	5	4.8	14.1	0.1	15
Old Lancaster Rd	6	0.6	7.8	0.0	23
Mondella Ave	7	10.3	23.4	0.1	15
Lindsay Ave	8	26.9	40.3	0.1	8
	36	13.3	18.0	0.0	6
Glenbrook Ave	11	26.1	30.0	0.0	4
Bryn Mawr Ave	9	15.4	20.7	0.0	7
	34	10.2	20.8	0.1	12
Landover Rd	10	9.0	15.2	0.0	9
Total		194.9	318.6	0.9	10

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	47.3	56.4	0.1	4
	34	3.3	7.8	0.0	14
Railroad Ave	9	37.1	46.1	0.1	5
Glenbrook Ave	11	5.0	11.3	0.0	12
	36	5.4	10.1	0.0	12
Lindsay Ave	8	3.6	7.8	0.0	15
Mondella Ave	7	2.0	15.5	0.1	22
Old Lancaster Rd	6	1.4	15.0	0.1	23
S Warner Ave	5	0.4	7.4	0.0	24
Thomas Ave	4	4.3	11.9	0.1	18
Roberts Rd	3	1.7	13.3	0.1	21
Montrose Ave	2	5.2	18.1	0.1	19
	21	4.4	22.3	0.1	20
Lancaster Ave	1	19.5	23.0	0.0	5
Total		140.6	266.0	0.9	12

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	31.2	34.7	0.0	3
	21	1.4	5.8	0.0	20
	2	5.1	23.1	0.1	20
	3	2.0	14.8	0.1	23
Conestoga Rd	4	23.1	33.6	0.1	8
S Warner Ave	5	2.6	12.0	0.1	18
Old Lancaster Rd	6	1.6	8.7	0.0	20
Mondella Ave	7	17.4	32.2	0.1	11
Lindsay Ave	8	33.7	47.2	0.1	7
	36	12.7	17.3	0.0	6
Glenbrook Ave	11	22.9	27.0	0.0	5
Bryn Mawr Ave	9	10.2	15.5	0.0	9
	34	3.7	14.3	0.1	17
Landover Rd	10	6.8	12.3	0.0	10
Total		174.4	298.4	0.9	11

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	52.6	61.8	0.1	3
	34	3.4	8.0	0.0	14
Railroad Ave	9	37.7	46.6	0.1	5
Glenbrook Ave	11	5.0	11.4	0.0	12
	36	4.9	9.6	0.0	13
Lindsay Ave	8	3.0	7.3	0.0	16
Mondella Ave	7	2.1	15.6	0.1	22
Old Lancaster Rd	6	1.5	15.1	0.1	22
S Warner Ave	5	0.4	7.4	0.0	24
Thomas Ave	4	4.0	11.5	0.1	19
Roberts Rd	3	1.7	13.3	0.1	21
Montrose Ave	2	5.8	18.8	0.1	18
	21	7.9	25.7	0.1	18
Lancaster Ave	1	28.3	31.6	0.0	4
Total		158.4	283.7	0.9	11

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	41.5	45.0	0.0	2
	21	1.7	6.7	0.0	17
	2	6.1	24.1	0.1	19
	3	2.1	15.1	0.1	22
Conestoga Rd	4	28.2	38.8	0.1	7
S Warner Ave	5	2.6	12.1	0.1	18
Old Lancaster Rd	6	0.9	8.0	0.0	22
Mondella Ave	7	11.5	25.0	0.1	14
Lindsay Ave	8	21.0	34.7	0.1	10
	36	13.1	17.8	0.0	6
Glenbrook Ave	11	22.3	26.3	0.0	5
Bryn Mawr Ave	9	12.9	18.2	0.0	7
	34	4.2	14.8	0.1	17
Landover Rd	10	7.8	13.4	0.0	9
Total		176.0	299.9	0.9	10

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	42.5	51.2	0.1	4
	34	2.7	7.3	0.0	15
Railroad Ave	9	32.5	41.6	0.1	6
Glenbrook Ave	11	4.7	11.0	0.0	12
	36	5.9	10.6	0.0	11
Lindsay Ave	8	3.2	7.3	0.0	16
Mondella Ave	7	1.9	15.4	0.1	22
Old Lancaster Rd	6	1.5	15.1	0.1	22
S Warner Ave	5	0.4	7.5	0.0	24
Thomas Ave	4	3.7	11.1	0.1	19
Roberts Rd	3	1.6	13.3	0.1	21
Montrose Ave	2	5.9	18.9	0.1	18
	21	9.1	27.0	0.1	17
Lancaster Ave	1	32.7	36.0	0.0	3
Total		148.1	273.4	0.9	12

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	45.0	48.4	0.0	2
	21	1.9	6.4	0.0	18
	2	5.4	23.4	0.1	19
	3	2.6	15.5	0.1	22
Conestoga Rd	4	24.1	34.6	0.1	8
S Warner Ave	5	3.7	13.1	0.1	16
Old Lancaster Rd	6	0.4	7.5	0.0	23
Mondella Ave	7	3.8	16.7	0.1	20
Lindsay Ave	8	12.4	25.8	0.1	13
	36	10.0	14.6	0.0	8
Glenbrook Ave	11	21.9	26.0	0.0	5
Bryn Mawr Ave	9	11.6	16.8	0.0	8
	34	7.1	17.6	0.1	14
Landover Rd	10	7.5	12.8	0.0	10
Total		157.3	279.2	0.9	11

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	38.6	47.2	0.1	4
	34	2.6	7.2	0.0	16
Railroad Ave	9	37.3	46.5	0.1	5
Glenbrook Ave	11	4.5	10.9	0.0	12
	36	4.5	9.2	0.0	13
Lindsay Ave	8	3.1	7.2	0.0	16
Mondella Ave	7	1.8	15.4	0.1	22
Old Lancaster Rd	6	1.4	15.0	0.1	23
S Warner Ave	5	0.4	7.4	0.0	24
Thomas Ave	4	4.1	11.6	0.1	19
Roberts Rd	3	1.6	13.3	0.1	21
Montrose Ave	2	7.4	20.4	0.1	17
	21	8.1	26.1	0.1	17
Lancaster Ave	1	26.4	29.8	0.0	4
Total		141.9	267.1	0.9	12

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	41.6	44.9	0.0	2
	21	2.1	7.4	0.0	16
	2	5.1	23.3	0.1	20
	3	1.9	15.0	0.1	22
Conestoga Rd	4	29.1	39.6	0.1	7
S Warner Ave	5	3.0	12.4	0.1	18
Old Lancaster Rd	6	1.0	8.1	0.0	22
Mondella Ave	7	8.7	23.1	0.1	16
Lindsay Ave	8	26.5	41.2	0.1	8
	36	12.9	17.5	0.0	6
Glenbrook Ave	11	24.8	28.7	0.0	4
Bryn Mawr Ave	9	15.3	20.6	0.0	7
	34	5.6	16.3	0.1	15
Landover Rd	10	6.9	11.6	0.0	10
Total		184.4	309.8	0.9	10

Arterial Level of Service: NB County Line Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	17.6	31.6	0.1	11
	36	0.9	6.1	0.0	21
Railroad Ave	9	18.6	26.7	0.1	9
Glenbrook Ave	11	2.0	8.4	0.0	16
	34	1.4	6.0	0.0	19
Lindsay Ave	8	2.2	6.4	0.0	18
Mondella Ave	7	1.3	14.8	0.1	23
Old Lancaster Rd	6	1.2	14.8	0.1	23
S Warner Ave	5	0.2	6.7	0.0	26
Thomas Ave	4	3.5	11.1	0.1	20
Roberts Rd	3	1.1	11.5	0.1	25
Montrose Ave	2	5.2	17.8	0.1	19
	21	4.1	22.2	0.1	20
Lancaster Ave	1	28.9	33.9	0.0	4
Total		88.2	218.0	0.9	15

Arterial Level of Service: SB County Line Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	60.1	63.4	0.0	2
	21	4.1	8.5	0.0	14
	2	55.7	85.0	0.1	6
	3	31.5	43.4	0.1	8
Conestoga Rd	4	88.7	159.6	0.1	3
S Warner Ave	5	29.8	39.8	0.1	5
Old Lancaster Rd	6	33.0	41.6	0.0	4
Mondella Ave	7	69.1	255.5	0.1	4
Lindsay Ave	8	70.4	83.7	0.1	4
	34	19.0	23.8	0.0	5
Glenbrook Ave	11	20.7	24.8	0.0	5
Bryn Mawr Ave	9	15.6	20.9	0.0	6
	36	5.0	15.0	0.1	15
Landover Rd	10	10.4	17.6	0.0	8
Total		513.2	882.7	0.9	5

Arterial Level of Service: NB County Line Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	16.8	30.6	0.1	12
	36	1.0	6.2	0.0	21
Railroad Ave	9	22.4	30.6	0.1	8
Glenbrook Ave	11	2.4	8.9	0.0	15
	34	2.2	6.8	0.0	17
Lindsay Ave	8	2.5	6.7	0.0	17
Mondella Ave	7	1.3	14.8	0.1	23
Old Lancaster Rd	6	1.2	14.8	0.1	23
S Warner Ave	5	0.3	6.7	0.0	26
Thomas Ave	4	3.0	10.5	0.1	21
Roberts Rd	3	1.4	12.0	0.1	24
Montrose Ave	2	6.6	19.1	0.1	18
	21	3.6	21.7	0.1	21
Lancaster Ave	1	18.4	23.0	0.0	5
Total		82.9	212.3	0.9	16

Arterial Level of Service: SB County Line Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	48.0	51.1	0.0	2
	21	4.0	8.1	0.0	14
	2	60.2	95.7	0.1	6
	3	31.2	42.6	0.1	8
Conestoga Rd	4	106.2	174.4	0.1	2
S Warner Ave	5	33.2	43.1	0.1	5
Old Lancaster Rd	6	35.0	42.1	0.0	4
Mondella Ave	7	75.2	266.0	0.1	4
Lindsay Ave	8	76.1	89.6	0.1	4
	34	19.8	24.6	0.0	5
Glenbrook Ave	11	23.8	27.7	0.0	4
Bryn Mawr Ave	9	17.3	22.7	0.0	6
	36	6.9	16.9	0.1	14
Landover Rd	10	12.3	20.8	0.0	7
Total		549.2	925.3	0.9	5

Arterial Level of Service: NB County Line Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	14.6	28.2	0.1	12
	36	0.9	6.1	0.0	21
Railroad Ave	9	19.4	27.6	0.1	8
Glenbrook Ave	11	2.2	8.7	0.0	15
	34	1.5	6.1	0.0	19
Lindsay Ave	8	2.0	6.3	0.0	19
Mondella Ave	7	1.0	14.6	0.1	23
Old Lancaster Rd	6	1.1	14.8	0.1	23
S Warner Ave	5	0.3	6.7	0.0	26
Thomas Ave	4	3.8	11.3	0.1	19
Roberts Rd	3	1.1	11.6	0.1	25
Montrose Ave	2	5.1	17.7	0.1	19
	21	4.0	22.0	0.1	21
Lancaster Ave	1	19.9	23.7	0.0	5
Total		76.9	205.5	0.9	16

Arterial Level of Service: SB County Line Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	65.1	68.6	0.0	2
	21	6.8	12.3	0.0	9
	2	43.6	65.5	0.1	7
	3	25.0	36.6	0.1	9
Conestoga Rd	4	87.1	173.0	0.1	3
S Warner Ave	5	31.8	42.2	0.1	5
Old Lancaster Rd	6	31.3	38.4	0.0	5
Mondella Ave	7	68.1	203.0	0.1	4
Lindsay Ave	8	70.7	84.0	0.1	4
	34	18.4	23.5	0.0	5
Glenbrook Ave	11	22.6	26.4	0.0	4
Bryn Mawr Ave	9	14.4	19.7	0.0	7
	36	5.0	15.0	0.1	15
Landover Rd	10	10.3	15.9	0.0	8
Total		500.3	824.1	0.9	5

Arterial Level of Service: NB County Line Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	15.8	29.5	0.1	12
	36	0.9	6.1	0.0	21
Railroad Ave	9	22.6	30.8	0.1	7
Glenbrook Ave	11	2.4	8.9	0.0	15
	34	1.9	6.4	0.0	18
Lindsay Ave	8	2.1	6.3	0.0	18
Mondella Ave	7	1.2	14.7	0.1	23
Old Lancaster Rd	6	1.1	14.7	0.1	23
S Warner Ave	5	0.2	6.6	0.0	27
Thomas Ave	4	3.8	11.3	0.1	19
Roberts Rd	3	1.4	12.0	0.1	24
Montrose Ave	2	5.1	17.7	0.1	19
	21	3.0	21.0	0.1	22
Lancaster Ave	1	16.6	21.4	0.0	6
Total		78.1	207.2	0.9	16

Arterial Level of Service: SB County Line Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	32.4	35.7	0.0	3
	21	3.2	7.6	0.0	15
	2	47.2	68.8	0.1	7
	3	29.0	41.0	0.1	8
Conestoga Rd	4	99.1	161.8	0.1	3
S Warner Ave	5	32.2	42.2	0.1	5
Old Lancaster Rd	6	32.4	44.7	0.0	4
Mondella Ave	7	67.5	218.5	0.1	4
Lindsay Ave	8	69.2	82.6	0.1	4
	34	19.4	24.1	0.0	5
Glenbrook Ave	11	23.1	26.8	0.0	4
Bryn Mawr Ave	9	16.2	21.5	0.0	6
	36	6.1	16.1	0.1	14
Landover Rd	10	11.8	19.4	0.0	8
Total		488.6	810.7	0.9	5

Arterial Level of Service: NB County Line Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	15.7	29.5	0.1	12
	36	1.1	6.3	0.0	20
Railroad Ave	9	20.7	28.9	0.1	8
Glenbrook Ave	11	2.1	8.6	0.0	16
	34	2.1	6.7	0.0	17
Lindsay Ave	8	2.6	6.8	0.0	17
Mondella Ave	7	1.3	14.9	0.1	23
Old Lancaster Rd	6	1.1	14.8	0.1	23
S Warner Ave	5	0.4	6.8	0.0	26
Thomas Ave	4	3.2	10.9	0.1	20
Roberts Rd	3	1.3	12.0	0.1	24
Montrose Ave	2	5.4	17.9	0.1	19
	21	2.5	20.7	0.1	22
Lancaster Ave	1	29.0	33.5	0.0	4
Total		88.7	218.4	0.9	15

Arterial Level of Service: SB County Line Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	46.7	50.0	0.0	2
	21	8.3	12.8	0.0	9
	2	58.8	82.8	0.1	6
	3	38.1	50.1	0.1	7
Conestoga Rd	4	108.5	141.3	0.1	2
S Warner Ave	5	29.9	39.8	0.1	5
Old Lancaster Rd	6	33.3	48.0	0.0	4
Mondella Ave	7	71.2	229.9	0.1	4
Lindsay Ave	8	75.0	88.4	0.1	4
	34	20.3	25.1	0.0	5
Glenbrook Ave	11	23.3	27.2	0.0	4
Bryn Mawr Ave	9	18.6	24.0	0.0	6
	36	5.3	15.3	0.1	15
Landover Rd	10	10.6	17.1	0.0	8
Total		547.9	851.8	0.9	5

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	28.8	37.8	0.1	5
	36	0.9	5.6	0.0	21
Railroad Ave	9	16.4	25.1	0.1	10
Glenbrook Ave	11	2.4	8.7	0.0	16
	34	1.0	5.6	0.0	21
Lindsay Ave	8	1.1	5.0	0.0	22
Mondella Ave	7	0.9	14.5	0.1	23
Old Lancaster Rd	6	1.0	14.4	0.1	24
S Warner Ave	5	0.4	7.3	0.0	24
Thomas Ave	4	4.7	12.8	0.1	17
Roberts Rd	3	1.5	13.3	0.1	21
Montrose Ave	2	3.6	16.9	0.1	20
	21	3.0	21.0	0.1	22
Lancaster Ave	1	13.2	16.2	0.0	7
Total		78.9	204.1	0.9	16

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	47.8	51.4	0.0	2
	21	1.8	6.8	0.0	17
	2	3.3	20.5	0.1	22
	3	1.6	13.8	0.1	25
Conestoga Rd	4	17.3	27.6	0.1	10
S Warner Ave	5	2.1	11.9	0.1	18
Old Lancaster Rd	6	0.4	7.4	0.0	24
Mondella Ave	7	1.1	13.8	0.1	25
Lindsay Ave	8	7.6	21.2	0.1	16
	34	8.6	13.3	0.0	8
Glenbrook Ave	11	18.6	22.5	0.0	5
Bryn Mawr Ave	9	10.5	15.8	0.0	9
	36	3.2	13.7	0.1	18
Landover Rd	10	6.9	11.5	0.0	10
Total		130.9	251.1	0.9	12

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	29.2	38.1	0.1	5
	36	0.8	5.5	0.0	21
Railroad Ave	9	16.5	25.2	0.1	10
Glenbrook Ave	11	2.3	8.7	0.0	16
	34	1.1	5.7	0.0	21
Lindsay Ave	8	1.1	5.1	0.0	22
Mondella Ave	7	0.9	14.5	0.1	23
Old Lancaster Rd	6	1.0	14.3	0.1	24
S Warner Ave	5	0.5	7.3	0.0	24
Thomas Ave	4	4.4	12.5	0.1	17
Roberts Rd	3	1.5	13.3	0.1	21
Montrose Ave	2	4.4	17.8	0.1	19
	21	3.3	21.3	0.1	21
Lancaster Ave	1	13.6	16.7	0.0	7
Total		80.6	206.1	0.9	15

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	32.4	35.8	0.0	3
	21	1.8	7.3	0.0	16
	2	3.1	20.3	0.1	22
	3	1.5	14.1	0.1	24
Conestoga Rd	4	15.8	25.9	0.1	11
S Warner Ave	5	2.5	12.4	0.1	17
Old Lancaster Rd	6	0.4	7.5	0.0	24
Mondella Ave	7	0.9	13.6	0.1	25
Lindsay Ave	8	9.6	23.2	0.1	15
	34	8.8	13.4	0.0	8
Glenbrook Ave	11	19.6	23.4	0.0	5
Bryn Mawr Ave	9	10.1	15.5	0.0	9
	36	2.6	13.0	0.1	18
Landover Rd	10	7.0	11.7	0.0	10
Total		116.1	237.2	0.9	13

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	24.2	33.2	0.1	6
	36	0.9	5.7	0.0	20
Railroad Ave	9	18.8	27.4	0.1	9
Glenbrook Ave	11	2.6	8.9	0.0	15
	34	1.1	5.8	0.0	21
Lindsay Ave	8	1.0	5.0	0.0	22
Mondella Ave	7	0.9	14.5	0.1	23
Old Lancaster Rd	6	1.0	14.4	0.1	24
S Warner Ave	5	0.4	7.3	0.0	24
Thomas Ave	4	5.6	13.7	0.1	16
Roberts Rd	3	1.7	13.4	0.1	21
Montrose Ave	2	4.4	17.6	0.1	19
	21	3.7	21.7	0.1	21
Lancaster Ave	1	18.6	21.8	0.0	5
Total		85.0	210.4	0.9	15

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	35.6	39.2	0.0	3
	21	1.4	6.3	0.0	18
	2	3.2	20.2	0.1	23
	3	1.5	13.9	0.1	24
Conestoga Rd	4	15.4	25.6	0.1	11
S Warner Ave	5	1.8	11.5	0.1	19
Old Lancaster Rd	6	0.4	7.5	0.0	24
Mondella Ave	7	1.0	13.6	0.1	25
Lindsay Ave	8	10.4	23.9	0.1	14
	34	9.1	13.7	0.0	8
Glenbrook Ave	11	18.2	22.1	0.0	5
Bryn Mawr Ave	9	11.1	16.4	0.0	8
	36	2.6	13.1	0.1	18
Landover Rd	10	7.0	11.6	0.0	10
Total		118.7	238.6	0.9	13

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	24.2	33.2	0.1	6
	36	0.9	5.7	0.0	20
Railroad Ave	9	14.6	23.4	0.1	10
Glenbrook Ave	11	2.1	8.6	0.0	16
	34	1.1	5.8	0.0	21
Lindsay Ave	8	1.0	5.0	0.0	22
Mondella Ave	7	0.9	14.6	0.1	23
Old Lancaster Rd	6	1.0	14.5	0.1	23
S Warner Ave	5	0.5	7.4	0.0	24
Thomas Ave	4	5.0	13.2	0.1	16
Roberts Rd	3	1.5	13.4	0.1	21
Montrose Ave	2	3.3	16.7	0.1	20
	21	3.4	21.6	0.1	21
Lancaster Ave	1	18.8	22.0	0.0	5
Total		78.3	204.9	0.9	16

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	37.0	40.4	0.0	3
	21	1.6	7.1	0.0	16
	2	2.2	19.5	0.1	23
	3	1.4	13.9	0.1	24
Conestoga Rd	4	16.4	26.7	0.1	11
S Warner Ave	5	2.2	12.0	0.1	18
Old Lancaster Rd	6	0.5	7.6	0.0	23
Mondella Ave	7	1.4	14.1	0.1	24
Lindsay Ave	8	8.2	22.0	0.1	16
	34	8.0	12.6	0.0	9
Glenbrook Ave	11	18.9	22.7	0.0	5
Bryn Mawr Ave	9	10.4	15.8	0.0	9
	36	2.4	12.7	0.1	19
Landover Rd	10	6.3	10.9	0.0	11
Total		116.9	238.0	0.9	13

Arterial Level of Service: NB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
County Line Rd	10	37.6	46.5	0.1	4
	36	0.8	5.5	0.0	21
Railroad Ave	9	15.7	24.5	0.1	10
Glenbrook Ave	11	2.8	9.2	0.0	15
	34	1.0	5.6	0.0	21
Lindsay Ave	8	1.0	5.0	0.0	22
Mondella Ave	7	0.9	14.5	0.1	23
Old Lancaster Rd	6	1.0	14.3	0.1	24
S Warner Ave	5	0.4	7.3	0.0	24
Thomas Ave	4	5.5	13.7	0.1	16
Roberts Rd	3	1.6	13.4	0.1	21
Montrose Ave	2	3.8	17.0	0.1	20
	21	2.8	20.8	0.1	22
Lancaster Ave	1	23.4	26.5	0.0	4
Total		98.2	223.8	0.9	14

Arterial Level of Service: SB County Line Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	1	48.2	51.7	0.0	2
	21	1.8	6.9	0.0	17
	2	2.7	20.1	0.1	23
	3	1.9	14.4	0.1	23
Conestoga Rd	4	17.2	27.4	0.1	10
S Warner Ave	5	1.8	11.6	0.1	19
Old Lancaster Rd	6	0.4	7.5	0.0	24
Mondella Ave	7	0.9	13.7	0.1	25
Lindsay Ave	8	3.2	16.7	0.1	20
	34	7.8	12.4	0.0	9
Glenbrook Ave	11	18.6	22.4	0.0	5
Bryn Mawr Ave	9	8.0	13.4	0.0	10
	36	2.7	13.2	0.1	18
Landover Rd	10	7.2	11.8	0.0	10
Total		122.3	243.1	0.9	13

APPENDIX I

Level of Service and Delay



Intersection	Existing LOS			Existing w/ Improvements LOS		
	AM Peak Hour LOS (seconds)	PM Peak Hour LOS (seconds)	SAT Peak Hour LOS (seconds)	AM Peak Hour LOS (seconds)	PM Peak Hour LOS (seconds)	SAT Peak Hour LOS (seconds)
Lancaster Avenue (S.R. 0030) ²	C (20.3)	C (23.0)	B (16.0)	C (20.4)	C (24.3)	B (16.0)
Eastbound Thru	C (20.8)	C (25.6)	B (12.5)	C (21.7)	C (27.6)	B (12.5)
Eastbound Thru/Right						
Westbound Left	B (15.2)	B (11.0)	B (10.5)	B (15.8)	B (11.6)	B (10.5)
Westbound Thru/Right						
Northbound Left	C (23.9)	C (27.7)	C (28.0)	C (22.3)	C (28.1)	C (28.1)
Northbound Left/Thru/Right	C (24.1)	C (28.1)	C (28.4)	C (22.5)	C (28.3)	C (28.5)
Southbound Left/Thru/Right	C (34.2)	C (34.2)	C (34.3)	C (32.2)	C (32.2)	C (34.3)
Montrose Avenue ^{1/2}	B (7.8)	B (12.4)	A (2.7)	B (11.7)	B (10.4)	A (6.9)
Eastbound Left/Thru/Right	F (51.7)	F (88.1)	C (19.1)	D (36.0)	C (33.3)	D (37.8)
Westbound Left/Thru/Right	E (38.4)	F (62.0)	C (17.7)	C (31.6)	C (29.6)	D (36.5)
Northbound Left/Thru	A (8.5)	A (9.6)	A (8.2)	A (7.5)	A (4.6)	A (0.2)
Northbound Thru/Right	A (0.1)	A (0.2)	A (0.0)	A (8.0)	A (1.1)	A (0.8)
Southbound Left/Thru	A (9.1)	A (8.4)	A (8.6)	B (10.3)	A (3.7)	A (2.3)
Southbound Thru/Right	A (0.1)	A (0.1)	A (0.0)	A (6.2)	A (9.9)	A (3.4)
South Roberts Road ¹	B (16.2)	A (3.4)	A (3.0)	C (26.3)	A (4.3)	A (3.8)
Eastbound Left/Thru/Right	F (109.7)	D (33.2)	C (19.2)	F (181.8)	E (44.0)	D (28.6)
Westbound Left/Thru/Right	D (27.3)	D (27.9)	C (20.4)	D (32.1)	D (32.8)	C (22.1)
Northbound Left/Thru	A (8.5)	A (0.0)	A (8.2)	A (8.5)	A (0.0)	A (8.2)
Northbound Thru/Right	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Southbound Left/Thru	A (8.8)	A (8.7)	A (8.6)	A (8.8)	A (8.7)	A (8.5)
Southbound Thru/Right	A (0.1)	A (0.0)	A (0.1)	A (0.0)	A (0.0)	A (0.0)
Conestoga Road (S.R. 1019) & Glenbrook Avenue & Thomas Avenue ²	B (15.8)	B (19.1)	B (13.8)	B (14.3)	B (17.0)	B (12.1)
Westbound Left/Thru/Right	C (25.5)	C (30.7)	C (27.1)	C (28.8)	D (42.9)	C (29.4)
Northeastbound Left/Thru/Right	C (28.2)	C (30.9)	C (29.6)	C (33.2)	D (44.9)	C (32.6)
Southeastbound Left/Thru/Right	C (27.9)	C (31.8)	B (25.4)	C (22.8)	D (35.1)	C (24.2)
Northbound Left/Thru	A (8.1)	A (5.3)	A (3.9)	A (5.8)	A (3.5)	A (2.8)
Northbound Thru/Right				A (6.6)	A (3.2)	A (4.4)
Southbound Left/Thru	B (16.7)	C (24.2)	B (16.9)	A (0.0)	B (15.7)	B (10.5)
Southbound Thru/Right				B (16.9)	B (12.9)	A (9.7)
South Warner Avenue ¹	A (0.1)	A (0.2)	A (0.1)	A (0.1)	A (0.2)	A (0.1)
Northbound Thru	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Northbound Thru/Right	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Southbound Left/Thru	B (10.7)	A (9.2)	B (10.0)	B (10.7)	A (9.2)	B (10.0)
Southbound Thru	A (0.1)	A (0.2)	A (0.1)	A (0.1)	A (0.2)	A (0.1)
Old Lancaster Avenue ¹	A (4.4)	A (3.9)	A (2.4)	A (3.8)	A (3.9)	A (2.2)
Westbound Left/Thru/Right	C (24.2)	C (20.1)	B (14.3)	D (26.1)	D (25.8)	C (15.4)
Northbound Thru	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Northbound Thru/Right						
Southbound Left/Thru	B (13.0)	A (9.8)	A (9.7)	B (13.0)	A (9.7)	A (9.5)
Southbound Thru	A (2.2)	A (1.5)	A (0.6)	A (3.9)	A (1.1)	A (1.3)
Mondella Avenue ¹	A (0.5)	A (0.4)	A (0.1)	A (0.4)	A (0.4)	A (0.3)
Westbound Left/Thru/Right	D (26.4)	C (18.9)	B (11.2)	C (20.9)	C (20.2)	C (15.3)
Northbound Thru	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Northbound Thru/Right						
Southbound Left/Thru	B (10.2)	A (9.0)	A (8.8)	B (10.2)	A (9.0)	A (8.8)
Southbound Thru	A (0.2)	A (0.1)	A (0.0)	A (0.3)	A (0.0)	A (0.0)

Intersection	Existing LOS			Existing w/ Improvements LOS		
	AM Peak Hour LOS (seconds)	PM Peak Hour LOS (seconds)	SAT Peak Hour LOS (seconds)	AM Peak Hour LOS (seconds)	PM Peak Hour LOS (seconds)	SAT Peak Hour LOS (seconds)
Lindsay Avenue ²	A (1.9)	A (1.5)	A (0.2)	B (15.0)	A (7.6)	A (0.7)
Westbound Left/Thru/Right	C (26.9)	C (25.6)	A (0.0)	C (25.7)	C (25.6)	A (0.0)
Northbound Thru	A (1.9)	A (0.8)	A (0.1)	C (22.6)	A (7.4)	A (0.7)
Northbound Thru/Right						
Southbound Left/Thru	A (1.2)	A (1.6)	A (0.2)	A (2.0)	A (1.5)	A (0.7)
Southbound Thru				A (3.1)	A (7.5)	
S. Bryn Mawr Avenue (S.R.) & Haverford Road & W. Railroad Avenue & Glenbrook Avenue ²	C (23.1)	C (22.4)	B (16.7)	C (28.2)	C (24.1)	B (18.0)
Eastbound Left	C (21.6)	C (23.9)	B (18.6)	C (21.6)	C (23.9)	B (18.5)
Eastbound Thru/Right	D (41.5)	D (46.2)	C (30.5)	D (41.5)	D (46.2)	C (30.4)
Westbound Left	C (23.8)	D (40.9)	C (20.0)	C (23.8)	D (40.9)	C (20.3)
Westbound Thru	C (30.6)	D (38.2)	C (27.7)	C (30.6)	D (38.2)	C (28.1)
Westbound Right	C (25.1)	C (28.2)	C (24.2)	C (25.1)	C (28.2)	C (24.4)
Northbound Left	B (13.0)	C (22.1)	B (10.5)	C (21.8)	C (24.5)	B (12.7)
Northbound Thru	C (24.0)	B (16.7)	B (18.2)	D (37.5)	C (21.7)	C (21.5)
Northbound Thru/Right						
Southbound Left	C (36.6)	A (4.4)	B (10.6)	C (30.5)	A (5.9)	B (12.5)
Southbound Thru	A (2.9)	A (6.5)	A (2.9)	A (3.7)	A (8.0)	A (3.7)
Southbound Thru/Right						
Glenbrook Avenue ²	B (11.7)	C (22.1)	B (10.4)	B (11.5)	C (20.9)	B (10.4)
Northbound Left/Thru	A (0.2)	A (0.2)	A (0.4)	A (0.4)	A (0.2)	A (0.3)
Northbound Thru/Right						
Southbound Thru	C (31.3)	D (36.7)	C (22.7)	C (30.4)	C (34.6)	C (22.8)
Southbound Thru/Right						
Haverford Road (S.R.) & Landover Road ²	B (16.0)	B (13.7)	B (10.5)	C (22.8)	E (56.8)	B (12.8)
Eastbound Left/Thru/Right	D (53.5)	D (41.4)	D (35.5)	D (53.3)	D (41.4)	D (35.8)
Westbound Left/Thru/Right	D (35.3)	D (53.6)	C (30.2)	D (35.3)	D (54.0)	C (33.8)
Northbound Left/Thru	B (10.4)	A (8.9)	A (4.0)	A (7.2)	F (82.5)	A (10.0)
Northbound Thru/Right	B (10.5)	A (9.1)	A (4.2)	C (23.9)	B (12.9)	A (6.4)
Southbound Left/Thru	A (0.8)	A (1.3)	A (4.1)	C (23.0)	A (4.6)	A (10.0)
Southbound Thru/Right	A (0.8)	A (1.5)	A (4.3)	A (2.1)	F (82.3)	A (6.5)

¹ Analyzed as stop controlled ² Analyzed as signal

APPENDIX J

95th Percentile Queues



Intersection	Existing Queues			Queues w/ Improvements			
	Existing Storage Length (feet)	AM Peak Hour 95th Percentile Queue (feet)	PM Peak Hour 95th Percentile Queue (feet)	SAT Peak Hour 95th Percentile Queue (feet)	AM Peak Hour 95th Percentile Queue (feet)	PM Peak Hour 95th Percentile Queue (feet)	SAT Peak Hour 95th Percentile Queue (feet)
Lancaster Avenue (S.R. 0030)							
Eastbound Thru	*340	224	497	182	224	497	182
Eastbound Thru/Right							
Westbound Left		167	137	137	167	138	137
Westbound Thru/Right							
Northbound Left		325	211	196	347	218	195
Northbound Left/Thru/Right		322	209	197	343	229	195
Southbound Left/Thru/Right		34	37	40	33	36	40
Montrose Avenue							
Eastbound Left/Thru/Right	*675	125	170	25	155	140	78
Westbound Left/Thru/Right	*340	40	70	15	50	55	53
Northbound Left/Thru	(75)	0	3	0	5	8	0
Northbound Thru/Right	*440	0	0	0	233	18	13
Southbound Left/Thru	(75)	0	0	0	3	3	0
Southbound Thru/Right	*750	0	0	0	153	283	65
South Roberts Road							
Eastbound Left/Thru/Right	*275	213	48	13	270	63	40
Westbound Left/Thru/Right	*540	23	25	23	28	30	25
Northbound Left/Thru	(75)	0	0	0	0	0	0
Northbound Thru/Right	*360	0	0	0	0	0	0
Southbound Left/Thru	(75)	0	0	0	0	0	0
Southbound Thru/Right	*440	0	0	0	0	0	0
Conestoga Road (S.R. 1019) & Glenbrook Avenue & Thomas Avenue							
Westbound Left/Thru/Right		27	97	34	31	120	38
Northeastbound Left/Thru/Right		107	103	96	125	130	108
Southeastbound Left/Thru/Right	*430	350	347	206	259	345	201
Northbound Left/Thru	(170)	202	151	121	87	61	50
Northbound Thru/Right					216	91	144
Southbound Left/Thru	*360	136	228	122	103	121	71
Southbound Thru/Right							
South Warner Avenue							
Northbound Thru		0	0	0	0	0	0
Northbound Thru/Right		0	0	0	0	0	0
Southbound Left/Thru		0	3	0	0	3	0
Southbound Thru		0	0	0	0	0	0
Old Lancaster Avenue							
Westbound Left/Thru/Right		60	83	30	63	103	33
Northbound Thru		0	0	0	0	0	0
Northbound Thru/Right							
Southbound Left/Thru		48	13	10	48	13	10
Southbound Thru		0	0	0	0	0	0
Mondella Avenue							
Westbound Left/Thru/Right		10	8	3	8	13	5
Northbound Thru		0	0	0	0	0	0
Northbound Thru/Right							
Southbound Left/Thru		3	0	0	3	0	0
Southbound Thru		0	0	0	0	0	0
Lindsay Avenue							
Westbound Left/Thru/Right		19	16	0	19	16	0
Northbound Thru	*400	162	40	0	652	340	0
Northbound Thru/Right							
Southbound Left/Thru			43	79	0	3	1
Southbound Thru							
S. Bryn Mawr Avenue (S.R.) & Haverford Road & W. Railroad Avenue & Glenbrook Avenue							
Eastbound Left	140	96	73	89	96	73	89
Eastbound Thru/Right		416	387	211	416	387	211
Westbound Left	180	47	159	67	47	159	67
Westbound Thru		230	328	147	230	328	148
Westbound Right	160	0	0	0	0	0	0
Northbound Left	70	80	81	66	77	82	66

Intersection	Existing Queues				Queues w/ Improvements		
	Existing Storage Length (feet)	AM Peak Hour 95th Percentile Queue (feet)	PM Peak Hour 95th Percentile Queue (feet)	SAT Peak Hour 95th Percentile Queue (feet)	AM Peak Hour 95th Percentile Queue (feet)	PM Peak Hour 95th Percentile Queue (feet)	SAT Peak Hour 95th Percentile Queue (feet)
Northbound Thru		500	147	180	482	195	180
Northbound Thru/Right							
Southbound Left	120	52	5	16	48	8	20
Southbound Thru							
Southbound Thru/Right	*120	0	0	0	0	1	0
Glenbrook Avenue							
Northbound Left/Thru		0	0	0	7	0	0
Northbound Thru/Right							
Southbound Thru							
Southbound Thru/Right	*235	299	550	219	257	542	219
Haverford Road (S.R.) & Landover Road							
Eastbound Left/Thru/Right		438	238	195	438	240	198
Westbound Left/Thru/Right	*300	173	445	135	173	453	130
Northbound Left/Thru	(75)	285	175	78	3	55	10
Northbound Thru/Right		243	173	60	768	378	188
Southbound Left/Thru	(75)	10	20	80	30	10	15
Southbound Thru/Right	*445	10	20	63	30	975	193

*Denotes distance to adjacent intersection

APPENDIX K

Pedestrian and Vehicle Clearance Calculations



STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township
 County: Delaware County
 PennDOT Engineering District: 6

Analysis Date: 9/12/2018
 Conducted By: LAS
 Checked By: DAD
 Agency/Company Name: Gilmore & Associates, Inc.

Intersection Description: County Line Road (SR 1001) & Lancaster Avenue (SR 0030)

VEHICLE AND PEDESTRIAN INTERVAL FINDINGS

Vehicle Change and Clearance Interval Findings

Approach Description	Direction	Calculated Yellow Change Interval, Y	User Defined Yellow Change Interval, Y	Calculated All-Red Clearance Interval, AR	User Defined All-Red Clearance Interval, AR	To Be Implemented	
						Y (s)	AR (s)
SR 0030 Phase 6	WB	3.1	4	3	3	4	3
SR 0030 Phase 2	EB	2.7	3	3.8	4	3	4
Private Drive Phase 4	SB	3.4	4	2.3	3	4	3
SR 1001 Phase 8	NB	3.4	4	2.4	3	4	3

Additional Comments/Justifications:

Pedestrian Interval Findings

WITH PEDESTRIAN SIGNALS	Description of Pedestrian Crossing	Calculated Walk Interval, T _w	User Defined Walk Interval, T _w	Calculated Ped. Change Interval, T _{pc}	User Defined Ped. Change Interval, T _{pc}	Greater than (T _w +T _{pc}) _{min} ?	To Be Implemented	
							T _w (s)	T _{pc} (s)
	Crossing of WB Lancaster Ave	11.6	7	17.2	18	Yes	7	18
	Crossing of EB Lancaster Ave	9.5	7	12.9	13	Yes	7	13
	Crossing of NB County Line Road	15.5	7	24.9	25	Yes	7	25

WITHOUT PEDESTRIAN SIGNALS	Description of Pedestrian Crossing	Calculated Min. Green Interval, T _p
	Crossing of SB Privtae Drive	11.9

Additional Comments/Justifications:

VEHICLE CHANGE AND CLEARANCE INTERVALS

Assumptions and Calibration Inputs

Change and Clearance Intervals (CCI, seconds)

$$CCI = Y + AR$$

Yellow Change Interval (Y, seconds)

$$Y = t + \frac{1.47V}{2a \pm 64.4(g/100)} \quad (\text{typ. 3-6 seconds})$$

- t = Perception-reaction time, s (1 second) ←
- V = Approach speed, MPH
- a = Deceleration rate (10 ft/s²) ←
- g = Grade of approach, %

All-Red Clearance Interval (AR, seconds)

$$AR = \frac{(W + L)}{1.47V}$$

- W = Width of the intersection, ft
(from the stop bar to the end of the farthest traveled lane)
- L = Length of Vehicle (20 ft) ←
- V = Approach speed, MPH

Calculations

Through Movement Phases								
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments
SR 0030 Phase 6	WB	25	-3.6	88	3.1	3.0	6.1	
SR 0030 Phase 2	EB	25	3.9	119	2.7	3.8	6.5	
Private Drive Phase 4	SB	35	2.4	94	3.4	2.3	5.7	
SR 1001 Phase 8	NB	35	2.9	102	3.4	2.4	5.8	
Left-Turn Movement Phases								
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments

PEDESTRIAN INTERVALS

Assumptions and Calibration Inputs

Walk Interval¹ (T _w , seconds)	$T_w = \left(\frac{1}{2} L \right) \div S_w + 3$
Pedestrian Change Interval (T _{pc} , seconds)	$T_{pc} = \frac{L}{S_w}$
Minimum Duration ((T _w +T _{pc}) _{min} , seconds)	$(T_w + T_{pc})_{min} = \frac{(L + 6)}{3}$

Pedestrian Interval Variables

L = Pedestrian walking distance from the curb or edge of shoulder to the far edge of the traveled way, ft

S_w = Walking Speed, ft/s (3.5 ft/s) ← 3.5

Minimum Green Interval²

(T_p, seconds)
$$T_p = \frac{L}{S_w} + 3$$

1) The walk interval should be at least 7 seconds, but where justified, a minimum 4 second interval may be used.

2) Minimum green interval when no pedestrian signals are present or proposed

Calculations

Description of Pedestrian Crossing	Ped Signal	L	T _w	T _{pc}	(T _w +T _{pc}) _{min}		T _p		Comments
Crossing of WB Lancaster Ave	Yes	60	11.6	17.2	22.0		N/A		USE 7 SEC WALK 18 FH
Crossing of EB Lancaster Ave	Yes	45	9.5	12.9	17.0		N/A		USE 7 SEC WALK 13 FH
Crossing of NB County Line Road	Yes	87	15.5	24.9	31.0		N/A		USE 7 SEC WALK 25 FH
Crossing of SB Privtae Drive	No	31	N/A	N/A	N/A		11.9		

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township
 County: Delaware County
 PennDOT Engineering District: 6

Analysis Date: 9/12/2018
 Conducted By: LAS
 Checked By: DAD
 Agency/Company Name: Gilmore & Associates, Inc.

Intersection Description: County Line Road (S.R. 1001) & Montrose Avenue

VEHICLE AND PEDESTRIAN INTERVAL FINDINGS

Vehicle Change and Clearance Interval Findings

Approach Description	Direction	Calculated Yellow Change Interval, Y	User Defined Yellow Change Interval, Y	Calculated All-Red Clearance Interval, AR	User Defined All-Red Clearance Interval, AR	To Be Implemented	
						Y (s)	AR (s)
SR 1001 Phase 6	WB	3.9	4	1.7	2	4	2
SR 1001 Phase 2	EB	3.5	4	1.7	2	4	2
Montrose Ave Phase 4	SB	3	4	2.4	3	4	3
Montrose Ave Phase 8	NB	2.6	4	2.4	3	4	3

Additional Comments/Justifications:

Pedestrian Interval Findings

WITH PEDESTRIAN SIGNALS	Description of Pedestrian Crossing	Calculated Walk Interval, T _w	User Defined Walk Interval, T _w	Calculated Ped. Change Interval, T _{pc}	User Defined Ped. Change Interval, T _{pc}	Greater than (T _w +T _{pc}) _{min} ?	To Be Implemented	
							T _w (s)	T _{pc} (s)
	Crossing of WB County Line Rd	10.9	7	15.8	16	Yes	7	16
	Crossing of EB County Line Rd	10.9	7	15.8	16	Yes	7	16
	Crossing of NB Montrose Ave	8.8	7	11.5	12	Yes	7	12
	Crossing of SB Montrose Ave	8.8	7	11.5	12	Yes	7	12

WITHOUT PEDESTRIAN SIGNALS	Calculated Min. Green Interval, T _p
Description of Pedestrian Crossing	

Additional Comments/Justifications:

VEHICLE CHANGE AND CLEARANCE INTERVALS

Assumptions and Calibration Inputs

Change and Clearance Intervals (CCI, seconds)

$$CCI = Y + AR$$

Yellow Change Interval (Y, seconds)

$$Y = t + \frac{1.47V}{2a \pm 64.4(g/100)} \quad (\text{typ. 3-6 seconds})$$

- t = Perception-reaction time, s (1 second) ←
- V = Approach speed, MPH
- a = Deceleration rate (10 ft/s²) ←
- g = Grade of approach, %

All-Red Clearance Interval (AR, seconds)

$$AR = \frac{(W + L)}{1.47V}$$

- W = Width of the intersection, ft
(from the stop bar to the end of the farthest traveled lane)
- L = Length of Vehicle (20 ft) ←
- V = Approach speed, MPH

Calculations

Through Movement Phases								
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments
SR 1001 Phase 6	WB	35	-3	65	3.9	1.7	5.6	
SR 1001 Phase 2	EB	35	1.5	65	3.5	1.7	5.2	
Montrose Ave Phase 4	SB	25	-2	65	3.0	2.4	5.4	
Montrose Ave Phase 8	NB	25	4.7	65	2.6	2.4	5.0	
Left-Turn Movement Phases								
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments

PEDESTRIAN INTERVALS

Assumptions and Calibration Inputs

Walk Interval¹

(T_w , seconds)

$$T_w = \left(\frac{1}{2} L \right) \div S_w + 3$$

Pedestrian Change Interval

(T_{pc} , seconds)

$$T_{pc} = \frac{L}{S_w}$$

Minimum Duration

(($T_w + T_{pc}$)_{min}, seconds)

$$(T_w + T_{pc})_{min} = \frac{(L + 6)}{3}$$

1) The walk interval should be at least 7 seconds, but where justified, a minimum 4 second interval may be used.

Pedestrian Interval Variables

L = Pedestrian walking distance from the curb or edge of shoulder to the far edge of the traveled way, ft

S_w = Walking Speed, ft/s (3.5 ft/s)

3.5

Minimum Green Interval²

(T_p , seconds)

$$T_p = \frac{L}{S_w} + 3$$

2) Minimum green interval when no pedestrian signals are present or proposed

Calculations

Description of Pedestrian Crossing	Ped Signal	L	T _w	T _{pc}	(T _w +T _{pc}) _{min}		T _p		Comments
Crossing of WB County Line Rd	Yes	55	10.9	15.8	20.4		N/A		USE 7 SEC WALK 16 FH
Crossing of EB County Line Rd	Yes	55	10.9	15.8	20.4		N/A		USE 7 SEC WALK 16 FH
Crossing of NB Montrose Ave	Yes	40	8.8	11.5	15.4		N/A		USE 7 SEC WALK 12 FH
Crossing of SB Montrose Ave	Yes	40	8.8	11.5	15.4		N/A		USE 7 SEC WALK 12 FH

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township
 County: Delaware County
 PennDOT Engineering District: 6

Analysis Date: 9/12/2018
 Conducted By: LAS
 Checked By: DAD
 Agency/Company Name: Gilmore & Associates, Inc.

Intersection Description: County Line Road (SR 1001) & Roberts Road

VEHICLE AND PEDESTRIAN INTERVAL FINDINGS

Vehicle Change and Clearance Interval Findings

Approach Description	Direction	Calculated Yellow Change Interval, Y	User Defined Yellow Change Interval, Y	Calculated All-Red Clearance Interval, AR	User Defined All-Red Clearance Interval, AR	To Be Implemented	
						Y (s)	AR (s)
SR 1001 Phase 6	WB	3.9	4	1.4	2	4	2
SR 1001 Phase 2	EB	3.5	4	1.3	2	4	2
Roberts Rd Phase 4	SB	2.8	4	2.5	3	4	3
Roberts Rd Phase 8	NB	2.7	4	2.3	3	4	3

Additional Comments/Justifications:

Pedestrian Interval Findings

WITH PEDESTRIAN SIGNALS	Description of Pedestrian Crossing	Calculated Walk Interval, T _w	User Defined Walk Interval, T _w	Calculated Ped. Change Interval, T _{pc}	User Defined Ped. Change Interval, T _{pc}	Greater than (T _w +T _{pc}) _{min} ?	To Be Implemented	
							T _w (s)	T _{pc} (s)
	Crossing of WB County Line Rd	9.5	7	12.9	13	Yes	7	13
	Crossing of EB County Line Rd	11.3	7	16.6	17	Yes	7	17
	Crossing of NB Roberts Rd	8.8	7	11.5	12	Yes	7	12
	Crossing of SB Roberts Rd	10.2	7	14.3	15	Yes	7	15

WITHOUT PEDESTRIAN SIGNALS	Calculated Min. Green Interval, T _p
Description of Pedestrian Crossing	

Additional Comments/Justifications:

VEHICLE CHANGE AND CLEARANCE INTERVALS

Assumptions and Calibration Inputs

Change and Clearance Intervals (CCI, seconds)

$$CCI = Y + AR$$

Yellow Change Interval (Y, seconds)

$$Y = t + \frac{1.47V}{2a \pm 64.4(g/100)} \quad (\text{typ. 3-6 seconds})$$

- t = Perception-reaction time, s (1 second) ←
- V = Approach speed, MPH
- a = Deceleration rate (10 ft/s²) ←
- g = Grade of approach, %

All-Red Clearance Interval (AR, seconds)

$$AR = \frac{(W + L)}{1.47V}$$

- W = Width of the intersection, ft
(from the stop bar to the end of the farthest traveled lane)
- L = Length of Vehicle (20 ft) ←
- V = Approach speed, MPH

Calculations

Through Movement Phases								
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments
SR 1001 Phase 6	WB	35	-3	48	3.9	1.4	5.3	
SR 1001 Phase 2	EB	35	1.5	45	3.5	1.3	4.8	
Roberts Rd Phase 4	SB	25	1.8	70	2.8	2.5	5.3	
Roberts Rd Phase 8	NB	25	3.8	63	2.7	2.3	5.0	
Left-Turn Movement Phases								
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments

PEDESTRIAN INTERVALS

Assumptions and Calibration Inputs

Walk Interval¹

(T_w , seconds)

$$T_w = \left(\frac{1}{2} L \right) \div S_w + 3$$

Pedestrian Change Interval

(T_{pc} , seconds)

$$T_{pc} = \frac{L}{S_w}$$

Minimum Duration

(($T_w + T_{pc}$)_{min}, seconds)

$$(T_w + T_{pc})_{min} = \frac{(L + 6)}{3}$$

1) The walk interval should be at least 7 seconds, but where justified, a minimum 4 second interval may be used.

Pedestrian Interval Variables

L = Pedestrian walking distance from the curb or edge of shoulder to the far edge of the traveled way, ft

S_w = Walking Speed, ft/s (3.5 ft/s)

←

Minimum Green Interval²

(T_p , seconds)

$$T_p = \frac{L}{S_w} + 3$$

2) Minimum green interval when no pedestrian signals are present or proposed

Calculations

Description of Pedestrian Crossing	Ped Signal	L	T_w	T_{pc}	$(T_w + T_{pc})_{min}$	T_p	Comments
Crossing of WB County Line Rd	Yes	45	9.5	12.9	17.0	N/A	USE 7 SEC WALK 13 FH
Crossing of EB County Line Rd	Yes	58	11.3	16.6	21.4	N/A	USE 7 SEC WALK 17 FH
Crossing of NB Roberts Rd	Yes	40	8.8	11.5	15.4	N/A	USE 7 SEC WALK 12 FH
Crossing of SB Roberts Rd	Yes	50	10.2	14.3	18.7	N/A	

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township
 County: Delaware County
 PennDOT Engineering District: 6

Analysis Date: 9/12/2018
 Conducted By: LAS
 Checked By: DAD
 Agency/Company Name: Gilmore & Associates, Inc.

Intersection Description: County Line Road (SR 1001) & Conestoga Road (SR 1019) & Thomas Avenue & Glenbrook Avenue

VEHICLE AND PEDESTRIAN INTERVAL FINDINGS

Vehicle Change and Clearance Interval Findings

Approach Description	Direction	Calculated Yellow Change Interval, Y	User Defined Yellow Change Interval, Y	Calculated All-Red Clearance Interval, AR	User Defined All-Red Clearance Interval, AR	To Be Implemented	
						Y (s)	AR (s)
Conestoga Rd (SR 1019)	SEB	3.3	4	3.3	3	4	3
County Line Rd (SR 1001)	NB	3.8	4	2.6	3	4	3
County Line Rd (SR 1001)	SB	3.4	4	2.6	3	4	3
Thomas Ave	WB	2.7	3	4.7	5	5	3
Glenbrook Ave	NEB	2.9	3	4.1	5	5	3

Additional Comments/Justifications:

Thomas Avenue CCI is 7.4; use Y=5 and AR=3 to meet requirements.

Pedestrian Interval Findings

WITH PEDESTRIAN SIGNALS	Description of Pedestrian Crossing	Calculated Walk Interval, T _w	User Defined Walk Interval, T _w	Calculated Ped. Change Interval, T _{pc}	User Defined Ped. Change Interval, T _{pc}	Greater than (T _w +T _{pc}) _{min} ?	To Be Implemented	
							T _w (s)	T _{pc} (s)
	Crossing Thomas Ave	7.8	7	9.5	10	Yes	7	10
	Crossing NB County Line Rd	11	7	16	16	Yes	7	16
	Crossing Glenbrook Ave	9.5	7	12.9	13	Yes	7	13
	Crossing Conestoga Rd	10.9	7	15.8	16	Yes	7	16
	Crossing SB County Line Rd	9.5	7	12.9	13	Yes	7	13

WITHOUT PEDESTRIAN SIGNALS	Calculated Min. Green Interval, T _p
Description of Pedestrian Crossing	

Additional Comments/Justifications:

VEHICLE CHANGE AND CLEARANCE INTERVALS

Assumptions and Calibration Inputs

Change and Clearance Intervals (CCI, seconds)

$$CCI = Y + AR$$

Yellow Change Interval (Y, seconds)

$$Y = t + \frac{1.47V}{2a \pm 64.4(g/100)} \quad (\text{typ. 3-6 seconds})$$

- t = Perception-reaction time, s (1 second) ←
- V = Approach speed, MPH
- a = Deceleration rate (10 ft/s²) ←
- g = Grade of approach, %

All-Red Clearance Interval (AR, seconds)

$$AR = \frac{(W + L)}{1.47V}$$

- W = Width of the intersection, ft
(from the stop bar to the end of the farthest traveled lane)
- L = Length of Vehicle (20 ft) ←
- V = Approach speed, MPH

Calculations

Through Movement Phases								
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments
Conestoga Rd (SR 1019)	SEB	35	5	145	3.3	3.3	6.6	
County Line Rd (SR 1001)	NB	35	-2.1	112	3.8	2.6	6.4	
County Line Rd (SR 1001)	SB	35	2.7	112	3.4	2.6	6.0	
Thomas Ave	WB	25	2.6	150	2.7	4.7	7.4	
Glenbrook Ave	NEB	25	-0.5	130	2.9	4.1	7.0	
Left-Turn Movement Phases								
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments

PEDESTRIAN INTERVALS

Assumptions and Calibration Inputs

Walk Interval¹

(T_w , seconds)

$$T_w = \left(\frac{1}{2} L \right) \div S_w + 3$$

Pedestrian Change Interval

(T_{pc} , seconds)

$$T_{pc} = \frac{L}{S_w}$$

Minimum Duration

(($T_w + T_{pc}$)_{min}, seconds)

$$(T_w + T_{pc})_{min} = \frac{(L + 6)}{3}$$

1) The walk interval should be at least 7 seconds, but where justified, a minimum 4 second interval may be used.

Pedestrian Interval Variables

L = Pedestrian walking distance from the curb or edge of shoulder to the far edge of the traveled way, ft

S_w = Walking Speed, ft/s (3.5 ft/s)

← 3.5

Minimum Green Interval²

(T_p , seconds)

$$T_p = \frac{L}{S_w} + 3$$

2) Minimum green interval when no pedestrian signals are present or proposed

Calculations

Description of Pedestrian Crossing	Ped Signal	L	T_w	T_{pc}	$(T_w + T_{pc})_{min}$	T_p	Comments
Crossing Thomas Ave	Yes	33	7.8	9.5	13.0	N/A	
Crossing NB County Line Rd	Yes	56	11	16	20.7	N/A	
Crossing Glenbrook Ave	Yes	45	9.5	12.9	17.0	N/A	
Crossing Conestoga Rd	Yes	55	10.9	15.8	20.4	N/A	
Crossing SB County Line Rd	Yes	45	9.5	12.9	17.0	N/A	

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township
 County: Delaware County
 PennDOT Engineering District: 6

Analysis Date: 9/12/2018
 Conducted By: LAS
 Checked By: DAD
 Agency/Company Name: Gilmore & Associates, Inc.

Intersection Description: County Line Road (SR 1001) & Lindsay Ave

VEHICLE AND PEDESTRIAN INTERVAL FINDINGS

Vehicle Change and Clearance Interval Findings

Approach Description	Direction	Calculated Yellow Change Interval, Y	User Defined Yellow Change Interval, Y	Calculated All-Red Clearance Interval, AR	User Defined All-Red Clearance Interval, AR	To Be Implemented	
						Y (s)	AR (s)
SR 1001 Phase 6	WB	3.6	4	1.7	2	4	2
SR 1001 Phase 2	EB	3.6	4	1.5	2	4	2
Lindsay Ave Phase 4	SB	2.9	4	2.7	3	4	3

Additional Comments/Justifications:

Pedestrian Interval Findings

WITH PEDESTRIAN SIGNALS	Description of Pedestrian Crossing	Calculated Walk Interval, T _w	User Defined Walk Interval, T _w	Calculated Ped. Change Interval, T _{pc}	User Defined Ped. Change Interval, T _{pc}	Greater than (T _w +T _{pc}) _{min} ?	To Be Implemented	
							T _w (s)	T _{pc} (s)
	Crossing of WB County Line Rd	8.9	7	11.8	12	Yes	7	12
	Crossing of Lindsay Ave	7.9	7	9.8	10	Yes	7	10

WITHOUT PEDESTRIAN SIGNALS	Calculated Min. Green Interval, T _p
Description of Pedestrian Crossing	

Additional Comments/Justifications:

VEHICLE CHANGE AND CLEARANCE INTERVALS

Assumptions and Calibration Inputs

Change and Clearance Intervals (CCI, seconds)

$$CCI = Y + AR$$

Yellow Change Interval (Y, seconds)

$$Y = t + \frac{1.47V}{2a \pm 64.4(g/100)} \quad (\text{typ. 3-6 seconds})$$

- t = Perception-reaction time, s (1 second) ←
- V = Approach speed, MPH
- a = Deceleration rate (10 ft/s²) ←
- g = Grade of approach, %

All-Red Clearance Interval (AR, seconds)

$$AR = \frac{(W + L)}{1.47V}$$

- W = Width of the intersection, ft
(from the stop bar to the end of the farthest traveled lane)
- L = Length of Vehicle (20 ft) ←
- V = Approach speed, MPH

Calculations

Through Movement Phases								
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments
SR 1001 Phase 6	WB	35	0	66	3.6	1.7	5.3	
SR 1001 Phase 2	EB	35	0	53	3.6	1.5	5.1	
Lindsay Ave Phase 4	SB	25	0	77	2.9	2.7	5.6	
Left-Turn Movement Phases								
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments

PEDESTRIAN INTERVALS

Assumptions and Calibration Inputs

Walk Interval¹ (T _w , seconds)	$T_w = \frac{\left(\frac{1}{2}L\right)}{S_w} + 3$
Pedestrian Change Interval (T _{pc} , seconds)	$T_{pc} = \frac{L}{S_w}$
Minimum Duration ((T _w +T _{pc}) _{min} , seconds)	$(T_w + T_{pc})_{min} = \frac{(L + 6)}{3}$

Pedestrian Interval Variables

L = Pedestrian walking distance from the curb or edge of shoulder to the far edge of the traveled way, ft

S_w = Walking Speed, ft/s (3.5 ft/s) ← 3.5

Minimum Green Interval²

(T_p, seconds) $T_p = \frac{L}{S_w} + 3$

1) The walk interval should be at least 7 seconds, but where justified, a minimum 4 second interval may be used.

2) Minimum green interval when no pedestrian signals are present or proposed

Calculations

Description of Pedestrian Crossing	Ped Signal	L	T _w	T _{pc}	(T _w +T _{pc}) _{min}		T _p		Comments
Crossing of WB County Line Rd	Yes	41	8.9	11.8	15.7		N/A		USE 7 SEC WALK 12 FH
Crossing of Lindsay Ave	Yes	34	7.9	9.8	13.4		N/A		USE 7 SEC WALK 10 FH

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township
 County: Delaware County
 PennDOT Engineering District: 6

Analysis Date: 9/12/2018
 Conducted By: LAS
 Checked By: DAD
 Agency/Company Name: Gilmore & Associates, Inc.

Intersection Description: County Line Road (SR 1001) & Bryn Mawr Ave (SR 3038) & Railroad Ave & Haverford Road (SR 1001)

VEHICLE AND PEDESTRIAN INTERVAL FINDINGS

Vehicle Change and Clearance Interval Findings

Approach Description	Direction	Calculated Yellow Change Interval, Y	User Defined Yellow Change Interval, Y	Calculated All-Red Clearance Interval, AR	User Defined All-Red Clearance Interval, AR	To Be Implemented	
						Y (s)	AR (s)
SR 1001 Phase 2	EB	3.6	4	2.1	2	4	2
SR 1001 Phase 6	WB	3.6	4	2	2	4	2
SR 1032 Phase 8	NB	3.3	4	2.5	3	4	3
SR 3038 Phase 4	SB	4	4	1.9	2	4	2
SR 1001 Phase 1	WB	2.9	3	2.6	3	3	3
SR 1001 Phase 5	EB	2.9	3	2.6	3	3	3
SR 1032 Phase 3	NB	2.9	3	2.8	3	3	3
SR 3038 Phase 7	SB	2.9	3	3.3	4	3	4

Additional Comments/Justifications:

Pedestrian Interval Findings

WITH PEDESTRIAN SIGNALS	Description of Pedestrian Crossing	Calculated Walk Interval, T _w	User Defined Walk Interval, T _w	Calculated Ped. Change Interval, T _{pc}	User Defined Ped. Change Interval, T _{pc}	Greater than (T _w +T _{pc}) _{min} ?	To Be Implemented	
							T _w (s)	T _{pc} (s)
	Crossing of WB County Line Rd	11.9	7	17.8	18	Yes	7	18
	Crossing of EB Haverford Rd	12.5	7	18.9	19	Yes	7	19
	Crossing of NB Bryn Mawr Ave	10.2	7	14.3	15	Yes	7	15
	Crossing of SB Bryn Mawr Ave	13.2	7	20.3	21	Yes	7	21
	Crossing of NB Glenbrook Ave	6.6	7	7.2	8	Yes	7	8

WITHOUT PEDESTRIAN SIGNALS

Description of Pedestrian Crossing	Calculated Min. Green Interval, T _p

Additional Comments/Justifications:

VEHICLE CHANGE AND CLEARANCE INTERVALS

Assumptions and Calibration Inputs

Change and Clearance Intervals (CCI, seconds)

$$CCI = Y + AR$$

Yellow Change Interval (Y, seconds)

$$Y = t + \frac{1.47V}{2a \pm 64.4(g/100)} \quad (\text{typ. 3-6 seconds})$$

- t = Perception-reaction time, s (1 second) ←
- V = Approach speed, MPH
- a = Deceleration rate (10 ft/s²) ←
- g = Grade of approach, %

All-Red Clearance Interval (AR, seconds)

$$AR = \frac{(W + L)}{1.47V}$$

- W = Width of the intersection, ft
(from the stop bar to the end of the farthest traveled lane)
- L = Length of Vehicle (20 ft) ←
- V = Approach speed, MPH

Calculations

Through Movement Phases								
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments
SR 1001 Phase 2	EB	35	0	85	3.6	2.1	5.7	
SR 1001 Phase 6	WB	35	0	79	3.6	2.0	5.6	
SR 1032 Phase 8	NB	30	0	90	3.3	2.5	5.8	
SR 3038 Phase 4	SB	40	0	88	4.0	1.9	5.9	
Left-Turn Movement Phases								
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments
SR 1001 Phase 1	WB	25	0	73	2.9	2.6	5.5	
SR 1001 Phase 5	EB	25	0	75	2.9	2.6	5.5	
SR 1032 Phase 3	NB	25	0	80	2.9	2.8	5.7	
SR 3038 Phase 7	SB	25	0	101	2.9	3.3	6.2	

PEDESTRIAN INTERVALS

Assumptions and Calibration Inputs

Walk Interval¹ (T _w , seconds)	$T_w = \left(\frac{1}{2} L \right) \div S_w + 3$
Pedestrian Change Interval (T _{pc} , seconds)	$T_{pc} = \frac{L}{S_w}$
Minimum Duration ((T _w +T _{pc}) _{min} , seconds)	$(T_w + T_{pc})_{min} = \frac{(L + 6)}{3}$

1) The walk interval should be at least 7 seconds, but where justified, a minimum 4 second interval may be used.

Pedestrian Interval Variables

L = Pedestrian walking distance from the curb or edge of shoulder to the far edge of the traveled way, ft

S_w = Walking Speed, ft/s (3.5 ft/s) ← 3.5

Minimum Green Interval²

(T_p, seconds)
$$T_p = \frac{L}{S_w} + 3$$

2) Minimum green interval when no pedestrian signals are present or proposed

Calculations

Description of Pedestrian Crossing	Ped Signal	L	T _w	T _{pc}	(T _w +T _{pc}) _{min}		T _p		Comments
Crossing of WB County Line Rd	Yes	62	11.9	17.8	22.7		N/A		USE 7 SEC WALK 18 FH
Crossing of EB Haverford Rd	Yes	66	12.5	18.9	24.0		N/A		USE 7 SEC WALK 19 FH
Crossing of NB Bryn Mawr Ave	Yes	50	10.2	14.3	18.7		N/A		USE 7 SEC WALK 15 FH
Crossing of SB Bryn Mawr Ave	Yes	71	13.2	20.3	25.7		N/A		USE 7 SEC WALK 21 FH
Crossing of NB Glenbrook Ave	Yes	25	6.6	7.2	10.4		N/A		USE 7 SEC WALK 8 FH

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: Radnor Township
 County: Delaware County
 PennDOT Engineering District: 6

Analysis Date: 9/12/2018
 Conducted By: LAS
 Checked By: DAD
 Agency/Company Name: Gilmore & Associates, Inc.

Intersection Description: County Line Road (SR 1001) & Haverford Road (Sr 1001) & Landover Road (SR 1009)

VEHICLE AND PEDESTRIAN INTERVAL FINDINGS

Vehicle Change and Clearance Interval Findings

Approach Description	Direction	Calculated Yellow Change Interval, Y	User Defined Yellow Change Interval, Y	Calculated All-Red Clearance Interval, AR	User Defined All-Red Clearance Interval, AR	To Be Implemented	
						Y (s)	AR (s)
SR 1001 Phase 2	EB	3.6	4	1.4	2	4	2
SR 1001 Phase 6	WB	3.6	4	1.5	2	4	2
SR 1009 Phase 8	NB	3.3	4	2.1	3	4	3
SR 1009 Phase 4	SB	3.6	4	1.8	2	4	2

Additional Comments/Justifications:

Pedestrian Interval Findings

WITH PEDESTRIAN SIGNALS	Description of Pedestrian Crossing	Calculated Walk Interval, T _w	User Defined Walk Interval, T _w	Calculated Ped. Change Interval, T _{pc}	User Defined Ped. Change Interval, T _{pc}	Greater than (T _w +T _{pc}) _{min} ?	To Be Implemented	
							T _w (s)	T _{pc} (s)
	Crossing of EB Haverford Rd	9	7	12	12	Yes	7	12
	Crossing of WB County Line Rd	8.9	7	11.8	12	Yes	7	12
	Crossing of NB County Line Rd	6.6	7	7.2	8	Yes	7	8
	Crossing of SB Landover Rd	6.6	7	7.2	8	Yes	7	8

WITHOUT PEDESTRIAN SIGNALS	Calculated Min. Green Interval, T _p
Description of Pedestrian Crossing	

Additional Comments/Justifications:

VEHICLE CHANGE AND CLEARANCE INTERVALS

Assumptions and Calibration Inputs

Change and Clearance Intervals (CCI, seconds)

$$CCI = Y + AR$$

Yellow Change Interval (Y, seconds)

$$Y = t + \frac{1.47V}{2a \pm 64.4(g/100)} \quad (\text{typ. 3-6 seconds})$$

- t = Perception-reaction time, s (1 second) ←
- V = Approach speed, MPH
- a = Deceleration rate (10 ft/s²) ←
- g = Grade of approach, %

All-Red Clearance Interval (AR, seconds)

$$AR = \frac{(W + L)}{1.47V}$$

- W = Width of the intersection, ft
(from the stop bar to the end of the farthest traveled lane)
- L = Length of Vehicle (20 ft) ←
- V = Approach speed, MPH

Calculations

Through Movement Phases								
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments
SR 1001 Phase 2	EB	35	0	50	3.6	1.4	5.0	
SR 1001 Phase 6	WB	35	0	56	3.6	1.5	5.1	
SR 1009 Phase 8	NB	30	0	70	3.3	2.1	5.4	
SR 1009 Phase 4	SB	35	0	70	3.6	1.8	5.4	
Left-Turn Movement Phases								
Approach Description	Direction	V	g (%)	W	Y	AR	CCI	Comments

PEDESTRIAN INTERVALS

Assumptions and Calibration Inputs

Walk Interval¹

(T_w , seconds)

$$T_w = \left(\frac{1}{2} L \right) \div S_w + 3$$

Pedestrian Change Interval

(T_{pc} , seconds)

$$T_{pc} = \frac{L}{S_w}$$

Minimum Duration

(($T_w + T_{pc}$)_{min}, seconds)

$$(T_w + T_{pc})_{min} = \frac{(L + 6)}{3}$$

1) The walk interval should be at least 7 seconds, but where justified, a minimum 4 second interval may be used.

Pedestrian Interval Variables

L = Pedestrian walking distance from the curb or edge of shoulder to the far edge of the traveled way, ft

S_w = Walking Speed, ft/s (3.5 ft/s)

3.5

Minimum Green Interval²

(T_p , seconds)

$$T_p = \frac{L}{S_w} + 3$$

2) Minimum green interval when no pedestrian signals are present or proposed

Calculations

Description of Pedestrian Crossing	Ped Signal	L	T_w	T_{pc}	$(T_w + T_{pc})_{min}$	T_p	Comments
Crossing of EB Haverford Rd	Yes	42	9	12	16.0	N/A	USE 7 SEC WALK 12 FH
Crossing of WB County Line Rd	Yes	41	8.9	11.8	15.7	N/A	USE 7 SEC WALK 12 FH
Crossing of NB County Line Rd	Yes	25	6.6	7.2	10.4	N/A	USE 7 SEC WALK 18 FH
Crossing of SB Landover Rd	Yes	25	6.6	7.2	10.4	N/A	USE 7 SEC WALK 8 FH

APPENDIX L

PennDOT Traffic Information Repository Data



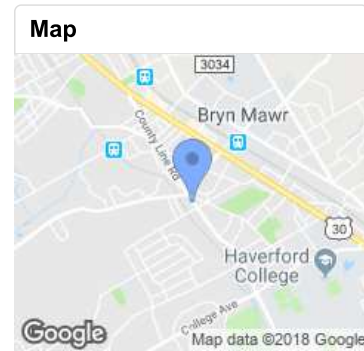


TMS Site 14624: Traffic Monitoring Report

Location Description: Between Landover Rd. and Bryn Mawr Ave.

Details	
Type of Count	MACHINE CLASS
Type of Site	Portable
Schedule	1 TIME/YR
Duration	24 HRS
Frequency Cycle	05
Cycle Year	03

Location	
County	DELAWARE (23)
Route	1001
Segment	0070
Offset	0254
Latitude	40.01676
Longitude	-75.32117



Traffic Data				
Date	Volume	Truck Volume	Truck %	Volume Graph
Nov 09, 2016	20,533	843	4.1	
Oct 27, 2011	21,986			
Oct 12, 2006	23,730			
Sep 03, 1997	29,434			



TMS Site 32949: Traffic Monitoring Report

Location Description: Between Lindsay Ave. and Old Lancaster Rd.

Details		Location		Map
Type of Count	VOLUME	County	DELAWARE (23)	
Type of Site	Portable	Route	1001	
Schedule	1 TIME/YR	Segment	0070	
Duration	24 HRS	Offset	1600	
Frequency Cycle	05	Latitude	40.01996	
Cycle Year	04	Longitude	-75.32364	

Traffic Data				
Date	Primary Volume	Secondary Volume	Volume	Volume Graph
Nov 01, 2017	9,105	10,155	19,260	
Oct 11, 2012	9,371	10,532	19,903	
Apr 11, 2007	9,636	11,106	20,742	
Oct 03, 2002	10,504	9,357	19,861	
Sep 03, 1997	10,234	11,596	21,830	



TMS Site 33092: Traffic Monitoring Report

Location Description: Btwn Authur Rd & Montrose Ave.

Details		Location		Map
Type of Count	MACHINE CLASS	County	DELAWARE (23)	
Type of Site	Portable	Route	1001	
Schedule	1 TIME/YR	Segment	0080	
Duration	24 HRS	Offset	1500	
Frequency Cycle	05	Latitude	40.02533	
Cycle Year	05	Longitude	-75.3278	

Traffic Data				
Date	Primary Volume	Secondary Volume	Volume	Volume Graph
Nov 20, 2013	7,788	8,242	16,030	
Nov 05, 2008	7,733	7,752	15,485	
Dec 02, 2003	8,327	7,978	16,305	