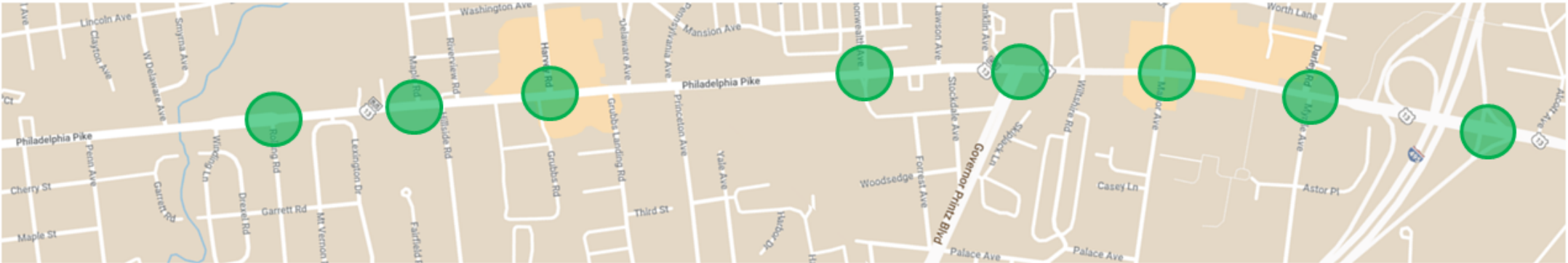


Intersection	AM PEAK HOUR					PM PEAK HOUR				
	Existing Conditions	Future No-Build	Future Conditions, Transportation Scenario 1 (Spot Improvements) with Maximum Land Development	Future Conditions, Transportation Scenario 2 (Extend Road Diet) with Maximum Land Development	Future Conditions, Transportation Scenario 3 (Roundabout at Governor Printz Boulevard) with Maximum Land Development	Existing Conditions	Future No-Build	Future Conditions, Transportation Scenario 1 (Spot Improvements) with Maximum Land Development	Future Conditions, Transportation Scenario 2 (Extend Road Diet) with Maximum Land Development	Future Conditions, Transportation Scenario 3 (Roundabout at Governor Printz Boulevard) with Maximum Land Development
Rolling Road	A (1.9)	A (1.9)	A (1.9)	A (2.3)	-	A (1.8)	A (2.0)	A (2.0)	A (2.8)	-
Maple Road	A (8.2)	A (8.3)	A (8.3)	A (9.7)	-	A (7.4)	A (8.3)	A (8.6)	B (11.1)	-
Harvey Road	C (23.3)	C (26.8)	C (27.7)	C (31.7)	-	C (21.7)	C (26.7)	C (27.5)	D (43.5)	-
Commonwealth Avenue	A (8.0)	A (8.3)	A (8.0)	A (7.1)	-	A (8.0)	A (8.7)	A (7.7)	A (6.8)	-
Governor Printz Boulevard	B (11.7)	B (12.2)	B (14.2)	B (16.8)	A (8.5)	B (15.3)	B (18.2)	C (25.9)	C (30.4)	C (20.3)
Seminole Avenue	A (3.7)	A (4.0)	A (4.0)	A (4.8)	-	A (4.1)	A (4.4)	A (4.4)	A (5.3)	-
Manor Avenue	B (10.5)	B (11.3)	B (11.6)	B (11.2)	-	A (6.3)	A (5.8)	A (6.4)	B (13.5)	-
Darley Road	C (21.0)	C (22.9)	C (23.2)	C (24.8)	-	C (31.8)	D (41.3)	D (43.3)	D (48.5)	-
I-495 Northbound Ramp	D (37.9)	D (41.1)	D (40.8)	D (36.6)	-	D (38.0)	D (42.4)	D (42.3)	D (50.8)	-

Background conditions include growth (21% out to 2050), but exclude trip generation from any Land Use Scenarios.
All Transportation Scenario results are shown for Land Use Scenario 2 only, which generated more trips than any other Land Use Scenario
Scenario results include signal timing optimization. Geometry is consistent with presented concept graphics.



Results: Acceptable levels of service (LOS D or better) for all future scenarios with signal timing adjustments and geometric accommodations.

Technical Memorandum

April 21, 2025 **DRAFT**

Project# 291990.000

To: Heather Dunigan, WILMAPCO

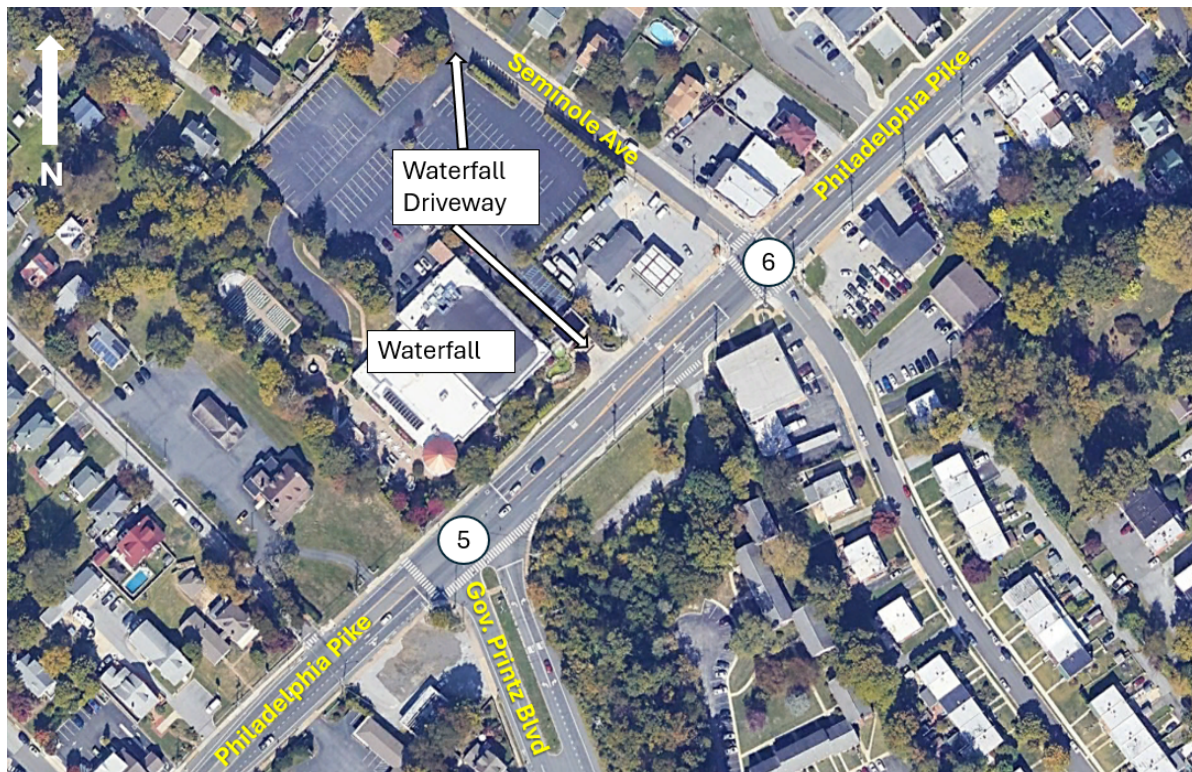
From: Jeff Riegner, Alexandra Jahnle, and Brianna Tutuska, Kittelson & Associates, Inc.

Subject: WILMAPCO Claymont Area Master Plan – Supplemental Traffic Operations Analysis

Kittelson & Associates, Inc. conducted a supplemental traffic operations analysis for the Claymont Area Master Plan. The analysis focused on reviewing the operational impact of a large event, or multiple simultaneous events, at The Waterfall banquet hall on the Philadelphia Pike/Governor Printz Boulevard intersection and Philadelphia Pike/Seminole Avenue/Wiltshire Road intersection. Two scenarios were considered: one that assumes the entire parking lot is filled during event(s), and a second based on input from the venue that includes 800 guests, which would likely significantly exceed the parking lot capacity.

The analysis reviewed the two intersections under **Transportation Scenario 2: Extend the Road Diet** and **Transportation Scenario 3: Governor Printz Roundabout**. The Waterfall is located along Philadelphia Pike between the two study intersections (see **Figure 1**), with the main driveway located on Seminole Avenue and a secondary driveway on Philadelphia Pike. An event at The Waterfall was not reviewed in the prior analysis except to the extent that The Waterfall traffic may have been present during traffic counts. This supplemental analysis reviewed the weekday PM peak hour and Saturday peak hour for 2050 future conditions.

Figure 1. Study Intersections



Traffic Volume Summary

Turning movement counts were collected for the study intersections for weekday AM peak hour and weekday PM peak hour time periods in March 2024 for the Claymont Area Master Plan. No counts were collected for the Saturday peak hour in the original study, therefore StreetLight data for the Philadelphia Pike/Governor Printz Boulevard intersection was downloaded for a typical weekday and Saturday. The counts were compared to create a ratio between the existing weekday PM peak hour and the existing Saturday peak hour (**Table 1**). The calculated factor (0.83) was applied to the 2050 future condition, PM peak hour (developed for the Claymont Area Master Plan) to develop an estimated 2050 future condition, Saturday peak hour.

Table 1. StreetLight Weekend to Weekday Volume Ratios

Time	Philadelphia Pike			Governor Printz Blvd			Philadelphia Pike			Intersection Total
	Left	Thru	Total	Left	Right	Total	Thru	Right	Total	
4:00pm	0.92	1.00	0.99	1.00	1.00	0.97	0.86	1.00	0.86	0.94
4:15pm	0.88	0.95	0.93	1.00	1.00	1.00	0.97	0.67	0.96	0.95
4:30pm	0.92	0.83	0.86	0.60	1.07	1.00	0.87	1.00	0.85	0.87
4:45pm	0.88	0.78	0.82	0.80	1.00	0.97	0.80	1.00	0.81	0.83
5:00pm	0.76	0.78	0.79	0.80	0.97	0.94	0.73	0.75	0.73	0.79
5:15pm	0.80	0.73	0.76	0.67	0.79	0.78	0.76	0.75	0.76	0.77
5:30pm	0.77	0.70	0.73	0.60	0.82	0.79	0.76	0.40	0.74	0.74
5:45pm	0.73	0.74	0.75	0.60	0.91	0.87	0.77	0.50	0.76	0.77
Average	0.83	0.81	0.83	0.76	0.94	0.92	0.81	0.76	0.81	0.83

Trip Generation

800-Guest Scenario

With no ITE land use available for a wedding/special event or banquet hall, a custom trip generation was created assuming a maximum of 800 guests at The Waterfall. The wedding/special event calculation assumes 2.2 persons per vehicle and two 20-person parties on-site prior to the start of the event. This is a typical practice that Kittelson has used for similar venues on other projects. **Table 2** summarizes the trip generation estimates for The Waterfall.

Table 2. Waterfall Trip Generation: 800 Guests

Land Use	Units		Weekday PM Peak Hour			Saturday Peak Hour		
			Total	In	Out	Total	In	Out
Wedding/Special Event	800	Persons	324	324	0	324	324	0

As shown in **Table 2**, The Waterfall is estimated to generate approximately 324 trips during a maximum capacity event. Trips arriving for the start of a wedding/special event within the same hour were assumed to be the worst-case scenario for traffic operations and the most likely occurrence to coincide with the peak hour traffic operations. However, an event could also be held where guests all depart within the hour

(i.e., fundraiser or other types of special events). It should be noted, however, that this is definitely a worst-case condition, as The Waterfall has only about 200 on-site parking spaces.

Full Parking Lot Scenario

For this scenario, a custom trip generation was created using the maximum amount of on-site parking spaces of 200. It is assumed that 19 vehicles would already be in the parking lot before the start of the event, roughly proportional to the 800-guest scenario. **Table 3** summarizes the trip generation estimates for The Waterfall.

Table 3. Waterfall Trip Generation: Full Parking Lot

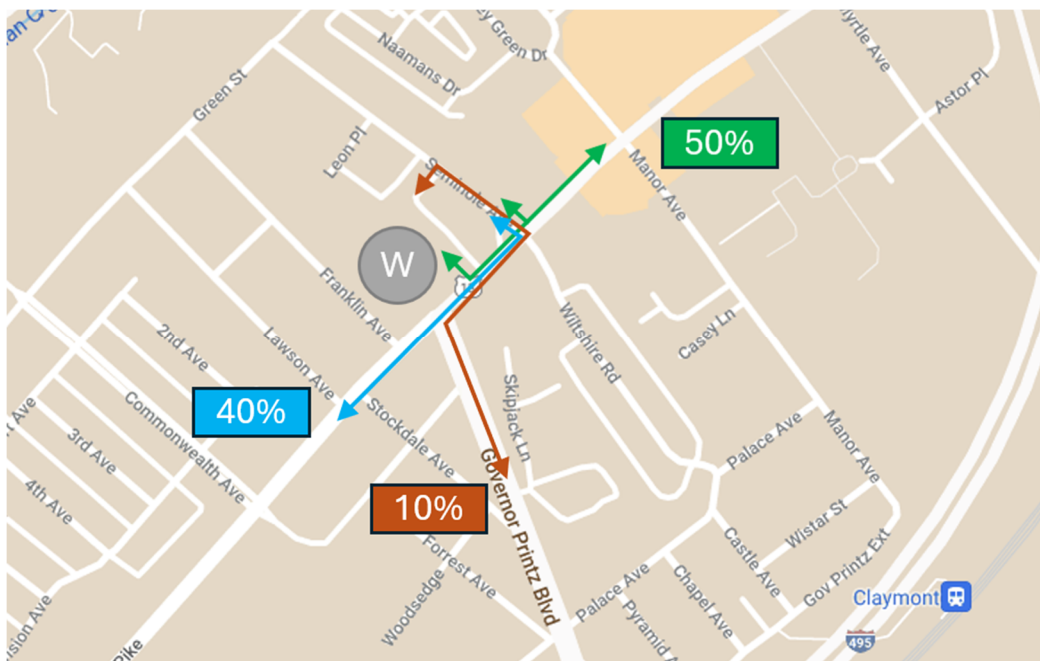
Land Use	Units		Weekday PM Peak Hour			Saturday Peak Hour		
			Total	In	Out	Total	In	Out
Wedding/Special Event	200	Vehicles	181	181	0	181	181	0

As shown in **Table 3**, The Waterfall is estimated to generate approximately 181 trips during a maximum parking lot capacity event. Trips arriving for the start of a wedding/special event within the same hour were assumed to be the worst-case scenario for traffic operations and the most likely occurrence to coincide with the peak hour traffic operations. However, an event could also be held where guests all depart within the hour (i.e., fundraiser or other types of special events).

Trip Distribution and Trip Assignment

The trip distribution estimates for The Waterfall were developed based on existing travel patterns and distribution assumptions developed as a part of the Claymont Area Master Plan traffic analysis. **Figure 2** illustrates the estimated trip distribution pattern associated with an event at The Waterfall. These percentages are valid for both scenarios.

Figure 2. The Waterfall Trip Distribution



800-Guest Scenario

For the 800-Guest Scenario the trips were assigned as follows:

- 50% of the estimated vehicles (162) from north of Philadelphia Pike/Seminole Avenue intersection.
 - The analysis assumed half of the southbound vehicles (81) turn right at Seminole Avenue, and half of the vehicles (81) turn right at The Waterfall driveway on Philadelphia Pike.
- 10% of the estimated vehicles from Governor Printz Boulevard (32).
 - The analysis assumed all the northbound vehicles (32) turn left at Seminole Avenue.
- 40% of estimated vehicles (130) from south of the Philadelphia Pike/Governor Printz Boulevard intersection.
 - The analysis assumed all the northbound vehicles (130) turn left at Seminole Avenue.

Full Parking Lot Scenario

For the Full Parking Lot scenario the trips were assigned as follows:

- 50% of the estimated vehicles (90) from north of Philadelphia Pike/Seminole Avenue intersection.
 - The analysis assumed half of the southbound vehicles (45) turn right at Seminole Avenue, and half of the vehicles (45) turn right at The Waterfall driveway on Philadelphia Pike.
- 10% of the estimated vehicles from Governor Printz Boulevard (18).
 - The analysis assumed all the northbound vehicles (18) turn left at Seminole Avenue.
- 40% of estimated vehicles (73) from south of the Philadelphia Pike/Governor Printz Boulevard intersection.
 - The analysis assumed all the northbound vehicles (73) turn left at Seminole Avenue.

Traffic Operations Analysis Results

800-Guest Scenario

A traffic operations analysis was conducted to document the impact The Waterfall generated traffic if The Waterfall were to host a maximum capacity event (800 guests) has on the adjacent intersections for 2050 Future Conditions: Transportation Scenario 2 and Transportation Scenario 3. The analysis was completed for both the weekday PM peak hour and the Saturday peak hour. The existing signal timings from the latest traffic signal permit plans were used as a base and green time was adjusted, but the overall cycle lengths for both intersections remained the same. **Table** shows a comparison of the intersection results and **Table 5** shows a summary of the 95th percentile queue results. The Synchro reports and HCS reports are in the Appendix.

For **Transportation Scenario 2**, both intersections were analyzed as signalized intersections and level of service analyses were performed in accordance with the following:

- Philadelphia Pike/Governor Printz Boulevard intersection - *Highway Capacity Manual (HCM)*, 2000 Edition, as implemented using the Synchro 11 software program because the HCM 6th Edition Methodology does not support exclusive pedestrian or hold phases.
- Philadelphia Pike/Seminole Avenue intersection - *Highway Capacity Manual (HCM)*, 6th Edition, as implemented using the Synchro 11 software program.

For **Transportation Scenario 3**, Governor Printz Boulevard was analyzed as a single-lane roundabout, and Seminole Avenue intersection remains the same as in Transportation Scenario 2. Level of service analyses were performed in accordance with the following:

- Philadelphia Pike/Governor Printz Boulevard intersection the *Highway Capacity Manual (HCM)*, 7th Edition, as implemented using the HCS Roundabouts Version 7.9.5 software program.

Table 4: Traffic Operations Analysis Results – 2050 Future Conditions (800-Guest Scenario)

	Transportation Scenario 2: Extend the Road Diet			Transportation Scenario 3: Governor Printz Roundabout		
	Governor Printz Blvd & Philadelphia Pike (Signalized)			Governor Printz Blvd & Philadelphia Pike (Roundabout)		
Lane Group	PM Peak Hour	PM Peak Hour with Waterfall	SAT Peak Hour with Waterfall	PM Peak Hour	PM Peak Hour with Waterfall	SAT Peak Hour with Waterfall
Westbound Approach	D (43.2)	D (40.5)	D (37.7)	B (14.0)	C (20.7)	B (13.4)
WBL	D (43.2)	D (40.5)	D (37.7)			
Northbound Approach	D (34.0)	E (74.5)	E (55.0)	B (15.0)	C (22.2)	B (13.5)
NBT	D (35.6)	E (78.7)	E (57.2)			
NBR	B (16.3)	B (16.3)	C (23.7)			
Southbound Approach	C (24.6)	C (24.3)	B (14.1)	D (25.7)	D (25.7)	B (14.0)
SBL	E (58.0)	E (61.9)	D (44.6)			
SBT	B (18.1)	B (17.0)	A (8.2)			
Intersection Total	C (30.4)	D (46.1)	C (33.5)	C (20.3)	C (23.7)	B (13.7)
	Seminole Ave & Philadelphia Pike (Signalized)			Seminole Ave & Philadelphia Pike (Signalized)		
Eastbound Approach	E (57.2)	E (57.2)	D (47.7)	This intersection operates the same as Transportation Scenario 2		
EBLTR	E (57.2)	E (57.2)	D (47.7)			
Westbound Approach	E (59.7)	E (59.7)	D (49.6)			
WBLTR	E (59.7)	E (59.7)	D (49.6)			
Northbound Approach	A (3.8)	D (38.5)	(F)188.8			
NBLTR	A (3.8)	F (38.5)	(F) 188.8			
Southbound Approach	A (1.6)	A (4.1)	C (21.8)			
SBLTR	A (1.6)	A (4.1)	C (21.8)			
Intersection Total	A (5.3)	C (21.2)	F (95.0)			

Results are shown as level of service followed by delay in seconds in the parentheses.

Table 5: 95th Percentile Queue Analysis Summary (800-Guest Scenario)

	Transportation Scenario 2, 2050 Future Conditions			Transportation Scenario 3, 2050 Future Conditions		
	Governor Printz Blvd & Philadelphia Pike (Signalized)			Governor Printz Blvd & Philadelphia Pike (Roundabout)		
Lane Group	PM Peak Hour	PM Peak Hour with Waterfall	SAT Peak Hour with Waterfall	PM Peak Hour	PM Peak Hour with Waterfall	SAT Peak Hour with Waterfall
WBL	222	238	154	67.5	107.5	62.5
NBT	#882	#1023	#834	172.5	280	155
NBR	27	21	20			
SBL	m183	m159	m113			
SBT	484	m478	m195	365	365	185
	Seminole Ave & Philadelphia Pike (Signalized)			Seminole Ave & Philadelphia Pike (Signalized)		
EBT	62	62	49	This intersection operates the same as Transportation Scenario 2		
WBT	62	62	49			
NBT	m131	m#1110	m#857			
SBT	776	#1335	#1038			

- 95th percentile volume exceeds capacity queue may be longer

m – volume for 95th percentile queue is metered by upstream

Queues for the roundabout (Governor Printz Blvd) were calculated with an average vehicle length of 25'

Transportation Scenario 2 – Traffic Operations Analysis Summary (800-Guest Scenario)

- Philadelphia Pike/Governor Printz Boulevard intersection
 - PM peak hour with Waterfall conditions –
 - The northbound through movement delay increased from 35.6 seconds (LOS D) to 74.5 seconds (LOS E) and exceeds capacity with a volume to capacity ratio (v/c) of 1.06.
 - The northbound queue increased to 1023 feet which would extend through Commonwealth Avenue. This is 157 feet further than the PM analysis without Waterfall trips. (14 additional vehicles). The queue may be longer than the report shows.
 - Saturday peak hour with Waterfall conditions –
 - The northbound through movement delay increased from 35.6 seconds (LOS D) to 57.2 seconds (LOS E). The v/c ratio is 0.99, and nearly at capacity.
 - The northbound queue extends through adjacent intersection but operates similar to the PM conditions without Waterfall conditions.
- Philadelphia Pike/Seminole Avenue intersection
 - PM peak hour with Waterfall conditions –
 - The delay increased for the northbound left movement from 3.8 seconds (LOS A) to 38.5 seconds (LOS D).
 - The northbound left movement exceeds capacity with a v/c at 1.06, queue may be longer than report shows.
 - The northbound queue increased to 1110 feet and the southbound queue increased to 1335 feet. Both queues would extend through adjacent intersections upstream and downstream.
 - Saturday peak hour with Waterfall conditions –
 - The delay increased for the northbound left movement from 3.8 seconds (LOS A) to 188.8 seconds (LOS F) respectively.
 - The northbound left movement exceeds capacity with a v/c of 1.39, queue may be longer than report shows.

- The northbound queue increased to 857 feet and the southbound queue increased to 1038 feet. Both queues would extend through adjacent intersections upstream and downstream.

Transportation Scenario 3 – Traffic Operations Analysis Summary (800-Guest Scenario)

- Philadelphia Pike/Governor Printz Boulevard intersection
 - The intersection operates similar to the 2025 Future Conditions for both the PM Peak Hour and Saturday peak hour and the level of service, and delay were not significantly impacted by the addition The Waterfall event trips.
 - There is an increase in queue length for the northbound through movement during the PM peak conditions.
- Philadelphia Pike/Seminole Avenue intersection
 - The intersection operates similar to Transportation Scenario 2, with northbound and southbound queues extending through adjacent intersections upstream and downstream.

Full Parking Lot Scenario

A traffic operations analysis was conducted to document the impact The Waterfall generated traffic has if The Waterfall has a maximum parking lot capacity event (200 vehicles) on the adjacent intersections for 2050 Future Conditions: Transportation Scenario 2 and Transportation Scenario 3. The analysis was completed for both the weekday PM peak hour and the Saturday peak hour. The existing signal timings from the latest traffic signal permit plans were used as a base and green time was adjusted, but the overall cycle lengths for both intersections remained the same. **Table** shows a comparison of the intersection results and **Table 7** shows a summary of the 95th percentile queue results. The Synchro reports and HCS reports are in the Appendix.

For **Transportation Scenario 2**, both intersections were analyzed as signalized intersections and level of service analyses were performed in accordance with the following:

- Philadelphia Pike/Governor Printz Boulevard intersection - *Highway Capacity Manual (HCM)*, 2000 Edition, as implemented using the Synchro 11 software program because the HCM 6th Edition Methodology does not support exclusive pedestrian or hold phases.
- Philadelphia Pike/Seminole Avenue intersection - *Highway Capacity Manual (HCM)*, 6th Edition, as implemented using the Synchro 11 software program.

For **Transportation Scenario 3**, Governor Printz Boulevard was analyzed as a single-lane roundabout, and Seminole Avenue intersection remains the same as in Transportation Scenario 2. Level of service analyses were performed in accordance with the following:

- Philadelphia Pike/Governor Printz Boulevard intersection the *Highway Capacity Manual (HCM)*, 7th Edition, as implemented using the HCS Roundabouts Version 7.9.5 software program.

Table 6: Traffic Operations Analysis Results – 2050 Future Conditions (Full Parking Lot Scenario)

	Transportation Scenario 2: Extend the Road Diet			Transportation Scenario 3: Governor Printz Roundabout		
	Governor Printz Blvd & Philadelphia Pike (Signalized)			Governor Printz Blvd & Philadelphia Pike (Roundabout)		
Lane Group	PM Peak Hour	PM Peak Hour with Waterfall	SAT Peak Hour with Waterfall	PM Peak Hour	PM Peak Hour with Waterfall	SAT Peak Hour with Waterfall
Westbound Approach	D (43.2)	D (41.7)	D (38.3)	B (14.0)	C (17.2)	B (11.6)
WBL	D (43.2)	D (41.7)	D (38.3)			
Northbound Approach	D (34.0)	E (55.3)	D (39.9)	B (15.0)	C (18.4)	B (11.9)
NBT	D (35.6)	E (58.3)	D (41.0)			
NBR	B (16.3)	B (16.8)	C (25.3)			
Southbound Approach	C (24.6)	C (21.3)	B (13.6)	D (25.7)	D (25.7)	B (14.0)
SBL	E (58.0)	E (57.5)	D (45.3)			
SBT	B (18.1)	B (16.5)	A (7.6)			
Intersection Total	C (30.4)	D (37.8)	C (27.0)	C (20.3)	C (21.8)	B (12.9)
	Seminole Ave & Philadelphia Pike (Signalized)			Seminole Ave & Philadelphia Pike (Signalized)		
Eastbound Approach	E (57.2)	E (57.2)	D (47.7)	This intersection operates the same as Transportation Scenario 2		
EBLTR	E (57.2)	E (57.2)	D (47.7)			
Westbound Approach	E (59.7)	E (59.7)	D (49.6)			
WBLTR	E (59.7)	E (59.7)	D (49.6)			
Northbound Approach	A (3.8)	A (4.9)	(A) 9.9			
NBLTR	A (3.8)	A (4.9)	(A) 9.9			
Southbound Approach	A (1.6)	A (2.3)	B (18.8)			
SBLTR	A (1.6)	A (2.3)	B (18.8)			
Intersection Total	A (5.3)	A (5.9)	B (16.3)			

Results are shown as level of service followed by delay in seconds in the parentheses.

Table 7: 95th Percentile Queue Analysis Summary (Full Parking Lot Scenario)

	Transportation Scenario 2, 2050 Future Conditions			Transportation Scenario 3, 2050 Future Conditions		
	Governor Printz Blvd & Philadelphia Pike (Signalized)			Governor Printz Blvd & Philadelphia Pike (Roundabout)		
Lane Group	PM Peak Hour	PM Peak Hour with Waterfall	SAT Peak Hour with Waterfall	PM Peak Hour	PM Peak Hour with Waterfall	SAT Peak Hour with Waterfall
WBL	222	231	149	67.5	87.5	50
NBT	#882	#923	#745	172.5	225	127.5
NBR	27	21	20			
SBL	m183	m170	m121			
SBT	484	519	193	365	365	185
	Seminole Ave & Philadelphia Pike (Signalized)			Seminole Ave & Philadelphia Pike (Signalized)		
EBT	62	62	49	This intersection operates the same as Transportation Scenario 2		
WBT	62	62	49			
NBT	m131	m#383	m#109			
SBT	776	#900	#908			

- 95th percentile volume exceeds capacity queue may be longer

m – volume for 95th percentile queue is metered by upstream

Queues for the roundabout (Governor Printz Blvd) were calculated with an average vehicle length of 25'

Transportation Scenario 2 – Traffic Operations Analysis Summary (Full Parking Lot Scenario)

- Philadelphia Pike/Governor Printz Boulevard intersection
 - PM peak hour with Waterfall conditions –
 - The northbound through movement delay increased from 35.6 seconds (LOS D) to 58.3 seconds (LOS E). The v/c ratio is 0.99, and nearly at capacity.
 - The northbound queue increased to 923 feet. This is 41 feet further than the PM analysis without Waterfall trips. (2 additional vehicles). The queue may be longer than the report shows.
 - Saturday peak hour with Waterfall conditions –
 - The northbound and southbound queues decreased and operates similar or better then the PM conditions without Waterfall conditions.
- Philadelphia Pike/Seminole Avenue intersection
 - PM peak hour with Waterfall conditions –
 - The northbound queue increased to 383 feet and the southbound queue increased to 900 feet. Both queues would extend through adjacent intersections upstream and downstream.
 - Saturday peak hour with Waterfall conditions –
 - The southbound queue increased to 908 feet. The queue would extend through adjacent intersection upstream.

Transportation Scenario 3 – Traffic Operations Analysis Summary (Full Parking Lot Scenario)

- Philadelphia Pike/Governor Printz Boulevard intersection
 - The intersection operates similar to the 2025 Future Conditions for both the PM Peak Hour and Saturday peak hour and the level of service, and delay were not significantly impacted by the addition The Waterfall event trips.
 - The northbound queue increased to 225 feet (2 additional vehicles) and westbound queue increased to 87.5 feet (about 1 additional vehicle) during the PM peak conditions.
- Philadelphia Pike/Seminole Avenue intersection
 - The intersection operates similar to Transportation Scenario 2, with northbound and southbound queues extending through adjacent intersections upstream and downstream.

Summary of Findings

Kittelson conducted an analysis to review the impact of two event scenarios at The Waterfall banquet hall during peak hours for both **Transportation Scenario 2: Extend the Road Diet** and **Transportation Scenario 3: Governor Printz Roundabout**. This analysis is intended to serve as the worst-case scenario.

800-Guest Scenario

For Transportation Scenario 2, both the Philadelphia Pike/Governor Printz Boulevard intersection and Philadelphia Pike/Seminole Avenue intersection experienced an increase in queueing and decrease in level of service at those locations. For Transportation Scenario 3, the Philadelphia Pike/Governor Printz Boulevard intersection is projected to continue to operate at an acceptable level of service even with the additional traffic from an event at The Waterfall – although the Philadelphia Pike/Seminole Avenue intersection will experience the same operational impacts in both Transportation Scenario 2 and Transportation Scenario 3.

Full Parking Lot Scenario

For Transportation Scenario 2, the Philadelphia Pike/Governor Printz Boulevard intersection experienced an increase in queueing and decrease in level of service for the PM Peak hour, while maintaining similar operations during the Saturday Peak hour. At the Philadelphia Pike/Seminole Avenue intersection, there was an increase in queueing and decrease in level of service for the Saturday Peak Hour, while the PM Peak Hour operates similarly to existing conditions. For Transportation Scenario 3, the Philadelphia Pike/Governor Printz Boulevard intersection is projected to continue to operate at an acceptable level of service even with the additional traffic from an event at The Waterfall for the PM Peak Hour and is projected to operate with an improvement of level of service during the Saturday Peak Hour. The Philadelphia Pike/Seminole Avenue intersection will experience the same operational impacts in both Transportation Scenario 2 and Transportation Scenario 3.

APPENDIX

Appendix A



Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	303	774	66	191	990
v/c Ratio	0.65	0.87	0.09	0.70	0.79
Control Delay	31.2	37.4	8.1	61.3	19.0
Queue Delay	0.0	0.0	0.0	0.0	3.8
Total Delay	31.2	37.4	8.1	61.3	22.8
Queue Length 50th (ft)	126	558	0	151	500
Queue Length 95th (ft)	222	#872	27	m183	484
Internal Link Dist (ft)	472	396			390
Turn Bay Length (ft)			250	125	
Base Capacity (vph)	467	886	762	297	1259
Starvation Cap Reductn	0	0	0	0	189
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.65	0.87	0.09	0.64	0.93

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

5: Philadelphia Pike & Gov. Printz Blvd

29919 Alternative 2 PM Peak Hour
08/29/2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰		↑	↱	↰	↱
Traffic Volume (vph)	60	230	743	63	183	950
Future Volume (vph)	60	230	743	63	183	950
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		7.0	7.0	5.0	7.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.89		1.00	0.85	1.00	1.00
Flt Protected	0.99		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1615		1900	1580	1770	1900
Flt Permitted	0.99		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1615		1900	1580	1770	1900
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	62	240	774	66	191	990
RTOR Reduction (vph)	98	0	0	25	0	0
Lane Group Flow (vph)	205	0	774	41	191	990
Confl. Peds. (#/hr)				1	1	
Heavy Vehicles (%)	0%	5%	0%	0%	2%	0%
Turn Type	Perm		NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	4			2		
Actuated Green, G (s)	27.4		56.0	56.0	18.6	79.6
Effective Green, g (s)	27.4		56.0	56.0	18.6	79.6
Actuated g/C Ratio	0.23		0.47	0.47	0.16	0.66
Clearance Time (s)	6.0		7.0	7.0	5.0	7.0
Vehicle Extension (s)	4.0		4.0	4.0	3.0	4.0
Lane Grp Cap (vph)	368		886	737	274	1260
v/s Ratio Prot			c0.41		0.11	c0.52
v/s Ratio Perm	c0.13			0.03		
v/c Ratio	0.56		0.87	0.06	0.70	0.79
Uniform Delay, d1	40.9		28.8	17.5	48.0	14.2
Progression Factor	1.00		0.86	0.92	1.11	1.05
Incremental Delay, d2	2.3		10.6	0.1	4.7	3.1
Delay (s)	43.2		35.6	16.3	58.0	18.1
Level of Service	D		D	B	E	B
Approach Delay (s)	43.2		34.0			24.6
Approach LOS	D		C			C
Intersection Summary						
HCM 2000 Control Delay			30.4		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.83			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	23.0
Intersection Capacity Utilization			81.7%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
6: Philadelphia Pike & Seminole Ave

29919 Alternative 2 PM Peak Hour
08/29/2024



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	48	63	957	1216
v/c Ratio	0.37	0.41	0.61	0.79
Control Delay	45.5	33.3	4.9	8.2
Queue Delay	0.2	0.2	0.3	1.3
Total Delay	45.7	33.5	5.2	9.5
Queue Length 50th (ft)	24	19	80	212
Queue Length 95th (ft)	62	62	m131	776
Internal Link Dist (ft)	300	239	390	488
Turn Bay Length (ft)				
Base Capacity (vph)	341	363	1562	1547
Starvation Cap Reductn	0	0	155	4
Spillback Cap Reductn	75	78	0	152
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.18	0.22	0.68	0.87
Intersection Summary				
m Volume for 95th percentile queue is metered by upstream signal.				

HCM 6th Signalized Intersection Summary

6: Philadelphia Pike & Seminole Ave

29919 Alternative 2 PM Peak Hour
08/29/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	4	16	19	5	37	15	900	14	27	1124	28
Future Volume (veh/h)	27	4	16	19	5	37	15	900	14	27	1124	28
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	1900	1900	1900	1796	1900	1900	1900	1900	1767	1900	1900	1900
Adj Flow Rate, veh/h	28	4	16	20	5	38	15	928	14	28	1159	29
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	7	0	0	0	0	9	0	0	0
Cap, veh/h	94	15	31	62	13	54	41	1523	23	51	1485	37
Arrive On Green	0.05	0.05	0.05	0.05	0.05	0.05	0.84	0.84	0.84	1.00	1.00	1.00
Sat Flow, veh/h	867	279	573	420	244	1010	13	1818	27	24	1772	44
Grp Volume(v), veh/h	48	0	0	63	0	0	957	0	0	1216	0	0
Grp Sat Flow(s),veh/h/ln	1718	0	0	1675	0	0	1857	0	0	1840	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.1	0.0	0.0	4.3	0.0	0.0	19.9	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.58		0.33	0.32		0.60	0.02		0.01	0.02		0.02
Lane Grp Cap(c), veh/h	140	0	0	130	0	0	1587	0	0	1572	0	0
V/C Ratio(X)	0.34	0.00	0.00	0.49	0.00	0.00	0.60	0.00	0.00	0.77	0.00	0.00
Avail Cap(c_a), veh/h	382	0	0	384	0	0	1587	0	0	1572	0	0
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	0.37	0.00	0.00	0.41	0.00	0.00
Uniform Delay (d), s/veh	55.2	0.0	0.0	55.7	0.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	2.0	0.0	0.0	4.0	0.0	0.0	0.6	0.0	0.0	1.6	0.0	0.0
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(50%),veh/ln	1.5	0.0	0.0	2.0	0.0	0.0	4.7	0.0	0.0	0.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.2	0.0	0.0	59.7	0.0	0.0	3.8	0.0	0.0	1.6	0.0	0.0
LnGrp LOS	E	A	A	E	A	A	A	A	A	A	A	A
Approach Vol, veh/h		48			63			957			1216	
Approach Delay, s/veh		57.2			59.7			3.8			1.6	
Approach LOS		E			E			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		107.5		12.5		107.5		12.5				
Change Period (Y+Rc), s		7.0		6.0		7.0		6.0				
Max Green Setting (Gmax), s		81.0		26.0		81.0		26.0				
Max Q Clear Time (g_c+I1), s		21.9		5.1		2.0		6.3				
Green Ext Time (p_c), s		16.2		0.2		31.7		0.4				
Intersection Summary												
HCM 6th Ctrl Delay				5.3								
HCM 6th LOS				A								

Queues
5: Philadelphia Pike & Gov. Printz Blvd

29919 Alternative 2 - Waterfall
PM Peak Hour 04/11/2025

					
Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	336	909	66	191	990
v/c Ratio	0.64	1.06	0.09	0.76	0.82
Control Delay	29.0	78.9	7.5	65.1	17.5
Queue Delay	70.1	14.7	0.0	0.0	26.7
Total Delay	99.1	93.6	7.5	65.1	44.2
Queue Length 50th (ft)	136	~787	10	136	409
Queue Length 95th (ft)	238	#1023	21	m159	m478
Internal Link Dist (ft)	472	396			390
Turn Bay Length (ft)			250	125	
Base Capacity (vph)	521	855	735	252	1205
Starvation Cap Reductn	0	0	0	0	256
Spillback Cap Reductn	383	34	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	2.43	1.11	0.09	0.76	1.04

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

5: Philadelphia Pike & Gov. Printz Blvd

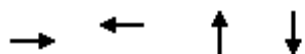
29919 Alternative 2 - Waterfall
PM Peak Hour
04/11/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	60	262	873	63	183	950
Future Volume (vph)	60	262	873	63	183	950
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		7.0	7.0	5.0	7.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.89		1.00	0.85	1.00	1.00
Flt Protected	0.99		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1610		1900	1580	1770	1900
Flt Permitted	0.99		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1610		1900	1580	1770	1900
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	62	273	909	66	191	990
RTOR Reduction (vph)	107	0	0	24	0	0
Lane Group Flow (vph)	229	0	909	42	191	990
Confl. Peds. (#/hr)				1	1	
Heavy Vehicles (%)	0%	5%	0%	0%	2%	0%
Turn Type	Perm		NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	4			2		
Actuated Green, G (s)	30.9		54.0	54.0	17.1	76.1
Effective Green, g (s)	30.9		54.0	54.0	17.1	76.1
Actuated g/C Ratio	0.26		0.45	0.45	0.14	0.63
Clearance Time (s)	6.0		7.0	7.0	5.0	7.0
Vehicle Extension (s)	4.0		4.0	4.0	3.0	4.0
Lane Grp Cap (vph)	414		855	711	252	1204
v/s Ratio Prot			c0.48		0.11	c0.52
v/s Ratio Perm	c0.14			0.03		
v/c Ratio	0.55		1.06	0.06	0.76	0.82
Uniform Delay, d1	38.6		33.0	18.6	49.5	16.8
Progression Factor	1.00		0.93	0.87	1.14	0.84
Incremental Delay, d2	2.0		48.0	0.1	5.7	3.0
Delay (s)	40.5		78.7	16.3	61.9	17.0
Level of Service	D		E	B	E	B
Approach Delay (s)	40.5		74.5			24.3
Approach LOS	D		E			C
Intersection Summary						
HCM 2000 Control Delay			46.1		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.93			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	23.0
Intersection Capacity Utilization			90.6%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
6: Philadelphia Pike & Seminole Ave

29919 Alternative 2 - Waterfall
PM Peak Hour 04/11/2025



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	48	63	1124	1382
v/c Ratio	0.37	0.41	1.18	0.90
Control Delay	45.5	33.3	107.2	16.3
Queue Delay	0.0	0.0	0.3	8.5
Total Delay	45.5	33.3	107.5	24.9
Queue Length 50th (ft)	24	19	~1105	322
Queue Length 95th (ft)	62	62	m#1110	#1335
Internal Link Dist (ft)	300	239	390	488
Turn Bay Length (ft)				
Base Capacity (vph)	341	363	954	1528
Starvation Cap Reductn	0	0	57	0
Spillback Cap Reductn	0	2	19	136
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.14	0.17	1.25	0.99

Intersection Summary

- ~ 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.

HCM 6th Signalized Intersection Summary 6: Philadelphia Pike & Seminole Ave

29919 Alternative 2 - Waterfall
PM Peak Hour
04/11/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	4	16	19	5	37	177	900	14	27	1205	109
Future Volume (veh/h)	27	4	16	19	5	37	177	900	14	27	1205	109
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	1900	1900	1900	1796	1900	1900	1900	1900	1767	1900	1900	1900
Adj Flow Rate, veh/h	28	4	16	20	5	38	182	928	14	28	1242	112
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	7	0	0	0	0	9	0	0	0
Cap, veh/h	94	15	31	62	13	54	189	862	13	48	1361	122
Arrive On Green	0.05	0.05	0.05	0.05	0.05	0.05	0.84	0.84	0.84	1.00	1.00	1.00
Sat Flow, veh/h	867	279	573	420	244	1010	184	1028	15	20	1625	145
Grp Volume(v), veh/h	48	0	0	63	0	0	1124	0	0	1382	0	0
Grp Sat Flow(s),veh/h/ln	1718	0	0	1675	0	0	1227	0	0	1790	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.2	0.0	0.0	95.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.1	0.0	0.0	4.3	0.0	0.0	100.5	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.58		0.33	0.32		0.60	0.16		0.01	0.02		0.08
Lane Grp Cap(c), veh/h	140	0	0	130	0	0	1063	0	0	1530	0	0
V/C Ratio(X)	0.34	0.00	0.00	0.49	0.00	0.00	1.06	0.00	0.00	0.90	0.00	0.00
Avail Cap(c_a), veh/h	382	0	0	384	0	0	1063	0	0	1530	0	0
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	0.09	0.00	0.00	0.41	0.00	0.00
Uniform Delay (d), s/veh	55.2	0.0	0.0	55.7	0.0	0.0	10.1	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	2.0	0.0	0.0	4.0	0.0	0.0	28.4	0.0	0.0	4.1	0.0	0.0
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(50%),veh/ln	1.5	0.0	0.0	2.0	0.0	0.0	22.9	0.0	0.0	1.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.2	0.0	0.0	59.7	0.0	0.0	38.5	0.0	0.0	4.1	0.0	0.0
LnGrp LOS	E	A	A	E	A	A	F	A	A	A	A	A
Approach Vol, veh/h	48			63			1124			1382		
Approach Delay, s/veh	57.2			59.7			38.5			4.1		
Approach LOS	E			E			D			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	107.5			12.5			107.5			12.5		
Change Period (Y+Rc), s	7.0			6.0			7.0			6.0		
Max Green Setting (Gmax), s	81.0			26.0			81.0			26.0		
Max Q Clear Time (g_c+I1), s	102.5			5.1			2.0			6.3		
Green Ext Time (p_c), s	0.0			0.2			46.0			0.4		
Intersection Summary												
HCM 6th Ctrl Delay	21.2											
HCM 6th LOS	C											

Queues
5: Philadelphia Pike & Gov. Printz Blvd

29919 Alternative 2 - Waterfall
SAT Peak Hour 04/11/2025

					
Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	296	812	57	165	858
v/c Ratio	0.65	0.99	0.08	0.53	0.68
Control Delay	22.1	59.1	10.5	47.8	8.9
Queue Delay	22.5	18.9	0.0	0.0	1.9
Total Delay	44.6	78.0	10.5	47.8	10.8
Queue Length 50th (ft)	68	548	6	96	75
Queue Length 95th (ft)	154	#834	20	m113	m195
Internal Link Dist (ft)	472	396			390
Turn Bay Length (ft)			250	125	
Base Capacity (vph)	454	821	730	309	1260
Starvation Cap Reductn	0	0	0	0	247
Spillback Cap Reductn	153	50	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.98	1.05	0.08	0.53	0.85
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

5: Philadelphia Pike & Gov. Printz Blvd

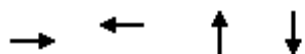
29919 Alternative 2 - Waterfall
SAT Peak Hour 04/11/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T	T	T	T
Traffic Volume (vph)	50	223	747	52	152	789
Future Volume (vph)	50	223	747	52	152	789
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		7.0	7.0	5.0	7.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.89		1.00	0.85	1.00	1.00
Flt Protected	0.99		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1622		1845	1581	1703	1863
Flt Permitted	0.99		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1622		1845	1581	1703	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	242	812	57	165	858
RTOR Reduction (vph)	141	0	0	26	0	0
Lane Group Flow (vph)	155	0	812	31	165	858
Confl. Peds. (#/hr)				1	1	
Heavy Vehicles (%)	0%	4%	3%	0%	6%	2%
Turn Type	Perm		NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	4			2		
Actuated Green, G (s)	19.3		44.6	44.6	18.1	67.7
Effective Green, g (s)	19.3		44.6	44.6	18.1	67.7
Actuated g/C Ratio	0.19		0.45	0.45	0.18	0.68
Clearance Time (s)	6.0		7.0	7.0	5.0	7.0
Vehicle Extension (s)	4.0		4.0	4.0	3.0	4.0
Lane Grp Cap (vph)	313		822	705	308	1261
v/s Ratio Prot			c0.44		0.10	c0.46
v/s Ratio Perm	c0.10			0.02		
v/c Ratio	0.49		0.99	0.04	0.54	0.68
Uniform Delay, d1	36.0		27.4	15.7	37.1	9.7
Progression Factor	1.00		1.06	1.51	1.18	0.69
Incremental Delay, d2	1.7		28.1	0.1	0.9	1.6
Delay (s)	37.7		57.2	23.7	44.6	8.2
Level of Service	D		E	C	D	A
Approach Delay (s)	37.7		55.0			14.1
Approach LOS	D		E			B
Intersection Summary						
HCM 2000 Control Delay			33.5		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.88			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	23.0
Intersection Capacity Utilization			79.3%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
6: Philadelphia Pike & Seminole Ave

29919 Alternative 2 - Waterfall
SAT Peak Hour 04/11/2025



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	41	55	1014	1239
v/c Ratio	0.33	0.35	1.14	0.85
Control Delay	37.6	27.3	90.4	19.2
Queue Delay	0.0	0.0	0.0	0.2
Total Delay	37.6	27.3	90.4	19.4
Queue Length 50th (ft)	16	13	~488	727
Queue Length 95th (ft)	49	49	m#857	#1038
Internal Link Dist (ft)	300	239	390	488
Turn Bay Length (ft)				
Base Capacity (vph)	345	403	893	1454
Starvation Cap Reductn	0	0	0	17
Spillback Cap Reductn	0	0	7	17
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.12	0.14	1.14	0.86

Intersection Summary

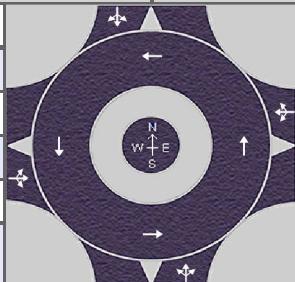
- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM 6th Signalized Intersection Summary
6: Philadelphia Pike & Seminole Ave

29919 Alternative 2 - Waterfall
SAT Peak Hour 04/11/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	3	13	16	4	31	174	747	12	22	1014	104
Future Volume (veh/h)	22	3	13	16	4	31	174	747	12	22	1014	104
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	1900	1900	1159	1900	1900	1767	1648	1870	1781	1900	1856	1900
Adj Flow Rate, veh/h	24	3	14	17	4	34	189	812	13	24	1102	113
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	50	0	0	9	17	2	8	0	3	0
Cap, veh/h	101	12	29	68	11	52	153	569	9	51	1308	133
Arrive On Green	0.05	0.05	0.05	0.05	0.05	0.05	0.82	0.82	0.82	0.55	0.55	0.55
Sat Flow, veh/h	874	247	582	415	221	1029	135	695	11	17	1595	162
Grp Volume(v), veh/h	41	0	0	55	0	0	1014	0	0	1239	0	0
Grp Sat Flow(s),veh/h/ln	1704	0	0	1665	0	0	840	0	0	1774	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.9	0.0	0.0	24.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.2	0.0	0.0	3.1	0.0	0.0	82.0	0.0	0.0	57.9	0.0	0.0
Prop In Lane	0.59		0.34	0.31		0.62	0.19		0.01	0.02		0.09
Lane Grp Cap(c), veh/h	143	0	0	131	0	0	731	0	0	1491	0	0
V/C Ratio(X)	0.29	0.00	0.00	0.42	0.00	0.00	1.39	0.00	0.00	0.83	0.00	0.00
Avail Cap(c_a), veh/h	455	0	0	458	0	0	731	0	0	1491	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.12	0.00	0.00	0.89	0.00	0.00
Uniform Delay (d), s/veh	46.1	0.0	0.0	46.5	0.0	0.0	13.7	0.0	0.0	16.8	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.0	3.0	0.0	0.0	175.0	0.0	0.0	5.0	0.0	0.0
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(50%),veh/ln	1.1	0.0	0.0	1.5	0.0	0.0	48.4	0.0	0.0	26.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.7	0.0	0.0	49.6	0.0	0.0	188.8	0.0	0.0	21.8	0.0	0.0
LnGrp LOS	D	A	A	D	A	A	F	A	A	C	A	A
Approach Vol, veh/h	41			55			1014			1239		
Approach Delay, s/veh	47.7			49.6			188.8			21.8		
Approach LOS	D			D			F			C		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	89.0			11.0			89.0			11.0		
Change Period (Y+Rc), s	7.0			6.0			7.0			6.0		
Max Green Setting (Gmax), s	61.0			26.0			61.0			26.0		
Max Q Clear Time (g_c+I1), s	84.0			4.2			59.9			5.1		
Green Ext Time (p_c), s	0.0			0.2			1.0			0.3		
Intersection Summary												
HCM 6th Ctrl Delay	95.0											
HCM 6th LOS	F											

HCS7 Roundabouts Report

General Information			Site Information		
Analyst	Kittelson & Associates		Intersection	Philly Pk & Gov. Printz	
Agency or Co.	WILMAPCO		E/W Street Name	Gov. Printz Blvd	
Date Performed	8/7/2024		N/S Street Name	Philadelphia Pike	
Analysis Year	2050		Analysis Time Period (hrs)	0.25	
Time Analyzed	Build Future PM		Peak Hour Factor	0.97	
Project Description	Scenario 3		Jurisdiction	Claymont, DE	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	0	0	0	0	60	0	230	0	0	743	63	0	183	950	0
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	5	0	0	0	0	0	2	0	0
Flow Rate (v_{pc}), pc/h	0	0	0	0	0	62	0	249	0	0	766	65	0	192	979	0
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				1				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		0			311			831			1171	
Entry Volume, veh/h		0			299			831			1167	
Circulating Flow (v_c), pc/h	1233			766			192			62		
Exiting Flow (v_{ex}), pc/h	257			0			1015			1041		
Capacity (C_{pc}), pc/h		392			632			1135			1295	
Capacity (c), veh/h		392			608			1135			1291	
v/c Ratio (x)		0.00			0.49			0.73			0.90	

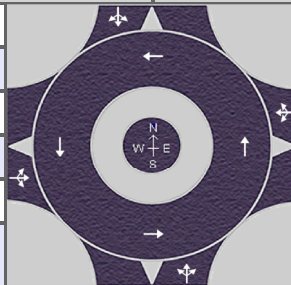
Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		9.2			14.0			15.0			25.7	
Lane LOS		A			B			B			D	
95% Queue, veh		0.0			2.7			6.9			14.6	
Approach Delay, s/veh				14.0			15.0			25.7		
Approach LOS				B			B			D		
Intersection Delay, s/veh LOS	20.3						C					

HCS7 Roundabouts Report

General Information

Analyst	Kittelson & Associates
Agency or Co.	WILMAPCO
Date Performed	8/7/2024
Analysis Year	2050
Time Analyzed	Build Future PM
Project Description	Scenario 3 Waterfall



Site Information

Intersection	Philly Pk & Gov. Printz
E/W Street Name	Gov. Printz Blvd
N/S Street Name	Philadelphia Pike
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.97
Jurisdiction	Claymont, DE

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	0	0	0	0	60	0	262	0	0	873	63	0	183	950	0
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	5	0	0	0	0	0	2	0	0
Flow Rate (V_{PCE}), pc/h	0	0	0	0	0	62	0	284	0	0	900	65	0	192	979	0
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				1				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		0			346			965			1171	
Entry Volume, veh/h		0			332			965			1167	
Circulating Flow (v_c), pc/h	1233			900			192			62		
Exiting Flow (v_{ex}), pc/h	257			0			1184			1041		
Capacity (C_{PCE}), pc/h		392			551			1135			1295	
Capacity (c), veh/h		392			530			1135			1291	
v/c Ratio (x)		0.00			0.63			0.85			0.90	

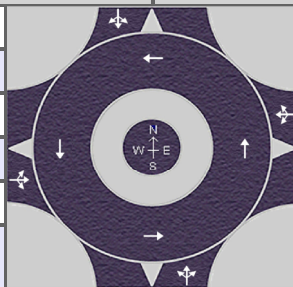
Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		9.2			20.7			22.2			25.7	
Lane LOS		A			C			C			D	
95% Queue, veh		0.0			4.3			11.2			14.6	
Approach Delay, s/veh				20.7			22.2			25.7		
Approach LOS				C			C			D		
Intersection Delay, s/veh LOS	23.7						C					

HCS7 Roundabouts Report

General Information

Analyst	Kittelson & Associates
Agency or Co.	WILMAPCO
Date Performed	8/7/2024
Analysis Year	2050
Time Analyzed	Build Future Saturday
Project Description	Scenario 3 Waterfall



Site Information

Intersection	Philly Pk & Gov. Printz
E/W Street Name	Gov. Printz Blvd
N/S Street Name	Philadelphia Pike
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.97
Jurisdiction	Claymont, DE

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	0	0	0	0	50	0	223	0	0	747	52	0	152	789	0
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	5	0	0	0	0	0	2	0	0
Flow Rate (V_{PCE}), pc/h	0	0	0	0	0	52	0	241	0	0	770	54	0	160	813	0
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				1				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		0			293			824			973	
Entry Volume, veh/h		0			282			824			970	
Circulating Flow (v_c), pc/h	1025			770			160			52		
Exiting Flow (v_{ex}), pc/h	214			0			1011			865		
Capacity (C_{PCE}), pc/h		485			629			1172			1309	
Capacity (c), veh/h		485			604			1172			1304	
v/c Ratio (x)		0.00			0.47			0.70			0.74	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		7.4			13.4			13.5			14.0	
Lane LOS		A			B			B			B	
95% Queue, veh		0.0			2.5			6.2			7.4	
Approach Delay, s/veh				13.4			13.5			14.0		
Approach LOS				B			B			B		
Intersection Delay, s/veh LOS	13.7						B					

Appendix B

Queues

5: Philadelphia Pike & Gov. Printz Blvd

04/16/2025

					
Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	321	850	66	191	990
v/c Ratio	0.65	0.99	0.09	0.69	0.80
Control Delay	29.9	59.2	7.2	61.1	17.0
Queue Delay	4.6	0.0	0.0	0.0	11.9
Total Delay	34.6	59.2	7.2	61.1	28.9
Queue Length 50th (ft)	131	673	0	135	454
Queue Length 95th (ft)	231	#923	21	m170	519
Internal Link Dist (ft)	472	396			390
Turn Bay Length (ft)			250	125	
Base Capacity (vph)	496	855	736	276	1230
Starvation Cap Reductn	0	0	0	0	231
Spillback Cap Reductn	112	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.84	0.99	0.09	0.69	0.99

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

5: Philadelphia Pike & Gov. Printz Blvd

04/16/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	60	248	816	63	183	950
Future Volume (vph)	60	248	816	63	183	950
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		7.0	7.0	5.0	7.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.89		1.00	0.85	1.00	1.00
Flt Protected	0.99		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1613		1900	1580	1770	1900
Flt Permitted	0.99		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1613		1900	1580	1770	1900
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	62	258	850	66	191	990
RTOR Reduction (vph)	104	0	0	26	0	0
Lane Group Flow (vph)	217	0	850	40	191	990
Confl. Peds. (#/hr)				1	1	
Heavy Vehicles (%)	0%	5%	0%	0%	2%	0%
Turn Type	Perm		NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	4			2		
Actuated Green, G (s)	29.3		54.0	54.0	18.7	77.7
Effective Green, g (s)	29.3		54.0	54.0	18.7	77.7
Actuated g/C Ratio	0.24		0.45	0.45	0.16	0.65
Clearance Time (s)	6.0		7.0	7.0	5.0	7.0
Vehicle Extension (s)	4.0		4.0	4.0	3.0	4.0
Lane Grp Cap (vph)	393		855	711	275	1230
v/s Ratio Prot			c0.45		0.11	c0.52
v/s Ratio Perm	c0.13			0.03		
v/c Ratio	0.55		0.99	0.06	0.69	0.80
Uniform Delay, d1	39.6		32.8	18.6	47.9	15.6
Progression Factor	1.00		0.92	0.89	1.12	0.86
Incremental Delay, d2	2.1		28.2	0.1	4.0	3.1
Delay (s)	41.7		58.3	16.8	57.5	16.5
Level of Service	D		E	B	E	B
Approach Delay (s)	41.7		55.3			23.1
Approach LOS	D		E			C
Intersection Summary						
HCM 2000 Control Delay			37.8		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.90			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	23.0
Intersection Capacity Utilization			86.7%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary
5: Philadelphia Pike & Gov. Printz Blvd

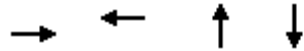
04/16/2025

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues

6: Philadelphia Pike & Seminole Ave

04/16/2025



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	48	63	1051	1308
v/c Ratio	0.37	0.41	0.90	0.85
Control Delay	45.5	33.3	23.1	12.1
Queue Delay	0.0	0.0	4.3	3.1
Total Delay	45.5	33.3	27.4	15.2
Queue Length 50th (ft)	24	19	330	269
Queue Length 95th (ft)	62	62	m#383	#900
Internal Link Dist (ft)	300	239	390	488
Turn Bay Length (ft)				
Base Capacity (vph)	341	363	1167	1535
Starvation Cap Reductn	0	0	72	0
Spillback Cap Reductn	1	2	23	142
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.14	0.17	0.96	0.94

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 6th Signalized Intersection Summary
6: Philadelphia Pike & Seminole Ave

04/16/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	4	16	19	5	37	106	900	14	27	1169	73
Future Volume (veh/h)	27	4	16	19	5	37	106	900	14	27	1169	73
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	1900	1900	1900	1796	1900	1900	1900	1900	1767	1900	1900	1900
Adj Flow Rate, veh/h	28	4	16	20	5	38	109	928	14	28	1205	75
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	7	0	0	0	0	9	0	0	0
Cap, veh/h	94	15	31	62	13	54	140	1108	16	49	1429	88
Arrive On Green	0.05	0.05	0.05	0.05	0.05	0.05	0.84	0.84	0.84	1.00	1.00	1.00
Sat Flow, veh/h	867	279	573	420	244	1010	128	1322	20	22	1705	105
Grp Volume(v), veh/h	48	0	0	63	0	0	1051	0	0	1308	0	0
Grp Sat Flow(s),veh/h/ln	1718	0	0	1675	0	0	1470	0	0	1833	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.2	0.0	0.0	27.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.1	0.0	0.0	4.3	0.0	0.0	40.1	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.58		0.33	0.32		0.60	0.10		0.01	0.02		0.06
Lane Grp Cap(c), veh/h	140	0	0	130	0	0	1265	0	0	1566	0	0
V/C Ratio(X)	0.34	0.00	0.00	0.49	0.00	0.00	0.83	0.00	0.00	0.84	0.00	0.00
Avail Cap(c_a), veh/h	382	0	0	384	0	0	1265	0	0	1566	0	0
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	0.10	0.00	0.00	0.41	0.00	0.00
Uniform Delay (d), s/veh	55.2	0.0	0.0	55.7	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	2.0	0.0	0.0	4.0	0.0	0.0	0.7	0.0	0.0	2.3	0.0	0.0
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(50%),veh/ln	1.5	0.0	0.0	2.0	0.0	0.0	5.7	0.0	0.0	1.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.2	0.0	0.0	59.7	0.0	0.0	4.9	0.0	0.0	2.3	0.0	0.0
LnGrp LOS	E	A	A	E	A	A	A	A	A	A	A	A
Approach Vol, veh/h	48			63			1051			1308		
Approach Delay, s/veh	57.2			59.7			4.9			2.3		
Approach LOS	E			E			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	107.5			12.5			107.5			12.5		
Change Period (Y+Rc), s	7.0			6.0			7.0			6.0		
Max Green Setting (Gmax), s	81.0			26.0			81.0			26.0		
Max Q Clear Time (g_c+I1), s	42.1			5.1			2.0			6.3		
Green Ext Time (p_c), s	19.9			0.2			39.2			0.4		
Intersection Summary												
HCM 6th Ctrl Delay	5.9											
HCM 6th LOS	A											

Queues

5: Philadelphia Pike & Gov. Printz Blvd

04/16/2025

					
Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	281	750	57	165	858
v/c Ratio	0.65	0.90	0.08	0.53	0.67
Control Delay	22.8	42.8	10.2	48.8	8.2
Queue Delay	3.4	0.7	0.0	0.0	1.3
Total Delay	26.1	43.6	10.2	48.8	9.5
Queue Length 50th (ft)	66	503	6	95	66
Queue Length 95th (ft)	149	#745	20	m121	193
Internal Link Dist (ft)	472	396			390
Turn Bay Length (ft)			250	125	
Base Capacity (vph)	434	835	744	309	1276
Starvation Cap Reductn	0	0	0	0	218
Spillback Cap Reductn	81	12	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.80	0.91	0.08	0.53	0.81
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

5: Philadelphia Pike & Gov. Printz Blvd

04/16/2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (vph)	50	209	690	52	152	789
Future Volume (vph)	50	209	690	52	152	789
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		7.0	7.0	5.0	7.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.89		1.00	0.85	1.00	1.00
Flt Protected	0.99		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1624		1845	1581	1703	1863
Flt Permitted	0.99		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1624		1845	1581	1703	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	227	750	57	165	858
RTOR Reduction (vph)	134	0	0	28	0	0
Lane Group Flow (vph)	147	0	750	29	165	858
Confl. Peds. (#/hr)				1	1	
Heavy Vehicles (%)	0%	4%	3%	0%	6%	2%
Turn Type	Perm		NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	4			2		
Actuated Green, G (s)	18.5		45.3	45.3	18.2	68.5
Effective Green, g (s)	18.5		45.3	45.3	18.2	68.5
Actuated g/C Ratio	0.18		0.45	0.45	0.18	0.68
Clearance Time (s)	6.0		7.0	7.0	5.0	7.0
Vehicle Extension (s)	4.0		4.0	4.0	3.0	4.0
Lane Grp Cap (vph)	300		835	716	309	1276
v/s Ratio Prot			c0.41		0.10	c0.46
v/s Ratio Perm	c0.09			0.02		
v/c Ratio	0.49		0.90	0.04	0.53	0.67
Uniform Delay, d1	36.5		25.2	15.2	37.1	9.2
Progression Factor	1.00		1.07	1.66	1.19	0.63
Incremental Delay, d2	1.7		14.1	0.1	1.1	1.7
Delay (s)	38.3		41.0	25.3	45.3	7.6
Level of Service	D		D	C	D	A
Approach Delay (s)	38.3		39.9			13.6
Approach LOS	D		D			B
Intersection Summary						
HCM 2000 Control Delay			27.0		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.83			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	23.0
Intersection Capacity Utilization			75.4%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary
5: Philadelphia Pike & Gov. Printz Blvd

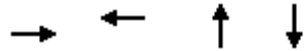
04/16/2025

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues

6: Philadelphia Pike & Seminole Ave

04/16/2025



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	41	55	937	1161
v/c Ratio	0.33	0.35	0.85	0.80
Control Delay	37.6	27.3	20.9	15.9
Queue Delay	0.0	0.0	0.2	0.1
Total Delay	37.6	27.3	21.1	16.0
Queue Length 50th (ft)	16	13	173	648
Queue Length 95th (ft)	49	49	m#409	#908
Internal Link Dist (ft)	300	239	390	488
Turn Bay Length (ft)				
Base Capacity (vph)	345	403	1106	1460
Starvation Cap Reductn	0	0	0	19
Spillback Cap Reductn	0	0	9	14
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.12	0.14	0.85	0.81

Intersection Summary

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

Queue shown is maximum after two cycles.

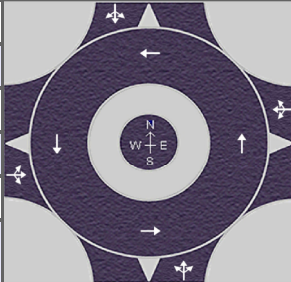
m Volume for 95th percentile queue is metered by upstream signal.

HCM 6th Signalized Intersection Summary
6: Philadelphia Pike & Seminole Ave

04/16/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	3	13	16	4	31	103	747	12	22	978	68
Future Volume (veh/h)	22	3	13	16	4	31	103	747	12	22	978	68
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	1900	1900	1159	1900	1900	1767	1648	1870	1781	1900	1856	1900
Adj Flow Rate, veh/h	24	3	14	17	4	34	112	812	13	24	1063	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	50	0	0	9	17	2	8	0	3	0
Cap, veh/h	101	12	29	68	11	52	135	909	14	52	1355	93
Arrive On Green	0.05	0.05	0.05	0.05	0.05	0.05	0.82	0.82	0.82	0.55	0.55	0.55
Sat Flow, veh/h	874	247	582	415	221	1029	115	1110	17	18	1654	114
Grp Volume(v), veh/h	41	0	0	55	0	0	937	0	0	1161	0	0
Grp Sat Flow(s),veh/h/ln	1704	0	0	1665	0	0	1242	0	0	1786	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.9	0.0	0.0	13.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.2	0.0	0.0	3.1	0.0	0.0	64.5	0.0	0.0	50.7	0.0	0.0
Prop In Lane	0.59		0.34	0.31		0.62	0.12		0.01	0.02		0.06
Lane Grp Cap(c), veh/h	143	0	0	131	0	0	1058	0	0	1500	0	0
V/C Ratio(X)	0.29	0.00	0.00	0.42	0.00	0.00	0.89	0.00	0.00	0.77	0.00	0.00
Avail Cap(c_a), veh/h	455	0	0	458	0	0	1058	0	0	1500	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.32	0.00	0.00	0.89	0.00	0.00
Uniform Delay (d), s/veh	46.1	0.0	0.0	46.5	0.0	0.0	6.0	0.0	0.0	15.3	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.0	3.0	0.0	0.0	3.9	0.0	0.0	3.5	0.0	0.0
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(50%),veh/ln	1.1	0.0	0.0	1.5	0.0	0.0	4.7	0.0	0.0	22.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.7	0.0	0.0	49.6	0.0	0.0	9.9	0.0	0.0	18.8	0.0	0.0
LnGrp LOS	D	A	A	D	A	A	A	A	A	B	A	A
Approach Vol, veh/h	41			55			937			1161		
Approach Delay, s/veh	47.7			49.6			9.9			18.8		
Approach LOS	D			D			A			B		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	89.0			11.0			89.0			11.0		
Change Period (Y+Rc), s	7.0			6.0			7.0			6.0		
Max Green Setting (Gmax), s	61.0			26.0			61.0			26.0		
Max Q Clear Time (g_c+l1), s	66.5			4.2			52.7			5.1		
Green Ext Time (p_c), s	0.0			0.2			6.5			0.3		
Intersection Summary												
HCM 6th Ctrl Delay	16.3											
HCM 6th LOS	B											

HCS7 Roundabouts Report

General Information			Site Information		
Analyst	Kittelson & Associates		Intersection	Philly Pk & Gov. Printz	
Agency or Co.	WILMAPCO		E/W Street Name	Gov. Printz Blvd	
Date Performed	8/7/2024		N/S Street Name	Philadelphia Pike	
Analysis Year	2050		Analysis Time Period (hrs)	0.25	
Time Analyzed	Build Future PM		Peak Hour Factor	0.97	
Project Description	Scenario 3		Jurisdiction	Claymont, DE	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	0	0	0	0	60	0	248	0	0	816	63	0	183	950	0
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	5	0	0	0	0	0	2	0	0
Flow Rate (V _{PCE}), pc/h	0	0	0	0	0	62	0	268	0	0	841	65	0	192	979	0
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				1				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

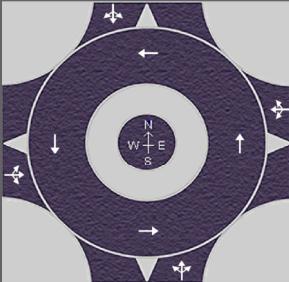
Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v _e), pc/h		0			330			906			1171	
Entry Volume, veh/h		0			317			906			1167	
Circulating Flow (v _c), pc/h	1233			841			192			62		
Exiting Flow (v _{ex}), pc/h	257			0			1109			1041		
Capacity (C _{PCE}), pc/h		392			585			1135			1295	
Capacity (c), veh/h		392			563			1135			1291	
v/c Ratio (x)		0.00			0.56			0.80			0.90	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		9.2			17.2			18.4			25.7	
Lane LOS		A			C			C			D	
95% Queue, veh		0.0			3.5			9.0			14.6	
Approach Delay, s/veh				17.2			18.4			25.7		
Approach LOS				C			C			D		
Intersection Delay, s/veh LOS	21.8						C					

HCS7 Roundabouts Report

General Information			Site Information		
Analyst	Kittelson & Associates		Intersection	Philly Pk & Gov. Printz	
Agency or Co.	WILMAPCO		E/W Street Name	Gov. Printz Blvd	
Date Performed	8/7/2024		N/S Street Name	Philadelphia Pike	
Analysis Year	2050		Analysis Time Period (hrs)	0.25	
Time Analyzed	Build Future PM		Peak Hour Factor	0.97	
Project Description	Scenario 3		Jurisdiction	Claymont, DE	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	0	0	0	0	50	0	209	0	0	690	52	0	152	789	0
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	5	0	0	0	0	0	2	0	0
Flow Rate (V_{PCE}), pc/h	0	0	0	0	0	52	0	226	0	0	711	54	0	160	813	0
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				1				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		0			278			765			973	
Entry Volume, veh/h		0			267			765			970	
Circulating Flow (v_c), pc/h	1025			711			160			52		
Exiting Flow (v_{ex}), pc/h	214			0			937			865		
Capacity (C_{PCE}), pc/h		485			668			1172			1309	
Capacity (c), veh/h		485			642			1172			1304	
v/c Ratio (x)		0.00			0.42			0.65			0.74	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		7.4			11.6			11.9			14.0	
Lane LOS		A			B			B			B	
95% Queue, veh		0.0			2.0			5.1			7.4	
Approach Delay, s/veh				11.6			11.9			14.0		
Approach LOS				B			B			B		
Intersection Delay, s/veh LOS	12.9						B					

Output Files
Existing Conditions
AM Peak Hour

Queues
1: Philadelphia Pike & Rolling Rd

29919 Existing Conditions AM Peak Hour
07/31/2024



Lane Group	EBL	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	1	3	9	2	326	3	444
v/c Ratio	0.01	0.01	0.01	0.00	0.10	0.00	0.14
Control Delay	44.0	0.0	0.0	3.0	3.1	0.7	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.0	0.0	0.0	3.0	3.1	0.7	0.7
Queue Length 50th (ft)	1	0	0	0	0	0	0
Queue Length 95th (ft)	6	0	0	2	69	1	14
Internal Link Dist (ft)			393		408		993
Turn Bay Length (ft)	70	70		155		155	
Base Capacity (vph)	361	445	864	917	3221	1008	3231
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	0.00	0.01	0.01	0.00	0.10	0.00	0.14
Intersection Summary							

HCM 6th Signalized Intersection Summary
1: Philadelphia Pike & Rolling Rd

29919 Existing Conditions AM Peak Hour

07/31/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	3	0	0	8	2	288	2	3	393	2
Future Volume (veh/h)	1	0	3	0	0	8	2	288	2	3	393	2
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	1900	0	1900	1900	1900	1900	1900	1870	1159	1900	1870	1900
Adj Flow Rate, veh/h	1	0	3	0	0	9	2	324	2	3	442	2
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	0	0	0	0	0	0	2	50	0	2	0
Cap, veh/h	0	0	0	0	0	18	860	2951	18	932	2961	13
Arrive On Green	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.81	0.81	0.01	1.00	1.00
Sat Flow, veh/h	0			0			1610	1810	3621	22	1810	3628
Grp Volume(v), veh/h	0.0			0	0	9	2	159	167	3	216	228
Grp Sat Flow(s),veh/h/ln				0	0	1610	1810	1777	1866	1810	1777	1867
Q Serve(g_s), s				0.0	0.0	0.6	0.0	1.8	1.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s				0.0	0.0	0.6	0.0	1.8	1.8	0.0	0.0	0.0
Prop In Lane				0.00		1.00	1.00		0.01	1.00		0.01
Lane Grp Cap(c), veh/h				0	0	18	860	1448	1521	932	1450	1524
V/C Ratio(X)				0.00	0.00	0.51	0.00	0.11	0.11	0.00	0.15	0.15
Avail Cap(c_a), veh/h				0	0	322	1018	1448	1521	1088	1450	1524
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)				0.00	0.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
Uniform Delay (d), s/veh				0.0	0.0	49.2	1.7	1.9	1.9	1.7	0.0	0.0
Incr Delay (d2), s/veh				0.0	0.0	28.2	0.0	0.2	0.1	0.0	0.2	0.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.0	0.0	0.4	0.0	0.4	0.4	0.0	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				0.0	0.0	77.4	1.7	2.0	2.0	1.7	0.2	0.2
LnGrp LOS				A	A	E	A	A	A	A	A	A
Approach Vol, veh/h					9				328			
Approach Delay, s/veh					77.4				2.0			
Approach LOS					E				A			
Timer - Assigned Phs	1	2	5			6	8					
Phs Duration (G+Y+Rc), s	5.4	87.5	5.3			87.6	7.1					
Change Period (Y+Rc), s	5.0	6.0	5.0			6.0	6.0					
Max Green Setting (Gmax), s	9.0	28.0	9.0			28.0	20.0					
Max Q Clear Time (g_c+I1), s	2.0	3.8	2.0			2.0	2.6					
Green Ext Time (p_c), s	0.0	3.4	0.0			5.0	0.0					
Intersection Summary												
HCM 6th Ctrl Delay	1.9											
HCM 6th LOS	A											

Queues
2: Philadelphia Pike & Maple Road

29919 Existing Conditions AM Peak Hour
07/31/2024



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	56	41	6	11	311	2	445
v/c Ratio	0.38	0.20	0.04	0.01	0.11	0.00	0.16
Control Delay	48.4	15.8	33.6	3.6	4.4	2.0	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	15.8	33.6	3.6	4.4	2.0	2.0
Queue Length 50th (ft)	34	1	2	1	21	0	11
Queue Length 95th (ft)	71	32	14	6	61	m0	32
Internal Link Dist (ft)		274	235		993		891
Turn Bay Length (ft)				175		130	
Base Capacity (vph)	243	309	278	836	2807	924	2793
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	0.23	0.13	0.02	0.01	0.11	0.00	0.16

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Philadelphia Pike & Maple Road

29919 Existing Conditions AM Peak Hour

07/31/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	2	35	2	2	2	10	270	10	2	375	25
Future Volume (vph)	50	2	35	2	2	2	10	270	10	2	375	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86			0.95		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1629			1785		1805	3591		1805	3576	
Flt Permitted	0.75	1.00			0.90		0.49	1.00		0.56	1.00	
Satd. Flow (perm)	1432	1629			1629		938	3591		1069	3576	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	2	39	2	2	2	11	300	11	2	417	28
RTOR Reduction (vph)	0	36	0	0	2	0	0	1	0	0	0	0
Lane Group Flow (vph)	56	5	0	0	4	0	11	310	0	2	445	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.9	8.9			8.9		71.2	70.0		71.0	69.9	
Effective Green, g (s)	8.9	8.9			8.9		71.2	70.0		71.0	69.9	
Actuated g/C Ratio	0.09	0.09			0.09		0.71	0.70		0.71	0.70	
Clearance Time (s)	6.0	6.0			6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	4.0	4.0			4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	127	144			144		678	2513		767	2499	
v/s Ratio Prot		0.00					c0.00	0.09		0.00	c0.12	
v/s Ratio Perm	c0.04				0.00		0.01			0.00		
v/c Ratio	0.44	0.04			0.03		0.02	0.12		0.00	0.18	
Uniform Delay, d1	43.2	41.6			41.6		4.2	4.9		4.2	5.2	
Progression Factor	1.00	1.00			1.00		1.01	0.99		0.51	0.41	
Incremental Delay, d2	3.3	0.1			0.1		0.0	0.1		0.0	0.2	
Delay (s)	46.5	41.8			41.7		4.2	5.0		2.2	2.3	
Level of Service	D	D			D		A	A		A	A	
Approach Delay (s)		44.5			41.7			5.0			2.3	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.2				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.21									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			30.3%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
3: Philadelphia Pike & Harvey Rd

29919 Existing Conditions AM Peak Hour
07/31/2024



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	195	99	26	11	75	322	25	531
v/c Ratio	0.67	0.29	0.18	0.04	0.14	0.31	0.04	0.30
Control Delay	50.2	13.7	45.3	0.3	11.5	16.9	10.0	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.2	13.7	45.3	0.3	11.5	16.9	10.0	15.6
Queue Length 50th (ft)	117	11	16	0	17	82	7	130
Queue Length 95th (ft)	177	50	40	0	62	292	19	113
Internal Link Dist (ft)		308	162			891		2180
Turn Bay Length (ft)	220			45			184	
Base Capacity (vph)	349	396	331	425	557	1044	675	1779
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.25	0.08	0.03	0.13	0.31	0.04	0.30
Intersection Summary								

HCM 6th Signalized Intersection Summary

3: Philadelphia Pike & Harvey Rd

29919 Existing Conditions AM Peak Hour

07/31/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	18	68	14	9	10	65	262	18	22	336	126
Future Volume (veh/h)	170	18	68	14	9	10	65	262	18	22	336	126
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		0.99	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	1841	1900	1900	1900	1900	1900	1870	1870	1900	1826	1885	1885
Adj Flow Rate, veh/h	195	21	78	16	10	11	75	301	21	25	386	145
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	4	0	0	0	0	0	2	2	0	5	1	1
Cap, veh/h	242	49	180	39	24	55	553	973	68	569	1390	515
Arrive On Green	0.14	0.14	0.14	0.03	0.03	0.03	0.03	0.38	0.38	0.03	0.54	0.54
Sat Flow, veh/h	1753	352	1309	1134	709	1594	1781	1728	121	1739	2554	947
Grp Volume(v), veh/h	195	0	99	26	0	11	75	0	322	25	269	262
Grp Sat Flow(s),veh/h/ln	1753	0	1661	1843	0	1594	1781	0	1848	1739	1791	1710
Q Serve(g_s), s	10.8	0.0	5.5	1.4	0.0	0.7	1.8	0.0	12.3	0.6	8.1	8.2
Cycle Q Clear(g_c), s	10.8	0.0	5.5	1.4	0.0	0.7	1.8	0.0	12.3	0.6	8.1	8.2
Prop In Lane	1.00		0.79	0.62		1.00	1.00		0.07	1.00		0.55
Lane Grp Cap(c), veh/h	242	0	229	63	0	55	553	0	1040	569	975	930
V/C Ratio(X)	0.81	0.00	0.43	0.41	0.00	0.20	0.14	0.00	0.31	0.04	0.28	0.28
Avail Cap(c_a), veh/h	351	0	332	332	0	287	635	0	1040	682	975	930
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.99	0.00	0.99	0.94	0.94	0.94
Uniform Delay (d), s/veh	41.8	0.0	39.5	47.3	0.0	47.0	9.4	0.0	17.4	10.0	12.2	12.3
Incr Delay (d2), s/veh	10.7	0.0	1.8	6.0	0.0	2.6	0.1	0.0	0.8	0.0	0.7	0.7
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(50%),veh/ln	5.3	0.0	2.3	0.7	0.0	0.3	0.7	0.0	5.7	0.2	3.2	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.5	0.0	41.4	53.3	0.0	49.5	9.5	0.0	18.2	10.0	12.9	13.0
LnGrp LOS	D	A	D	D	A	D	A	A	B	A	B	B
Approach Vol, veh/h	294			37			397			556		
Approach Delay, s/veh	48.8			52.2			16.6			12.8		
Approach LOS	D			D			B			B		
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	7.5	63.3	19.8		9.4	61.4	9.4					
Change Period (Y+Rc), s	5.0	7.0	6.0		5.0	7.0	6.0					
Max Green Setting (Gmax), s	9.0	29.0	20.0		9.0	29.0	18.0					
Max Q Clear Time (g_c+I1), s	2.6	14.3	12.8		3.8	10.2	3.4					
Green Ext Time (p_c), s	0.0	2.2	0.9		0.1	4.2	0.1					
Intersection Summary												
HCM 6th Ctrl Delay	23.3											
HCM 6th LOS	C											

Queues
4: Philadelphia Pike & Commonwealth Ave

29919 Existing Conditions AM Peak Hour
07/31/2024



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	85	1	15	499	1	531	27
v/c Ratio	0.41	0.00	0.02	0.32	0.00	0.36	0.02
Control Delay	11.1	0.0	2.6	4.5	9.0	6.2	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	0.0	2.6	4.5	9.0	6.2	0.4
Queue Length 50th (ft)	0	0	2	135	0	23	0
Queue Length 95th (ft)	28	0	m8	173	m1	193	2
Internal Link Dist (ft)	259	219		2180		539	
Turn Bay Length (ft)			230		145		45
Base Capacity (vph)	287	617	791	1559	732	1493	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	0.30	0.00	0.02	0.32	0.00	0.36	0.02

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Philadelphia Pike & Commonwealth Ave

29919 Existing Conditions AM Peak Hour

07/31/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	0	35	0	0	1	13	439	0	1	467	24
Future Volume (vph)	40	0	35	0	0	1	13	439	0	1	467	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt		0.94			0.86		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.97			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1733			1644		1805	1845		1805	1863	1615
Flt Permitted		0.83			1.00		0.41	1.00		0.48	1.00	1.00
Satd. Flow (perm)		1484			1644		781	1845		913	1863	1615
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	45	0	40	0	0	1	15	499	0	1	531	27
RTOR Reduction (vph)	0	80	0	0	1	0	0	0	0	0	0	7
Lane Group Flow (vph)	0	5	0	0	0	0	15	499	0	1	531	20
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	2%	0%
Turn Type	Perm	NA			NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		5.9			5.9		82.1	82.1		74.8	74.8	74.8
Effective Green, g (s)		5.9			5.9		82.1	82.1		74.8	74.8	74.8
Actuated g/C Ratio		0.06			0.06		0.82	0.82		0.75	0.75	0.75
Clearance Time (s)		6.0			6.0		5.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		4.0			4.0		3.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)		87			96		664	1514		682	1393	1208
v/s Ratio Prot					0.00		0.00	c0.27			c0.29	
v/s Ratio Perm		c0.00					0.02			0.00		0.01
v/c Ratio		0.06			0.00		0.02	0.33		0.00	0.38	0.02
Uniform Delay, d1		44.4			44.3		2.1	2.2		3.2	4.4	3.2
Progression Factor		1.00			1.00		1.36	1.66		1.83	1.19	1.00
Incremental Delay, d2		0.4			0.0		0.0	0.5		0.0	0.8	0.0
Delay (s)		44.8			44.3		2.8	4.2		5.8	6.1	3.2
Level of Service		D			D		A	A		A	A	A
Approach Delay (s)		44.8			44.3			4.2			5.9	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.0			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.38										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)			19.0				
Intersection Capacity Utilization		45.6%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
5: Philadelphia Pike & Gov. Printz Blvd

29919 Existing Conditions AM Peak Hour
07/31/2024

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	38	155	534	56	554
v/c Ratio	0.23	0.55	0.23	0.24	0.38
Control Delay	44.7	14.8	3.3	54.7	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.4
Total Delay	44.7	14.8	3.3	54.7	5.6
Queue Length 50th (ft)	23	0	25	19	115
Queue Length 95th (ft)	51	52	24	40	101
Internal Link Dist (ft)	472		396		390
Turn Bay Length (ft)				125	
Base Capacity (vph)	164	281	2373	330	1453
Starvation Cap Reductn	0	0	0	0	419
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.23	0.55	0.23	0.17	0.54
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

5: Philadelphia Pike & Gov. Printz Blvd

29919 Existing Conditions AM Peak Hour

07/31/2024

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	33	135	449	16	49	482
Future Volume (vph)	33	135	449	16	49	482
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	7.0		5.0	7.0
Lane Util. Factor	1.00	1.00	0.95		0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	1553	3489		3303	1863
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1805	1553	3489		3303	1863
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	38	155	516	18	56	554
RTOR Reduction (vph)	0	141	1	0	0	0
Lane Group Flow (vph)	38	14	533	0	56	554
Confl. Peds. (#/hr)				1	1	
Heavy Vehicles (%)	0%	4%	3%	0%	6%	2%
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	4	4				
Actuated Green, G (s)	9.0	9.0	67.0		6.0	78.0
Effective Green, g (s)	9.0	9.0	67.0		6.0	78.0
Actuated g/C Ratio	0.09	0.09	0.67		0.06	0.78
Clearance Time (s)	6.0	6.0	7.0		5.0	7.0
Vehicle Extension (s)	4.0	4.0	4.0		3.0	4.0
Lane Grp Cap (vph)	162	139	2337		198	1453
v/s Ratio Prot			0.15		0.02	c0.30
v/s Ratio Perm	c0.02	0.01				
v/c Ratio	0.23	0.10	0.23		0.28	0.38
Uniform Delay, d1	42.3	41.8	6.4		44.9	3.4
Progression Factor	1.00	1.00	0.45		1.20	1.18
Incremental Delay, d2	1.0	0.4	0.2		0.8	0.8
Delay (s)	43.3	42.2	3.1		54.8	4.8
Level of Service	D	D	A		D	A
Approach Delay (s)	42.4		3.1			9.4
Approach LOS	D		A			A
Intersection Summary						
HCM 2000 Control Delay			11.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.41			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	23.0
Intersection Capacity Utilization			52.5%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
6: Philadelphia Pike & Seminole Ave

29919 Existing Conditions AM Peak Hour
07/31/2024

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	31	36	623	590
v/c Ratio	0.27	0.25	0.22	0.21
Control Delay	43.0	24.7	3.6	7.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	43.0	24.7	3.6	7.6
Queue Length 50th (ft)	16	6	103	25
Queue Length 95th (ft)	44	36	33	212
Internal Link Dist (ft)	300	239	390	488
Turn Bay Length (ft)				
Base Capacity (vph)	339	397	2835	2754
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	0.09	0.09	0.22	0.21
Intersection Summary				

HCM 6th Signalized Intersection Summary
6: Philadelphia Pike & Seminole Ave

29919 Existing Conditions AM Peak Hour

07/31/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	2	5	8	1	24	14	545	15	23	505	15
Future Volume (veh/h)	22	2	5	8	1	24	14	545	15	23	505	15
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	1900	1900	1159	1900	1900	1767	1648	1870	1781	1900	1856	1900
Adj Flow Rate, veh/h	24	2	5	9	1	26	15	592	16	25	549	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	50	0	0	9	17	2	8	0	3	0
Cap, veh/h	115	7	11	58	6	50	77	2783	75	124	2647	77
Arrive On Green	0.04	0.04	0.04	0.04	0.04	0.04	0.83	0.83	0.83	1.00	1.00	1.00
Sat Flow, veh/h	1212	163	264	317	140	1188	47	3362	90	103	3197	93
Grp Volume(v), veh/h	31	0	0	36	0	0	323	0	300	301	0	289
Grp Sat Flow(s),veh/h/ln	1639	0	0	1645	0	0	1813	0	1686	1721	0	1672
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	3.7	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.6	0.0	0.0	2.0	0.0	0.0	3.6	0.0	3.7	0.0	0.0	0.0
Prop In Lane	0.77		0.16	0.25		0.72	0.05		0.05	0.08		0.06
Lane Grp Cap(c), veh/h	133	0	0	114	0	0	1539	0	1395	1464	0	1384
V/C Ratio(X)	0.23	0.00	0.00	0.31	0.00	0.00	0.21	0.00	0.21	0.21	0.00	0.21
Avail Cap(c_a), veh/h	451	0	0	456	0	0	1539	0	1395	1464	0	1384
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	0.96	0.00	0.96	0.99	0.00	0.99
Uniform Delay (d), s/veh	46.7	0.0	0.0	46.8	0.0	0.0	1.8	0.0	1.8	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.3	0.0	0.0	2.2	0.0	0.0	0.3	0.0	0.3	0.3	0.0	0.3
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(50%),veh/ln	0.8	0.0	0.0	1.0	0.0	0.0	0.8	0.0	0.7	0.1	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.9	0.0	0.0	49.1	0.0	0.0	2.1	0.0	2.1	0.3	0.0	0.3
LnGrp LOS	D	A	A	D	A	A	A	A	A	A	A	A
Approach Vol, veh/h		31			36			623			590	
Approach Delay, s/veh		47.9			49.1			2.1			0.3	
Approach LOS		D			D			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		89.8		10.2		89.8		10.2				
Change Period (Y+Rc), s		7.0		6.0		7.0		6.0				
Max Green Setting (Gmax), s		61.0		26.0		61.0		26.0				
Max Q Clear Time (g_c+I1), s		5.7		3.6		2.0		4.0				
Green Ext Time (p_c), s		6.4		0.1		6.1		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				3.7								
HCM 6th LOS				A								

Queues
7: Philadelphia Pike & Manor Ave

29919 Existing Conditions AM Peak Hour
07/31/2024



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	71	16	28	578	20	509
v/c Ratio	0.42	0.10	0.04	0.21	0.03	0.19
Control Delay	28.6	23.4	1.5	3.7	8.5	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.6	23.4	1.5	3.7	8.5	14.2
Queue Length 50th (ft)	18	2	4	50	5	95
Queue Length 95th (ft)	59	21	2	86	24	191
Internal Link Dist (ft)	387	309		488		946
Turn Bay Length (ft)			110		135	
Base Capacity (vph)	244	240	828	2741	876	2654
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	0.29	0.07	0.03	0.21	0.02	0.19
Intersection Summary						

HCM Signalized Intersection Capacity Analysis

7: Philadelphia Pike & Manor Ave

29919 Existing Conditions AM Peak Hour

07/31/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	2	41	1	2	13	27	557	4	19	481	13
Future Volume (vph)	26	2	41	1	2	13	27	557	4	19	481	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		0.99	1.00		1.00	1.00	
Frt		0.92			0.89		1.00	1.00		1.00	1.00	
Flt Protected		0.98			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1687			1663		1792	3495		1801	3482	
Flt Permitted		0.87			0.98		0.46	1.00		0.43	1.00	
Satd. Flow (perm)		1492			1636		862	3495		824	3482	
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)	27	2	42	1	2	13	28	574	4	20	496	13
RTOR Reduction (vph)	0	39	0	0	12	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	32	0	0	4	0	28	578	0	20	508	0
Confl. Peds. (#/hr)	2						2	10		3	3	10
Heavy Vehicles (%)	4%	0%	0%	0%	0%	0%	0%	3%	25%	0%	3%	8%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.5			7.5		76.7	73.1		74.3	71.9	
Effective Green, g (s)		7.5			7.5		76.7	73.1		74.3	71.9	
Actuated g/C Ratio		0.08			0.08		0.77	0.73		0.74	0.72	
Clearance Time (s)		6.0			6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)		111			122		694	2554		635	2503	
v/s Ratio Prot							c0.00	c0.17		0.00	0.15	
v/s Ratio Perm		c0.02			0.00		0.03			0.02		
v/c Ratio		0.29			0.03		0.04	0.23		0.03	0.20	
Uniform Delay, d1		43.7			42.9		2.8	4.3		3.3	4.6	
Progression Factor		1.00			1.00		0.57	0.78		3.26	2.76	
Incremental Delay, d2		2.0			0.1		0.0	0.2		0.0	0.2	
Delay (s)		45.7			43.0		1.6	3.6		10.9	12.9	
Level of Service		D			D		A	A		B	B	
Approach Delay (s)		45.7			43.0			3.5			12.9	
Approach LOS		D			D			A			B	
Intersection Summary												
HCM 2000 Control Delay		10.5					HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio		0.23										
Actuated Cycle Length (s)		100.0					Sum of lost time (s)			19.0		
Intersection Capacity Utilization		43.2%					ICU Level of Service			A		
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
8: Philadelphia Pike & Darley Rd

29919 Existing Conditions AM Peak Hour
07/31/2024

	→	↘	←	↙	↑	↗	↓
Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	184	126	37	119	510	7	513
v/c Ratio	0.65	0.32	0.28	0.21	0.25	0.01	0.31
Control Delay	50.3	4.7	33.4	7.7	10.7	12.9	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.3	4.7	33.4	7.7	10.7	12.9	17.4
Queue Length 50th (ft)	111	0	13	26	64	2	68
Queue Length 95th (ft)	177	26	43	61	163	m7	95
Internal Link Dist (ft)	313		348		946		1190
Turn Bay Length (ft)		150		130		50	
Base Capacity (vph)	341	439	274	599	2070	626	1639
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	0.54	0.29	0.14	0.20	0.25	0.01	0.31

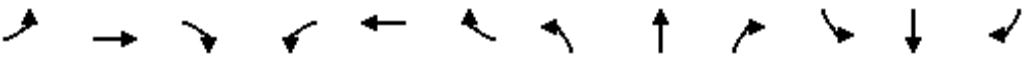
Intersection Summary

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

HCM 6th Signalized Intersection Summary 8: Philadelphia Pike & Darley Rd

29919 Existing Conditions AM Peak Hour

07/31/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↩	↩		↩		↩	↩		↩	↩	
Traffic Volume (veh/h)	172	7	122	17	3	16	115	482	13	7	400	98
Future Volume (veh/h)	172	7	122	17	3	16	115	482	13	7	400	98
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	1885	1900	1900	1811	1900	1307	1885	1841	1900	1900	1841	1826
Adj Flow Rate, veh/h	177	7	126	18	3	16	119	497	13	7	412	101
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, %	1	0	0	6	0	40	1	4	0	0	4	5
Cap, veh/h	226	9	209	27	4	24	536	2053	54	585	1534	373
Arrive On Green	0.13	0.13	0.13	0.03	0.03	0.03	0.10	1.00	1.00	0.00	0.18	0.18
Sat Flow, veh/h	1744	69	1610	839	140	745	1795	3482	91	1810	2788	677
Grp Volume(v), veh/h	184	0	126	37	0	0	119	249	261	7	257	256
Grp Sat Flow(s),veh/h/ln	1813	0	1610	1724	0	0	1795	1749	1824	1810	1749	1717
Q Serve(g_s), s	9.8	0.0	7.4	2.1	0.0	0.0	2.8	0.0	0.0	0.2	12.6	12.8
Cycle Q Clear(g_c), s	9.8	0.0	7.4	2.1	0.0	0.0	2.8	0.0	0.0	0.2	12.6	12.8
Prop In Lane	0.96		1.00	0.49		0.43	1.00		0.05	1.00		0.39
Lane Grp Cap(c), veh/h	235	0	209	55	0	0	536	1031	1075	585	962	945
V/C Ratio(X)	0.78	0.00	0.60	0.67	0.00	0.00	0.22	0.24	0.24	0.01	0.27	0.27
Avail Cap(c_a), veh/h	344	0	306	310	0	0	665	1031	1075	750	962	945
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.99	0.99	0.99	0.99	0.99	0.99
Uniform Delay (d), s/veh	42.2	0.0	41.1	47.9	0.0	0.0	8.9	0.0	0.0	9.8	23.6	23.7
Incr Delay (d2), s/veh	9.0	0.0	4.0	18.0	0.0	0.0	0.2	0.6	0.5	0.0	0.7	0.7
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(50%),veh/ln	4.9	0.0	3.2	1.2	0.0	0.0	1.0	0.2	0.2	0.1	6.0	6.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.2	0.0	45.1	65.9	0.0	0.0	9.1	0.6	0.5	9.8	24.3	24.4
LnGrp LOS	D	A	D	E	A	A	A	A	A	A	C	C
Approach Vol, veh/h	310			37			629			520		
Approach Delay, s/veh	48.7			65.9			2.2			24.1		
Approach LOS	D			E			A			C		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	66.0		18.9	9.8	62.0		9.2				
Change Period (Y+Rc), s	5.0	7.0		6.0	5.0	7.0		6.0				
Max Green Setting (Gmax), s	10.0	29.0		19.0	12.0	27.0		18.0				
Max Q Clear Time (g_c+I1), s	2.2	2.0		11.8	4.8	14.8		4.1				
Green Ext Time (p_c), s	0.0	4.4		1.1	0.1	3.2		0.1				
Intersection Summary												
HCM 6th Ctrl Delay				21.0								
HCM 6th LOS				C								

Queues
9: Philadelphia Pike & I-495 NB Ramp

29919 Existing Conditions AM Peak Hour
07/31/2024



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	141	251	329	203	262	10
v/c Ratio	0.48	0.18	0.78	0.08	0.21	0.01
Control Delay	42.1	0.3	46.8	6.1	23.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.1	0.3	46.8	6.1	23.0	0.0
Queue Length 50th (ft)	82	0	140	5	58	0
Queue Length 95th (ft)	134	0	290	61	102	0
Internal Link Dist (ft)	537			1190	794	
Turn Bay Length (ft)		183	425			180
Base Capacity (vph)	446	1369	461	2424	1268	1351
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	0.18	0.71	0.08	0.21	0.01
Intersection Summary						

HCM 6th Signalized Intersection Summary

9: Philadelphia Pike & I-495 NB Ramp

29919 Existing Conditions AM Peak Hour

07/31/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	131	0	233	306	189	0	0	244	9
Future Volume (veh/h)	0	0	0	131	0	233	306	189	0	0	244	9
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1826	1900	1633	1856	1841	0	0	1752	1648
Adj Flow Rate, veh/h				141	0	0	329	203	0	0	262	0
Peak Hour Factor				0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %				5	0	18	3	4	0	0	10	17
Cap, veh/h				199	0		373	2659	0	0	1595	
Arrive On Green				0.11	0.00	0.00	0.07	0.25	0.00	0.00	0.48	0.00
Sat Flow, veh/h				1810	0	1384	1767	3589	0	0	3416	1397
Grp Volume(v), veh/h				141	0	0	329	203	0	0	262	0
Grp Sat Flow(s),veh/h/ln				1810	0	1384	1767	1749	0	0	1664	1397
Q Serve(g_s), s				7.5	0.0	0.0	18.5	4.4	0.0	0.0	4.5	0.0
Cycle Q Clear(g_c), s				7.5	0.0	0.0	18.5	4.4	0.0	0.0	4.5	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				199	0		373	2659	0	0	1595	
V/C Ratio(X)				0.71	0.00		0.88	0.08	0.00	0.00	0.16	
Avail Cap(c_a), veh/h				470	0		442	2659	0	0	1595	
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.98	0.98	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				43.0	0.0	0.0	45.3	10.6	0.0	0.0	14.7	0.0
Incr Delay (d2), s/veh				19.3	0.0	0.0	17.2	0.1	0.0	0.0	0.2	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				4.4	0.0	0.0	10.5	1.4	0.0	0.0	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				62.3	0.0	0.0	62.5	10.7	0.0	0.0	14.9	0.0
LnGrp LOS				E	A		E	B	A	A	B	
Approach Vol, veh/h					141			532			262	
Approach Delay, s/veh					62.3			42.7			14.9	
Approach LOS					E			D			B	
Timer - Assigned Phs	2			4	5	6						
Phs Duration (G+Y+Rc), s	83.0			17.0	28.1	54.9						
Change Period (Y+Rc), s	7.0			6.0	7.0	7.0						
Max Green Setting (Gmax), s	61.0			26.0	25.0	29.0						
Max Q Clear Time (g_c+I1), s	6.4			9.5	20.5	6.5						
Green Ext Time (p_c), s	2.0			1.7	0.7	2.2						
Intersection Summary												
HCM 6th Ctrl Delay			37.9									
HCM 6th LOS			D									

Output Files
Existing Conditions
PM Peak Hour

Queues
1: Philadelphia Pike & Rolling Rd

29919 Existing Conditions PM Peak Hour
08/01/2024



Lane Group	EBL	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	1	1	9	2	585	9	663
v/c Ratio	0.01	0.00	0.04	0.00	0.18	0.01	0.20
Control Delay	54.0	0.0	0.4	2.5	2.7	0.6	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	0.0	0.4	2.5	2.7	0.6	1.1
Queue Length 50th (ft)	1	0	0	0	0	0	0
Queue Length 95th (ft)	7	0	0	2	123	1	68
Internal Link Dist (ft)			393		408		993
Turn Bay Length (ft)	70	70		155		155	
Base Capacity (vph)	300	375	382	785	3341	837	3317
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	0.00	0.00	0.02	0.00	0.18	0.01	0.20
Intersection Summary							

HCM 6th Signalized Intersection Summary
1: Philadelphia Pike & Rolling Rd

29919 Existing Conditions PM Peak Hour

08/01/2024

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations								 			 				
Traffic Volume (veh/h)	1	0	1	1	0	7	2	520	6	8	595	2			
Future Volume (veh/h)	1	0	1	1	0	7	2	520	6	8	595	2			
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	1900	0	1900	1900	1900	1900	1900	1900	1900	1900	1885	1900			
Adj Flow Rate, veh/h	1	0	1	1	0	8	2	578	7	9	661	2			
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, %	0	0	0	0	0	0	0	0	0	0	1	0			
Cap, veh/h	0	0	0	2	0	16	721	3056	37	758	3095	9			
Arrive On Green	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.84	0.84	0.02	1.00	1.00			
Sat Flow, veh/h	0			181	0	1449	1810	3653	44	1810	3663	11			
Grp Volume(v), veh/h	0.0			9	0	0	2	286	299	9	323	340			
Grp Sat Flow(s),veh/h/ln				1630	0	0	1810	1805	1892	1810	1791	1883			
Q Serve(g_s), s				0.7	0.0	0.0	0.0	3.7	3.7	0.1	0.0	0.0			
Cycle Q Clear(g_c), s				0.7	0.0	0.0	0.0	3.7	3.7	0.1	0.0	0.0			
Prop In Lane				0.11		0.89	1.00		0.02	1.00		0.01			
Lane Grp Cap(c), veh/h				18	0	0	721	1510	1583	758	1513	1591			
V/C Ratio(X)				0.51	0.00	0.00	0.00	0.19	0.19	0.01	0.21	0.21			
Avail Cap(c_a), veh/h				272	0	0	882	1510	1583	905	1513	1591			
HCM Platoon Ratio				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	1.00	1.00	0.97	0.97	0.97			
Uniform Delay (d), s/veh				59.0	0.0	0.0	1.5	1.9	1.9	1.4	0.0	0.0			
Incr Delay (d2), s/veh				29.1	0.0	0.0	0.0	0.3	0.3	0.0	0.3	0.3			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.4	0.0	0.0	0.0	0.9	0.9	0.0	0.1	0.1			
Unsig. Movement Delay, s/veh															
LnGrp Delay(d),s/veh				88.1	0.0	0.0	1.6	2.2	2.2	1.5	0.3	0.3			
LnGrp LOS				F	A	A	A	A	A	A	A	A			
Approach Vol, veh/h				9			587			672					
Approach Delay, s/veh				88.1			2.2			0.3					
Approach LOS				F			A			A					
Timer - Assigned Phs	1	2			5	6			8						
Phs Duration (G+Y+Rc), s	6.3	106.4			5.3	107.4			7.3						
Change Period (Y+Rc), s	5.0	6.0			5.0	6.0			6.0						
Max Green Setting (Gmax), s	11.0	46.0			11.0	46.0			20.0						
Max Q Clear Time (g_c+I1), s	2.1	5.7			2.0	2.0			2.7						
Green Ext Time (p_c), s	0.0	7.8			0.0	9.3			0.0						
Intersection Summary															
HCM 6th Ctrl Delay				1.8											
HCM 6th LOS				A											

Queues
2: Philadelphia Pike & Maple Road

29919 Existing Conditions PM Peak Hour

08/01/2024



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	39	22	18	17	558	11	762
v/c Ratio	0.34	0.04	0.13	0.03	0.19	0.02	0.27
Control Delay	59.1	0.1	39.9	1.9	3.0	4.1	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.1	0.1	39.9	1.9	3.0	4.1	5.1
Queue Length 50th (ft)	29	0	9	2	40	1	44
Queue Length 95th (ft)	64	0	32	2	148	m8	176
Internal Link Dist (ft)		274	235		993		891
Turn Bay Length (ft)				175		130	
Base Capacity (vph)	200	596	232	676	2961	804	2826
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	0.20	0.04	0.08	0.03	0.19	0.01	0.27

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Philadelphia Pike & Maple Road

29919 Existing Conditions PM Peak Hour

08/01/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	0	20	5	5	5	15	500	2	10	590	95
Future Volume (vph)	35	0	20	5	5	5	15	500	2	10	590	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85			0.95		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1615			1785		1805	3608		1805	3535	
Flt Permitted	0.75	1.00			0.88		0.35	1.00		0.44	1.00	
Satd. Flow (perm)	1417	1615			1603		666	3608		842	3535	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	39	0	22	6	6	6	17	556	2	11	656	106
RTOR Reduction (vph)	0	20	0	0	6	0	0	0	0	0	0	0
Lane Group Flow (vph)	39	2	0	0	12	0	17	558	0	11	762	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.5	8.5			8.5		92.7	90.3		90.3	89.1	
Effective Green, g (s)	8.5	8.5			8.5		92.7	90.3		90.3	89.1	
Actuated g/C Ratio	0.07	0.07			0.07		0.77	0.75		0.75	0.74	
Clearance Time (s)	6.0	6.0			6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	4.0	4.0			4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	100	114			113		537	2715		643	2624	
v/s Ratio Prot		0.00					c0.00	0.15		0.00	c0.22	
v/s Ratio Perm	c0.03				0.01		0.02			0.01		
v/c Ratio	0.39	0.01			0.11		0.03	0.21		0.02	0.29	
Uniform Delay, d1	53.3	51.9			52.2		3.2	4.3		3.7	5.1	
Progression Factor	1.00	1.00			1.00		0.69	0.79		1.44	1.02	
Incremental Delay, d2	3.4	0.1			0.6		0.0	0.2		0.0	0.3	
Delay (s)	56.7	51.9			52.8		2.2	3.6		5.3	5.4	
Level of Service	E	D			D		A	A		A	A	
Approach Delay (s)		55.0			52.8			3.5			5.4	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.4				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			35.4%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
3: Philadelphia Pike & Harvey Rd

29919 Existing Conditions PM Peak Hour

08/01/2024



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	217	156	34	8	123	458	14	756
v/c Ratio	0.72	0.42	0.22	0.03	0.28	0.41	0.03	0.42
Control Delay	60.8	13.4	52.6	0.2	7.9	15.4	15.7	25.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.8	13.4	52.6	0.2	7.9	15.4	15.7	25.7
Queue Length 50th (ft)	160	15	25	0	41	194	3	199
Queue Length 95th (ft)	239	73	54	0	26	404	m11	384
Internal Link Dist (ft)		308	162			891		2180
Turn Bay Length (ft)	220			45			184	
Base Capacity (vph)	361	423	278	352	505	1107	607	1792
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.37	0.12	0.02	0.24	0.41	0.02	0.42

Intersection Summary

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

HCM 6th Signalized Intersection Summary

3: Philadelphia Pike & Harvey Rd

29919 Existing Conditions PM Peak Hour

08/01/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	208	21	129	15	17	8	118	409	31	13	552	174
Future Volume (veh/h)	208	21	129	15	17	8	118	409	31	13	552	174
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.89	1.00		0.99	0.99		0.98
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	1900	1900	1870	1900	1900	1900	1900	1885	1900	1900	1885	1900
Adj Flow Rate, veh/h	217	22	134	16	18	8	123	426	32	14	575	181
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, %	0	0	2	0	0	0	0	1	0	0	1	0
Cap, veh/h	264	33	202	45	51	74	457	1016	76	611	1485	466
Arrive On Green	0.15	0.15	0.15	0.05	0.05	0.05	0.09	1.00	1.00	0.02	0.56	0.56
Sat Flow, veh/h	1810	227	1385	874	983	1439	1810	1730	130	1810	2671	838
Grp Volume(v), veh/h	217	0	156	34	0	8	123	0	458	14	385	371
Grp Sat Flow(s),veh/h/ln	1810	0	1613	1856	0	1439	1810	0	1860	1810	1791	1719
Q Serve(g_s), s	14.0	0.0	11.0	2.1	0.0	0.6	3.5	0.0	0.0	0.4	14.6	14.7
Cycle Q Clear(g_c), s	14.0	0.0	11.0	2.1	0.0	0.6	3.5	0.0	0.0	0.4	14.6	14.7
Prop In Lane	1.00		0.86	0.47		1.00	1.00		0.07	1.00		0.49
Lane Grp Cap(c), veh/h	264	0	235	96	0	74	457	0	1092	611	996	956
V/C Ratio(X)	0.82	0.00	0.66	0.35	0.00	0.11	0.27	0.00	0.42	0.02	0.39	0.39
Avail Cap(c_a), veh/h	362	0	323	278	0	216	598	0	1092	734	996	956
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	1.00	1.00	0.00	1.00	0.99	0.00	0.99	0.87	0.87	0.87
Uniform Delay (d), s/veh	49.8	0.0	48.5	55.0	0.0	54.3	10.5	0.0	0.0	11.1	15.1	15.1
Incr Delay (d2), s/veh	12.3	0.0	4.5	3.1	0.0	0.9	0.3	0.0	1.2	0.0	1.0	1.0
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(50%),veh/ln	7.2	0.0	4.7	1.1	0.0	0.3	1.3	0.0	0.4	0.2	6.0	5.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.0	0.0	53.0	58.1	0.0	55.2	10.8	0.0	1.2	11.1	16.1	16.1
LnGrp LOS	E	A	D	E	A	E	B	A	A	B	B	B
Approach Vol, veh/h		373			42			581			770	
Approach Delay, s/veh		58.3			57.6			3.2			16.0	
Approach LOS		E			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	77.5		23.5	10.6	73.7		12.2				
Change Period (Y+Rc), s	5.0	7.0		6.0	5.0	7.0		6.0				
Max Green Setting (Gmax), s	10.0	44.0		24.0	15.0	39.0		18.0				
Max Q Clear Time (g_c+I1), s	2.4	2.0		16.0	5.5	16.7		4.1				
Green Ext Time (p_c), s	0.0	4.7		1.4	0.2	6.8		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			21.7									
HCM 6th LOS			C									

Queues
4: Philadelphia Pike & Commonwealth Ave

29919 Existing Conditions PM Peak Hour
08/01/2024



Lane Group	EBT	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	73	2	38	614	751	48
v/c Ratio	0.41	0.01	0.07	0.37	0.49	0.04
Control Delay	13.8	0.0	1.9	3.7	7.3	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	0.0	1.9	3.7	7.3	0.7
Queue Length 50th (ft)	0	0	2	175	140	1
Queue Length 95th (ft)	32	0	m13	212	419	m5
Internal Link Dist (ft)	259	219		2180	539	
Turn Bay Length (ft)			230			45
Base Capacity (vph)	241	238	662	1650	1544	1298
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	0.30	0.01	0.06	0.37	0.49	0.04

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Philadelphia Pike & Commonwealth Ave

29919 Existing Conditions PM Peak Hour

08/01/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	↔
Traffic Volume (vph)	31	0	40	1	0	1	37	601	1	0	736	47
Future Volume (vph)	31	0	40	1	0	1	37	601	1	0	736	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.0	6.0			6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes		0.98			1.00		1.00	1.00			1.00	0.98
Flpb, ped/bikes		1.00			0.99		1.00	1.00			1.00	1.00
Frt		0.92			0.93		1.00	1.00			1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1684			1718		1805	1899			1900	1577
Flt Permitted		0.86			0.82		0.31	1.00			1.00	1.00
Satd. Flow (perm)		1476			1450		588	1899			1900	1577
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	32	0	41	1	0	1	38	613	1	0	751	48
RTOR Reduction (vph)	0	69	0	0	2	0	0	0	0	0	0	11
Lane Group Flow (vph)	0	4	0	0	0	0	38	614	0	0	751	37
Confl. Peds. (#/hr)			3	3			1		2	2		1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		6.2			6.2		101.8	101.8			93.1	93.1
Effective Green, g (s)		6.2			6.2		101.8	101.8			93.1	93.1
Actuated g/C Ratio		0.05			0.05		0.85	0.85			0.78	0.78
Clearance Time (s)		6.0			6.0		5.0	6.0			6.0	6.0
Vehicle Extension (s)		4.0			4.0		3.0	4.0			4.0	4.0
Lane Grp Cap (vph)		76			74		536	1610			1474	1223
v/s Ratio Prot							0.00	c0.32			c0.40	
v/s Ratio Perm		c0.00			0.00		0.06					0.02
v/c Ratio		0.05			0.00		0.07	0.38			0.51	0.03
Uniform Delay, d1		54.1			54.0		2.9	2.0			5.0	3.1
Progression Factor		1.00			1.00		1.03	1.38			1.14	5.60
Incremental Delay, d2		0.4			0.0		0.1	0.6			1.1	0.0
Delay (s)		54.5			54.0		3.0	3.4			6.8	17.3
Level of Service		D			D		A	A			A	B
Approach Delay (s)		54.5			54.0			3.4			7.4	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.0				HCM 2000 Level of Service				A	
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)				19.0	
Intersection Capacity Utilization			54.3%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
5: Philadelphia Pike & Gov. Printz Blvd

29919 Existing Conditions PM Peak Hour
08/01/2024

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	33	151	658	132	799
v/c Ratio	0.24	0.58	0.27	0.46	0.52
Control Delay	55.3	17.2	7.3	41.7	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.3
Total Delay	55.3	17.2	7.3	41.7	11.2
Queue Length 50th (ft)	25	0	53	39	371
Queue Length 95th (ft)	56	63	117	0	292
Internal Link Dist (ft)	472		396		390
Turn Bay Length (ft)				125	
Base Capacity (vph)	184	298	2474	514	1549
Starvation Cap Reductn	0	0	0	0	246
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.18	0.51	0.27	0.26	0.61
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

5: Philadelphia Pike & Gov. Printz Blvd

29919 Existing Conditions PM Peak Hour

08/01/2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	32	145	598	34	127	767
Future Volume (vph)	32	145	598	34	127	767
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	7.0		5.0	7.0
Lane Util. Factor	1.00	1.00	0.95		0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	1599	3579		3433	1900
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1805	1599	3579		3433	1900
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	33	151	623	35	132	799
RTOR Reduction (vph)	0	140	2	0	0	0
Lane Group Flow (vph)	33	11	656	0	132	799
Confl. Peds. (#/hr)				1	1	
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	4	4				
Actuated Green, G (s)	9.1	9.1	82.9		10.0	97.9
Effective Green, g (s)	9.1	9.1	82.9		10.0	97.9
Actuated g/C Ratio	0.08	0.08	0.69		0.08	0.82
Clearance Time (s)	6.0	6.0	7.0		5.0	7.0
Vehicle Extension (s)	4.0	4.0	4.0		3.0	4.0
Lane Grp Cap (vph)	136	121	2472		286	1550
v/s Ratio Prot			0.18		0.04	c0.42
v/s Ratio Perm	c0.02	0.01				
v/c Ratio	0.24	0.09	0.27		0.46	0.52
Uniform Delay, d1	52.2	51.6	7.0		52.4	3.5
Progression Factor	1.00	1.00	0.95		0.70	2.49
Incremental Delay, d2	1.3	0.5	0.2		1.1	1.2
Delay (s)	53.5	52.1	6.9		38.0	9.9
Level of Service	D	D	A		D	A
Approach Delay (s)	52.3		6.9			13.9
Approach LOS	D		A			B

Intersection Summary

HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
6: Philadelphia Pike & Seminole Ave

29919 Existing Conditions PM Peak Hour
08/01/2024

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	39	50	750	961
v/c Ratio	0.31	0.36	0.26	0.34
Control Delay	44.6	33.4	4.2	3.0
Queue Delay	0.0	0.0	0.2	0.2
Total Delay	44.6	33.4	4.3	3.1
Queue Length 50th (ft)	19	14	103	102
Queue Length 95th (ft)	54	54	7	118
Internal Link Dist (ft)	300	239	390	488
Turn Bay Length (ft)				
Base Capacity (vph)	350	351	2860	2821
Starvation Cap Reductn	0	0	1138	887
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.11	0.14	0.44	0.50
Intersection Summary				

HCM 6th Signalized Intersection Summary 6: Philadelphia Pike & Seminole Ave

29919 Existing Conditions PM Peak Hour

08/01/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	3	13	15	4	30	12	705	11	22	887	23
Future Volume (veh/h)	22	3	13	15	4	30	12	705	11	22	887	23
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	1900	1900	1900	1796	1900	1900	1900	1900	1767	1900	1900	1900
Adj Flow Rate, veh/h	23	3	13	15	4	31	12	727	11	23	914	24
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	7	0	0	0	0	9	0	0	0
Cap, veh/h	88	11	25	57	11	46	55	2947	44	75	2871	75
Arrive On Green	0.04	0.04	0.04	0.04	0.04	0.04	0.85	0.85	0.85	1.00	1.00	1.00
Sat Flow, veh/h	892	248	570	400	237	1039	28	3479	52	52	3390	88
Grp Volume(v), veh/h	39	0	0	50	0	0	388	0	362	495	0	466
Grp Sat Flow(s),veh/h/ln	1710	0	0	1676	0	0	1840	0	1719	1817	0	1713
Q Serve(g_s), s	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	4.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.5	0.0	0.0	3.4	0.0	0.0	4.7	0.0	4.9	0.0	0.0	0.0
Prop In Lane	0.59		0.33	0.30		0.62	0.03		0.03	0.05		0.05
Lane Grp Cap(c), veh/h	124	0	0	114	0	0	1590	0	1456	1570	0	1451
V/C Ratio(X)	0.31	0.00	0.00	0.44	0.00	0.00	0.24	0.00	0.25	0.32	0.00	0.32
Avail Cap(c_a), veh/h	381	0	0	383	0	0	1590	0	1456	1570	0	1451
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	0.96	0.00	0.96	0.94	0.00	0.94
Uniform Delay (d), s/veh	56.0	0.0	0.0	56.4	0.0	0.0	1.8	0.0	1.8	0.0	0.0	0.0
Incr Delay (d2), s/veh	2.0	0.0	0.0	3.8	0.0	0.0	0.4	0.0	0.4	0.5	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(50%),veh/ln	1.2	0.0	0.0	1.6	0.0	0.0	1.1	0.0	1.1	0.2	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.0	0.0	0.0	60.1	0.0	0.0	2.1	0.0	2.2	0.5	0.0	0.6
LnGrp LOS	E	A	A	E	A	A	A	A	A	A	A	A
Approach Vol, veh/h	39			50			750			961		
Approach Delay, s/veh	58.0			60.1			2.1			0.5		
Approach LOS	E			E			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	108.6			11.4			108.6			11.4		
Change Period (Y+Rc), s	7.0			6.0			7.0			6.0		
Max Green Setting (Gmax), s	81.0			26.0			81.0			26.0		
Max Q Clear Time (g_c+I1), s	6.9			4.5			2.0			5.4		
Green Ext Time (p_c), s	8.3			0.2			12.1			0.3		
Intersection Summary												
HCM 6th Ctrl Delay	4.1											
HCM 6th LOS	A											

Queues
7: Philadelphia Pike & Manor Ave

29919 Existing Conditions PM Peak Hour
08/01/2024



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	53	26	40	748	48	988
v/c Ratio	0.40	0.19	0.08	0.27	0.08	0.36
Control Delay	44.4	29.6	2.9	4.6	2.1	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.4	29.6	2.9	4.6	2.1	4.6
Queue Length 50th (ft)	25	6	2	30	4	82
Queue Length 95th (ft)	65	34	17	137	m8	109
Internal Link Dist (ft)	387	309		488		946
Turn Bay Length (ft)			110		135	
Base Capacity (vph)	185	196	572	2775	735	2780
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	0.29	0.13	0.07	0.27	0.07	0.36

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

7: Philadelphia Pike & Manor Ave

29919 Existing Conditions PM Peak Hour

08/01/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↗	↕		↗	↕	
Traffic Volume (vph)	28	4	19	7	1	17	38	715	3	46	904	44
Future Volume (vph)	28	4	19	7	1	17	38	715	3	46	904	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.95			0.91		1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1722			1656		1800	3572		1803	3571	
Flt Permitted		0.82			0.92		0.27	1.00		0.36	1.00	
Satd. Flow (perm)		1442			1544		512	3572		678	3571	
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)	29	4	20	7	1	18	40	745	3	48	942	46
RTOR Reduction (vph)	0	19	0	0	17	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	34	0	0	9	0	40	748	0	48	986	0
Confl. Peds. (#/hr)	7		2	2		7	15		2	2		15
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.1			8.1		94.8	89.9		95.0	90.0	
Effective Green, g (s)		8.1			8.1		94.8	89.9		95.0	90.0	
Actuated g/C Ratio		0.07			0.07		0.79	0.75		0.79	0.75	
Clearance Time (s)		6.0			6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)		97			104		457	2676		583	2678	
v/s Ratio Prot							c0.00	0.21		0.00	c0.28	
v/s Ratio Perm		c0.02			0.01		0.07			0.06		
v/c Ratio		0.35			0.09		0.09	0.28		0.08	0.37	
Uniform Delay, d1		53.5			52.5		2.9	4.8		2.7	5.2	
Progression Factor		1.00			1.00		1.14	0.82		0.84	0.76	
Incremental Delay, d2		3.0			0.5		0.1	0.3		0.1	0.4	
Delay (s)		56.5			53.0		3.4	4.2		2.3	4.3	
Level of Service		E			D		A	A		A	A	
Approach Delay (s)		56.5			53.0			4.1			4.2	
Approach LOS		E			D			A			A	
Intersection Summary												
HCM 2000 Control Delay		6.3										
HCM 2000 Volume to Capacity ratio		0.36										
Actuated Cycle Length (s)		120.0										
Intersection Capacity Utilization		50.5%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
8: Philadelphia Pike & Darley Rd

29919 Existing Conditions PM Peak Hour
08/01/2024

							
Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	168	225	33	181	532	21	927
v/c Ratio	0.70	0.55	0.25	0.43	0.23	0.04	0.48
Control Delay	65.3	11.3	48.2	13.4	6.9	7.2	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.3	11.3	48.2	13.4	6.9	7.2	13.5
Queue Length 50th (ft)	124	0	19	23	37	6	133
Queue Length 95th (ft)	199	71	52	76	66	m11	155
Internal Link Dist (ft)	313		348		946		1190
Turn Bay Length (ft)		150		130		50	
Base Capacity (vph)	272	433	442	482	2305	620	1927
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	0.62	0.52	0.07	0.38	0.23	0.03	0.48
Intersection Summary							
m Volume for 95th percentile queue is metered by upstream signal.							

HCM 6th Signalized Intersection Summary

8: Philadelphia Pike & Darley Rd

29919 Existing Conditions PM Peak Hour

08/01/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	147	16	218	13	13	7	176	492	24	20	720	179
Future Volume (veh/h)	147	16	218	13	13	7	176	492	24	20	720	179
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	1900	1900	1900	1900	1900	1900	1900	1900	1900	1826	1900	1885
Adj Flow Rate, veh/h	152	16	225	13	13	7	181	507	25	21	742	185
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	0	0	5	0	1
Cap, veh/h	247	26	242	20	20	11	373	2105	104	573	1604	400
Arrive On Green	0.15	0.15	0.15	0.03	0.03	0.03	0.12	1.00	1.00	0.01	0.19	0.19
Sat Flow, veh/h	1645	173	1610	708	708	381	1810	3501	172	1739	2860	713
Grp Volume(v), veh/h	168	0	225	33	0	0	181	261	271	21	468	459
Grp Sat Flow(s),veh/h/ln	1818	0	1610	1796	0	0	1810	1805	1868	1739	1805	1768
Q Serve(g_s), s	10.4	0.0	16.6	2.2	0.0	0.0	5.1	0.0	0.0	0.6	27.7	27.8
Cycle Q Clear(g_c), s	10.4	0.0	16.6	2.2	0.0	0.0	5.1	0.0	0.0	0.6	27.7	27.8
Prop In Lane	0.90		1.00	0.39		0.21	1.00		0.09	1.00		0.40
Lane Grp Cap(c), veh/h	273	0	242	50	0	0	373	1085	1123	573	1012	991
V/C Ratio(X)	0.62	0.00	0.93	0.66	0.00	0.00	0.49	0.24	0.24	0.04	0.46	0.46
Avail Cap(c_a), veh/h	273	0	242	434	0	0	503	1085	1123	696	1012	991
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.97	0.97	0.97	0.90	0.90	0.90
Uniform Delay (d), s/veh	47.8	0.0	50.4	57.8	0.0	0.0	12.9	0.0	0.0	10.8	32.8	32.8
Incr Delay (d2), s/veh	4.8	0.0	40.0	19.2	0.0	0.0	0.9	0.5	0.5	0.0	1.4	1.4
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(50%),veh/ln	5.0	0.0	9.4	1.3	0.0	0.0	1.8	0.2	0.2	0.2	13.8	13.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.6	0.0	90.4	77.0	0.0	0.0	13.9	0.5	0.5	10.8	34.1	34.2
LnGrp LOS	D	A	F	E	A	A	B	A	A	B	C	C
Approach Vol, veh/h		393			33			713			948	
Approach Delay, s/veh		74.2			77.0			3.9			33.6	
Approach LOS		E			E			A			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	79.1		24.0	12.4	74.3		9.3				
Change Period (Y+Rc), s	5.0	7.0		6.0	5.0	7.0		6.0				
Max Green Setting (Gmax), s	11.0	38.0		18.0	16.0	33.0		29.0				
Max Q Clear Time (g_c+I1), s	2.6	2.0		18.6	7.1	29.8		4.2				
Green Ext Time (p_c), s	0.0	4.9		0.0	0.3	2.1		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			31.8									
HCM 6th LOS			C									

Queues
9: Philadelphia Pike & I-495 NB Ramp

29919 Existing Conditions PM Peak Hour

08/01/2024



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	265	308	278	344	663	3
v/c Ratio	0.68	0.19	0.82	0.14	0.44	0.00
Control Delay	51.8	0.3	61.4	7.8	26.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.8	0.3	61.4	7.8	26.8	0.0
Queue Length 50th (ft)	189	0	182	45	196	0
Queue Length 95th (ft)	264	0	#347	75	260	0
Internal Link Dist (ft)	651			1190	836	
Turn Bay Length (ft)		183	425			180
Base Capacity (vph)	473	1583	354	2403	1492	1582
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	0.56	0.19	0.79	0.14	0.44	0.00

Intersection Summary

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

HCM 6th Signalized Intersection Summary

9: Philadelphia Pike & I-495 NB Ramp

29919 Existing Conditions PM Peak Hour

08/01/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	232	4	274	247	306	0	0	590	3
Future Volume (veh/h)	0	0	0	232	4	274	247	306	0	0	590	3
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1870	1900	1870	1885	1885	0	0	1856	1900
Adj Flow Rate, veh/h				261	4	0	278	344	0	0	663	0
Peak Hour Factor				0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %				2	0	2	1	1	0	0	3	0
Cap, veh/h				326	5		311	2539	0	0	1683	
Arrive On Green				0.18	0.18	0.00	0.06	0.23	0.00	0.00	0.48	0.00
Sat Flow, veh/h				1783	27	1585	1795	3676	0	0	3618	1610
Grp Volume(v), veh/h				265	0	0	278	344	0	0	663	0
Grp Sat Flow(s),veh/h/ln				1811	0	1585	1795	1791	0	0	1763	1610
Q Serve(g_s), s				16.8	0.0	0.0	18.5	9.1	0.0	0.0	14.5	0.0
Cycle Q Clear(g_c), s				16.8	0.0	0.0	18.5	9.1	0.0	0.0	14.5	0.0
Prop In Lane				0.98		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				331	0		311	2539	0	0	1683	
V/C Ratio(X)				0.80	0.00		0.89	0.14	0.00	0.00	0.39	
Avail Cap(c_a), veh/h				483	0		344	2539	0	0	1683	
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.98	0.98	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				46.9	0.0	0.0	55.5	16.9	0.0	0.0	20.2	0.0
Incr Delay (d2), s/veh				18.2	0.0	0.0	23.5	0.1	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				9.2	0.0	0.0	10.9	4.0	0.0	0.0	6.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				65.1	0.0	0.0	79.0	17.0	0.0	0.0	20.9	0.0
LnGrp LOS				E	A		E	B	A	A	C	
Approach Vol, veh/h					265			622			663	
Approach Delay, s/veh					65.1			44.7			20.9	
Approach LOS					E			D			C	
Timer - Assigned Phs	2			4	5	6						
Phs Duration (G+Y+Rc), s	92.1			27.9	27.8	64.3						
Change Period (Y+Rc), s	7.0			6.0	7.0	7.0						
Max Green Setting (Gmax), s	75.0			32.0	23.0	45.0						
Max Q Clear Time (g_c+I1), s	11.1			18.8	20.5	16.5						
Green Ext Time (p_c), s	3.5			3.1	0.3	6.8						
Intersection Summary												
HCM 6th Ctrl Delay			38.0									
HCM 6th LOS			D									

Output Files
Future No-Build
AM Peak Hour

Queues

29919 Alternative 1 AM Peak Hour

1: Philadelphia Pike & Rolling Rd

08/14/2024



Lane Group	EBL	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	2	4	11	3	383	4	523
v/c Ratio	0.02	0.02	0.02	0.00	0.12	0.00	0.16
Control Delay	43.5	0.0	0.0	3.0	3.2	1.2	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.5	0.0	0.0	3.0	3.2	1.2	1.1
Queue Length 50th (ft)	1	0	0	0	0	0	0
Queue Length 95th (ft)	9	0	0	3	83	m1	26
Internal Link Dist (ft)			393		408		993
Turn Bay Length (ft)	70	70		155		155	
Base Capacity (vph)	361	445	840	861	3216	961	3230
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	0.01	0.01	0.01	0.00	0.12	0.00	0.16

Intersection Summary

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

HCM 6th Signalized Intersection Summary

1: Philadelphia Pike & Rolling Rd

29919 Alternative 1 AM Peak Hour
08/14/2024

																				
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR								
Lane Configurations																				
Traffic Volume (veh/h)	2	0	4	0	0	10	3	350	3	4	478	3								
Future Volume (veh/h)	2	0	4	0	0	10	3	350	3	4	478	3								
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	1900	0	1900	1900	1900	1900	1900	1870	1159	1900	1870	1900								
Adj Flow Rate, veh/h	2	0	4	0	0	11	3	380	3	4	520	3								
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92								
Percent Heavy Veh, %	0	0	0	0	0	0	0	2	50	0	2	0								
Cap, veh/h	0	0	0	0	0	21	804	2933	23	883	2945	17								
Arrive On Green	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.81	0.81	0.01	1.00	1.00								
Sat Flow, veh/h	0			0			1610	1810	3614	29	1810	3623								
Grp Volume(v), veh/h	0.0			0	0	11	3	187	196	4	255	268								
Grp Sat Flow(s),veh/h/ln				0	0	1610	1810	1777	1865	1810	1777	1867								
Q Serve(g_s), s				0.0	0.0	0.7	0.0	2.2	2.2	0.0	0.0	0.0								
Cycle Q Clear(g_c), s				0.0	0.0	0.7	0.0	2.2	2.2	0.0	0.0	0.0								
Prop In Lane				0.00		1.00	1.00		0.02	1.00		0.01								
Lane Grp Cap(c), veh/h				0	0	21	804	1442	1514	883	1444	1517								
V/C Ratio(X)				0.00	0.00	0.52	0.00	0.13	0.13	0.00	0.18	0.18								
Avail Cap(c_a), veh/h				0	0	322	960	1442	1514	1037	1444	1517								
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00								
Upstream Filter(I)				0.00	0.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99								
Uniform Delay (d), s/veh				0.0	0.0	49.0	1.7	2.0	2.0	1.7	0.0	0.0								
Incr Delay (d2), s/veh				0.0	0.0	25.3	0.0	0.2	0.2	0.0	0.3	0.3								
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
%ile BackOfQ(50%),veh/ln				0.0	0.0	0.4	0.0	0.5	0.5	0.0	0.1	0.1								
Unsig. Movement Delay, s/veh																				
LnGrp Delay(d),s/veh				0.0	0.0	74.3	1.7	2.2	2.2	1.7	0.3	0.3								
LnGrp LOS				A	A	E	A	A	A	A	A	A								
Approach Vol, veh/h						11					386	527								
Approach Delay, s/veh						74.3					2.2	0.3								
Approach LOS						E					A	A								
Timer - Assigned Phs	1	2				5	6													
Phs Duration (G+Y+Rc), s	5.5	87.2				5.4	87.3													
Change Period (Y+Rc), s	5.0	6.0				5.0	6.0													
Max Green Setting (Gmax), s	9.0	28.0				9.0	28.0													
Max Q Clear Time (g_c+I1), s	2.0	4.2				2.0	2.0													
Green Ext Time (p_c), s	0.0	4.1				0.0	6.0													
Intersection Summary																				
HCM 6th Ctrl Delay																				
HCM 6th LOS																				

Queues
2: Philadelphia Pike & Maple Road

29919 Alternative 1 AM Peak Hour
08/14/2024



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	66	50	9	14	371	3	530
v/c Ratio	0.43	0.23	0.05	0.02	0.13	0.00	0.19
Control Delay	49.0	15.1	32.4	3.8	4.6	1.7	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	15.1	32.4	3.8	4.6	1.7	1.9
Queue Length 50th (ft)	40	2	4	2	26	0	13
Queue Length 95th (ft)	79	35	18	7	65	m1	42
Internal Link Dist (ft)		274	235		993		891
Turn Bay Length (ft)				175		130	
Base Capacity (vph)	242	316	279	780	2782	876	2767
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	0.27	0.16	0.03	0.02	0.13	0.00	0.19

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis 2: Philadelphia Pike & Maple Road

29919 Alternative 1 AM Peak Hour
08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	3	43	3	3	3	13	328	13	3	456	31
Future Volume (vph)	61	3	43	3	3	3	13	328	13	3	456	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86			0.95		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1632			1785		1805	3590		1805	3575	
Flt Permitted	0.75	1.00			0.90		0.45	1.00		0.53	1.00	
Satd. Flow (perm)	1428	1632			1627		864	3590		1009	3575	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	66	3	47	3	3	3	14	357	14	3	496	34
RTOR Reduction (vph)	0	42	0	0	3	0	0	2	0	0	0	0
Lane Group Flow (vph)	66	8	0	0	6	0	14	369	0	3	530	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.6	9.6			9.6		70.5	69.3		70.3	69.2	
Effective Green, g (s)	9.6	9.6			9.6		70.5	69.3		70.3	69.2	
Actuated g/C Ratio	0.10	0.10			0.10		0.70	0.69		0.70	0.69	
Clearance Time (s)	6.0	6.0			6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	4.0	4.0			4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	137	156			156		620	2487		718	2473	
v/s Ratio Prot		0.00					c0.00	0.10		0.00	c0.15	
v/s Ratio Perm	c0.05				0.00		0.02			0.00		
v/c Ratio	0.48	0.05			0.04		0.02	0.15		0.00	0.21	
Uniform Delay, d1	42.8	41.1			41.0		4.4	5.3		4.4	5.6	
Progression Factor	1.00	1.00			1.00		1.00	0.97		0.45	0.36	
Incremental Delay, d2	3.6	0.2			0.1		0.0	0.1		0.0	0.2	
Delay (s)	46.5	41.2			41.2		4.4	5.2		2.0	2.2	
Level of Service	D	D			D		A	A		A	A	
Approach Delay (s)		44.2			41.2			5.2			2.2	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.3			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.25										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)			22.0				
Intersection Capacity Utilization		32.9%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
3: Philadelphia Pike & Harvey Rd

29919 Alternative 1 AM Peak Hour
08/14/2024



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	225	114	32	14	86	371	29	612
v/c Ratio	0.72	0.31	0.21	0.05	0.18	0.38	0.05	0.36
Control Delay	52.2	13.2	45.5	0.3	12.2	19.9	8.0	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.2	13.2	45.5	0.3	12.2	19.9	8.0	13.8
Queue Length 50th (ft)	135	13	19	0	19	127	8	145
Queue Length 95th (ft)	214	59	48	0	70	344	m15	112
Internal Link Dist (ft)		308	162			891		2180
Turn Bay Length (ft)	220			45			184	
Base Capacity (vph)	353	409	331	425	504	976	596	1720
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.28	0.10	0.03	0.17	0.38	0.05	0.36

Intersection Summary

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

HCM 6th Signalized Intersection Summary

3: Philadelphia Pike & Harvey Rd

29919 Alternative 1 AM Peak Hour
08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	207	22	83	18	11	13	79	319	22	27	409	154
Future Volume (veh/h)	207	22	83	18	11	13	79	319	22	27	409	154
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		0.99	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	1841	1900	1900	1900	1900	1900	1870	1870	1900	1826	1885	1885
Adj Flow Rate, veh/h	225	24	90	20	12	14	86	347	24	29	445	167
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	0	0	0	0	0	2	2	0	5	1	1
Cap, veh/h	270	54	202	44	26	61	493	934	65	479	1333	496
Arrive On Green	0.15	0.15	0.15	0.04	0.04	0.04	0.01	0.18	0.18	0.03	0.52	0.52
Sat Flow, veh/h	1753	350	1311	1152	691	1594	1781	1729	120	1739	2551	949
Grp Volume(v), veh/h	225	0	114	32	0	14	86	0	371	29	311	301
Grp Sat Flow(s),veh/h/ln	1753	0	1661	1842	0	1594	1781	0	1848	1739	1791	1709
Q Serve(g_s), s	12.5	0.0	6.2	1.7	0.0	0.9	2.2	0.0	17.7	0.8	10.0	10.2
Cycle Q Clear(g_c), s	12.5	0.0	6.2	1.7	0.0	0.9	2.2	0.0	17.7	0.8	10.0	10.2
Prop In Lane	1.00		0.79	0.62		1.00	1.00		0.06	1.00		0.56
Lane Grp Cap(c), veh/h	270	0	256	70	0	61	493	0	998	479	936	893
V/C Ratio(X)	0.83	0.00	0.45	0.46	0.00	0.23	0.17	0.00	0.37	0.06	0.33	0.34
Avail Cap(c_a), veh/h	351	0	332	332	0	287	573	0	998	587	936	893
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.99	0.00	0.99	0.91	0.91	0.91
Uniform Delay (d), s/veh	41.0	0.0	38.4	47.1	0.0	46.7	10.7	0.0	26.2	11.6	13.8	13.8
Incr Delay (d2), s/veh	14.1	0.0	1.7	6.4	0.0	2.7	0.2	0.0	1.1	0.0	0.9	0.9
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(50%),veh/ln	6.3	0.0	2.6	0.9	0.0	0.4	0.8	0.0	9.0	0.3	4.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.2	0.0	40.1	53.5	0.0	49.4	10.9	0.0	27.2	11.6	14.7	14.8
LnGrp LOS	E	A	D	D	A	D	B	A	C	B	B	B
Approach Vol, veh/h		339			46			457			641	
Approach Delay, s/veh		50.1			52.3			24.1			14.6	
Approach LOS		D			D			C			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.8	61.0		21.4	9.5	59.2		9.8				
Change Period (Y+Rc), s	5.0	7.0		6.0	5.0	7.0		6.0				
Max Green Setting (Gmax), s	9.0	29.0		20.0	9.0	29.0		18.0				
Max Q Clear Time (g_c+I1), s	2.8	19.7		14.5	4.2	12.2		3.7				
Green Ext Time (p_c), s	0.0	2.0		0.9	0.1	4.7		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			26.8									
HCM 6th LOS			C									

Queues
4: Philadelphia Pike & Commonwealth Ave

29919 Alternative 1 AM Peak Hour
08/14/2024



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	100	2	17	580	2	617	33
v/c Ratio	0.47	0.00	0.03	0.37	0.00	0.42	0.03
Control Delay	14.6	0.0	3.7	5.4	6.5	6.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.6	0.0	3.7	5.4	6.5	6.2	0.2
Queue Length 50th (ft)	0	0	1	157	0	73	0
Queue Length 95th (ft)	42	0	m8	166	m1	170	m0
Internal Link Dist (ft)	259	219		2180		539	
Turn Bay Length (ft)			230		145		45
Base Capacity (vph)	287	566	722	1549	674	1482	1307
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	0.00	0.02	0.37	0.00	0.42	0.03

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Philadelphia Pike & Commonwealth Ave

29919 Alternative 1 AM Peak Hour
08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	0	43	0	0	2	16	534	0	2	568	30
Future Volume (vph)	49	0	43	0	0	2	16	534	0	2	568	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt		0.94			0.86		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.97			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1734			1644		1805	1845		1805	1863	1615
Flt Permitted		0.83			1.00		0.36	1.00		0.45	1.00	1.00
Satd. Flow (perm)		1482			1644		690	1845		847	1863	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	0	47	0	0	2	17	580	0	2	617	33
RTOR Reduction (vph)	0	94	0	0	2	0	0	0	0	0	0	9
Lane Group Flow (vph)	0	6	0	0	0	0	17	580	0	2	617	24
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	2%	0%
Turn Type	Perm	NA			NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		6.4			6.4		81.6	81.6		74.2	74.2	74.2
Effective Green, g (s)		6.4			6.4		81.6	81.6		74.2	74.2	74.2
Actuated g/C Ratio		0.06			0.06		0.82	0.82		0.74	0.74	0.74
Clearance Time (s)		6.0			6.0		5.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		4.0			4.0		3.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)		94			105		589	1505		628	1382	1198
v/s Ratio Prot					0.00		0.00	c0.31			c0.33	
v/s Ratio Perm		c0.00					0.02			0.00		0.02
v/c Ratio		0.07			0.00		0.03	0.39		0.00	0.45	0.02
Uniform Delay, d1		44.0			43.8		2.5	2.5		3.3	5.0	3.4
Progression Factor		1.00			1.00		1.71	1.70		1.27	1.02	1.00
Incremental Delay, d2		0.4			0.0		0.0	0.7		0.0	1.0	0.0
Delay (s)		44.4			43.8		4.3	4.9		4.2	6.0	3.4
Level of Service		D			D		A	A		A	A	A
Approach Delay (s)		44.4			43.8			4.9			5.9	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.3					HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio		0.44										
Actuated Cycle Length (s)		100.0					Sum of lost time (s)			19.0		
Intersection Capacity Utilization		51.9%					ICU Level of Service			A		
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	45	178	615	65	637
v/c Ratio	0.27	0.58	0.26	0.27	0.44
Control Delay	45.0	14.5	4.6	53.6	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.3
Total Delay	45.0	14.5	4.6	53.6	5.8
Queue Length 50th (ft)	27	0	32	22	71
Queue Length 95th (ft)	59	60	35	45	115
Internal Link Dist (ft)	472		396		390
Turn Bay Length (ft)				125	
Base Capacity (vph)	169	307	2352	330	1446
Starvation Cap Reductn	0	0	0	0	311
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.27	0.58	0.26	0.20	0.56
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

5: Philadelphia Pike & Gov. Printz Blvd

29919 Alternative 1 AM Peak Hour
08/14/2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	41	164	546	20	60	586
Future Volume (vph)	41	164	546	20	60	586
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	7.0		5.0	7.0
Lane Util. Factor	1.00	1.00	0.95		0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	1553	3488		3303	1863
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1805	1553	3488		3303	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	178	593	22	65	637
RTOR Reduction (vph)	0	161	1	0	0	0
Lane Group Flow (vph)	45	17	614	0	65	637
Confl. Peds. (#/hr)				1	1	
Heavy Vehicles (%)	0%	4%	3%	0%	6%	2%
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	4	4				
Actuated Green, G (s)	9.3	9.3	66.4		6.3	77.7
Effective Green, g (s)	9.3	9.3	66.4		6.3	77.7
Actuated g/C Ratio	0.09	0.09	0.66		0.06	0.78
Clearance Time (s)	6.0	6.0	7.0		5.0	7.0
Vehicle Extension (s)	4.0	4.0	4.0		3.0	4.0
Lane Grp Cap (vph)	167	144	2316		208	1447
v/s Ratio Prot			0.18		0.02	c0.34
v/s Ratio Perm	c0.02	0.01				
v/c Ratio	0.27	0.11	0.26		0.31	0.44
Uniform Delay, d1	42.2	41.6	6.8		44.8	3.8
Progression Factor	1.00	1.00	0.59		1.18	1.07
Incremental Delay, d2	1.2	0.5	0.3		0.8	1.0
Delay (s)	43.4	42.1	4.3		53.5	5.0
Level of Service	D	D	A		D	A
Approach Delay (s)	42.3		4.3			9.5
Approach LOS	D		A			A
Intersection Summary						
HCM 2000 Control Delay			12.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.48			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	23.0
Intersection Capacity Utilization			54.3%		ICU Level of Service	A
Analysis Period (min)			15			

c Critical Lane Group

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
6: Philadelphia Pike & Seminole Ave

29919 Alternative 1 AM Peak Hour
08/14/2024



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	40	46	761	718
v/c Ratio	0.33	0.29	0.27	0.27
Control Delay	42.7	24.0	3.6	8.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	42.7	24.0	3.6	8.9
Queue Length 50th (ft)	19	8	131	104
Queue Length 95th (ft)	51	41	40	231
Internal Link Dist (ft)	300	239	390	488
Turn Bay Length (ft)				
Base Capacity (vph)	336	404	2790	2696
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	0.12	0.11	0.27	0.27
Intersection Summary				

HCM 6th Signalized Intersection Summary

6: Philadelphia Pike & Seminole Ave

29919 Alternative 1 AM Peak Hour
08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	27	3	7	10	2	30	18	662	19	28	614	19
Future Volume (veh/h)	27	3	7	10	2	30	18	662	19	28	614	19
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	1900	1900	1159	1900	1900	1767	1648	1870	1781	1900	1856	1900
Adj Flow Rate, veh/h	29	3	8	11	2	33	20	720	21	30	667	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	50	0	0	9	17	2	8	0	3	0
Cap, veh/h	115	8	15	59	7	54	82	2743	79	121	2611	81
Arrive On Green	0.05	0.05	0.05	0.05	0.05	0.05	0.82	0.82	0.82	1.00	1.00	1.00
Sat Flow, veh/h	1171	168	335	309	163	1199	53	3327	96	100	3167	99
Grp Volume(v), veh/h	40	0	0	46	0	0	393	0	368	363	0	355
Grp Sat Flow(s),veh/h/ln	1674	0	0	1671	0	0	1792	0	1684	1695	0	1670
Q Serve(g_s), s	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	4.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.1	0.0	0.0	2.6	0.0	0.0	4.7	0.0	4.9	0.0	0.0	0.0
Prop In Lane	0.72		0.20	0.24		0.72	0.05		0.06	0.08		0.06
Lane Grp Cap(c), veh/h	138	0	0	121	0	0	1515	0	1389	1437	0	1377
V/C Ratio(X)	0.29	0.00	0.00	0.38	0.00	0.00	0.26	0.00	0.27	0.25	0.00	0.26
Avail Cap(c_a), veh/h	452	0	0	458	0	0	1515	0	1389	1437	0	1377
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	0.95	0.00	0.95	0.98	0.00	0.98
Uniform Delay (d), s/veh	46.6	0.0	0.0	46.8	0.0	0.0	1.9	0.0	2.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.8	0.0	0.0	0.4	0.0	0.4	0.4	0.0	0.4
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(50%),veh/ln	1.0	0.0	0.0	1.2	0.0	0.0	1.0	0.0	1.0	0.2	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.2	0.0	0.0	49.6	0.0	0.0	2.3	0.0	2.4	0.4	0.0	0.4
LnGrp LOS	D	A	A	D	A	A	A	A	A	A	A	A
Approach Vol, veh/h		40			46			761			718	
Approach Delay, s/veh		48.2			49.6			2.4			0.4	
Approach LOS		D			D			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		89.5		10.5		89.5		10.5				
Change Period (Y+Rc), s		7.0		6.0		7.0		6.0				
Max Green Setting (Gmax), s		61.0		26.0		61.0		26.0				
Max Q Clear Time (g_c+I1), s		6.9		4.1		2.0		4.6				
Green Ext Time (p_c), s		8.4		0.2		7.9		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				4.0								
HCM 6th LOS				A								

Queues
7: Philadelphia Pike & Manor Ave

29919 Alternative 1 AM Peak Hour
08/14/2024



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	88	21	34	703	25	619
v/c Ratio	0.47	0.13	0.05	0.26	0.04	0.23
Control Delay	28.6	22.6	1.5	3.8	8.7	15.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.6	22.6	1.5	3.8	8.7	15.9
Queue Length 50th (ft)	22	3	2	34	9	162
Queue Length 95th (ft)	67	25	6	142	m24	208
Internal Link Dist (ft)	387	309		488		946
Turn Bay Length (ft)			110		135	
Base Capacity (vph)	253	242	762	2722	813	2635
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	0.35	0.09	0.04	0.26	0.03	0.23
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

HCM Signalized Intersection Capacity Analysis

7: Philadelphia Pike & Manor Ave

29919 Alternative 1 AM Peak Hour
08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	3	50	2	3	16	33	677	5	24	585	16
Future Volume (vph)	32	3	50	2	3	16	33	677	5	24	585	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		0.99	1.00		1.00	1.00	
Frt		0.92			0.90		1.00	1.00		1.00	1.00	
Flt Protected		0.98			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1688			1674		1795	3495		1802	3482	
Flt Permitted		0.87			0.97		0.41	1.00		0.38	1.00	
Satd. Flow (perm)		1492			1633		772	3495		729	3482	
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)	33	3	52	2	3	16	34	698	5	25	603	16
RTOR Reduction (vph)	0	48	0	0	15	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	40	0	0	6	0	34	703	0	25	618	0
Confl. Peds. (#/hr)	2					2	10		3	3		10
Heavy Vehicles (%)	4%	0%	0%	0%	0%	0%	0%	3%	25%	0%	3%	8%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.0			8.0		76.2	72.5		73.8	71.3	
Effective Green, g (s)		8.0			8.0		76.2	72.5		73.8	71.3	
Actuated g/C Ratio		0.08			0.08		0.76	0.72		0.74	0.71	
Clearance Time (s)		6.0			6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)		119			130		626	2533		564	2482	
v/s Ratio Prot							c0.00	c0.20		0.00	0.18	
v/s Ratio Perm		c0.03			0.00		0.04			0.03		
v/c Ratio		0.34			0.05		0.05	0.28		0.04	0.25	
Uniform Delay, d1		43.5			42.5		2.9	4.7		3.5	5.0	
Progression Factor		1.00			1.00		0.51	0.72		3.11	2.83	
Incremental Delay, d2		2.3			0.2		0.0	0.3		0.0	0.2	
Delay (s)		45.8			42.7		1.5	3.7		10.9	14.4	
Level of Service		D			D		A	A		B	B	
Approach Delay (s)		45.8			42.7			3.6			14.3	
Approach LOS		D			D			A			B	
Intersection Summary												
HCM 2000 Control Delay		11.3			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.28										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)			19.0				
Intersection Capacity Utilization		48.9%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
8: Philadelphia Pike & Darley Rd

29919 Alternative 1 AM Peak Hour
08/14/2024



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	224	154	47	144	620	9	625
v/c Ratio	0.74	0.38	0.33	0.29	0.31	0.02	0.40
Control Delay	54.1	7.7	33.3	9.0	12.1	12.8	18.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.1	7.7	33.3	9.0	12.1	12.8	18.9
Queue Length 50th (ft)	134	0	16	34	83	2	86
Queue Length 95th (ft)	214	46	50	47	213	m8	244
Internal Link Dist (ft)	313		348		946		1190
Turn Bay Length (ft)		150		130		50	
Base Capacity (vph)	341	439	277	525	2016	562	1563
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	0.66	0.35	0.17	0.27	0.31	0.02	0.40

Intersection Summary

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

HCM 6th Signalized Intersection Summary 8: Philadelphia Pike & Darley Rd

29919 Alternative 1 AM Peak Hour
08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	209	9	149	21	4	20	140	586	16	9	486	120
Future Volume (veh/h)	209	9	149	21	4	20	140	586	16	9	486	120
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	1885	1900	1900	1811	1900	1307	1885	1841	1900	1900	1841	1826
Adj Flow Rate, veh/h	215	9	154	22	4	21	144	604	16	9	501	124
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, %	1	0	0	6	0	40	1	4	0	0	4	5
Cap, veh/h	262	11	243	29	5	28	462	1956	52	512	1433	353
Arrive On Green	0.15	0.15	0.15	0.04	0.04	0.04	0.11	1.00	1.00	0.00	0.17	0.17
Sat Flow, veh/h	1740	73	1610	806	146	769	1795	3480	92	1810	2780	684
Grp Volume(v), veh/h	224	0	154	47	0	0	144	303	317	9	314	311
Grp Sat Flow(s),veh/h/ln	1813	0	1610	1721	0	0	1795	1749	1824	1810	1749	1715
Q Serve(g_s), s	12.0	0.0	9.0	2.7	0.0	0.0	3.7	0.0	0.0	0.2	15.8	16.0
Cycle Q Clear(g_c), s	12.0	0.0	9.0	2.7	0.0	0.0	3.7	0.0	0.0	0.2	15.8	16.0
Prop In Lane	0.96		1.00	0.47		0.45	1.00		0.05	1.00		0.40
Lane Grp Cap(c), veh/h	273	0	243	63	0	0	462	983	1025	512	901	884
V/C Ratio(X)	0.82	0.00	0.64	0.75	0.00	0.00	0.31	0.31	0.31	0.02	0.35	0.35
Avail Cap(c_a), veh/h	344	0	306	310	0	0	574	983	1025	673	901	884
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.98	0.98	0.98	0.97	0.97	0.97
Uniform Delay (d), s/veh	41.2	0.0	39.9	47.7	0.0	0.0	10.4	0.0	0.0	11.4	26.7	26.7
Incr Delay (d2), s/veh	13.3	0.0	3.9	22.1	0.0	0.0	0.4	0.8	0.8	0.0	1.0	1.1
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(50%),veh/ln	6.3	0.0	3.8	1.5	0.0	0.0	1.3	0.2	0.2	0.1	7.6	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.5	0.0	43.8	69.8	0.0	0.0	10.8	0.8	0.8	11.4	27.7	27.8
LnGrp LOS	D	A	D	E	A	A	B	A	A	B	C	C
Approach Vol, veh/h		378			47			764			634	
Approach Delay, s/veh		50.1			69.8			2.7			27.5	
Approach LOS		D			E			A			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	63.2		21.1	10.7	58.5		9.6				
Change Period (Y+Rc), s	5.0	7.0		6.0	5.0	7.0		6.0				
Max Green Setting (Gmax), s	10.0	29.0		19.0	12.0	27.0		18.0				
Max Q Clear Time (g_c+I1), s	2.2	2.0		14.0	5.7	18.0		4.7				
Green Ext Time (p_c), s	0.0	5.6		1.1	0.2	3.3		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			22.9									
HCM 6th LOS			C									

Queues
9: Philadelphia Pike & I-495 NB Ramp

29919 Alternative 1 AM Peak Hour
08/14/2024



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	172	304	400	247	319	12
v/c Ratio	0.53	0.22	0.83	0.10	0.29	0.01
Control Delay	42.0	0.4	48.8	8.0	26.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	0.4	48.8	8.0	26.6	0.0
Queue Length 50th (ft)	100	0	189	21	81	0
Queue Length 95th (ft)	156	0	#400	75	122	0
Internal Link Dist (ft)	537			1190	794	
Turn Bay Length (ft)		183	425			180
Base Capacity (vph)	446	1369	489	2366	1103	1351
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	0.39	0.22	0.82	0.10	0.29	0.01

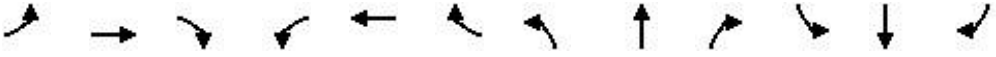
Intersection Summary

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

HCM 6th Signalized Intersection Summary

9: Philadelphia Pike & I-495 NB Ramp

29919 Alternative 1 AM Peak Hour
08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↶	↶	↶	↶			↶	↶
Traffic Volume (veh/h)	0	0	0	160	0	283	372	230	0	0	297	11
Future Volume (veh/h)	0	0	0	160	0	283	372	230	0	0	297	11
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1826	1900	1633	1856	1841	0	0	1752	1648
Adj Flow Rate, veh/h				172	0	0	400	247	0	0	319	0
Peak Hour Factor				0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %				5	0	18	3	4	0	0	10	17
Cap, veh/h				236	0		435	2587	0	0	1410	
Arrive On Green				0.13	0.00	0.00	0.08	0.24	0.00	0.00	0.42	0.00
Sat Flow, veh/h				1810	0	1384	1767	3589	0	0	3416	1397
Grp Volume(v), veh/h				172	0	0	400	247	0	0	319	0
Grp Sat Flow(s),veh/h/ln				1810	0	1384	1767	1749	0	0	1664	1397
Q Serve(g_s), s				9.1	0.0	0.0	22.5	5.5	0.0	0.0	6.1	0.0
Cycle Q Clear(g_c), s				9.1	0.0	0.0	22.5	5.5	0.0	0.0	6.1	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				236	0		435	2587	0	0	1410	
V/C Ratio(X)				0.73	0.00		0.92	0.10	0.00	0.00	0.23	
Avail Cap(c_a), veh/h				470	0		442	2587	0	0	1410	
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.96	0.96	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				41.8	0.0	0.0	45.0	11.9	0.0	0.0	18.4	0.0
Incr Delay (d2), s/veh				17.9	0.0	0.0	23.9	0.1	0.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				5.2	0.0	0.0	13.5	1.9	0.0	0.0	2.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				59.7	0.0	0.0	68.9	12.0	0.0	0.0	18.7	0.0
LnGrp LOS				E	A		E	B	A	A	B	
Approach Vol, veh/h					172			647			319	
Approach Delay, s/veh					59.7			47.2			18.7	
Approach LOS					E			D			B	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		81.0		19.0	31.6	49.4						
Change Period (Y+Rc), s		7.0		6.0	7.0	7.0						
Max Green Setting (Gmax), s		61.0		26.0	25.0	29.0						
Max Q Clear Time (g_c+I1), s		7.5		11.1	24.5	8.1						
Green Ext Time (p_c), s		2.4		2.0	0.1	2.7						
Intersection Summary												
HCM 6th Ctrl Delay				41.1								
HCM 6th LOS				D								
Notes												
Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Output Files
Future No-Build
PM Peak Hour

Queues

29919 NoBuild 2050 PM Peak Hour

1: Philadelphia Pike & Rolling Rd

08/14/2024



Lane Group	EBL	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	2	2	12	3	696	11	789
v/c Ratio	0.02	0.01	0.06	0.00	0.22	0.02	0.25
Control Delay	54.0	0.0	0.5	2.7	3.2	0.7	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	0.0	0.5	2.7	3.2	0.7	1.6
Queue Length 50th (ft)	2	0	0	0	0	0	0
Queue Length 95th (ft)	10	0	0	3	151	m1	143
Internal Link Dist (ft)			393		408		993
Turn Bay Length (ft)	70	70		155		155	
Base Capacity (vph)	300	375	384	687	3228	745	3202
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	0.01	0.01	0.03	0.00	0.22	0.01	0.25

Intersection Summary

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

HCM 6th Signalized Intersection Summary

1: Philadelphia Pike & Rolling Rd

29919 NoBuild 2050 PM Peak Hour
08/14/2024

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Traffic Volume (veh/h)	2	0	2	2	0	9	3	632	8	10	723	3			
Future Volume (veh/h)	2	0	2	2	0	9	3	632	8	10	723	3			
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	1900	0	1900	1900	1900	1900	1900	1900	1900	1900	1885	1900			
Adj Flow Rate, veh/h	2	0	2	2	0	10	3	687	9	11	786	3			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	1	0			
Cap, veh/h	0	0	0	4	0	19	647	3035	40	686	3076	12			
Arrive On Green	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.83	0.83	0.03	1.00	1.00			
Sat Flow, veh/h	0			273	0	1367	1810	3648	48	1810	3660	14			
Grp Volume(v), veh/h	0.0			12	0	0	3	340	356	11	385	404			
Grp Sat Flow(s),veh/h/ln				1640	0	0	1810	1805	1891	1810	1791	1883			
Q Serve(g_s), s				0.9	0.0	0.0	0.0	4.7	4.7	0.1	0.0	0.0			
Cycle Q Clear(g_c), s				0.9	0.0	0.0	0.0	4.7	4.7	0.1	0.0	0.0			
Prop In Lane				0.17		0.83	1.00		0.03	1.00		0.01			
Lane Grp Cap(c), veh/h				23	0	0	647	1501	1573	686	1506	1583			
V/C Ratio(X)				0.53	0.00	0.00	0.00	0.23	0.23	0.02	0.26	0.26			
Avail Cap(c_a), veh/h				273	0	0	806	1501	1573	828	1506	1583			
HCM Platoon Ratio				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	1.00	1.00	0.96	0.96	0.96			
Uniform Delay (d), s/veh				58.8	0.0	0.0	1.6	2.1	2.1	1.5	0.0	0.0			
Incr Delay (d2), s/veh				25.0	0.0	0.0	0.0	0.4	0.3	0.0	0.4	0.4			
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln				0.5	0.0	0.0	0.0	1.2	1.2	0.0	0.2	0.2			
Unsig. Movement Delay, s/veh															
LnGrp Delay(d),s/veh				83.8	0.0	0.0	1.6	2.4	2.4	1.5	0.4	0.4			
LnGrp LOS				F	A	A	A	A	A	A	A	A			
Approach Vol, veh/h				12			699			800					
Approach Delay, s/veh				83.8			2.4			0.4					
Approach LOS				F			A			A					
Timer - Assigned Phs	1	2			5	6			8						
Phs Duration (G+Y+Rc), s	6.5	105.8			5.5	106.9			7.6						
Change Period (Y+Rc), s	5.0	6.0			5.0	6.0			6.0						
Max Green Setting (Gmax), s	11.0	46.0			11.0	46.0			20.0						
Max Q Clear Time (g_c+I1), s	2.1	6.7			2.0	2.0			2.9						
Green Ext Time (p_c), s	0.0	9.7			0.0	11.7			0.0						
Intersection Summary															
HCM 6th Ctrl Delay				2.0											
HCM 6th LOS				A											

Queues
2: Philadelphia Pike & Maple Road

29919 NoBuild 2050 PM Peak Hour
08/14/2024



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	47	27	24	21	664	14	905
v/c Ratio	0.39	0.05	0.17	0.04	0.23	0.02	0.32
Control Delay	59.9	0.2	39.4	2.1	4.6	4.5	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	0.2	39.4	2.1	4.6	4.5	5.8
Queue Length 50th (ft)	35	0	12	3	51	1	35
Queue Length 95th (ft)	73	0	38	2	190	m7	195
Internal Link Dist (ft)		274	235		993		891
Turn Bay Length (ft)				175		130	
Base Capacity (vph)	199	560	233	604	2866	736	2806
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	0.24	0.05	0.10	0.03	0.23	0.02	0.32

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Philadelphia Pike & Maple Road

29919 NoBuild 2050 PM Peak Hour
08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	0	25	7	7	7	19	608	3	13	717	116
Future Volume (vph)	43	0	25	7	7	7	19	608	3	13	717	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85			0.95		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1615			1785		1805	3608		1805	3535	
Flt Permitted	0.74	1.00			0.88		0.30	1.00		0.40	1.00	
Satd. Flow (perm)	1409	1615			1600		569	3608		754	3535	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	0	27	8	8	8	21	661	3	14	779	126
RTOR Reduction (vph)	0	25	0	0	7	0	0	0	0	0	0	0
Lane Group Flow (vph)	47	2	0	0	17	0	21	664	0	14	905	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.1	9.1			9.1		90.9	88.5		90.9	88.5	
Effective Green, g (s)	9.1	9.1			9.1		90.9	88.5		90.9	88.5	
Actuated g/C Ratio	0.08	0.08			0.08		0.76	0.74		0.76	0.74	
Clearance Time (s)	6.0	6.0			6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	4.0	4.0			4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	106	122			121		455	2660		592	2607	
v/s Ratio Prot		0.00					c0.00	0.18		0.00	c0.26	
v/s Ratio Perm	c0.03				0.01		0.03			0.02		
v/c Ratio	0.44	0.02			0.14		0.05	0.25		0.02	0.35	
Uniform Delay, d1	53.0	51.3			51.8		3.7	5.1		3.6	5.6	
Progression Factor	1.00	1.00			1.00		0.66	0.90		1.47	1.03	
Incremental Delay, d2	4.0	0.1			0.7		0.0	0.2		0.0	0.3	
Delay (s)	57.0	51.4			52.5		2.5	4.8		5.2	6.0	
Level of Service	E	D			D		A	A		A	A	
Approach Delay (s)		55.0			52.5			4.7			6.0	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.3				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			41.6%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
3: Philadelphia Pike & Harvey Rd

29919 NoBuild 2050 PM Peak Hour
08/14/2024



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	264	191	42	10	150	558	17	920
v/c Ratio	0.80	0.45	0.26	0.04	0.43	0.54	0.04	0.57
Control Delay	65.0	12.8	53.4	0.3	11.9	20.0	12.1	29.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.0	12.8	53.4	0.3	11.9	20.0	12.1	29.5
Queue Length 50th (ft)	192	17	31	0	57	279	4	361
Queue Length 95th (ft)	#304	83	63	0	22	522	m7	453
Internal Link Dist (ft)		308	162			891		2180
Turn Bay Length (ft)	220			45			184	
Base Capacity (vph)	363	449	278	352	404	1028	480	1615
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.43	0.15	0.03	0.37	0.54	0.04	0.57

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 6th Signalized Intersection Summary

3: Philadelphia Pike & Harvey Rd

29919 NoBuild 2050 PM Peak Hour
08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	253	26	157	19	21	10	144	497	38	16	671	212
Future Volume (veh/h)	253	26	157	19	21	10	144	497	38	16	671	212
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.90	1.00		0.98	1.00		0.98
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	1900	1900	1870	1900	1900	1900	1900	1885	1900	1900	1885	1900
Adj Flow Rate, veh/h	264	27	164	20	22	10	150	518	40	17	699	221
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, %	0	0	2	0	0	0	0	1	0	0	1	0
Cap, veh/h	306	39	235	48	53	78	377	964	74	464	1389	439
Arrive On Green	0.17	0.17	0.17	0.05	0.05	0.05	0.07	0.74	0.74	0.02	0.52	0.52
Sat Flow, veh/h	1810	229	1389	884	972	1446	1810	1726	133	1810	2665	843
Grp Volume(v), veh/h	264	0	191	42	0	10	150	0	558	17	470	450
Grp Sat Flow(s),veh/h/ln	1810	0	1617	1856	0	1446	1810	0	1859	1810	1791	1717
Q Serve(g_s), s	17.0	0.0	13.4	2.6	0.0	0.8	4.5	0.0	15.4	0.5	20.4	20.4
Cycle Q Clear(g_c), s	17.0	0.0	13.4	2.6	0.0	0.8	4.5	0.0	15.4	0.5	20.4	20.4
Prop In Lane	1.00		0.86	0.48		1.00	1.00		0.07	1.00		0.49
Lane Grp Cap(c), veh/h	306	0	273	100	0	78	377	0	1039	464	934	895
V/C Ratio(X)	0.86	0.00	0.70	0.42	0.00	0.13	0.40	0.00	0.54	0.04	0.50	0.50
Avail Cap(c_a), veh/h	362	0	323	278	0	217	503	0	1039	582	934	895
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.98	0.00	0.98	0.73	0.73	0.73
Uniform Delay (d), s/veh	48.5	0.0	47.0	54.9	0.0	54.1	13.4	0.0	8.8	13.4	18.6	18.6
Incr Delay (d2), s/veh	18.0	0.0	6.3	3.9	0.0	1.0	0.7	0.0	2.0	0.0	1.4	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(50%),veh/ln	9.1	0.0	5.8	1.4	0.0	0.3	1.8	0.0	5.1	0.2	8.5	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.5	0.0	53.3	58.9	0.0	55.1	14.1	0.0	10.7	13.4	20.1	20.1
LnGrp LOS	E	A	D	E	A	E	B	A	B	B	C	C
Approach Vol, veh/h		455			52			708			937	
Approach Delay, s/veh		60.9			58.1			11.4			20.0	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	74.1		26.3	11.7	69.6		12.5				
Change Period (Y+Rc), s	5.0	7.0		6.0	5.0	7.0		6.0				
Max Green Setting (Gmax), s	10.0	44.0		24.0	15.0	39.0		18.0				
Max Q Clear Time (g_c+I1), s	2.5	17.4		19.0	6.5	22.4		4.6				
Green Ext Time (p_c), s	0.0	5.5		1.2	0.2	7.3		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			26.7									
HCM 6th LOS			C									

Queues
4: Philadelphia Pike & Commonwealth Ave

29919 NoBuild 2050 PM Peak Hour
08/14/2024



Lane Group	EBT	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	89	4	46	747	912	59
v/c Ratio	0.49	0.02	0.11	0.47	0.63	0.05
Control Delay	19.4	0.2	2.4	4.4	9.2	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.4	0.2	2.4	4.4	9.2	0.3
Queue Length 50th (ft)	0	0	3	207	482	1
Queue Length 95th (ft)	49	0	m6	85	592	m2
Internal Link Dist (ft)	259	219		2180	539	
Turn Bay Length (ft)			230			45
Base Capacity (vph)	240	237	532	1584	1443	1219
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	0.37	0.02	0.09	0.47	0.63	0.05

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Philadelphia Pike & Commonwealth Ave

29919 NoBuild 2050 PM Peak Hour
08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	0	49	2	0	2	45	730	2	0	894	58
Future Volume (vph)	38	0	49	2	0	2	45	730	2	0	894	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.0	6.0			6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes		0.98			1.00		1.00	1.00			1.00	0.98
Flpb, ped/bikes		1.00			0.99		1.00	1.00			1.00	1.00
Frt		0.92			0.93		1.00	1.00			1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1683			1719		1805	1899			1900	1577
Flt Permitted		0.86			0.82		0.22	1.00			1.00	1.00
Satd. Flow (perm)		1474			1445		427	1899			1900	1577
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	39	0	50	2	0	2	46	745	2	0	912	59
RTOR Reduction (vph)	0	83	0	0	4	0	0	0	0	0	0	15
Lane Group Flow (vph)	0	6	0	0	0	0	46	747	0	0	912	44
Confl. Peds. (#/hr)			3	3			1		2	2		1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		8.0			8.0		100.0	100.0			90.1	90.1
Effective Green, g (s)		8.0			8.0		100.0	100.0			90.1	90.1
Actuated g/C Ratio		0.07			0.07		0.83	0.83			0.75	0.75
Clearance Time (s)		6.0			6.0		5.0	6.0			6.0	6.0
Vehicle Extension (s)		4.0			4.0		3.0	4.0			4.0	4.0
Lane Grp Cap (vph)		98			96		412	1582			1426	1184
v/s Ratio Prot							0.00	c0.39			c0.48	
v/s Ratio Perm		c0.00			0.00		0.09					0.03
v/c Ratio		0.06			0.00		0.11	0.47			0.64	0.04
Uniform Delay, d1		52.5			52.3		5.7	2.7			7.2	3.8
Progression Factor		1.00			1.00		1.10	1.20			0.95	0.64
Incremental Delay, d2		0.4			0.0		0.1	0.8			1.7	0.0
Delay (s)		52.8			52.3		6.4	4.1			8.5	2.5
Level of Service		D			D		A	A			A	A
Approach Delay (s)		52.8			52.3			4.3			8.2	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.7			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.61										
Actuated Cycle Length (s)		120.0			Sum of lost time (s)			19.0				
Intersection Capacity Utilization		63.6%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	41	211	801	161	971
v/c Ratio	0.28	0.66	0.33	0.51	0.63
Control Delay	55.2	17.2	9.9	39.9	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.5
Total Delay	55.2	17.2	9.9	39.9	16.3
Queue Length 50th (ft)	31	0	70	52	485
Queue Length 95th (ft)	64	72	226	105	483
Internal Link Dist (ft)	472		396		390
Turn Bay Length (ft)				125	
Base Capacity (vph)	190	350	2425	514	1539
Starvation Cap Reductn	0	0	0	0	217
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.22	0.60	0.33	0.31	0.73
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

5: Philadelphia Pike & Gov. Printz Blvd

29919 NoBuild 2050 PM Peak Hour
08/14/2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	39	203	727	42	155	932
Future Volume (vph)	39	203	727	42	155	932
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	7.0		5.0	7.0
Lane Util. Factor	1.00	1.00	0.95		0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	1538	3578		3433	1900
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1805	1538	3578		3433	1900
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	41	211	757	44	161	971
RTOR Reduction (vph)	0	194	2	0	0	0
Lane Group Flow (vph)	41	17	799	0	161	971
Confl. Peds. (#/hr)				1	1	
Heavy Vehicles (%)	0%	5%	0%	0%	2%	0%
Turn Type	Perm	Perm	NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	4	4				
Actuated Green, G (s)	9.8	9.8	81.2		11.0	97.2
Effective Green, g (s)	9.8	9.8	81.2		11.0	97.2
Actuated g/C Ratio	0.08	0.08	0.68		0.09	0.81
Clearance Time (s)	6.0	6.0	7.0		5.0	7.0
Vehicle Extension (s)	4.0	4.0	4.0		3.0	4.0
Lane Grp Cap (vph)	147	125	2421		314	1539
v/s Ratio Prot			0.22		0.05	c0.51
v/s Ratio Perm	c0.02	0.01				
v/c Ratio	0.28	0.14	0.33		0.51	0.63
Uniform Delay, d1	51.8	51.2	8.1		51.9	4.4
Progression Factor	1.00	1.00	1.11		0.67	2.70
Incremental Delay, d2	1.4	0.7	0.3		1.3	1.8
Delay (s)	53.2	51.9	9.3		36.0	13.8
Level of Service	D	D	A		D	B
Approach Delay (s)	52.1		9.3			17.0
Approach LOS	D		A			B
Intersection Summary						
HCM 2000 Control Delay			18.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.66			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	23.0
Intersection Capacity Utilization			64.1%		ICU Level of Service	C
Analysis Period (min)			15			

c Critical Lane Group

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
6: Philadelphia Pike & Seminole Ave

29919 NoBuild 2050 PM Peak Hour
08/14/2024



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	48	63	913	1168
v/c Ratio	0.37	0.41	0.32	0.42
Control Delay	45.5	33.3	3.6	2.1
Queue Delay	0.1	0.1	0.2	0.1
Total Delay	45.6	33.4	3.8	2.2
Queue Length 50th (ft)	24	19	112	98
Queue Length 95th (ft)	62	62	13	10
Internal Link Dist (ft)	300	239	390	488
Turn Bay Length (ft)				
Base Capacity (vph)	341	363	2812	2766
Starvation Cap Reductn	0	0	973	468
Spillback Cap Reductn	33	36	0	321
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.19	0.50	0.51
Intersection Summary				

HCM 6th Signalized Intersection Summary

6: Philadelphia Pike & Seminole Ave

29919 NoBuild 2050 PM Peak Hour
08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	4	16	19	5	37	15	857	14	27	1078	28
Future Volume (veh/h)	27	4	16	19	5	37	15	857	14	27	1078	28
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	1900	1900	1900	1796	1900	1900	1900	1900	1767	1900	1900	1900
Adj Flow Rate, veh/h	28	4	16	20	5	38	15	884	14	28	1111	29
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	7	0	0	0	0	9	0	0	0
Cap, veh/h	94	15	31	62	13	54	55	2895	45	74	2824	73
Arrive On Green	0.05	0.05	0.05	0.05	0.05	0.05	0.84	0.84	0.84	1.00	1.00	1.00
Sat Flow, veh/h	867	279	573	420	244	1010	29	3456	54	51	3371	87
Grp Volume(v), veh/h	48	0	0	63	0	0	470	0	443	599	0	569
Grp Sat Flow(s),veh/h/ln	1718	0	0	1675	0	0	1820	0	1719	1797	0	1713
Q Serve(g_s), s	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	6.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.1	0.0	0.0	4.3	0.0	0.0	6.4	0.0	6.8	0.0	0.0	0.0
Prop In Lane	0.58		0.33	0.32		0.60	0.03		0.03	0.05		0.05
Lane Grp Cap(c), veh/h	140	0	0	130	0	0	1556	0	1440	1537	0	1435
V/C Ratio(X)	0.34	0.00	0.00	0.49	0.00	0.00	0.30	0.00	0.31	0.39	0.00	0.40
Avail Cap(c_a), veh/h	382	0	0	384	0	0	1556	0	1440	1537	0	1435
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	0.92	0.00	0.92	0.90	0.00	0.90
Uniform Delay (d), s/veh	55.2	0.0	0.0	55.7	0.0	0.0	2.1	0.0	2.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	2.0	0.0	0.0	4.0	0.0	0.0	0.5	0.0	0.5	0.7	0.0	0.7
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(50%),veh/ln	1.5	0.0	0.0	2.0	0.0	0.0	1.6	0.0	1.6	0.3	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.2	0.0	0.0	59.7	0.0	0.0	2.6	0.0	2.6	0.7	0.0	0.7
LnGrp LOS	E	A	A	E	A	A	A	A	A	A	A	A
Approach Vol, veh/h		48			63			913			1168	
Approach Delay, s/veh		57.2			59.7			2.6			0.7	
Approach LOS		E			E			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		107.5		12.5		107.5		12.5				
Change Period (Y+Rc), s		7.0		6.0		7.0		6.0				
Max Green Setting (Gmax), s		81.0		26.0		81.0		26.0				
Max Q Clear Time (g_c+I1), s		8.8		5.1		2.0		6.3				
Green Ext Time (p_c), s		11.2		0.2		17.3		0.4				
Intersection Summary												
HCM 6th Ctrl Delay				4.4								
HCM 6th LOS				A								

Queues
7: Philadelphia Pike & Manor Ave

29919 NoBuild 2050 PM Peak Hour
08/14/2024



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	66	33	49	909	58	1200
v/c Ratio	0.46	0.22	0.13	0.33	0.11	0.44
Control Delay	46.9	28.7	2.7	4.0	1.9	3.9
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	46.9	28.7	2.7	4.1	1.9	3.9
Queue Length 50th (ft)	34	8	3	48	5	85
Queue Length 95th (ft)	78	39	13	132	m8	89
Internal Link Dist (ft)	387	309		488		946
Turn Bay Length (ft)			110		135	
Base Capacity (vph)	188	200	484	2744	648	2749
Starvation Cap Reductn	0	0	0	566	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.17	0.10	0.42	0.09	0.44

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

7: Philadelphia Pike & Manor Ave

29919 NoBuild 2050 PM Peak Hour
08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	5	24	9	2	21	47	869	4	56	1098	54
Future Volume (vph)	35	5	24	9	2	21	47	869	4	56	1098	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.95			0.91		1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1722			1664		1803	3572		1804	3571	
Flt Permitted		0.81			0.91		0.21	1.00		0.29	1.00	
Satd. Flow (perm)		1436			1532		392	3572		560	3571	
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)	36	5	25	9	2	22	49	905	4	58	1144	56
RTOR Reduction (vph)	0	19	0	0	20	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	47	0	0	13	0	49	909	0	58	1198	0
Confl. Peds. (#/hr)	7		2	2		7	15		2	2		15
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.0			9.0		93.9	88.9		94.1	89.0	
Effective Green, g (s)		9.0			9.0		93.9	88.9		94.1	89.0	
Actuated g/C Ratio		0.08			0.08		0.78	0.74		0.78	0.74	
Clearance Time (s)		6.0			6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)		107			114		365	2646		492	2648	
v/s Ratio Prot							c0.01	0.25		0.01	c0.34	
v/s Ratio Perm		c0.03			0.01		0.10			0.09		
v/c Ratio		0.44			0.11		0.13	0.34		0.12	0.45	
Uniform Delay, d1		53.1			51.8		3.4	5.4		3.0	6.0	
Progression Factor		1.00			1.00		0.83	0.61		0.65	0.53	
Incremental Delay, d2		3.8			0.6		0.2	0.3		0.1	0.5	
Delay (s)		56.9			52.4		3.0	3.7		2.0	3.6	
Level of Service		E			D		A	A		A	A	
Approach Delay (s)		56.9			52.4			3.6			3.6	
Approach LOS		E			D			A			A	
Intersection Summary												
HCM 2000 Control Delay		5.8					HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio		0.44										
Actuated Cycle Length (s)		120.0					Sum of lost time (s)			19.0		
Intersection Capacity Utilization		57.5%					ICU Level of Service			B		
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	206	273	41	221	647	26	1127
v/c Ratio	0.80	0.59	0.29	0.64	0.31	0.06	0.65
Control Delay	72.4	11.0	48.3	34.9	11.4	7.5	17.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.4	11.0	48.3	34.9	11.4	7.5	17.7
Queue Length 50th (ft)	155	0	24	92	64	7	166
Queue Length 95th (ft)	#267	79	60	186	150	m12	194
Internal Link Dist (ft)	313		348		946		1190
Turn Bay Length (ft)		150		130		50	
Base Capacity (vph)	272	474	443	391	2111	531	1731
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	0.76	0.58	0.09	0.57	0.31	0.05	0.65

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 6th Signalized Intersection Summary 8: Philadelphia Pike & Darley Rd

29919 NoBuild 2050 PM Peak Hour
08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	179	20	265	16	16	9	214	598	30	25	875	218
Future Volume (veh/h)	179	20	265	16	16	9	214	598	30	25	875	218
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	1900	1900	1900	1900	1900	1900	1900	1900	1900	1826	1900	1885
Adj Flow Rate, veh/h	185	21	273	16	16	9	221	616	31	26	902	225
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	0	0	5	0	1
Cap, veh/h	245	28	242	22	22	12	324	2080	105	518	1559	389
Arrive On Green	0.15	0.15	0.15	0.03	0.03	0.03	0.15	1.00	1.00	0.01	0.18	0.18
Sat Flow, veh/h	1633	185	1610	700	700	394	1810	3497	176	1739	2860	713
Grp Volume(v), veh/h	206	0	273	41	0	0	221	318	329	26	569	558
Grp Sat Flow(s),veh/h/ln	1818	0	1610	1794	0	0	1810	1805	1867	1739	1805	1768
Q Serve(g_s), s	13.0	0.0	18.0	2.7	0.0	0.0	6.5	0.0	0.0	0.8	34.6	34.7
Cycle Q Clear(g_c), s	13.0	0.0	18.0	2.7	0.0	0.0	6.5	0.0	0.0	0.8	34.6	34.7
Prop In Lane	0.90		1.00	0.39		0.22	1.00		0.09	1.00		0.40
Lane Grp Cap(c), veh/h	273	0	242	56	0	0	324	1074	1111	518	984	964
V/C Ratio(X)	0.76	0.00	1.13	0.74	0.00	0.00	0.68	0.30	0.30	0.05	0.58	0.58
Avail Cap(c_a), veh/h	273	0	242	434	0	0	431	1074	1111	636	984	964
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.95	0.95	0.95	0.80	0.80	0.80
Uniform Delay (d), s/veh	48.9	0.0	51.0	57.7	0.0	0.0	17.0	0.0	0.0	11.5	36.6	36.6
Incr Delay (d2), s/veh	12.1	0.0	97.5	23.2	0.0	0.0	2.6	0.7	0.6	0.0	2.0	2.0
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(50%),veh/ln	6.8	0.0	13.8	1.6	0.0	0.0	2.6	0.2	0.2	0.3	17.3	16.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.0	0.0	148.5	80.9	0.0	0.0	19.7	0.7	0.6	11.5	38.6	38.6
LnGrp LOS	E	A	F	F	A	A	B	A	A	B	D	D
Approach Vol, veh/h		479			41			868			1153	
Approach Delay, s/veh		110.9			80.9			5.5			38.0	
Approach LOS		F			F			A			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.9	78.4		24.0	13.9	72.4		9.7				
Change Period (Y+Rc), s	5.0	7.0		6.0	5.0	7.0		6.0				
Max Green Setting (Gmax), s	11.0	38.0		18.0	16.0	33.0		29.0				
Max Q Clear Time (g_c+I1), s	2.8	2.0		20.0	8.5	36.7		4.7				
Green Ext Time (p_c), s	0.0	6.3		0.0	0.4	0.0		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			41.3									
HCM 6th LOS			D									

Queues
9: Philadelphia Pike & I-495 NB Ramp

29919 NoBuild 2050 PM Peak Hour
08/14/2024



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	312	362	326	404	779	4
v/c Ratio	0.74	0.23	0.89	0.17	0.57	0.00
Control Delay	53.5	0.3	64.8	10.5	31.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	0.3	64.8	10.5	31.1	0.0
Queue Length 50th (ft)	220	0	257	80	252	0
Queue Length 95th (ft)	317	0	m#440	116	317	0
Internal Link Dist (ft)	651			1190	836	
Turn Bay Length (ft)		183	425			180
Base Capacity (vph)	473	1583	366	2340	1372	1582
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	0.66	0.23	0.89	0.17	0.57	0.00

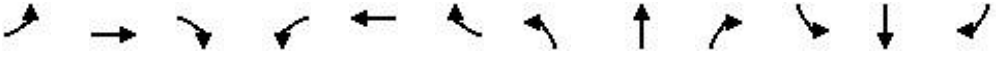
Intersection Summary

- # 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 6th Signalized Intersection Summary

9: Philadelphia Pike & I-495 NB Ramp

29919 NoBuild 2050 PM Peak Hour
08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕	↕	↕	↕			↕	↕
Traffic Volume (veh/h)	0	0	0	282	5	333	300	372	0	0	717	4
Future Volume (veh/h)	0	0	0	282	5	333	300	372	0	0	717	4
Initial Q (Qb), veh				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
Parking Bus, Adj				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		
Adj Sat Flow, veh/h/ln				1870	1900	1870	1885	1885	0	0	1856	1900
Adj Flow Rate, veh/h				307	5	0	326	404	0	0	779	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	0	2	1	1	0	0	3	0
Cap, veh/h				370	6		344	2450	0	0	1530	
Arrive On Green				0.21	0.21	0.00	0.06	0.23	0.00	0.00	0.43	0.00
Sat Flow, veh/h				1782	29	1585	1795	3676	0	0	3618	1610
Grp Volume(v), veh/h				312	0	0	326	404	0	0	779	0
Grp Sat Flow(s),veh/h/ln				1811	0	1585	1795	1791	0	0	1763	1610
Q Serve(g_s), s				19.8	0.0	0.0	21.7	10.9	0.0	0.0	19.3	0.0
Cycle Q Clear(g_c), s				19.8	0.0	0.0	21.7	10.9	0.0	0.0	19.3	0.0
Prop In Lane				0.98		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				376	0		344	2450	0	0	1530	
V/C Ratio(X)				0.83	0.00		0.95	0.16	0.00	0.00	0.51	
Avail Cap(c_a), veh/h				483	0		344	2450	0	0	1530	
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.96	0.96	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				45.5	0.0	0.0	55.6	18.9	0.0	0.0	24.7	0.0
Incr Delay (d2), s/veh				18.7	0.0	0.0	34.3	0.1	0.0	0.0	1.2	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				10.7	0.0	0.0	13.7	5.1	0.0	0.0	8.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				64.2	0.0	0.0	89.9	19.0	0.0	0.0	25.9	0.0
LnGrp LOS				E	A		F	B	A	A	C	
Approach Vol, veh/h					312			730			779	
Approach Delay, s/veh					64.2			50.7			25.9	
Approach LOS					E			D			C	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		89.1		30.9	30.0	59.1						
Change Period (Y+Rc), s		7.0		6.0	7.0	7.0						
Max Green Setting (Gmax), s		75.0		32.0	23.0	45.0						
Max Q Clear Time (g_c+I1), s		12.9		21.8	23.7	21.3						
Green Ext Time (p_c), s		4.2		3.1	0.0	7.6						
Intersection Summary												
HCM 6th Ctrl Delay				42.4								
HCM 6th LOS				D								
Notes												
Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Output Files
Future Conditions
Transportation Scenario 1
AM Peak Hour

Queues

29919 Scenario 1 modified AM Peak Hour

1: Philadelphia Pike & Rolling Rd

08/27/2024



Lane Group	EBL	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	2	4	11	3	395	4	527
v/c Ratio	0.02	0.02	0.02	0.00	0.12	0.00	0.16
Control Delay	43.5	0.0	0.0	3.0	3.2	1.2	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.5	0.0	0.0	3.0	3.2	1.2	1.1
Queue Length 50th (ft)	1	0	0	0	0	0	0
Queue Length 95th (ft)	9	0	0	3	85	m1	27
Internal Link Dist (ft)			393		408		993
Turn Bay Length (ft)	70	70		155		155	
Base Capacity (vph)	361	445	836	858	3216	951	3230
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	0.01	0.01	0.01	0.00	0.12	0.00	0.16

Intersection Summary

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

HCM 6th Signalized Intersection Summary

1: Philadelphia Pike & Rolling Rd

29919 Scenario 1 modified AM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	4	0	0	10	3	361	3	4	482	3
Future Volume (veh/h)	2	0	4	0	0	10	3	361	3	4	482	3
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	1900	0	1900	1900	1900	1900	1900	1870	1159	1900	1870	1900
Adj Flow Rate, veh/h	2	0	4	0	0	11	3	392	3	4	524	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	2	50	0	2	0
Cap, veh/h	0	0	0	0	0	21	801	2933	22	874	2945	17
Arrive On Green	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.81	0.81	0.01	1.00	1.00
Sat Flow, veh/h	0			0			1610			1810		
Grp Volume(v), veh/h	0.0			0			11			202		
Grp Sat Flow(s),veh/h/ln				0			1610			1810		
Q Serve(g_s), s				0.0			0.7			2.3		
Cycle Q Clear(g_c), s				0.0			0.7			2.3		
Prop In Lane				0.00			1.00			0.01		
Lane Grp Cap(c), veh/h				0			21			801		
V/C Ratio(X)				0.00			0.00			0.13		
Avail Cap(c_a), veh/h				0			322			957		
HCM Platoon Ratio				1.00			1.00			1.00		
Upstream Filter(l)				0.00			0.00			1.00		
Uniform Delay (d), s/veh				0.0			0.0			49.0		
Incr Delay (d2), s/veh				0.0			0.0			25.3		
Initial Q Delay(d3),s/veh				0.0			0.0			0.0		
%ile BackOfQ(50%),veh/ln				0.0			0.0			0.4		
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				0.0			0.0			74.3		
LnGrp LOS				A			A			E		
Approach Vol, veh/h					11				398			
Approach Delay, s/veh					74.3				2.2			
Approach LOS					E				A			
Timer - Assigned Phs	1	2	5				6	8				
Phs Duration (G+Y+Rc), s	5.5	87.2	5.4				87.3	7.3				
Change Period (Y+Rc), s	5.0	6.0	5.0				6.0	6.0				
Max Green Setting (Gmax), s	9.0	28.0	9.0				28.0	20.0				
Max Q Clear Time (g_c+I1), s	2.0	4.3	2.0				2.0	2.7				
Green Ext Time (p_c), s	0.0	4.2	0.0				6.1	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	1.9											
HCM 6th LOS	A											

Queues
2: Philadelphia Pike & Maple Road

29919 Scenario 1 modified AM Peak Hour
08/27/2024



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	66	50	9	14	382	3	534
v/c Ratio	0.43	0.23	0.05	0.02	0.14	0.00	0.19
Control Delay	49.0	15.1	32.4	3.7	4.6	2.0	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	15.1	32.4	3.7	4.6	2.0	2.0
Queue Length 50th (ft)	40	2	4	2	27	0	13
Queue Length 95th (ft)	79	35	18	7	67	m1	45
Internal Link Dist (ft)		274	235		993		891
Turn Bay Length (ft)				175		130	
Base Capacity (vph)	242	316	279	778	2785	869	2767
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	0.27	0.16	0.03	0.02	0.14	0.00	0.19

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis 29919 Scenario 1 modified AM Peak Hour

2: Philadelphia Pike & Maple Road

08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	3	43	3	3	3	13	339	13	3	460	31
Future Volume (vph)	61	3	43	3	3	3	13	339	13	3	460	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86			0.95		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1632			1785		1805	3590		1805	3576	
Flt Permitted	0.75	1.00			0.90		0.45	1.00		0.53	1.00	
Satd. Flow (perm)	1428	1632			1627		860	3590		998	3576	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	66	3	47	3	3	3	14	368	14	3	500	34
RTOR Reduction (vph)	0	42	0	0	3	0	0	2	0	0	0	0
Lane Group Flow (vph)	66	8	0	0	6	0	14	380	0	3	534	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.6	9.6			9.6		70.5	69.3		70.3	69.2	
Effective Green, g (s)	9.6	9.6			9.6		70.5	69.3		70.3	69.2	
Actuated g/C Ratio	0.10	0.10			0.10		0.70	0.69		0.70	0.69	
Clearance Time (s)	6.0	6.0			6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	4.0	4.0			4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	137	156			156		617	2487		710	2474	
v/s Ratio Prot		0.00					c0.00	0.11		0.00	c0.15	
v/s Ratio Perm	c0.05				0.00		0.02			0.00		
v/c Ratio	0.48	0.05			0.04		0.02	0.15		0.00	0.22	
Uniform Delay, d1	42.8	41.1			41.0		4.4	5.3		4.4	5.6	
Progression Factor	1.00	1.00			1.00		0.99	0.97		0.53	0.38	
Incremental Delay, d2	3.6	0.2			0.1		0.0	0.1		0.0	0.2	
Delay (s)	46.5	41.2			41.2		4.4	5.2		2.3	2.3	
Level of Service	D	D			D		A	A		A	A	
Approach Delay (s)		44.2			41.2			5.2			2.3	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.3				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.25									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			33.0%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
3: Philadelphia Pike & Harvey Rd

29919 Scenario 1 modified AM Peak Hour
08/27/2024



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	241	119	32	14	88	386	29	625
v/c Ratio	0.75	0.31	0.21	0.05	0.19	0.40	0.05	0.37
Control Delay	53.6	12.8	45.5	0.3	12.5	20.5	7.4	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	12.8	45.5	0.3	12.5	20.5	7.4	12.7
Queue Length 50th (ft)	144	13	19	0	19	192	8	145
Queue Length 95th (ft)	#236	60	48	0	71	355	m12	108
Internal Link Dist (ft)		308	162			891		2180
Turn Bay Length (ft)	220			45			184	
Base Capacity (vph)	353	412	331	425	490	965	577	1697
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.29	0.10	0.03	0.18	0.40	0.05	0.37

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 6th Signalized Intersection Summary 3: Philadelphia Pike & Harvey Rd

29919 Scenario 1 modified AM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	222	22	87	18	11	13	81	333	22	27	414	161
Future Volume (veh/h)	222	22	87	18	11	13	81	333	22	27	414	161
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		0.99	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	1841	1900	1900	1900	1900	1900	1870	1870	1900	1826	1885	1885
Adj Flow Rate, veh/h	241	24	95	20	12	14	88	362	24	29	450	175
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	0	0	0	0	0	2	2	0	5	1	1
Cap, veh/h	285	54	215	44	26	61	479	922	61	458	1296	500
Arrive On Green	0.16	0.16	0.16	0.04	0.04	0.04	0.02	0.18	0.18	0.03	0.51	0.51
Sat Flow, veh/h	1753	335	1324	1152	691	1594	1781	1734	115	1739	2523	973
Grp Volume(v), veh/h	241	0	119	32	0	14	88	0	386	29	318	307
Grp Sat Flow(s),veh/h/ln	1753	0	1659	1842	0	1594	1781	0	1849	1739	1791	1705
Q Serve(g_s), s	13.4	0.0	6.5	1.7	0.0	0.9	2.3	0.0	18.5	0.8	10.5	10.7
Cycle Q Clear(g_c), s	13.4	0.0	6.5	1.7	0.0	0.9	2.3	0.0	18.5	0.8	10.5	10.7
Prop In Lane	1.00		0.80	0.62		1.00	1.00		0.06	1.00		0.57
Lane Grp Cap(c), veh/h	285	0	269	70	0	61	479	0	984	458	920	876
V/C Ratio(X)	0.85	0.00	0.44	0.46	0.00	0.23	0.18	0.00	0.39	0.06	0.35	0.35
Avail Cap(c_a), veh/h	351	0	332	332	0	287	558	0	984	566	920	876
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.99	0.00	0.99	0.91	0.91	0.91
Uniform Delay (d), s/veh	40.7	0.0	37.8	47.1	0.0	46.7	11.2	0.0	26.9	12.1	14.4	14.4
Incr Delay (d2), s/veh	16.1	0.0	1.6	6.4	0.0	2.7	0.2	0.0	1.2	0.1	0.9	1.0
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(50%),veh/ln	6.9	0.0	2.7	0.9	0.0	0.4	0.9	0.0	9.4	0.3	4.3	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.8	0.0	39.4	53.5	0.0	49.4	11.4	0.0	28.1	12.2	15.3	15.4
LnGrp LOS	E	A	D	D	A	D	B	A	C	B	B	B
Approach Vol, veh/h		360			46			474			654	
Approach Delay, s/veh		51.0			52.3			25.0			15.2	
Approach LOS		D			D			C			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.8	60.2		22.2	9.6	58.4		9.8				
Change Period (Y+Rc), s	5.0	7.0		6.0	5.0	7.0		6.0				
Max Green Setting (Gmax), s	9.0	29.0		20.0	9.0	29.0		18.0				
Max Q Clear Time (g_c+I1), s	2.8	20.5		15.4	4.3	12.7		3.7				
Green Ext Time (p_c), s	0.0	1.9		0.9	0.1	4.7		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			27.7									
HCM 6th LOS			C									

Queues
4: Philadelphia Pike & Commonwealth Ave

29919 Scenario 1 modified AM Peak Hour
08/27/2024



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	101	2	18	601	2	633	34
v/c Ratio	0.47	0.00	0.03	0.39	0.00	0.43	0.03
Control Delay	14.8	0.0	3.5	5.5	6.0	5.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.8	0.0	3.5	5.5	6.0	5.5	0.2
Queue Length 50th (ft)	0	0	1	165	0	85	0
Queue Length 95th (ft)	43	0	m7	160	m1	153	m1
Internal Link Dist (ft)	259	219		2180		539	
Turn Bay Length (ft)			230		145		45
Base Capacity (vph)	287	553	711	1548	660	1482	1306
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	0.00	0.03	0.39	0.00	0.43	0.03

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis 29919 Scenario 1 modified AM Peak Hour

4: Philadelphia Pike & Commonwealth Ave

08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	0	43	0	0	2	17	553	0	2	582	31
Future Volume (vph)	50	0	43	0	0	2	17	553	0	2	582	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt		0.94			0.86		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.97			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1734			1644		1805	1845		1805	1863	1615
Flt Permitted		0.83			1.00		0.35	1.00		0.44	1.00	1.00
Satd. Flow (perm)		1481			1644		674	1845		831	1863	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	0	47	0	0	2	18	601	0	2	633	34
RTOR Reduction (vph)	0	94	0	0	2	0	0	0	0	0	0	9
Lane Group Flow (vph)	0	7	0	0	0	0	18	601	0	2	633	25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	2%	0%
Turn Type	Perm	NA			NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		6.5			6.5		81.5	81.5		74.1	74.1	74.1
Effective Green, g (s)		6.5			6.5		81.5	81.5		74.1	74.1	74.1
Actuated g/C Ratio		0.06			0.06		0.82	0.82		0.74	0.74	0.74
Clearance Time (s)		6.0			6.0		5.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		4.0			4.0		3.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)		96			106		576	1503		615	1380	1196
v/s Ratio Prot					0.00		0.00	c0.33			c0.34	
v/s Ratio Perm		c0.00					0.02			0.00		0.02
v/c Ratio		0.07			0.00		0.03	0.40		0.00	0.46	0.02
Uniform Delay, d1		43.9			43.7		2.6	2.5		3.4	5.1	3.4
Progression Factor		1.00			1.00		1.63	1.68		1.18	0.86	1.00
Incremental Delay, d2		0.4			0.0		0.0	0.7		0.0	1.0	0.0
Delay (s)		44.3			43.7		4.3	5.0		4.0	5.3	3.4
Level of Service		D			D		A	A		A	A	A
Approach Delay (s)		44.3			43.7			4.9			5.2	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.0				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			52.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.



Lane Group	WBL	NBT	SBL	SBT
Lane Group Flow (vph)	245	642	77	648
v/c Ratio	0.61	0.32	0.30	0.50
Control Delay	23.6	6.9	57.2	8.0
Queue Delay	0.0	0.0	0.0	0.3
Total Delay	23.6	6.9	57.2	8.3
Queue Length 50th (ft)	63	31	26	72
Queue Length 95th (ft)	140	60	51	111
Internal Link Dist (ft)	472	396		390
Turn Bay Length (ft)			125	
Base Capacity (vph)	404	2035	330	1284
Starvation Cap Reductn	0	0	0	176
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.61	0.32	0.23	0.58
Intersection Summary				



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	WT		WT		WT	WT
Traffic Volume (vph)	51	175	559	31	71	596
Future Volume (vph)	51	175	559	31	71	596
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		7.0		5.0	7.0
Lane Util. Factor	1.00		0.95		0.97	1.00
Frpb, ped/bikes	1.00		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.90		0.99		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1632		3480		3303	1863
Flt Permitted	0.99		1.00		0.95	1.00
Satd. Flow (perm)	1632		3480		3303	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	55	190	608	34	77	648
RTOR Reduction (vph)	110	0	3	0	0	0
Lane Group Flow (vph)	135	0	639	0	77	648
Confl. Peds. (#/hr)				1	1	
Heavy Vehicles (%)	0%	4%	3%	0%	6%	2%
Turn Type	Perm		NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	4					
Actuated Green, G (s)	18.0		57.4		6.6	69.0
Effective Green, g (s)	18.0		57.4		6.6	69.0
Actuated g/C Ratio	0.18		0.57		0.07	0.69
Clearance Time (s)	6.0		7.0		5.0	7.0
Vehicle Extension (s)	4.0		4.0		3.0	4.0
Lane Grp Cap (vph)	293		1997		217	1285
v/s Ratio Prot			0.18		0.02	c0.35
v/s Ratio Perm	c0.08					
v/c Ratio	0.46		0.32		0.35	0.50
Uniform Delay, d1	36.7		11.1		44.7	7.4
Progression Factor	1.00		0.56		1.25	0.84
Incremental Delay, d2	1.6		0.4		1.0	1.4
Delay (s)	38.2		6.7		57.0	7.6
Level of Service	D		A		E	A
Approach Delay (s)	38.2		6.7			12.8
Approach LOS	D		A			B
Intersection Summary						
HCM 2000 Control Delay			14.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.56			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	23.0
Intersection Capacity Utilization			57.8%		ICU Level of Service	B
Analysis Period (min)			15			

c Critical Lane Group

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
6: Philadelphia Pike & Seminole Ave

29919 Scenario 1 modified AM Peak Hour
08/27/2024



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	40	46	787	741
v/c Ratio	0.33	0.29	0.28	0.27
Control Delay	42.7	24.0	2.1	8.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	42.7	24.0	2.1	8.5
Queue Length 50th (ft)	19	8	124	114
Queue Length 95th (ft)	51	41	60	235
Internal Link Dist (ft)	300	239	390	488
Turn Bay Length (ft)				
Base Capacity (vph)	336	404	2790	2696
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	0.12	0.11	0.28	0.27
Intersection Summary				

HCM 6th Signalized Intersection Summary

6: Philadelphia Pike & Seminole Ave

29919 Scenario 1 modified AM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	27	3	7	10	2	30	18	686	19	28	635	19
Future Volume (veh/h)	27	3	7	10	2	30	18	686	19	28	635	19
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	1900	1900	1159	1900	1900	1767	1648	1870	1781	1900	1856	1900
Adj Flow Rate, veh/h	29	3	8	11	2	33	20	746	21	30	690	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	50	0	0	9	17	2	8	0	3	0
Cap, veh/h	115	8	15	59	7	54	79	2749	77	118	2618	79
Arrive On Green	0.05	0.05	0.05	0.05	0.05	0.05	0.82	0.82	0.82	1.00	1.00	1.00
Sat Flow, veh/h	1171	168	335	309	163	1199	51	3334	93	96	3175	96
Grp Volume(v), veh/h	40	0	0	46	0	0	406	0	381	374	0	367
Grp Sat Flow(s),veh/h/ln	1674	0	0	1671	0	0	1793	0	1685	1696	0	1671
Q Serve(g_s), s	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	5.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.1	0.0	0.0	2.6	0.0	0.0	4.9	0.0	5.1	0.0	0.0	0.0
Prop In Lane	0.72		0.20	0.24		0.72	0.05		0.06	0.08		0.06
Lane Grp Cap(c), veh/h	138	0	0	121	0	0	1516	0	1389	1437	0	1378
V/C Ratio(X)	0.29	0.00	0.00	0.38	0.00	0.00	0.27	0.00	0.27	0.26	0.00	0.27
Avail Cap(c_a), veh/h	452	0	0	458	0	0	1516	0	1389	1437	0	1378
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	0.96	0.00	0.96	0.98	0.00	0.98
Uniform Delay (d), s/veh	46.6	0.0	0.0	46.8	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.8	0.0	0.0	0.4	0.0	0.5	0.4	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(50%),veh/ln	1.0	0.0	0.0	1.2	0.0	0.0	1.1	0.0	1.0	0.2	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.2	0.0	0.0	49.6	0.0	0.0	2.4	0.0	2.5	0.4	0.0	0.5
LnGrp LOS	D	A	A	D	A	A	A	A	A	A	A	A
Approach Vol, veh/h		40			46			787			741	
Approach Delay, s/veh		48.2			49.6			2.4			0.4	
Approach LOS		D			D			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		89.5		10.5		89.5		10.5				
Change Period (Y+Rc), s		7.0		6.0		7.0		6.0				
Max Green Setting (Gmax), s		61.0		26.0		61.0		26.0				
Max Q Clear Time (g_c+I1), s		7.1		4.1		2.0		4.6				
Green Ext Time (p_c), s		8.8		0.2		8.3		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				4.0								
HCM 6th LOS				A								

Queues
7: Philadelphia Pike & Manor Ave

29919 Scenario 1 modified AM Peak Hour
08/27/2024



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	94	21	39	715	25	629
v/c Ratio	0.49	0.13	0.06	0.26	0.04	0.24
Control Delay	27.7	22.5	2.1	4.4	8.6	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	22.5	2.1	4.4	8.6	15.8
Queue Length 50th (ft)	22	3	1	9	9	168
Queue Length 95th (ft)	68	25	11	167	m24	211
Internal Link Dist (ft)	387	309		488		946
Turn Bay Length (ft)			110		135	
Base Capacity (vph)	260	241	755	2722	808	2632
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	0.36	0.09	0.05	0.26	0.03	0.24
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

HCM Signalized Intersection Capacity Analysis 29919 Scenario 1 modified AM Peak Hour

7: Philadelphia Pike & Manor Ave

08/27/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↗	↕		↗	↕	
Traffic Volume (vph)	32	3	56	2	3	16	38	689	5	24	595	16
Future Volume (vph)	32	3	56	2	3	16	38	689	5	24	595	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		0.99	1.00		1.00	1.00	
Frt		0.92			0.90		1.00	1.00		1.00	1.00	
Flt Protected		0.98			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1685			1674		1796	3495		1803	3482	
Flt Permitted		0.88			0.97		0.40	1.00		0.38	1.00	
Satd. Flow (perm)		1500			1630		762	3495		721	3482	
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)	33	3	58	2	3	16	39	710	5	25	613	16
RTOR Reduction (vph)	0	53	0	0	15	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	41	0	0	6	0	39	715	0	25	628	0
Confl. Peds. (#/hr)	2					2	10		3	3		10
Heavy Vehicles (%)	4%	0%	0%	0%	0%	0%	0%	3%	25%	0%	3%	8%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.1			8.1		76.2	72.4		73.6	71.1	
Effective Green, g (s)		8.1			8.1		76.2	72.4		73.6	71.1	
Actuated g/C Ratio		0.08			0.08		0.76	0.72		0.74	0.71	
Clearance Time (s)		6.0			6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)		121			132		619	2530		557	2475	
v/s Ratio Prot							c0.00	c0.20		0.00	0.18	
v/s Ratio Perm		c0.03			0.00		0.05			0.03		
v/c Ratio		0.34			0.05		0.06	0.28		0.04	0.25	
Uniform Delay, d1		43.4			42.4		2.9	4.8		3.5	5.1	
Progression Factor		1.00			1.00		0.71	0.84		3.06	2.78	
Incremental Delay, d2		2.2			0.2		0.0	0.3		0.0	0.2	
Delay (s)		45.7			42.6		2.1	4.3		10.8	14.4	
Level of Service		D			D		A	A		B	B	
Approach Delay (s)		45.7			42.6			4.2			14.3	
Approach LOS		D			D			A			B	
Intersection Summary												
HCM 2000 Control Delay		11.6					HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio		0.29										
Actuated Cycle Length (s)		100.0					Sum of lost time (s)			19.0		
Intersection Capacity Utilization		49.6%					ICU Level of Service			A		
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	230	157	47	148	628	9	636
v/c Ratio	0.75	0.38	0.33	0.31	0.31	0.02	0.41
Control Delay	54.7	8.0	33.3	8.6	10.9	13.1	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.7	8.0	33.3	8.6	10.9	13.1	19.1
Queue Length 50th (ft)	138	0	16	34	94	2	88
Queue Length 95th (ft)	#221	49	50	46	232	m7	248
Internal Link Dist (ft)	313		348		946		1190
Turn Bay Length (ft)		150		130		50	
Base Capacity (vph)	341	439	277	518	2009	558	1553
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	0.67	0.36	0.17	0.29	0.31	0.02	0.41

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 6th Signalized Intersection Summary

8: Philadelphia Pike & Darley Rd

29919 Scenario 1 modified AM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	214	9	152	21	4	20	144	594	16	9	493	124
Future Volume (veh/h)	214	9	152	21	4	20	144	594	16	9	493	124
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	1885	1900	1900	1811	1900	1307	1885	1841	1900	1900	1841	1826
Adj Flow Rate, veh/h	221	9	157	22	4	21	148	612	16	9	508	128
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, %	1	0	0	6	0	40	1	4	0	0	4	5
Cap, veh/h	268	11	247	29	5	28	455	1946	51	506	1415	355
Arrive On Green	0.15	0.15	0.15	0.04	0.04	0.04	0.12	1.00	1.00	0.00	0.17	0.17
Sat Flow, veh/h	1742	71	1610	806	146	769	1795	3482	91	1810	2768	694
Grp Volume(v), veh/h	230	0	157	47	0	0	148	307	321	9	320	316
Grp Sat Flow(s),veh/h/ln	1813	0	1610	1721	0	0	1795	1749	1824	1810	1749	1713
Q Serve(g_s), s	12.3	0.0	9.1	2.7	0.0	0.0	3.8	0.0	0.0	0.2	16.2	16.3
Cycle Q Clear(g_c), s	12.3	0.0	9.1	2.7	0.0	0.0	3.8	0.0	0.0	0.2	16.2	16.3
Prop In Lane	0.96		1.00	0.47		0.45	1.00		0.05	1.00		0.40
Lane Grp Cap(c), veh/h	278	0	247	63	0	0	455	977	1019	506	894	876
V/C Ratio(X)	0.83	0.00	0.63	0.75	0.00	0.00	0.33	0.31	0.31	0.02	0.36	0.36
Avail Cap(c_a), veh/h	344	0	306	310	0	0	565	977	1019	667	894	876
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.97	0.97	0.97	0.97	0.97	0.97
Uniform Delay (d), s/veh	41.0	0.0	39.7	47.7	0.0	0.0	10.6	0.0	0.0	11.6	27.1	27.1
Incr Delay (d2), s/veh	14.1	0.0	4.0	22.1	0.0	0.0	0.4	0.8	0.8	0.0	1.1	1.1
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(50%),veh/ln	6.5	0.0	3.9	1.5	0.0	0.0	1.3	0.2	0.2	0.1	7.8	7.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.1	0.0	43.7	69.8	0.0	0.0	11.0	0.8	0.8	11.6	28.1	28.2
LnGrp LOS	E	A	D	E	A	A	B	A	A	B	C	C
Approach Vol, veh/h		387			47			776			645	
Approach Delay, s/veh		50.5			69.8			2.7			28.0	
Approach LOS		D			E			A			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	62.9		21.4	10.9	58.1		9.6				
Change Period (Y+Rc), s	5.0	7.0		6.0	5.0	7.0		6.0				
Max Green Setting (Gmax), s	10.0	29.0		19.0	12.0	27.0		18.0				
Max Q Clear Time (g_c+I1), s	2.2	2.0		14.3	5.8	18.3		4.7				
Green Ext Time (p_c), s	0.0	5.7		1.1	0.2	3.3		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			23.2									
HCM 6th LOS			C									

Queues
9: Philadelphia Pike & I-495 NB Ramp

29919 Scenario 1 modified AM Peak Hour
08/27/2024



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	172	304	400	254	324	12
v/c Ratio	0.53	0.22	0.83	0.11	0.29	0.01
Control Delay	42.0	0.4	49.0	8.0	26.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	0.4	49.0	8.0	26.7	0.0
Queue Length 50th (ft)	100	0	211	26	83	0
Queue Length 95th (ft)	156	0	#402	81	124	0
Internal Link Dist (ft)	537			1190	794	
Turn Bay Length (ft)		183	425			180
Base Capacity (vph)	446	1369	489	2366	1103	1351
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	0.39	0.22	0.82	0.11	0.29	0.01

Intersection Summary

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

HCM 6th Signalized Intersection Summary 9: Philadelphia Pike & I-495 NB Ramp

29919 Scenario 1 modified AM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	160	0	283	372	236	0	0	301	11
Future Volume (veh/h)	0	0	0	160	0	283	372	236	0	0	301	11
Initial Q (Qb), veh				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
Parking Bus, Adj				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		
Adj Sat Flow, veh/h/ln				1826	1900	1633	1856	1841	0	0	1752	1648
Adj Flow Rate, veh/h				172	0	0	400	254	0	0	324	0
Peak Hour Factor				0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %				5	0	18	3	4	0	0	10	17
Cap, veh/h				236	0		435	2587	0	0	1410	
Arrive On Green				0.13	0.00	0.00	0.08	0.24	0.00	0.00	0.42	0.00
Sat Flow, veh/h				1810	0	1384	1767	3589	0	0	3416	1397
Grp Volume(v), veh/h				172	0	0	400	254	0	0	324	0
Grp Sat Flow(s),veh/h/ln				1810	0	1384	1767	1749	0	0	1664	1397
Q Serve(g_s), s				9.1	0.0	0.0	22.5	5.6	0.0	0.0	6.2	0.0
Cycle Q Clear(g_c), s				9.1	0.0	0.0	22.5	5.6	0.0	0.0	6.2	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				236	0		435	2587	0	0	1410	
V/C Ratio(X)				0.73	0.00		0.92	0.10	0.00	0.00	0.23	
Avail Cap(c_a), veh/h				470	0		442	2587	0	0	1410	
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.96	0.96	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				41.8	0.0	0.0	45.0	12.0	0.0	0.0	18.4	0.0
Incr Delay (d2), s/veh				17.9	0.0	0.0	23.9	0.1	0.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				5.2	0.0	0.0	13.5	2.0	0.0	0.0	2.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				59.7	0.0	0.0	68.9	12.0	0.0	0.0	18.8	0.0
LnGrp LOS				E	A		E	B	A	A	B	
Approach Vol, veh/h					172			654			324	
Approach Delay, s/veh					59.7			46.8			18.8	
Approach LOS					E			D			B	
Timer - Assigned Phs	2			4		5	6					
Phs Duration (G+Y+Rc), s	81.0			19.0		31.6	49.4					
Change Period (Y+Rc), s	7.0			6.0		7.0	7.0					
Max Green Setting (Gmax), s	61.0			26.0		25.0	29.0					
Max Q Clear Time (g_c+I1), s	7.6			11.1		24.5	8.2					
Green Ext Time (p_c), s	2.5			2.0		0.1	2.7					
Intersection Summary												
HCM 6th Ctrl Delay				40.8								
HCM 6th LOS				D								
Notes												

Output Files
Future Conditions
Transportation Scenario 1
PM Peak Hour

Queues

29919 Scenario 1 modified PM Peak Hour

1: Philadelphia Pike & Rolling Rd

08/27/2024



Lane Group	EBL	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	2	2	12	3	692	11	791
v/c Ratio	0.02	0.01	0.06	0.00	0.21	0.02	0.25
Control Delay	54.0	0.0	0.5	2.7	3.2	0.7	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	0.0	0.5	2.7	3.2	0.7	1.7
Queue Length 50th (ft)	2	0	0	0	0	0	0
Queue Length 95th (ft)	10	0	0	3	150	m1	162
Internal Link Dist (ft)			393		408		993
Turn Bay Length (ft)	70	70		155		155	
Base Capacity (vph)	300	375	384	686	3228	747	3202
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	0.01	0.01	0.03	0.00	0.21	0.01	0.25

Intersection Summary

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

HCM 6th Signalized Intersection Summary

1: Philadelphia Pike & Rolling Rd

29919 Scenario 1 modified PM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	2	2	0	9	3	628	8	10	725	3
Future Volume (veh/h)	2	0	2	2	0	9	3	628	8	10	725	3
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	1900	0	1900	1900	1900	1900	1900	1900	1900	1900	1885	1900
Adj Flow Rate, veh/h	2	0	2	2	0	10	3	683	9	11	788	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	1	0
Cap, veh/h	0	0	0	4	0	19	646	3034	40	688	3076	12
Arrive On Green	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.83	0.83	0.03	1.00	1.00
Sat Flow, veh/h	0			273	0	1367	1810	3648	48	1810	3660	14
Grp Volume(v), veh/h	0.0			12	0	0	3	338	354	11	386	405
Grp Sat Flow(s),veh/h/ln				1640	0	0	1810	1805	1891	1810	1791	1883
Q Serve(g_s), s				0.9	0.0	0.0	0.0	4.6	4.7	0.1	0.0	0.0
Cycle Q Clear(g_c), s				0.9	0.0	0.0	0.0	4.6	4.7	0.1	0.0	0.0
Prop In Lane				0.17		0.83	1.00		0.03	1.00		0.01
Lane Grp Cap(c), veh/h				23	0	0	646	1501	1573	688	1506	1583
V/C Ratio(X)				0.53	0.00	0.00	0.00	0.23	0.23	0.02	0.26	0.26
Avail Cap(c_a), veh/h				273	0	0	805	1501	1573	831	1506	1583
HCM Platoon Ratio				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	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh				58.8	0.0	0.0	1.6	2.1	2.1	1.5	0.0	0.0
Incr Delay (d2), s/veh				25.0	0.0	0.0	0.0	0.3	0.3	0.0	0.4	0.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.5	0.0	0.0	0.0	1.2	1.2	0.0	0.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				83.8	0.0	0.0	1.6	2.4	2.4	1.5	0.4	0.4
LnGrp LOS				F	A	A	A	A	A	A	A	A
Approach Vol, veh/h					12		695				802	
Approach Delay, s/veh					83.8		2.4				0.4	
Approach LOS					F		A				A	
Timer - Assigned Phs	1	2				5	6	8				
Phs Duration (G+Y+Rc), s	6.5	105.8				5.5	106.9	7.6				
Change Period (Y+Rc), s	5.0	6.0				5.0	6.0	6.0				
Max Green Setting (Gmax), s	11.0	46.0				11.0	46.0	20.0				
Max Q Clear Time (g_c+I1), s	2.1	6.7				2.0	2.0	2.9				
Green Ext Time (p_c), s	0.0	9.6				0.0	11.8	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	2.0											
HCM 6th LOS	A											

Queues
2: Philadelphia Pike & Maple Road

29919 Scenario 1 modified PM Peak Hour
08/27/2024



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	47	27	24	21	660	14	908
v/c Ratio	0.39	0.05	0.17	0.04	0.23	0.02	0.32
Control Delay	59.9	0.2	39.4	2.1	4.4	5.0	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	0.2	39.4	2.1	4.4	5.0	6.4
Queue Length 50th (ft)	35	0	12	3	51	2	79
Queue Length 95th (ft)	73	0	38	2	185	m7	197
Internal Link Dist (ft)		274	235		993		891
Turn Bay Length (ft)				175		130	
Base Capacity (vph)	199	560	233	601	2866	737	2806
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	0.24	0.05	0.10	0.03	0.23	0.02	0.32

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis 29919 Scenario 1 modified PM Peak Hour

2: Philadelphia Pike & Maple Road

08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	0	25	7	7	7	19	604	3	13	719	116
Future Volume (vph)	43	0	25	7	7	7	19	604	3	13	719	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85			0.95		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1615			1785		1805	3608		1805	3535	
Flt Permitted	0.74	1.00			0.88		0.30	1.00		0.40	1.00	
Satd. Flow (perm)	1409	1615			1600		567	3608		757	3535	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	0	27	8	8	8	21	657	3	14	782	126
RTOR Reduction (vph)	0	25	0	0	7	0	0	0	0	0	0	0
Lane Group Flow (vph)	47	2	0	0	17	0	21	660	0	14	908	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.1	9.1			9.1		90.9	88.5		90.9	88.5	
Effective Green, g (s)	9.1	9.1			9.1		90.9	88.5		90.9	88.5	
Actuated g/C Ratio	0.08	0.08			0.08		0.76	0.74		0.76	0.74	
Clearance Time (s)	6.0	6.0			6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	4.0	4.0			4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	106	122			121		454	2660		594	2607	
v/s Ratio Prot		0.00					c0.00	0.18		0.00	c0.26	
v/s Ratio Perm	c0.03				0.01		0.03			0.02		
v/c Ratio	0.44	0.02			0.14		0.05	0.25		0.02	0.35	
Uniform Delay, d1	53.0	51.3			51.8		3.7	5.1		3.6	5.6	
Progression Factor	1.00	1.00			1.00		0.67	0.87		1.65	1.15	
Incremental Delay, d2	4.0	0.1			0.7		0.0	0.2		0.0	0.3	
Delay (s)	57.0	51.4			52.5		2.5	4.6		5.9	6.7	
Level of Service	E	D			D		A	A		A	A	
Approach Delay (s)		55.0			52.5			4.5			6.7	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.6				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			41.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
3: Philadelphia Pike & Harvey Rd

29919 Scenario 1 modified PM Peak Hour
08/27/2024



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	276	194	42	10	154	563	17	950
v/c Ratio	0.81	0.45	0.26	0.04	0.46	0.55	0.04	0.60
Control Delay	65.9	12.6	53.4	0.3	13.0	20.7	9.4	25.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.9	12.6	53.4	0.3	13.0	20.7	9.4	25.8
Queue Length 50th (ft)	200	17	31	0	59	287	4	384
Queue Length 95th (ft)	#326	83	63	0	25	527	m8	465
Internal Link Dist (ft)		308	162			891		2180
Turn Bay Length (ft)	220			45			184	
Base Capacity (vph)	366	453	278	352	391	1020	471	1595
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.43	0.15	0.03	0.39	0.55	0.04	0.60

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 6th Signalized Intersection Summary 3: Philadelphia Pike & Harvey Rd

29919 Scenario 1 modified PM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	265	26	160	19	21	10	148	502	38	16	682	230
Future Volume (veh/h)	265	26	160	19	21	10	148	502	38	16	682	230
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.90	1.00		0.98	1.00		0.98
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	1900	1900	1870	1900	1900	1900	1900	1885	1900	1900	1885	1900
Adj Flow Rate, veh/h	276	27	167	20	22	10	154	523	40	17	710	240
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, %	0	0	2	0	0	0	0	1	0	0	1	0
Cap, veh/h	316	39	243	48	53	78	363	956	73	453	1345	455
Arrive On Green	0.17	0.17	0.17	0.05	0.05	0.05	0.08	0.74	0.74	0.02	0.51	0.51
Sat Flow, veh/h	1810	225	1393	884	972	1446	1810	1727	132	1810	2615	884
Grp Volume(v), veh/h	276	0	194	42	0	10	154	0	563	17	486	464
Grp Sat Flow(s),veh/h/ln	1810	0	1618	1856	0	1446	1810	0	1859	1810	1791	1709
Q Serve(g_s), s	17.8	0.0	13.5	2.6	0.0	0.8	4.7	0.0	16.1	0.5	21.7	21.7
Cycle Q Clear(g_c), s	17.8	0.0	13.5	2.6	0.0	0.8	4.7	0.0	16.1	0.5	21.7	21.7
Prop In Lane	1.00		0.86	0.48		1.00	1.00		0.07	1.00		0.52
Lane Grp Cap(c), veh/h	316	0	282	100	0	78	363	0	1029	453	921	878
V/C Ratio(X)	0.87	0.00	0.69	0.42	0.00	0.13	0.42	0.00	0.55	0.04	0.53	0.53
Avail Cap(c_a), veh/h	362	0	324	278	0	217	486	0	1029	571	921	878
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.98	0.00	0.98	0.71	0.71	0.71
Uniform Delay (d), s/veh	48.2	0.0	46.4	54.9	0.0	54.1	14.0	0.0	9.2	13.8	19.4	19.4
Incr Delay (d2), s/veh	19.6	0.0	6.0	3.9	0.0	1.0	0.8	0.0	2.1	0.0	1.5	1.6
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(50%),veh/ln	9.7	0.0	5.8	1.4	0.0	0.3	1.8	0.0	5.4	0.2	9.1	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.9	0.0	52.4	58.9	0.0	55.1	14.8	0.0	11.3	13.8	21.0	21.1
LnGrp LOS	E	A	D	E	A	E	B	A	B	B	C	C
Approach Vol, veh/h		470			52			717			967	
Approach Delay, s/veh		61.5			58.1			12.0			20.9	
Approach LOS		E			E			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	73.4		27.0	11.9	68.7		12.5				
Change Period (Y+Rc), s	5.0	7.0		6.0	5.0	7.0		6.0				
Max Green Setting (Gmax), s	10.0	44.0		24.0	15.0	39.0		18.0				
Max Q Clear Time (g_c+I1), s	2.5	18.1		19.8	6.7	23.7		4.6				
Green Ext Time (p_c), s	0.0	5.5		1.1	0.2	7.2		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			27.5									
HCM 6th LOS			C									

Queues
4: Philadelphia Pike & Commonwealth Ave

29919 Scenario 1 modified PM Peak Hour
08/27/2024



Lane Group	EBT	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	93	4	47	771	941	61
v/c Ratio	0.51	0.02	0.12	0.49	0.65	0.05
Control Delay	20.8	0.2	2.7	4.7	6.7	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	0.2	2.7	4.7	6.7	0.3
Queue Length 50th (ft)	1	0	4	215	233	2
Queue Length 95th (ft)	53	0	m7	90	47	m0
Internal Link Dist (ft)	259	219		2180	539	
Turn Bay Length (ft)			230			45
Base Capacity (vph)	240	237	512	1580	1439	1216
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	0.39	0.02	0.09	0.49	0.65	0.05

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis 29919 Scenario 1 modified PM Peak Hour

4: Philadelphia Pike & Commonwealth Ave

08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	0	50	2	0	2	46	754	2	0	922	60
Future Volume (vph)	41	0	50	2	0	2	46	754	2	0	922	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.0	6.0			6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes		0.98			1.00		1.00	1.00			1.00	0.98
Flpb, ped/bikes		1.00			0.99		1.00	1.00			1.00	1.00
Frt		0.93			0.93		1.00	1.00			1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1686			1719		1805	1899			1900	1577
Flt Permitted		0.85			0.82		0.21	1.00			1.00	1.00
Satd. Flow (perm)		1471			1444		401	1899			1900	1577
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	42	0	51	2	0	2	47	769	2	0	941	61
RTOR Reduction (vph)	0	85	0	0	4	0	0	0	0	0	0	15
Lane Group Flow (vph)	0	8	0	0	0	0	47	771	0	0	941	46
Confl. Peds. (#/hr)			3	3			1		2	2		1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		8.2			8.2		99.8	99.8			89.9	89.9
Effective Green, g (s)		8.2			8.2		99.8	99.8			89.9	89.9
Actuated g/C Ratio		0.07			0.07		0.83	0.83			0.75	0.75
Clearance Time (s)		6.0			6.0		5.0	6.0			6.0	6.0
Vehicle Extension (s)		4.0			4.0		3.0	4.0			4.0	4.0
Lane Grp Cap (vph)		100			98		390	1579			1423	1181
v/s Ratio Prot							0.00	c0.41			c0.50	
v/s Ratio Perm		c0.01			0.00		0.10					0.03
v/c Ratio		0.08			0.00		0.12	0.49			0.66	0.04
Uniform Delay, d1		52.4			52.1		6.4	2.9			7.5	3.9
Progression Factor		1.00			1.00		1.17	1.22			0.63	0.65
Incremental Delay, d2		0.5			0.0		0.1	0.9			1.5	0.0
Delay (s)		52.9			52.1		7.6	4.3			6.2	2.6
Level of Service		D			D		A	A			A	A
Approach Delay (s)		52.9			52.1			4.5			6.0	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.7					HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		120.0					Sum of lost time (s)			19.0		
Intersection Capacity Utilization		65.4%					ICU Level of Service			C		
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.



Lane Group	WBL	NBT	SBL	SBT
Lane Group Flow (vph)	303	840	191	990
v/c Ratio	0.65	0.45	0.56	0.79
Control Delay	31.2	14.8	61.0	25.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	31.2	14.8	61.0	25.2
Queue Length 50th (ft)	126	176	80	487
Queue Length 95th (ft)	222	270	0	647
Internal Link Dist (ft)	472	396		390
Turn Bay Length (ft)			125	
Base Capacity (vph)	467	1862	514	1259
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	0.65	0.45	0.37	0.79
Intersection Summary				



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	N	N	S	S
Traffic Volume (vph)	60	230	743	63	183	950
Future Volume (vph)	60	230	743	63	183	950
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		7.0		5.0	7.0
Lane Util. Factor	1.00		0.95		0.97	1.00
Frpb, ped/bikes	1.00		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.89		0.99		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1615		3564		3433	1900
Flt Permitted	0.99		1.00		0.95	1.00
Satd. Flow (perm)	1615		3564		3433	1900
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	62	240	774	66	191	990
RTOR Reduction (vph)	98	0	4	0	0	0
Lane Group Flow (vph)	205	0	836	0	191	990
Confl. Peds. (#/hr)				1	1	
Heavy Vehicles (%)	0%	5%	0%	0%	2%	0%
Turn Type	Perm		NA		Prot	NA
Protected Phases			2		1	6
Permitted Phases	4					
Actuated Green, G (s)	27.4		62.6		12.0	79.6
Effective Green, g (s)	27.4		62.6		12.0	79.6
Actuated g/C Ratio	0.23		0.52		0.10	0.66
Clearance Time (s)	6.0		7.0		5.0	7.0
Vehicle Extension (s)	4.0		4.0		3.0	4.0
Lane Grp Cap (vph)	368		1859		343	1260
v/s Ratio Prot			0.23		0.06	c0.52
v/s Ratio Perm	c0.13					
v/c Ratio	0.56		0.45		0.56	0.79
Uniform Delay, d1	40.9		17.9		51.5	14.2
Progression Factor	1.00		0.77		1.08	1.37
Incremental Delay, d2	2.3		0.7		1.8	4.6
Delay (s)	43.2		14.6		57.3	24.1
Level of Service	D		B		E	C
Approach Delay (s)	43.2		14.6			29.4
Approach LOS	D		B			C
Intersection Summary						
HCM 2000 Control Delay			25.9		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)	23.0
Intersection Capacity Utilization			78.3%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
6: Philadelphia Pike & Seminole Ave

29919 Scenario 1 modified PM Peak Hour
08/27/2024

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	48	63	957	1216
v/c Ratio	0.37	0.41	0.34	0.44
Control Delay	45.5	33.3	1.6	1.8
Queue Delay	0.1	0.1	0.1	0.1
Total Delay	45.6	33.5	1.7	1.8
Queue Length 50th (ft)	24	19	12	87
Queue Length 95th (ft)	62	62	68	15
Internal Link Dist (ft)	300	239	390	488
Turn Bay Length (ft)				
Base Capacity (vph)	341	363	2813	2764
Starvation Cap Reductn	0	0	544	384
Spillback Cap Reductn	55	57	0	116
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.17	0.21	0.42	0.51
Intersection Summary				

HCM 6th Signalized Intersection Summary 6: Philadelphia Pike & Seminole Ave

29919 Scenario 1 modified PM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	4	16	19	5	37	15	900	14	27	1124	28
Future Volume (veh/h)	27	4	16	19	5	37	15	900	14	27	1124	28
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	1900	1900	1900	1796	1900	1900	1900	1900	1767	1900	1900	1900
Adj Flow Rate, veh/h	28	4	16	20	5	38	15	928	14	28	1159	29
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	7	0	0	0	0	9	0	0	0
Cap, veh/h	94	15	31	62	13	54	53	2901	43	72	2830	70
Arrive On Green	0.05	0.05	0.05	0.05	0.05	0.05	0.84	0.84	0.84	1.00	1.00	1.00
Sat Flow, veh/h	867	279	573	420	244	1010	27	3462	52	48	3378	84
Grp Volume(v), veh/h	48	0	0	63	0	0	492	0	465	623	0	593
Grp Sat Flow(s),veh/h/ln	1718	0	0	1675	0	0	1821	0	1720	1797	0	1714
Q Serve(g_s), s	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	7.2	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.1	0.0	0.0	4.3	0.0	0.0	6.8	0.0	7.2	0.0	0.0	0.0
Prop In Lane	0.58		0.33	0.32		0.60	0.03		0.03	0.04		0.05
Lane Grp Cap(c), veh/h	140	0	0	130	0	0	1557	0	1441	1537	0	1436
V/C Ratio(X)	0.34	0.00	0.00	0.49	0.00	0.00	0.32	0.00	0.32	0.41	0.00	0.41
Avail Cap(c_a), veh/h	382	0	0	384	0	0	1557	0	1441	1537	0	1436
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	0.89	0.00	0.89	0.89	0.00	0.89
Uniform Delay (d), s/veh	55.2	0.0	0.0	55.7	0.0	0.0	2.1	0.0	2.2	0.0	0.0	0.0
Incr Delay (d2), s/veh	2.0	0.0	0.0	4.0	0.0	0.0	0.5	0.0	0.5	0.7	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(50%),veh/ln	1.5	0.0	0.0	2.0	0.0	0.0	1.7	0.0	1.7	0.3	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.2	0.0	0.0	59.7	0.0	0.0	2.6	0.0	2.7	0.7	0.0	0.8
LnGrp LOS	E	A	A	E	A	A	A	A	A	A	A	A
Approach Vol, veh/h		48			63			957			1216	
Approach Delay, s/veh		57.2			59.7			2.6			0.7	
Approach LOS		E			E			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		107.5		12.5		107.5		12.5				
Change Period (Y+Rc), s		7.0		6.0		7.0		6.0				
Max Green Setting (Gmax), s		81.0		26.0		81.0		26.0				
Max Q Clear Time (g_c+I1), s		9.2		5.1		2.0		6.3				
Green Ext Time (p_c), s		12.1		0.2		18.7		0.4				
Intersection Summary												
HCM 6th Ctrl Delay				4.4								
HCM 6th LOS				A								

Queues
7: Philadelphia Pike & Manor Ave

29919 Scenario 1 modified PM Peak Hour
08/27/2024



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	33	63	933	58	1227
v/c Ratio	0.50	0.22	0.17	0.34	0.11	0.45
Control Delay	43.9	28.5	3.6	5.4	2.0	3.7
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	43.9	28.5	3.6	5.5	2.0	3.7
Queue Length 50th (ft)	35	8	6	88	5	75
Queue Length 95th (ft)	82	39	15	114	m8	90
Internal Link Dist (ft)	387	309		488		946
Turn Bay Length (ft)			110		135	
Base Capacity (vph)	199	198	471	2738	637	2738
Starvation Cap Reductn	0	0	0	534	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.17	0.13	0.42	0.09	0.45
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

HCM Signalized Intersection Capacity Analysis 29919 Scenario 1 modified PM Peak Hour

7: Philadelphia Pike & Manor Ave

08/27/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↗	↕		↗	↕	
Traffic Volume (vph)	35	5	35	9	2	21	60	892	4	56	1124	54
Future Volume (vph)	35	5	35	9	2	21	60	892	4	56	1124	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.91		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1707			1664		1803	3572		1804	3572	
Flt Permitted		0.83			0.89		0.20	1.00		0.29	1.00	
Satd. Flow (perm)		1457			1508		377	3572		545	3572	
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)	36	5	36	9	2	22	62	929	4	58	1171	56
RTOR Reduction (vph)	0	28	0	0	20	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	49	0	0	13	0	63	933	0	58	1225	0
Confl. Peds. (#/hr)	7		2	2		7	15		2	2		15
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.2			9.2		93.9	88.7		93.7	88.6	
Effective Green, g (s)		9.2			9.2		93.9	88.7		93.7	88.6	
Actuated g/C Ratio		0.08			0.08		0.78	0.74		0.78	0.74	
Clearance Time (s)		6.0			6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)		111			115		356	2640		479	2637	
v/s Ratio Prot							c0.01	0.26		0.01	c0.34	
v/s Ratio Perm		c0.03			0.01		0.13			0.09		
v/c Ratio		0.44			0.11		0.18	0.35		0.12	0.46	
Uniform Delay, d1		53.0			51.6		3.6	5.5		3.1	6.3	
Progression Factor		1.00			1.00		1.06	0.82		0.64	0.47	
Incremental Delay, d2		3.8			0.6		0.2	0.4		0.1	0.5	
Delay (s)		56.8			52.2		4.0	4.9		2.1	3.4	
Level of Service		E			D		A	A		A	A	
Approach Delay (s)		56.8			52.2			4.8			3.4	
Approach LOS		E			D			A			A	
Intersection Summary												
HCM 2000 Control Delay		6.4					HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio		0.46										
Actuated Cycle Length (s)		120.0					Sum of lost time (s)			19.0		
Intersection Capacity Utilization		58.7%					ICU Level of Service			B		
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
8: Philadelphia Pike & Darley Rd

29919 Scenario 1 modified PM Peak Hour
08/27/2024



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	214	281	41	228	664	26	1155
v/c Ratio	0.82	0.59	0.29	0.67	0.32	0.06	0.68
Control Delay	74.5	11.0	48.3	36.1	17.7	7.5	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.5	11.0	48.3	36.1	17.7	7.5	18.5
Queue Length 50th (ft)	162	0	24	89	68	7	172
Queue Length 95th (ft)	#282	79	60	205	225	m12	257
Internal Link Dist (ft)	313		348		946		1190
Turn Bay Length (ft)		150		130		50	
Base Capacity (vph)	272	481	443	383	2105	520	1710
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	0.79	0.58	0.09	0.60	0.32	0.05	0.68

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 6th Signalized Intersection Summary 8: Philadelphia Pike & Darley Rd

29919 Scenario 1 modified PM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	187	20	273	16	16	9	221	614	30	25	893	227
Future Volume (veh/h)	187	20	273	16	16	9	221	614	30	25	893	227
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	1900	1900	1900	1900	1900	1900	1900	1900	1900	1826	1900	1885
Adj Flow Rate, veh/h	193	21	281	16	16	9	228	633	31	26	921	234
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	0	0	5	0	1
Cap, veh/h	246	27	242	22	22	12	319	2083	102	510	1547	392
Arrive On Green	0.15	0.15	0.15	0.03	0.03	0.03	0.15	1.00	1.00	0.01	0.18	0.18
Sat Flow, veh/h	1640	178	1610	700	700	394	1810	3502	171	1739	2848	723
Grp Volume(v), veh/h	214	0	281	41	0	0	228	326	338	26	583	572
Grp Sat Flow(s),veh/h/ln	1818	0	1610	1794	0	0	1810	1805	1868	1739	1805	1766
Q Serve(g_s), s	13.6	0.0	18.0	2.7	0.0	0.0	6.8	0.0	0.0	0.8	35.6	35.7
Cycle Q Clear(g_c), s	13.6	0.0	18.0	2.7	0.0	0.0	6.8	0.0	0.0	0.8	35.6	35.7
Prop In Lane	0.90		1.00	0.39		0.22	1.00		0.09	1.00		0.41
Lane Grp Cap(c), veh/h	273	0	242	56	0	0	319	1074	1111	510	980	959
V/C Ratio(X)	0.78	0.00	1.16	0.74	0.00	0.00	0.72	0.30	0.30	0.05	0.59	0.60
Avail Cap(c_a), veh/h	273	0	242	434	0	0	423	1074	1111	628	980	959
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.95	0.95	0.95	0.79	0.79	0.79
Uniform Delay (d), s/veh	49.1	0.0	51.0	57.7	0.0	0.0	17.9	0.0	0.0	11.6	37.1	37.2
Incr Delay (d2), s/veh	14.7	0.0	109.3	23.2	0.0	0.0	3.6	0.7	0.7	0.0	2.1	2.2
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(50%),veh/ln	7.2	0.0	14.6	1.6	0.0	0.0	3.0	0.2	0.2	0.3	17.8	17.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.8	0.0	160.3	80.9	0.0	0.0	21.5	0.7	0.7	11.6	39.2	39.3
LnGrp LOS	E	A	F	F	A	A	C	A	A	B	D	D
Approach Vol, veh/h		495			41			892			1181	
Approach Delay, s/veh		118.6			80.9			6.0			38.7	
Approach LOS		F			F			A			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.9	78.4		24.0	14.1	72.2		9.7				
Change Period (Y+Rc), s	5.0	7.0		6.0	5.0	7.0		6.0				
Max Green Setting (Gmax), s	11.0	38.0		18.0	16.0	33.0		29.0				
Max Q Clear Time (g_c+I1), s	2.8	2.0		20.0	8.8	37.7		4.7				
Green Ext Time (p_c), s	0.0	6.5		0.0	0.4	0.0		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			43.3									
HCM 6th LOS			D									



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	312	362	326	412	789	4
v/c Ratio	0.74	0.23	0.89	0.18	0.58	0.00
Control Delay	53.5	0.3	66.9	7.0	31.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	0.3	66.9	7.0	31.3	0.0
Queue Length 50th (ft)	220	0	253	61	256	0
Queue Length 95th (ft)	317	0	m#432	m64	323	0
Internal Link Dist (ft)	651			1190	836	
Turn Bay Length (ft)		183	425			180
Base Capacity (vph)	473	1583	366	2340	1372	1582
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	0.66	0.23	0.89	0.18	0.58	0.00

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 6th Signalized Intersection Summary 9: Philadelphia Pike & I-495 NB Ramp

29919 Scenario 1 modified PM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	282	5	333	300	379	0	0	726	4
Future Volume (veh/h)	0	0	0	282	5	333	300	379	0	0	726	4
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1870	1900	1870	1885	1885	0	0	1856	1900
Adj Flow Rate, veh/h				307	5	0	326	412	0	0	789	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	0	2	1	1	0	0	3	0
Cap, veh/h				370	6		344	2450	0	0	1530	
Arrive On Green				0.21	0.21	0.00	0.06	0.23	0.00	0.00	0.43	0.00
Sat Flow, veh/h				1782	29	1585	1795	3676	0	0	3618	1610
Grp Volume(v), veh/h				312	0	0	326	412	0	0	789	0
Grp Sat Flow(s),veh/h/ln				1811	0	1585	1795	1791	0	0	1763	1610
Q Serve(g_s), s				19.8	0.0	0.0	21.7	11.1	0.0	0.0	19.6	0.0
Cycle Q Clear(g_c), s				19.8	0.0	0.0	21.7	11.1	0.0	0.0	19.6	0.0
Prop In Lane				0.98		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				376	0		344	2450	0	0	1530	
V/C Ratio(X)				0.83	0.00		0.95	0.17	0.00	0.00	0.52	
Avail Cap(c_a), veh/h				483	0		344	2450	0	0	1530	
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.96	0.96	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				45.5	0.0	0.0	55.6	19.0	0.0	0.0	24.8	0.0
Incr Delay (d2), s/veh				18.7	0.0	0.0	34.3	0.1	0.0	0.0	1.2	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				10.7	0.0	0.0	13.7	5.3	0.0	0.0	8.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				64.2	0.0	0.0	89.9	19.1	0.0	0.0	26.0	0.0
LnGrp LOS				E	A		F	B	A	A	C	
Approach Vol, veh/h					312			738			789	
Approach Delay, s/veh					64.2			50.4			26.0	
Approach LOS					E			D			C	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		89.1		30.9	30.0	59.1						
Change Period (Y+Rc), s		7.0		6.0	7.0	7.0						
Max Green Setting (Gmax), s		75.0		32.0	23.0	45.0						
Max Q Clear Time (g_c+I1), s		13.1		21.8	23.7	21.6						
Green Ext Time (p_c), s		4.3		3.1	0.0	7.7						
Intersection Summary												
HCM 6th Ctrl Delay				42.3								
HCM 6th LOS				D								
Notes												
Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Output Files
Future Conditions
Transportation Scenario 2
AM Peak Hour

Queues

29919 Scenario 2 final AM Peak Hour

1: Philadelphia Pike & Rolling Rd

08/27/2024



Lane Group	EBL	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	2	4	11	3	395	4	527
v/c Ratio	0.02	0.02	0.02	0.00	0.23	0.00	0.31
Control Delay	43.5	0.0	0.0	3.0	4.0	3.2	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.5	0.0	0.0	3.0	4.0	3.2	3.4
Queue Length 50th (ft)	1	0	0	0	0	0	0
Queue Length 95th (ft)	9	0	0	3	194	m2	136
Internal Link Dist (ft)			393		408		993
Turn Bay Length (ft)	70	70		155		155	
Base Capacity (vph)	361	445	836	827	1693	949	1700
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	0.01	0.01	0.01	0.00	0.23	0.00	0.31

Intersection Summary

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

HCM 6th Signalized Intersection Summary

1: Philadelphia Pike & Rolling Rd

29919 Scenario 2 final AM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	4	0	0	10	3	361	3	4	482	3
Future Volume (veh/h)	2	0	4	0	0	10	3	361	3	4	482	3
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	1900	0	1900	1900	1900	1900	1900	1870	1159	1900	1870	1900
Adj Flow Rate, veh/h	2	0	4	0	0	11	3	392	3	4	524	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	2	50	0	2	0
Cap, veh/h	0	0	0	0	0	21	801	1504	12	846	1510	9
Arrive On Green	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.81	0.81	0.01	1.00	1.00
Sat Flow, veh/h	0			0			1610	1810	1854	14	1810	1858
Grp Volume(v), veh/h	0.0			0	0	11	3	0	395	4	0	527
Grp Sat Flow(s),veh/h/ln				0	0	1610	1810	0	1868	1810	0	1868
Q Serve(g_s), s				0.0	0.0	0.7	0.0	0.0	5.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s				0.0	0.0	0.7	0.0	0.0	5.1	0.0	0.0	0.0
Prop In Lane				0.00		1.00	1.00		0.01	1.00		0.01
Lane Grp Cap(c), veh/h				0	0	21	801	0	1516	846	0	1519
V/C Ratio(X)				0.00	0.00	0.52	0.00	0.00	0.26	0.00	0.00	0.35
Avail Cap(c_a), veh/h				0	0	322	957	0	1516	999	0	1519
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)				0.00	0.00	1.00	1.00	0.00	1.00	0.94	0.00	0.94
Uniform Delay (d), s/veh				0.0	0.0	49.0	1.7	0.0	2.3	1.8	0.0	0.0
Incr Delay (d2), s/veh				0.0	0.0	25.3	0.0	0.0	0.4	0.0	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
%ile BackOfQ(50%),veh/ln				0.0	0.0	0.4	0.0	0.0	1.2	0.0	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				0.0	0.0	74.3	1.7	0.0	2.7	1.8	0.0	0.6
LnGrp LOS				A	A	E	A	A	A	A	A	A
Approach Vol, veh/h						11				398		
Approach Delay, s/veh						74.3				2.7		
Approach LOS						E				A		
Timer - Assigned Phs	1	2				5	6	8				
Phs Duration (G+Y+Rc), s	5.5	87.2				5.4	87.3	7.3				
Change Period (Y+Rc), s	5.0	6.0				5.0	6.0	6.0				
Max Green Setting (Gmax), s	9.0	28.0				9.0	28.0	20.0				
Max Q Clear Time (g_c+I1), s	2.0	7.1				2.0	2.0	2.7				
Green Ext Time (p_c), s	0.0	4.3				0.0	6.7	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	2.3											
HCM 6th LOS	A											

Queues
2: Philadelphia Pike & Maple Road

29919 Scenario 2 final AM Peak Hour
08/27/2024



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	66	50	9	14	382	3	534
v/c Ratio	0.43	0.23	0.05	0.02	0.26	0.00	0.37
Control Delay	49.0	15.1	32.4	3.6	4.8	2.7	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	15.1	32.4	3.6	4.8	2.7	4.4
Queue Length 50th (ft)	40	2	4	2	59	1	116
Queue Length 95th (ft)	79	35	18	7	88	m1	80
Internal Link Dist (ft)		274	235		993		891
Turn Bay Length (ft)				175		130	
Base Capacity (vph)	242	316	279	740	1465	869	1456
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	0.27	0.16	0.03	0.02	0.26	0.00	0.37

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Philadelphia Pike & Maple Road

29919 Scenario 2 final AM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	3	43	3	3	3	13	339	13	3	460	31
Future Volume (vph)	61	3	43	3	3	3	13	339	13	3	460	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.86			0.95		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1632			1785		1805	1890		1805	1882	
Flt Permitted	0.75	1.00			0.90		0.42	1.00		0.53	1.00	
Satd. Flow (perm)	1428	1632			1627		806	1890		1000	1882	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	66	3	47	3	3	3	14	368	14	3	500	34
RTOR Reduction (vph)	0	42	0	0	3	0	0	1	0	0	0	0
Lane Group Flow (vph)	66	8	0	0	6	0	14	381	0	3	534	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.6	9.6			9.6		70.5	69.3		70.3	69.2	
Effective Green, g (s)	9.6	9.6			9.6		70.5	69.3		70.3	69.2	
Actuated g/C Ratio	0.10	0.10			0.10		0.70	0.69		0.70	0.69	
Clearance Time (s)	6.0	6.0			6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	4.0	4.0			4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	137	156			156		580	1309		711	1302	
v/s Ratio Prot		0.00					c0.00	0.20		0.00	c0.28	
v/s Ratio Perm	c0.05				0.00		0.02			0.00		
v/c Ratio	0.48	0.05			0.04		0.02	0.29		0.00	0.41	
Uniform Delay, d1	42.8	41.1			41.0		4.6	5.9		4.4	6.6	
Progression Factor	1.00	1.00			1.00		0.97	0.81		0.71	0.63	
Incremental Delay, d2	3.6	0.2			0.1		0.0	0.6		0.0	0.8	
Delay (s)	46.5	41.2			41.2		4.4	5.3		3.2	5.0	
Level of Service	D	D			D		A	A		A	A	
Approach Delay (s)		44.2			41.2			5.3			5.0	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.7				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			45.4%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
3: Philadelphia Pike & Harvey Rd

29919 Scenario 2 final AM Peak Hour
08/27/2024



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	241	119	20	26	88	386	29	625
v/c Ratio	0.83	0.28	0.19	0.18	0.25	0.38	0.05	0.67
Control Delay	64.4	12.2	49.4	30.0	11.4	18.0	7.4	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.4	12.2	49.4	30.0	11.4	18.0	7.4	23.3
Queue Length 50th (ft)	148	11	12	7	22	183	6	306
Queue Length 95th (ft)	#288	60	37	33	70	283	m14	#554
Internal Link Dist (ft)		308		162		891		2180
Turn Bay Length (ft)	220				200		184	
Base Capacity (vph)	295	549	108	325	357	1010	560	934
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.22	0.19	0.08	0.25	0.38	0.05	0.67

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 6th Signalized Intersection Summary 3: Philadelphia Pike & Harvey Rd

29919 Scenario 2 final AM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	222	22	87	18	11	13	81	333	22	27	414	161
Future Volume (veh/h)	222	22	87	18	11	13	81	333	22	27	414	161
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		0.99	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	1841	1900	1900	1900	1900	1900	1870	1870	1900	1826	1885	1885
Adj Flow Rate, veh/h	241	24	95	20	12	14	88	362	24	29	450	175
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	0	0	0	0	0	2	2	0	5	1	1
Cap, veh/h	272	54	214	39	22	26	378	953	63	476	686	267
Arrive On Green	0.16	0.16	0.16	0.02	0.03	0.03	0.02	0.18	0.18	0.03	0.53	0.53
Sat Flow, veh/h	1753	334	1323	1810	795	927	1781	1734	115	1739	1290	502
Grp Volume(v), veh/h	241	0	119	20	0	26	88	0	386	29	0	625
Grp Sat Flow(s),veh/h/ln	1753	0	1657	1810	0	1722	1781	0	1849	1739	0	1792
Q Serve(g_s), s	13.5	0.0	6.5	1.1	0.0	1.5	2.2	0.0	18.4	0.7	0.0	25.1
Cycle Q Clear(g_c), s	13.5	0.0	6.5	1.1	0.0	1.5	2.2	0.0	18.4	0.7	0.0	25.1
Prop In Lane	1.00		0.80	1.00		0.54	1.00		0.06	1.00		0.28
Lane Grp Cap(c), veh/h	272	0	268	39	0	48	378	0	1016	476	0	952
V/C Ratio(X)	0.89	0.00	0.44	0.52	0.00	0.54	0.23	0.00	0.38	0.06	0.00	0.66
Avail Cap(c_a), veh/h	280	0	481	90	0	310	385	0	1016	515	0	952
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.97	0.00	0.97	0.91	0.00	0.91
Uniform Delay (d), s/veh	41.4	0.0	37.9	48.4	0.0	48.0	13.4	0.0	26.0	11.3	0.0	16.9
Incr Delay (d2), s/veh	27.2	0.0	1.6	14.5	0.0	12.8	0.3	0.0	1.0	0.0	0.0	3.2
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(50%),veh/ln	7.7	0.0	2.7	0.7	0.0	0.8	0.9	0.0	9.3	0.3	0.0	10.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.6	0.0	39.5	62.9	0.0	60.8	13.7	0.0	27.0	11.3	0.0	20.1
LnGrp LOS	E	A	D	E	A	E	B	A	C	B	A	C
Approach Vol, veh/h		360			46			474			654	
Approach Delay, s/veh		59.0			61.7			24.5			19.7	
Approach LOS		E			E			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.8	61.9	8.1	22.2	9.6	60.1	21.5	8.8				
Change Period (Y+Rc), s	5.0	7.0	6.0	6.0	5.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	5.0	37.0	5.0	29.0	5.0	37.0	16.0	18.0				
Max Q Clear Time (g_c+I1), s	2.7	20.4	3.1	8.5	4.2	27.1	15.5	3.5				
Green Ext Time (p_c), s	0.0	2.9	0.0	0.8	0.0	3.9	0.1	0.1				
Intersection Summary												
HCM 6th Ctrl Delay			31.7									
HCM 6th LOS			C									

Queues
4: Philadelphia Pike & Commonwealth Ave

29919 Scenario 2 final AM Peak Hour
08/27/2024



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	101	2	18	601	2	633	34
v/c Ratio	0.47	0.00	0.03	0.39	0.00	0.43	0.03
Control Delay	14.8	0.0	3.0	4.0	3.5	4.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.8	0.0	3.0	4.0	3.5	4.7	0.1
Queue Length 50th (ft)	0	0	1	33	0	124	0
Queue Length 95th (ft)	43	0	m10	m215	m0	121	m0
Internal Link Dist (ft)	259	219		2180		539	
Turn Bay Length (ft)			230		145		45
Base Capacity (vph)	287	553	711	1548	660	1482	1306
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	0.00	0.03	0.39	0.00	0.43	0.03

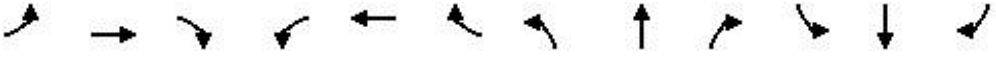
Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Philadelphia Pike & Commonwealth Ave

29919 Scenario 2 final AM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↗	↖		↗	↖	↗
Traffic Volume (vph)	50	0	43	0	0	2	17	553	0	2	582	31
Future Volume (vph)	50	0	43	0	0	2	17	553	0	2	582	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt		0.94			0.86		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.97			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1734			1644		1805	1845		1805	1863	1615
Flt Permitted		0.83			1.00		0.35	1.00		0.44	1.00	1.00
Satd. Flow (perm)		1481			1644		674	1845		831	1863	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	0	47	0	0	2	18	601	0	2	633	34
RTOR Reduction (vph)	0	94	0	0	2	0	0	0	0	0	0	9
Lane Group Flow (vph)	0	7	0	0	0	0	18	601	0	2	633	25
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	2%	0%
Turn Type	Perm	NA			NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		6.5			6.5		81.5	81.5		74.1	74.1	74.1
Effective Green, g (s)		6.5			6.5		81.5	81.5		74.1	74.1	74.1
Actuated g/C Ratio		0.06			0.06		0.82	0.82		0.74	0.74	0.74
Clearance Time (s)		6.0			6.0		5.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		4.0			4.0		3.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)		96			106		576	1503		615	1380	1196
v/s Ratio Prot					0.00		0.00	c0.33			c0.34	
v/s Ratio Perm		c0.00					0.02			0.00		0.02
v/c Ratio		0.07			0.00		0.03	0.40		0.00	0.46	0.02
Uniform Delay, d1		43.9			43.7		2.6	2.5		3.4	5.1	3.4
Progression Factor		1.00			1.00		1.37	1.17		0.71	0.71	1.00
Incremental Delay, d2		0.4			0.0		0.0	0.7		0.0	1.0	0.0
Delay (s)		44.3			43.7		3.6	3.7		2.4	4.6	3.4
Level of Service		D			D		A	A		A	A	A
Approach Delay (s)		44.3			43.7			3.6			4.5	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.1				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			52.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.



Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	245	608	34	77	648
v/c Ratio	0.61	0.59	0.04	0.46	0.50
Control Delay	23.6	12.8	2.5	57.1	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.2
Total Delay	23.6	12.8	2.5	57.1	10.4
Queue Length 50th (ft)	63	224	3	53	98
Queue Length 95th (ft)	140	298	2	102	195
Internal Link Dist (ft)	472	396			390
Turn Bay Length (ft)			250	125	
Base Capacity (vph)	404	1039	905	187	1284
Starvation Cap Reductn	0	0	0	0	149
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.61	0.59	0.04	0.41	0.57
Intersection Summary					



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑	↱	↰	↑
Traffic Volume (vph)	51	175	559	31	71	596
Future Volume (vph)	51	175	559	31	71	596
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		7.0	7.0	5.0	7.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.90		1.00	0.85	1.00	1.00
Flt Protected	0.99		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1632		1845	1581	1703	1863
Flt Permitted	0.99		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1632		1845	1581	1703	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	55	190	608	34	77	648
RTOR Reduction (vph)	110	0	0	15	0	0
Lane Group Flow (vph)	135	0	608	19	77	648
Confl. Peds. (#/hr)				1	1	
Heavy Vehicles (%)	0%	4%	3%	0%	6%	2%
Turn Type	Perm		NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	4			2		
Actuated Green, G (s)	18.0		55.4	55.4	8.6	69.0
Effective Green, g (s)	18.0		55.4	55.4	8.6	69.0
Actuated g/C Ratio	0.18		0.55	0.55	0.09	0.69
Clearance Time (s)	6.0		7.0	7.0	5.0	7.0
Vehicle Extension (s)	4.0		4.0	4.0	3.0	4.0
Lane Grp Cap (vph)	293		1022	875	146	1285
v/s Ratio Prot			c0.33		0.05	c0.35
v/s Ratio Perm	c0.08			0.01		
v/c Ratio	0.46		0.59	0.02	0.53	0.50
Uniform Delay, d1	36.7		14.8	10.1	43.8	7.4
Progression Factor	1.00		0.64	0.51	1.17	1.13
Incremental Delay, d2	1.6		2.4	0.0	3.1	1.3
Delay (s)	38.2		11.8	5.1	54.3	9.6
Level of Service	D		B	A	D	A
Approach Delay (s)	38.2		11.5			14.3
Approach LOS	D		B			B
Intersection Summary						
HCM 2000 Control Delay			16.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.61			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	23.0
Intersection Capacity Utilization			66.1%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Edition methodology does not support exclusive ped or hold phases.



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	40	46	787	741
v/c Ratio	0.33	0.29	0.51	0.49
Control Delay	42.7	24.0	3.1	3.8
Queue Delay	0.0	0.0	0.1	0.3
Total Delay	42.7	24.0	3.2	4.1
Queue Length 50th (ft)	19	8	19	258
Queue Length 95th (ft)	51	41	116	33
Internal Link Dist (ft)	300	239	390	488
Turn Bay Length (ft)				
Base Capacity (vph)	336	404	1546	1506
Starvation Cap Reductn	0	0	136	288
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.12	0.11	0.56	0.61
Intersection Summary				

HCM 6th Signalized Intersection Summary

6: Philadelphia Pike & Seminole Ave

29919 Scenario 2 final AM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	3	7	10	2	30	18	686	19	28	635	19
Future Volume (veh/h)	27	3	7	10	2	30	18	686	19	28	635	19
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	1900	1900	1159	1900	1900	1767	1648	1870	1781	1900	1856	1900
Adj Flow Rate, veh/h	29	3	8	11	2	33	20	746	21	30	690	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	50	0	0	9	17	2	8	0	3	0
Cap, veh/h	115	8	15	59	7	54	55	1450	40	70	1395	42
Arrive On Green	0.05	0.05	0.05	0.05	0.05	0.05	0.82	0.82	0.82	1.00	1.00	1.00
Sat Flow, veh/h	1171	168	335	309	163	1199	22	1758	49	39	1691	50
Grp Volume(v), veh/h	40	0	0	46	0	0	787	0	0	741	0	0
Grp Sat Flow(s),veh/h/ln	1674	0	0	1671	0	0	1828	0	0	1781	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.1	0.0	0.0	2.6	0.0	0.0	12.9	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.72		0.20	0.24		0.72	0.03		0.03	0.04		0.03
Lane Grp Cap(c), veh/h	138	0	0	121	0	0	1545	0	0	1506	0	0
V/C Ratio(X)	0.29	0.00	0.00	0.38	0.00	0.00	0.51	0.00	0.00	0.49	0.00	0.00
Avail Cap(c_a), veh/h	452	0	0	458	0	0	1545	0	0	1506	0	0
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	0.78	0.00	0.00	0.89	0.00	0.00
Uniform Delay (d), s/veh	46.6	0.0	0.0	46.8	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.8	0.0	0.0	0.9	0.0	0.0	1.0	0.0	0.0
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(50%),veh/ln	1.0	0.0	0.0	1.2	0.0	0.0	2.8	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.2	0.0	0.0	49.6	0.0	0.0	3.6	0.0	0.0	1.0	0.0	0.0
LnGrp LOS	D	A	A	D	A	A	A	A	A	A	A	A
Approach Vol, veh/h		40			46			787			741	
Approach Delay, s/veh		48.2			49.6			3.6			1.0	
Approach LOS		D			D			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		89.5		10.5		89.5		10.5				
Change Period (Y+Rc), s		7.0		6.0		7.0		6.0				
Max Green Setting (Gmax), s		61.0		26.0		61.0		26.0				
Max Q Clear Time (g_c+I1), s		14.9		4.1		2.0		4.6				
Green Ext Time (p_c), s		10.6		0.2		10.1		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				4.8								
HCM 6th LOS				A								



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	94	21	39	715	25	629
v/c Ratio	0.49	0.13	0.06	0.50	0.04	0.45
Control Delay	27.8	22.6	4.0	8.6	4.5	10.4
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	27.8	22.6	4.0	8.8	4.5	10.4
Queue Length 50th (ft)	22	3	1	151	6	207
Queue Length 95th (ft)	68	25	m18	285	m9	227
Internal Link Dist (ft)	387	309		488		946
Turn Bay Length (ft)			110		135	
Base Capacity (vph)	259	239	705	1433	754	1384
Starvation Cap Reductn	0	0	0	193	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.09	0.06	0.58	0.03	0.45
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

HCM Signalized Intersection Capacity Analysis

7: Philadelphia Pike & Manor Ave

29919 Scenario 2 final AM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	3	56	2	3	16	38	689	5	24	595	16
Future Volume (vph)	32	3	56	2	3	16	38	689	5	24	595	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.92			0.90		1.00	1.00		1.00	1.00	
Flt Protected		0.98			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1683			1659		1800	1840		1804	1833	
Flt Permitted		0.88			0.97		0.36	1.00		0.33	1.00	
Satd. Flow (perm)		1498			1615		687	1840		633	1833	
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)	33	3	58	2	3	16	39	710	5	25	613	16
RTOR Reduction (vph)	0	53	0	0	15	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	41	0	0	6	0	39	715	0	25	628	0
Confl. Peds. (#/hr)	2					2	10		3	3		10
Heavy Vehicles (%)	4%	0%	0%	0%	0%	0%	0%	3%	25%	0%	3%	8%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.1			8.1		76.2	72.4		73.6	71.1	
Effective Green, g (s)		8.1			8.1		76.2	72.4		73.6	71.1	
Actuated g/C Ratio		0.08			0.08		0.76	0.72		0.74	0.71	
Clearance Time (s)		6.0			6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)		121			130		565	1332		495	1303	
v/s Ratio Prot							c0.00	c0.39		0.00	0.34	
v/s Ratio Perm		c0.03			0.00		0.05			0.04		
v/c Ratio		0.34			0.05		0.07	0.54		0.05	0.48	
Uniform Delay, d1		43.4			42.4		3.5	6.2		4.1	6.4	
Progression Factor		1.00			1.00		1.42	1.07		1.58	1.28	
Incremental Delay, d2		2.2			0.2		0.0	1.4		0.0	1.1	
Delay (s)		45.7			42.6		5.0	8.0		6.6	9.2	
Level of Service		D			D		A	A		A	A	
Approach Delay (s)		45.7			42.6			7.9			9.1	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay		11.2					HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio		0.52										
Actuated Cycle Length (s)		100.0					Sum of lost time (s)			19.0		
Intersection Capacity Utilization		58.6%					ICU Level of Service			B		
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
8: Philadelphia Pike & Darley Rd

29919 Scenario 2 final AM Peak Hour
08/27/2024



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	230	157	47	148	628	9	508	128
v/c Ratio	0.75	0.38	0.33	0.33	0.59	0.02	0.60	0.17
Control Delay	54.7	8.0	33.3	12.7	19.7	13.1	25.1	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.7	8.0	33.3	12.7	19.7	13.1	25.1	3.7
Queue Length 50th (ft)	138	0	16	52	345	2	148	5
Queue Length 95th (ft)	#221	49	50	66	#564	m6	#496	18
Internal Link Dist (ft)	313		348		946		1190	
Turn Bay Length (ft)		150		130		50		150
Base Capacity (vph)	341	439	277	481	1057	472	840	768
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.36	0.17	0.31	0.59	0.02	0.60	0.17

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 6th Signalized Intersection Summary 8: Philadelphia Pike & Darley Rd

29919 Scenario 2 final AM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	214	9	152	21	4	20	144	594	16	9	493	124
Future Volume (veh/h)	214	9	152	21	4	20	144	594	16	9	493	124
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	1885	1900	1900	1811	1900	1307	1885	1841	1900	1900	1841	1826
Adj Flow Rate, veh/h	221	9	157	22	4	21	148	612	16	9	508	128
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, %	1	0	0	6	0	40	1	4	0	0	4	5
Cap, veh/h	268	11	247	29	5	28	384	998	26	506	941	788
Arrive On Green	0.15	0.15	0.15	0.04	0.04	0.04	0.12	1.00	1.00	0.00	0.17	0.17
Sat Flow, veh/h	1742	71	1610	806	146	769	1795	1785	47	1810	1841	1543
Grp Volume(v), veh/h	230	0	157	47	0	0	148	0	628	9	508	128
Grp Sat Flow(s),veh/h/ln	1813	0	1610	1721	0	0	1795	0	1832	1810	1841	1543
Q Serve(g_s), s	12.3	0.0	9.1	2.7	0.0	0.0	3.8	0.0	0.0	0.2	25.2	7.1
Cycle Q Clear(g_c), s	12.3	0.0	9.1	2.7	0.0	0.0	3.8	0.0	0.0	0.2	25.2	7.1
Prop In Lane	0.96		1.00	0.47		0.45	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	278	0	247	63	0	0	384	0	1024	506	941	788
V/C Ratio(X)	0.83	0.00	0.63	0.75	0.00	0.00	0.39	0.00	0.61	0.02	0.54	0.16
Avail Cap(c_a), veh/h	344	0	306	310	0	0	494	0	1024	667	941	788
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.86	0.00	0.86	0.81	0.81	0.81
Uniform Delay (d), s/veh	41.0	0.0	39.7	47.7	0.0	0.0	12.8	0.0	0.0	11.6	30.8	23.3
Incr Delay (d2), s/veh	14.1	0.0	4.0	22.1	0.0	0.0	0.5	0.0	2.4	0.0	1.8	0.4
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(50%),veh/ln	6.5	0.0	3.9	1.5	0.0	0.0	1.3	0.0	0.7	0.1	12.8	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.1	0.0	43.7	69.8	0.0	0.0	13.4	0.0	2.4	11.6	32.6	23.6
LnGrp LOS	E	A	D	E	A	A	B	A	A	B	C	C
Approach Vol, veh/h		387			47			776			645	
Approach Delay, s/veh		50.5			69.8			4.5			30.5	
Approach LOS		D			E			A			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	62.9		21.4	10.9	58.1		9.6				
Change Period (Y+Rc), s	5.0	7.0		6.0	5.0	7.0		6.0				
Max Green Setting (Gmax), s	10.0	29.0		19.0	12.0	27.0		18.0				
Max Q Clear Time (g_c+I1), s	2.2	2.0		14.3	5.8	27.2		4.7				
Green Ext Time (p_c), s	0.0	6.4		1.1	0.2	0.0		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			24.8									
HCM 6th LOS			C									

Queues
9: Philadelphia Pike & I-495 NB Ramp

29919 Scenario 2 final AM Peak Hour
08/27/2024



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	172	304	400	254	324	12
v/c Ratio	0.53	0.22	0.83	0.20	0.56	0.01
Control Delay	42.0	0.4	47.7	9.5	33.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	0.4	47.7	9.5	33.2	0.0
Queue Length 50th (ft)	100	0	236	98	175	0
Queue Length 95th (ft)	156	0	#402	141	276	0
Internal Link Dist (ft)	537			1190	794	
Turn Bay Length (ft)		183	425			180
Base Capacity (vph)	446	1369	489	1245	580	1351
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	0.39	0.22	0.82	0.20	0.56	0.01

Intersection Summary

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

HCM 6th Signalized Intersection Summary

9: Philadelphia Pike & I-495 NB Ramp

29919 Scenario 2 final AM Peak Hour
08/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	160	0	283	372	236	0	0	301	11
Future Volume (veh/h)	0	0	0	160	0	283	372	236	0	0	301	11
Initial Q (Qb), veh				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
Parking Bus, Adj				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		
Adj Sat Flow, veh/h/ln				1826	1900	1633	1856	1841	0	0	1752	1648
Adj Flow Rate, veh/h				172	0	0	400	254	0	0	324	0
Peak Hour Factor				0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %				5	0	18	3	4	0	0	10	17
Cap, veh/h				236	0		430	1361	0	0	747	
Arrive On Green				0.13	0.00	0.00	0.24	0.74	0.00	0.00	0.43	0.00
Sat Flow, veh/h				1810	0	1384	1767	1841	0	0	1752	1397
Grp Volume(v), veh/h				172	0	0	400	254	0	0	324	0
Grp Sat Flow(s),veh/h/ln				1810	0	1384	1767	1841	0	0	1752	1397
Q Serve(g_s), s				9.1	0.0	0.0	22.1	4.2	0.0	0.0	13.0	0.0
Cycle Q Clear(g_c), s				9.1	0.0	0.0	22.1	4.2	0.0	0.0	13.0	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				236	0		430	1361	0	0	747	
V/C Ratio(X)				0.73	0.00		0.93	0.19	0.00	0.00	0.43	
Avail Cap(c_a), veh/h				470	0		442	1361	0	0	747	
HCM Platoon Ratio				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	0.77	0.77	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				41.8	0.0	0.0	37.0	3.9	0.0	0.0	20.2	0.0
Incr Delay (d2), s/veh				17.9	0.0	0.0	22.0	0.2	0.0	0.0	1.8	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				5.2	0.0	0.0	11.9	1.3	0.0	0.0	5.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				59.7	0.0	0.0	59.0	4.2	0.0	0.0	22.0	0.0
LnGrp LOS				E	A		E	A	A	A	C	
Approach Vol, veh/h					172			654			324	
Approach Delay, s/veh					59.7			37.7			22.0	
Approach LOS					E			D			C	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		81.0		19.0	31.3	49.6						
Change Period (Y+Rc), s		7.0		6.0	7.0	7.0						
Max Green Setting (Gmax), s		61.0		26.0	25.0	29.0						
Max Q Clear Time (g_c+I1), s		6.2		11.1	24.1	15.0						
Green Ext Time (p_c), s		2.3		2.0	0.2	2.1						
Intersection Summary												
HCM 6th Ctrl Delay				36.6								
HCM 6th LOS				D								
Notes												
Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Output Files
Future Conditions
Transportation Scenario 2
PM Peak Hour

Queues

29919 Alternative 2 PM Peak Hour

1: Philadelphia Pike & Rolling Rd

08/29/2024



Lane Group	EBL	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	2	2	12	3	692	11	791
v/c Ratio	0.02	0.01	0.06	0.01	0.41	0.02	0.47
Control Delay	54.0	0.0	0.5	2.7	5.0	3.6	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	0.0	0.5	2.7	5.0	3.6	9.2
Queue Length 50th (ft)	2	0	0	0	0	0	0
Queue Length 95th (ft)	10	0	0	3	391	m4	719
Internal Link Dist (ft)			393		408		993
Turn Bay Length (ft)	70	70		155		155	
Base Capacity (vph)	300	375	423	625	1699	698	1685
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	0.01	0.01	0.03	0.00	0.41	0.02	0.47

Intersection Summary

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

HCM 6th Signalized Intersection Summary

1: Philadelphia Pike & Rolling Rd

29919 Alternative 2 PM Peak Hour
08/29/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	2	2	0	9	3	628	8	10	725	3
Future Volume (veh/h)	2	0	2	2	0	9	3	628	8	10	725	3
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	1900	0	1900	1900	1900	1900	1900	1900	1900	1900	1885	1900
Adj Flow Rate, veh/h	2	0	2	2	0	10	3	683	9	11	788	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	1	0
Cap, veh/h	0	0	0	4	0	19	646	1556	21	644	1578	6
Arrive On Green	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.83	0.83	0.02	1.00	1.00
Sat Flow, veh/h	0			273	0	1367	1810	1871	25	1810	1877	7
Grp Volume(v), veh/h	0.0			12	0	0	3	0	692	11	0	791
Grp Sat Flow(s),veh/h/ln				1640	0	0	1810	0	1895	1810	0	1884
Q Serve(g_s), s				0.9	0.0	0.0	0.0	0.0	11.6	0.1	0.0	0.0
Cycle Q Clear(g_c), s				0.9	0.0	0.0	0.0	0.0	11.6	0.1	0.0	0.0
Prop In Lane				0.17		0.83	1.00		0.01	1.00		0.00
Lane Grp Cap(c), veh/h				23	0	0	646	0	1577	644	0	1584
V/C Ratio(X)				0.53	0.00	0.00	0.00	0.00	0.44	0.02	0.00	0.50
Avail Cap(c_a), veh/h				314	0	0	805	0	1577	787	0	1584
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(l)				1.00	0.00	0.00	1.00	0.00	1.00	0.75	0.00	0.75
Uniform Delay (d), s/veh				58.8	0.0	0.0	1.6	0.0	2.7	2.0	0.0	0.0
Incr Delay (d2), s/veh				25.0	0.0	0.0	0.0	0.0	0.9	0.0	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
%ile BackOfQ(50%),veh/ln				0.5	0.0	0.0	0.0	0.0	3.1	0.0	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				83.8	0.0	0.0	1.6	0.0	3.6	2.0	0.0	0.8
LnGrp LOS				F	A	A	A	A	A	A	A	A
Approach Vol, veh/h					12		695				802	
Approach Delay, s/veh					83.8		3.6				0.9	
Approach LOS					F		A				A	
Timer - Assigned Phs	1	2				5	6	8				
Phs Duration (G+Y+Rc), s	6.5	105.8				5.5	106.9	7.6				
Change Period (Y+Rc), s	5.0	6.0				5.0	6.0	6.0				
Max Green Setting (Gmax), s	11.0	43.0				11.0	43.0	23.0				
Max Q Clear Time (g_c+I1), s	2.1	13.6				2.0	2.0	2.9				
Green Ext Time (p_c), s	0.0	10.1				0.0	14.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	2.8											
HCM 6th LOS	A											

Queues
2: Philadelphia Pike & Maple Road

29919 Alternative 2 PM Peak Hour
08/29/2024



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	47	27	24	21	660	14	908
v/c Ratio	0.39	0.05	0.17	0.05	0.44	0.02	0.61
Control Delay	59.9	0.2	39.4	2.9	10.3	3.2	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	0.2	39.4	2.9	10.3	3.2	7.3
Queue Length 50th (ft)	35	0	12	3	122	3	280
Queue Length 95th (ft)	73	0	38	m8	637	m2	m196
Internal Link Dist (ft)		274	235		993		891
Turn Bay Length (ft)				175		130	
Base Capacity (vph)	199	560	233	515	1508	687	1477
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	0.24	0.05	0.10	0.04	0.44	0.02	0.61

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Philadelphia Pike & Maple Road

29919 Alternative 2 PM Peak Hour
08/29/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	0	25	7	7	7	19	604	3	13	719	116
Future Volume (vph)	43	0	25	7	7	7	19	604	3	13	719	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85			0.95		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1615			1785		1805	1899		1805	1860	
Flt Permitted	0.74	1.00			0.88		0.24	1.00		0.36	1.00	
Satd. Flow (perm)	1409	1615			1600		447	1899		687	1860	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	0	27	8	8	8	21	657	3	14	782	126
RTOR Reduction (vph)	0	25	0	0	7	0	0	0	0	0	0	0
Lane Group Flow (vph)	47	2	0	0	17	0	21	660	0	14	908	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.1	9.1			9.1		90.9	88.5		90.9	88.5	
Effective Green, g (s)	9.1	9.1			9.1		90.9	88.5		90.9	88.5	
Actuated g/C Ratio	0.08	0.08			0.08		0.76	0.74		0.76	0.74	
Clearance Time (s)	6.0	6.0			6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	4.0	4.0			4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	106	122			121		365	1400		542	1371	
v/s Ratio Prot		0.00					c0.00	0.35		0.00	c0.49	
v/s Ratio Perm	c0.03				0.01		0.04			0.02		
v/c Ratio	0.44	0.02			0.14		0.06	0.47		0.03	0.66	
Uniform Delay, d1	53.0	51.3			51.8		6.3	6.3		4.1	8.1	
Progression Factor	1.00	1.00			1.00		0.93	1.47		1.05	0.73	
Incremental Delay, d2	4.0	0.1			0.7		0.1	1.1		0.0	1.3	
Delay (s)	57.0	51.4			52.5		5.9	10.4		4.3	7.2	
Level of Service	E	D			D		A	B		A	A	
Approach Delay (s)		55.0			52.5			10.2			7.2	
Approach LOS		D			D			B			A	
Intersection Summary												
HCM 2000 Control Delay		11.1			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.64										
Actuated Cycle Length (s)		120.0			Sum of lost time (s)			22.0				
Intersection Capacity Utilization		63.0%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
3: Philadelphia Pike & Harvey Rd

29919 Alternative 2 PM Peak Hour
08/29/2024



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	276	194	20	32	154	563	17	950
v/c Ratio	1.15	0.46	0.27	0.21	0.60	0.48	0.03	1.00
Control Delay	150.9	12.5	64.7	40.4	39.0	10.2	10.1	58.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	150.9	12.5	64.7	40.4	39.0	10.2	10.1	58.5
Queue Length 50th (ft)	~251	16	15	16	36	233	5	~820
Queue Length 95th (ft)	#423	79	42	45	#241	89	m10	#1112
Internal Link Dist (ft)		308		162		891		2180
Turn Bay Length (ft)	220				200		184	
Base Capacity (vph)	240	502	75	278	256	1178	505	952
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.15	0.39	0.27	0.12	0.60	0.48	0.03	1.00

Intersection Summary

- ~ 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.

HCM 6th Signalized Intersection Summary

3: Philadelphia Pike & Harvey Rd

29919 Alternative 2 PM Peak Hour
08/29/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	265	26	160	19	21	10	148	502	38	16	682	230
Future Volume (veh/h)	265	26	160	19	21	10	148	502	38	16	682	230
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.89	1.00		0.99	0.99		0.99
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	1900	1900	1870	1900	1900	1900	1900	1885	1900	1900	1885	1900
Adj Flow Rate, veh/h	276	27	167	20	22	10	154	523	40	17	710	240
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, %	0	0	2	0	0	0	0	1	0	0	1	0
Cap, veh/h	241	36	222	37	57	26	196	1037	79	586	774	262
Arrive On Green	0.13	0.16	0.16	0.02	0.05	0.05	0.08	1.00	1.00	0.02	0.58	0.58
Sat Flow, veh/h	1810	222	1373	1810	1184	538	1810	1727	132	1810	1342	454
Grp Volume(v), veh/h	276	0	194	20	0	32	154	0	563	17	0	950
Grp Sat Flow(s),veh/h/ln	1810	0	1596	1810	0	1721	1810	0	1859	1810	0	1796
Q Serve(g_s), s	16.0	0.0	13.9	1.3	0.0	2.2	4.5	0.0	0.0	0.5	0.0	57.1
Cycle Q Clear(g_c), s	16.0	0.0	13.9	1.3	0.0	2.2	4.5	0.0	0.0	0.5	0.0	57.1
Prop In Lane	1.00		0.86	1.00		0.31	1.00		0.07	1.00		0.25
Lane Grp Cap(c), veh/h	241	0	257	37	0	83	196	0	1116	586	0	1036
V/C Ratio(X)	1.14	0.00	0.75	0.55	0.00	0.39	0.79	0.00	0.50	0.03	0.00	0.92
Avail Cap(c_a), veh/h	241	0	386	75	0	258	196	0	1116	628	0	1036
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	1.00	1.00	0.00	1.00	0.90	0.00	0.90	0.71	0.00	0.71
Uniform Delay (d), s/veh	52.0	0.0	48.0	58.2	0.0	55.4	25.9	0.0	0.0	9.9	0.0	22.8
Incr Delay (d2), s/veh	102.3	0.0	6.3	16.7	0.0	4.1	17.0	0.0	1.5	0.0	0.0	10.7
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(50%),veh/ln	14.0	0.0	5.9	0.8	0.0	1.0	3.3	0.0	0.5	0.2	0.0	25.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	154.3	0.0	54.4	75.0	0.0	59.5	42.9	0.0	1.5	10.0	0.0	33.5
LnGrp LOS	F	A	D	E	A	E	D	A	A	A	A	C
Approach Vol, veh/h		470			52			717			967	
Approach Delay, s/veh		113.1			65.5			10.4			33.1	
Approach LOS		F			E			B			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.2	79.0	8.4	25.4	10.0	76.2	22.0	11.8				
Change Period (Y+Rc), s	5.0	7.0	6.0	6.0	5.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	5.0	57.0	5.0	29.0	5.0	57.0	16.0	18.0				
Max Q Clear Time (g_c+I1), s	2.5	2.0	3.3	15.9	6.5	59.1	18.0	4.2				
Green Ext Time (p_c), s	0.0	6.3	0.0	1.2	0.0	0.0	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay			43.5									
HCM 6th LOS			D									

Queues
4: Philadelphia Pike & Commonwealth Ave

29919 Alternative 2 PM Peak Hour
08/29/2024



Lane Group	EBT	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	93	4	47	771	941	61
v/c Ratio	0.51	0.02	0.12	0.49	0.65	0.05
Control Delay	20.8	0.2	2.9	4.2	5.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	0.2	2.9	4.2	5.3	0.1
Queue Length 50th (ft)	1	0	2	55	183	0
Queue Length 95th (ft)	53	0	m22	m246	46	m0
Internal Link Dist (ft)	259	219		2180	539	
Turn Bay Length (ft)			230			45
Base Capacity (vph)	240	237	512	1580	1439	1216
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	0.39	0.02	0.09	0.49	0.65	0.05

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Philadelphia Pike & Commonwealth Ave

29919 Alternative 2 PM Peak Hour
08/29/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	0	50	2	0	2	46	754	2	0	922	60
Future Volume (vph)	41	0	50	2	0	2	46	754	2	0	922	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.0	6.0			6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes		0.98			1.00		1.00	1.00			1.00	0.98
Flpb, ped/bikes		1.00			0.99		1.00	1.00			1.00	1.00
Frt		0.93			0.93		1.00	1.00			1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1686			1719		1805	1899			1900	1577
Flt Permitted		0.85			0.82		0.21	1.00			1.00	1.00
Satd. Flow (perm)		1471			1444		401	1899			1900	1577
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	42	0	51	2	0	2	47	769	2	0	941	61
RTOR Reduction (vph)	0	85	0	0	4	0	0	0	0	0	0	15
Lane Group Flow (vph)	0	8	0	0	0	0	47	771	0	0	941	46
Confl. Peds. (#/hr)			3	3			1		2	2		1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		8.2			8.2		99.8	99.8			89.9	89.9
Effective Green, g (s)		8.2			8.2		99.8	99.8			89.9	89.9
Actuated g/C Ratio		0.07			0.07		0.83	0.83			0.75	0.75
Clearance Time (s)		6.0			6.0		5.0	6.0			6.0	6.0
Vehicle Extension (s)		4.0			4.0		3.0	4.0			4.0	4.0
Lane Grp Cap (vph)		100			98		390	1579			1423	1181
v/s Ratio Prot							0.00	c0.41			c0.50	
v/s Ratio Perm		c0.01			0.00		0.10					0.03
v/c Ratio		0.08			0.00		0.12	0.49			0.66	0.04
Uniform Delay, d1		52.4			52.1		6.4	2.9			7.5	3.9
Progression Factor		1.00			1.00		1.35	1.07			0.46	0.11
Incremental Delay, d2		0.5			0.0		0.1	0.8			1.5	0.0
Delay (s)		52.9			52.1		8.7	3.8			4.9	0.5
Level of Service		D			D		A	A			A	A
Approach Delay (s)		52.9			52.1			4.1			4.6	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay		6.8			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		120.0			Sum of lost time (s)			19.0				
Intersection Capacity Utilization		65.4%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.



Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	303	774	66	191	990
v/c Ratio	0.65	0.87	0.09	0.70	0.79
Control Delay	31.2	37.4	8.1	61.3	19.0
Queue Delay	0.0	0.0	0.0	0.0	3.8
Total Delay	31.2	37.4	8.1	61.3	22.8
Queue Length 50th (ft)	126	558	0	151	500
Queue Length 95th (ft)	222	#872	27	m183	484
Internal Link Dist (ft)	472	396			390
Turn Bay Length (ft)			250	125	
Base Capacity (vph)	467	886	762	297	1259
Starvation Cap Reductn	0	0	0	0	189
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.65	0.87	0.09	0.64	0.93

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

5: Philadelphia Pike & Gov. Printz Blvd

29919 Alternative 2 PM Peak Hour
08/29/2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰		↑	↱	↰	↱
Traffic Volume (vph)	60	230	743	63	183	950
Future Volume (vph)	60	230	743	63	183	950
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		7.0	7.0	5.0	7.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.89		1.00	0.85	1.00	1.00
Flt Protected	0.99		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1615		1900	1580	1770	1900
Flt Permitted	0.99		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1615		1900	1580	1770	1900
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	62	240	774	66	191	990
RTOR Reduction (vph)	98	0	0	25	0	0
Lane Group Flow (vph)	205	0	774	41	191	990
Confl. Peds. (#/hr)				1	1	
Heavy Vehicles (%)	0%	5%	0%	0%	2%	0%
Turn Type	Perm		NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	4			2		
Actuated Green, G (s)	27.4		56.0	56.0	18.6	79.6
Effective Green, g (s)	27.4		56.0	56.0	18.6	79.6
Actuated g/C Ratio	0.23		0.47	0.47	0.16	0.66
Clearance Time (s)	6.0		7.0	7.0	5.0	7.0
Vehicle Extension (s)	4.0		4.0	4.0	3.0	4.0
Lane Grp Cap (vph)	368		886	737	274	1260
v/s Ratio Prot			c0.41		0.11	c0.52
v/s Ratio Perm	c0.13			0.03		
v/c Ratio	0.56		0.87	0.06	0.70	0.79
Uniform Delay, d1	40.9		28.8	17.5	48.0	14.2
Progression Factor	1.00		0.86	0.92	1.11	1.05
Incremental Delay, d2	2.3		10.6	0.1	4.7	3.1
Delay (s)	43.2		35.6	16.3	58.0	18.1
Level of Service	D		D	B	E	B
Approach Delay (s)	43.2		34.0			24.6
Approach LOS	D		C			C
Intersection Summary						
HCM 2000 Control Delay			30.4		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.83			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	23.0
Intersection Capacity Utilization			81.7%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
6: Philadelphia Pike & Seminole Ave

29919 Alternative 2 PM Peak Hour
08/29/2024



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	48	63	957	1216
v/c Ratio	0.37	0.41	0.61	0.79
Control Delay	45.5	33.3	4.9	8.2
Queue Delay	0.2	0.2	0.3	1.3
Total Delay	45.7	33.5	5.2	9.5
Queue Length 50th (ft)	24	19	80	212
Queue Length 95th (ft)	62	62	m131	776
Internal Link Dist (ft)	300	239	390	488
Turn Bay Length (ft)				
Base Capacity (vph)	341	363	1562	1547
Starvation Cap Reductn	0	0	155	4
Spillback Cap Reductn	75	78	0	152
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.18	0.22	0.68	0.87

Intersection Summary

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

HCM 6th Signalized Intersection Summary 6: Philadelphia Pike & Seminole Ave

29919 Alternative 2 PM Peak Hour
08/29/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	4	16	19	5	37	15	900	14	27	1124	28
Future Volume (veh/h)	27	4	16	19	5	37	15	900	14	27	1124	28
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	1900	1900	1900	1796	1900	1900	1900	1900	1767	1900	1900	1900
Adj Flow Rate, veh/h	28	4	16	20	5	38	15	928	14	28	1159	29
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	7	0	0	0	0	9	0	0	0
Cap, veh/h	94	15	31	62	13	54	41	1523	23	51	1485	37
Arrive On Green	0.05	0.05	0.05	0.05	0.05	0.05	0.84	0.84	0.84	1.00	1.00	1.00
Sat Flow, veh/h	867	279	573	420	244	1010	13	1818	27	24	1772	44
Grp Volume(v), veh/h	48	0	0	63	0	0	957	0	0	1216	0	0
Grp Sat Flow(s),veh/h/ln	1718	0	0	1675	0	0	1857	0	0	1840	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.1	0.0	0.0	4.3	0.0	0.0	19.9	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.58		0.33	0.32		0.60	0.02		0.01	0.02		0.02
Lane Grp Cap(c), veh/h	140	0	0	130	0	0	1587	0	0	1572	0	0
V/C Ratio(X)	0.34	0.00	0.00	0.49	0.00	0.00	0.60	0.00	0.00	0.77	0.00	0.00
Avail Cap(c_a), veh/h	382	0	0	384	0	0	1587	0	0	1572	0	0
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	0.37	0.00	0.00	0.41	0.00	0.00
Uniform Delay (d), s/veh	55.2	0.0	0.0	55.7	0.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	2.0	0.0	0.0	4.0	0.0	0.0	0.6	0.0	0.0	1.6	0.0	0.0
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(50%),veh/ln	1.5	0.0	0.0	2.0	0.0	0.0	4.7	0.0	0.0	0.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.2	0.0	0.0	59.7	0.0	0.0	3.8	0.0	0.0	1.6	0.0	0.0
LnGrp LOS	E	A	A	E	A	A	A	A	A	A	A	A
Approach Vol, veh/h	48			63			957			1216		
Approach Delay, s/veh	57.2			59.7			3.8			1.6		
Approach LOS	E			E			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	107.5			12.5			107.5			12.5		
Change Period (Y+Rc), s	7.0			6.0			7.0			6.0		
Max Green Setting (Gmax), s	81.0			26.0			81.0			26.0		
Max Q Clear Time (g_c+I1), s	21.9			5.1			2.0			6.3		
Green Ext Time (p_c), s	16.2			0.2			31.7			0.4		
Intersection Summary												
HCM 6th Ctrl Delay	5.3											
HCM 6th LOS	A											



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	33	63	933	58	1227
v/c Ratio	0.50	0.22	0.31	0.65	0.14	0.85
Control Delay	44.0	28.6	8.8	6.2	1.6	16.1
Queue Delay	0.0	0.0	0.0	0.2	0.0	1.6
Total Delay	44.0	28.6	8.8	6.3	1.6	17.7
Queue Length 50th (ft)	35	8	5	159	2	158
Queue Length 95th (ft)	82	39	m16	299	m6	m#398
Internal Link Dist (ft)	387	309		488		946
Turn Bay Length (ft)			110		135	
Base Capacity (vph)	197	195	297	1440	549	1439
Starvation Cap Reductn	0	0	0	71	0	90
Spillback Cap Reductn	0	0	0	0	0	49
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.17	0.21	0.68	0.11	0.91

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

7: Philadelphia Pike & Manor Ave

29919 Alternative 2 PM Peak Hour
08/29/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	5	35	9	2	21	60	892	4	56	1124	54
Future Volume (vph)	35	5	35	9	2	21	60	892	4	56	1124	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99			0.96		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.98			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.91		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1685			1637		1805	1880		1805	1880	
Flt Permitted		0.83			0.90		0.07	1.00		0.22	1.00	
Satd. Flow (perm)		1439			1487		139	1880		419	1880	
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)	36	5	36	9	2	22	62	929	4	58	1171	56
RTOR Reduction (vph)	0	28	0	0	20	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	49	0	0	13	0	63	933	0	58	1226	0
Confl. Peds. (#/hr)	7		2	2		7	15		2	2		15
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.3			9.3		93.9	88.6		93.5	88.4	
Effective Green, g (s)		9.3			9.3		93.9	88.6		93.5	88.4	
Actuated g/C Ratio		0.08			0.08		0.78	0.74		0.78	0.74	
Clearance Time (s)		6.0			6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)		111			115		182	1388		385	1384	
v/s Ratio Prot							c0.02	0.50		0.01	c0.65	
v/s Ratio Perm		c0.03			0.01		0.25			0.11		
v/c Ratio		0.44			0.11		0.35	0.67		0.15	0.89	
Uniform Delay, d1		52.9			51.5		21.4	8.2		6.5	12.0	
Progression Factor		1.00			1.00		2.02	0.43		0.47	0.82	
Incremental Delay, d2		3.8			0.6		0.9	2.1		0.1	4.7	
Delay (s)		56.7			52.1		44.3	5.7		3.2	14.6	
Level of Service		E			D		D	A		A	B	
Approach Delay (s)		56.7			52.1			8.1			14.1	
Approach LOS		E			D			A			B	
Intersection Summary												
HCM 2000 Control Delay		13.5					HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		120.0					Sum of lost time (s)			19.0		
Intersection Capacity Utilization		80.0%					ICU Level of Service			D		
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Edition methodology does not support exclusive ped or hold phases.

Queues
8: Philadelphia Pike & Darley Rd

29919 Alternative 2 PM Peak Hour
08/29/2024



Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	214	281	41	228	664	26	921	234
v/c Ratio	0.82	0.59	0.29	0.83	0.60	0.07	0.99	0.29
Control Delay	74.5	11.0	48.3	54.9	25.9	8.6	42.6	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.5	11.0	48.3	54.9	25.9	8.6	42.6	6.9
Queue Length 50th (ft)	162	0	24	148	303	6	~758	27
Queue Length 95th (ft)	#282	79	60	242	403	m7	m#980	m32
Internal Link Dist (ft)	313		348		946		1190	
Turn Bay Length (ft)		150		130		50		150
Base Capacity (vph)	272	481	443	320	1108	443	928	820
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.58	0.09	0.71	0.60	0.06	0.99	0.29

Intersection Summary

- ~ 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.

HCM 6th Signalized Intersection Summary 8: Philadelphia Pike & Darley Rd

29919 Alternative 2 PM Peak Hour
08/29/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	187	20	273	16	16	9	221	614	30	25	893	227
Future Volume (veh/h)	187	20	273	16	16	9	221	614	30	25	893	227
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	1900	1900	1900	1900	1900	1900	1900	1900	1900	1826	1900	1885
Adj Flow Rate, veh/h	193	21	281	16	16	9	228	633	31	26	921	234
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	0	0	5	0	1
Cap, veh/h	246	27	242	22	22	12	254	1068	52	497	998	835
Arrive On Green	0.15	0.15	0.15	0.03	0.03	0.03	0.19	1.00	1.00	0.01	0.17	0.17
Sat Flow, veh/h	1640	178	1610	700	700	394	1810	1796	88	1739	1900	1590
Grp Volume(v), veh/h	214	0	281	41	0	0	228	0	664	26	921	234
Grp Sat Flow(s),veh/h/ln	1818	0	1610	1794	0	0	1810	0	1884	1739	1900	1590
Q Serve(g_s), s	13.6	0.0	18.0	2.7	0.0	0.0	9.0	0.0	0.0	0.8	57.2	15.3
Cycle Q Clear(g_c), s	13.6	0.0	18.0	2.7	0.0	0.0	9.0	0.0	0.0	0.8	57.2	15.3
Prop In Lane	0.90		1.00	0.39		0.22	1.00		0.05	1.00		1.00
Lane Grp Cap(c), veh/h	273	0	242	56	0	0	254	0	1120	497	998	835
V/C Ratio(X)	0.78	0.00	1.16	0.74	0.00	0.00	0.90	0.00	0.59	0.05	0.92	0.28
Avail Cap(c_a), veh/h	273	0	242	434	0	0	325	0	1120	614	998	835
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.72	0.00	0.72	0.10	0.10	0.10
Uniform Delay (d), s/veh	49.1	0.0	51.0	57.7	0.0	0.0	29.8	0.0	0.0	12.6	47.2	29.9
Incr Delay (d2), s/veh	14.7	0.0	109.3	23.2	0.0	0.0	17.5	0.0	1.7	0.0	2.0	0.1
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(50%),veh/ln	7.2	0.0	14.6	1.6	0.0	0.0	7.1	0.0	0.5	0.3	29.7	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.8	0.0	160.3	80.9	0.0	0.0	47.3	0.0	1.7	12.6	49.3	30.0
LnGrp LOS	E	A	F	F	A	A	D	A	A	B	D	C
Approach Vol, veh/h		495			41			892			1181	
Approach Delay, s/veh		118.6			80.9			13.3			44.6	
Approach LOS		F			F			B			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.9	78.4		24.0	16.3	70.0		9.7				
Change Period (Y+Rc), s	5.0	7.0		6.0	5.0	7.0		6.0				
Max Green Setting (Gmax), s	11.0	38.0		18.0	16.0	33.0		29.0				
Max Q Clear Time (g_c+I1), s	2.8	2.0		20.0	11.0	59.2		4.7				
Green Ext Time (p_c), s	0.0	7.5		0.0	0.3	0.0		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			48.5									
HCM 6th LOS			D									
Notes												
User approved pedestrian interval to be less than phase max green.												

Queues
9: Philadelphia Pike & I-495 NB Ramp

29919 Alternative 2 PM Peak Hour
08/29/2024



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	312	362	326	412	789	4
v/c Ratio	0.84	0.23	0.95	0.32	0.99	0.00
Control Delay	65.3	0.3	76.8	12.2	65.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.3	0.3	76.8	12.2	65.6	0.0
Queue Length 50th (ft)	231	0	249	159	~610	0
Queue Length 95th (ft)	#373	0	m#421	m277	#880	0
Internal Link Dist (ft)	651			1190	836	
Turn Bay Length (ft)		183	425			180
Base Capacity (vph)	384	1583	344	1281	793	1582
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	0.81	0.23	0.95	0.32	0.99	0.00

Intersection Summary

- ~ 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.

HCM 6th Signalized Intersection Summary

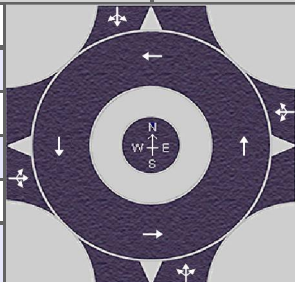
9: Philadelphia Pike & I-495 NB Ramp

29919 Alternative 2 PM Peak Hour
08/29/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	282	5	333	300	379	0	0	726	4
Future Volume (veh/h)	0	0	0	282	5	333	300	379	0	0	726	4
Initial Q (Qb), veh				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
Parking Bus, Adj				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		
Adj Sat Flow, veh/h/ln				1870	1900	1870	1885	1885	0	0	1856	1900
Adj Flow Rate, veh/h				307	5	0	326	412	0	0	789	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	0	2	1	1	0	0	3	0
Cap, veh/h				349	6		344	1312	0	0	827	
Arrive On Green				0.20	0.20	0.00	0.19	0.70	0.00	0.00	0.45	0.00
Sat Flow, veh/h				1782	29	1585	1795	1885	0	0	1856	1610
Grp Volume(v), veh/h				312	0	0	326	412	0	0	789	0
Grp Sat Flow(s),veh/h/ln				1811	0	1585	1795	1885	0	0	1856	1610
Q Serve(g_s), s				20.1	0.0	0.0	21.5	10.2	0.0	0.0	49.2	0.0
Cycle Q Clear(g_c), s				20.1	0.0	0.0	21.5	10.2	0.0	0.0	49.2	0.0
Prop In Lane				0.98		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				354	0		344	1312	0	0	827	
V/C Ratio(X)				0.88	0.00		0.95	0.31	0.00	0.00	0.95	
Avail Cap(c_a), veh/h				392	0		344	1312	0	0	827	
HCM Platoon Ratio				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	0.77	0.77	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				46.9	0.0	0.0	47.9	7.1	0.0	0.0	32.0	0.0
Incr Delay (d2), s/veh				25.4	0.0	0.0	29.8	0.5	0.0	0.0	21.8	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				11.4	0.0	0.0	12.3	3.9	0.0	0.0	26.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				72.3	0.0	0.0	77.7	7.6	0.0	0.0	53.9	0.0
LnGrp LOS				E	A		E	A	A	A	D	
Approach Vol, veh/h				312			738				789	
Approach Delay, s/veh				72.3			38.5				53.9	
Approach LOS				E			D				D	
Timer - Assigned Phs	2			4	5	6						
Phs Duration (G+Y+Rc), s	90.5			29.5	30.0	60.5						
Change Period (Y+Rc), s	7.0			6.0	7.0	7.0						
Max Green Setting (Gmax), s	81.0			26.0	23.0	51.0						
Max Q Clear Time (g_c+I1), s	12.2			22.1	23.5	51.2						
Green Ext Time (p_c), s	4.2			1.4	0.0	0.0						
Intersection Summary												
HCM 6th Ctrl Delay				50.8								
HCM 6th LOS				D								
Notes												
Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.												

Output Files
Future Conditions
Transportation Scenario 3
AM Peak Hour

HCS7 Roundabouts Report

General Information			Site Information		
Analyst	Kittelson & Associates		Intersection	Philly Pk & Gov. Printz	
Agency or Co.	WILMAPCO		E/W Street Name	Gov. Printz Blvd	
Date Performed	8/7/2024		N/S Street Name	Philadelphia Pike	
Analysis Year	2050		Analysis Time Period (hrs)	0.25	
Time Analyzed	Build Future PM		Peak Hour Factor	0.97	
Project Description	Scenario 3		Jurisdiction	Claymont, DE	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	0	0	0	0	51	0	175	0	0	559	31	0	71	596	0
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	3	0	0	6	2	0
Flow Rate (v_{pc}), pc/h	0	0	0	0	0	53	0	188	0	0	594	32	0	78	627	0
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				1				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

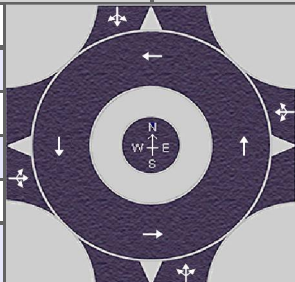
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		0			241			626			705	
Entry Volume, veh/h		0			234			609			688	
Circulating Flow (v_c), pc/h	758			594			78			53		
Exiting Flow (v_{ex}), pc/h	110			0			782			680		
Capacity (C_{pc}), pc/h		637			753			1274			1307	
Capacity (c), veh/h		637			730			1239			1276	
v/c Ratio (x)		0.00			0.32			0.49			0.54	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		5.7			8.8			8.1			8.8	
Lane LOS		A			A			A			A	
95% Queue, veh		0.0			1.4			2.8			3.4	
Approach Delay, s/veh				8.8			8.1			8.8		
Approach LOS				A			A			A		
Intersection Delay, s/veh LOS	8.5						A					

Output Files
Future Conditions
Transportation Scenario 3
PM Peak Hour

HCS7 Roundabouts Report

General Information				Site Information			
Analyst	Kittelson & Associates		Intersection	Philly Pk & Gov. Printz			
Agency or Co.	WILMAPCO		E/W Street Name	Gov. Printz Blvd			
Date Performed	8/7/2024		N/S Street Name	Philadelphia Pike			
Analysis Year	2050		Analysis Time Period (hrs)	0.25			
Time Analyzed	Build Future PM		Peak Hour Factor	0.97			
Project Description	Scenario 3		Jurisdiction	Claymont, DE			

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	0	0	0	0	60	0	230	0	0	743	63	0	183	950	0
Percent Heavy Vehicles, %	0	0	0	0	0	0	0	5	0	0	0	0	0	2	0	0
Flow Rate (v_{pc}), pc/h	0	0	0	0	0	62	0	249	0	0	766	65	0	192	979	0
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				1				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		0			311			831			1171	
Entry Volume, veh/h		0			299			831			1167	
Circulating Flow (v_c), pc/h	1233			766			192			62		
Exiting Flow (v_{ex}), pc/h	257			0			1015			1041		
Capacity (C_{pce}), pc/h		392			632			1135			1295	
Capacity (c), veh/h		392			608			1135			1291	
v/c Ratio (x)		0.00			0.49			0.73			0.90	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		9.2			14.0			15.0			25.7	
Lane LOS		A			B			B			D	
95% Queue, veh		0.0			2.7			6.9			14.6	
Approach Delay, s/veh				14.0			15.0			25.7		
Approach LOS				B			B			D		
Intersection Delay, s/veh LOS	20.3						C					