

Traffic Impact Study

for the proposed

Residential Projects at Big Tree Road and Parker Road

Town of Hamburg
Erie County, New York

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Project No. 41019

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EXECUTIVE SUMMARY

OVERVIEW

The purpose of this report is to evaluate the potential traffic impacts related to two proposed residential projects located along the south side of Big Tree Road and west side of Parker Road in the Town of Hamburg, NY. Within this report, the operating characteristics of the proposed access drives and impacts to the adjacent roadway network are identified and evaluated, and mitigating measures, if needed, are provided to minimize capacity or safety concerns.

To define traffic impact, this analysis establishes existing baseline traffic conditions, projects background traffic flow including area growth, and determines the traffic operations that would result from the proposed project.

As stated, this report evaluates two separate residential projects in this singular report. One of the residential projects consists entirely of single-family homes (located along Parker Road) and one consists entirely of multifamily apartment units (located along Big Tree Road). It is important to mention that the two proposed residential projects are not dependent on each other since they involve different project sponsors and do not involve vehicular connections (roadway, driveways, etc.) between the two separate project sites. It is our understanding that the Town of Hamburg Planning Board requested that the potential traffic impacts of both residential projects be evaluated simultaneously given the geographic proximity of the project sites to determine if there would be cumulative potentially significant adverse traffic impacts.

The single-family residential subdivision project site is bounded by residential development to the north, Parker Road to the east, residential development to the south, and undeveloped lands to the west. The multifamily project site is bounded by Big Tree Road to the north, primarily undeveloped lands to the east, residential development to the south, and commercial development to the west. Each project site is currently undeveloped.

Land uses in the vicinity of the proposed projects include commercial, educational, and residential. The study area includes the following existing intersections:

- Big Tree Road/Southwestern Boulevard
- Big Tree Road/Parker Road
- Big Tree Road/Abbott Road
- Parker Road/Marilyn Drive

The proposed projects consist of a 156-unit multifamily complex along Big Tree Road and a 67-lot single-family residential subdivision along Parker Road. It is important to mention that the project site for the multifamily project will include 20.1 acre of Permanent Open (nearly 50% of the approximately 42-acre site) that will remain permanently undeveloped via a deed restriction to be recorded at the Erie County Clerk's Office and that there will not be any roadway or driveway connections (including no gated emergency access driveway) from the multifamily project site onto Wilson Road. The original Concept Plan for the multifamily project site included a proposed 18 lot residential subdivision that would have included a public roadway connecting to Wilson Drive opposite of Tomaka Drive. However, the 18-lot residential subdivision was eliminated based on input received during the review process.

Access to the multifamily project will be provided via two new driveways along Big Tree Road. Access to the residential subdivision will be provided via two new driveways along Parker Road; of which one will be at the existing intersection of Parker Road/Marilyn Drive. Figures 5

(multifamily project) and 6 (single-family residential subdivision) depict the proposed site plans for each project.

Construction of both residential projects are anticipated to reach full build-out in approximately two to three years depending on market conditions. Town of Hamburg personnel were contacted to discuss any other specific projects that are currently approved or under construction that would generate additional traffic in the study area. No projects were identified.

In addition, to account for normal increases in background traffic growth, including any unforeseen developments in the project study area, and given the length of time (3 years) associated with full build-out of the proposed project, a growth rate of 0.5% has been applied to the existing traffic volumes in the study area based upon a review of historical traffic information obtained from the NYSDOT. All ambient growth calculations are included in the Appendices.

CONCLUSIONS & RECOMMENDATIONS

This Traffic Impact Study identifies and evaluates the potential traffic impacts that can be expected from the two proposed residential projects in the Town of Hamburg, New York, as described in this study. The results of this study determined that the existing transportation network can adequately accommodate the cumulative projected traffic volumes from both proposed residential projects and the resulting minor impacts to study area intersections with the noted improvements in place. The following sets forth the conclusions and recommendations based upon the results of the analyses:

1. The proposed residential projects are expected to generate approximately 30 entering/95 exiting vehicle trips during the AM peak hour and 98 entering/59 exiting vehicle trips during the PM peak hour.
2. The existing crash investigation did not reveal inherent safety deficiencies related to the geometric design of the study area intersections.
3. The left-turn warrant investigation at the proposed driveways along Big Tree Road determined that the proposed Driveway multifamily project Big Tree Road/Proposed Multifamily Easterly Driveway during the PM peak hour was satisfied; no other peak hours at either the proposed westerly or easterly intersections for the proposed multifamily family project were satisfied.
4. At the intersection of Big Tree Road/Proposed Multifamily Westerly Driveway, the existing striping pattern should be restriped to legally accommodate drivers turning left from Big Tree Road onto the proposed driveway via a two-way left-turn lane (TWLTL) treatment. This maintains the ability for drivers to turn left onto the commercial driveway west of the proposed driveway location while accommodating drivers to exit the proposed westerly driveway.
5. The projected traffic impacts resulting from full development of both of the proposed residential projects during both peak hours can be accommodated by the existing transportation network with the noted improvements in place.
6. For purposes of the environmental review of the proposed residential projects pursuant to the State Environmental Quality Review Act (SEQRA), it is our firm's professional opinion that the proposed residential projects will not result in any cumulative potentially significant adverse traffic impacts to the study area intersections. Given that both proposed residential projects will not result in any cumulative potentially significant traffic impacts, our firm's professional opinion as state above also applies to each of the two proposed residential projects if they had been evaluated separately.

I. INTRODUCTION

The purpose of this report is to evaluate the potential traffic impacts related to the proposed residential projects located along the south side of Big Tree Road and west side of Parker Road in the Town of Hamburg, NY. Within this report, the operating characteristics of the proposed access drives and impacts to the adjacent roadway network are identified and evaluated, and mitigating measures, if needed, are provided to minimize capacity or safety concerns.

To define traffic impact, this analysis establishes existing baseline traffic conditions, projects background traffic flow including area growth, and determines the traffic operations that would result from the proposed project.

II. LOCATION

As stated previously above, this report evaluates two separate residential projects located in close geographic proximity in this singular report as requested by the Town of Hamburg Planning Board. One of the residential projects consists entirely of single-family homes (located along Parker Road) and one consists entirely of multifamily units (located along Big Tree Road with no vehicular connections to Wilson Drive).

The single-family development is bounded by residential development to the north, Parker Road to the east, residential development to the south, and undeveloped lands to the west. The multifamily development is bounded by Big Tree Road to the north, primarily undeveloped lands to the east, residential development to the south, and commercial development to the west. Each of the project sites are currently undeveloped.

Land uses in the vicinity of the proposed projects include commercial, educational, and residential. The study area includes the following existing intersections:

- Big Tree Road/Southwestern Boulevard
- Big Tree Road/Parker Road
- Big Tree Road/Abbott Road
- Parker Road/Marilyn Drive

The site location and study area are illustrated in Figure 1 (all figures are included at the end of this report).

III. EXISTING HIGHWAY SYSTEM

The following information outlined in Table I provides a description of the existing roadway network within project study area. Figure 2 illustrates the lane geometry at each of the study intersections and the Annual Average Daily Traffic (AADT) volumes on the study roadways. The AADTs reflect the most recently collected data obtained from the New York State Department of Transportation (NYSDOT)

TABLE I: EXISTING HIGHWAY SYSTEM

ROADWAY ¹	CLASS ²	AGENCY ³	SPEED LIMIT ⁴	# OF TRAVEL LANES ⁵	TRAVEL PATTERN/DIRECTION	EST. AADT ⁶ & SOURCE ⁷
Southwestern Blvd (US-20)	14	NYSDOT	50	6	Two-way/Northeast-Southwest	21,267 NYSDOT (2016)
Big Tree Road (US-20A)	14	NYSDOT	45	2	Two-way/East-West	12,584 NYSDOT (2018)
Abbott Road (CR-4)	16	ECDPW	45	4	Two-way/North-South	7,586 NYSDOT (2018)
Parker Road	19	Town	30	2	Two-way/North-South	1,500 SRF (2021)
Marilyn Drive	19	Town	30	2	Two-way/East-West	280 SRF (2021)

Notes:

1. Route Name/Number: "NY" = New York; "CR" = County Road
2. State Functional Classification of Roadway (All are Urban): 14 = Principal Arterial, 16 = Minor Arterial, 19 = Local
3. Jurisdictional Agency of Roadway. "NYSDOT" = New York State Department of Transportation; "ECDPW" = Erie County Department of Public Works
4. Posted or Statewide Limit in Miles per Hour (mph).
5. Excludes turning/auxiliary lanes developed at intersections.
6. Estimated AADT in Vehicles per Day (vpd).
7. AADT Source (Year). SRF data estimated based upon an extrapolation of turning movement counts.

PEDESTRIAN & BICYCLE FACILITIES

There are sidewalks along both sides of Southwestern Boulevard and there is a short segment of sidewalk along the south side Big Tree Rd that extends from Southwestern Boulevard to the commercial plaza driveway.

There are no dedicated bicycle lanes or trails although cyclists are permitted to share the road on all roadways within the study area.

TRANSIT FACILITIES

Public transit service within the study area is provided by the Niagara Frontier Transit Metro System, Inc (NFTA). NFTA currently provides service via Route 72 along Abbott Road and Big Tree Road (east of Abbott Road).

IV. EXISTING TRAFFIC CONDITIONS**A. Peak Intervals for Analysis**

Given the functional characteristics of the corridors, adjacent land uses, and the proposed land use for the project sites (residential), the peak hours selected for analysis are the weekday commuter AM and PM peak periods. The combination of site traffic and adjacent through traffic produces the greatest demand during these time periods.

B. Existing Traffic Volume Data

Turning movement traffic counts were collected by SRF at the study area intersections described. Traffic counts were conducted on a typical weekday between 7:00-9:00 AM and 4:00-6:00 PM and on the dates noted in Table II. The peak hour traffic periods for each study intersection are noted in the table. The unadjusted weekday AM and PM peak hour volumes are reflected in Figure 3A. Traffic data for the Big Tree Road/Abbott Road intersection was obtained from the GBNRTC database. This data was collected on Tuesday, September 10, 2019 and inflated using the growth rate discussed in Section V to establish representative 2021 peak hour volumes.

TABLE II: STUDY INTERSECTION PEAK HOURS

INTERSECTION	DATE OF STUDY	AM PEAK HOUR	PM PEAK HOUR
Southwestern Boulevard/Big Tree Road	March 4, 2021	7:30-8:30 AM	4:00-5:00 PM
Big Tree Road/Parker Road/ECC Driveway	March 4, 2021	7:15-8:15 AM	4:00-5:00 PM
Big Tree Road/Abbott Road	September 10, 2019	7:30-8:30 AM	4:00-5:00 PM
Parker Road/Marilyn Drive	March 4, 2021	7:15-8:15 AM	4:00-5:00 PM

It is noted, however, that traffic volumes are currently lower than normal because of business restrictions resulting from COVID-19 pandemic. Traffic volumes were compared to traffic data obtained in various locations before the COVID-19 pandemic by the NYSDOT and adjusted to reflect 2021 representative traffic conditions by increasing the collected traffic volumes. This is consistent with NYSDOT and ITE methodology for adjustments related to collected traffic volumes affected by the COVID-19 pandemic. The collected traffic volumes were generally 20% lower during the peak periods.

Given the proximity to ECC South Campus, this study researched the effect of the pandemic on in-person sessions at the campus. ECC personnel stated that approximately 20% of sessions are held in-person. Therefore, this study increased the volume of traffic related to ECC South Campus, using the traffic counts obtained at the Big Tree Road/Parker Road/ECC Driveway, to reflect typical ECC South Campus conditions.

Figure 3B illustrates the representative 2021 weekday AM and PM peak hour base volumes used for analysis purposes in this study.

C. Field Observations

The study intersections were observed during both peak intervals to assess current traffic operations. Signal timing information was obtained from the NYSDOT through a Freedom of Information (FOIL) request to determine peak hour phasing plans and phase durations during each interval. This information was used to support and/or calibrate capacity analysis models described in detail later in this report.

D. Existing Crash Investigation

The purpose of this crash analysis is to identify inherent safety issues by studying and quantifying historical crashes at the study intersections and identifying potential crash patterns and clusters.

A crash cluster is defined as an abnormal occurrence of similar crash types occurring at approximately the same location or involving the same geometric features. The severity of the crashes should also be considered. A history of crashes is an indication that further analysis is required to determine the cause(s) of the crash(es) and to identify what actions, if any, could be taken to mitigate the crashes.

A crash investigation within the study area was conducted to assess the safety history from January 1, 2018 through December 31, 2020. The data was provided by the New York State Department of Motor Vehicles (NYSDMV) through a Freedom of Information (FOIL) request.

Reportable (non-injury, injury, and fatal injury) type crashes are defined as damage to one person's property in the amount of \$1,001 or more. The Non-Reportable type crashes result in property damage of \$1,000 or less. Crash rates were computed for the study intersections and compared with New York State Department of Transportation average crash rates for similar intersections, as summarized in the following table. Intersection rates are listed as accidents (crashes) per million entering vehicle (Acc/MEV). Pertinent crash data is provided in the Appendices.

TABLE III: EXISTING ACCIDENT INVESTIGATION

INTERSECTION	TOTAL NO. OF ACCIDENTS	ACTUAL CRASH RATE	STATEWIDE AVERAGE CRASH RATE
Southwestern Boulevard/Big Tree Road	28	0.88	0.23
Big Tree Road/Parker Road	3	0.26	0.31
Big Tree Road/Abbott Road	15	0.74	0.23
Parker Road/Marilyn Drive	0	0.00	0.18

Two of the four study intersections had a crash rate lower than the statewide average. The results of the two intersections with calculated rates higher than the statewide average are described in greater detail.

Southwestern Boulevard/Big Tree Road

As shown in Table III, the study intersection has a crash rate that is 3.8 times higher than the statewide average crash rate for similar intersections. Of the 28 crashes, one was fixed object related and one was animal related. When discounting these two crashes from the total rate, the actual crash rate decreases to 0.81 Acc/MEV. Notable crash clusters—approaches with three or greater identifiable consistent crash patterns—at this location include:

- Rear-end (nine total crashes)
 - Eastbound (four crashes)
 - Westbound (three crashes)
- Right angle
 - Westbound (three crashes)

The frequency of rear-end crashes is characteristic of signalized intersections along heavily trafficked corridors, such as Southwestern Boulevard. Most of these crashes, in addition to the other reported crashes, were caused by driver inattention, following too closely, or disregard of the traffic control device. Despite the number of crashes, no inherent safety deficiencies exist related to the geometric conditions of the intersection.

Big Tree Road/Abbott Road

As shown in Table III, the study intersection has a crash rate that is 3.2 times higher than the statewide average crash rate for similar intersections. Of the 15 total crashes, three right angle crashes occurred in the northbound direction. These crashes were reportedly caused by a failure to yield the right of way. No other discernible crash patterns were identified related to geometric conditions and no apparent safety deficiencies exist.

V. FUTURE AREA DEVELOPMENT AND LOCAL GROWTH

Construction of both residential projects are anticipated to reach full build-out in approximately two to three years depending on market conditions. Town of Hamburg personnel were contacted to discuss any other specific projects that are currently approved or under construction that would generate additional traffic in the study area. No projects were identified.

In addition, to account for normal increases in background traffic growth, including any unforeseen developments in the project study area, and given the length of time (3 years) associated with full build-out of the proposed project, a growth rate of 0.5% has been applied to the existing traffic volumes in the study area based upon a review of historical traffic information obtained from the NYSDOT. All ambient growth calculations are included in the Appendices. The background traffic volumes are depicted in Figure 4.

VI. PROPOSED DEVELOPMENT

A. Description

The proposed projects consist of a 156-unit multifamily complex along Big Tree Road and a 67-lot single-family residential subdivision along Parker Road. It is important to mention that the project site for the multifamily project will include 20.1 acre of Permanent Open (nearly 50% of the approximately 42-acre site) that will remain permanently undeveloped via a deed restriction to be recorded at the Erie County Clerk's Office and that there will not be any roadway or driveway connections (including no gated emergency access driveway) from the multifamily project site onto Wilson Road. The original Concept Plan for the multifamily project site included a proposed 18 lot residential subdivision that would have included a public roadway connecting to Wilson Drive opposite of Tomaka Drive. However, the 18-lot residential subdivision was eliminated based on input received during the review process.

B. Site Traffic

The volume of traffic generated by a site is dependent on the intended land use and size of the development. Trip generation is an estimate of the number of trips generated by a specific building or land use. These trips represent the volume of traffic entering and exiting the development. Trip Generation, 10th Edition (2017) published by the Institute of Transportation Engineers (ITE) is used as a reference for this information. The trip rate for the peak hour of the generator may or may not coincide in time or volume with the trip rate for the peak hour of adjacent street traffic. Volumes generated during the peak hour of the adjacent street traffic and proposed land uses, in this case, the weekday commuter AM and PM peaks, represent a more critical volume when analyzing the capacity of the system; those intervals will provide the basis of this analysis.

Table IV shows the total site generated trips for the weekday commuter AM and PM peak hours for the proposed project. All trip generation information has been included in the Appendices.

TABLE IV: SITE GENERATED TRIPS

DESCRIPTION	ITE LUC ¹	SIZE	AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Multifamily Project	220	156 Units	17	56	55	33
Single-Family Project	210	67 Lots	13	39	43	26
Total Site Generated Trips			30	95	98	59

Note:

1. LUC = Land Use Code.

The proposed projects are expected to generate approximately 30 entering/95 exiting vehicle trips during the AM peak hour and 98 entering/59 exiting vehicle trips during the PM peak hour.

C. Site Traffic Distribution

The cumulative effect of site-generated traffic on the transportation network is dependent on the origins and destinations of that traffic and the location of the access drives serving the site. The proposed arrival/departure distribution of traffic generated by the proposed project is considered a function of several parameters, including:

- Employment centers using Census Data (e.g., OnTheMap)
- Commercial centers and schools
- Site access driveway locations
- Existing traffic patterns
- Existing traffic conditions and controls

Figure 7A shows the anticipated trip distribution pattern percentages for the traffic from the proposed multifamily project, Figure 7B shows the anticipated project trip distribution pattern percentages for the traffic from the proposed single-family project. Figures 8A and 8B illustrate the peak hour project site generated traffic based on those percentages for the multifamily and single-family projects, respectively. Figure 8C illustrates the combined total site generated trips from both projects.

VII. FULL DEVELOPMENT VOLUMES

Proposed design hour traffic volumes are developed for the AM and PM peak hours by combining the background traffic conditions (Figure 4) and the new site generated traffic volumes (Figure 8C) to yield the traffic volumes under full development conditions. The resulting design hour volumes for the proposed project are illustrated in Figure 9 under full build-out conditions.

VIII. CAPACITY ANALYSIS

A. Description of Capacity Analysis

Capacity analysis is a technique used for determining a measure of effectiveness for a section of roadway and/or intersection based on the number of vehicles during a specific time period. The measure of effectiveness used for the capacity analysis is referred to as a Level of Service (LOS). Levels of Service are calculated to provide an indication of the amount of delay that a motorist experiences while traveling along a roadway or through an intersection. Since the most amount of delay to motorists usually occurs at intersections, capacity analysis focuses on intersections, as opposed to highway segments.

Six Levels of Service are defined for analysis purposes. They are assigned letter designations, from "A" to "F", with LOS "A" representing the conditions with little to no delay, and LOS "F" conditions with very long delays. Suggested ranges of service capacity and an explanation of Levels of Service are included in the Appendices.

The standard procedure for capacity analysis of signalized and unsignalized intersections is outlined in the Highway Capacity Manual (HCM 2016) published by the Transportation Research Board. Traffic analysis software, Synchro 10, which is based on procedures and methodologies contained in the HCM, was used to analyze operating conditions at study area intersections. The procedure yields a Level of Service based on the HCM as an indicator of how well intersections operate. This study used HCM 2000 methodology for determining operations at the unsignalized intersections in accordance with local NYSDOT Region 5 guidelines.

B. Capacity Analysis Results

Existing and background operating conditions during the peak study periods are evaluated to determine a basis for comparison with the projected future conditions. The future traffic conditions generated by the project were analyzed to assess the operation of the study area intersections. Capacity results for existing, background and full development conditions are listed in Table V. The discussion following the table summarizes capacity conditions.

INTERSECTION	2021 EXISTING BASE CONDITIONS			2024 NO BUILD CONDITIONS			2024 FULL BUILD CONDITIONS			2024 FULL BUILD CONDITIONS W/ IMPROVEMENTS	
	AM	PM		AM	PM		AM	PM		AM	PM
1. SOUTHWESTERN BOULEVARD/BIG TREE ROAD (S)											
EB Left - Southwestern Boulevard	A	6.9	B 13.1	A	7.0	B 13.3	A	8.1	B 13.8		
EB Thru - Southwestern Boulevard	A	7.6	B 16.9	A	7.7	B 17.2	B	10.0	B 17.9		
EB Right - Southwestern Boulevard	A	0.7	A 0.9	A	0.7	A 0.9	A	0.8	A 1.0		
WB Left - Southwestern Boulevard	A	7.1	B 12.9	A	7.2	B 13.0	A	8.2	B 13.5		
WB Thru/Right - Southwestern Boulevard	A	9.0	C 21.5	A	9.1	C 21.9	B	10.2	C 22.8	NA	NA
NB Left - Big Tree Road	E	60.6	D 54.9	E	60.8	D 54.6	E	59.3	D 53.6		
NB Left/Thru/Right - Big Tree Road	E	59.6	D 54.6	E	59.6	D 54.2	E	57.3	D 53.5		
SB Left - Radigan's	E	55.3	E 55.1	E	55.3	E 55.1	E	55.3	E 55.1		
SB Thru/Right - Radigan's	D	41.4	C 34.0	D	41.4	C 34.0	D	41.4	C 34.0		
Overall LOS	B	13.6	C 23.5	B	13.7	C 23.7	B	15.8	C 24.0		
Volume-to-Capacity (v/c) Ratio	0.61	0.72		0.62	0.72		0.65	0.73			
2. BIG TREE ROAD/PARKER ROAD/ECC DRIVEWAY (U)											
EB - Big Tree Road	A	0.5	A 0.3	A	0.5	A 0.3	A	0.5	A 0.3		
WB - Big Tree Road	A	0.5	A 0.9	A	0.5	A 0.9	A	0.7	A 1.5		
NB - Parker Road	C	15.2	C 20.8	C	15.3	C 21.2	C	18.3	D 28.0	NA	NA
SB - ECC Dwy	C	15.7	C 16.5	C	15.9	C 16.7	C	17.8	C 18.7		
3. BIG TREE ROAD/ABBOTT ROAD (S)											
EB Left - Big Tree Road	B	10.3	A 9.8	B	10.4	A 10.0	B	10.9	B 10.8		
EB Thru/Right - Big Tree Road	B	14.6	B 12.4	B	14.7	B 12.5	B	15.6	B 13.0		
WB Left - Big Tree Road	B	10.5	B 11.8	B	10.5	B 12.1	B	10.8	B 12.5		
WB Thru/Right - Big Tree Road	B	13.1	B 15.0	B	13.2	B 15.2	B	13.4	B 16.4		
NB Left - Abbott Road	B	13.8	B 15.6	B	14.1	B 15.7	B	14.5	B 16.1		
NB Thru/Right - Abbott Road	B	16.4	B 15.0	B	17.0	B 15.2	B	17.3	B 15.4		
SB Left - Abbott Road	B	19.2	B 16.6	B	20.0	B 16.8	C	20.5	B 17.1		
SB Thru/Right - Abbott Road	B	12.0	B 17.9	B	12.3	B 18.1	B	12.3	B 18.6		
Overall LOS	B	14.5	B 14.7	B	14.8	B 14.9	B	15.2	B 15.5		
Volume-to-Capacity (v/c) Ratio	0.57	0.64		0.57	0.65		0.62	0.68			
4. PARKER ROAD/MARILYN DRIVE/PROPOSED SF NORTHERLY DWY (U)											
EB - Proposed Driveway	NA	NA		NA	NA		A	9.6	B 10.2		
WB - Marilyn Drive	A	8.8	A 8.9	A	8.8	A 8.9	A	8.9	A 9.1	NA	NA
NB - Parker Road	NA	NA		NA	NA		A	0.0	A 0.1		
SB - Parker Road	A	1.5	A 1.1	A	1.6	A 1.1	A	1.0	A 0.7		
5. PARKER ROAD/PROPOSED SF SOUTHERLY DWY (U)											
EB - Proposed Driveway	NA	NA		NA	NA		A	9.2	A 9.4		
NB - Parker Road	NA	NA		NA	NA		A	0.0	A 0.1	NA	NA
6. BIG TREE ROAD/PROPOSED MF EASTERLY DWY (U)											
WB - Big Tree Road	NA	NA		NA	NA		A	0.3	A 0.7		
NB - Proposed Driveway	NA	NA		NA	NA		B	13.5	C 18.6	NA	NA
7. BIG TREE ROAD/PROPOSED MF WESTERLY DWY (U)											
WB Left - Big Tree Road							A	8.1	A 8.5	A 8.1	A 8.5
WB Thru - Big Tree Road	NA	NA		NA	NA		A	0.0	A 0.0	A 0.0	A 0.0
NB - Proposed Driveway							B	13.1	C 18.4	B 11.1	B 12.9

Notes:

1. A(2.8) = Level of Service (Delay in seconds per vehicle)
2. EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound
3. (S) = Signalized; (U) = Unsignalized
4. N/A = Approach does not exist and/or was not analyzed during this condition
5. Green shaded cells indicate low delays, yellow shaded cells indicate moderate delays, red shaded cells indicate long delays.
6. The v/c ratio, also referred to as degree of saturation, represents the sufficiency of an intersection to accommodate the vehicular demand. A v/c ratio less than 0.85 generally indicates that adequate capacity is available and vehicles are not expected to experience significant queues and delays. A v/c ratio between 0.85 and 0.95 generally indicates an intersection is nearing capacity. Intersections with a v/c ratio of 1.0 or greater generally indicate conditions at or above capacity.

1. Southwestern Boulevard/Big Tree Road

All movements operate at LOS "E" or better under existing and projected no build conditions during both peak hours with short to moderate delays. In urbanized conditions, LOS "D" is considered an acceptable condition. The movements resulting in LOS "E", namely the northbound left/thru/right and southbound left, are near borderline conditions, as the threshold between LOS "D" and "E" is 55.0 seconds of delay per vehicle for signalized intersections.

Between no build and full build conditions, the eastbound thru and westbound thru/right movements change from LOS "A" to "B" during the AM peak hour; a borderline condition as the threshold is 10.0 seconds of delay per vehicle. No other movements are projected to change in LOS because of the proposed residential projects during either peak hour and no improvements are warranted nor recommended at this location.

2. Big Tree Road/Parker Road/ECC South Campus Driveway

All movements operate at a highly acceptable LOS "C" or better under existing and projected no build conditions during both peak hours. Between no build and full build conditions, the northbound movement changes from LOS "C" to an acceptable "D" during the PM peak hour; a change that occurs at 25.0 seconds of delay per vehicle. The projected minor impacts resulting from the proposed residential projects can be sufficiently accommodated by the existing intersection and no improvements are warranted nor recommended at this location.

3. Big Tree Road/Abbott Road

All movements operate at LOS "B" or better under existing and projected no build conditions during both peak hours. Between no build and full build conditions, the southbound left movement changes from LOS "B" to a highly acceptable "C" during the AM peak hour; a borderline condition as the change that occurs at 20.0 seconds of delay per vehicle. The projected minor impacts resulting from the proposed residential projects can be sufficiently accommodated by the existing intersection and no improvements are warranted nor recommended at this location.

4. Parker Road/Marilyn Drive/Proposed Single Family Northerly Driveway

All approaches operate at LOS "A" or better under existing and projected no build conditions during both peak hours. Under full build conditions, the eastbound approach from the proposed project is projected to operate at LOS "B". No changes in LOS are projected because of the proposed residential projects and the projected minor impacts can be sufficiently accommodated by the existing intersection; thus, no improvements are warranted nor recommended at this location. The proposed driveway should consist of one entering and one exiting lane.

5. Parker Road/Proposed Single Family Southerly Driveway

All approaches are projected to operate at LOS "A" under full build conditions. No improvements are warranted nor recommended at this location. The proposed driveway should consist of one entering and one exiting lane.

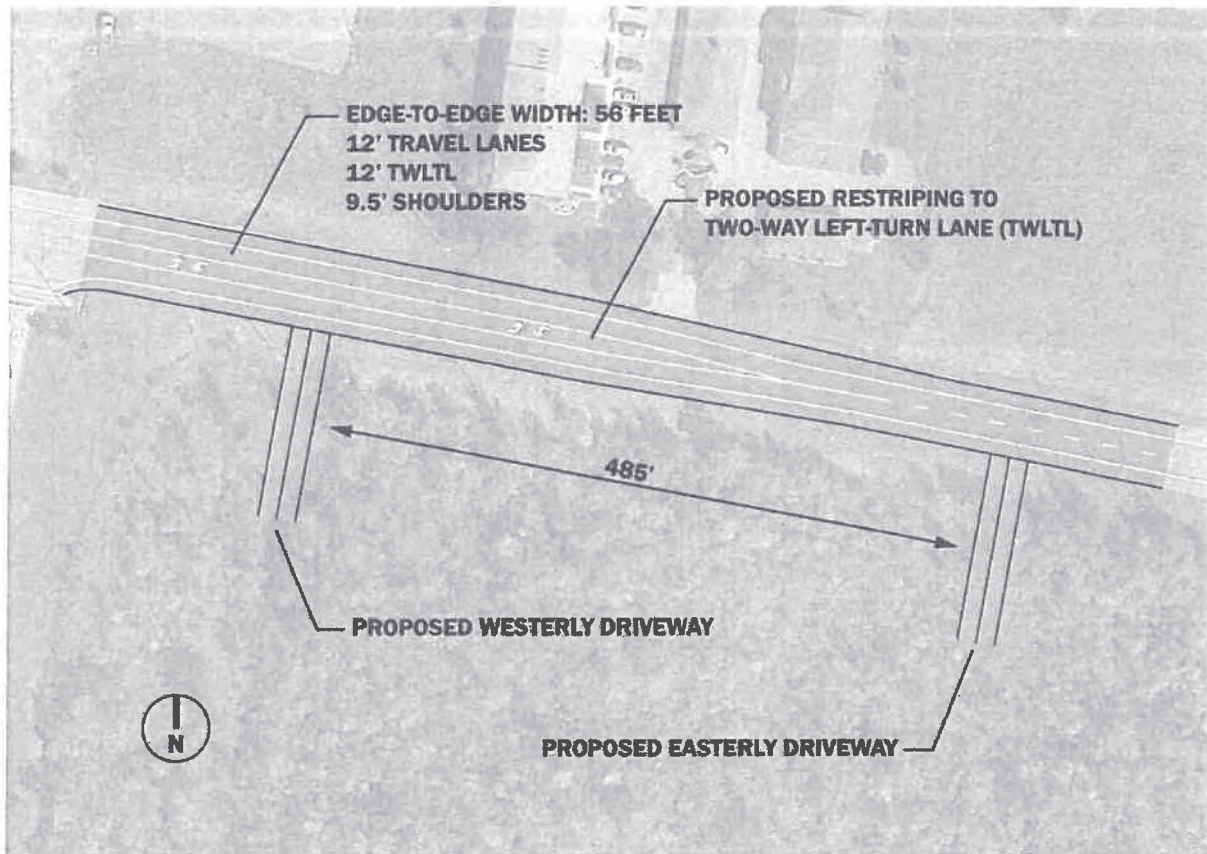
6. Big Tree Road/Proposed Multifamily Easterly Driveway

The proposed northbound approach is projected to operate at LOS "B" and "C" under full build conditions during the AM and PM peak hours, respectively. Big Tree Road approaches are projected to operate at LOS "A".

This study evaluated warrants for a left-turn treatment at this location and determined that they are only satisfied during the PM peak hour. This evaluation is discussed in greater detail in the following section. There are 22 left-turn vehicles entering the Proposed Multifamily Easterly Driveway (one vehicle every 2.7 minutes). Based upon the projected vehicle trips and capacity analysis results, no improvements are recommended at this location.

7. Big Tree Road/Proposed Multifamily Westerly Driveway

The proposed northbound approach is projected to operate at LOS "B" and "C" under full build conditions during the AM and PM peak hours, respectively. Big Tree Road approaches are projected to operate at LOS "A". The warrants for a left-turn treatment were not satisfied during both peak hours. However, the existing striping pattern should be restriped to legally accommodate drivers turning left from Big Tree Road onto the proposed driveway via a two-way left-turn lane (TWLTL) treatment. This concept is illustrated in the following figure. This maintains the ability for drivers to turn left onto the commercial driveway west of the proposed driveway location while accommodating drivers to exit the Proposed Multifamily Westerly Driveway. The Proposed Multifamily Westerly Driveway should consist of one entering and one exiting lane.



IX. LEFT TURN TREATMENT INVESTIGATION

Volume warrants for left turn treatments at the proposed driveways for the multifamily project along Big Tree Road were investigated using the Transportation Research Board's NCHRP Report 279, Intersection Channelization Design Guide. Provisions for left turn lane facilities should be established where traffic volumes are high enough and safety considerations are sufficient to warrant the additional lane. All warrant calculations are included in the Appendices.

Warrants were investigated for full build conditions of the multifamily project site during both peak hours analyzed. For the intersection of Big Tree Road/Proposed Multifamily Easterly Driveway, the proposed traffic volumes turning left onto the proposed driveway from Big Tree Road indicates that the warrants for a westbound left turn lane are not satisfied during the AM peak hour but are satisfied during the PM peak hour. It should be noted that the projected volumes turning left onto the multifamily project site at this location is 22 vehicles per hour (one vehicle every 2.7 minutes).

For the intersection of Big Tree Road/Proposed Multifamily Westerly Driveway, the proposed traffic volumes turning left onto the proposed driveway from Big Tree Road indicates that the warrants for a westbound left turn lane are not satisfied during both peak hours studied.

X. CONCLUSIONS & RECOMMENDATIONS

This Traffic Impact Study identifies and evaluates the potential traffic impacts that can be expected from the proposed project in the Town of Hamburg, New York, as described in this study. The results of this study determined that the existing transportation network can adequately accommodate the projected traffic volumes and resulting minor impacts to study area intersections with the noted improvements in place. The following sets forth the conclusions and recommendations based upon the results of the analyses:

1. The proposed residential projects are expected to generate approximately 30 entering/95 exiting vehicle trips during the AM peak hour and 98 entering/59 exiting vehicle trips during the PM peak hour.
2. The existing crash investigation did not reveal inherent safety deficiencies related to the geometric design of the study area intersections.
3. The left-turn warrant investigation at the proposed driveways along Big Tree Road determined that the proposed Driveway multifamily project Big Tree Road/Proposed Multifamily Easterly Driveway during the PM peak hour was satisfied; no other peak hours at either the proposed westerly or easterly intersections for the proposed multifamily family project were satisfied.
4. At the intersection of Big Tree Road/Proposed Multifamily Westerly Driveway, the existing striping pattern should be restriped to legally accommodate drivers turning left from Big Tree Road onto the proposed driveway via a two-way left-turn lane (TWLTL) treatment. This maintains the ability for drivers to turn left onto the commercial driveway west of the proposed driveway location while accommodating drivers to exit the proposed westerly driveway.

5. The projected traffic impacts resulting from full development of both of the proposed residential projects during both peak hours can be accommodated by the existing transportation network with the noted improvements in place.
6. For purposes of the environmental review of the proposed residential projects pursuant to the State Environmental Quality Review Act (SEQRA), it is our firm's professional opinion that the proposed residential projects will not result in any cumulative potentially significant adverse traffic impacts to the study area intersections. Given that both proposed residential projects will not result in any cumulative potentially significant traffic impacts, our firm's professional opinion as state above also applies to each of the two proposed residential projects if they had been evaluated separately.

XI. FIGURES

Figures 1 through 9 are included on the following pages.

FIGURE 1: SITE LOCATION AND STUDY AREA



Key

- # Study Intersection
- Proposed Intersection
- Study/Proposed Intersection
- Study Area
- Site Location

**PROPOSED RESIDENTIAL PROJECTS
AT BIG TREE ROAD AND PARKER ROAD**

TOWN OF HAMBURG, ERIE COUNTY, NEW YORK



0 600
FEET

Project No: 41019

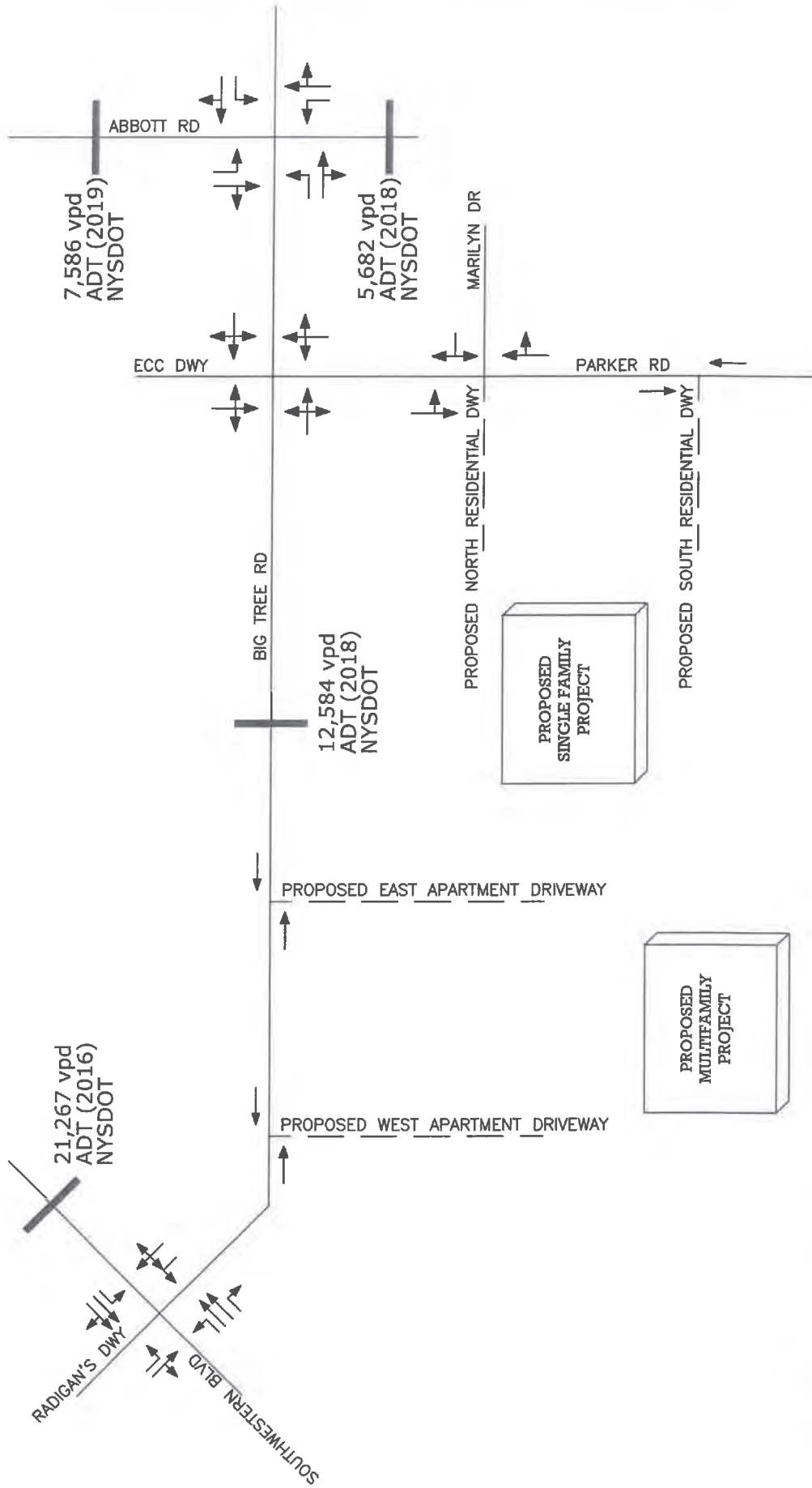


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Notes:

1. All AADT volumes by those noted:
- 1.1. NYSDOT = New York State Department of Transportation.
2. V.P.D. = Vehicles per Day.



NOT TO SCALE

FIGURE 2

LANE GEOMETRY &
AVERAGE DAILY TRAFFIC

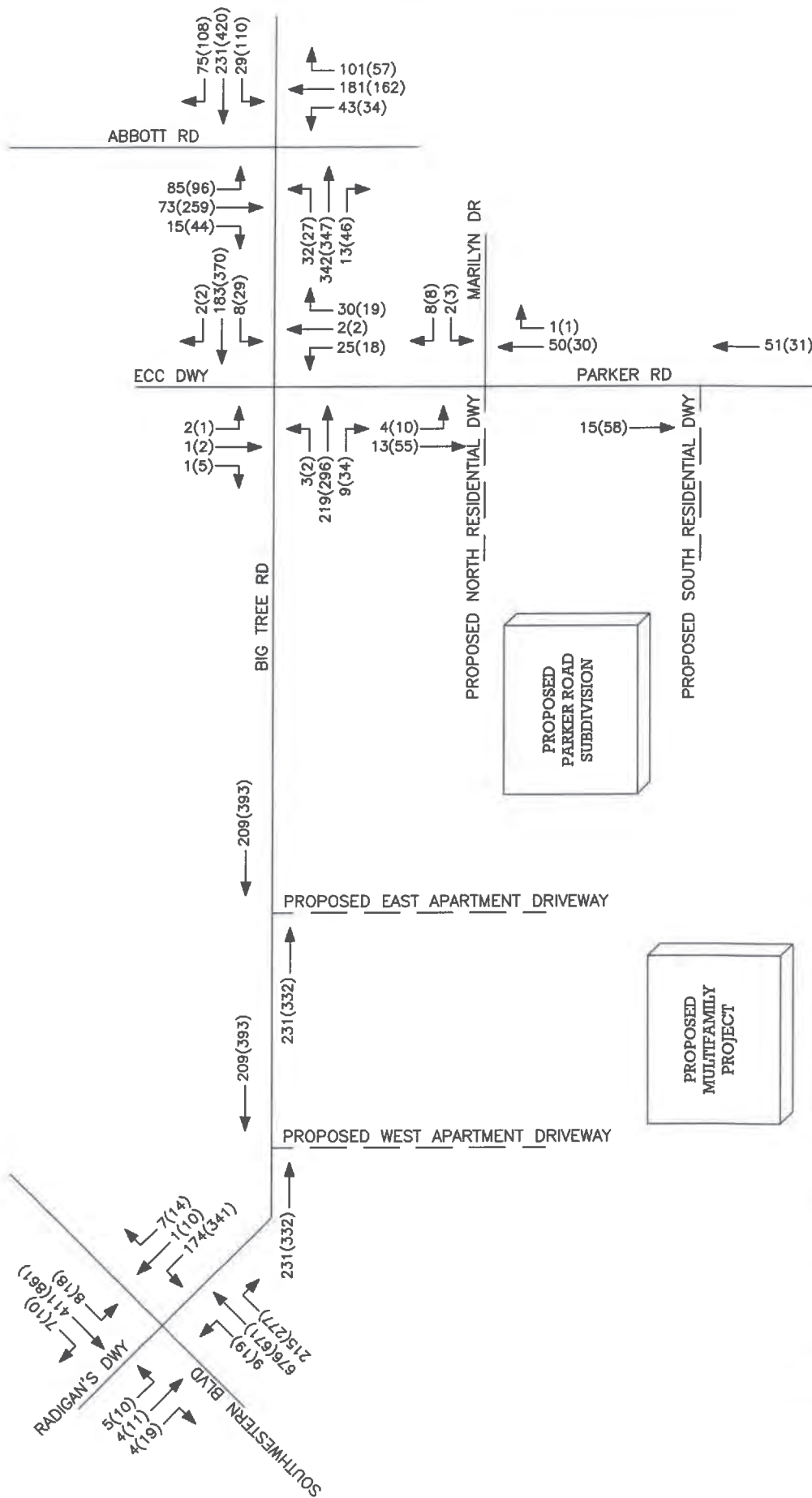
PROPOSED BIG TREE RESIDENTIAL PORJECTS
TOWN OF HAMBURG, NY

KEY

PROJECT NO: 41019

Notes:

1. Data for the Big Tree Rd/Abbott Rd intersection was obtained the GBNRTC database. Data for this intersection is from 2019.
2. Data for the remaining intersections is from 2021.



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N
NOT TO SCALE

FIGURE 3A

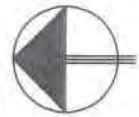
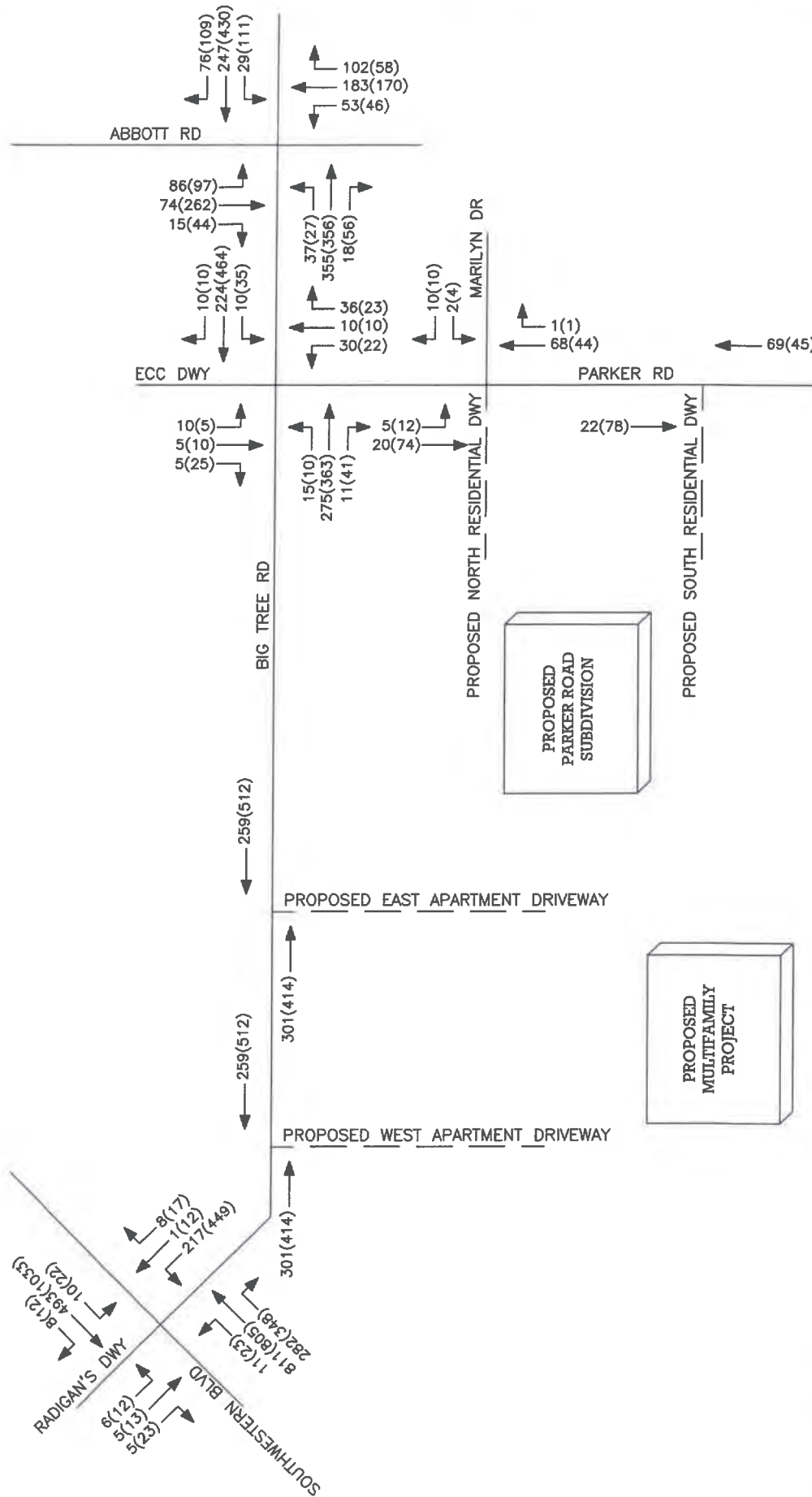
PEAK HOUR VOLUMES
EXISTING CONDITIONS

PROPOSED BIG TREE RESIDENTIAL PORJECTS
TOWN OF HAMBURG, NY

KEY

00(00) = AM(PM)

PROJECT NO: 41019



NOT TO SCALE

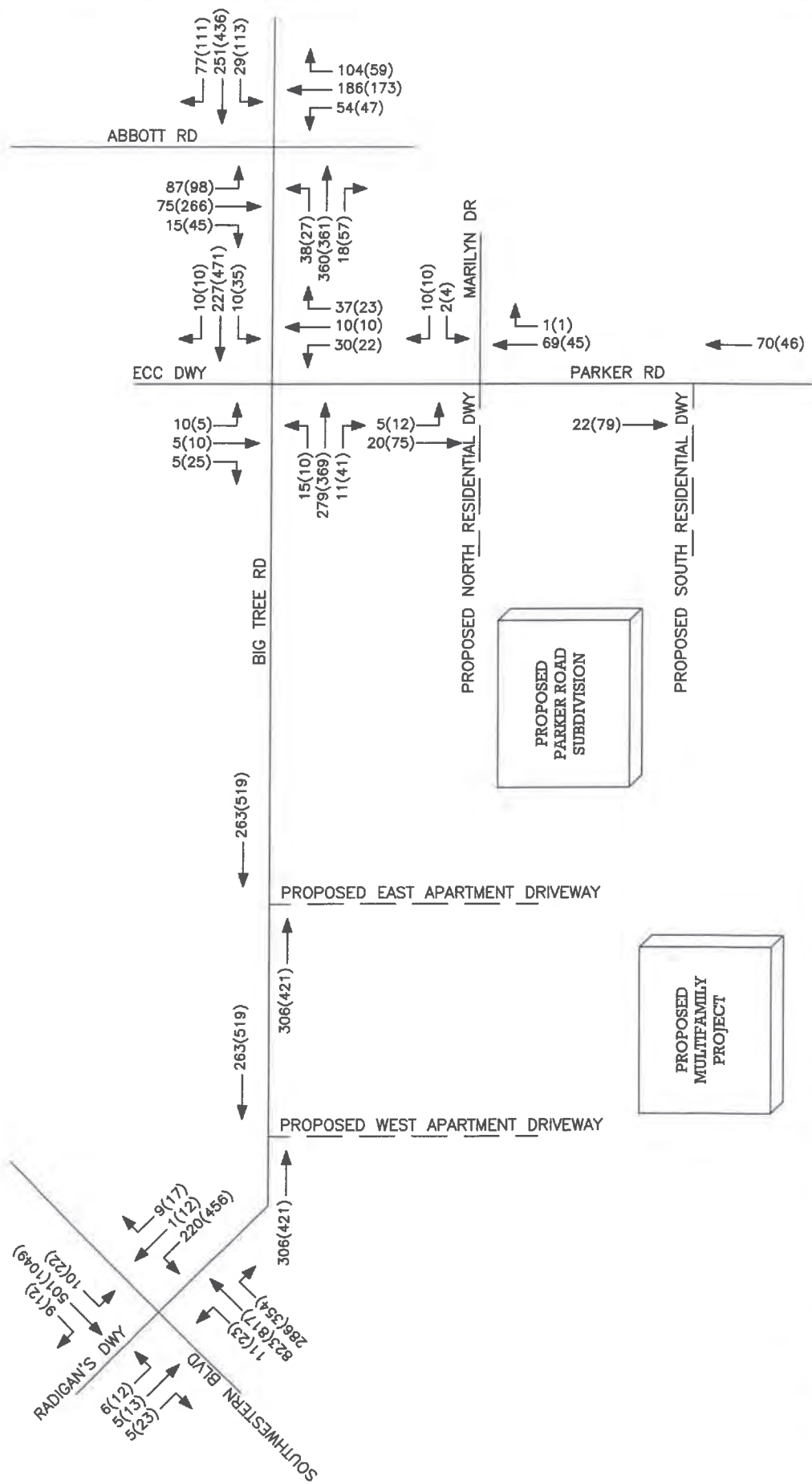
FIGURE 3B

PEAK HOUR VOLUMES
 2021 ADJUSTED BASE CONDITIONS
 PROPOSED BIG TREE RESIDENTIAL PORJECTS
 TOWN OF HAMBURG, NY

KEY

00(00) = AM(PM)

PROJECT NO: 41019



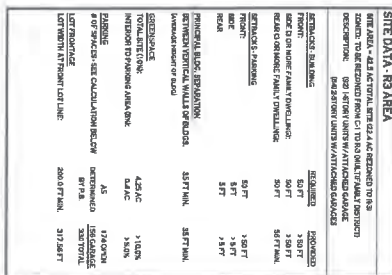
NOT TO SCALE

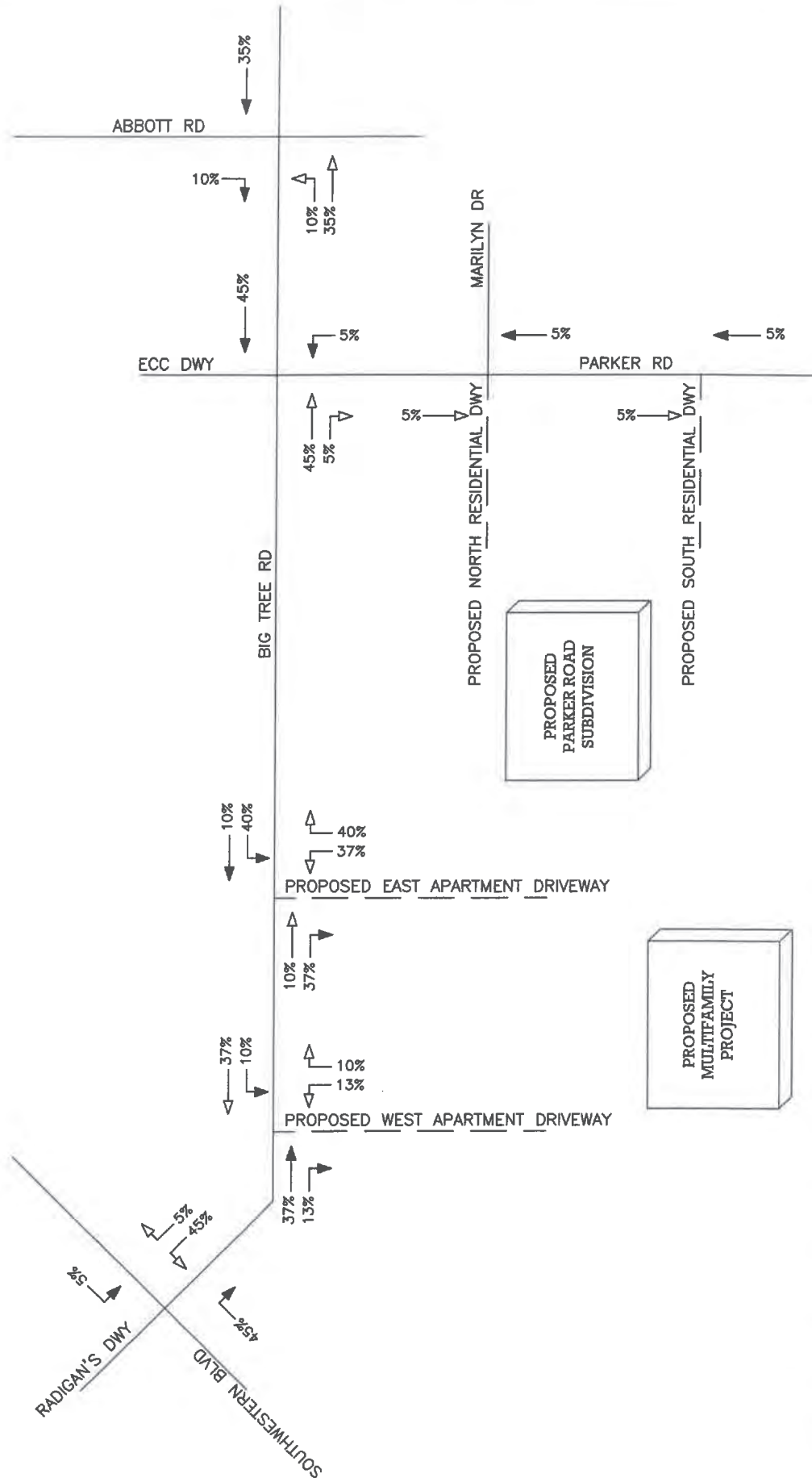
FIGURE 4

PEAK HOUR VOLUMES
 2024 BACKGROUND CONDITIONS
 PROPOSED BIG TREE RESIDENTIAL PROJECTS
 TOWN OF HAMBURG, NY

KEY

00(00) = AM(PM)





NOT TO SCALE



NOT TO SCALE

FIGURE 7A

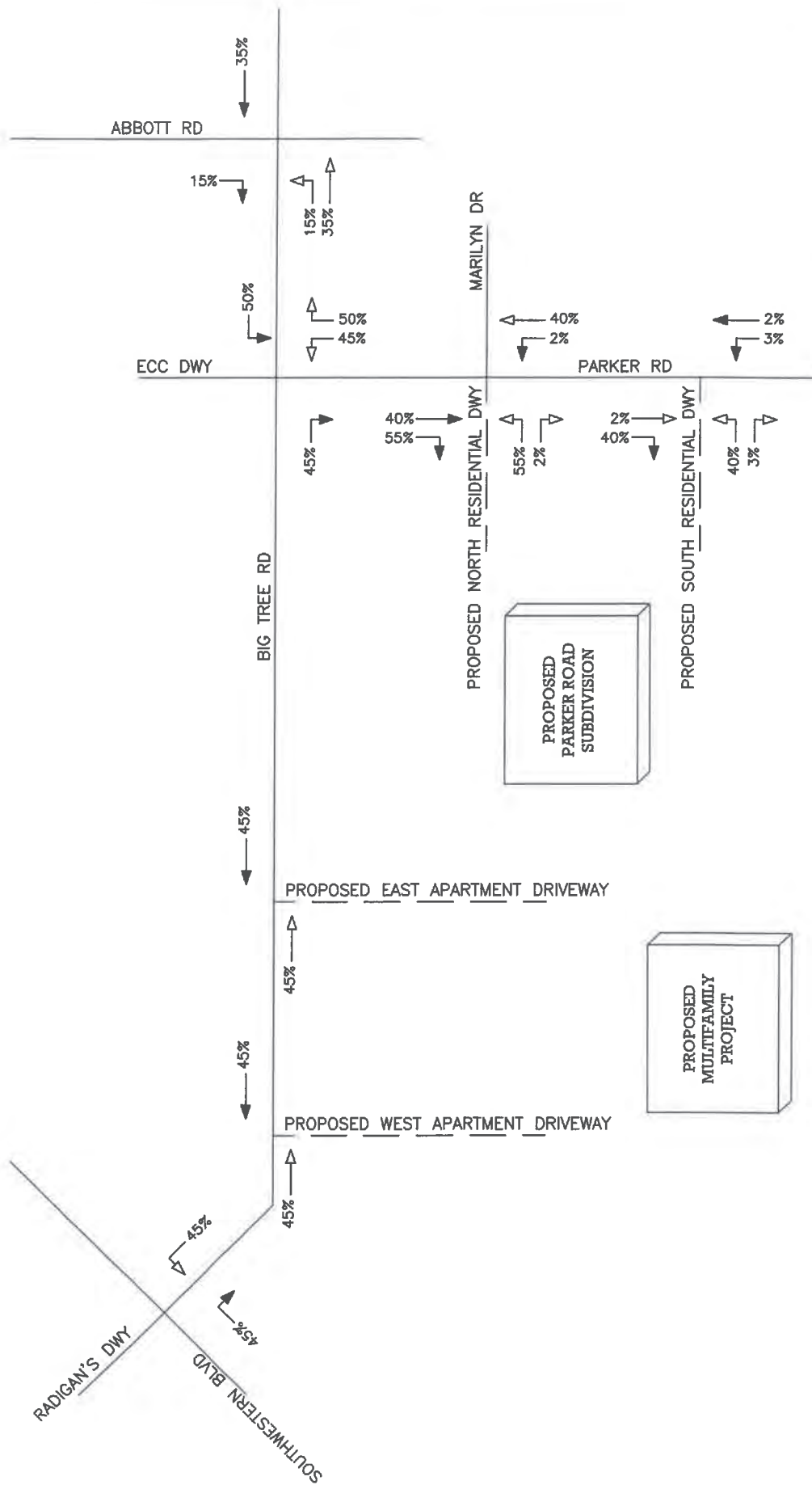
MULTIFAMILY PROJECT TRIP DISTRIBUTION

PROPOSED BIG TREE RESIDENTIAL PROJECTS
TOWN OF HAMBURG, NY

KEY

00(00) = AM(PM)
→ = ENTERING TRIPS
← = EXITING TRIPS

PROJECT NO: 41019



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NOT TO SCALE

FIGURE 7B

PARKER RD SUBDIVISION TRIP DISTRIBUTION

PROPOSED BIG TREE RESIDENTIAL PROJECTS
TOWN OF HAMBURG, NY

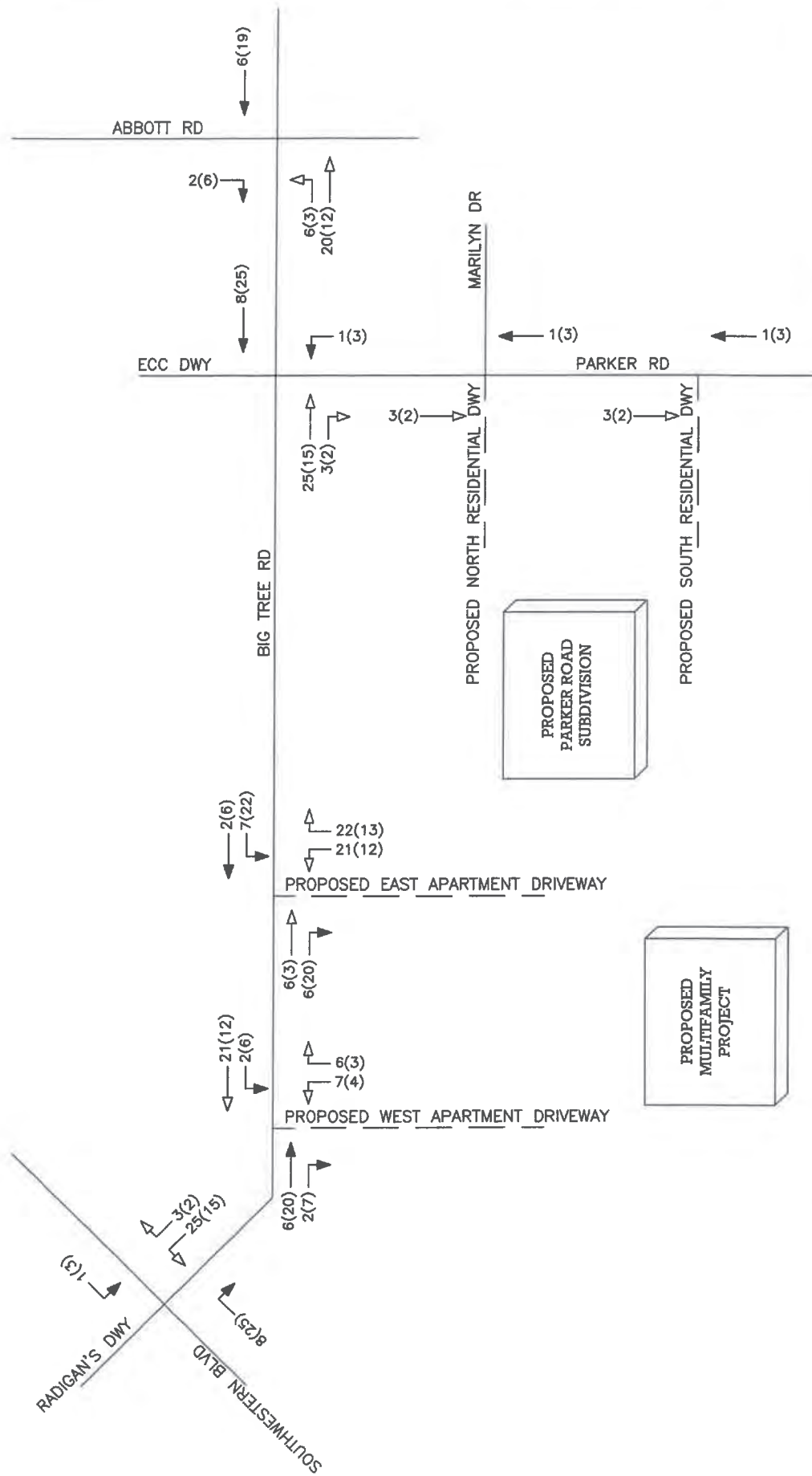
KEY

00(00) = AM(PM)

→ = ENTERING TRIPS

← = EXITING TRIPS

PROJECT NO: 41019



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NOT TO SCALE

FIGURE 8A

MULTIFAMILY PROJECT SITE GENERATED TRIPS

PROPOSED BIG TREE RESIDENTIAL PORJECTS
TOWN OF HAMBURG, NY

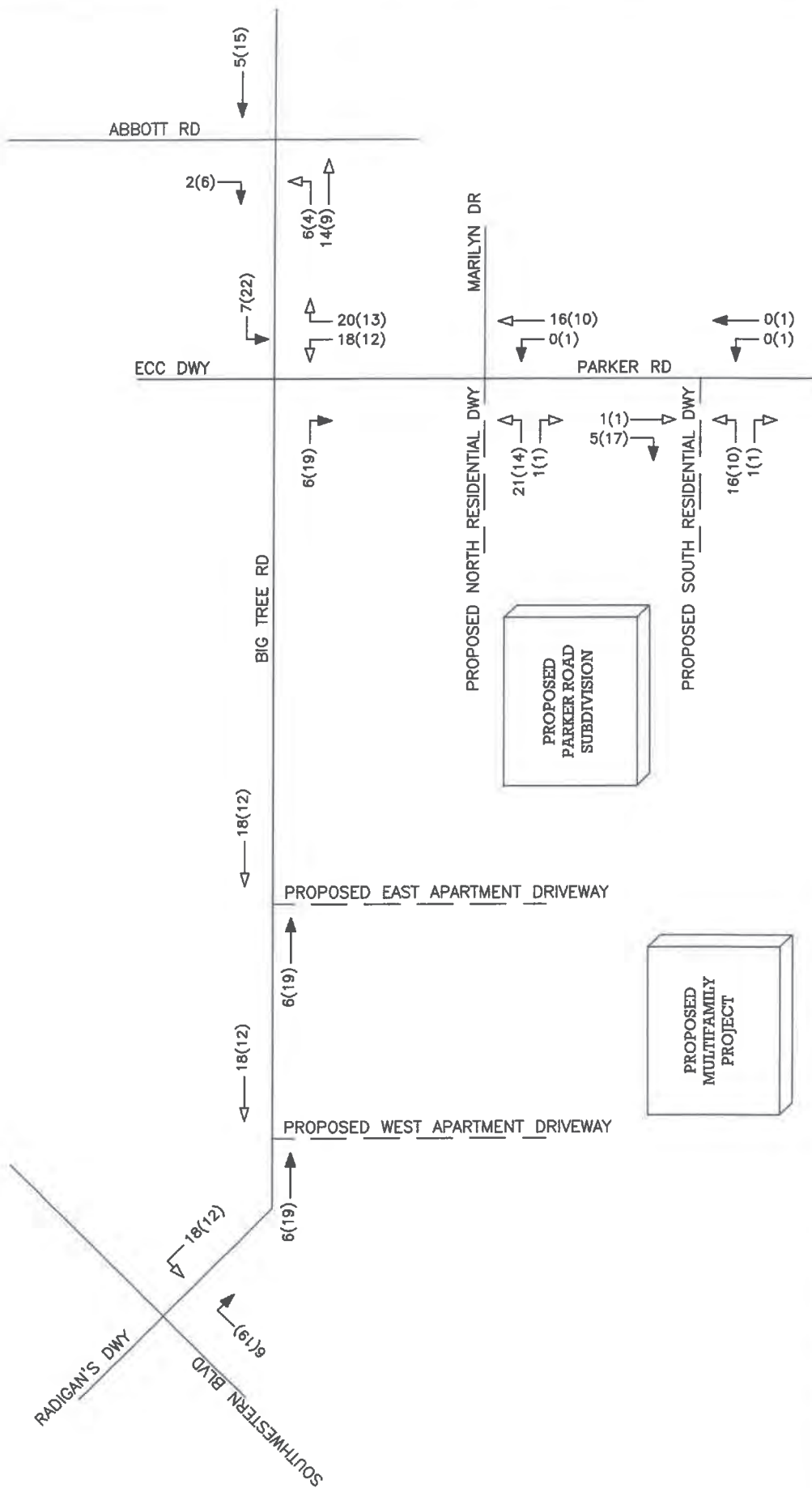
KEY

00(00) = AM(PM)

→ = ENTERING TRIPS

← = EXITING TRIPS

PROJECT NO: 41019



NOT TO SCALE

FIGURE 8B

PARKER RD SUBDIVISION TRIP DISTRIBUTION

PROPOSED BIG TREE RESIDENTIAL PROJECTS
 TOWN OF HAMBURG, NY

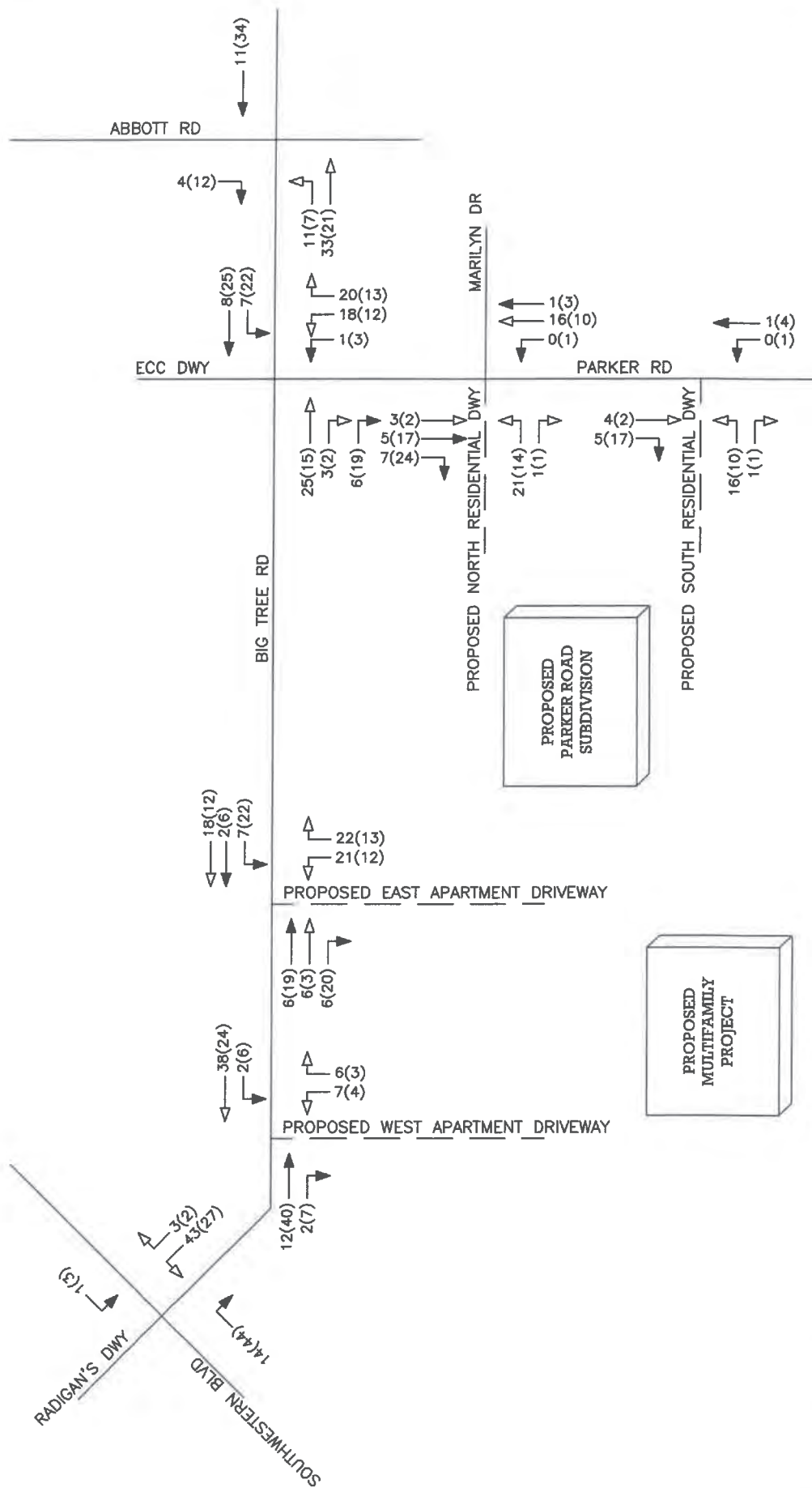
KEY

00(00) = AM(PM)

→ = ENTERING TRIPS

← = EXITING TRIPS

PROJECT NO: 41019



NOT TO SCALE



FIGURE 8C

TOTAL SITE GENERATED TRIPS

PROPOSED BIG TREE RESIDENTIAL PROJECTS
TOWN OF HAMBURG, NY

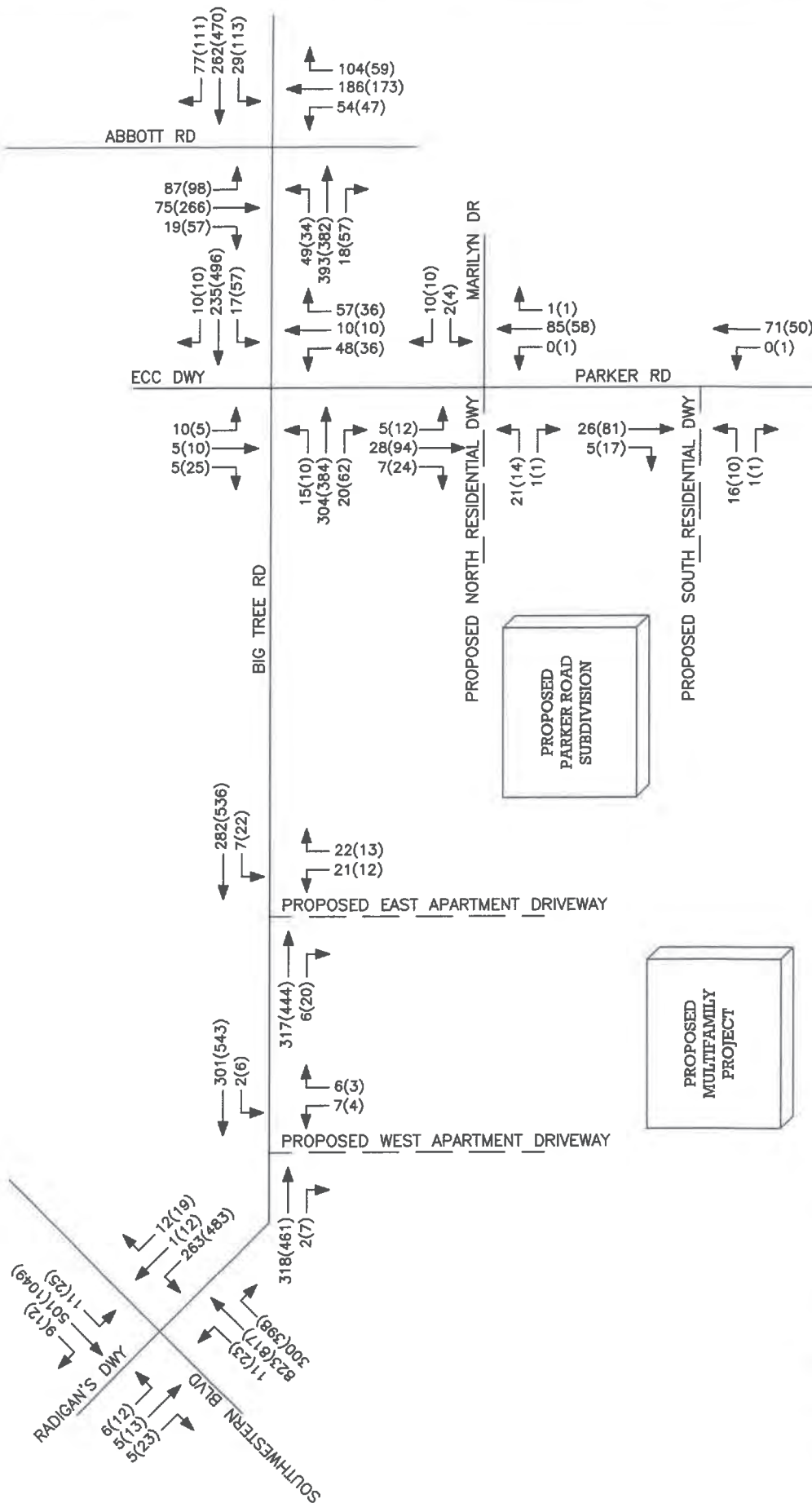
KEY

00(00) = AM(PM)

→ = ENTERING TRIPS

← = EXITING TRIPS

PROJECT NO: 41019



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NOT TO SCALE

FIGURE 9

PEAK HOUR VOLUMES
FULL DEVELOPMENT CONDITIONS

PROPOSED BIG TREE RESIDENTIAL PROJECTS
TOWN OF HAMBURG, NY

KEY

00(00) = AM(PM)

PROJECT NO: 41019

APPENDICES

A1

Collected Traffic Volume Data

Peak Hour Data for Intersection

Int ID: 270
 Community: Orchard Park
 Road 1: Abbott Rd
 Road 2: Big Tree Rd

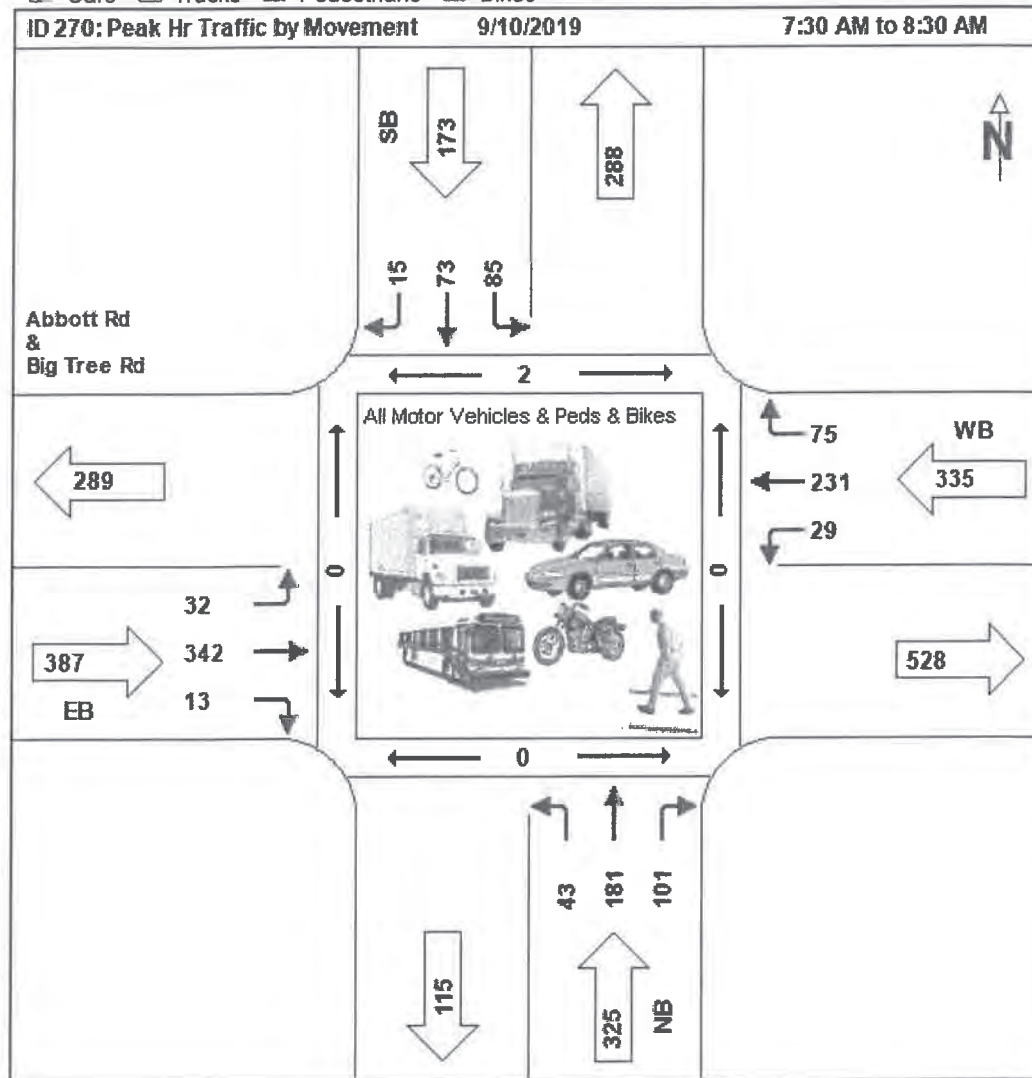
Corridor: NA
 Road 3:
 Road 4:

<< < > >> 1-2 of 2

AM Peak Hour 09/10/2019

	NB					EB					SB					WB					App	Int
Start Time	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Int Total	
7:30 AM	11	50	23	0	84	8	85	4	0	97	19	31	2	0	52	5	66	22	2	93	326	
7:45 AM	14	60	37	0	111	12	108	1	0	121	30	12	4	0	46	7	67	22	0	96	374	
8:00 AM	7	34	20	0	61	7	77	4	0	88	17	15	5	0	37	9	49	18	0	76	262	
8:15 AM	11	37	21	0	69	5	72	4	0	81	19	15	4	0	38	8	49	13	0	70	258	
Total	43	181	101	0	325	32	342	13	0	387	85	73	15	0	173	29	231	75	2	335	1220	
PHF	0.77	0.75	0.68		0.73	0.67	0.79	0.81		0.80	0.71	0.59	0.75		0.83	0.81	0.86	0.85		0.87		
HV %	2	4	1			3	4	15			11	4	0			7	6	11				

☒ Cars ☒ Trucks ☒ Pedestrians ☒ Bikes



Midday Peak Hour 09/10/2019

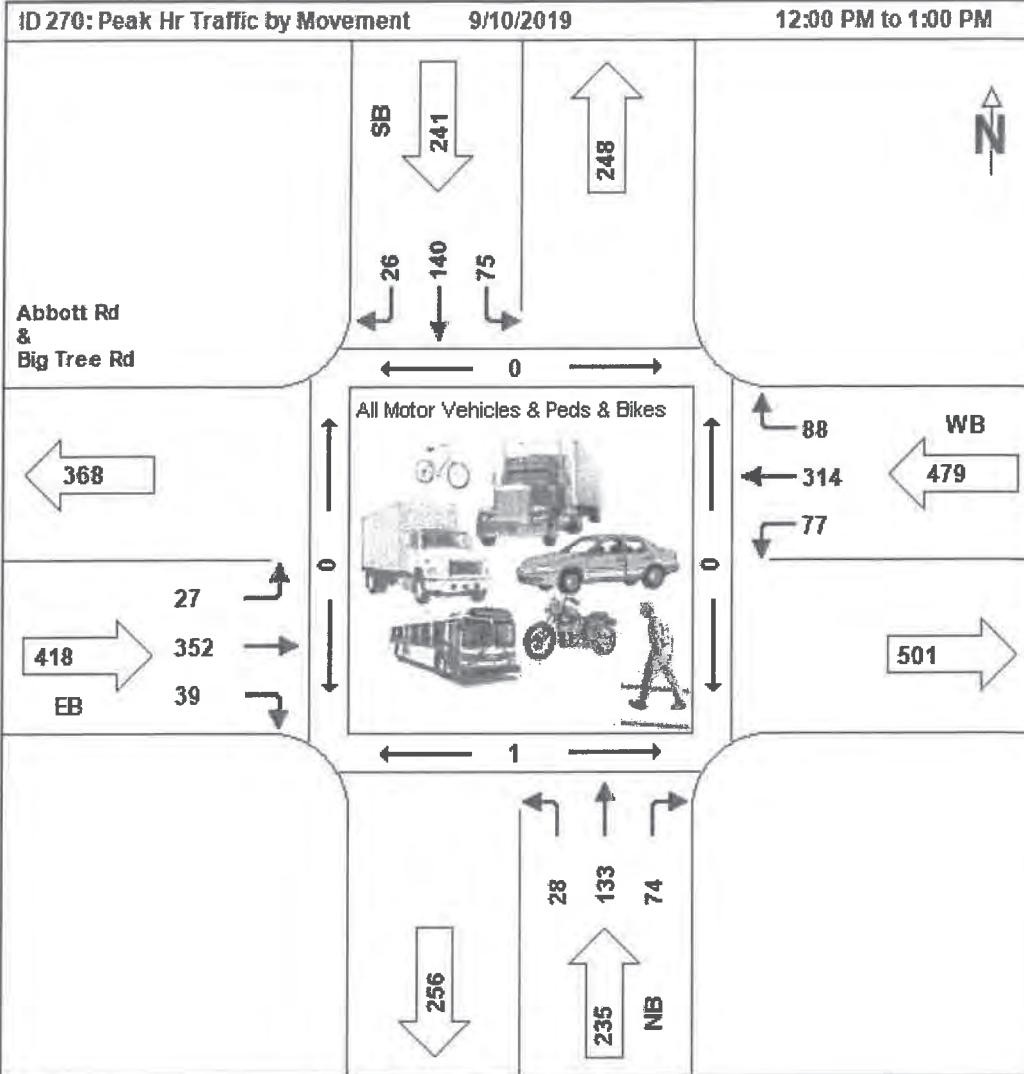
	NB					EB					SB					WB					App	Int
Start Time	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Int Total	
12:00 PM	5	33	18	0	56	1	65	9	0	75	21	31	4	0	56	34	101	38	0	173	360	

3/3/2021

Traffic Count Database System (TCDS)

12:15 PM	8	27	19	0	54	8	116	13	1	137	21	30	9	0	60	18	78	16	0	112	363
12:30 PM	6	33	20	0	59	9	89	12	0	110	13	33	10	0	56	13	71	17	0	101	326
12:45 PM	9	40	17	0	66	9	82	5	0	96	20	46	3	0	69	12	64	17	0	93	324
Total	28	133	74	0	235	27	352	39	1	418	75	140	3	0	241	314	159	0	0	1373	
PHF	0.76	0.83	0.93																		
HV%	0	2	4																		

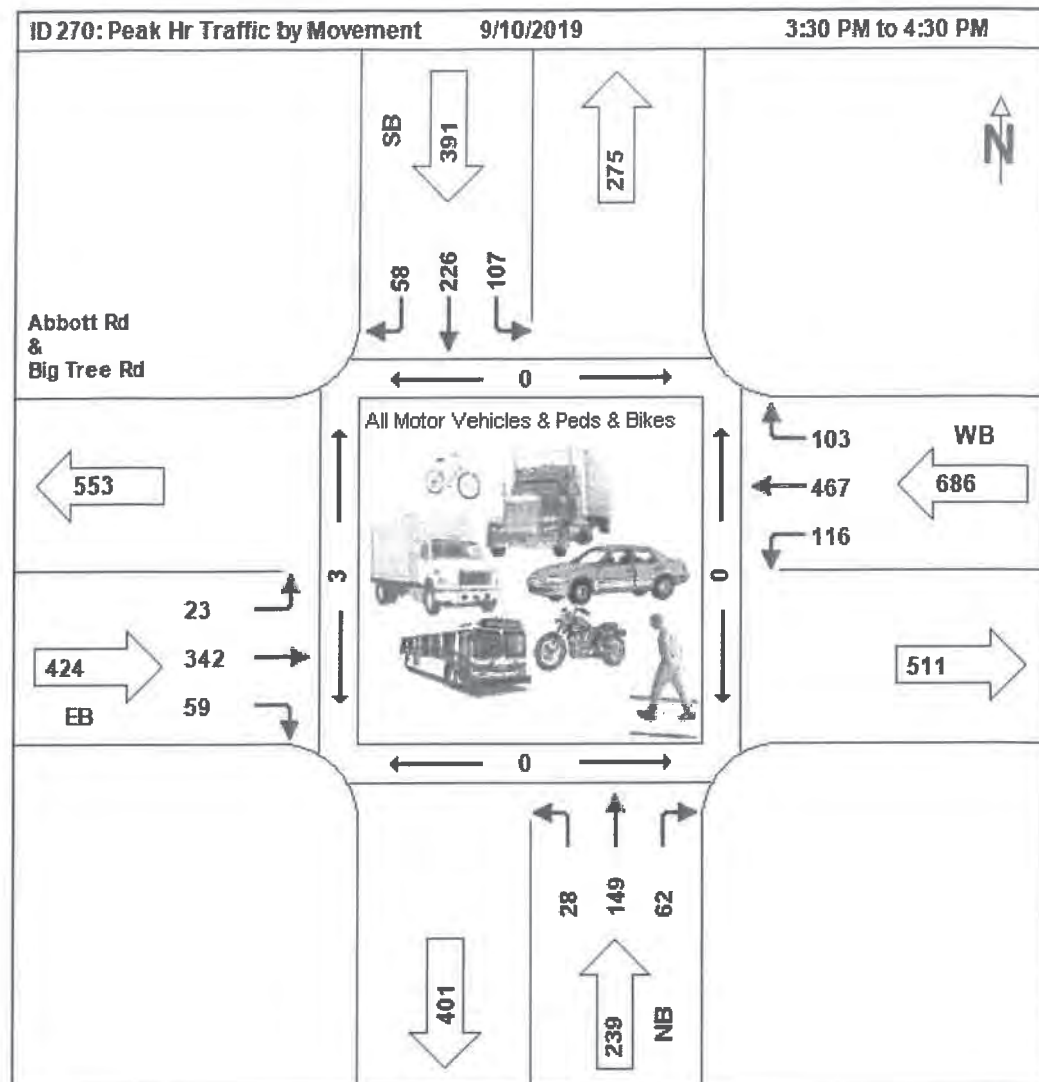
☒ Cars ☒ Trucks ☒ Pedestrians ☒ Bikes



**PM Peak Hour
09/10/2019**

NB					EB					SB					WB					App	Int
Start Time	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Total
3:30 PM	4	31	10	0	45	7	79	11	0	97	31	59	12	3	102	42	130	28	0	200	444
3:45 PM	8	37	21	0	66	5	94	16	0	115	23	55	16	0	94	22	127	23	0	172	447
4:00 PM	4	38	13	0	55	5	82	18	0	105	29	61	17	0	107	29	101	33	0	163	430
4:15 PM	12	43	18	0	73	6	87	14	0	107	24	51	13	0	88	23	109	19	0	151	419
Total	28	149	62	0	239	23	342	59	0	424	107	226	58	3	391	116	467	103	0	686	1740
PHF	0.58	0.87	0.74		0.82	0.82	0.91	0.82		0.92	0.86	0.93	0.85		0.91	0.69	0.90	0.78		0.86	
HV %	0	1	5			4	2	3			5	1	3			2	1	5			

☒ Cars ☒ Trucks ☒ Pedestrians ☒ Bikes



SRF ASSOCIATES, D.P.C.

3495 Winton Place, Building E, Suite 110
Rochester, New York 14623

File Name : Big Tree Rd-Abbott PM
Site Code : 00000000
Start Date : 9/10/2019
Page No : 1

File Name : Big Tree Rd-Abbott PM
Site Code : 00000000
Start Date : 9/10/2019
Page No : 2

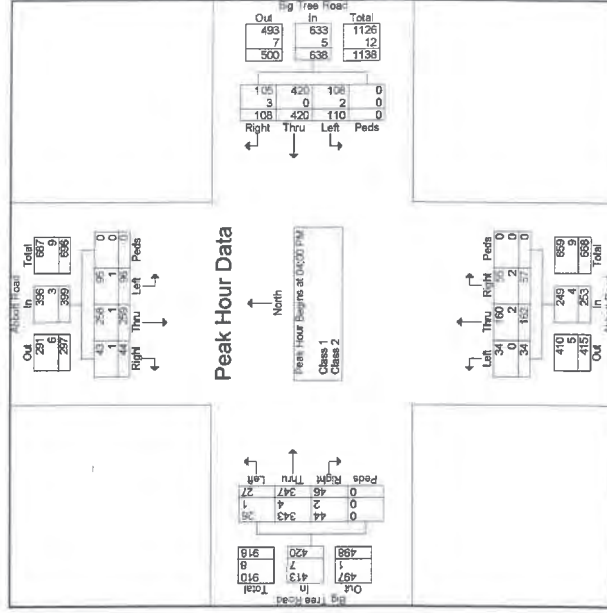
Group: Printed- Class 1 - Class 2

	Abbott Road Southbound			Big Tree Road Westbound			Abbott Road Northbound			Big Tree Road Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
04:00 PM	16	61	29	0	33	100	29	0	13	38	4	0
04:15 PM	13	51	24	0	19	109	23	0	18	43	12	0
04:30 PM	10	70	16	0	31	110	32	0	12	41	8	0
04:45 PM	5	77	27	0	25	101	26	0	14	40	10	0
Total	44	259	96	0	108	420	110	0	57	162	34	0
Grand Total	44	259	96	0	108	420	110	0	57	162	34	0
Approach %	11	64.9	24.1	0	16.9	65.8	17.2	0	22.5	64	13.4	0
Total %	2.6	15.1	5.6	0	6.3	24.6	6.4	0	3.3	9.5	2	0
Class 1	43	258	95	0	105	420	108	0	55	160	34	0
Class 2	1	1	1	0	3	0	2	0	2	2	0	0
% Class 2	2.3	0.4	1.0	0	0.8	0.8	2.8	0	1.5	0.8	3.5	1.2

	Abbott Road Southbound			Big Tree Road Westbound			Abbott Road Northbound			Big Tree Road Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
04:00 PM	16	61	29	0	109	33	100	29	0	162	13	38
04:15 PM	13	51	24	0	98	18	109	23	0	151	18	43
04:30 PM	10	70	16	0	96	31	110	32	0	173	12	41
04:45 PM	5	77	27	0	109	25	101	26	0	152	14	40
Total	44	259	96	0	389	108	420	110	0	638	57	162
% Approach	11	64.9	24.1	0	16.9	65.8	17.2	0	22.5	64	13.4	0
Class 1	43	258	95	0	385	105	420	108	0	633	55	160
Class 2	1	1	1	0	4	3	0	2	0	5	2	2
% Class 2	2.3	0.4	1.0	0	0.8	2.8	0	1.5	0	0.8	3.5	1.2

Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 04:00 PM

Grand Total	44	259	96	0	389	108	420	110	0	638	57	162
Approach %	11	64.9	24.1	0	16.9	65.8	17.2	0	22.5	64	13.4	0
Total %	2.6	15.1	5.6	0	6.3	24.6	6.4	0	3.3	9.5	2	0
Class 1	43	258	95	0	385	105	420	108	0	633	55	160
Class 2	1	1	1	0	4	3	0	2	0	5	2	2
% Class 2	2.3	0.4	1.0	0	0.8	2.8	0	1.5	0	0.8	3.5	1.2



Hamburg, NY

Thursday, March 4, 2021
Location: 42.768041, -78.79735

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

Count Name: Big Tree
Rd/Manor Dr
Site Code:
Start Date: 03/04/2021
Page No: 1

Turning Movement Data

Start Time	Big Tree Rd Westbound					Manor Dr Northbound					Big Tree Rd Eastbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
7:00 AM	34	0	0	0	34	5	0	0	0	5	0	46	0	0	46	85
7:15 AM	36	3	0	1	39	7	1	0	0	8	2	51	0	0	53	100
7:30 AM	47	0	0	0	47	2	4	0	0	6	0	69	0	0	69	122
7:45 AM	60	1	0	0	61	7	2	0	0	9	1	73	0	0	74	144
Hourly Total	177	4	0	1	181	21	7	0	0	28	3	239	0	0	242	451
8:00 AM	41	2	0	0	43	5	0	0	0	5	2	50	0	0	52	100
8:15 AM	31	0	0	0	31	6	1	0	0	7	1	49	0	0	50	88
8:30 AM	45	0	0	0	45	6	4	0	0	10	1	56	0	0	57	112
8:45 AM	45	0	0	0	45	4	2	0	0	6	0	60	0	0	60	111
Hourly Total	162	2	0	0	164	21	7	0	0	28	4	215	0	0	219	411
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	96	6	0	0	102	4	0	0	0	4	2	76	0	0	78	184
4:15 PM	89	8	0	0	97	6	3	0	0	9	4	65	0	0	69	175
4:30 PM	110	5	0	0	115	2	2	0	0	4	1	76	0	0	77	196
4:45 PM	93	5	0	0	98	1	2	0	0	3	6	84	0	0	90	191
Hourly Total	388	24	0	0	412	13	7	0	0	20	13	301	0	0	314	746
5:00 PM	79	7	0	0	86	0	3	0	0	3	1	85	0	0	86	175
5:15 PM	65	3	0	1	68	5	1	0	0	6	0	82	0	0	82	156
5:30 PM	61	4	0	1	65	2	0	0	0	2	0	66	0	0	66	133
5:45 PM	68	5	0	0	73	4	1	0	0	5	0	69	0	0	69	147
Hourly Total	273	19	0	2	292	11	5	0	0	16	1	302	0	0	303	611
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	1000	49	0	3	1049	66	26	0	0	92	21	1057	0	0	1078	2219
Approach %	95.3	4.7	0.0	-	-	71.7	28.3	0.0	-	-	1.9	98.1	0.0	-	-	-
Total %	45.1	2.2	0.0	-	47.3	3.0	1.2	0.0	-	4.1	0.9	47.6	0.0	-	48.6	-
Lights	971	48	0	-	1019	64	25	0	-	89	21	1036	0	-	1057	2165
% Lights	97.1	98.0	-	-	97.1	97.0	98.2	-	-	96.7	100.0	98.0	-	-	98.1	97.6
Buses	6	0	0	-	6	2	0	0	-	2	0	5	0	-	5	13
% Buses	0.6	0.0	-	-	0.6	3.0	0.0	-	-	2.2	0.0	0.5	-	-	0.5	0.6
Trucks	23	1	0	-	24	0	1	0	-	1	0	16	0	-	16	41
% Trucks	2.3	2.0	-	-	2.3	0.0	3.8	-	-	1.1	0.0	1.5	-	-	1.5	1.8
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	3	-	-	-	-	0	-	-	-	-	0	-	-</

Thursday, March 4, 2021
Location: 42.768041, -78.79735

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

Count Name: Big Tree
Rd/Manor Dr
Site Code:
Start Date: 03/04/2021
Page No: 2



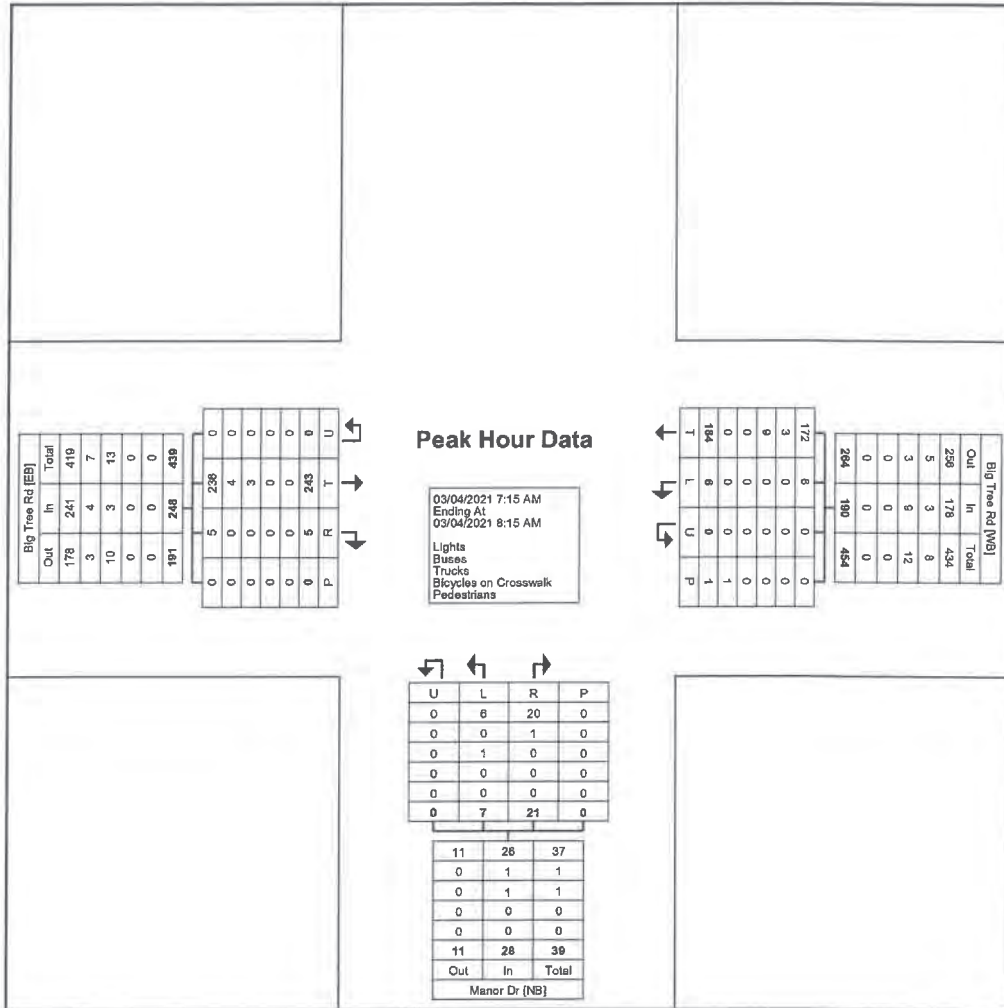


Thursday, March 4, 2021
Location: 42.768041, -78.79735

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

Count Name: Big Tree
Rd/Manor Dr
Site Code:
Start Date: 03/04/2021
Page No: 3

[illegible]



Turning Movement Peak Hour Data Plot (7:15 AM)

Hamburg, NY

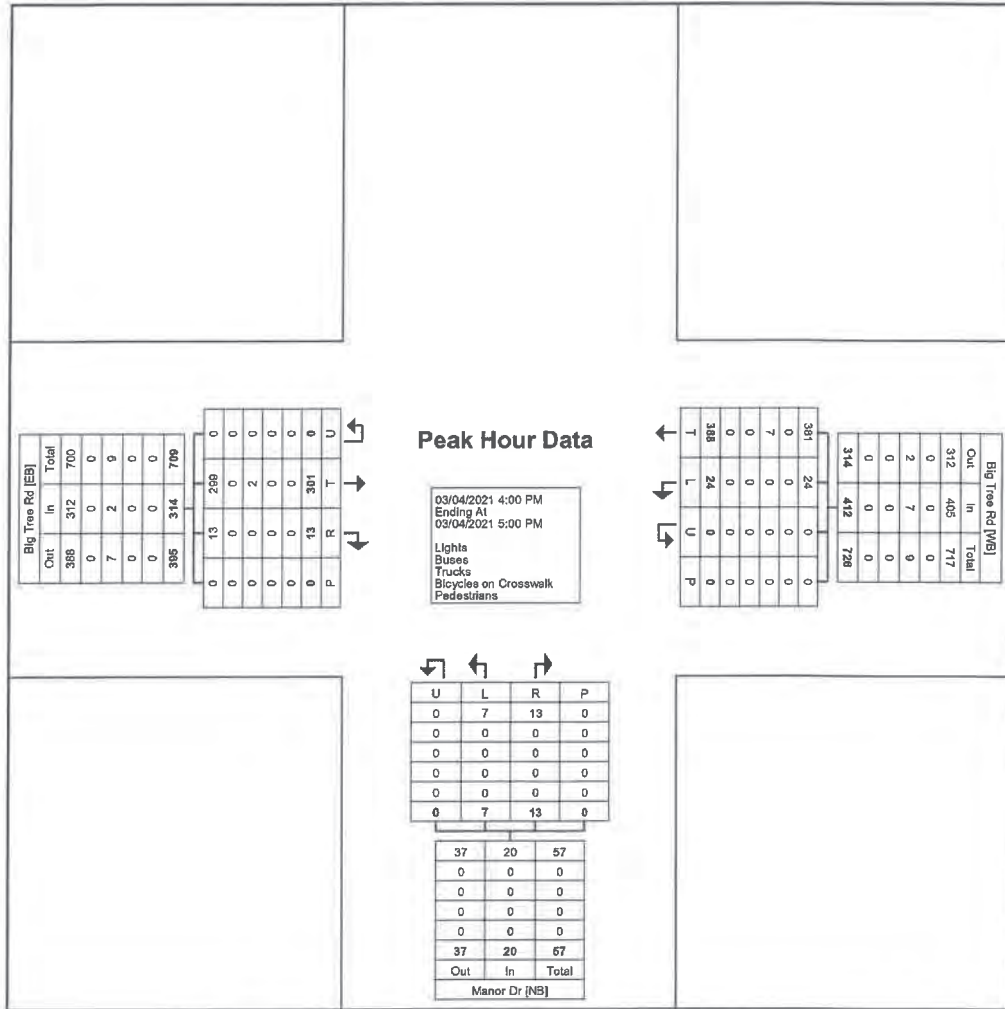
Thursday, March 4, 2021
Location: 42.768041, -78.79735

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

Count Name: Big Tree
Rd/Manor Dr
Site Code:
Start Date: 03/04/2021
Page No: 5

Turning Movement Peak Hour Data (4:00 PM)

[illegible]



Turning Movement Peak Hour Data Plot (4:00 PM)

Hamburg, NY

Thursday, March 4 2021
Location: 42.768461, -
78.800467

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

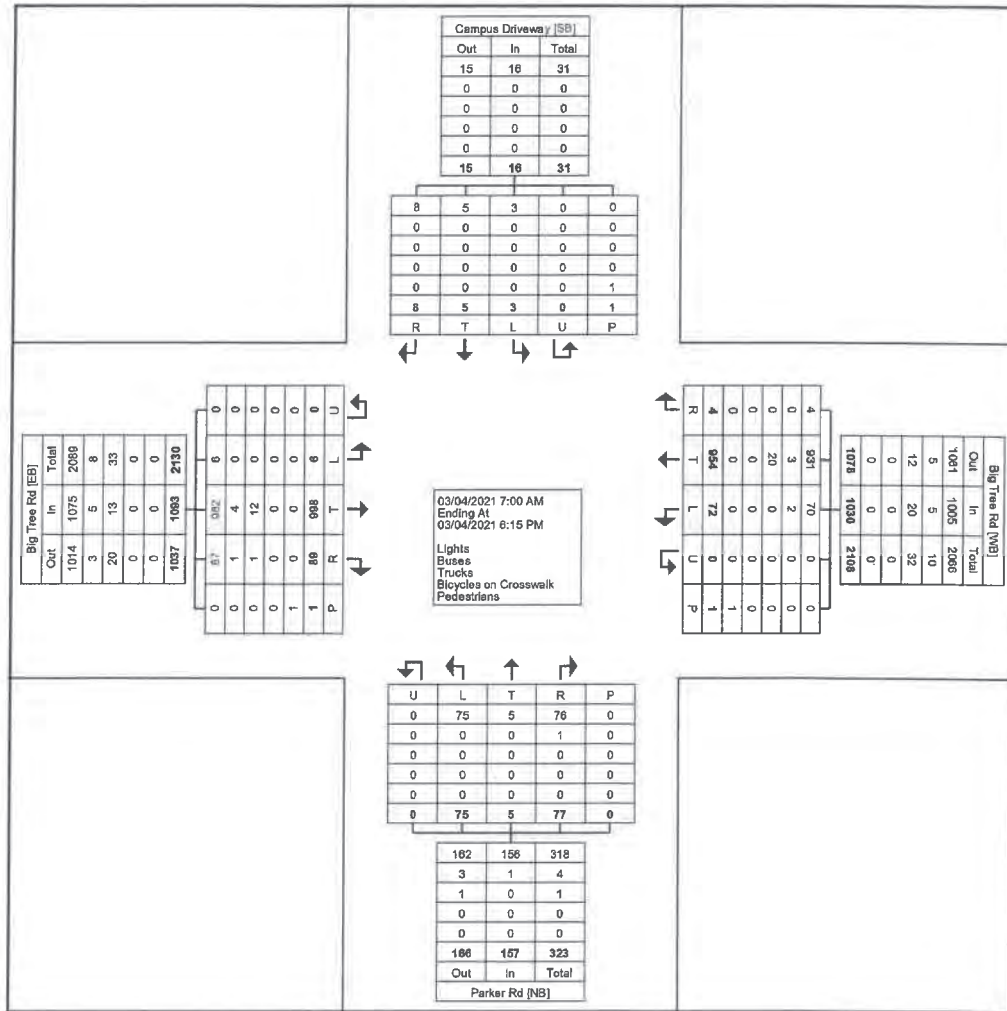
Count Name: Parker Rd/Big
Tree Rd
Site Code:
Start Date: 03/04/2021
Page No: 1

Turning Movement Data

Start Time	Campus Driveway Southbound						Big Tree Rd Westbound						Parker Rd Northbound						Big Tree Rd Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	0	0	0	0	0	0	0	31	1	0	0	32	4	0	2	0	0	6	0	40	1	0	0	41	79
7:15 AM	0	0	0	0	0	0	0	36	1	0	0	37	7	1	6	0	0	14	2	44	0	0	1	46	97
7:30 AM	0	0	0	0	0	0	0	52	2	0	0	54	8	0	5	0	0	13	3	61	1	0	0	65	132
7:45 AM	1	0	1	0	0	2	2	57	2	0	0	61	8	1	6	0	0	15	3	69	2	0	0	74	152
Hourly Total	1	0	1	0	0	2	2	176	6	0	0	184	27	2	19	0	0	48	8	214	4	0	1	226	460
8:00 AM	0	1	1	0	0	2	0	38	3	0	0	41	7	0	8	0	0	15	1	45	0	0	0	46	104
8:15 AM	0	1	0	0	0	1	0	31	1	0	0	32	4	0	7	0	0	11	2	47	0	0	0	49	93
8:30 AM	0	0	0	0	0	0	0	49	1	0	0	50	6	0	3	0	0	9	11	49	0	0	0	60	119
8:45 AM	1	0	0	0	0	1	0	44	4	0	0	48	5	0	4	0	0	9	2	58	0	0	0	60	118
Hourly Total	1	2	1	0	0	4	0	162	9	0	0	171	22	0	22	0	0	44	16	199	0	0	0	215	434
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	2	0	0	0	0	2	0	89	10	0	0	99	5	2	5	0	0	12	6	74	0	0	0	80	193
4:15 PM	1	1	0	0	0	2	0	88	6	0	0	94	6	0	5	0	0	11	12	63	1	0	0	76	183
4:30 PM	0	1	1	0	1	2	1	102	8	0	1	111	4	0	4	0	0	8	9	75	1	0	0	85	206
4:45 PM	2	0	0	0	0	2	1	91	5	0	0	97	4	0	4	0	0	8	7	84	0	0	0	91	198
Hourly Total	5	2	1	0	1	8	2	370	29	0	1	401	19	2	18	0	0	39	34	296	2	0	0	332	780
5:00 PM	0	0	0	0	0	0	0	75	8	0	0	83	2	0	2	0	0	4	7	86	0	0	0	93	180
5:15 PM	0	1	0	0	0	1	0	62	4	0	0	66	2	1	4	0	0	7	12	76	0	0	0	88	162
5:30 PM	0	0	0	0	0	0	0	48	7	0	0	55	1	0	5	0	0	6	4	68	0	0	0	72	133
5:45 PM	1	0	0	0	0	1	0	61	9	0	0	70	4	0	5	0	0	9	8	59	0	0	0	67	147
Hourly Total	1	1	0	0	0	2	0	246	28	0	0	274	9	1	16	0	0	26	31	289	0	0	0	320	622
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	8	5	3	0	1	16	4	954	72	0	1	1030	77	5	75	0	0	157	89	998	6	0	1	1093	2296
Approach %	50.0	31.3	18.8	0.0	-	-	0.4	92.6	7.0	0.0	-	-	49.0	3.2	47.8	0.0	-	-	8.1	91.3	0.5	0.0	-	-	-
Total %	0.3	0.2	0.1	0.0	-	0.7	0.2	41.6	3.1	0.0	-	44.9	3.4	0.2	3.3	0.0	-	6.8	3.9	43.5	0.3	0.0	-	47.6	-
Lights	8	5	3	0	-	16	4	931	70	0	-	1005	76	5	75	0	-	156	87	982	6	0	-	1075	2252
% Lights	100.0	100.0	100.0	-	-	100.0	100.0	97.6	97.2	-	-	97.6	98.7	100.0	100.0	-	-	99.4	97.8	98.4	100.0	-	-	98.4	98.1
Buses	0	0	0	0	-	0	0	3	2	0	-	5	1	0	0	0	-	1	1	4	0	0	-	5	11
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.3	2.8	-	-	0.5	1.3	0.0	0.0	-	-	0.6	1.1	0.4	0.0	-	-	0.5	0.5
Trucks	0	0	0	0	-	0	0	20	0	0	-	20	0	0	0	0	-	0	1	12	0	0	-	13	33
% Trucks	0.0	0.0	0.0	-	-	0.0	0.0	2.1	0.0	-	-	1.9	0.0	0.0	0.0	-	-	0.0	1.1	1.2	0.0	-	-	1.2	1.4
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Hamburg, NY

Thursday, March 4 2021
Location: 42.768461, -
78.800467



Turning Movement Data Plot

Hamburg, NY

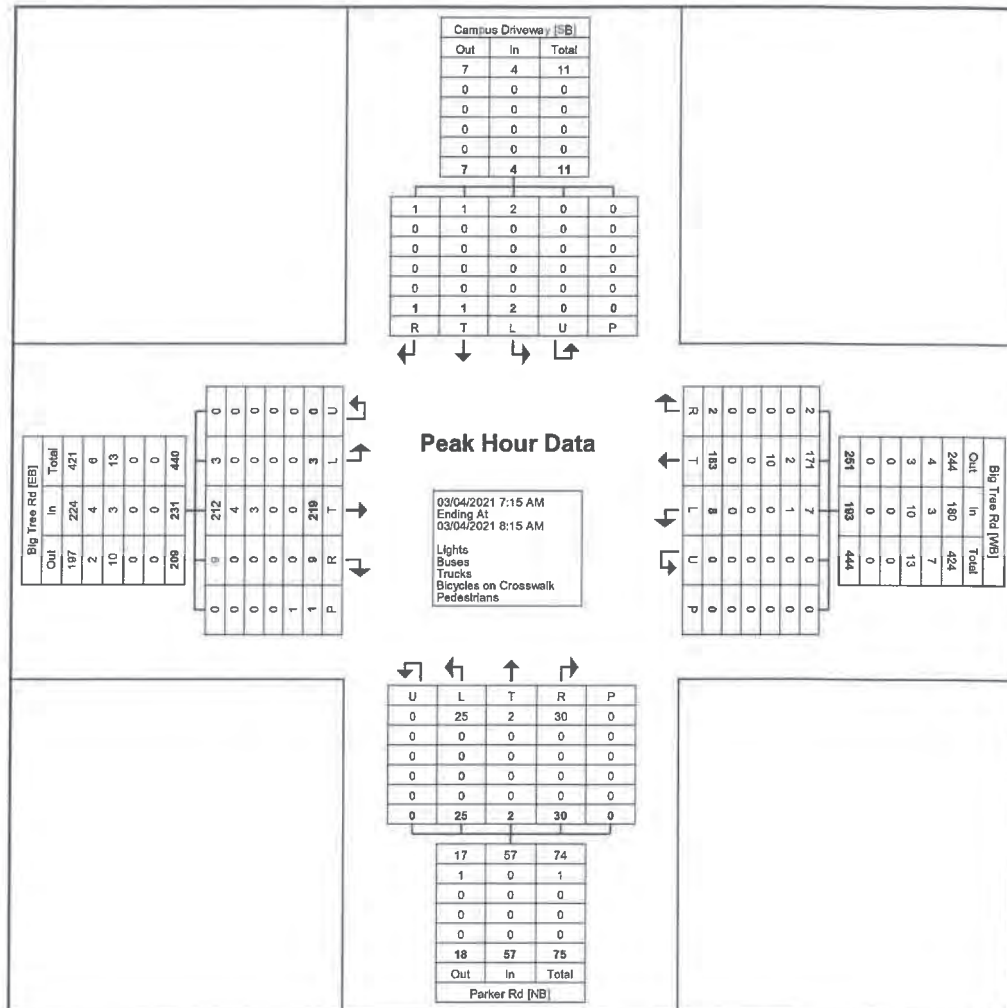
Thursday, March 4 2021
Location: 42.768461, -
78.800467

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

Count Name: Parker Rd/Big
Tree Rd
Site Code:
Start Date: 03/04/2021
Page No: 3

Turning Movement Peak Hour Data (7:15 AM)

Start Time	Campus Driveway Southbound						Big Tree Rd Westbound						Parker Rd Northbound						Big Tree Rd Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:15 AM	0	0	0	0	0	0	0	36	1	0	0	37	7	1	6	0	0	14	2	44	0	0	1	46	97
7:30 AM	0	0	0	0	0	0	0	52	2	0	0	54	8	0	5	0	0	13	3	61	1	0	0	65	132
7:45 AM	1	0	1	0	0	2	2	57	2	0	0	61	8	1	6	0	0	15	3	69	2	0	0	74	152
8:00 AM	0	1	1	0	0	2	0	38	3	0	0	41	7	0	8	0	0	15	1	45	0	0	0	46	104
Total	1	1	2	0	0	4	2	183	8	0	0	193	30	2	25	0	0	57	9	219	3	0	1	231	485
Approach %	25.0	25.0	50.0	0.0	-	-	1.0	94.8	4.1	0.0	-	-	52.6	3.5	43.9	0.0	-	-	3.9	94.8	1.3	0.0	-	-	-
Total %	0.2	0.2	0.4	0.0	-	0.8	0.4	37.7	1.6	0.0	-	39.8	6.2	0.4	5.2	0.0	-	11.8	1.9	45.2	0.6	0.0	-	47.6	-
PHF	0.250	0.250	0.500	0.000	-	0.500	0.250	0.803	0.667	0.000	-	0.791	0.938	0.500	0.781	0.000	-	0.950	0.750	0.793	0.375	0.000	-	0.780	0.798
Lights	1	1	2	0	-	4	2	171	7	0	-	180	30	2	25	0	-	57	9	212	3	0	-	224	465
% Lights	100.0	100.0	100.0	-	-	100.0	100.0	93.4	87.5	-	-	93.3	100.0	100.0	100.0	-	-	100.0	100.0	96.8	100.0	-	-	97.0	95.9
Buses	0	0	0	0	-	0	0	2	1	0	-	3	0	0	0	0	-	0	0	4	0	0	-	4	7
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	1.1	12.5	-	-	1.6	0.0	0.0	0.0	-	-	0.0	0.0	1.8	0.0	-	-	1.7	1.4
Trucks	0	0	0	0	-	0	0	10	0	0	-	10	0	0	0	0	-	0	0	3	0	0	-	3	13
% Trucks	0.0	0.0	0.0	-	-	0.0	0.0	5.5	0.0	-	-	5.2	0.0	0.0	0.0	-	-	0.0	0.0	1.4	0.0	-	-	1.3	2.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (7:15 AM)



www.TSTData.com
184 Baker Rd

Hamburg, NY

Thursday, March 4 2021
Location: 42.768461, -
78.800467

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

Count Name: Parker Rd/Big
Tree Rd
Site Code:
Start Date: 03/04/2021
Page No: 5

Turning Movement Peak Hour Data (4:00 PM)

[illegible]

Count Name: Parker Rd/Big
Tree Rd
Site Code:
Start Date: 03/04/2021
Page No: 6



Hamburg, NY

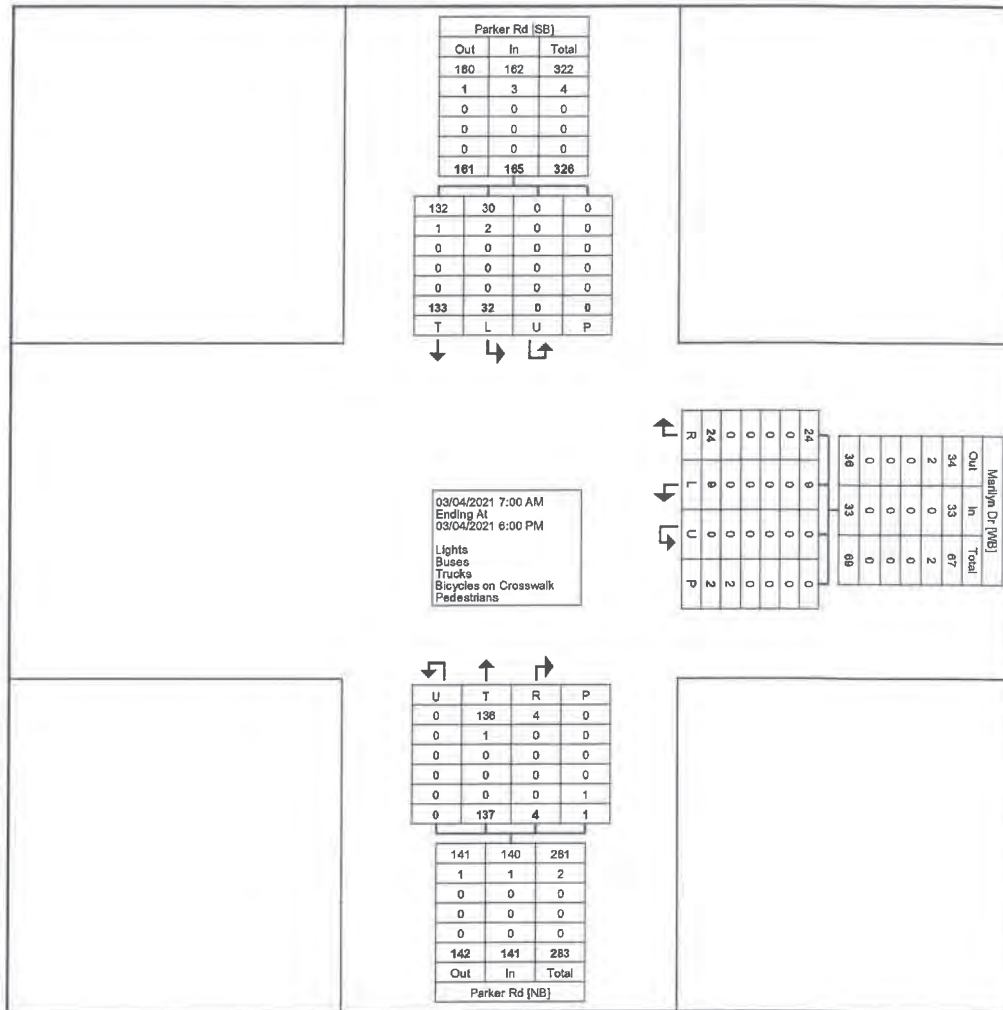
Thursday, March 4, 2021
Location: 42.767123, -
78.800485

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

Count Name: Parker Rd/Marilyn
Dr
Site Code:
Start Date: 03/04/2021
Page No: 1

Turning Movement Data

Start Time	Parker Rd Southbound					Marilyn Dr Westbound					Parker Rd Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
7:00 AM	1	0	0	0	1	0	1	0	0	1	0	6	0	0	6	8
7:15 AM	1	2	0	0	3	4	0	0	0	4	0	11	0	0	11	18
7:30 AM	4	1	0	0	5	2	0	0	0	2	1	10	0	0	11	18
7:45 AM	4	1	0	0	5	1	2	0	0	3	0	15	0	0	15	23
Hourly Total	10	4	0	0	14	7	3	0	0	10	1	42	0	0	43	67
8:00 AM	4	0	0	0	4	1	0	0	0	1	0	14	0	0	14	19
8:15 AM	4	1	0	0	5	2	0	0	0	2	1	9	0	0	10	17
8:30 AM	6	4	0	0	10	1	0	0	0	1	0	7	0	0	7	18
8:45 AM	6	1	0	0	7	0	0	0	0	0	0	12	0	0	12	19
Hourly Total	20	6	0	0	26	4	0	0	0	4	1	42	0	0	43	73
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	14	1	0	0	15	4	1	0	1	5	0	8	0	0	8	28
4:15 PM	14	6	0	0	20	3	1	0	0	4	0	8	0	0	8	32
4:30 PM	17	1	0	0	18	0	0	0	0	0	1	7	0	0	8	26
4:45 PM	10	2	0	0	12	1	1	0	0	2	0	7	0	0	7	21
Hourly Total	55	10	0	0	65	8	3	0	1	11	1	30	0	0	31	107
5:00 PM	11	3	0	0	14	1	1	0	0	2	0	4	0	0	4	20
5:15 PM	15	3	0	0	18	0	1	0	0	1	0	7	0	1	7	26
5:30 PM	9	2	0	0	11	2	1	0	1	3	0	3	0	0	3	17
5:45 PM	13	4	0	0	17	2	0	0	0	2	1	9	0	0	10	29
Hourly Total	48	12	0	0	60	5	3	0	1	8	1	23	0	1	24	92
Grand Total	133	32	0	0	165	24	9	0	2	33	4	137	0	1	141	339
Approach %	80.6	19.4	0.0	-	-	72.7	27.3	0.0	-	-	2.8	97.2	0.0	-	-	-
Total %	39.2	9.4	0.0	-	48.7	7.1	2.7	0.0	-	9.7	1.2	40.4	0.0	-	41.6	-
Lights	132	30	0	-	162	24	9	0	-	33	4	136	0	-	140	335
% Lights	99.2	93.8	-	-	98.2	100.0	100.0	-	-	100.0	100.0	99.3	-	-	99.3	98.8
Buses	1	2	0	-	3	0	0	0	-	0	0	1	0	-	1	4
% Buses	0.8	6.3	-	-	1.8	0.0	0.0	-	-	0.0	0.0	0.7	-	-	0.7	1.2
Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	2	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Turning Movement Data Plot



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184 Baker Rd

Hamburg, NY

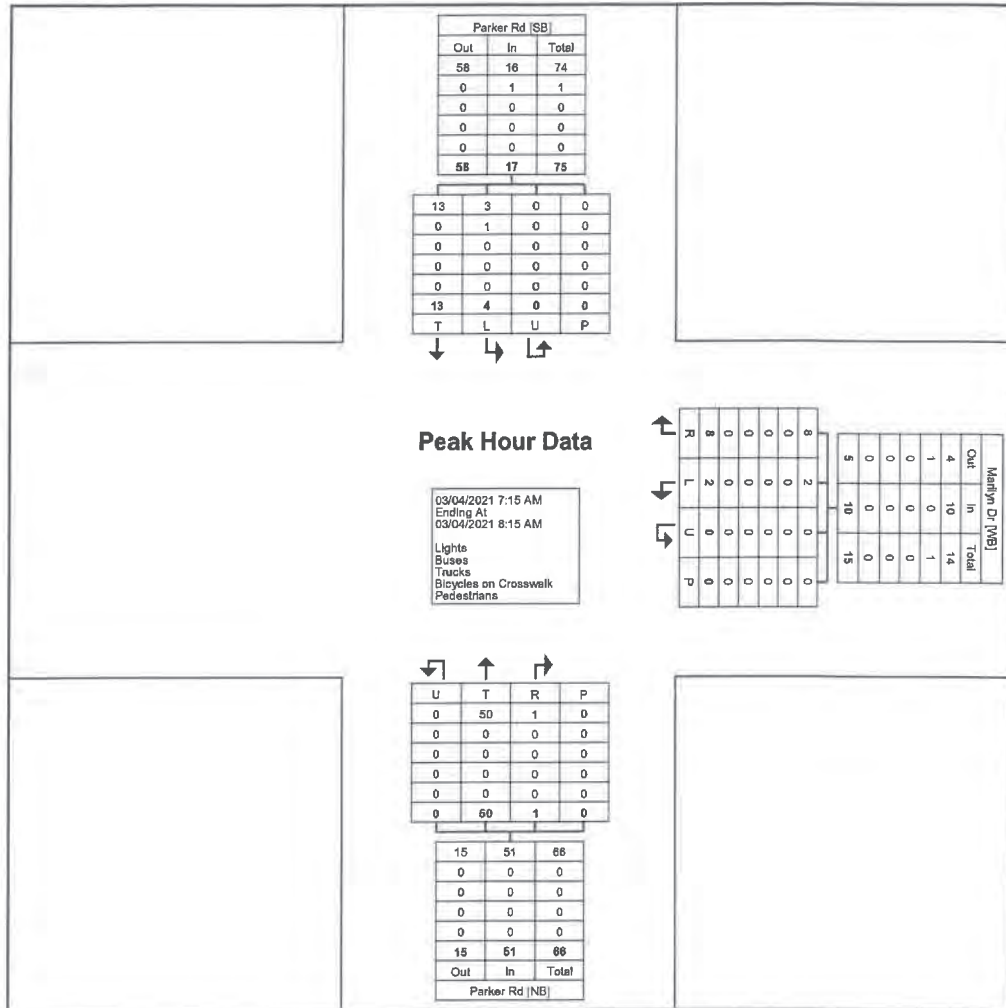
Thursday, March 4, 2021
Location: 42.767123, -
78.800485

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

Count Name: Parker Rd/Marilyn
Dr
Site Code:
Start Date: 03/04/2021
Page No: 3

Turning Movement Peak Hour Data (7:15 AM)

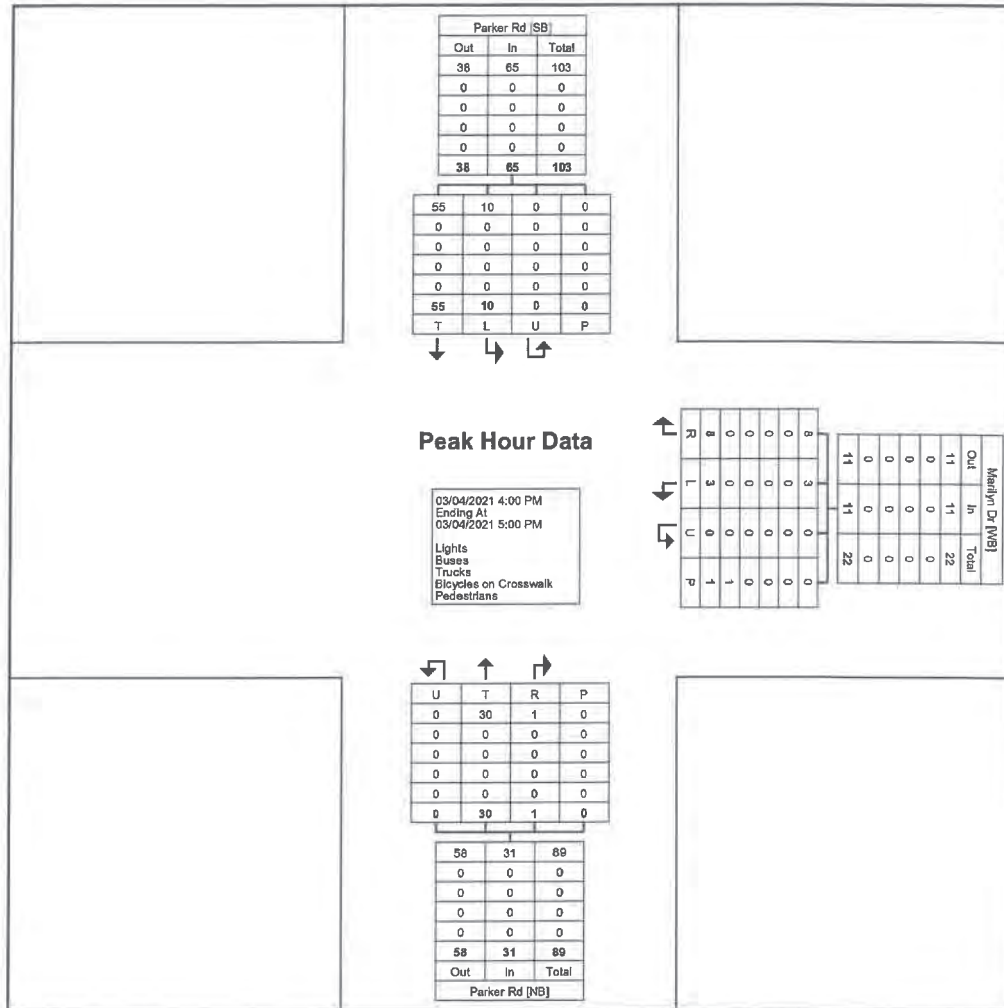
[illegible]



Turning Movement Peak Hour Data Plot (7:15 AM)

Turning Movement Peak Hour Data (4:00 PM)

Start Time	Parker Rd Southbound					Marilyn Dr Westbound					Parker Rd Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
4:00 PM	14	1	0	0	15	4	1	0	1	5	0	8	0	0	8	28
4:15 PM	14	6	0	0	20	3	1	0	0	4	0	8	0	0	8	32
4:30 PM	17	1	0	0	18	0	0	0	0	0	1	7	0	0	8	26
4:45 PM	10	2	0	0	12	1	1	0	0	2	0	7	0	0	7	21
Total	55	10	0	0	65	8	3	0	1	11	1	30	0	0	31	107
Approach %	84.6	15.4	0.0	-	-	72.7	27.3	0.0	-	-	3.2	96.8	0.0	-	-	-
Total %	51.4	9.3	0.0	-	60.7	7.5	2.8	0.0	-	10.3	0.9	28.0	0.0	-	29.0	-
PHF	0.809	0.417	0.000	-	0.813	0.500	0.750	0.000	-	0.550	0.250	0.938	0.000	-	0.969	0.836
Lights	55	10	0	-	65	8	3	0	-	11	1	30	0	-	31	107
% Lights	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-



Turning Movement Peak Hour Data Plot (4:00 PM)



www.TSTData.com
184 Baker Rd

Hamburg, NY

Thursday, March 4, 2021
Location: 42.770732, -
78.809658

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

Count Name: Southwestern
Blvd/Big Tree Rd
Site Code:
Start Date: 03/04/2021
Page No: 1

Turning Movement Data

Start Time	Parking Lot Southbound							Southwestern Blvd Westbound							Big Tree Rd Northbound							Southwestern Blvd Eastbound							Int. Total
	Right on Red	Right on Red	Thru	Left	U-Turn	Ped's	App. Total	Right on Red	Right on Red	Thru	Left	U-Turn	Ped's	App. Total	Right on Red	Right on Red	Thru	Left	U-Turn	Ped's	App. Total	Right on Red	Right on Red	Thru	Left	U-Turn	Ped's	App. Total	
7:00 AM	0	0	0	0	0	0	0	1	0	81	0	0	0	82	0	0	0	32	0	0	32	41	2	124	0	1	0	168	282
7:15 AM	0	1	0	2	0	0	3	1	0	89	1	0	0	91	0	0	1	33	0	0	34	41	4	139	2	0	0	186	314
7:30 AM	0	1	1	1	0	0	3	2	0	99	3	0	0	104	0	0	0	47	0	0	47	48	12	181	2	1	0	244	398
7:45 AM	1	1	3	2	0	1	7	1	0	128	3	0	0	132	0	2	1	55	0	0	58	50	13	176	3	0	0	242	439
Hourly Total	1	3	4	5	0	1	13	5	0	397	7	0	0	409	0	2	2	167	0	0	171	180	31	620	7	2	0	840	1433
8:00 AM	0	0	0	1	0	0	1	0	0	92	2	0	0	94	4	0	0	42	0	0	46	39	8	163	3	1	0	214	355
8:15 AM	0	1	0	1	0	0	2	4	0	96	0	0	0	96	1	0	0	30	0	0	31	38	7	156	1	0	0	202	331
8:30 AM	1	0	0	1	0	0	2	0	1	96	2	0	0	101	0	0	1	44	0	0	45	46	11	141	1	0	0	199	347
8:45 AM	0	1	0	0	0	0	1	0	1	110	1	0	0	112	3	2	2	41	0	0	48	47	6	144	0	0	0	197	358
Hourly Total	1	2	0	3	0	0	6	4	2	392	5	0	0	403	8	2	3	157	0	0	170	170	32	604	5	1	0	812	1391
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	9	2	1	5	0	0	17	1	1	221	7	0	0	230	3	0	1	85	0	0	89	50	13	187	4	0	0	254	590
4:15 PM	3	3	2	1	0	0	7	1	0	209	2	0	0	212	1	2	1	80	0	0	84	66	4	162	7	1	0	240	543
4:30 PM	2	0	6	4	0	0	12	3	0	244	7	0	0	254	4	0	6	82	0	0	92	42	26	180	2	0	0	250	608
4:45 PM	2	0	2	0	0	0	4	4	0	187	2	0	0	193	3	1	2	94	0	0	100	61	15	142	6	1	0	225	522
Hourly Total	16	3	11	10	0	0	40	9	1	861	18	0	0	889	11	3	10	341	0	0	365	219	58	671	19	2	0	969	2263
5:00 PM	1	2	4	2	0	0	9	4	0	236	1	0	2	241	2	0	5	70	0	0	77	40	23	152	4	0	0	219	546
5:15 PM	9	3	5	5	0	0	22	3	0	197	3	0	0	203	2	1	2	51	0	0	56	49	25	135	6	1	0	216	497
5:30 PM	4	4	3	4	0	0	15	6	1	161	2	0	0	170	1	1	3	55	0	0	60	54	14	151	1	1	0	221	466
5:45 PM	1	1	6	2	0	0	10	5	1	151	4	0	2	161	5	1	2	60	0	0	63	44	14	124	2	1	0	185	419
Hourly Total	15	10	18	13	0	0	56	18	2	745	10	0	4	775	0	3	12	236	0	0	256	167	76	562	13	3	0	841	1928
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	33	18	33	31	0	1	115	36	5	2395	40	0	4	2476	24	10	27	901	0	0	962	756	197	2457	44	8	0	3462	7015
Approach %	28.7	15.7	28.7	27.0	0.0	-	-	1.5	0.2	96.7	1.6	0.0	-	-	2.5	1.0	2.8	93.7	0.0	-	-	21.6	5.7	71.0	1.3	0.2	-	-	-
Total %	0.5	0.3	0.5	0.4	0.0	-	1.6	0.5	0.1	34.1	0.6	0.0	-	35.3	0.3	0.1	0.4	12.8	0.0	-	13.7	10.8	2.8	35.0	0.6	0.1	-	49.4	-
Lights	33	18	33	31	0	-	115	36	5	2329	38	0	-	2408	22	10	27	883	0	-	942	740	194	2409	44	8	-	3385	6860
% Lights	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	97.2	95.0	-	97.3	91.7	100.0	100.0	98.0	-	-	97.9	97.9	98.5	98.0	100.0	100.0	-	98.1	97.8	-
Buses	0	0	0	0	0	-	0	0	0	20	0	0	-	20	0	0	0	4	0	-	4	5	0	13	0	0	-	18	42
% Buses	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.8	0.0	-	-	0.8	0.0	0.0	0.0	0.4	-	-	0.4	0.7	0.0	0.5	0.0	0.0	-	0.5	0.6
Trucks	0	0	0	0	0	-	0	0	0	46	2	0	-	48	2	0	0	14	0	-	16	11	3	35	0	0	-	49	113
% Trucks	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	1.9	5.0	-	-	1.9	8.3	0.0	0.0	1.6	-	-	1.7	1.5	1.5	1.4	0.0	0.0	-	1.4	1.6
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	-	4	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TRI-ST-TE

TRAFFIC DATA

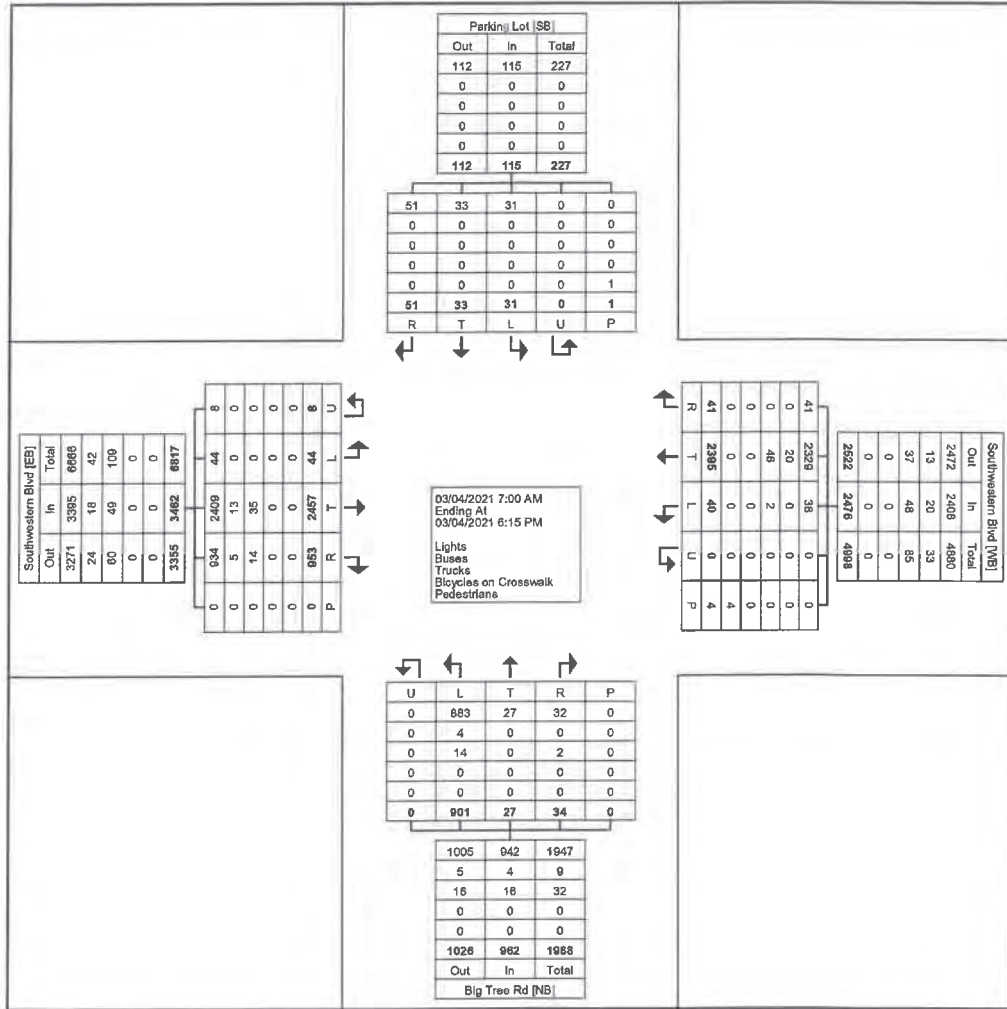
www.TSTData.com
184 Baker Rd

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

Hamburg, NY

Thursday, March 4, 2021
Location: 42.770732, -
78.809658

Count Name: Southwestern
Blvd/Big Tree Rd
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Start Date: 03/04/2021
Page No: 2



Turning Movement Data Plot

www.TSTData.com
184 Baker Rd

Thursday, March 4, 2021
Location: 42.770732, -
78.809658

Count Name: Southwestern
Blvd/Big Tree Rd
Site Code:
Start Date: 03/04/2021
Page No: 3

[illegible]

Thursday, March 4, 2021
Location: 42.770732, -
78.809658

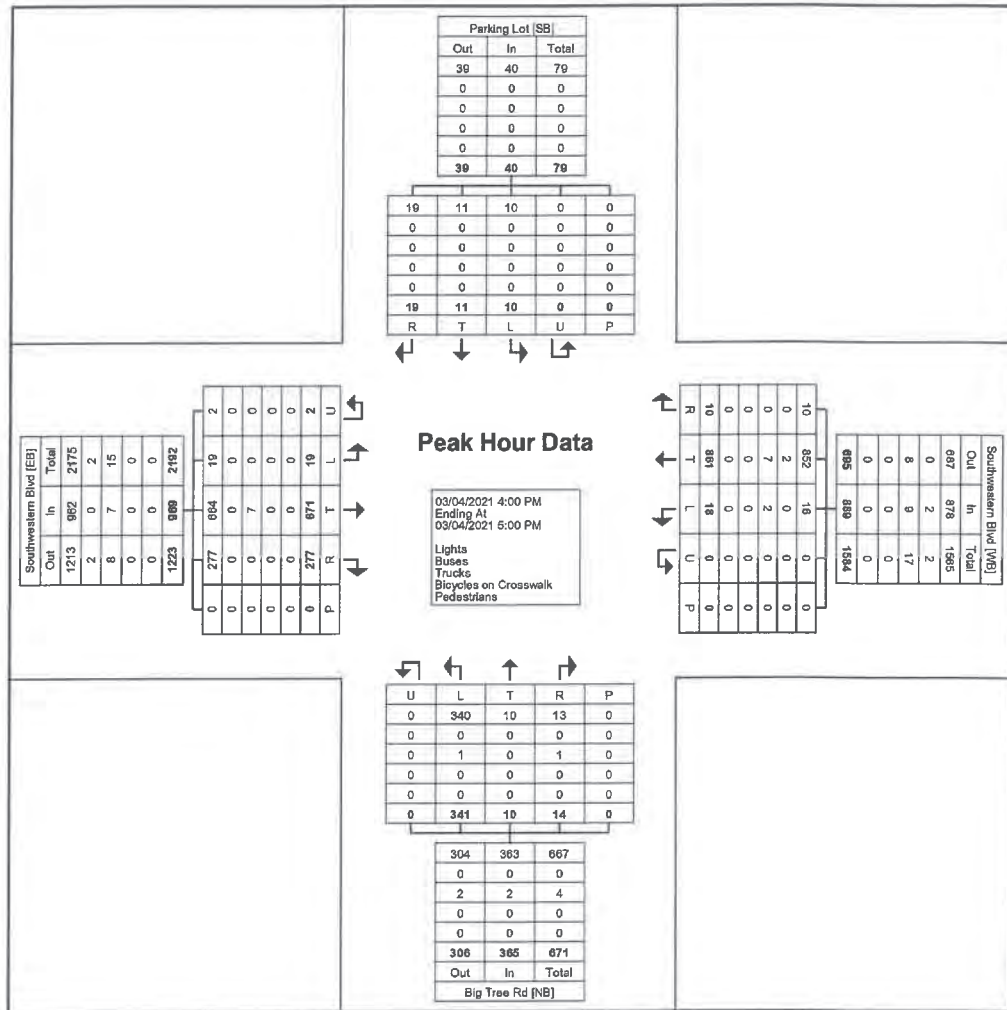
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Count Name: Southwestern
Blvd/Big Tree Rd
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Count Name: Southwestern
Blvd/Big Tree Rd
Site Code:
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Page No: 5

[illegible]



Turning Movement Peak Hour Data Plot (4:00 PM)

A2

**Miscellaneous Traffic Data
and Calculations**



Roadway	Segment starts at	Segment end at	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Annual Growth
SW Blvd	Big Tree Rd	Milestrip Rd	16,649			17,631			21,267					4.16%
Big Tree Rd	SW Blvd	Rte 219	12,059			11,602			12,281		12,584			0.53%
Abbott Rd	Orchard Park TL	Big Tree Rd	6,421					5,722			5,682			-1.52%
Abbott Rd	SW Blvd	Big Tree Rd	8,604					7,074				7,586		-1.39%
												AVERAGE		0.45%

Single-Family Detached Housing

(210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 173

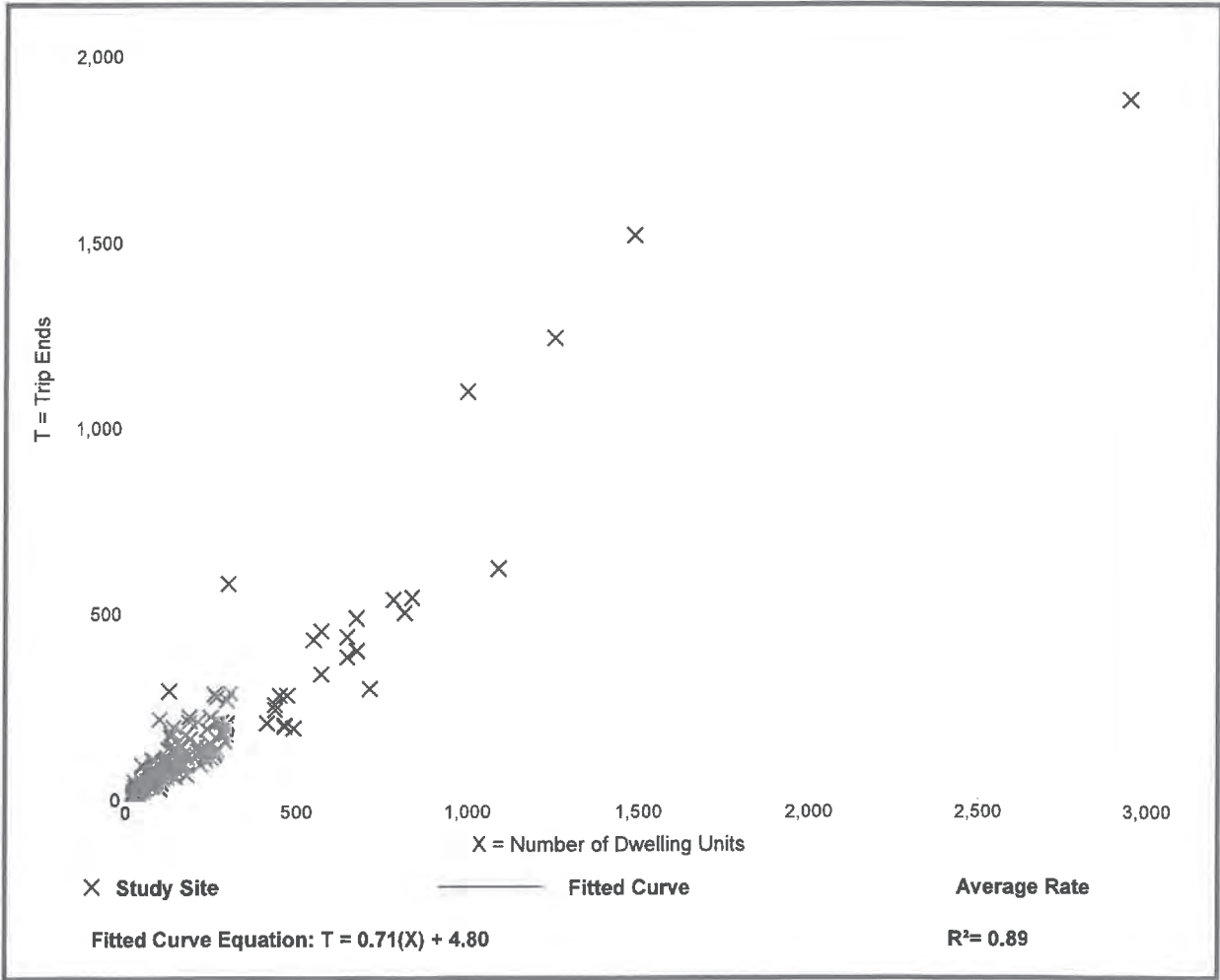
Avg. Num. of Dwelling Units: 219

Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.74	0.33 - 2.27	0.27

Data Plot and Equation



Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 190

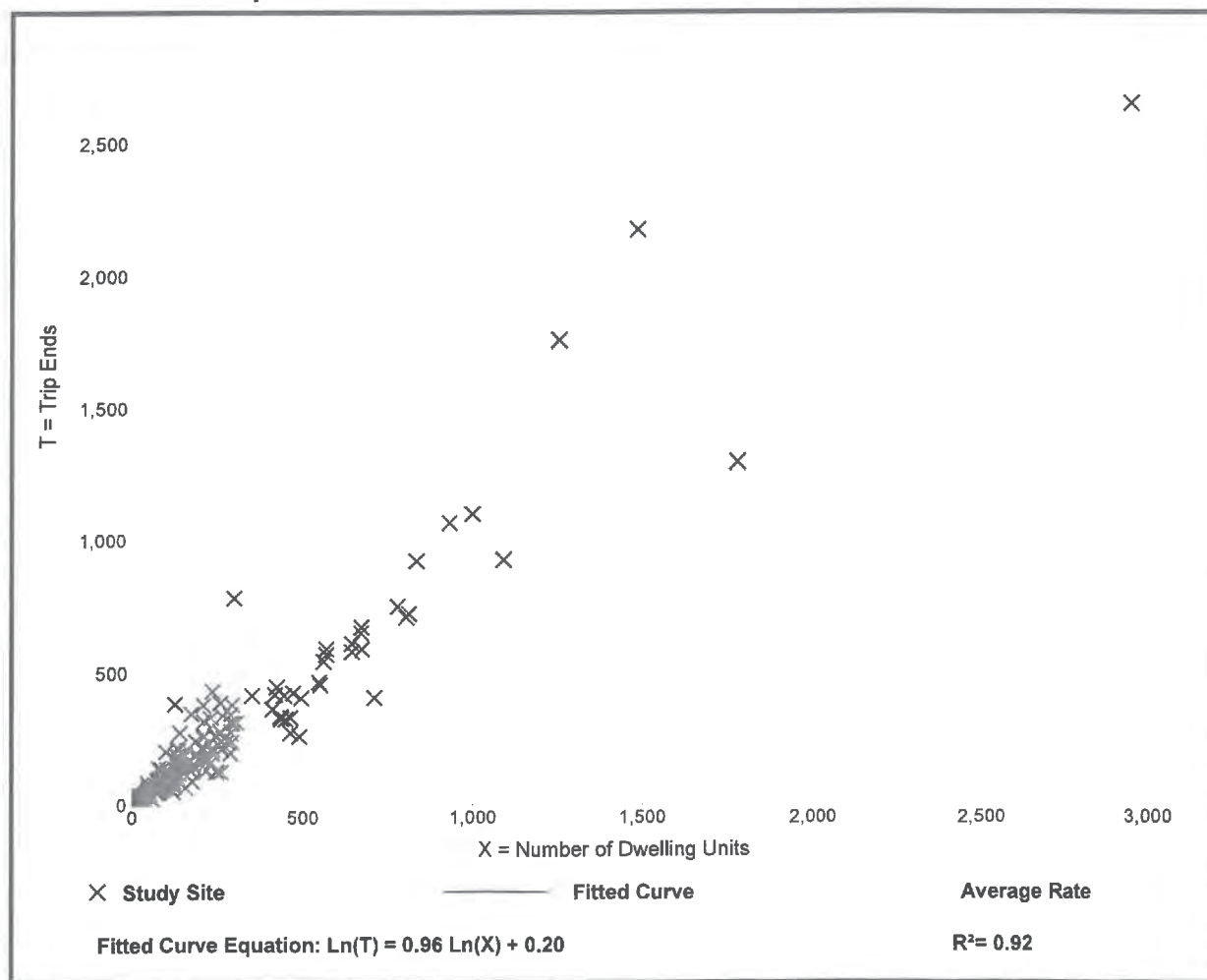
Avg. Num. of Dwelling Units: 242

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.99	0.44 - 2.98	0.31

Data Plot and Equation



Trip Gen Manual, 10th Ed + Supplement • Institute of Transportation Engineers

Multifamily Housing (Low-Rise) (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 42

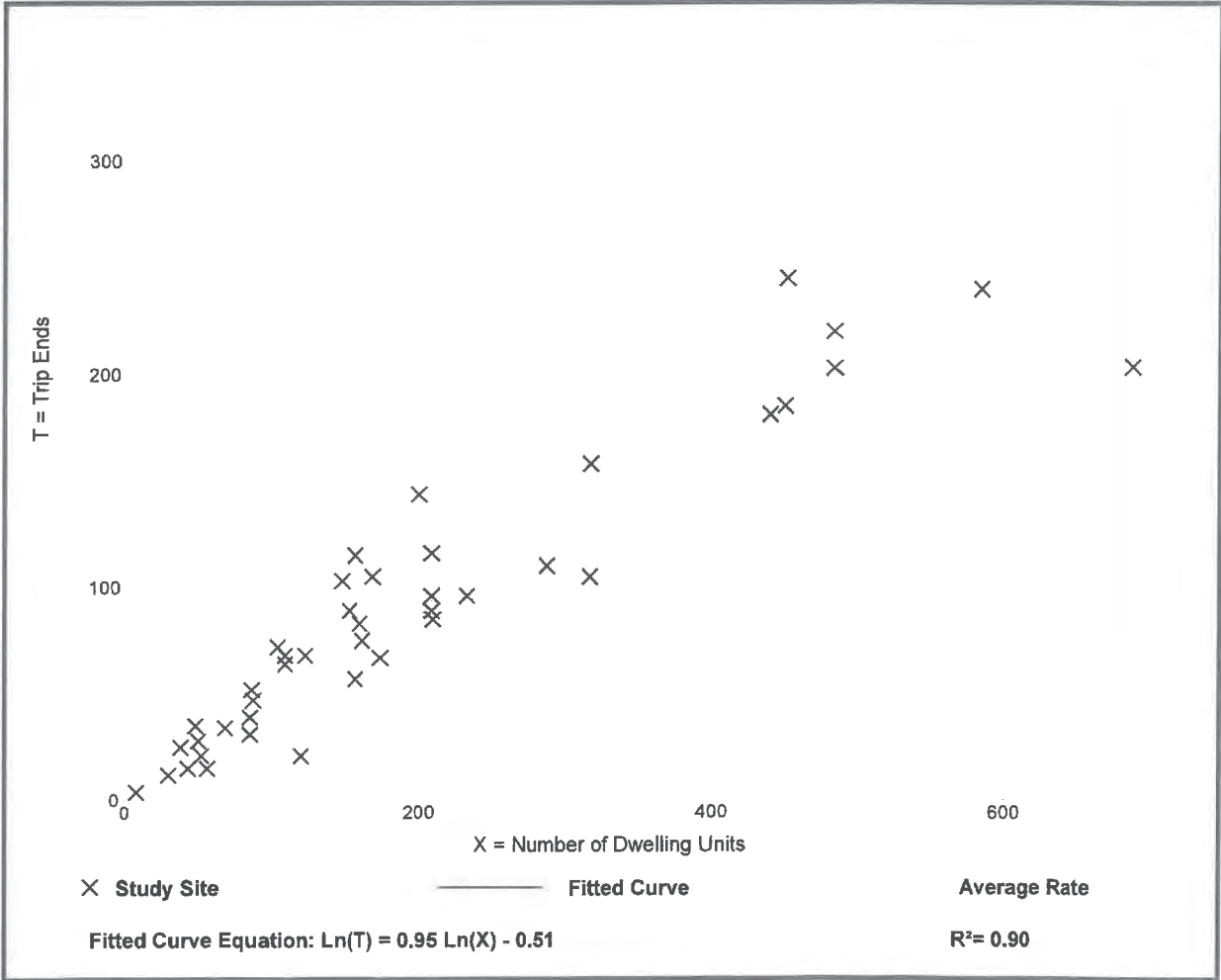
Avg. Num. of Dwelling Units: 199

Directional Distribution: 23% entering, 77% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.46	0.18 - 0.74	0.12

Data Plot and Equation



Multifamily Housing (Low-Rise) (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 50

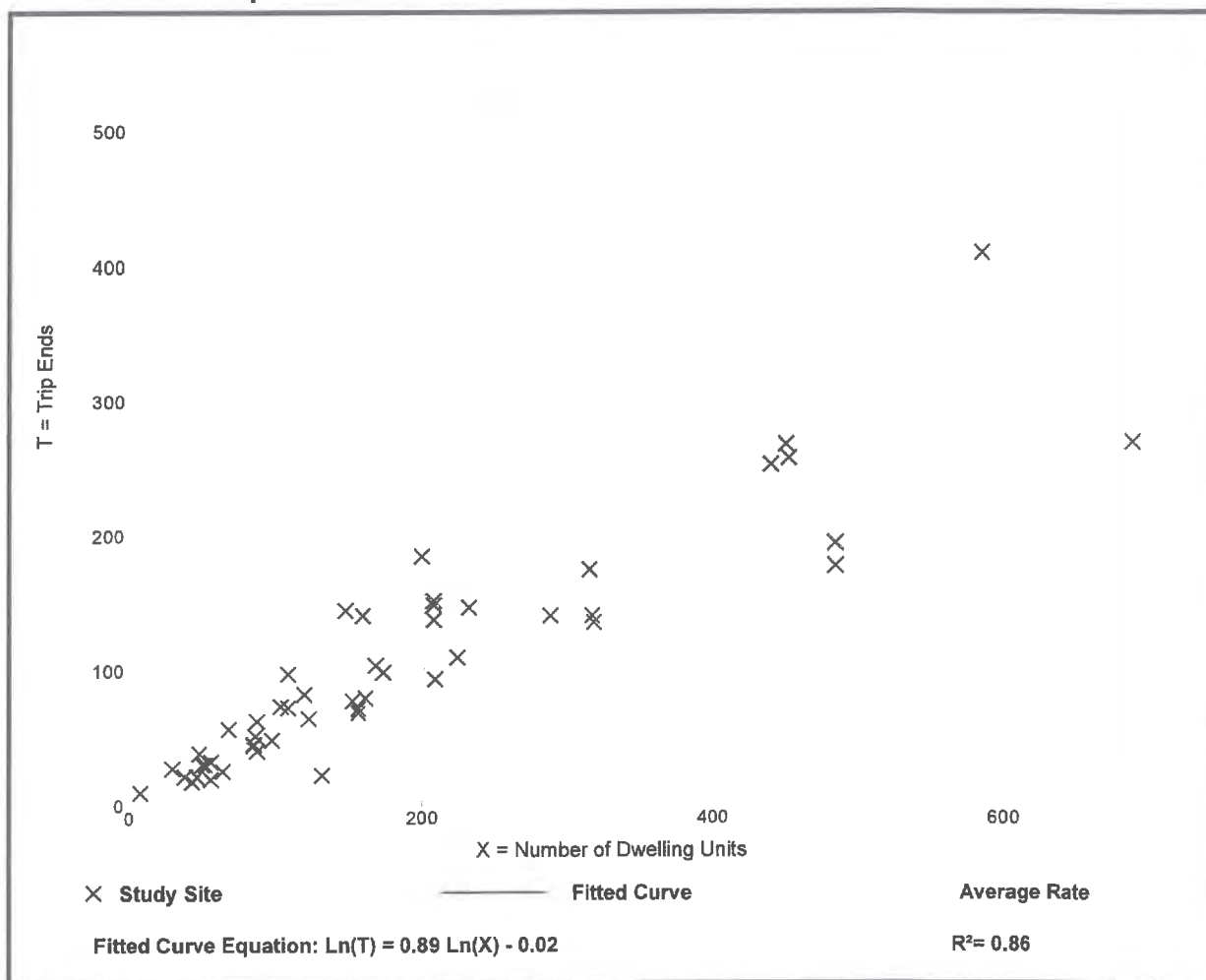
Avg. Num. of Dwelling Units: 187

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.56	0.18 - 1.25	0.16

Data Plot and Equation



Trip Gen Manual, 10th Ed + Supplement • Institute of Transportation Engineers

PROJECT: Proposed Big Tree Residential Projects
 LOCATION: Big Tree Rd, Town of Hamburg, New York
 PEAK HOUR: AM Peak

Figure Number: 3A 3B 4 6A 7A 6B 7B 7C 8

LOCATION NUMBER	INTERSECTION DESCRIPTION	2019 Volumes	2021 Unadjusted Volumes	2021 Adjusted Base	ECC South Campus (west dwy)	ECC South Campus (east dwy)	2019 Incl. ECC South Adjust.	2024 Blvd Vol ~ 0.5%	Proposed Multifamily Project				Total Multifamily Trips	Proposed Parker Rd Subdivision				Total Parker Rd Trips	Total Site Generated Trips	Full Build Volumes
									Enter Dist. %	Exit Dist. %	Trips IN 17	Trips OUT 56		Enter Dist. %	Exit Dist. %	Trips IN 13	Trips OUT 39			
1	Southwestern Blvd/ Big Tree Rd/Radigan's Dwy			Covid-19 1.20																
	SR		4	5			5	5												5
	ST - Radigan's		4	5			5	5												5
	SL		5	6			6	6												6
	WR		7	8			8	9												9
	WT - SW Blvd		411	483			483	501											1	501
	WL		8	10			10	10	5%		1	3	1						3	11
	NR		7	8			8	9		5%										12
	NT - Big Tree Rd		2	2			1	2												1
	ER		174	209	4	4	217	223	45%	45%	8	25	25	45%	45%	6	18	18	43	263
2	Big Tree Rd/ Parker Rd/ECC Dwy																			
	SR		1	1	5		5	5												5
	ST		1	1	5		5	5												5
	SL		2	2	10		10	10												10
	WR		2	2	10		10	10												10
	WT		183	220	4		224	227	45%		8		8	50%		7		7	8	235
	WL		8	10			10	10												17
	NR		30	36			36	37												57
	NT		2	2	10		10	10												10
	ER		9	11			11	11	5%	5%	1	3	3	45%		6	18	18	18	48
3	Big Tree Rd/ Abbott Rd			0.5%																
	SR		15	15			15	15	10%		2		2	15%		2		2	4	19
	ST		73	74			74	75												75
	SL		65	66			66	67												67
	WR		75	76			76	77												77
	WT		231	233	6	8	247	251	35%		6		6	35%		5		5	11	262
	WL		29	29			29	29												29
	NR		101	102			102	104												104
	NT		181	183			183	186												186
	ER		13	13	1	4	18	18												18
4	Parker Rd/Marilyn Dr/ Proposed Northerly SF Home Dwy																			
	SR		13	16	4		20	20	5%		3	3	3	55%		7		7	7	7
	ST		4	5			5	5						40%		5		5	8	26
	SL		8	10			10	10												10
	WR		2	2			2	2												2
	WT		8	10			10	10												10
	WL		2	2			2	2												2
	NR		1	1			1	1	5%		1		1							1
	NT		50	60	8		68	69						40%		16		16	16	85
	ER													2%		0		0	0	0
5	Parker Rd/ Proposed Southerly SF Home Dwy																			
	SR		15	18	4		22	22	5%		3	3	3	40%		5		5	5	5
	ST													2%		1		1	4	26
	SL																			
	WR																			
	WT																			
	WL																			
	NR		51	61	8		69	70	5%		1		1	2%		0		0	1	71
	NT													3%		0		0	0	0
	ER															1		1	1	1
6	Big Tree Rd/ Proposed Easterly Multifamily Dwy																			
	SR																			
	ST																			
	SL																			
	WR																			
	WT		209	251	4	4	259	263	10%	40%	2	7	2		45%		18		18	282
	WL																			7
	NR																			22
	NT																			21
	ER		231	277	12	12	301	305	37%	10%	6	6	6	45%		6		6	11	317
7	Big Tree Rd/ Proposed Westerly Multifamily Dwy																			
	SR																			
	ST																			
	SL																			
	WR																			
	WT		209	251	4	4	259	263	10%	37%	2	21	21		45%		18		18	301
	WL																			2
	NR																			6
	NT																			6
	ER		231	277	12	12	301	305	37%	37%	2	6	6	45%		6		6	12	318

Figure Number:	3A	3B	4	6A	7A	6B	7B	7C	8
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LOCATION NUMBER	INTERSECTION DESCRIPTION	2019 Volumes	2021 Unadjusted Volumes	2021 Adjusted Base Covid-19	ECC South Campus (west drwy)	ECC South Campus (east drwy)	2021 Incl. ECC South Adjust.	3	Proposed Multifamily Project				Total Multifamily Trips	Proposed Parker Rd Subdivision				Total Parker Rd Trips	Total Site Generated Trips	Full Build Volumes	
								2024 Blvd Vol 0.5%	Enter Dist. %	Exit Dist. %	Trips IN 55	Trips OUT 33		Enter Dist. %	Exit Dist. %	Trips IN 43	Trips OUT 26				
1	Southwestern Blvd/ Big Tree Rd/Radigan's Drwy			1,20																	
	SR		19	23			23	23										23	23		
	ST - Radigan's		11	13			13	13										13	13		
	SL		10	12			12	12										12	12		
	WR		10	12			12	12										12	12		
	WT - SW Blvd		861	1033			1033	1049										1049	1049		
	WL		18	22			22	22	5%			3		3				3	3		
	NR		14	17			17	17					2	2				2	19		
	NT - Big Tree Rd		10	12			12	12		5%				15				15	12		
NL		341	409		20	20	449	456		45%			15				15	27	463		
ER		277	332				345	364	46%	45%		25		25	46%	45%	19	12	44	388	
ET - SW Blvd		671	805				805	817										817	817		
EL		19	23				23	23										23	23		
2	Big Tree Rd/ Parker Rd/ECC Drwy																				
	SR		5	5	25		25	25											25	25	
	ST		2	2	10		10	10											10	10	
	SL		1	1	5		5	5											5	5	
	WR		2	2	10		10	10											10	10	
	WT		370	444		20	464	471	45%			25		25	50%		22	22	25	496	
	WL		29	35			35	35										35	35		
	NR		19	23			23	23										23	23		
	NT		2	2	10		10	10										10	10		
	NL		18	22			22	22										22	22		
	ER		34	41			41	41	5%									41	41		
	ET		296	355		8	363	369		5%	45%		2	2	45%	45%	19	12	19	21	362
EL		2	2	10		10	10					15	15				15	15	10	10	
3	Big Tree Rd/ Abbott Rd			2																	
	SR		44	44			44	45	10%				6	6	15%			6	12	57	57
	ST		259	262			262	266											266	266	
	SL		96	97			97	98											98	98	
	WR		108	109			109	111											111	111	
	WT		420	424	6		430	436	35%			19		19	35%		15	15	34	470	
	WL		110	111			111	113											113	113	
	NR		57	58			58	59											59	59	
	NT		162	164			170	173											173	173	
	NL		34	34	2	6	46	47											47	47	
	ER		46	46	1	9	56	57											57	57	
	ET		347	350	3	3	356	361		35%	10%		12	12		35%		9	9	21	362
EL		27	27			27	27					3	3		15%		4	4	7	34	
4	Parker Rd/Marilyn Dr/ Proposed Northerly SF Home Drwy																				
	SR		55	66	8		74	75		5%			2	2	55%		24	24	24	24	34
	ST		10	12			12	12							40%		17	17	19	19	12
	SL		8	10			10	10												10	10
	WR																				
	WT		3	4			4	4											4	4	
	WL		1	1			1	1											1	1	
	NR		30	36	8		44	45	5%			3		3		40%	1	10	10	13	58
	NT																		1	1	
	NL																		1	1	
	ER															2%		1	1	1	1
	ET																				
EL															55%		14	14	14	14	
5	Parker Rd/ Proposed Southerly SF Home Drwy																				
	SR		56	70	8		78	79		5%			2	2	40%		17	17	17	17	17
	ST																				
	SL																				
	WR																				
	WT																				
	WL																				
	NR																				
	NT		31	37	8		45	46	5%			3		3	2%	40%	1	1	1	4	50
NL														3%				1	1	1	
ER																					
ET																					
EL															40%		10	10	10	10	
6	Big Tree Rd/ Proposed Easterly Multifamily Drwy																				
	SR																				
	ST																				
	SL																				
	WR																				
	WT		393	472	20	20	512	519	10%			6		6		45%		12	12	17	536
	WL								40%			22		22					22	22	
	NR									40%			13						13	13	
	NT									37%			12						12	12	
NL																					
ER								37%			20		20					20	20		
ET		332	398	8	8	414	421		10%			3		3	45%		19	19	23	444	
EL																					
7	Big Tree Rd/ Proposed Westerly Multifamily Drwy																				
	SR																				
	ST																				
	SL																				
	WR																				
	WT		393	472	20	20	512	519	10%			6		6		45%		12	12	24	543
	WL									10%			3		3				3	3	
	NR																				
	NT									13%			4		4				4	4	
NL																					
ER																					
ET		332	398	8	8	414	421	37%			20		20		45%		19	19	40	451	
EL																					

INTERSECTION CRASH RATE CALCULATIONS

$$\text{Rate per MEV} = \frac{\# \text{ of Crashes} \times 1,000,000}{\text{Total No. of Entering Vehicles}} =$$

$$\text{Rate} = \frac{\# \text{ of Crashes} \times 1,000,000}{\text{Veh./Day} \times \text{Duration of Study}} =$$

Crashes per million entering vehicles (Crash / MEV)

1 Southwestern Boulevard/Big Tree Road

$$\text{ADT} = \text{Peak hour entering volume} / \text{k factor}$$

$$\text{ADT} = \boxed{2769} \text{ VPH} / 0.095 = 29147 \text{ VPD}$$

$$\text{Rate} = \frac{28 \text{ Acc.} \times 1,000,000}{29147 \text{ VPD} \times 365 \text{ Days} \times 3.000 \text{ Yrs.}} = 0.88 \text{ Crash / MEV}$$

2 Big Tree Road/Parker Road

$$\text{ADT} = \text{Peak hour entering volume} / \text{k factor}$$

$$\text{ADT} = \boxed{1018} \text{ VPH} / 0.095 = 10716 \text{ VPD}$$

$$\text{Rate} = \frac{3 \text{ Acc.} \times 1,000,000}{10716 \text{ VPD} \times 365 \text{ Days} \times 3.000 \text{ Yrs.}} = 0.26 \text{ Crash / MEV}$$

3 Big Tree Road/Abbott Road

$$\text{ADT} = \text{Peak hour entering volume} / \text{k factor}$$

$$\text{ADT} = \boxed{1766} \text{ VPH} / 0.095 = 18589 \text{ VPD}$$

$$\text{Rate} = \frac{15 \text{ Acc.} \times 1,000,000}{18589 \text{ VPD} \times 365 \text{ Days} \times 3.000 \text{ Yrs.}} = 0.74 \text{ Crash / MEV}$$

4 Parker Road/Marilyn Drive

$$\text{ADT} = \text{Peak hour entering volume} / \text{k factor}$$

$$\text{ADT} = \boxed{145} \text{ VPH} / 0.095 = 1526 \text{ VPD}$$

$$\text{Rate} = \frac{0 \text{ Acc.} \times 1,000,000}{1526.3 \text{ VPD} \times 365 \text{ Days} \times 3.000 \text{ Yrs.}} = 0.00 \text{ Crash / MEV}$$

Guideline for determining left-turn Lane at a two-way stop-controlled intersection
TWO LANE ROADWAY

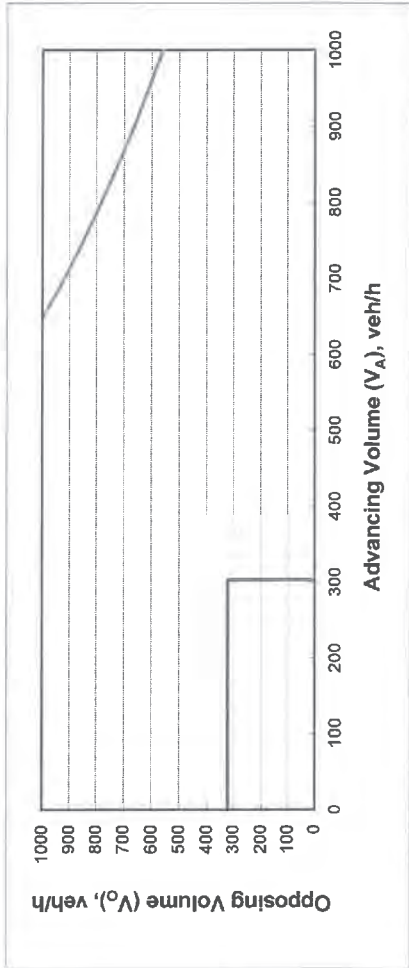
INPUT

Major Approach	Variable	Value
Approach	Big Tree Road @ Westerly MF Dwy Westbound (AM Peak Hour)	
Design Speed Limit - MPH		50
Percent of left-turns in advancing volume (V _A), %:		1%
Advancing volume (V _A), veh/h:		303
Opposing volume (V _O), veh/h:		320

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

PLOT - LINE 1	PLOT - LINE 2
0 320	303 0
303 320	303 320



OUTPUT

Variable	Value
Limiting advancing volume (V _A), veh/h:	1286
Guidance for determining the need for a major-road left-turn bay:	
Westbound (AM Peak Hour) Left-turn treatment NOT warranted at Big Tree Road @ Westerly MF Dwy Int	

P 0.015
f = 0.79
Wait Time 1.296 s
Service Rate 962 veh/h
Arrival Rate 1286 veh/h

V _O	Time _{tw}	V _O	Serv. rate
0	0.0	0	1200
100	0.4	100	1121
200	0.8	200	1046
300	1.2	300	976
400	1.7	400	910
500	2.2	500	848
600	2.8	600	789
700	3.5	700	735
800	4.2	800	683
900	5.0	900	635
1000	5.8	1000	590

% LT veh.	1%	10%	15%	20%	40%
V _O	V _A	V _A	V _A	V _A	V _A
0	1862	503	422	377	308
100	1649	445	374	334	273
200	1468	396	333	297	243
300	1314	355	298	266	217
400	1180	319	268	239	195
500	1063	287	241	215	176
600	960	259	218	194	159
700	868	234	197	176	143
800	786	212	178	159	130
900	713	192	162	144	118
1000	647	175	147	131	107

Guideline for determining left-turn Lane at a two-way stop-controlled intersection
TWO LANE ROADWAY

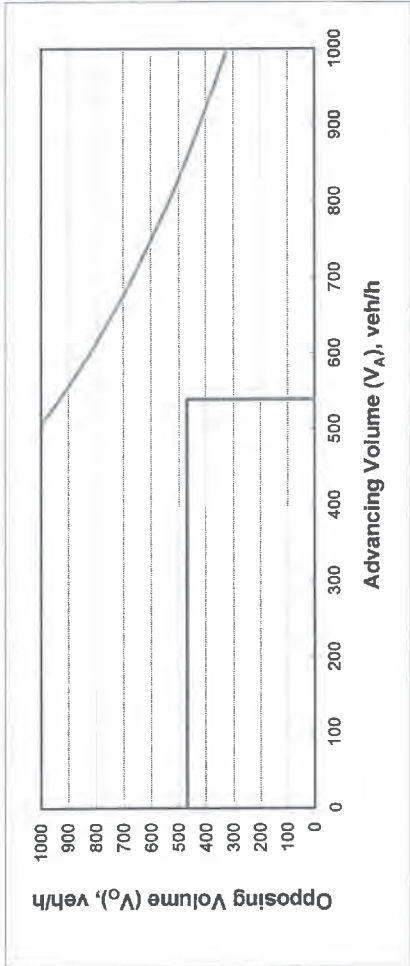
INPUT

Major Approach	Variable	Value
Approach	Big Tree Road @ Westerly MF Dwy Westbound (PM Peak Hour)	
Design Speed Limit - MPH		50
Percent of left-turns in advancing volume (V _A), %:		1%
Advancing volume (V _A), veh/h:		539
Opposing volume (V _O), veh/h:		468

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

PLOT - LINE 1	PLOT - LINE 2
0	539
539	539
	468



OUTPUT

Variable	Value
Limiting advancing volume (V _A), veh/h:	856
Guidance for determining the need for a major-road left-turn bay:	
Westbound (PM Peak Hour) Left-turn treatment NOT warranted at Big Tree Road @ Westerly MF Dwy Int	

ρ 0.015
 f = 0.79
 Wait Time 2.043 s
 Service Rate 867 veh/h
 Arrival Rate 856 veh/h

V _O	Time tw	V _O	Serv rate
0	0.0	0	1200
100	0.4	100	1121
200	0.8	200	1046
300	1.2	300	976
400	1.7	400	910
500	2.2	500	848
600	2.8	600	789
700	3.5	700	735
800	4.2	800	683
900	5.0	900	635
1000	5.8	1000	590

% LT veh.	1%	10%	15%	20%	40%
V _O	V _A	V _A	V _A	V _A	V _A
0	1450	503	422	377	308
100	1284	445	374	334	273
200	1144	396	333	297	243
300	1023	355	298	266	217
400	919	319	268	239	195
500	828	287	241	215	176
600	747	259	218	194	159
700	676	234	197	176	143
800	612	212	178	159	130
900	555	192	162	144	118
1000	504	175	147	131	107

Guideline for determining left-turn Lane at a two-way stop-controlled intersection
TWO LANE ROADWAY

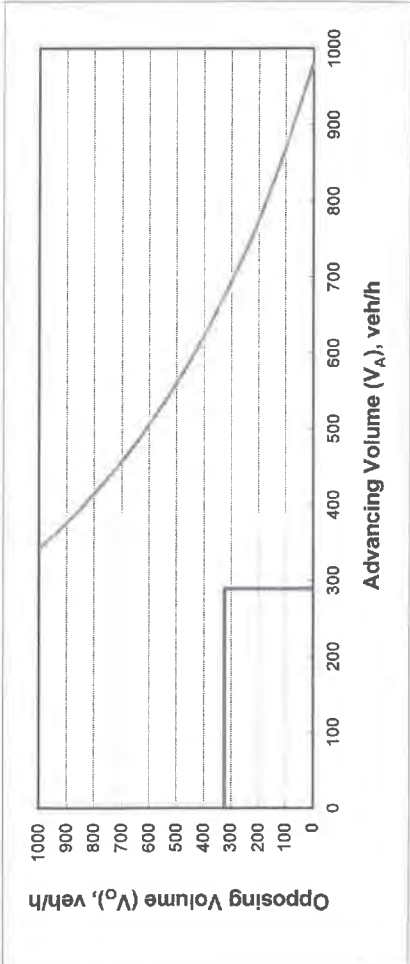
INPUT

Variable	Value
Major Approach	Big Tree Road @ Easterly MF Dwy
Approach	Westbound (AM Peak Hour)
Design Speed Limit - MPH	50
Percent of left-turns in advancing volume (V _A), %:	2%
Advancing volume (V _A), veh/h:	289
Opposing volume (V _O), veh/h:	323

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

PLOT - LINE 1	PLOT - LINE 2
0	289
289	289
	0
	323



OUTPUT

Variable	Value
Limiting advancing volume (V _A), veh/h:	675
Guidance for determining the need for a major-road left-turn bay:	
Westbound (AM Peak Hour) Left-turn treatment NOT warranted at Big Tree Road @ Easterly MF Dwy Inte	

p 0.015
 f 0.79
Wait Time 1.310 s
Service Rate 960 veh/h
Arrival Rate 675 veh/h

V _O	Time _{tw}	Serv. rate
0	0.0	1200
100	0.4	1121
200	0.8	1046
300	1.2	976
400	1.7	910
500	2.2	848
600	2.8	789
700	3.5	735
800	4.2	683
900	5.0	635
1000	5.8	590

% LT veh.	2%	10%	15%	20%	40%
V _O	V _A	V _A	V _A	V _A	V _A
0	981	503	422	377	308
100	868	445	374	334	273
200	773	396	333	297	243
300	692	355	298	266	217
400	622	319	268	239	195
500	560	287	241	215	176
600	505	259	218	194	159
700	457	234	197	176	143
800	414	212	178	159	130
900	376	192	162	144	118
1000	341	175	147	131	107

Guideline for determining left-turn Lane at a two-way stop-controlled intersection

TWO LANE ROADWAY

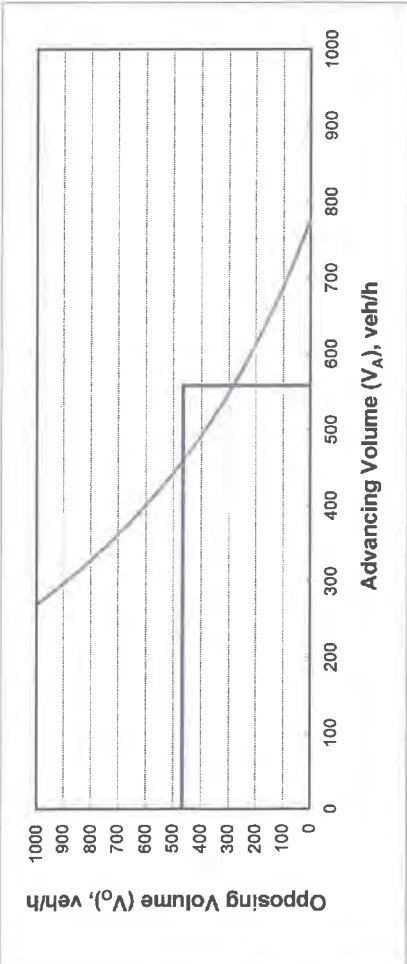
INPUT

Variable	Value
Major Approach	Big Tree Road @ Easterly MF Dwy
Design Speed Limit - MPH	Westbound (PM Peak Hour)
Percent of left-turns in advancing volume (V _A), %:	50
Advancing volume (V _A), veh/h:	4%
Opposing volume (V _O), veh/h:	558
	464

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

PLOT - LINE 1	PLOT - LINE 2
0	558
558	558
	0
	464



OUTPUT

Variable	Value
Limiting advancing volume (V _A), veh/h:	459
Guidance for determining the need for a major-road left-turn bay:	
Westbound (PM Peak Hour) Left-turn treatment warranted at Big Tree Road @ Easterly MF Dwy Intersec	

$p = 0.015$
 $f = 0.79$
Wait Time 2.021 s
Service Rate 870 veh/h
Arrival Rate 459 veh/h

V _O	Time tw	Serv rate
0	0.0	0
100	0.4	100
200	0.8	200
300	1.2	300
400	1.7	400
500	2.2	500
600	2.8	600
700	3.5	700
800	4.2	800
900	5.0	900
1000	5.8	1000

% LT veh.	4%	10%	15%	20%	40%
V _O	V _A	V _A	V _A	V _A	V _A
0	775	503	422	377	308
100	686	445	374	334	273
200	611	396	333	297	243
300	547	355	298	266	217
400	491	319	268	239	195
500	442	287	241	215	176
600	399	259	218	194	159
700	361	234	197	176	143
800	327	212	178	159	130
900	297	192	162	144	118
1000	269	175	147	131	107

A3

Level of Service: Criteria and Definitions

Level of Service Criteria

Highway Capacity Manual 2016

SIGNALIZED INTERSECTIONS

Level of Service is a qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. Level of Service for signalized intersections is defined in terms of delay specifically, average total delay per vehicle for a 15 minute analysis period. The ranges are as follows:

Level of Service	Control Delay per vehicle (seconds)
A	< 10
B	10 – 20
C	20 – 35
D	35 – 55
E	55 – 80
F	>80

UNSIGNALIZED INTERSECTIONS

Level of Service for unsignalized intersections is also defined in terms of delay. However, the delay criteria are different from a signalized intersection. The primary reason for this is driver expectation that a signalized intersection is designed to carry higher volumes than an unsignalized intersection. The total delay threshold for any given Level of Service is less for an unsignalized intersection than for a signalized intersection. The ranges are as follows:

Level of Service	Control Delay per vehicle (seconds)
A	< 10
B	10 – 15
C	15 – 25
D	25 – 35
E	35 - 50
F	>50

A4

**Level of Service Calculations:
Existing Conditions**

Lanes, Volumes, Timings
1: Big Tree Rd/Radigan's Dwy & Southwestern Blvd
2021 Existing Conditions - AM Peak Hour
04/02/2021

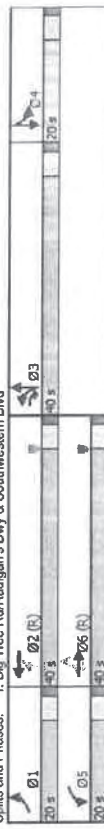
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	11	811	282	10	493	8	217	1	8	6	5	5
Traffic Volume (vph)	11	811	282	10	493	8	217	1	8	6	5	5
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	45	190	140	0	205	0	205	0	0	0	0	0
Storage Length (ft)	105	120	120	100	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Taper Length (ft)	1.00	0.91	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Lane Util. Factor	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Flt Protected	1805	4988	1553	3340	0	1633	1617	0	1805	1758	0	0
Satd. Flow (prot)	0.411	0.283	0.283	0.283	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Flt Permitted	781	4988	1553	3340	0	1633	1617	0	1805	1758	0	0
Satd. Flow (perm)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Right Turn on Red	324	324	324	324	324	324	324	324	324	324	324	324
Satd. Flow (RTOR)	50	720	735	735	884	884	884	884	884	884	884	884
Link Speed (mph)	9.8	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Travel Time (s)	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Peak Hour Factor	0%	4%	4%	0%	8%	0%	5%	0%	15%	0%	0%	0%
Heavy Vehicles (%)	13	932	324	11	567	9	249	1	9	7	6	6
Adj. Flow (vph)	13	932	324	11	567	9	249	1	9	7	6	6
Shared Lane Traffic (%)	13	932	324	11	567	9	249	1	9	7	6	6
Lane Group Flow (vph)	13	932	324	11	567	9	249	1	9	7	6	6
Turn Type	pm-pt	NA	pm-ov	pm-pt	NA	NA	Split	NA	Split	NA	Split	NA
Protected Phases	6	6	6	2	2	3	3	3	3	4	4	4
Permitted Phases	1	6	3	5	2	3	3	3	3	4	4	4
Detector Phase	1	6	3	5	2	3	3	3	3	4	4	4
Switch Phase	6.0	20.0	6.0	6.0	20.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Initial (s)	11.0	27.0	37.0	11.0	27.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Minimum Split (s)	20.0	40.0	40.0	20.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	16.7%	33.3%	33.3%	16.7%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Total Split (%)	15.0	35.0	35.0	15.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Maximum Green (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Yellow Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total Lost Time (s)	Lead	Yes	Yes	Lead	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead/Lag	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead-Lag Optimize?	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	None	C-Max	None	None	C-Max	None	None	None	None	None	None	None
Recall Mode	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Walk Time (s)	15.0	25.0	25.0	15.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Flash Don't Walk (s)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Calls (#/hr)	88.6	87.4	110.9	87.6	85.1	15.6	15.6	15.6	6.4	6.4	6.4	6.4
Act Effct Green (s)	0.74	0.73	0.92	0.73	0.71	0.13	0.13	0.13	0.05	0.05	0.05	0.05
Actuated g/C Ratio	0.02	0.26	0.22	0.02	0.24	0.61	0.61	0.61	0.07	0.12	0.12	0.12
v/c Ratio	6.9	7.6	0.7	7.1	9.0	60.6	59.6	59.6	55.3	41.4	41.4	41.4
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Big Tree Road Hamburg
SRF Associates, D.P.C.

Synchro 10 Report
Page 1

Lanes, Volumes, Timings
1: Big Tree Rd/Radigan's Dwy & Southwestern Blvd
2021 Existing Conditions - AM Peak Hour
04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	6.9	7.6	0.7	7.1	9.0	60.6	59.6	59.6	55.3	41.4	41.4	41.4
LOS	A	A	A	A	A	E	E	E	E	D	D	D
Approach Delay	5.8	5.8	0	5.8	8.9	60.1	60.1	60.1	55.3	41.4	41.4	41.4
Approach LOS	A	A	A	A	A	E	E	E	E	D	D	D
Queue Length 50th (ft)	2	57	0	2	50	101	98	98	5	5	5	5
Queue Length 95th (ft)	11	170	17	10	159	153	152	152	20	23	23	23
Internal Link Dist (ft)	640	640	190	140	655	804	804	804	205	225	225	225
Turn Bay Length (ft)	45	3631	1520	580	2370	476	473	473	0	0	0	0
Base Capacity (vph)	711	3631	1520	580	2370	476	473	473	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.26	0.21	0.02	0.24	0.27	0.27	0.27	0.03	0.05	0.05	0.05
Intersection Summary	Other											
Area Type:	Other											
Cycle Length:	120											
Actuated Cycle Length:	120											
Offset:	0 (0%), Referenced to phase 2:WBT, and 6:EBTL Start of Yellow											
Natural Cycle:	115											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.61											
Intersection Signal Delay:	13.6											
Intersection Capacity Utilization:	40.0%											
Analysis Period (min):	15											
Splits and Phases:	1: Big Tree Rd/Radigan's Dwy & Southwestern Blvd											



Big Tree Road Hamburg
SRF Associates, D.P.C.

Synchro 10 Report
Page 2

Lanes, Volumes, Timings 2: Parker Rd/ECC Dwy & Big Tree Rd

2021 Existing Conditions - AM Peak Hour
04/02/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (veh/h)	15	275	11	10	224	10	30	10	36	10	5	5
Future Volume (veh/h)	15	275	11	10	224	10	30	10	36	10	5	5
Ideal Flow (veh/pl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.985	0.997	0.998	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981
Fit Protected	0.985	0.997	0.998	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981
Satd. Flow (prot)	0	1835	0	0	1763	0	0	1746	0	0	1793	0
Fit Permitted	0.985	0.997	0.998	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981
Satd. Flow (perm)	0	1835	0	0	1763	0	0	1746	0	0	1793	0
Link Speed (mph)	45	45	45	45	45	45	45	45	45	45	45	45
Link Distance (ft)	1782	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441
Travel Time (s)	27.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	0%	3%	0%	12%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (veh/h)	19	344	14	13	280	13	38	13	45	13	6	6
Shared Lane Traffic (%)	0	377	0	0	306	0	0	96	0	0	25	0
Lane Group Flow (vph)	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Sign Control												

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	32.6%
Analysis Period (min)	15
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis 2: Parker Rd/ECC Dwy & Big Tree Rd

2021 Existing Conditions - AM Peak Hour
04/02/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (veh/h)	15	275	11	10	224	10	30	10	36	10	5	5
Future Volume (veh/h)	15	275	11	10	224	10	30	10	36	10	5	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	19	344	14	13	280	13	38	13	45	13	6	6
Pedestrians												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None	None	None	None	None	None	None	None	None	None	None	None
Upstream signal (ft)												
pk platoon unblocked												
vc, conflicting volume	293			358			710	708	351	753	708	286
vc1, stage 1 conf vol	293			358			710	708	351	753	708	286
vc2, stage 2 conf vol	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
IC, single (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
IC, 2 stage (s)	99			99			88	96	94	96	98	99
IF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			88	96	94	96	98	99
cm capacity (veh/h)	1280			1147			337	353	697	293	352	757

Direction, Lane #	EBL	EBT	EBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	377	306	96	25					
Volume Left	19	13	38	13					
Volume Right	14	13	45	6					
CSH	1280	1147	448	360					
Volume to Capacity	0.01	0.01	0.21	0.07					
Queue Length 95th (ft)	1	1	20	8					
Control Delay (s)	0.5	0.5	15.2	15.7					
Lane LOS	A	A	C	C					
Approach Delay (s)	0.5	0.5	15.2	15.7					
Approach LOS	C	C	C	C					

Intersection Summary									
Average Delay	2.7								
Intersection Capacity Utilization	32.6%								
Analysis Period (min)	15								
ICU Level of Service	A								

Lanes, Volumes, Timings

3: Abbott Rd & Big Tree Rd

2021 Existing Conditions - AM Peak Hour

04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	355	18	29	247	76	53	183	102	86	74	15
Future Volume (vph)	37	355	18	29	247	76	53	183	102	86	74	15
Ideal Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	140	0	0	70	0	0	100	0	0	0	0	0
Storage Lanes	1	0	0	1	0	0	1	0	0	0	0	0
Taper Length (ft)	25	100	100	25	100	100	100	100	100	100	100	100
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FFI	0.993											
FFI Protected	0.950											
Satd. Flow (prot)	1752	1805	0	1687	1711	0	1770	1746	0	1626	1793	0
FFI Permitted	0.478											
Satd. Flow (perm)	884	1805	0	740	1711	0	1280	1746	0	781	1793	0
Right Turn on Red		Yes			Yes			Yes		Yes		Yes
Satd. Flow (RTOR)	4				24			44		16		
Link Speed (mph)	45				45			45		45		
Link Distance (ft)	2441				661			550		398		
Travel Time (s)	37.0				10.0			8.3		6.0		
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	3%	4%	15%	7%	6%	11%	2%	4%	1%	11%	4%	0%
Adj. Flow (vph)	45	433	22	35	301	93	65	223	124	105	90	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	455	0	35	394	0	65	347	0	105	108	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases	1			1			3			3		
Permitted Phases	1	1	1	1	1	1	3	3	3	3	3	3
Detector Phase	1	1	1	1	1	1	3	3	3	3	3	3
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	20.0	15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	25.9	25.9	25.9	25.9	25.9	25.9	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	40.9	40.9	40.9	40.9	40.9	40.9	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	49.4%	49.4%	49.4%	49.4%	49.4%	49.4%
Maximum Green (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Yellow Time (s)	4.7	4.7	4.7	4.7	4.7	4.7	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.2	1.2	1.2	1.2	1.2	1.2	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	5.9	5.9	5.9	5.9	5.9	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	Min	Min	Min	Min	None	None	None	None	None	None
Act Effrt Green (s)	23.2	23.2	23.2	23.2	23.2	23.2	18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.34	0.34	0.34	0.34	0.34	0.34
g/C Ratio	0.12	0.57	0.11	0.51	0.11	0.51	0.15	0.55	0.15	0.39	0.17	0.17
Control Delay	10.3	14.6	10.5	13.1	10.5	13.1	13.8	16.4	13.8	19.2	12.0	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.3	14.6	10.5	13.1	10.5	13.1	13.8	16.4	13.8	19.2	12.0	12.0
LOS	B	B	B	B	B	B	B	B	B	B	B	B
Approach Delay		14.2			12.8			16.0			15.5	

Big Tree Road Hamburg
SRF Associates, D.P.C.

Synchro 10 Report
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Lanes, Volumes, Timings

3: Abbott Rd & Big Tree Rd

2021 Existing Conditions - AM Peak Hour

04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS												
Queue Length 50th (ft)	7	83		5	65		12	63		21	17	
Queue Length 95th (ft)	25	185		21	152		39	149		64	51	
Internal Link Dist (ft)												
Turn Bay Length (ft)	140			70			100					
Base Capacity (vph)	607	1241		508	1182		879	1212		536	1237	
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	0.07	0.37		0.07	0.33		0.07	0.29		0.20	0.09	
Intersection Summary												
Area Type:	Other											
Cycle Length:	80.9											
Actuated Cycle Length:	52.4											
Natural Cycle:	50											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.57											
Intersection Signal Delay:	14.5											
Intersection Capacity Utilization:	72.3%											
Analysis Period (min):	15											
Intersection LOS:	B											
ICU Level of Service:	C											
Splits and Phases:	3: Abbott Rd & Big Tree Rd											

Big Tree Road Hamburg
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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	2	10	68	1	5	20
Future Volume (vph)	2	10	68	1	5	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.884		0.998			
Satd. Flow (prot)	1666	0	1896	0	0	1791
Flt Permitted	0.993					0.990
Satd. Flow (perm)	1668	0	1896	0	0	1791
Link Speed (mph)	30		30			30
Link Distance (ft)	742		1530			480
Travel Time (s)	16.9		34.8			10.9
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	0%	0%	25%	0%
Adj. Flow (vph)	2	12	80	1	6	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	14	0	81	0	0	30
Sign Control	Stop		Free			Free

Intersection Summary
Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 15.4%
Analysis Period (min) 15

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Traffic Volume (veh/h)	2	10	68	1	5	20
Future Volume (veh/h)	2	10	68	1	5	20
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	2	12	80	1	6	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn lane (veh)						
Median type						
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
VC, conflicting volume	116	80			81	
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	116	80			81	
IC, single (s)	6.4	6.2			4.3	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.4	
p0 queue free %	100	99			100	
cM capacity (veh/h)	881	985			1383	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	14	81	30			
Volume Left	2	0	6			
Volume Right	12	1	0			
GSH	969	1700	1383			
Volume to Capacity	0.01	0.05	0.00			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	8.8	0.0	1.5			
Lane LOS	A	A	A			
Approach Delay (s)	8.8	0.0	1.5			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			15.4%			
Analysis Period (min)			15			
ICU Level of Service			A			

Lanes, Volumes, Timings

2021 Existing Conditions - PM Peak Hour
1: Big Tree Rd/Radian's Dwy & Southwestern Blvd

04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	23	805	345	22	1033	12	449	12	17	12	13
Future Volume (vph)	23	805	345	22	1033	12	449	12	17	12	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	45	190	140	0	205	0	205	0	0	0	0
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	105	120	120	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Satd. Flow (prot)	1805	5135	1615	1626	3568	0	1698	1689	0	1805	1718
Flt Permitted	0.168	0.282	0.282	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Satd. Flow (perm)	319	5135	1615	483	3568	0	1698	1689	0	1805	1718
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)	1	374	1	1	1	1	1	1	1	1	1
Link Speed (mph)	50	720	735	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Link Distance (ft)	720	735	884	134	134	134	134	134	134	134	134
Travel Time (s)	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Peak Hour Factor	0%	1%	0%	11%	1%	0%	7%	0%	7%	0%	0%
Heavy Vehicles (%)	25	866	374	24	1111	13	483	13	18	13	14
Adj. Flow (vph)	25	866	374	24	1111	13	483	13	18	13	14
Shared Lane Traffic (%)	25	866	374	24	1124	0	256	256	0	13	39
Lane Group Flow (vphpl)	pm-pt	NA	pm-ov	pm-pt	NA	Split	NA	Split	NA	Split	NA
Turn Type	1	6	3	5	2	3	3	3	4	4	4
Permitted Phases	6	6	6	2	2	3	3	3	4	4	4
Detector Phase	1	6	3	5	2	3	3	3	4	4	4
Switch Phase	6.0	20.0	6.0	6.0	20.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Initial (s)	11.0	27.0	37.0	11.0	27.0	37.0	37.0	37.0	37.0	37.0	37.0
Minimum Split (s)	20.0	40.0	40.0	20.0	40.0	40.0	40.0	40.0	20.0	20.0	20.0
Total Split (%)	16.7%	33.3%	33.3%	16.7%	33.3%	33.3%	33.3%	33.3%	16.7%	16.7%	16.7%
Maximum Green (s)	15.0	35.0	35.0	15.0	35.0	35.0	35.0	35.0	15.0	15.0	15.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	15.0	25.0	15.0	15.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	71.9	67.8	99.0	72.0	67.9	25.2	25.2	25.2	7.1	7.1	7.1
Actuated g/C Ratio	0.60	0.66	0.82	0.60	0.57	0.21	0.21	0.21	0.06	0.06	0.06
v/c Ratio	0.09	0.30	0.27	0.07	0.56	0.72	0.72	0.72	0.12	0.12	0.31
Control Delay	13.1	16.3	0.9	12.9	21.5	54.6	54.6	54.6	55.1	34.0	34.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Big Tree Road Hamburg
SRF Associates, D.P.C.

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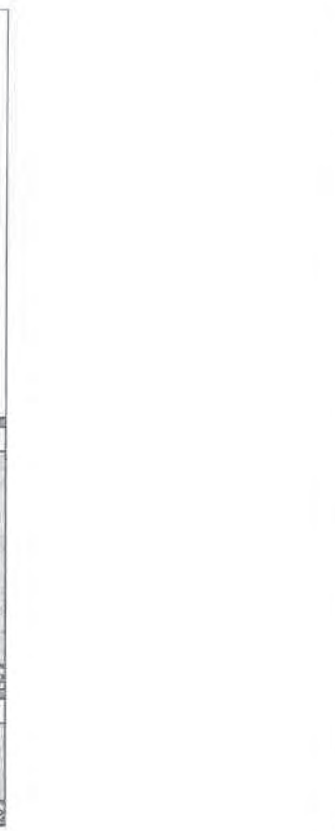
Lanes, Volumes, Timings

2021 Existing Conditions - PM Peak Hour
1: Big Tree Rd/Radian's Dwy & Southwestern Blvd

04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Total Delay	13.1	16.9	0.9	12.9	21.5	54.9	54.9	54.9	55.1	34.0	34.0
LOS	B	B	A	B	C	D	D	D	E	C	C
Approach Delay	12.1	12.1	0	21.4	21.4	54.8	54.8	54.8	55.1	39.3	39.3
Queue Length 50th (ft)	7	136	0	7	310	195	194	194	10	11	11
Queue Length 95th (ft)	24	212	23	24	482	264	265	265	30	46	46
Internal Link Dist (ft)	640	640	0	655	655	804	804	804	0	0	0
Turn Bay Length (ft)	45	190	140	205	205	225	225	225	225	236	236
Base Capacity (vph)	384	2903	1459	444	2018	495	495	495	0	0	0
Survivability Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.30	0.26	0.05	0.56	0.52	0.52	0.52	0.06	0.17	0.17

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset 0 (0%):	Referenced to phase 2:WBT/L and 6:EBT/L, Start of Yellow
Natural Cycle:	125
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.72
Intersection Signal Delay:	23.5
Intersection Capacity Utilization:	57.2%
Analysis Period (min):	15
Intersection LOS:	C
ICU Level of Service:	B



Big Tree Road Hamburg
SRF Associates, D.P.C.

Synchro 10 Report
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Lanes, Volumes, Timings
2: Parker Rd/ECC Dwy & Big Tree Rd

2021 Existing Conditions - PM Peak Hour
04/02/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	10	363	41	35	464	10	22	10	23	5	10
Traffic Volume (veh/h)	10	363	41	35	464	10	22	10	23	5	10
Future Volume (veh/h)	10	363	41	35	464	10	22	10	23	5	10
Ideal Flow (veh/h)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.997	0.999	0.997	0.997	0.997	0.997	0.981	0.981	0.981	0.994	0.994
Satd. Flow (prot)	0	1857	0	0	1872	0	0	1760	0	0	1730
Flt Permitted	0	1857	0	0	1872	0	0	1760	0	0	1730
Satd. Flow (perm)	0	1857	0	0	1872	0	0	1760	0	0	1730
Link Speed (mph)	45	45	45	45	45	45	30	30	30	30	30
Link Distance (ft)	1782	2241	37.0	2241	37.0	2241	480	480	480	334	334
Travel Time (s)	27.0	27.0	37.0	27.0	37.0	27.0	10.9	10.9	10.9	7.6	7.6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Adj. Flow (veh/h)	11	362	43	37	488	11	23	11	24	5	11
Shared Lane Traffic (%)	0	436	0	0	536	0	0	58	0	0	42
Lane Group Flow (vph)	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop
Sign Control											

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	56.5%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
2: Parker Rd/ECC Dwy & Big Tree Rd

2021 Existing Conditions - PM Peak Hour
04/02/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	10	363	41	35	464	10	22	10	23	5	10
Traffic Volume (veh/h)	10	363	41	35	464	10	22	10	23	5	10
Future Volume (veh/h)	10	363	41	35	464	10	22	10	23	5	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	382	43	37	488	11	23	11	24	5	11
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type	None	None	None	None	None	None	None	None	None	None	None
Median storage (veh)											
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	499			425			1024	998	404	1022	1014
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCU, unblocked vol	499			425			1024	998	404	1022	1014
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5
IC, 2 stage (s)											
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0
p0 queue free %	99			97			88	95	96	97	95
cm capacity (veh/h)	1075			1145			192	235	651	194	230
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Volume Total	436	536	58	42							
Volume Left	11	37	23	5							
Volume Right	43	11	24	26							
CSH	1075	1145	285	385							
Volume to Capacity	0.01	0.03	0.20	0.12							
Queue Length 95th (ft)	1	3	19	10							
Control Delay (s)	0.3	0.9	20.8	16.5							
Lane LOS	A	A	C	C							
Approach Delay (s)	0.3	0.9	20.8	16.5							
Approach LOS	C	C	C	C							
Intersection Summary											
Average Delay											
Intersection Capacity Utilization											
Analysis Period (min)											

Lanes, Volumes, Timings
3: Abbott Rd & Big Tree Rd

2021 Existing Conditions - PM Peak Hour
04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	356	56	111	431	109	46	170	58	97	262	43
Future Volume (vph)	27	356	56	111	431	109	46	170	58	97	262	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	140	0	0	70	0	0	100	0	0	0	0	0
Storage Lanes	1	0	0	1	0	0	1	0	0	1	0	0
Taper Length (ft)	25	100	100	100	100	100	100	100	100	100	100	100
Lane Util. Factor	0.950	0.979	0.950	0.950	0.970	0.950	0.950	0.962	0.950	0.950	0.979	0.950
Fit Protected	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Satd. Flow (prot)	1736	1834	0	1770	1832	0	1805	1792	0	1787	1839	0
Fit Permitted	0.339	0.461	0.461	0.461	0.461	0.461	0.461	0.461	0.461	0.461	0.461	0.461
Satd. Flow (perm)	619	1834	0	859	1832	0	944	1792	0	1142	1839	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	12	45	20	45	20	45	20	45	20	45	20	45
Link Speed (mph)	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Travel Time (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	4%	1%	4%	2%	0%	3%	0%	2%	1%	2%	1%	2%
Adj. Flow (vph)	27	360	57	112	435	110	46	172	59	98	265	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	417	0	112	545	0	46	231	0	98	308	0
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	1	1	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1	1	1
Detector Phase	1	1	1	1	1	1	1	1	1	1	1	1
Switch Phase	1	1	1	1	1	1	1	1	1	1	1	1
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9
Total Split (s)	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9
Total Split (%)	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%
Maximum Green (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Yellow Time (s)	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
All-Red Time (s)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag												
Lead/Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	24.6	24.6	24.6	24.6	24.6	24.6	24.6	24.6	24.6	24.6	24.6	24.6
Actuated g/C Ratio	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
g/C Ratio	0.10	0.49	0.28	0.64	0.15	0.38	0.15	0.38	0.15	0.38	0.15	0.38
Control Delay	9.8	12.4	11.8	15.0	15.6	15.0	15.6	15.0	15.6	15.0	15.6	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.8	12.4	11.8	15.0	15.6	15.0	15.6	15.0	15.6	15.0	15.6	15.0
LOS	A	B	B	B	B	B	B	B	B	B	B	B
Approach Delay		12.2			14.4			15.1			17.5	

Big Tree Road Hamburg
SRF Associates, D.P.C.

Synchro 10 Report
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Lanes, Volumes, Timings
3: Abbott Rd & Big Tree Rd

2021 Existing Conditions - PM Peak Hour
04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS												
Queue Length 50th (ft)	4	72	18	102	9	42				20	64	
Queue Length 95th (ft)	19	176	59	246	36	118				64	166	
Internal Link Dist (ft)		2361		581		470					318	
Turn Bay Length (ft)	140		70		100							
Base Capacity (vph)	416	1237	577	1238	634	1213				767	1240	
Sanitation 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	0.06	0.34	0.19	0.44	0.07	0.19				0.13	0.25	
Intersection Summary												
Area Type	Other											
Cycle Length	80.9											
Actuated Cycle Length	53.6											
Natural Cycle	50											
Control Type	Actuated-Uncoordinated											
Maximum v/c Ratio	0.64											
Intersection Signal Delay	14.7											
Intersection LOS	B											
ICU Level of Service	F											
Analysis Period (min)	15											

Splits and Phases: 3: Abbott Rd & Big Tree Rd

EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9

Big Tree Road Hamburg
SRF Associates, D.P.C.

Synchro 10 Report
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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (veh/h)	4	10	44	1	12	74
Future Volume (veh/h)	4	10	44	1	12	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.905		0.997			
Satd. Flow (prot)	0.986		1894	0	0	1887
Flt Permitted	0.986					0.993
Satd. Flow (perm)	1895	0	1894	0	0	1887
Link Speed (mph)	30		30			30
Link Distance (ft)	742		1530			480
Travel Time (s)	16.9		34.8			10.9
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	5	12	52	1	14	88
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	53	0	0	102
Sign Control	Stop		Free			Free

Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	21.2%					
ICU Level of Service	A					
Analysis Period (min)	15					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (veh/h)	4	10	44	1	12	74
Future Volume (veh/h)	4	10	44	1	12	74
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	5	12	52	1	14	88
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
p/c, platoon unblocked						
v/c, conflicting volume		168	52			53
v/c1, stage 1 conf vol						
v/c2, stage 2 conf vol						
v/cu, unblocked vol		168	52			53
IC, single (s)		6.4	6.2			4.1
IC, 2 stage (s)						
IF (s)		3.5	3.3			2.2
p0 queue free %		99	99			99
cM capacity (veh/h)		819	1021			1566

Direction, Lane #	WBL	WBR	NBT	NBR	SBL	SBT
Volume Total	17	53	102			
Volume Left	5	0	14			
Volume Right	12	1	0			
cSH	962	1700	1566			
Volume to Capacity	0.02	0.03	0.01			
Queue Length 95th (ft)	1	0				
Control Delay (s)	8.9	0.0	1.1			
Lane LOS	A	A	A			
Approach Delay (s)	8.9	0.0	1.1			
Approach LOS	A	A	A			

Intersection Summary						
Average Delay	1.5					
Intersection Capacity Utilization	21.2%					
ICU Level of Service	A					
Analysis Period (min)	15					

A5

**Level of Service Calculations:
Background Conditions**

Lanes, Volumes, Timings
1: Big Tree Rd/Radigan's Dwy & Southwestern Blvd

2024 No Build Conditions - AM Peak Hour
04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	11	823	286	10	501	8	220	1	9	6	5	5
Traffic Volume (vph)	11	823	286	10	501	8	220	1	9	6	5	5
Future Volume (vph)	11	823	286	10	501	8	220	1	9	6	5	5
Ideal Flow (vphpl)	1000	1900	1900	1000	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	45	190	190	140	0	205	0	0	0	0	0	0
Storage Lanes	1	1	1	1	0	1	0	1	0	1	0	0
Queue Length (ft)	105	100	991	100	100	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Queue Length (ft)	100	991	100	100	100	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Queue Length Factor	0.950	0.950	0.850	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Fit Protected	1805	4988	1553	1805	3340	0	1633	1614	0	1805	1758	0
Satd. Flow (pm)	0.405	0.278	0.278	0.405	0.278	0.950	0.956	0.956	0.950	0.950	0.950	0.950
Fit Permitted	771	4988	1553	528	3340	0	1633	1614	0	1805	1758	0
Satd. Flow (perm)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Right Turn on Red	329	329	329	329	329	329	329	329	329	329	329	329
Satd. Flow (RTOR)	50	50	50	50	50	50	50	50	50	50	50	50
Link Speed (mph)	720	720	720	720	720	720	720	720	720	720	720	720
Link Distance (ft)	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8
Travel Time (s)	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Peak Hour Factor	0%	4%	4%	0%	8%	0%	5%	0%	15%	0%	0%	0%
Heavy Vehicles (%)	13	946	329	11	576	9	253	1	10	7	6	6
Adj. Flow (vph)	13	946	329	11	576	9	253	1	10	7	6	6
Shared Lane Traffic (%)	13	946	329	11	576	9	253	1	10	7	6	6
Lane Group Flow (vph)	13	946	329	11	576	9	253	1	10	7	6	6
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	NA	Split	NA	Split	NA	NA	NA
Protected Phases	1	6	3	5	2	3	3	3	3	4	4	4
Permitted Phases	6	6	6	6	6	6	6	6	6	6	6	6
Detector Phase	1	6	3	5	2	3	3	3	3	4	4	4
Switch Phase	6.0	20.0	6.0	6.0	20.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Initial (s)	11.0	27.0	37.0	11.0	27.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Minimum Split (s)	20.0	40.0	40.0	20.0	40.0	40.0	40.0	40.0	40.0	20.0	20.0	20.0
Total Split (s)	16.7%	33.3%	33.3%	16.7%	33.3%	33.3%	33.3%	33.3%	33.3%	16.7%	16.7%	16.7%
Total Split (%)	16.7%	33.3%	33.3%	16.7%	33.3%	33.3%	33.3%	33.3%	33.3%	16.7%	16.7%	16.7%
Maximum Green (s)	15.0	35.0	35.0	15.0	35.0	35.0	35.0	35.0	35.0	15.0	15.0	15.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	15.0	25.0	15.0	15.0	25.0	15.0	25.0	25.0	25.0	25.0	25.0	25.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effect Green (s)	88.5	87.2	110.9	87.4	86.0	158	158	158	6.4	6.4	6.4	6.4
Actual g/C Ratio	0.74	0.73	0.92	0.73	0.71	0.13	0.13	0.13	0.05	0.05	0.05	0.05
v/c Ratio	0.02	0.26	0.23	0.02	0.25	0.62	0.62	0.62	0.07	0.12	0.12	0.12
Control Delay	7.0	7.7	0.7	7.2	9.1	60.8	59.6	59.6	55.3	41.4	41.4	41.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Lanes, Volumes, Timings
1: Big Tree Rd/Radigan's Dwy & Southwestern Blvd

2024 No Build Conditions - AM Peak Hour
04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	7.0	7.7	0.7	7.2	9.1	60.8	59.6	59.6	55.3	41.4	41.4	41.4
LOS	A	A	A	A	A	E	E	E	E	D	D	D
Approach Delay	5.9	5.9	0	5.9	9.0	60.2	60.2	60.2	56.2	46.5	46.5	46.5
Approach LOS	A	A	A	A	A	D	D	D	D	D	D	D
Queue Length 50th (ft)	2	59	0	2	51	103	101	101	5	5	5	5
Queue Length 95th (ft)	11	173	17	10	163	156	154	154	20	23	23	23
Internal Link Dist (ft)	640	640	190	140	655	804	804	804	205	225	225	225
Turn Bay Length (ft)	45	190	140	140	205	205	205	205	205	225	225	225
Base Capacity (vph)	703	3623	1519	553	2385	476	472	472	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.26	0.22	0.02	0.25	0.28	0.28	0.28	0.03	0.03	0.03	0.03

Area Type:	Other
Cycle Length:	120
Actual Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:WBT and 6:EBTL Start of Yellow
Natural Cycle:	115
Control Type:	Actuated/Coordinated
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	13.7
Intersection Capacity Utilization:	40.2%
Analysis Period (min):	15

Spits and Phases: 1: Big Tree Rd/Radigan's Dwy & Southwestern Blvd



Lanes, Volumes, Timings
2: Parker Rd/ECC Dwy & Big Tree Rd

2024 No Build Conditions - AM Peak Hour
04/02/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	15	279	11	10	227	10	30	10	37	10	5
Future Volume (veh/h)	15	279	11	10	227	10	30	10	37	10	5
Ideal Flow (veh/pl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.995	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
Flt Protected	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
Satd. Flow (prot)	0	1836	0	0	1763	0	0	1745	0	0	1793
Flt Permitted	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
Satd. Flow (perm)	0	1836	0	0	1763	0	0	1745	0	0	1793
Link Speed (mph)	45	45	45	45	45	45	45	45	45	45	45
Link Distance (ft)	1782	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441
Travel Time (s)	27.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	0%	3%	0%	12%	7%	0%	0%	0%	0%	0%	0%
Adj. Flow (veh/h)	19	340	14	13	264	13	38	13	46	13	6
Shared Lane Traffic (%)	0	382	0	0	310	0	0	97	0	0	25
Lane Group Flow (vph)	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 32.9%

Analysis Period (min) 15

ICU Level of Service: A

HCM Unsignalized Intersection Capacity Analysis
2: Parker Rd/ECC Dwy & Big Tree Rd

2024 No Build Conditions - AM Peak Hour
04/02/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	15	279	11	10	227	10	30	10	37	10	5
Future Volume (veh/h)	15	279	11	10	227	10	30	10	37	10	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	19	340	14	13	264	13	38	13	46	13	6
Pedestrians	None	None	None	None	None	None	None	None	None	None	None
Walking Speed (ft/s)	None	None	None	None	None	None	None	None	None	None	None
Lane Width (ft)	None	None	None	None	None	None	None	None	None	None	None
Percent Blockage	None	None	None	None	None	None	None	None	None	None	None
Right turn flare (veh)	None	None	None	None	None	None	None	None	None	None	None
Median type	None	None	None	None	None	None	None	None	None	None	None
Median storage (veh)	None	None	None	None	None	None	None	None	None	None	None
Upstream signal (ft)	None	None	None	None	None	None	None	None	None	None	None
Pk. platoon unblocked	297	363	363	363	363	363	363	363	363	363	363
vc, conflicting volume	297	363	363	363	363	363	363	363	363	363	363
vc1, stage 1 conf vol	297	363	363	363	363	363	363	363	363	363	363
vc2, stage 2 conf vol	297	363	363	363	363	363	363	363	363	363	363
vcu, unblocked vol	4.1	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
tc, single (s)	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
tc, 2 stage (s)	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
pf (s)	99	99	99	99	99	99	99	99	99	99	99
po queue free %	1276	1142	1142	1142	1142	1142	1142	1142	1142	1142	1142
cm capacity (veh/h)	382	310	97	25	382	310	97	25	382	310	97
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Volume Total	382	310	97	25	382	310	97	25	382	310	97
Volume Left	19	13	38	13	19	13	38	13	19	13	38
Volume Right	14	13	46	6	14	13	46	6	14	13	46
ESH	1276	1142	445	355	1276	1142	445	355	1276	1142	445
Volume to Capacity	0.01	0.01	0.22	0.07	0.01	0.01	0.22	0.07	0.01	0.01	0.22
Queue Length 95th (ft)	1	1	21	6	1	1	21	6	1	1	21
Control Delay (s)	0.5	0.5	15.3	15.9	0.5	0.5	15.3	15.9	0.5	0.5	15.3
Lane LOS	A	A	C	C	A	A	C	C	A	A	C
Approach Delay (s)	0.5	0.5	15.3	15.9	0.5	0.5	15.3	15.9	0.5	0.5	15.3
Approach LOS	C	C	C	C	C	C	C	C	C	C	C
Intersection Summary											
Average Delay	2.7										
Intersection Capacity Utilization	32.9%										
Analysis Period (min)	15										
ICU Level of Service	A										

Lanes, Volumes, Timings
3: Abbott Rd & Big Tree Rd

2024 No Build Conditions - AM Peak Hour
04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	360	18	29	251	77	54	186	104	87	75	15
Future Volume (vph)	38	360	18	29	251	77	54	186	104	87	75	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	140	0	0	70	0	0	100	0	0	0	0	0
Storage Lanes	1	0	0	1	1	0	1	0	0	1	0	0
Taper Length (ft)	25	100	100	25	100	100	130	100	100	100	100	100
Lane Util. Factor	1.00	0.993	1.00	1.00	0.985	1.00	1.00	0.946	1.00	1.00	0.975	1.00
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1805	0	1687	1711	0	1770	1746	0	1626	1793	0
Flt Permitted	0.473			0.411			0.687			0.445		
Satd. Flow (perm)	873	1805	0	730	1711	0	1280	1746	0	762	1793	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)	4	45		24	45		44			16	45	
Link Speed (mph)	2441			661			550			398		
Travel Time (s)	37.0	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	3%	4%	15%	7%	6%	11%	2%	4%	1%	11%	4%	0%
Adj. Flow (vph)	46	439	22	35	306	94	65	227	127	106	91	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	461	0	35	400	0	66	354	0	106	109	0
Turn Type	Perm	NA	0	Perm	NA	0	Perm	NA	0	Perm	NA	0
Protected Phases	1	1		1			3			3		
Permitted Phases	1	1	1	1	1	1	3	3	3	3	3	3
Detector Phase	1	1	1	1	1	1	3	3	3	3	3	3
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	25.9	25.9		25.9	25.9		22.5	22.5		22.5	22.5	
Total Split (s)	40.9	40.9		40.9	40.9		40.0	40.0		40.0	40.0	
Total Split (%)	50.6%	50.6%		50.6%	50.6%		49.4%	49.4%		49.4%	49.4%	
Maximum Green (s)	35.0	35.0		35.0	35.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	4.7	4.7		4.7	4.7		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.2	1.2		1.2	1.2		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.9	5.9		5.9	5.9		5.0	5.0		5.0	5.0	
Lead-Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effd Green (s)	23.6	23.6		23.6	23.6		18.2	18.2		18.2	18.2	
Act Effd Green (%)	0.45	0.45		0.45	0.45		0.34	0.34		0.34	0.34	
Act Effd Green Ratio	0.12	0.57		0.11	0.52		0.15	0.56		0.15	0.52	
Control Delay	10.4	14.7		10.5	13.2		14.1	17.0		20.0	12.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.4	14.7		10.5	13.2		14.1	17.0		20.0	12.3	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		14.3			13.0			16.5			16.1	

Big Tree Road Hamburg
SRF Associates, D.P.C.

Synchro 10 Report
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Lanes, Volumes, Timings
3: Abbott Rd & Big Tree Rd

2024 No Build Conditions - AM Peak Hour
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Queue Length 50th (ft)	7	85	5	67	12	65	21	17	65	21	17	17
Queue Length 95th (ft)	26	189	21	158	40	158	67	53	158	67	53	53
Internal Link Dist (ft)	2381			581			470				318	
Turn Bay Length (ft)	140		70				100					
Base Capacity (vph)	595	1232	497	1174	873	1204	519	1228	873	519	1228	873
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.37	0.07	0.34	0.08	0.29	0.20	0.09	0.08	0.20	0.09	0.09
Intersection Summary												
Area Type: Other												
Cycle Length: 80.9												
Actuated Cycle Length: 53												
Natural Cycle: 50												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.57												
Intersection Signal Delay: 14.8												
Intersection Capacity Utilization: 73.5%												
Analysis Period (min): 15												

Spills and Phases: 3: Abbott Rd & Big Tree Rd



Big Tree Road Hamburg
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Synchro 10 Report
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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	S	S
Traffic Volume (veh/h)	2	10	69	1	5	20
Future Volume (veh/h)	2	10	69	1	5	20
Ideal Flow (veh/pl)	1900	1900	1900	1900	1900	1900
Lane Util Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.993		0.998			
Satd. Flow (prot)	1668	0	1896	0	0	1791
Flt Permitted	0.993					
Satd. Flow (perm)	1668	0	1896	0	0	1791
Link Speed (mph)	30		30			30
Link Distance (ft)	742		1530			480
Travel Time (s)	16.9		34.8			10.9
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	0%	0%	25%	0%
Adj. Flow (vph)	2	12	81	1	6	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	14	0	82	0	0	30
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	15.4%					
ICU Level of Service	A					
Analysis Period (min)	15					

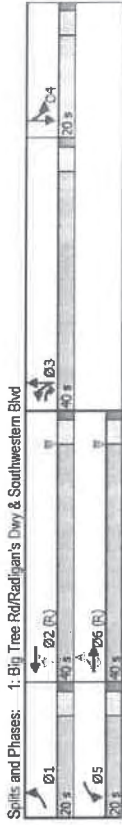
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	S	S
Traffic Volume (veh/h)	2	10	69	1	5	20
Future Volume (veh/h)	2	10	69	1	5	20
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	2	12	81	1	6	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	118	82			82	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	118	82			82	
tC, single (s)	6.4	6.2			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.4	
p0 queue free %	100	99			100	
cM capacity (veh/h)	879	984			1382	
Direction, Lane #	WBL	WBR	NBT	NBR	SBL	SBT
Volume Total	14	82	30			
Volume Left	2	0	6			
Volume Right	12	1	0			
CSH	967	1700	1382			
Volume to Capacity	0.01	0.05	0.00			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	8.8	0.0	1.6			
Lane LOS	A	A	A			
Approach Delay (s)	8.8	0.0	1.6			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay	1.3					
Intersection Capacity Utilization	15.4%					
ICU Level of Service	A					
Analysis Period (min)	15					

Lanes, Volumes, Timings
 1: Big Tree Rd/Radian's Dwy & Southwestern Blvd
 2024 No Build Conditions - PM Peak Hour
 04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	23	817	354	22	1049	12	456	12	17	12	13	23
Future Volume (vph)	23	817	354	22	1049	12	456	12	17	12	13	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	45	190	190	140	190	140	205	0	0	0	0	0
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Lane Length (ft)	105	120	120	120	120	120	25	25	25	25	25	25
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Fit Protected	0.950		0.950	0.950		0.950	0.950	0.950		0.950		0.950
Satd. Flow (prot)	1805	5136	1615	1626	3568	0	1698	1689	0	1805	1718	0
Fit Permitted	0.162		0.277			0.950	0.950	0.950		0.950		0.950
Satd. Flow (perm)	308	5136	1615	474	3568	0	1698	1689	0	1805	1718	0
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)	381		381				3			25		
Link Speed (mph)	50	720	735	735	735	735	735	735	735	735	735	735
Link Distance (ft)	720	735	735	735	735	735	735	735	735	735	735	735
Travel Time (s)	9.8	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	0%	1%	0%	1%	0%	1%	0%	1%	0%	1%
Adj. Flow (vph)	25	878	381	24	1128	13	490	13	18	13	14	25
Shared Lane Traffic (%)							47%					
Lane Group Flow (vph)	25	878	381	24	1141	0	260	261	0	13	39	0
Turn Type	pm-pt	NA	pm-ov	pm-pt	NA	Split	NA	Split	NA	Split	NA	NA
Protected Phases	1	6	3	5	2	3	3	3	3	4	4	4
Permitted Phases	6	6	6	6	6	6	6	6	6	6	6	6
Detector Phase	1	6	3	5	2	3	3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	20.0	6.0	6.0	20.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	27.0	37.0	11.0	27.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (s)	20.0	40.0	40.0	20.0	40.0	40.0	40.0	40.0	40.0	20.0	20.0	20.0
Total Split (%)	16.7%	33.3%	33.3%	16.7%	33.3%	33.3%	33.3%	33.3%	33.3%	16.7%	16.7%	16.7%
Maximum Green (s)	15.0	35.0	35.0	15.0	35.0	35.0	35.0	35.0	35.0	15.0	15.0	15.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	15.0	25.0	15.0	15.0	15.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	71.5	67.4	99.0	71.6	67.5	25.5	25.5	25.5	7.1	7.1	7.1	7.1
Actuated g/C Ratio	0.60	0.56	0.82	0.60	0.56	0.21	0.21	0.21	0.06	0.06	0.06	0.06
v/c Ratio	0.10	0.30	0.27	0.07	0.57	0.72	0.72	0.72	0.12	0.12	0.31	0.31
Control Delay	13.3	17.2	0.9	13.0	21.9	54.2	54.2	54.2	55.1	34.0	34.0	34.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Lanes, Volumes, Timings
 1: Big Tree Rd/Radian's Dwy & Southwestern Blvd
 2024 No Build Conditions - PM Peak Hour
 04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	13.3	17.2	0.9	13.0	21.9	54.2	54.2	54.2	55.1	34.0	34.0	34.0
LOS	B	B	A	B	C	D	D	D	E	C	C	C
Approach Delay	12.3											
Approach LOS	B											
Queue Length 95th (ft)	7	140	0	7	317	198	197	197	10	11	11	11
Queue Length 95th (ft)	24	217	24	24	493	268	267	267	30	46	46	46
Internal Link Dist (ft)	640				655		804	804				
Turn Bay Length (ft)	45	190	140	205								
Base Capacity (vph)	378	2085	1456	438	2007	495	494	494	225	236	236	236
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.30	0.26	0.05	0.57	0.53	0.53	0.53	0.06	0.17	0.17	0.17
Intersection Summary												
Area Type:	Other											
Cycle Length:	120											
Actuated Cycle Length:	120											
Offset:	0 (0%), Referenced to phase 2:WBTL and 6:EBTL Start of Yellow											
Natural Cycle:	125											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.72											
Intersection Signal Delay:	23.7											
Intersection LOS:	C											
Intersection Capacity Utilization:	57.8%											
Analysis Period (min):	15											



Lanes, Volumes, Timings
2. Parker Rd/ECC Dwy & Big Tree Rd

2024 No Build Conditions - PM Peak Hour
04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	10	369	41	35	471	10	22	10	23	5	10	25
Traffic Volume (vph)	10	369	41	35	471	10	22	10	23	5	10	25
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.987	0.997	0.997	0.997	0.997	0.997	0.981	0.981	0.994	0.994	0.994	0.994
Flt Protected	0	1857	0	0	1872	0	0	1760	0	0	1730	0
Satd. Flow (prot)	0	1857	0	0	1872	0	0	1760	0	0	1730	0
Flt Permitted	0	1857	0	0	1872	0	0	1760	0	0	1730	0
Satd. Flow (perm)	0	1857	0	0	1872	0	0	1760	0	0	1730	0
Link Speed (mph)	45	45	45	45	45	45	45	45	45	45	45	45
Link Distance (ft)	1782	2441	1782	2441	1782	2441	1782	2441	1782	2441	1782	2441
Travel Time (s)	27.0	37.0	27.0	37.0	27.0	37.0	27.0	37.0	27.0	37.0	27.0	37.0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	11	388	43	37	486	11	23	11	24	5	11	26
Shared Lane Traffic (%)	0	442	0	0	544	0	0	58	0	0	42	0
Lane Group Flow (vph)	0	442	0	0	544	0	0	58	0	0	42	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 57.0%
Analysis Period (min) 15
ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
2. Parker Rd/ECC Dwy & Big Tree Rd

2024 No Build Conditions - PM Peak Hour
04/02/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	10	369	41	35	471	10	22	10	23	5	10	25
Traffic Volume (veh/h)	10	369	41	35	471	10	22	10	23	5	10	25
Future Volume (veh/h)	10	369	41	35	471	10	22	10	23	5	10	25
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	388	43	37	496	11	23	11	24	5	11	26
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None	None	None	None	None	None	None	None	None	None	None	None
Median storage (veh)												
Upstream signal (ft)												
pk-platoon unblocked												
vc, conflicting volume	507			431			1038	1012	410	1036	1028	502
vc1, stage 1 conf vol												
vc2, stage 2 conf vol												
vc, unblocked vol	507			431			1038	1012	410	1036	1028	502
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
pu queue free %	99			97			88	95	96	97	95	95
cm capacity (veh/h)	1068			1139			187	231	646	190	226	574
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	442	544	58	42								
Volume Left	11	37	23	5								
Volume Right	43	11	24	26								
CSH	1068	1139	280	349								
Volume to Capacity	0.01	0.03	0.21	0.12								
Queue Length 85th (ft)	1	3	19	10								
Control Delay (s)	0.3	0.9	21.2	16.7								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.3	0.9	21.2	16.7								
Approach LOS	C	C	C	C								
Intersection Summary												
Average Delay												
Intersection Capacity Utilization												
Analysis Period (min)												

ICU Level of Service B

Lanes, Volumes, Timings
3: Abbott Rd & Big Tree Rd

2024 No Build Conditions - PM Peak Hour
04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SEB
Lane Configurations	27	361	57	113	436	111	47	173	59	98	266	45
Traffic Volume (vph)	27	361	57	113	436	111	47	173	59	98	266	45
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	140	0	0	70	0	0	100	0	0	0	0	0
Storage Length (ft)	1	0	0	1	1	0	1	1	0	1	1	0
Taper Length (ft)	25	100	100	25	100	100	100	100	100	100	100	100
Lane Util. Factor	1.00	0.979	1.00	0.950	0.970	1.00	0.982	1.00	0.982	1.00	0.979	1.00
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1834	0	1770	1832	0	1805	1792	0	1787	1839	0
Flt Permitted	0.331			0.454			0.469			0.600		
Satd. Flow (perm)	605	1834	0	846	1832	0	929	1792	0	1129	1839	0
Right Turn on Red	12	Yes		20	Yes		27	Yes		13	Yes	
Satd. Flow (RTOR)	45			45			45			45		
Link Speed (mph)	2441			661			550			398		
Travel Time (s)	37.0			10.0			8.3			6.0		
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	4%	1%	4%	2%	0%	3%	0%	2%	2%	1%	1%	2%
Adj. Flow (vph)	27	365	58	114	440	112	47	175	60	99	269	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	423	0	114	552	0	47	235	0	99	314	0
Turn Type	Perm.	NA	NA	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	1	1	1	1	1	1	3	3	3	3	3	3
Permitted Phases	1	1	1	1	1	1	3	3	3	3	3	3
Detector Phase	1	1	1	1	1	1	3	3	3	3	3	3
Switch Phase	1	1	1	1	1	1	3	3	3	3	3	3
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	20.0	15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	25.9	25.9	25.9	25.9	25.9	25.9	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	40.9	40.9	40.9	40.9	40.9	40.9	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	49.4%	49.4%	49.4%	49.4%	49.4%	49.4%
Maximum Green (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Yellow Time (s)	4.7	4.7	4.7	4.7	4.7	4.7	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.2	1.2	1.2	1.2	1.2	1.2	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	5.9	5.9	5.9	5.9	5.9	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	Min	Min	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	24.8	24.8	24.8	24.8	24.8	24.8	17.9	17.9	17.9	17.9	17.9	17.9
Actuated g/C Ratio	0.46	0.46	0.46	0.46	0.46	0.46	0.33	0.33	0.33	0.33	0.33	0.33
W/C Ratio	0.10	0.50	0.29	0.65	0.15	0.38	0.15	0.38	0.15	0.26	0.51	0.15
Control Delay	10.0	12.5	12.1	15.2	15.7	15.2	16.8	16.8	16.8	16.8	16.8	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.0	12.5	12.1	15.2	15.7	15.2	16.8	16.8	16.8	16.8	16.8	16.8
LOS	A	B	B	B	B	B	B	B	B	B	B	B
Approach Delay		12.4			14.7			15.3			17.8	

Big Tree Road Hamburg
SRF Associates, D.P.C.

Synchro 10 Report
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Lanes, Volumes, Timings
3: Abbott Rd & Big Tree Rd

2024 No Build Conditions - PM Peak Hour
04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SEB
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Queue Length 50th (ft)	4	73	18	104	9	44	20	67	20	67	20	67
Queue Length 95th (ft)	19	182	61	255	36	120	65	169	65	169	65	169
Internal Link Dist (ft)	2361			381			470				318	
Turn Bay Length (ft)	140			79			100					
Base Capacity (vph)	404	1231	566	1233	622	1208	755	1235	755	1235	755	1235
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.34	0.20	0.45	0.08	0.19	0.13	0.25	0.13	0.25	0.13	0.25
Intersection Summary												
Area Type:	Other											
Cycle Length:	80.9											
Actuated Cycle Length:	53.9											
Natural Cycle:	50											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.65											
Intersection Signal Delay:	14.9											
Intersection Capacity Utilization:	93.8%											
Analysis Period (min):	15											
Splits and Phases:	3: Abbott Rd & Big Tree Rd											

Big Tree Road Hamburg
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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	P	P	12	4
Traffic Volume (veh/h)	4	10	45	1	12	75
Future Volume (veh/h)	4	10	45	1	12	75
Ideal Flow (veh/pl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr	0.905		0.998			
Flt Protected	0.986					0.993
Satd. Flow (prot)	1895	0	1896	0	0	1887
Flt Permitted	0.986					0.993
Satd. Flow (perm)	1895	0	1896	0	0	1887
Link Speed (mph)	30		30			30
Link Distance (ft)	742		1530			480
Travel Time (s)	16.9		34.8			10.9
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	5	12	54	1	14	89
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	55	0	0	103
Sign Control	Stop	Free	Free	Free	Free	Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	21.3%					
Analysis Period (min)	15					
	ICU Level of Service A					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	P	P	12	4
Traffic Volume (veh/h)	4	10	45	1	12	75
Future Volume (veh/h)	4	10	45	1	12	75
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%					0%
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	5	12	54	1	14	89
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median Type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	172	54				55
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	172	54				55
IC, single (s)	6.4	6.2				4.1
IC, 2 stage (s)						
IF (s)	3.5	3.3				2.2
p0 queue free %	99	99				99
cM capacity (veh/h)	816	1018				1563
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	17	55	103			
Volume Left	5	0	14			
Volume Right	12	1	0			
CSH	949	1700	1563			
Volume to Capacity	0.02	0.03	0.01			
Queue Length 95th (ft)	1	0	1			
Control Delay (s)	8.9	0.0	1.1			
Lane LOS	A	A	A			
Approach Delay (s)	8.9	0.0	1.1			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay	1.5					
Intersection Capacity Utilization	21.3%					
Analysis Period (min)	15					
	ICU Level of Service A					

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**Level of Service Calculations:
Full Development Conditions**

Lanes, Volumes, Timings

2024 Full Build Conditions - AM Peak Hour
1: Big Tree Rd/Radian's Dwy & Southwestern Blvd

04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	11	823	300	11	501	8	263	1	12	6	5	5
Future Volume (vph)	11	823	300	11	501	8	263	1	12	6	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	45	190	140	0	205	0	205	0	0	0	0	0
Storage Lanes	1	1	1	0	1	0	1	0	1	0	0	0
Queue Length (ft)	105	120	120	0	95	0	95	0	25	25	1.00	1.00
Queue Length (ft)	1.00	0.91	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Lane Util. Factor	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Flt Protected	1805	4988	1553	1805	3340	0	1633	1611	0	1805	1758	0
Satd. Flow (prot)	0.409	0.270	0.950	0.950	0.957	0.950	0.950	0.957	0.950	0.950	0.950	0.950
Flt Permitted	777	4988	1553	513	3340	0	1633	1611	0	1805	1758	0
Satd. Flow (perm)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Right Turn on Red	345	345	345	345	345	345	345	345	345	345	345	345
Satd. Flow (RTOR)	1	1	1	1	1	1	1	1	1	1	1	1
Link Speed (mph)	50	720	735	50	735	50	735	50	735	50	735	50
Link Distance (ft)	9.8	9.8	10.0	9.8	10.0	9.8	10.0	9.8	10.0	9.8	10.0	9.8
Travel Time (s)	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Peak Hour Factor	0%	4%	4%	0%	8%	0%	5%	0%	15%	0%	0%	0%
Heavy Vehicles (%)	13	946	345	13	576	9	302	1	14	7	6	6
Adj. Flow (vph)	13	946	345	13	576	9	302	1	14	7	6	6
Shared Lane Traffic (%)	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
Lane Group Flow (vph)	13	946	345	13	585	0	160	157	0	7	12	0
Turn Type	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Protected Phases	6	6	6	2	2	2	3	3	3	4	4	4
Permitted Phases	1	1	1	1	1	1	1	1	1	1	1	1
Detector Phase	1	1	1	1	1	1	1	1	1	1	1	1
Switch Phase	6.0	20.0	6.0	6.0	20.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Initial (s)	11.0	27.0	37.0	11.0	27.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Minimum Split (s)	20.0	40.0	40.0	20.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	16.7%	33.3%	33.3%	16.7%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Total Split (%)	15.0	35.0	35.0	15.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Maximum Green (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Yellow Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total Lost Time (s)	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag
Lead/Lag	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead-Lag Optimize?	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	None	C-Max	None	None	C-Max	None	None	None	None	None	None	None
Recall Mode	15.0	25.0	15.0	15.0	25.0	15.0	15.0	25.0	15.0	25.0	15.0	25.0
Walk Time (s)	0	0	0	0	0	0	0	0	0	0	0	0
Flash Dont Walk (s)	85.1	82.6	108.7	85.1	82.6	108.7	85.1	82.6	108.7	85.1	82.6	108.7
Pedestrian Calls (#/hr)	0.71	0.69	0.91	0.71	0.69	0.91	0.71	0.69	0.91	0.71	0.69	0.91
Act Effct Green (s)	0.02	0.28	0.24	0.03	0.25	0.65	0.64	0.07	0.12	0.07	0.12	0.07
Actuated g/C Ratio	8.1	10.0	0.8	8.2	10.2	59.3	57.3	55.3	41.4	55.3	41.4	55.3
vc Ratio	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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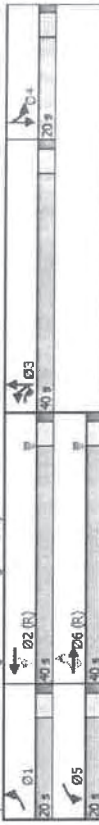
Lanes, Volumes, Timings

2024 Full Build Conditions - AM Peak Hour
1: Big Tree Rd/Radian's Dwy & Southwestern Blvd

04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	8.1	10.0	0.8	8.2	10.2	59.3	57.3	55.3	41.4	55.3	41.4	55.3
LOS	A	B	A	A	B	E	E	E	D	E	D	D
Approach Delay	7.6	10.2	0.2	7.6	10.2	58.3	56.3	54.3	40.3	54.3	40.3	54.3
Approach LOS	A	B	A	A	B	E	E	E	D	E	D	D
Queue Length 50th (ft)	2	65	0	2	66	124	118	118	5	118	5	5
Queue Length 95th (ft)	12	186	17	12	174	178	173	173	20	173	20	23
Internal Link Dist. (ft)	640	640	640	640	640	640	640	640	640	640	640	640
Turn Bay Length (ft)	45	190	140	45	190	140	205	205	225	225	225	225
Base Capacity (vph)	682	3431	1484	533	2298	476	472	472	0	472	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.28	0.23	0.02	0.25	0.34	0.33	0.33	0.03	0.33	0.03	0.05
Intersection Summary	Other											
Area Type:	Other											
Cycle Length:	120											
Actuated Cycle Length:	120											
Offset:	0 (0%), Referenced to phase 2:WBTL and 6:EBTL - Start of Yellow											
Natural Cycle:	115											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.65											
Intersection Signal Delay:	15.8											
Intersection Capacity Utilization:	41.1%											
Analysis Period (min):	15											

Splits and Phases: 1: Big Tree Rd/Radian's Dwy & Southwestern Blvd



Big Tree Road Hamburg
SRF Associates, D.P.C.

Synchro 10 Report
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Lanes, Volumes, Timings
2: Parker Rd/ECC Dwy & Big Tree Rd

2024 Full Build Conditions - AM Peak Hour
04/02/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	15	304	20	17	235	10	48	10	57	10	5
Traffic Volume (veh/h)	15	304	20	17	235	10	48	10	57	10	5
Future Volume (veh/h)	15	304	20	17	235	10	48	10	57	10	5
Ideal Flow (veh/pl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.992	0.998	0.995	0.995	0.997	0.997	0.980	0.980	0.975	0.975	0.975
Satd. Flow (prot)	0	1832	0	0	1761	0	0	1737	0	0	1793
Flt Permitted	0.998	0.997	0.997	0.997	0.997	0.997	0.980	0.980	0.975	0.975	0.975
Satd. Flow (perm)	0	1832	0	0	1761	0	0	1737	0	0	1793
Link Distance (ft)	1128	45	2441	37.0	45	30	30	30	30	30	30
Travel Time (s)	17.1	17.1	37.0	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	0%	3%	0%	12%	7%	0%	0%	0%	0%	0%	0%
Adj. Flow (veh)	19	360	25	21	294	13	60	13	71	13	6
Shared Lane Traffic (%)	0	424	0	0	328	0	0	144	0	0	25
Lane Group Flow (vph)	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop
Sign Control											

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.1%
Analysis Period (min)	15
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
2: Parker Rd/ECC Dwy & Big Tree Rd

2024 Full Build Conditions - AM Peak Hour
04/02/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	15	304	20	17	235	10	48	10	57	10	5
Traffic Volume (veh/h)	15	304	20	17	235	10	48	10	57	10	5
Future Volume (veh/h)	15	304	20	17	235	10	48	10	57	10	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	19	380	25	21	294	13	60	13	71	13	6
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type	None	None	None	None	None	None	None	None	None	None	None
Median storage (veh)											
Upstream signal (ft)											
pL platoon unblocked											
vC conflicting volume	307			405			782	780	392	850	786
vC1 stage 1 conf vol											
vC2 stage 2 conf vol											
vC1, unblocked vol	307			405			782	780	392	850	786
IC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5
IC, 2 stage (s)											
IF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0
pL queue free %	98			98			80	96	89	95	98
cM capacity (veh/h)	1265			1102			299	318	661	238	316
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Volume Total	424	328	144	25							
Volume Left	19	21	60	13							
Volume Right	25	13	71	6							
GSH	1265	1102	413	306							
Volume to Capacity	0.02	0.02	0.35	0.08							
Queue Length 95th (ft)	1	1	38	7							
Control Delay (s)	0.5	0.7	18.3	17.8							
Lane LOS	A	A	C	C							
Approach Delay (s)	0.5	0.7	18.3	17.8							
Approach LOS	C	C	C	C							
Intersection Summary											
Average Delay											
Intersection Capacity Utilization											
Analysis Period (min)											

Lanes, Volumes, Timings
3: Abbott Rd & Big Tree Rd

2024 Full Build Conditions - AM Peak Hour
04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SSR
Lane Configurations	49	393	18	29	262	77	54	186	104	87	75	19
Traffic Volume (vph)	49	393	18	29	262	77	54	186	104	87	75	19
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	140	140	0	70	0	100	0	100	0	0	0	0
Storage Length (ft)	25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Taper Length (ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993	0.993
Fit Protected	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Satd. Flow (prot)	1752	1806	0	1667	1713	0	1770	1746	0	1626	1786	0
Fit Permitted	0.459	0.459	0.373	0.373	0.373	0.373	0.373	0.373	0.373	0.373	0.373	0.373
Satd. Flow (perm)	847	1806	0	662	1713	0	1274	1746	0	757	1786	0
Right Turn on Red	4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)	4	45	23	45	45	45	45	45	45	45	45	45
Link Speed (mph)	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Link Distance (ft)	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441
Travel Time (s)	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	3%	4%	15%	7%	6%	11%	2%	4%	1%	1%	4%	0%
Adj. Flow (vph)	60	479	22	35	320	94	66	227	127	106	91	23
Shared Lane Traffic (%)	60	501	0	35	414	0	66	354	0	106	114	0
Lane Group Flow (vph)	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Turn Type	1	1	1	1	1	1	1	1	1	1	1	1
Protected Phases	1	1	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1	1	1
Detector Phase	1	1	1	1	1	1	1	1	1	1	1	1
Switch Phase	1	1	1	1	1	1	1	1	1	1	1	1
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9
Total Split (s)	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9
Total Split (%)	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%
Maximum Green (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Yellow Time (s)	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
All-Red Time (s)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag												
Lead-Lag Optimizer?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	24.2	24.2	24.2	24.2	24.2	24.2	24.2	24.2	24.2	24.2	24.2	24.2
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
v/c Ratio	0.16	0.62	0.12	0.53	0.15	0.57	0.15	0.57	0.15	0.41	0.18	0.18
Control Delay	10.9	15.6	10.8	13.4	14.5	17.3	14.5	17.3	14.5	20.5	12.3	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.9	15.6	10.8	13.4	14.5	17.3	14.5	17.3	14.5	20.5	12.3	12.3
LOS	B	B	B	B	B	B	B	B	B	C	B	B
Approach Delay	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1

Lanes, Volumes, Timings
3: Abbott Rd & Big Tree Rd

2024 Full Build Conditions - AM Peak Hour
04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SSR
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Queue Length 50th (ft)	9	97	5	72	12	66	21	17	21	17	17	17
Queue Length 95th (ft)	32	209	21	162	40	158	68	54	68	54	54	54
Internal Link Dist (ft)	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
Turn Bay Length (ft)	140	140	140	140	140	140	140	140	140	140	140	140
Base Capacity (vph)	569	1215	444	1158	856	1187	509	1207	509	1207	1207	1207
Saturation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Scallback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.41	0.08	0.36	0.08	0.30	0.21	0.09	0.21	0.09	0.09	0.09
Intersection Summary	Other											
Area Type	Other											
Cycle Length	80.9											
Actuated Cycle Length	53.9											
Natural Cycle	50											
Control Type	Actuated-Uncoordinated											
Maximum v/c Ratio	0.62											
Intersection Signal Delay	15.2											
Intersection Capacity Utilization	82.8%											
ICU Level of Service	E											
Analysis Period (min)	15											

Splits and Phases: 3: Abbott Rd & Big Tree Rd

EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SSR
0.11	0.41	0.08	0.36	0.08	0.30	0.21	0.09	0.21	0.09	0.09	0.09

Lanes, Volumes, Timings
4: Parker Rd & Proposed SF Northerly Dwy/Marilyn Dr

2024 Full Build Conditions - AM Peak Hour
04/02/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Traffic Volume (vph)	21	0	1	2	0	10	0	85	1	5	28
Future Volume (vph)	21	0	1	2	0	10	0	85	1	5	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.995			0.884			0.999			0.977	
Flt Protected	0.954			0.993						0.994	
Satd. Flow (prop)	0	1804	0	0	1668	0	0	1898	0	0	1788
Flt Permitted	0.954			0.993						0.994	
Satd. Flow (perm)	0	1804	0	0	1668	0	0	1898	0	0	1788
Link Speed (mph)	30			30			30			30	
Link Distance (ft)	453			742			825			480	
Travel Time (s)	10.3			16.9			18.8			10.9	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	0%
Adj. Flow (vph)	25	0	1	2	0	12	0	100	1	6	33
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	26	0	0	14	0	0	101	0	0	47
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free

Intersection Summary	Other
Area Type	Other
Control Type	Unsignalized
Intersection Capacity Utilization	17.9%
Analysis Period (min)	15
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
4: Parker Rd & Proposed SF Northerly Dwy/Marilyn Dr

2024 Full Build Conditions - AM Peak Hour
04/02/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Traffic Volume (veh/h)	21	0	1	2	0	10	0	85	1	5	28
Future Volume (veh/h)	21	0	1	2	0	10	0	85	1	5	28
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	25	0	1	2	0	12	0	100	1	6	33
Pedestrians											
Lane Width (ft)											
Walking Speed (ft/s)											
Percent Blockage											
Right turn flare (veh)											
Median type											
Median storage (veh)											
Upstream signal (ft)											
pX, platoon unblocked											
vC, conflicting volume	182	150	37	150	154	100	41			101	
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vC3, unblocked vol	182	150	37	150	154	100	41			101	
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.3	
IC, 2 stage (s)											
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.4	
p0 queue free %	97	100	100	100	100	99	100			100	
cM capacity (veh/h)	795	742	1041	818	739	960	1581			1359	

Direction, Lane #	EBL	WBL	NBL	SBL
Volume Total	26	14	101	47
Volume Left	25	2	0	6
Volume Right	1	12	1	8
CSH	803	937	1581	1359
Volume to Capacity	0.03	0.01	0.00	0.00
Queue Length 95th (ft)	3	1	0	0
Control Delay (s)	9.6	8.9	0.0	1.0
Lane LOS	A	A	A	A
Approach Delay (s)	9.6	8.9	0.0	1.0
Approach LOS	A	A	A	A

Intersection Summary				
Average Delay	22			
Intersection Capacity Utilization	17.9%			
Analysis Period (min)	15			
ICU Level of Service	A			

Lane Group	EBL	EBR	NBL	NBT	SBT	GBR
Lane Configurations	W	W	4	4	4	4
Traffic Volume (vph)	16	1	0	71	26	5
Future Volume (vph)	16	1	0	71	26	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	0.994				0.977	
Fit Permitted	0.954					
Satd. Flow (prot)	1802	0	0	1900	1856	0
Satd. Flow (perm)	1802	0	0	1900	1856	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	567			500	825	
Travel Time (s)	13.3			11.4	18.8	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	21	1	0	95	35	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	0	0	95	42	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	13.7%
Analysis Period (min)	15
ICU Level of Service	A

Movement	EBL	EBR	NBL	NBT	SBT	GBR
Lane Configurations	W	W	4	4	4	4
Traffic Volume (veh/h)	16	1	0	71	26	5
Future Volume (veh/h)	16	1	0	71	26	5
Sign Control	Stop			Free	Free	
Grade	0%			0%		
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	21			95	35	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)				None	None	
Median type						
Median storage (veh)						
Upstream signal (ft)						
p/c platoon unblocked						
p/c conflicting volume	134	38	42			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	134	38	42			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p/c queue free %	98	100	100			
CM capacity (veh/h)	865	1039	1580			
Direction, Lane #	EB1	NB1	SB1			
Volume Total	22	95	42			
Volume Left	21	0	0			
Volume Right	1	0	7			
CSH	872	1580	1700			
Volume to Capacity	0.03	0.00	0.02			
Queue Length 95th (ft)	2	0	0			
Control Delay (s)	9.2	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.2	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay				13		
Intersection Capacity Utilization				13.7%		
Analysis Period (min)				15		
ICU Level of Service				A		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4	4	4	4	4	4
Traffic Volume (vph)	317	6	7	282	21	22
Future Volume (vph)	317	6	7	282	21	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.997				0.930	
Flt Protected					0.999	0.976
Satd. Flow (prot)	1840	0	0	1777	1725	0
Flt Permitted					0.999	0.976
Satd. Flow (perm)	1840	0	0	1777	1725	0
Link Speed (mph)	45			45	30	
Link Distance (ft)	482			1128	350	
Travel Time (s)	7.3			17.1	8.0	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	3%	0%	0%	7%	0%	0%
Adj. Flow (vph)	396	8	9	353	26	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	404	0	0	362	54	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.5%
Analysis Period (min)	15
ICU Level of Service	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4	4	4	4	4	4
Traffic Volume (veh/h)	317	6	7	282	21	22
Future Volume (veh/h)	317	6	7	282	21	22
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	396	8	9	353	26	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pK, platoon unblocked						
vC, conflicting volume		404			771	400
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vC3, unblocked vol		404			771	400
IC, single (s)		4.1			6.4	6.2
IC, 2 stage (s)						
IF (s)		2.2			3.5	3.3
p0 queue free %		99			93	96
cM capacity (veh/h)		1166			368	654

Direction, Lane #	EBT	WBL	NBL
Volume Total	404	362	54
Volume Left	0	9	26
Volume Right	8	0	28
CSH	1700	1166	476
Volume to Capacity	0.24	0.01	0.11
Queue Length 95th (ft)	0	1	10
Control Delay (s)	0.0	0.3	13.5
Lane LOS		A	B
Approach Delay (s)	0.0	0.3	13.5
Approach LOS		B	B

Intersection Summary

Average Delay	1.0
Intersection Capacity Utilization	30.5%
Analysis Period (min)	15
ICU Level of Service	A

Lanes, Volumes, Timings 2024 Full Build Conditions - AM Peak Hour
7: Proposed Multifamily Westerly Dwy & Blg Tree Rd 04/02/2021

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1	1	1	1	1	1
Traffic Volume (veh/h)	318	2	2	301	7	6
Future Volume (veh/h)	318	2	2	301	7	6
Ideal Flow (veh/h)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100	0	0	0
Storage Lanes	0	0	1	1	1	0
Taper Length (ft)	100	25	100	100	25	100
Lane Util. Factor	0.999	1.00	1.00	1.00	1.00	1.00
Fit Protected			0.350		0.936	
Satd. Flow (prot)	1943	0	1805	1776	1732	0
Fit Permitted			0.950		0.974	
Satd. Flow (perm)	1943	0	1805	1776	1732	0
Link Speed (mph)	45			45	30	
Link Distance (ft)	172			482	455	
Travel Time (s)	2.6			7.3	10.3	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	3%	0%	0%	7%	0%	0%
Adj. Flow (vph)	398	3	3	376	9	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	401	0	3	376	17	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	26.9%
Analysis Period (min)	15
ICU Level of Service A	

HCM Unsignalized Intersection Capacity Analysis 2024 Full Build Conditions - AM Peak Hour
7: Proposed Multifamily Westerly Dwy & Blg Tree Rd 04/02/2021

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1	1	1	1	1	1
Traffic Volume (veh/h)	318	2	2	301	7	6
Future Volume (veh/h)	318	2	2	301	7	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	398	3	3	376	9	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median Type	None			None		
Median storage (veh)						
Upstream signal (ft)	1056					
pX, platoon unblocked						
vC, conflicting volume			401		782	400
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vC3, unblocked vol						
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1169		365	655

Direction, Lane #

Direction, Lane #	EBT	EBR	WBL	WBT	NBL	NBR
Volume Total	401	3	376	17		
Volume Left	0	3	0	9		
Volume Right	3	0	0	8		
CSH	1700	1169	1700	461		
Volume to Capacity	0.24	0.00	0.22	0.04		
Duration Length 95th (ft)	0	0	0	3		
Control Delay (s)	0.0	8.1	0.0	13.1		
Lane LOS	A	A	A	B		
Approach Delay (s)	0.0	0.1		13.1		
Approach LOS				B		

Intersection Summary

Average Delay	0.3
Intersection Capacity Utilization	26.9%
Analysis Period (min)	15
ICU Level of Service	A

Lanes, Volumes, Timings
1: Big Tree Rd/Radian's Dwy & Southwestern Blvd

2024 Full Build Conditions - PM Peak Hour
04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	23	817	398	25	1049	12	483	12	19	12	13	23
Traffic Volume (vph)	23	817	398	25	1049	12	483	12	19	12	13	23
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	45	190	140	190	140	0	205	0	0	0	0	0
Storage Length (ft)	1	1	1	1	1	1	1	1	1	1	1	1
Storage Lanes	105	120	120	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Lane Length (ft)	1.00	0.91	1.00	0.850	0.998	0.950	0.989	0.950	1.00	1.00	0.904	1.00
Lane Util. Factor	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Flt Protected	1805	5136	1615	1626	3568	0	1698	1687	0	1805	1718	0
Satd. Flow (prot)	0.157	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274
Flt Permitted	298	5136	1615	469	3568	0	1698	1687	0	1805	1718	0
Satd. Flow (perm)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Right Turn on Red	50	720	735	735	735	735	735	735	735	735	735	735
Satd. Flow (RTOR)	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Link Distance (ft)	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Travel Time (s)	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	25	878	428	27	1128	13	519	13	20	13	14	25
Shared Lane Traffic (%)	25	878	428	27	1128	13	519	13	20	13	14	25
Lane Group Flow (vph)	25	878	428	27	1128	13	519	13	20	13	14	25
Turn Type	pm-rt	NA	pm-rt	NA	pm-rt	NA	pm-rt	NA	pm-rt	NA	pm-rt	NA
Protected Phases	6	6	3	5	2	3	3	3	3	3	3	3
Permitted Phases	1	6	3	5	2	3	3	3	3	3	3	3
Detector Phase	1	6	3	5	2	3	3	3	3	3	3	3
Switch Phase	6.0	20.0	6.0	6.0	20.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Initial (s)	11.0	27.0	37.0	11.0	27.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Minimum Split (s)	20.0	40.0	40.0	20.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	16.7%	33.3%	33.3%	16.7%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	15.0	35.0	35.0	15.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None	None	None	None
Flash Don't Walk (s)	15.0	25.0	25.0	15.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effect Green (s)	70.1	66.0	98.9	70.4	66.2	26.9	26.9	26.9	26.9	26.9	26.9	26.9
Actuated g/C Ratio	0.58	0.55	0.59	0.55	0.55	0.22	0.22	0.22	0.22	0.22	0.22	0.22
v/c Ratio	0.40	0.31	0.30	0.08	0.58	0.72	0.73	0.73	0.73	0.73	0.73	0.73
Control Delay	13.8	17.9	1.0	13.5	22.8	53.6	53.5	53.5	53.5	53.5	53.5	53.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Lanes, Volumes, Timings
1: Big Tree Rd/Radian's Dwy & Southwestern Blvd

2024 Full Build Conditions - PM Peak Hour
04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	13.8	17.9	1.0	13.5	22.8	53.6	53.5	53.5	53.5	53.5	53.5	53.5
LOS	B	B	A	B	C	D	D	D	D	E	C	C
Approach Delay	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4
Approach LOS	B	B	A	B	C	D	D	D	D	E	C	C
Queue Length 50th (ft)	8	145	0	8	329	208	207	207	207	10	11	11
Queue Length 95th (ft)	24	217	25	26	493	284	285	285	285	30	46	46
Internal Link Dist (ft)	640	640	190	140	655	804	804	804	804	171	171	171
Turn Bay Length (ft)	45	370	2825	1452	430	1968	495	494	494	225	236	236
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillover Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.31	0.29	0.06	0.58	0.56	0.56	0.56	0.56	0.06	0.17	0.17



Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2-WBTL and 6-EBTL Start of Yellow
Natural Cycle: 125
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 24.0
Intersection Capacity Utilization: 58.7%
Analysis Period (min): 15

Splits and Phases: 1: Big Tree Rd/Radian's Dwy & Southwestern Blvd

Lanes, Volumes, Timings
 2: Parker Rd/ECC Dwy & Blg Tree Rd

2024 Full Build Conditions - PM Peak Hour
 04/02/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	10	384	62	57	496	10	36	10	36	5	10	25
Traffic Volume (veh/h)	10	384	62	57	496	10	36	10	36	5	10	25
Future Volume (veh/h)	10	384	62	57	496	10	36	10	36	5	10	25
Ideal Flow (veh/h)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
RT	0.982	0.999	0.999	0.997	0.995	0.995	0.994	0.994	0.994	0.916	0.916	0.916
Flt Protected	0	1848	0	0	1868	0	0	1750	0	0	1730	0
Satd. Flow (prot)	0	1848	0	0	1868	0	0	1750	0	0	1730	0
Flt Permitted	0.999	0.999	0.999	0.995	0.995	0.995	0.979	0.979	0.994	0.994	0.994	0.994
Satd. Flow (perm)	0	1848	0	0	1868	0	0	1750	0	0	1730	0
Link Speed (mph)	45	45	45	45	45	45	30	30	30	30	30	30
Link Distance (ft)	1130	1130	2441	2441	2441	2441	480	480	334	334	334	334
Travel Time (s)	17.1	17.1	37.0	37.0	37.0	37.0	10.9	10.9	7.6	7.6	7.6	7.6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (veh/h)	11	404	65	60	522	11	38	11	38	5	11	26
Shared Lane Traffic (%)	0	480	0	0	583	0	0	87	0	0	42	0
Lane Group Flow (vph)	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	74.7%
Analysis Period (min)	15
ICU Level of Service	D

HCM Unsignalized Intersection Capacity Analysis
 2: Parker Rd/ECC Dwy & Blg Tree Rd

2024 Full Build Conditions - PM Peak Hour
 04/02/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	10	384	62	57	496	10	36	10	36	5	10	25
Traffic Volume (veh/h)	10	384	62	57	496	10	36	10	36	5	10	25
Future Volume (veh/h)	10	384	62	57	496	10	36	10	36	5	10	25
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	404	65	60	522	11	38	11	38	5	11	26
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None	None	None	None	None	None	None	None	None	None	None	None
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	533			469			1138	1112	436	1150	1138	528
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vC3, unblocked vol	533			469			1138	1112	436	1150	1138	528
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			95			76	94	94	97	94	95
cM capacity (veh/h)	1045			1103			155	197	624	151	190	555
Direction, Lane #	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume Total	480	593	87	42								
Volume Left	11	60	38	5								
Volume Right	65	11	38	26								
CSH	1045	1103	242	305								
Volume to Capacity	0.01	0.05	0.36	0.14								
Queue Length 95th (ft)	1	4	39	12								
Control Delay (s)	0.3	1.5	28.0	18.7								
Lane LOS	A	A	D	C								
Approach Delay (s)	0.3	1.5	28.0	18.7								
Approach LOS	D	D	D	C								
Intersection Summary												
Average Delay												
Intersection Capacity Utilization												
Analysis Period (min)												
ICU Level of Service												

Lanes, Volumes, Timings
3: Abbott Rd & Big Tree Rd

2024 Full Build Conditions - PM Peak Hour
04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	34	382	57	113	470	111	47	173	59	98	286	57
Traffic Volume (vph)	34	382	57	113	470	111	47	173	59	98	286	57
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	140	140	140	140	140	140	140	140	140	140	140	140
Storage Length (ft)	140	140	140	140	140	140	140	140	140	140	140	140
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	25	25	25	25	25	25	25	25	25	25	25	25
Lane Util. Factor	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
Fit Protected	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Satd. Flow (prot)	1736	1836	0	1770	1834	0	1805	1792	0	1787	1827	0
Fit Permitted	0.300	0.300	0.433	0.433	0.433	0.433	0.433	0.433	0.433	0.433	0.433	0.433
Satd. Flow (perm)	548	1836	0	807	1834	0	889	1792	0	1123	1827	0
Right Turn on Red	12	12	Yes	18	18	Yes	27	27	Yes	17	17	Yes
Satd. Flow (RTOR)	45	45	45	45	45	45	45	45	45	45	45	45
Link Speed (mph)	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441	2441
Link Distance (ft)	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Travel Time (s)	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	34	386	58	114	475	112	47	175	60	99	289	58
Shared Lane Traffic (%)	34	444	0	114	587	0	47	235	0	99	327	0
Lane Group Flow (vph)	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Turn Type	1	1	1	1	1	1	1	1	1	1	1	1
Protected Phases	1	1	1	1	1	1	1	1	1	1	1	1
Permitted Phases	1	1	1	1	1	1	1	1	1	1	1	1
Detector Phase	1	1	1	1	1	1	1	1	1	1	1	1
Switch Phase	1	1	1	1	1	1	1	1	1	1	1	1
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9
Total Split (s)	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9
Total Split (%)	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%	50.6%
Maximum Green (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Yellow Time (s)	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
All-Red Time (s)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4
Actuated g/C Ratio	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
v/c Ratio	0.13	0.52	0.31	0.68	0.16	0.38	0.27	0.53	0.16	0.38	0.27	0.53
Control Delay	10.8	13.0	12.5	16.4	16.1	15.4	17.1	18.6	16.1	15.4	17.1	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.8	13.0	12.5	16.4	16.1	15.4	17.1	18.6	16.1	15.4	17.1	18.6
LOS	B	B	B	B	B	B	B	B	B	B	B	B
Approach Delay	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8

Lanes, Volumes, Timings
3: Abbott Rd & Big Tree Rd

2024 Full Build Conditions - PM Peak Hour
04/02/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Queue Length 50th (ft)	5	81	19	119	10	46	21	73	65	175	318	1207
Queue Length 95th (ft)	24	198	63	287	36	119	65	175	65	175	318	1207
Internal Link Dist (ft)	2361	2361	581	581	470	470	470	470	470	470	470	470
Turn Bay Length (ft)	140	140	70	70	100	100	100	100	100	100	100	100
Base Capacity (vph)	360	1211	530	1211	584	1187	738	1207	738	1207	1207	1207
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.37	0.22	0.48	0.08	0.20	0.13	0.27	0.13	0.27	0.27	0.27
Intersection Summary	Other											
Area Type:	Other											
Cycle Length:	80.9											
Actuated Cycle Length:	54.9											
Natural Cycle:	55											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.68											
Intersection Signal Delay:	15.5											
Intersection Capacity Utilization:	96.3%											
Analysis Period (min):	15											
Splits and Phases:	3: Abbott Rd & Big Tree Rd											
	40.9											
	40.9											

Lanes, Volumes, Timings
4: Parker Rd & Proposed SF Northernly Dwy/Marllyn Dr

2024 Full Build Conditions - PM Peak Hour
04/02/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	14	0	1	4	0	10	1	58	1	12	94	24
Traffic Volume (veh/h)	14	0	1	4	0	10	1	58	1	12	94	24
Future Volume (veh/h)	14	0	1	4	0	10	1	58	1	12	94	24
Ideal Flow (veh/h)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	0.992	0.995	0.998	0.996	0.998	0.999	0.999	0.999	0.999	0.999	0.999	0.999
Satd. Flow (prot)	0	1800	0	0	1635	0	0	1894	0	0	1845	0
Fit Permitted	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955
Satd. Flow (perm)	0	1800	0	0	1635	0	0	1894	0	0	1845	0
Link Speed (mph)	30	30	30	30	30	30	30	30	30	30	30	30
Link Distance (ft)	397	742	825	742	825	742	825	742	825	742	825	742
Travel Time (s)	9.0	16.9	18.8	16.9	18.8	16.9	18.8	16.9	18.8	16.9	18.8	16.9
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (veh/h)	17	0	1	5	0	12	1	69	1	14	112	29
Shared Lane Traffic (%)	0	18	0	0	17	0	0	71	0	0	155	0
Lane Group Flow (veh/h)	0	18	0	0	17	0	0	71	0	0	155	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free

Intersection Summary	Other
Area Type:	Unsignalized
Control Type:	Unsignalized
Intersection Capacity Utilization	23.4%
Analysis Period (min)	15
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
4: Parker Rd & Proposed SF Northernly Dwy/Marllyn Dr

2024 Full Build Conditions - PM Peak Hour
04/02/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	14	0	1	4	0	10	1	58	1	12	94	24
Traffic Volume (veh/h)	14	0	1	4	0	10	1	58	1	12	94	24
Future Volume (veh/h)	14	0	1	4	0	10	1	58	1	12	94	24
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	17	0	1	5	0	12	1	69	1	14	112	29
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
PX platoon unblocked												
vC, conflicting volume	238	226	126	227	240	70	141					
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vC1, unblocked vol	238	226	126	227	240	70	141					
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1					
IC, 2 stage (s)												
IC (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					
p0 queue free %	98	100	100	99	100	99	100					
cM capacity (veh/h)	707	670	929	726	658	999	1455					
Direction, Lane #	EBT	WBT	NBT	SBT								
Volume Total	18	17	71	155								
Volume Left	1	5	1	14								
Volume Right	1	12	1	29								
CSH	716	900	1455	1544								
Volume to Capacity	0.03	0.02	0.00	0.01								
Queue Length (ft)	2	0	0	1								
Control Delay (s)	10.2	9.1	0.1	0.7								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.2	9.1	0.1	0.7								
Approach LOS	B	A	A	A								
Intersection Summary												
Average Delay				1.8								
Intersection Capacity Utilization				23.4%								
Analysis Period (min)				15								
ICU Level of Service				A								

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W	W	1	1	4	1
Traffic Volume (vph)	10	1	1	50	81	17
Future Volume (vph)	10	1	1	50	81	17
Ideal Flow (vph)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.990				0.977	
Fit Protected	0.956				0.999	
Satd. Flow (prot)	1798	0	0	1898	1856	0
Fit Permitted	0.956				0.999	
Satd. Flow (perm)	1798	0	0	1898	1856	0
Link Speed (mph)	30				30	
Link Distance (ft)	475				850	
Travel Time (s)	10.8				19.3	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	12	1	1	59	95	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	13	0	0	60	115	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	15.3%					
Analysis Period (min)	15					
ICU Level of Service A						

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W	W	1	4	1	
Traffic Volume (veh/h)	10	1	1	50	81	17
Future Volume (veh/h)	10	1	1	50	81	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	
Hourly flow rate (vph)	12	1	1	59	95	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX platform unblocked						
vC, conflicting volume	166	105	115			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vC4, unblocked vol	166	105	115			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
pd queue free, %	99	100	100			
cell capacity (veh/h)	829	955	1487			
Direction, Lane #	EB 1	EB 1	NB 1	SB 1		
Volume Total	13	60	115			
Volume Left	12	1	0			
Volume Right	1	0	20			
CSH	837	1487	1700			
Volume to Capacity	0.02	0.00	0.07			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	9.4	0.1	0.0			
Lane LOS	A	A	A			
Approach Delay (s)	9.4	0.1	0.0			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay	0.7					
Intersection Capacity Utilization	15.3%					
Analysis Period (min)	15					
ICU Level of Service A						

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (veh/h)	444	20	22	536	12	13
Future Volume (veh/h)	444	20	22	536	12	13
Ideal Flow (veh/h)	1800	1900	1900	1900	1900	1900
Lane Util. Factor	0.994	1.00	1.00	1.00	1.00	1.00
Flt Protected						
Satd. Flow (prot)	1871	0	0	1878	1725	0
Flt Permitted						
Satd. Flow (perm)	1871	0	0	1878	1725	0
Link Speed (mph)	45			45	30	
Link Distance (ft)	488			1130	435	
Travel Time (s)	7.4			17.1	9.9	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Adj. Flow (veh/h)	522	24	26	631	14	15
Shared Lane Traffic (%)						
Lane Group Flow (veh/h)	546	0	0	657	29	0
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	56.0%					
ICU Level of Service	B					
Analysis Period (min)	15					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (veh/h)	444	20	22	536	12	13
Future Volume (veh/h)	444	20	22	536	12	13
Sign Control	Free			Free	Stop	
Grade	0%			0%		
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (veh/h)	522	24	26	631	14	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume		546			1217	534
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vC3, unblocked vol		546			1217	534
IC, single (s)		4.1			6.4	6.2
IC, 2 stage (s)						
IF (s)		2.2			3.5	3.3
p0 queue free %		97			93	97
cM capacity (veh/h)		1033			197	550
Direction, Lane #	EBT	EBR	WBL	WBT	NBL	NBR
Volume Total	546	657	29			
Volume Left	0	26	14			
Volume Right	24	0	15			
CSH						
Volume to Capacity	1700	1033	294			
Queue Length 95th (ft)	0.32	0.03	0.10			
Queue Length 95th (ft)	0	2	8			
Control Delay (s)	0.0	0.7	18.6			
Lane LOS	A	A	C			
Approach Delay (s)	0.0	0.7	18.6			
Approach LOS	C	C	C			
Intersection Summary						
Average Delay	0.8					
Intersection Capacity Utilization	56.0%					
ICU Level of Service	B					
Analysis Period (min)	15					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1	1	1	1	1	1
Traffic Volume (veh/h)	461	7	6	563	4	3
Future Volume (veh/h)	461	7	6	563	4	3
Ideal Flow (veh/pl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100	0	0	0
Storage Lanes	0	0	1	0	1	0
Taper Length (ft)	100	100	25	100	100	100
Lane Util Factor	0.998	1.00	1.00	1.00	1.00	1.00
Flt Protected			0.950		0.940	
Flt Permitted	1878	0	1805	1881	1738	0
Satd. Flow (prot)	1878	0	1805	1881	1738	0
Satd. Flow (perm)	1878	0	1805	1881	1738	0
Link Speed (mph)	45		45		30	
Link Distance (ft)	164		488		485	
Travel Time (s)	2.5		7.4		10.6	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Adj. Flow (vph)	542	8	7	662	5	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	550	0	7	662	9	0
Sign Control	Free		Free		Stop	

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 39.6%
 Analysis Period (min) 15

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1	1	1	1	1	1
Traffic Volume (veh/h)	461	7	6	563	4	3
Future Volume (veh/h)	461	7	6	563	4	3
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	542	8	7	662	5	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None				None	
Median storage (veh)						
Upstream signal (ft)	1048					
pX, platoon unblocked						
vC, conflicting volume			550		1222	546
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vC3, unblocked vol			550		1222	546
IC, single (s)			4.1		6.4	6.2
IC, 2 stage (s)						
IF (s)			2.2		3.5	3.3
p0 queue free %			99		97	99
cM capacity (veh/h)			1030		199	541

Direction	Lane #	EB1	WB1	WB2	NB1
Volume Total		550	7	662	9
Volume Left		0	7	0	5
Volume Right		8	0	0	4
ESH		1700	1030	1700	277
Volume to Capacity		0.32	0.01	0.39	0.03
Queue Length 95th (ft)		0	1	0	3
Control Delay (s)		0.0	8.5	0.0	18.4
Lane LOS		A	A	A	C
Approach Delay (s)		0.0	0.1	18.4	
Approach LOS				C	

Intersection Summary
 Average Delay
 Intersection Capacity Utilization 39.6%
 Analysis Period (min) 15

A7

**Level of Service Calculations:
Full Development Conditions
with Mitigation**

HCM Unsignalized Intersection Capacity Analysis 2024 Full Build Conditions - AM Peak Hour

7: Proposed Multifamily Westerly Dwy & Big Tree Rd

04/02/2021

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↙	↗	↘	↗
Traffic Volume (veh/h)	318	2	2	301	7	6
Future Volume (Veh/h)	318	2	2	301	7	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	398	3	3	376	9	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL		TWLTL			
Median storage (veh)	2		2			
Upstream signal (ft)	1056					
pX, platoon unblocked						
vC, conflicting volume			401		782	400
vC1, stage 1 conf vol					400	
vC2, stage 2 conf vol					382	
vCu, unblocked vol			401		782	400
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1169		566	655
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	401	3	376	17		
Volume Left	0	3	0	9		
Volume Right	3	0	0	8		
cSH	1700	1169	1700	604		
Volume to Capacity	0.24	0.00	0.22	0.03		
Queue Length 95th (ft)	0	0	0	2		
Control Delay (s)	0.0	8.1	0.0	11.1		
Lane LOS		A		B		
Approach Delay (s)	0.0	0.1		11.1		
Approach LOS				B		
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			26.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 2024 Full Build Conditions - PM Peak Hour

7: Proposed Multifamily Westerly Dwy & Blg Tree Rd

04/02/2021

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↙	↗	↘	
Traffic Volume (veh/h)	461	7	6	563	4	3
Future Volume (Veh/h)	461	7	6	563	4	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	542	8	7	662	5	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage veh	2			2		
Upstream signal (ft)	1048					
pX, platoon unblocked						
vC, conflicting volume			550		1222	546
vC1, stage 1 conf vol					546	
vC2, stage 2 conf vol					676	
vCu, unblocked vol			550		1222	546
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	99
cM capacity (veh/h)			1030		416	541
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	550	7	662	9		
Volume Left	0	7	0	5		
Volume Right	8	0	0	4		
cSH	1700	1030	1700	463		
Volume to Capacity	0.32	0.01	0.39	0.02		
Queue Length 95th (ft)	0	1	0	1		
Control Delay (s)	0.0	8.5	0.0	12.9		
Lane LOS		A		B		
Approach Delay (s)	0.0	0.1		12.9		
Approach LOS				B		
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			39.6%	ICU Level of Service	A	
Analysis Period (min)			15			