TRAFFIC IMPACT STUDY

For

Ivy River Property, LLC
Proposed Warehouse Development

Property Located at:

1 Riverview Drive
Block 517.03 – Lot 3.30
Township of Franklin, Somerset County, NJ

Prepared by:

1904 Main Street
Lake Como, NJ 07719

245 Main Street, Suite #110
Chester, NJ 07930

(732) 681-0760

Craig W. Peregoy, PE
NJ PE License #45880

Corey M. Chase, PE
NJ PE License #47470

August 2, 2019
Revised: May 7, 2020

0206-99-002T

CGH:ned

INTRODUCTION

It is proposed to construct a warehouse building on a parcel of land that is currently developed with a building consisting of warehouse space and office space, located along the west side of Apgar Drive just south of its intersection with Weston Canal Road (CR 623) in Franklin Township, Somerset County, New Jersey, see Figure 1 in Appendix A. The site is designated as Block 517.03 – Lot 3.30 on the Township of Franklin Tax Maps. The site is currently developed with an existing 109,269 SF office/warehouse building. It is proposed to maintain the existing building and construct an additional 79,380 SF warehouse building inclusive of 5,000 SF of office space. The proposed building will be modified to contain 61,963 SF of warehouse space and 47,306 SF of office space, resulting in a total of 136,343 SF of warehouse space and 52,306 SF of office space. The site is located within the M-1 – Light Manufacturing Zone. Access to the site is currently provided via one (1) full movement driveway along Riverview Drive, one (1) full movement driveway along Apgar Drive and one (1) full movement driveway along a neighboring access drive which connects to Riverview Drive and to Randolph Road. It is proposed to maintain the existing access configuration. Parking will be provided via one hundred eight (108) on-site parking spaces and eleven (11) "land banked" parking stalls for a total of 119 spaces.

Dynamic Traffic, LLC has been retained to prepare this study to assess the traffic impact associated with the construction of The Project on the adjacent roadway network. This study documents the methodology, analyses, findings and conclusions of our study and includes:

- A detailed field inspection was conducted to obtain an inventory of existing roadway geometry, traffic control, and location and geometry of existing driveways and intersections.
- Existing traffic volume data was obtained from the Traffic Impact Study, last revised September 7, 2018, for the adjacent warehouse project along Randolph Road.
- Existing traffic data was collected via manual turning movement (MTM) counts during the weekday AM and weekday PM peak periods at the following intersections:
    - Weston Canal Road and Apgar Drive;
    - Weston Canal Road and Randolph Road;
    - Randolph Road and Apgar Drive;
    - Apgar Drive and Riverview Drive/PSE&G Driveway
    - Apgar Drive and Site Driveway/Newtech Driveway
- Projections of traffic to be generated by the proposed development were prepared utilizing trip generation data as published by the Institute of Transportation Engineers. Site traffic was then assigned to the adjacent street system based upon the anticipated directional distribution.
- Capacity analyses were conducted for the Existing, No Build, and Build conditions for the study intersections.
- The proposed points of ingress and egress were inspected for adequacy of geometric design, spacing and/or alignment to streets and driveways on the opposite side of the street, relationship to other driveways adjacent to the development, and conformance with accepted design standards.
- The site plan as designed was reviewed for sufficiency in accommodating large wheel base vehicles such as delivery trucks, refuse trucks, and emergency vehicles.
- The parking layout and supply was assessed based on accepted design standards and demand experienced at similar developments.

EXISTING CONDITIONS

A review of the existing roadway conditions near the proposed site was conducted to provide the basis for assessing the traffic impact of the development. This included field investigations of the surrounding roadways and intersections, collection of traffic volume data, and extensive analyses.

Existing Roadway Conditions

The following are descriptions of the roadways in the study area:

Weston Canal Road (CR 623) is an Urban Major Collector roadway under Somerset County jurisdiction with a general east/west orientation. In the vicinity of the site the posted speed limit is 45 MPH and the roadway provides one travel lane in each direction. On-street parking is prohibited along both sides of the roadway, while curb and sidewalk are not provided along either side of the roadway. Weston Canal Road (CR 623) provides a curved horizontal alignment and a relatively flat vertical alignment. The land uses along Weston Canal Road (CR 623) in the vicinity of The Project are mixed residential and business.

Randolph Road is an Urban Major Collector roadway under Franklin Township jurisdiction with a general north/south orientation. In the vicinity of the site the posted speed limit is 40 MPH and the roadway provides one travel lane in each direction. On-street parking is prohibited along both sides of the roadway. Curb is provided along both sides of the roadway while sidewalk is not provided along either side of the roadway. Randolph Road provides a straight horizontal alignment and a relatively flat vertical alignment. The land uses along Randolph Road in the vicinity of The Project are mixed business and industrial.

Apgar Drive is a local roadway under Franklin Township jurisdiction with a general north/south orientation in the vicinity of Weston Canal Road and a general east/west orientation in the vicinity of Randolph Road. In the vicinity of the site the posted speed limit is 35 MPH and the roadway provides one travel lane in each direction. On-street parking is permitted along both sides of the roadway. Curb is provided along both sides of the roadway while sidewalk is not provided along either side of the roadway. Apgar Drive provides a curved horizontal alignment and a relatively flat vertical alignment. The land uses along Apgar Drive in the vicinity of the Project are mixed business and industrial.

Riverview Drive is a local roadway under Franklin Township jurisdiction with a general east/west orientation. In the vicinity of the site the speed limit is not posted and the roadway provides one travel lane in each direction. Curb is provided along both sides of the roadway while sidewalk is not provided along either side of the roadway. Riverview Drive provides a straight horizontal alignment and a relatively flat vertical alignment. The land uses along Riverview Drive in the vicinity of the Project are mixed business and industrial. The roadway extends west from Apgar Drive approximately 650 feet where it terminates in the form of a cul-de-sac.

Existing Traffic Volumes

Spot manual turning movement (MTM) counts were conducted at the following intersections to validate the previously collected data associated with the adjacent warehouse project:

- Weston Canal Road and Apgar Drive, originally counted on Tuesday, July 10, 2018 from 6:30 to 9:00 AM and from 4:30 to 6:30 PM and spot counted on Thursday, March 7, 2019 during both peak periods.
- Weston Canal Road and Randolph Road, originally counted on Wednesday, March 14, 2018 from 7:00 AM to 9:00 AM and from 4:30 to 6:30 PM and again on Wednesday, June 6, 2018 from 6:30 AM to 7:00 AM and spot counted on Thursday, March 7, 2019 during both peak periods.
- Randolph Road and Apgar Drive, originally counted on Tuesday, July 10, 2018 from 6:30 to 9:00 AM and from 4:30 to 6:30 PM and spot counted on Tuesday, March 12, 2019 during both peak periods.

Upon review of the spot count data, it was confirmed that the previously collected data is consistent with current traffic volumes and therefore the utilization of the previous counts is validated. Additional MTM counts were conducted at the following intersections:

- Apgar Drive and Riverview Drive/PSE&G Driveway on Thursday, March 7, 2019 from 7:00 AM to 9:00 AM and from 4:30 PM to 6:30 PM.
- Apgar Drive and Site Driveway/Newtech Driveway on Tuesday, March 12, 2019 from 7:00 AM to 9:00 AM and from 4:30 PM to 6:30 PM.

Review of the collected data reveals that the weekday morning Peak Street Hour (PSH) of the network occurs from 7:15 – 8:15 AM and the weekday evening network PSH occurs from 5:00 – 6:00 PM. However, the weekday morning peak hour is essentially "shifted" with the inclusion of the traffic generated by the adjacent Amazon facility which is under construction such that the future weekday morning peak hour is not the same as the existing morning peak hour as counted. To assess a worst case scenario, the future peak hour, with consideration of the Amazon project was utilized and it was assumed that the proposed project generates its peak hour volumes simultaneously. Realistically, these uses may not peak at the same time. However, the analyses are conservatively prepared assuming they do which results in the highest potential future peak hour traffic volumes. Therefore, conservatively, a weekday morning PSH from 6:30 AM to 7:30 AM and a weekday evening PSH from 5:00 PM to 6:00 PM have been utilized in the capacity analysis in order to remain consistent with the peak hours utilized for the Amazon report. Figure 2, located in Appendix A, shows the existing peak hour traffic volumes at the study intersections. All MTM counts are contained in Appendix B.

Existing Capacity Analysis

The methodology utilized in the capacity analyses is described in the *Highway Capacity Manual*, published by the Transportation Research Board. In general, the term Level of Service (LOS) is used to provide a "qualitative" evaluation of capacity based upon certain "quantitative" calculations related to empirical values, such as traffic volume and intersection control.

At the signalized intersections, factors that affect the various approach capacities include width of approach, number of lanes, signal "green time", turning percentages, truck volumes, etc. However,

delays cannot be related to capacity in a simple one-to-one fashion. For example, it is possible to have delays in the Level of Service "F" range without exceeding roadway capacity. Substantial delays can exist without exceeding capacity if one or more of the following conditions exist: long signal cycle lengths; a particular traffic movement experiences a long red time; or progressive movement for a particular lane group is poor. Table I describes the Level of Service ranges for signalized intersections. An unsignalized (STOP sign controlled) driveway or side street along a through route is seldom critical from an overall capacity standpoint, however, it may be of great significance to the capacity of the minor cross-route, and it may influence the quality of traffic flow on both. When analyzing an unsignalized intersection, it is assumed that both the major street through and right turn movements are unimpeded and have the right-of-way over all side street traffic and left turns from the major street. All other turning movements in the intersection cross, merge with, or are otherwise impeded by major street movements. Traffic delays at unsignalized intersections are determined by sequentially processing these impeded movements. Table II describes the Level of Service ranges for unsignalized (stop controlled) intersections.

Table I
Level of Service Criteria
for Signalized Intersections

Level of Service	Average Control Delay (seconds per vehicle)
A	0.0 to 10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	greater than 80.0

Table II
Level of Service Criteria
for Unsignalized Intersections

Level of Service	Average Control Delay (seconds per vehicle)
a	0.0 to 10.0
b	10.1 to 15.0
c	15.1 to 25.0
d	25.1 to 35.0
e	35.1 to 50.0
f	greater than 50.0

It should be noted that the analyses within the *Highway Capacity Manual* assume a random arrival for all the movements, which may not be the case if an adjacent traffic signal is present that platoons vehicles. All capacity analyses were performed utilizing the Synchro Software package (Synchro 10). Table III summarizes the existing Levels of Service (LOS) and delays.

Table III
Existing Levels of Service

Intersection	Direction/ Movement		AM PSH	PM PSH
Weston Canal Road & Randolph Road	EB	TR	C (31)	B (14)
	WB	L	B (13)	A (4)
		T	A (5)	B (12)
	NB	L	C (28)	C (29)
		R	B (11)	B (11)
	Overall		C (21)	B (12)
Weston Canal Road & Apgar Drive	WB	LT	b (12)	a (10)
	NB	L	f (68)	a (0)
		R	c (18)	b (15)
Randolph Road & Apgar Drive	WB	LR	b (10)	b (12)
	SB	LT	a (8)	a (8)
Apgar Drive & Riverview Drive/PSE&G Driveway	EB	LTR	a (9)	a (9)
	WB	LTR	a (9)	a (9)
	NB	LTR	a (7)	a (8)
	SB	LTR	a (7)	a (7)
Apgar Drive & Site Driveway/Newtech Driveway	EB	LTR	a (9)	a (9)
	WB	LTR	a (9)	a (9)
	NB	LTR	a (0)	a (0)
	SB	LTR	a (7)	a (0)

A (#) - Signalized Intersection Level of Service (seconds of delay per vehicle)
a (#) - Unsignalized Intersection Level of Service (seconds of delay per vehicle)

The following are discussions pertaining to each of the existing intersections analyzed. The existing truck percentages and peak hour factors obtained from the MTM counts were utilized in the Existing analyses. It should be noted that the percentage of trucks and peak hours factors were updated based on the distribution of site traffic throughout the peak hours associated with the adjacent warehouse development located along the west side of Randolph Road. The adjusted truck percentages and peak hour factors were utilized in the Build analyses. Furthermore, the percentage of trucks was again updated for the Build analysis based on the fact that 20% of the site traffic is anticipated to be trucks which is a typical characteristic of warehouse uses.

Weston Canal Road (CR 623) and Randolph Road

Randolph Road intersects Weston Canal Road (CR 623) to form a three-leg intersection controlled by a three-phase traffic signal operating on a variable background cycle length. Weston Canal Road (CR 623) provides one shared through/right turn lane in the eastbound direction and one dedicated left turn lane and one dedicated through lane in the westbound direction. Randolph Road provides one dedicated left turn lane and one dedicated right turn lane in the northbound direction.

A review of the existing analysis reveals that all movements operate at Levels of Service "C" or better during the analyzed peak periods. See Table III for the individual movement Levels of Service and delays.

Weston Canal Road (CR 623) and Apgar Drive

Apgar Drive interests Weston Canal Road to form a three-leg unsignalized intersection with the northbound approach of Apgar Drive operating under stop control. Weston Canal Road provides one shared through/right turn lane in the eastbound direction and one dedicated left turn lane and one dedicated through lane in the westbound direction. Apgar Drive provides one dedicated left turn lane and one dedicated right turn lane in the northbound direction.

A review of the existing analysis reveals that the northbound left turn movement operates at Level of Service "F" during the weekday morning peak hour. It is anticipated that the Apgar Drive approach left turn movement will operate at better than the theoretically calculated weekday morning peak hour results, as the capacity analysis procedures are based on random traffic flow on the arterial roadway, whereas platooned traffic flow is present in each direction of Weston Canal Road, due to the presence of traffic signals located along Weston Canal Road to the east (Cottontail Lane) and west (Randolph Road) of Apgar Drive. Platooned traffic flow affords side road vehicles longer gaps in the main road traffic flow in which to perform their traffic movement. Also note that there is only one northbound left turn during the morning peak hour and zero during the evening peak hour. The delay equating to Level of Service "F" is attributable to that single left-turning vehicle.

All other movements operate at Levels of Service "C" or better during the analyzed peak periods. See Table III for the individual movement Levels of Service and delays.

Randolph Road and Apgar Drive

Apgar Drive intersects Randolph Road to form a three-leg unsignalized intersection with the westbound approach of Apgar Drive operating under stop control. Randolph Road provides one shared through/right turn lane in the northbound direction and one shared left turn/through lane in the southbound direction. Apgar Drive provides one shared left turn/right turn lane in the westbound direction.

A review of the existing analysis reveals that all movements operate at Levels of Service "B" or better during the analyzed peak periods. See Table III for the individual movement Levels of Service and delays.

Apgar Drive and Riverview Drive/PSE&G Driveway

Riverview Drive/the PSE&G driveway intersect Apgar Drive to form a four-leg unsignalized intersection with Riverview Drive/the PSE&G driveway operating under stop control. The eastbound approach of Riverview Drive provides a shared left turn/through/right turn lane. The westbound approach of the PSE&G driveway provides a shared left turn/through/right turn lane. The northbound and southbound approaches of Apgar Drive each provide a shared left turn/through/right turn lane.

A review of the existing analysis reveals that all movements operate at Levels of Service "A" during the analyzed peak periods. See Table III for the individual movement Levels of Service and delays.

Apgar Drive and Site Driveway/Newtech Driveway

The site driveway/the Newtech driveway intersect Apgar Drive to form a four-leg unsignalized intersection with the site driveway/the Newtech driveway operating under stop control. The eastbound approach of the site driveway provides a shared left turn/through/right turn lane. The westbound approach of the Newtech driveway provides a shared left turn/through/right turn lane. The northbound and southbound approaches of Apgar Drive each provide a shared left turn/through/right turn lane.

A review of the existing analysis reveals that all movements operate at Levels of Service "A" during the analyzed peak periods. See Table III for the individual movement Levels of Service and delays.

FUTURE CONDITIONS

Traffic volumes and operational analyses were developed for both the No Build and Build conditions. The No Build conditions provide a baseline for assessing the impact of the site development traffic on the roadway system. The process of developing the No Build and Build traffic volumes and the subsequent analyses is outlined below.

Regardless of whether the subject site is developed or not, traffic volumes on the surrounding roadways are expected to increase as a result of developments throughout the region. A growth rate for roadways within the study area was obtained from the NJDOT Annual Background Growth Rate Table, which indicates a growth rate of 1.75% per year.

It should be noted that the *Traffic Impact Study* prepared by this firm for a development located along the west side of Randolph Road just west of the subject site, was referenced in order to identify adjacent developments in the vicinity of the site. Through this reference, there are seven (7) developments that have been approved but not yet constructed that are identified as a potential significant traffic generator, along with the proposed development for which the study was prepared. Each of the adjacent developments are shown below. It was assumed that the background growth rate was adequate to account for the traffic associated with all developments not listed hereafter.

- A residential development known as Summerfields at Franklin, located along Randolph Road and along Schoolhouse Road, has been approved. The development at the time of the traffic counts was approximately 80% occupied. Projections of the associated traffic volumes were taken from the technical appendix of a traffic study for the subject site, titled Traffic Impact Analysis for 495 Weston Canal Road – Proposed Distribution Center, prepared by Dolan & Dean Consulting Engineers, LLC, dated February 15, 2013. The Adjacent Development Traffic Volumes at the study intersections from this development are shown on Figure 3.

- A development consisting of a 31,500 SF shopping center, located adjacent to the Summerfields residential development at the intersection of Randolph Road and Schoolhouse Road, has been approved. Projections of the associated traffic volumes were taken from the updated traffic analysis for the site, prepared by Dolan & Dean Consulting Engineers, LLC, in a letter to the Franklin Township Planning Board, dated December 4, 2014. The Adjacent Development Traffic Volumes at the study intersections from this development are shown on Figure 4.

- Two phases of a residential development known as Canal Walk consisting of 63 age-restricted, single-family detached homes and 62 age-restricted condominiums, located along Schoolhouse Road, has been approved. Projections of the associated traffic volumes were developed using Institute of Transportation Engineers (ITE) publication *Trip Generation, 10th Edition* for Land Use Code (LUC) 251 – Senior Adult Housing – Detached and LUC 252 – Senior Adult Housing – Attached. The Adjacent Development Traffic Volumes at the study intersections from this development are shown on Figure 5.

- A development consisting of a 79,725 SF warehouse, known as GFA Warehouse, located at 415 Weston Canal Road, has been approved. Projections of the associated traffic volumes were developed using LUC 150 – Warehousing. The Adjacent Development Traffic Volumes at the study intersections from this development are shown on Figure 6.

- A development consisting of three warehouse buildings totaling 1,233,132 SF, known as Bridgepoint Somerset, located along the west side of Randolph Road and the south side of Weston Canal Road, has been approved. Projections of the associated traffic volumes were developed using trip generation methodologies as outlined in the *Traffic Impact Study,* last revised September 7, 2018 prepared by this firm. The Adjacent Development Traffic Volumes at the study intersections from this development are shown on Figures 7 and 8.

- A development consisting of a 88,457 SF warehouse expansion, known as Ferraro, located at 600 Cottontail Lane, has been approved. It should be noted that trips associated with this project are not anticipated to travel through any of the study intersections, therefore it was not considered for analysis purposes.

- A development consisting of a 201,210 SF warehouse expansion, known as Nissan, located at 1501 Cottontail Lane, has been approved. It should be noted that trips associated with this project are not anticipated to travel through any of the study intersections, therefore it was not considered for analysis purposes.

- A development consisting of a warehouse, known as 928 Holdings, located at 480 Elizabeth Avenue, has been approved. It should be noted that trips associated with this project are not anticipated to travel through any of the study intersections, therefore it was not considered for analysis purposes.

Additionally, the adjacent warehouse report also lists multiple roadway improvements in the vicinity of the site that were considered for the No Build and Build analyses, described below.

- A two-way center left-turn lane along the adjacent site frontage – This lane will enhance access to/from not only the subject site, but also the driveways and roadways opposite the subject site. Two-way center left-turn lanes have the unique capability of improving not only ingress movements but also egress movements while not impacting through traffic. This configuration is ideally suited for the type of situation found along Randolph Road where the intersecting driveways and streets are primarily unidirectional during peak hours (i.e. primarily inbound in the morning and outbound in the evening).

- Improvements at Weston Canal Road & Randolph Road – Traffic signal timing and phasing adjustments will accommodate site generated traffic during peak hours and will greatly enhance operations at this intersection at all other times of day. Extending the left-turn lane for movements into Randolph Road from Weston Canal Road will ensure through traffic along Weston Canal Road is not impeded by site generated traffic of the Project.

- Signalization of Randolph Road & Schoolhouse Road – Installing a traffic signal at this location can relieve the delay for vehicles exiting Randolph Road and minimally impact through movements along Schoolhouse Road.

- Signal timing adjustments at Weston Canal Road & Schoolhouse Road – Future Levels of Service can be improved with adjustments to the traffic signal timing.

It should be noted that the signalization of Randolph Road and Schoolhouse Road as well as the signal timing adjustments at Weston Canal Road and Schoolhouse Road do not affect any of the study intersections and therefore were not considered for analysis purposes. Future No Build traffic volumes were developed by applying the background growth rate of 1.75% for two (2) years to the study area roadways existing traffic volumes and adding the traffic volumes associated with the Adjacent Development. Figure 9, in Appendix A, shows the Total Adjacent Development traffic volumes and Figure 10 shows the No Build traffic volumes.

Traffic Generation

Projections of future traffic volumes were developed utilizing data as published in the Institute of Transportation Engineers (ITE) publication *Trip Generation, 10th Edition* under Land Use Code (LUC) 150 – Warehousing and LUC 710 – General Office Building. ITE indicates that warehouses are defined as facilities primarily devoted to the storage of goods, and typically have an office component which is ancillary to the warehouse use and comprises of up to 10% of the total building area. Therefore, trip generation estimates for the existing building were made utilizing both LUC 150 and LUC 710, considering the office portion of the building as a separate land use. Trip generation estimates for the proposed building were made utilizing LUC 150 due to the ancillary office space being less than 10% of the total building. Table IV summarizes the projected trips generated by the proposed development utilizing the ITE data.

Table IV
Trip Generation

Trip Type	AM PSH			PM PSH		
	In	Out	Total	In	Out	Total
141,343 SF Warehouse	32	10	42	12	33	45
47,306 SF Office	61	10	71	9	47	56
Total	**93**	**20**	**113**	**21**	**80**	**101**

It should be noted that the trip generation provided in Table IV above does not represent the net increase of the site. As mentioned earlier, the site is currently developed with a warehouse/office building and as such has an existing trip generation potential. The following Table V compares the proposed use to the existing use utilizing ITE trip generation. It should be noted that the existing breakdown of office and warehouse space in building 1 is unclear and the office component may be more than 10%. However, projections for the existing building are made as all warehouse space which presumes a smaller office component.

Table V
Existing vs. Proposed Trip Generation Comparison

Trip Type	AM PSH			PM PSH		
	In	Out	Total	In	Out	Total
141,343 SF Warehouse & 47,306 SF Office *(Existing + Proposed)*	93	20	113	21	80	101
109,269 SF Warehouse *(Existing)*	29	9	38	11	30	41
Difference	**+64**	**+11**	**+75**	**+10**	**+50**	**+60**

As shown in the table above, the proposed redevelopment is anticipated to generate a maximum of 75 additional primary trips during the morning peak hour and 60 additional primary trips during the afternoon peak hour. It should be noted that the difference in number of new trips falls below the industry accepted standard of a significant increase in traffic of 100 trips. Based on *Transportation Impact Analysis for Site Development*, published by the ITE "it is suggested that a transportation impact study be conducted whenever a proposed development will generate 100 or more added (new) trips during the adjacent roadways' peak hour or the development's peak hour." Additionally, NJDOT has determined that the same 100 vehicle threshold is considered a "significant increase in traffic," hence, it is not anticipated that the change in use have any perceptible impact on the traffic operation of the adjacent roadway network. However, no credit was taken for the existing use of the property and all trips are considered an increase over vacant land. This accounts for a "worst case scenario" from a traffic impact perspective.

Once the magnitude of traffic to be generated by the site is known, it is necessary to assign that traffic to the adjacent street system. The distribution of new traffic to the surrounding roadways is based on the previously prepared *Traffic Impact Study* prepared by this firm for the adjacent warehouse development as detailed above. Within the report, a detailed journey to work model prepared for commuters with a place of work in Franklin Township, Somerset County as obtained from the US Census Bureau. Due to the anticipated origins and destinations for trucks accessing the site, separate trip distributions were prepared for passenger cars and trucks for the proposed development. The following table summarizes the anticipated trip distribution for The Project.

Table VI
Trip Distribution

TO/FROM	PERCENTAGE			
	Cars		Trucks	
	In	Out	In	Out
North via I-287	18%	18%	25%	25%
South via I-287	33%	34%	50%	50%
West via Manville Causeway	10%	10%	0%	0%
West via Mettlers Road	11%	10%	0%	0%
East via Schoolhouse Road/Pierce Street	24%	24%	25%	25%
East via Weston Canal	4%	4%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**

Located in Appendix A, Figure 11 illustrates the car site generated volumes, Figure 12 illustrates the truck site generated volumes, and Figure 13 illustrates the total site generated volumes assigned to the study area network. As mentioned previously, 20% of the site generated trips were assumed to be trucks which is consistent with data published by the ITE for warehouse type uses. The site generated volumes were added to the Future No Build traffic volumes to generate the Future Build traffic volumes, which are shown in Figure 14.

Future Capacity Analysis

Operational conditions at the study intersections were analyzed under the No Build and Build conditions and are summarized in Table VII below.

Table VII
Future Levels of Service

Intersection	Direction/ Movement		AM PSH		PM PSH	
			No Build	Build	No Build	Build
Weston Canal Road & Randolph Road	EB	TR	E (71)	E (74)	D (39)	D (40)
	WB	L	E (65)	E (65)	A (5)	A (5)
		T	A (1)	A (1)	B (10)	B (10)
	NB	L	D (39)	D (39)	D (43)	D (44)
		R	B (18)	B (18)	C (27)	C (27)
	Overall		D (51)	D (53)	C (21)	C (21)
Weston Canal Road & Apgar Drive	WB	LT	c (17)	c (20)	b (13)	b (13)
	NB	L	f (232)	f (367)	a (0)	a (0)
		R	c (21)	c (22)	f (65)	f (130)
Randolph Road & Apgar Drive	WB	LR	c (23)	c (24)	d (25)	d (33)
	SB	LT	a (8)	a (8)	b (11)	b (11)
Apgar Drive & Riverview Drive/PSE&G Driveway	EB	LTR	a (9)	a (10)	a (10)	a (10)
	WB	LTR	a (9)	a (10)	a (10)	b (10)
	NB	LTR	a (7)	a (8)	a (8)	a (8)
	SB	LTR	a (7)	a (7)	a (8)	a (8)
Apgar Drive & Site Driveway/Newtech Driveway	EB	LTR	a (9)	a (10)	a (10)	b (10)
	WB	LTR	a (9)	a (9)	a (10)	a (10)
	NB	LTR	a (0)	a (8)	a (0)	a (8)
	SB	LTR	a (7)	a (7)	a (0)	a (0)
Riverview Drive & Site Driveway	WB	LT	-	a (7)	-	a (7)
	NB	LR	-	a (9)	-	a (9)

A (#) - Signalized Intersection Level of Service (seconds of delay per vehicle)
a (#) - Unsignalized Intersection Level of Service (seconds of delay per vehicle)

Weston Canal Road (CR 623) and Randolph Road

With the addition of site generated traffic and consideration of the aforementioned roadway improvements, all intersection movements are anticipated to continue operating at No Build Level of Service "E" or better during the studied peak hours. See Table VII for the individual movement Levels of Service and delays.

Weston Canal Road (CR 623) and Apgar Drive

With the addition of site generated traffic and consideration of the aforementioned roadway improvements, the northbound right turn movement is anticipated to continue operating at Level of Service "F" during the PM peak hour. Additionally, the northbound left turn movement is anticipated to continue operating at Level of Service "F" during the AM peak hour for the single vehicle performing this turning movement. No traffic performs the northbound left turn movement under existing conditions during the PM peak hour and only one (1) vehicle performed the left-turn during the AM peak hour. As the peak hour traffic associated with the proposed project will be almost entirely comprised of employees who will become familiar with the surrounding area, it is expected that the minimal traffic oriented towards the south on Weston Canal Road will avail themselves of the protection of the signal at Randolph Road to turn left onto Weston Canal Road; therefore, no site generated traffic from The Project is anticipated to be added to this movement. All other movements are anticipated to operate at Level of Service "C" or better during the peak hours studied.

As previously mentioned, it is anticipated that the Apgar Drive approach northbound movements will operate at better than the theoretically calculated weekday morning peak hour results due to the presence of platooned traffic flow along Weston Canal Road and likely acceptance of smaller gaps as is typical in the northeast and with increased driver familiarity with the roadway network. Additionally, the cross access to the adjacent property will allow access to the signalized intersection at Randolph Road as an alternative to accomplish this movement.

Additionally, in considering the theoretical capacity analysis results related to the LOS "F" conditions identified for the Apgar Drive right turn, it is important to note that the calculated average vehicle delays begin to lose mathematical significance as one proceeds deeper into the LOS "F" range. Small increases in volume can result in disproportionally large increases in average vehicle delay. Related to the subject project, the site generated traffic added to the Apgar Drive right turn movement is only 45 trips in the PM peak hour and the calculated increase in 95th percentile queue is approximately four (4) vehicles. See Table VII for the individual movement Levels of Service and delays.

Randolph Road and Apgar Drive

With the addition of site generated traffic and consideration of the aforementioned roadway improvements, all intersection movements are anticipated to continue operating at No Build at Levels of Service "D" or better during the peak hours studied. See Table VII for the individual movement Levels of Service and delays.

Apgar Drive and Riverview Drive/the PSE&G Driveway

With the addition of site generated traffic and consideration of the aforementioned roadway improvements, all intersection movements are anticipated to operate at Levels of Service "B" or better during the peak hours studied. See Table VII for the individual movement Levels of Service and delays.

Apgar Drive and the Site Driveway/Newtech Driveway

With the addition of site generated traffic and consideration of the aforementioned roadway improvements, all intersection movements are anticipated to operate at Levels of Service "B" or better during the peak hours studied. See Table VII for the individual movement Levels of Service and delays.

Riverview Drive and the Site Driveway

The site driveway is proposed to intersect Riverview Drive to form an unsignalized T-intersection with the site driveway under stop control. The eastbound and westbound approaches of Riverview will provide a shared through/right turn lane and a shared left turn/through lane, respectively. The northbound approach of the site driveway will provide a shared lane for left and right turns.

As designed, all intersection movements will operate at Level of Service "A" during the studied peak hours. See Table VII for the individual movement Levels of Service and delays.

SITE PLAN

Site Access and Circulation

The site plan was reviewed with respect to the site access and on-site circulation design. As noted previously, access to The Project will continue to be provided via one (1) full movement driveway along Riverview Drive, one (1) full movement driveway along Apgar Drive and one (1) full movement driveway along a neighboring access drive which connects to Riverview Drive.

Review of the site plan design indicates that the site can sufficiently accommodate, within paved areas, the anticipated tractor trailer activity which is appropriately separated from passenger vehicle circulation and parking. The parking lot will be serviced by parking aisles with minimum widths of 24', which require a design waiver from the Ordinance's minimum requirement of 26'. It should be noted that the 24' aisles will allow for two-way circulation and 90 degree parking and will provide for the safe and efficient movement of the automobile traffic anticipated. Note that 24' aisles are only proposed in the passenger car parking areas and have not been designed to accommodate truck traffic. Therefore, efficient circulation will be provided for both passenger vehicles and heavy trucks throughout the site.

Parking

The Franklin Township Ordinance sets forth a parking requirement of 1 parking space per 250 square feet for office uses and 1 parking space per 1,000 square feet for the first 5,000 square feet, then 1 space for each 2,500 square foot thereafter for warehouse uses. This equates to a parking requirement of 209 spaces for the proposed 52,306 SF of office space and 58 spaces for the proposed 136,343 SF of warehouse space, or a total of 267 spaces. The site as proposed provides 119 parking spaces and as such a variance is required.

In order to satisfy the parking requirement, excess parking spaces located at the adjacent properties at 50 and 100 Randolph Road will be utilized. 100 Randolph provides 117 parking spaces in excess of the parking requirement and 50 Randolph provides 31 excess parking spaces, for a total of 148 parking spaces. The 119 proposed parking spaces and 148 excess parking spaces to be utilized on the adjacent properties equate to a total parking supply of 267 parking spaces for the site. With the utilization of the excess parking spaces, the Ordinance requirement of 267 parking spaces is met.

Additionally, as mentioned previously, ITE indicates that warehouse uses typically have an office component which is ancillary to the warehouse use, and is consistent with the proposed development. National parking demand data has been collected by the ITE within their publication *Parking Generation, 5th Edition.* This publication establishes peak parking demands for multiple land uses based upon different independent variables, such as GFA and employees. For LUC 150 – Warehousing, ITE sets forth an average peak parking demand of 0.39 vehicles per 1,000 SF of GFA and for LUC 710 – General Office Building, ITE sets forth an average peak parking demand of 2.39 vehicles per 1,000 SF. Considering all of the proposed building as a warehouse based upon the guidance set forth by ITE, this equates to a parking demand of 55 parking spaces for the 141,343 SF of warehouse space and 113 parking spaces for the 47,306 SF of exclusive office space, or a total of 168 parking spaces. The proposed parking accommodations equating to a total of 267 parking spaces is more than sufficient to support the ITE peak parking demand of 168 parking spaces.

It is proposed to provide parking stalls with dimensions of 9'x18', which satisfy the Ordinance minimum requirement of 9'x18'.

FINDINGS & CONCLUSIONS

Findings

Based upon the detailed analyses as documented herein, the following findings are noted:

- The Project will generate a maximum of 93 entering trips and 20 exiting trips during weekday morning peak hour and 21 entering and 80 exiting trips during evening peak hour.

- Access to the site is proposed to continue to be provided via one (1) full movement driveway along Riverview Drive, one (1) full movement driveway along Apgar Drive and one (1) full movement driveway along a neighboring access drive which connects to Riverview Drive.

- With the addition of site generated traffic and consideration of future roadway improvements, all intersection movements of Weston Canal Road (CR 623) and Randolph Road are anticipated to continue operating at No Build Levels of Service "E" or better during the peak hours studied.

- With the addition of site generated traffic and consideration of future roadway improvements, all intersection movements of Weston Canal Road (CR 623) and Apgar Drive are anticipated to operate at Levels of Service "C" or better with the exception of the northbound left and right turn movements, which operate at Level of Service "F". It should be noted that only 1 vehicle performed the left turn movement onto Weston Canal Road (CR 623) during the morning peak hour and 0 during the evening peak hour. Additionally, due to the presence of platooned traffic along Weston Canal Road (CR 623), it is anticipated that the northbound movements operate at better than the theoretically calculated results.

- With the addition of site generated traffic and consideration of future roadway improvements, all intersection movements of Randolph Road and Apgar Drive are anticipated to continue operating at No Build Levels of Service "D" or better during the peak hours studied.

- With the addition of site generated traffic and consideration of future roadway improvements, all intersection movements of Apgar Drive and Riverview Drive/the PSE&G Driveway are anticipated to operate at Levels of Service "B" or better during the peak hours studied.

- With the addition of site generated traffic and consideration of future roadway improvements, all intersection movements of Apgar Drive and the site driveway/Newtech Driveway are anticipated to operate at Levels of Service "B" or better during the peak hours studied.

- As designed, all intersection movements of Riverview Drive and the site driveway are anticipated to operate at Levels of Service "A" during the peak hours studied.

- The proposed increase in vehicular traffic along Weston Canal Road is not anticipated to have an adverse impact on the nearby Delaware and Raritan Canal State Park.

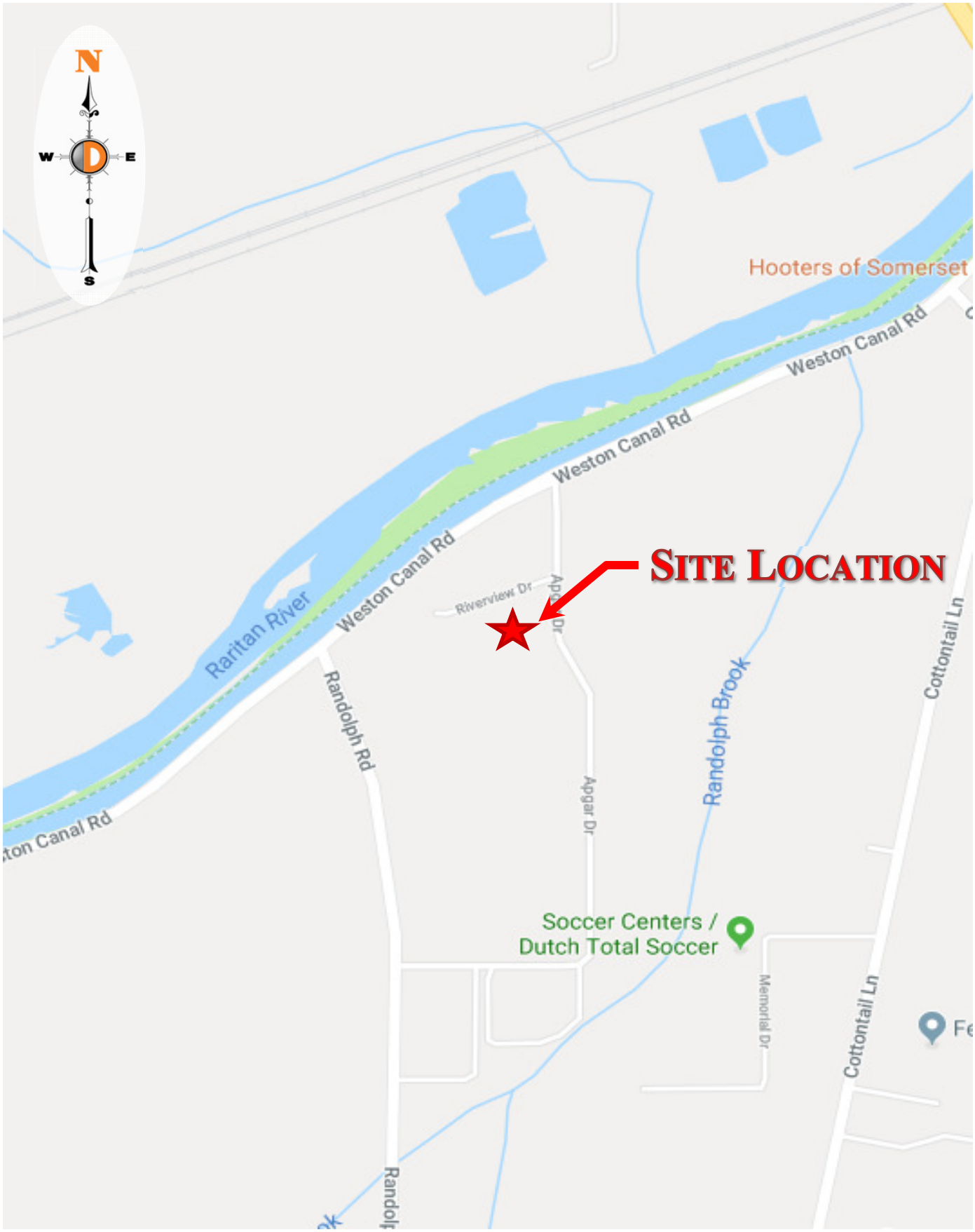
- As proposed, The Project's site driveways and internal circulation have been designed to provide for safe and efficient movement of automobiles and large wheel base vehicles.

- The proposed parking supply, inclusive of the excess parking spaces on the adjacent properties, and design is sufficient to support the projected demand.

Conclusions

Based upon our Traffic Impact Study as detailed in the body of this report, it is the professional opinion of Dynamic Traffic, LLC that the adjacent street system of the Township of Franklin and Somerset County will not experience any significant degradation in operating conditions nor will the Delaware and Raritan Canal State Park experience any adverse impacts. The site driveways are located to provide safe and efficient access to the adjacent roadway system. The site plan as proposed provides for good circulation throughout the site and provides adequate parking to accommodate The Project's needs.

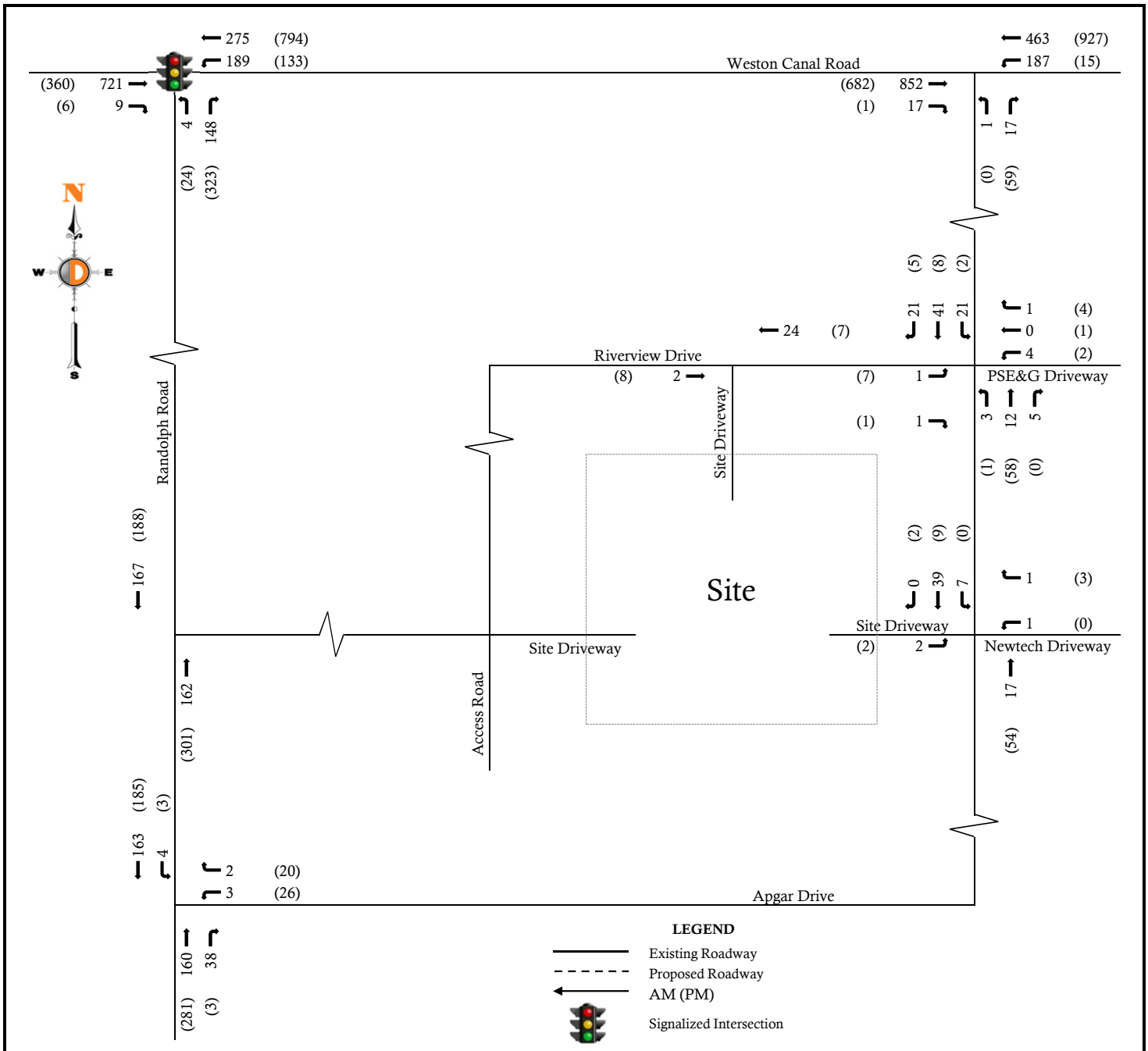
Appendix A
Traffic Volume Figures



Proposed Warehouse Development
Traffic Impact Study
0206-99-002T
5/7/2020

Figure 1

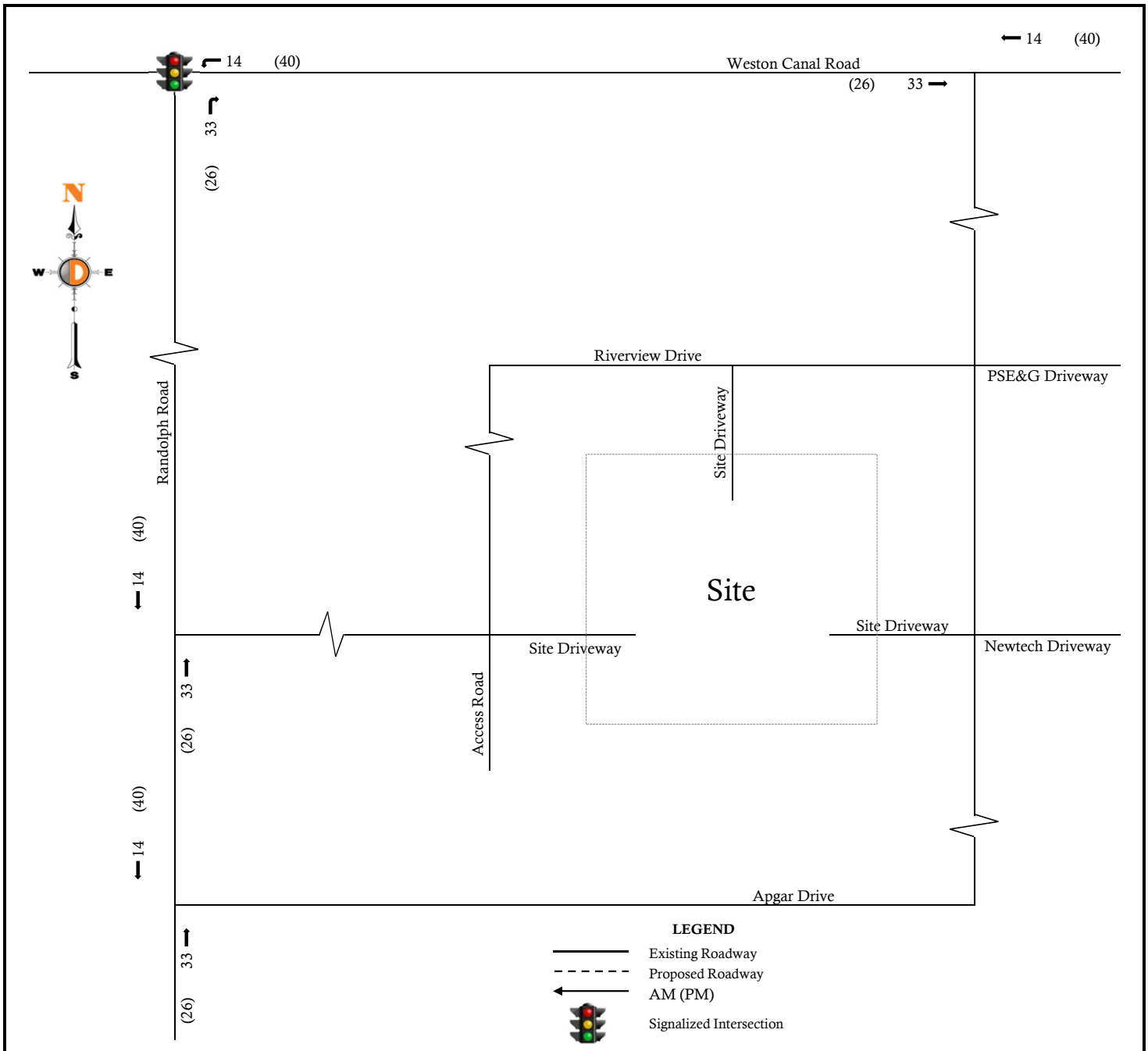
Site Location Map



Proposed Warehouse Development
Traffic Impact Study
0206-99-002T
5/7/2020

Figure 2

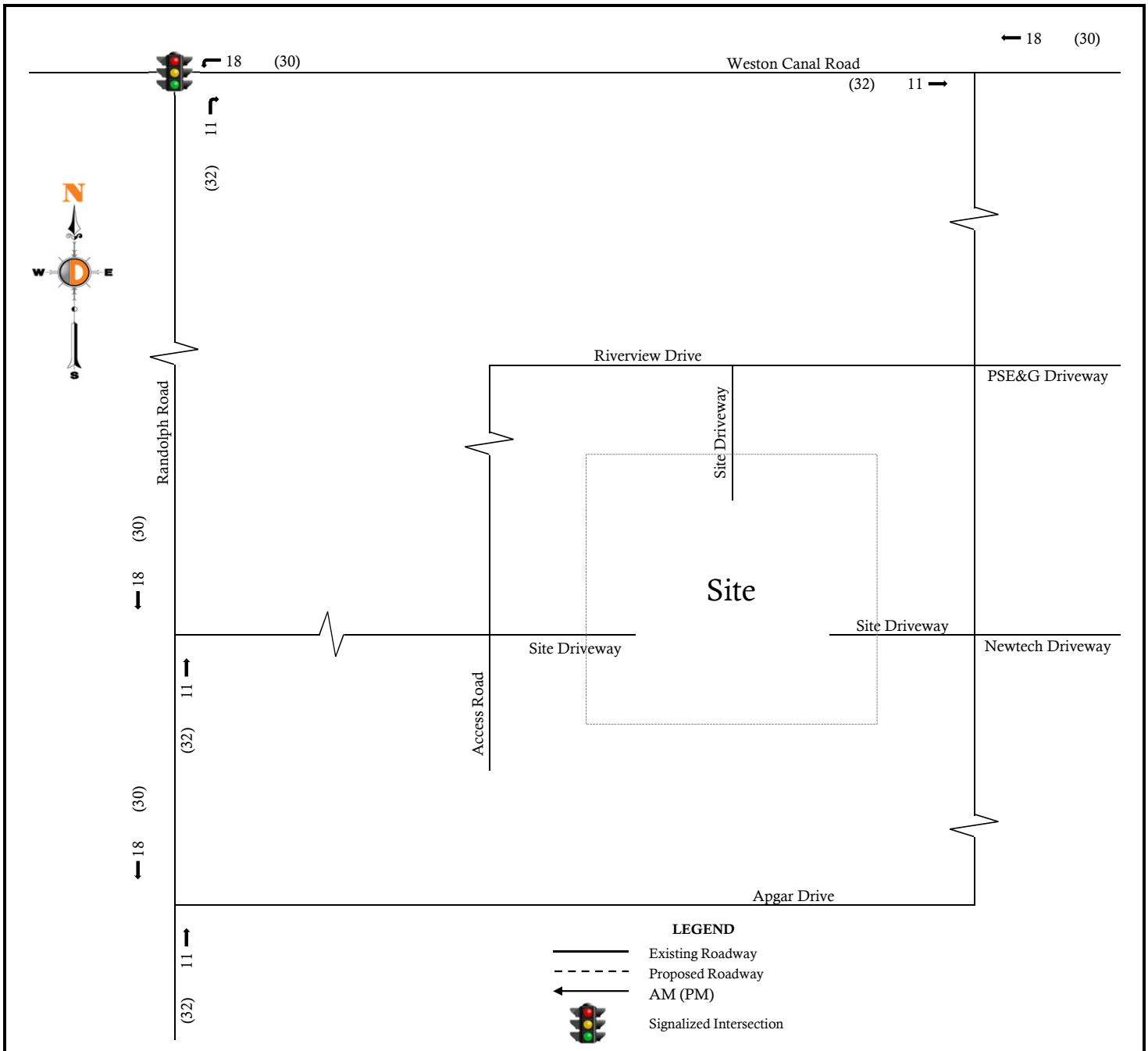
Existing Traffic Volumes



Proposed Warehouse Development
Traffic Impact Study
0206-99-002T
5/7/2020

Figure 3

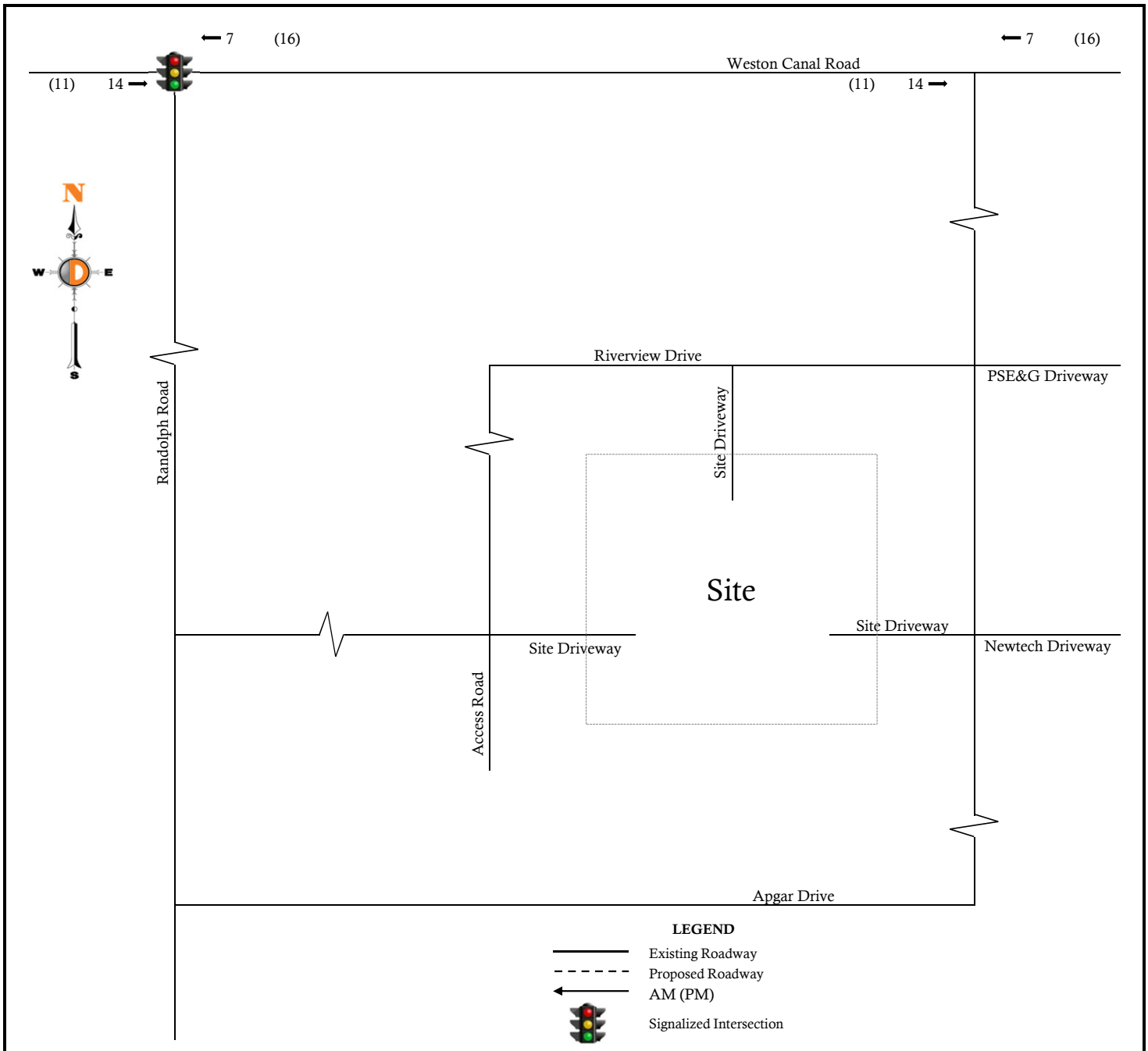
Adjacent Development Traffic Volumes
[Summerfields at Franklin]



Proposed Warehouse Development
Traffic Impact Study
0206-99-002T
5/7/2020

Figure 4

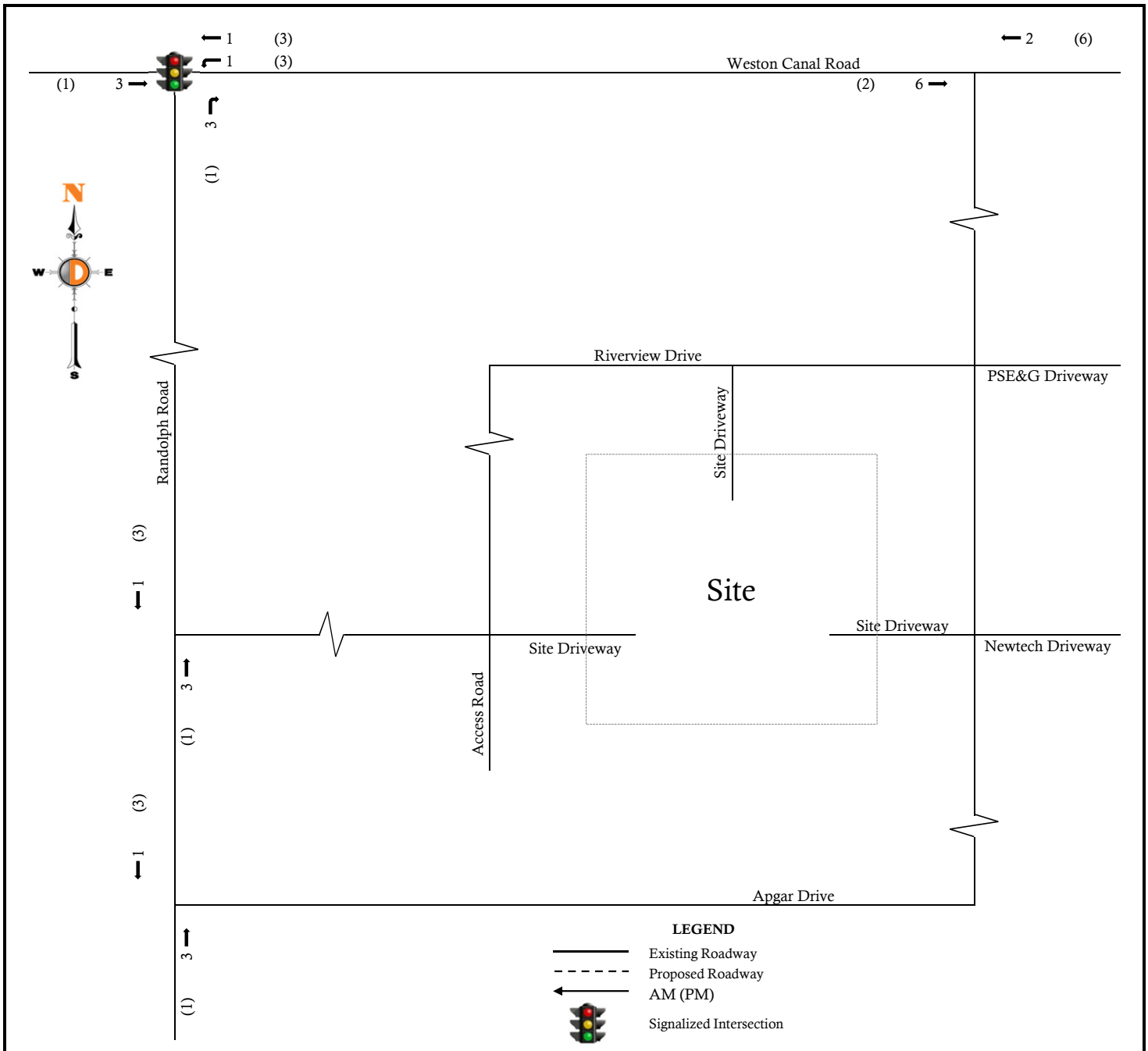
Adjacent Development Traffic Volumes [Summerfields Retail]



Proposed Warehouse Development
Traffic Impact Study
0206-99-002T
5/7/2020

Figure 5

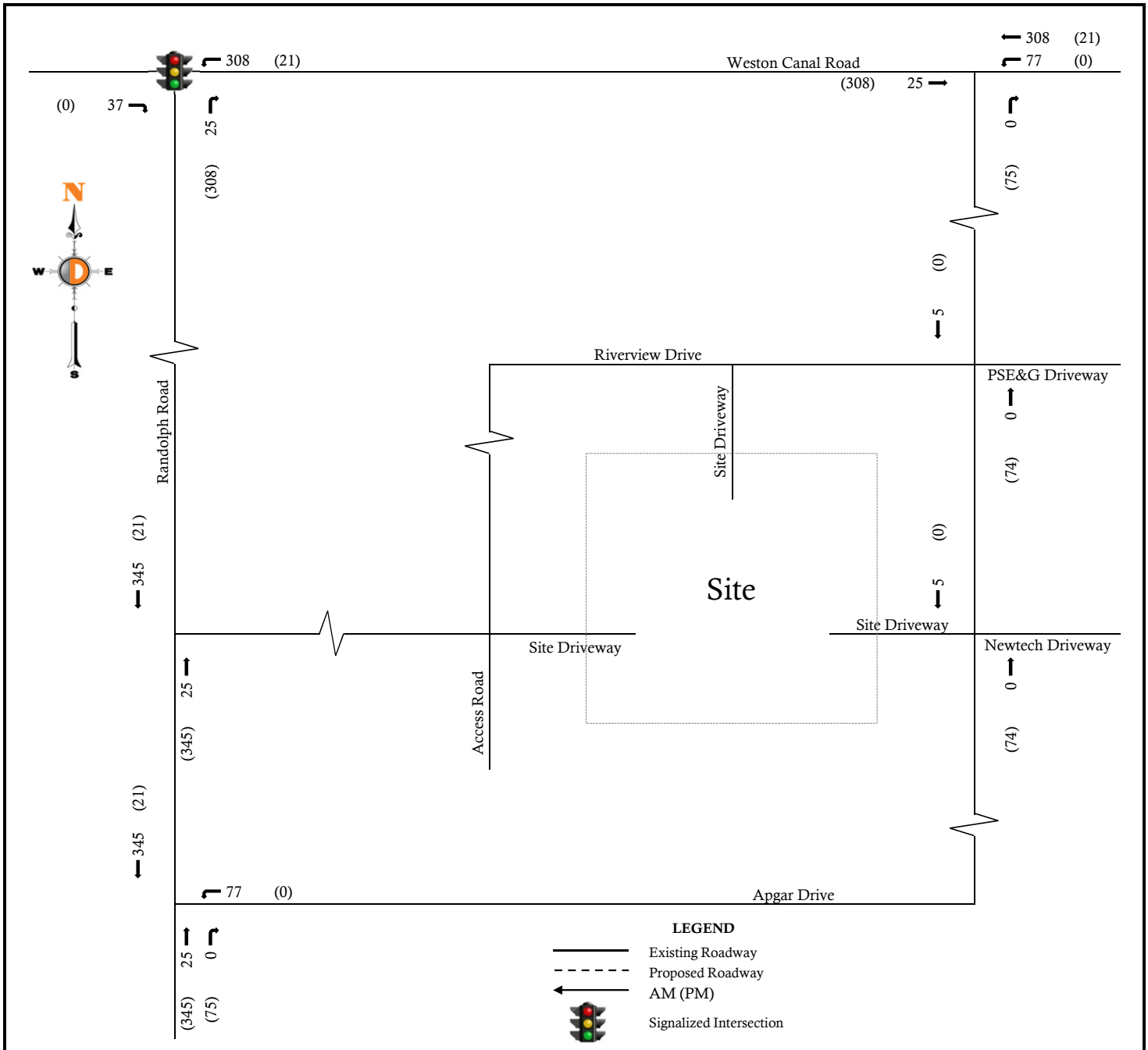
Adjacent Development Traffic Volumes [Canal Walk]



Proposed Warehouse Development
Traffic Impact Study
0206-99-002T
5/7/2020

Figure 6

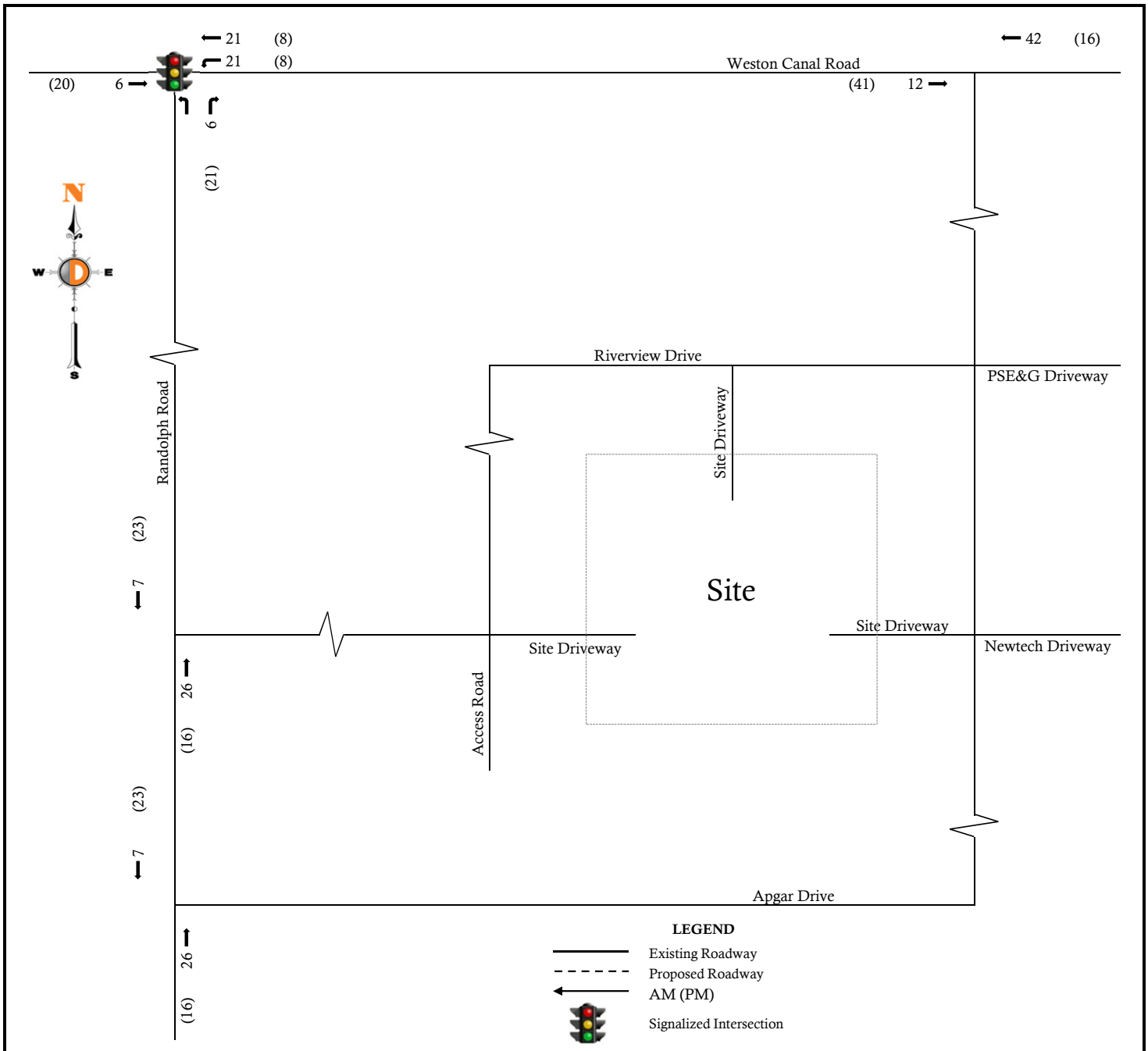
Adjacent Development Traffic Volumes
[GFA Warehosue]



Proposed Warehouse Development
Traffic Impact Study
0206-99-002T
5/7/2020

Figure 7

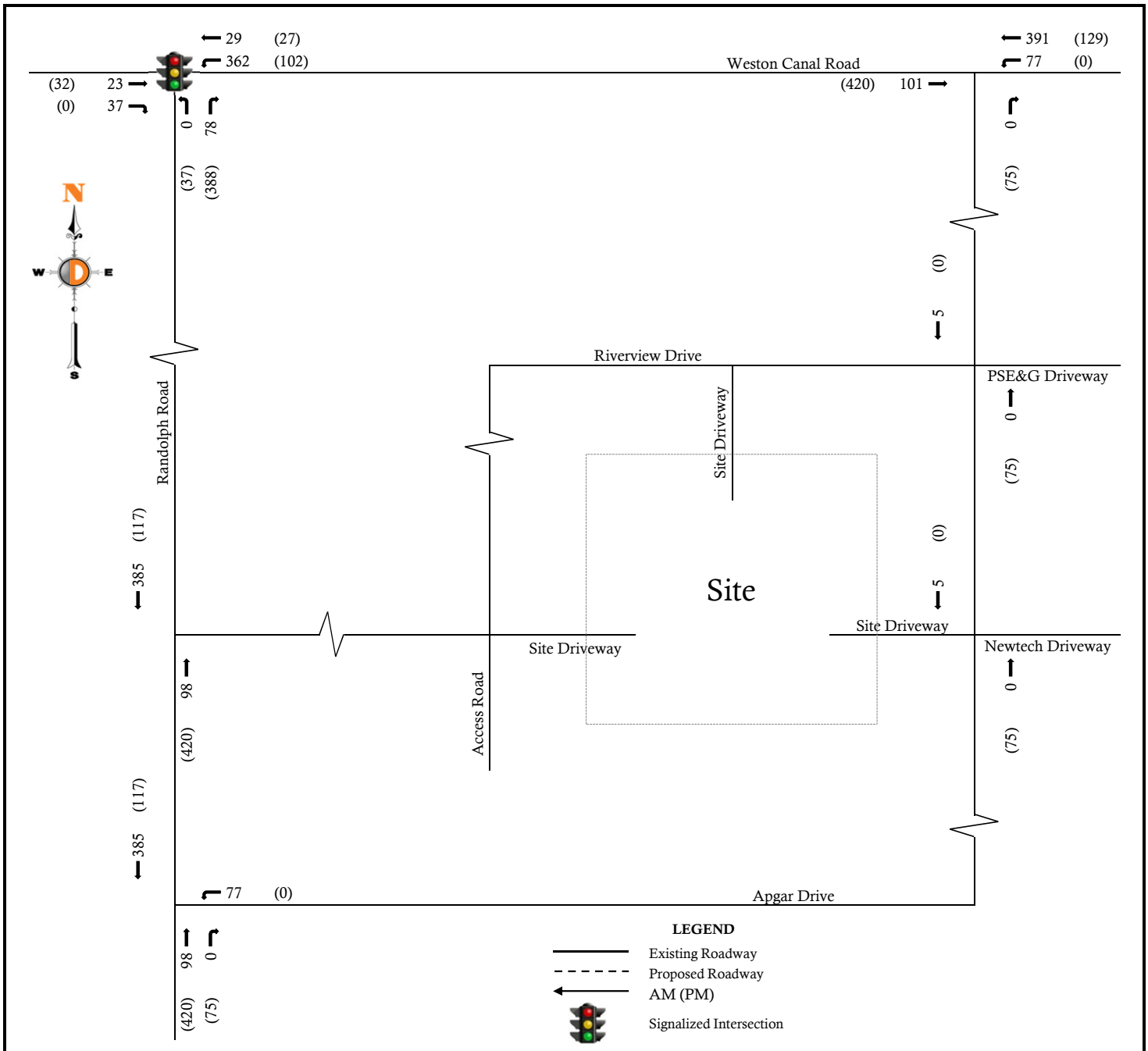
Adjacent Development Traffic Volumes
[Bridgepoint Somerset AMZ]



Proposed Warehouse Development
Traffic Impact Study
0206-99-002T
5/7/2020

Figure 8

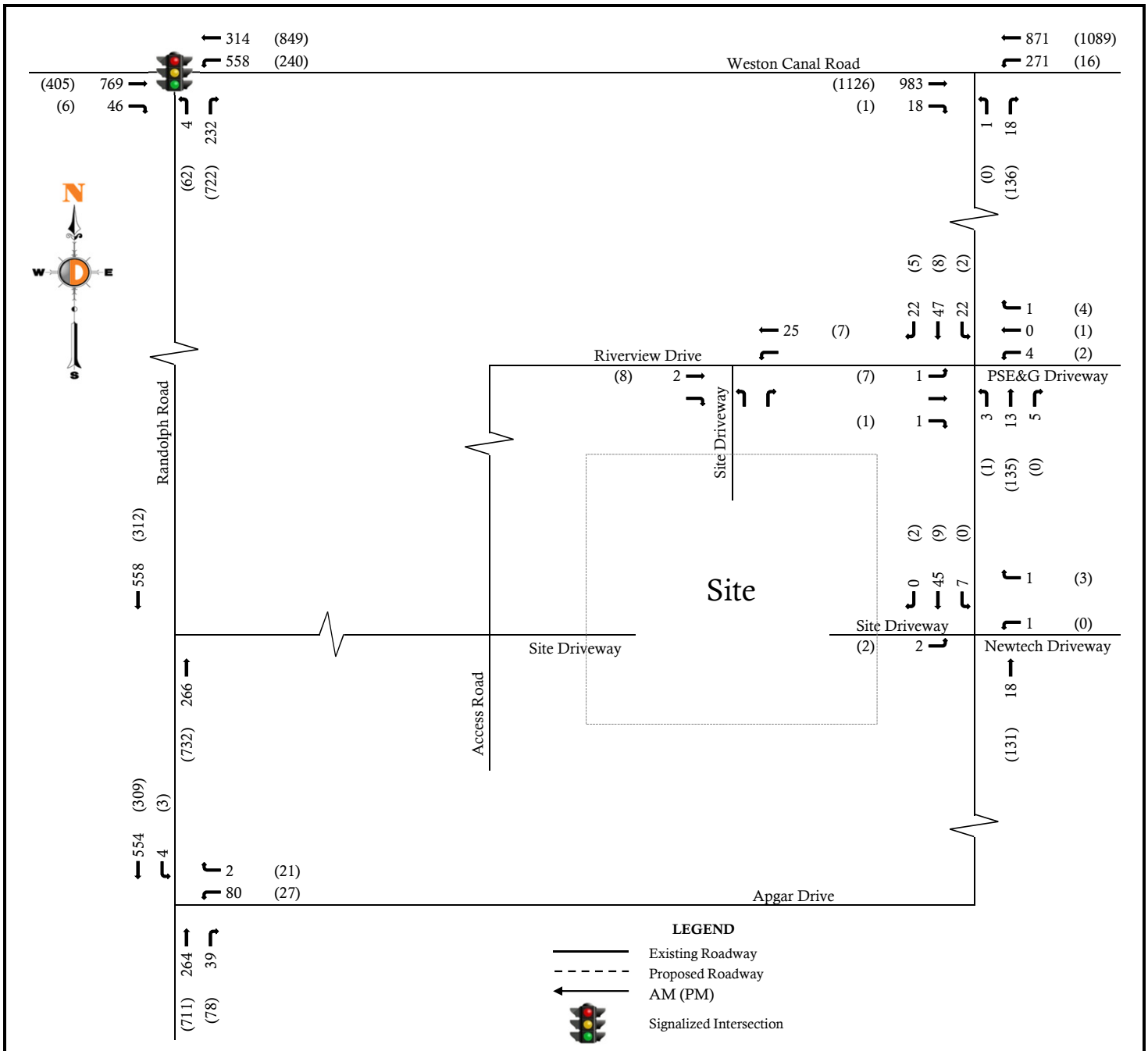
Adjacent Development Traffic Volumes
[Bridgepoint Somerset Warehouse]



Proposed Warehouse Development
Traffic Impact Study
0206-99-002T
5/7/2020

Figure 9

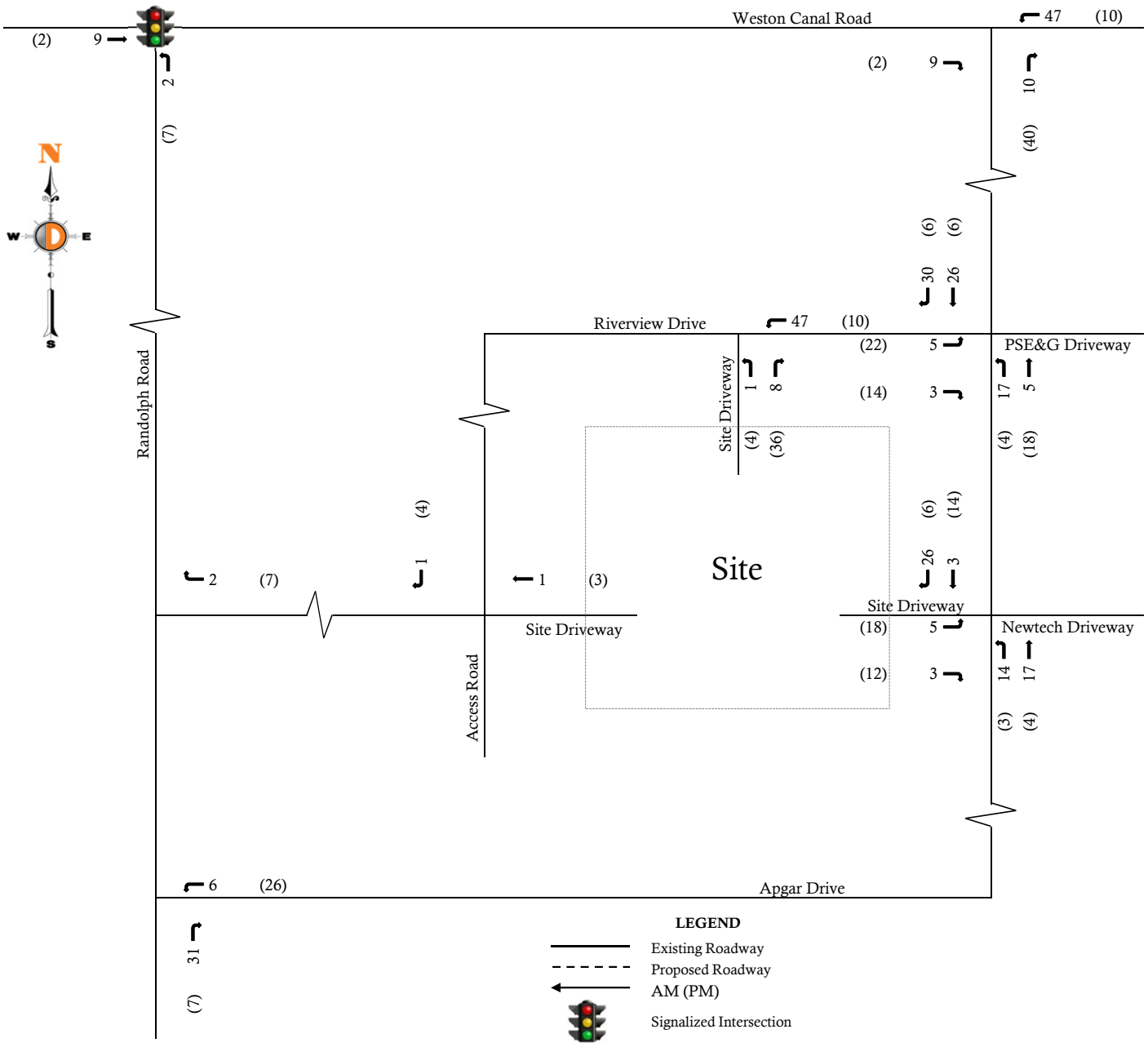
Adjacent Development Traffic Volumes [TOTAL]



Proposed Warehouse Development
Traffic Impact Study
0206-99-002T
5/7/2020

Figure 10

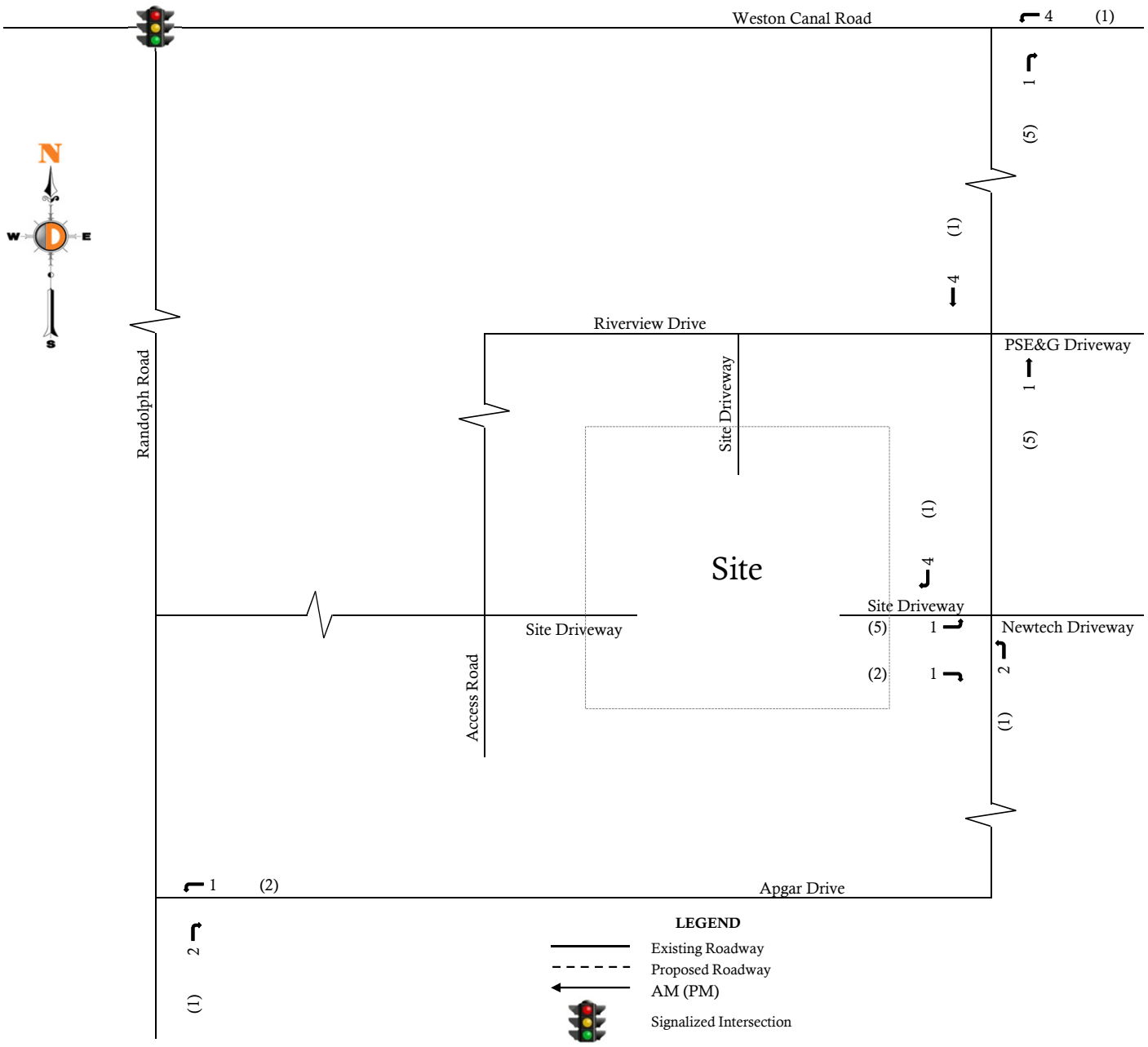
No Build Traffic Volumes



Proposed Warehouse Development
Traffic Impact Study
0206-99-002T
5/7/2020

Figure 11

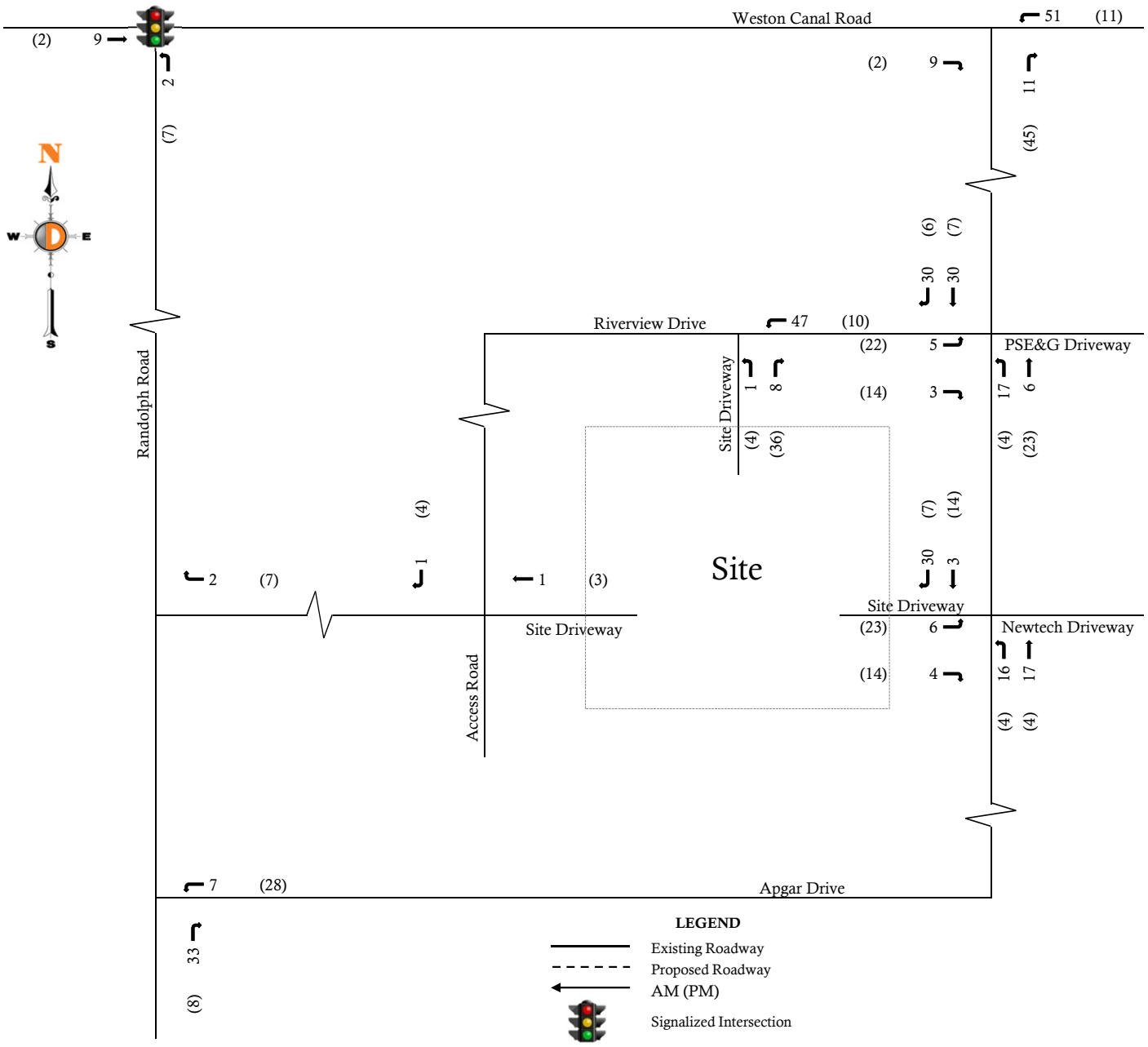
Car Site Generated Trips



Proposed Warehouse Development
Traffic Impact Study
0206-99-002T
5/7/2020

Figure 12

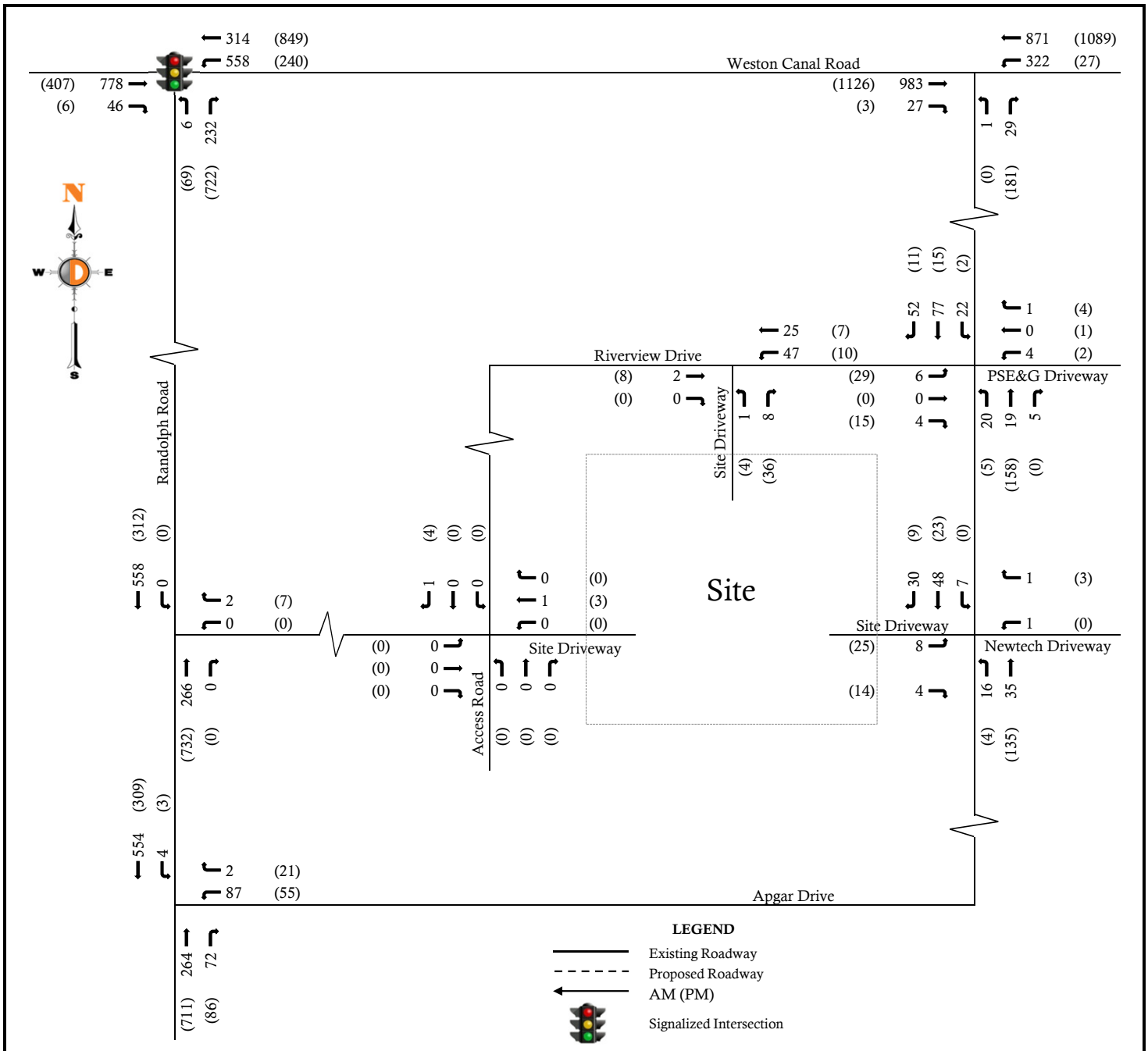
Truck Site Generated Trips



Proposed Warehouse Development
Traffic Impact Study
0206-99-002T
5/7/2020

Figure 13

Total Site Generated Trips



Proposed Warehouse Development
Traffic Impact Study
0206-99-002T
5/7/2020

Figure 14

Build Traffic Volumes

Appendix B
Traffic Counts

Dynamic Traffic, LLC

1904 Main Street, Lake Como, NJ 07719
245 Main Street - Suite 110, Chester, NJ 07930
732-681-0760

E/W: Weston Canal Rd
N/S: Apgar Dr
Town/County: Franklin/Somerset
Job #: 1313-99-010T

File Name : Weston Canal Rd & Apgar Dr AM & PM
Site Code : 00000000
Start Date : 7/10/2018
Page No : 1

Groups Printed- Cars - Single Unit Trucks - Tractor Trailers

	Weston Canal Road (CR 623) Eastbound					Weston Canal Road (CR 623) Westbound					Apgar Drive Northbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:30 AM	0	160	10	0	170	59	102	0	0	161	1	0	9	0	10	341
06:45 AM	0	176	5	0	181	71	111	0	0	182	0	0	1	0	1	364
Total	0	336	15	0	351	130	213	0	0	343	1	0	10	0	11	705
07:00 AM	0	227	0	0	227	40	111	0	0	151	0	0	1	0	1	379
07:15 AM	0	282	2	0	284	17	107	0	0	124	0	0	6	0	6	414
07:30 AM	0	262	0	0	262	25	88	0	0	113	0	0	3	0	3	378
07:45 AM	0	282	6	0	288	17	109	0	0	126	0	0	6	0	6	420
Total	0	1053	8	0	1061	99	415	0	0	514	0	0	16	0	16	1591
08:00 AM	0	233	4	0	237	27	80	0	0	107	0	0	6	0	6	350
08:15 AM	0	239	5	0	244	27	89	0	0	116	0	0	4	0	4	364
08:30 AM	0	241	0	0	241	29	100	0	0	129	0	0	9	0	9	379
08:45 AM	0	208	2	0	210	29	97	0	0	126	4	0	27	0	31	367
Total	0	921	11	0	932	112	366	0	0	478	4	0	46	0	50	1460
*** BREAK ***																
04:30 PM	0	183	0	0	183	9	207	0	0	216	0	0	12	1	13	412
04:45 PM	0	182	3	0	185	6	197	0	0	203	0	0	14	1	15	403
Total	0	365	3	0	368	15	404	0	0	419	0	0	26	2	28	815
05:00 PM	0	179	1	0	180	1	189	0	0	190	0	0	26	0	26	396
05:15 PM	0	199	0	0	199	3	217	0	0	220	0	0	10	0	10	429
05:30 PM	0	155	0	0	155	5	239	0	0	244	0	0	14	0	14	413
05:45 PM	0	149	0	0	149	6	241	0	0	247	0	0	9	0	9	405
Total	0	682	1	0	683	15	886	0	0	901	0	0	59	0	59	1643
06:00 PM	0	139	1	0	140	5	220	0	0	225	3	0	11	0	14	379
06:15 PM	0	121	0	0	121	3	205	0	0	208	0	0	5	0	5	334
Grand Total	0	3617	39	0	3656	379	2709	0	0	3088	8	0	173	2	183	6927
Apprch %	0	98.9	1.1	0		12.3	87.7	0	0		4.4	0	94.5	1.1		
Total %	0	52.2	0.6	0	52.8	5.5	39.1	0	0	44.6	0.1	0	2.5	0	2.6	
Cars	0	3500	37	0	3537	363	2633	0	0	2996	6	0	145	2	153	6686
% Cars	0	96.8	94.9	0	96.7	95.8	97.2	0	0	97	75	0	83.8	100	83.6	96.5
Single Unit Trucks	0	89	2	0	91	11	56	0	0	67	2	0	23	0	25	183
% Single Unit Trucks	0	2.5	5.1	0	2.5	2.9	2.1	0	0	2.2	25	0	13.3	0	13.7	2.6
Tractor Trailers	0	28	0	0	28	5	20	0	0	25	0	0	5	0	5	58
% Tractor Trailers	0	0.8	0	0	0.8	1.3	0.7	0	0	0.8	0	0	2.9	0	2.7	0.8

Dynamic Traffic, LLC

1904 Main Street, Lake Como, NJ 07719
245 Main Street - Suite 110, Chester, NJ 07930
732-681-0760

E/W: Weston Canal Rd
N/S: Apgar Dr
Town/County: Franklin/Somerset
Job #: 1313-99-010T

File Name : Weston Canal Rd & Apgar Dr AM & PM Spot Count
Site Code : 00000000
Start Date : 3/7/2019
Page No : 1

Groups Printed- Cars - Single Unit Trucks - Tractor Trailers

	Weston Canal Road (CR 623) Eastbound					Weston Canal Road (CR 623) Westbound					Apgar Drive Northbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	216	2	0	218	29	113	0	0	142	0	0	4	0	4	364
07:15 AM	0	265	3	0	268	24	99	0	0	123	1	0	4	0	5	396
07:30 AM	0	246	4	0	250	33	105	0	0	138	0	0	6	0	6	394
07:45 AM	0	298	2	0	300	27	123	0	0	150	0	0	8	0	8	458
Total	0	1025	11	0	1036	113	440	0	0	553	1	0	22	0	23	1612
*** BREAK ***																
05:00 PM	0	169	2	0	171	5	205	0	0	210	2	0	21	0	23	404
05:15 PM	0	192	1	0	193	2	216	0	0	218	0	0	17	0	17	428
05:30 PM	0	170	1	0	171	5	225	0	0	230	1	0	10	0	11	412
05:45 PM	0	179	0	0	179	4	229	0	0	233	0	0	13	0	13	425
Total	0	710	4	0	714	16	875	0	0	891	3	0	61	0	64	1669
Grand Total	0	1735	15	0	1750	129	1315	0	0	1444	4	0	83	0	87	3281
Apprch %	0	99.1	0.9	0		8.9	91.1	0	0		4.6	0	95.4	0		
Total %	0	52.9	0.5	0	53.3	3.9	40.1	0	0	44	0.1	0	2.5	0	2.7	
Cars	0	1684	15	0	1699	122	1288	0	0	1410	3	0	73	0	76	3185
% Cars	0	97.1	100	0	97.1	94.6	97.9	0	0	97.6	75	0	88	0	87.4	97.1
Single Unit Trucks	0	39	0	0	39	2	19	0	0	21	1	0	6	0	7	67
% Single Unit Trucks	0	2.2	0	0	2.2	1.6	1.4	0	0	1.5	25	0	7.2	0	8	2
Tractor Trailers	0	12	0	0	12	5	8	0	0	13	0	0	4	0	4	29
% Tractor Trailers	0	0.7	0	0	0.7	3.9	0.6	0	0	0.9	0	0	4.8	0	4.6	0.9

Dynamic Traffic, LLC

1904 Main Street, Lake Como, NJ 07719
245 Main Street - Suite 110, Chester, NJ 07930
732-681-0760

E/W: Weston Canal Rd
N/S: Randolph Rd
Town/County: Franklin/Somerset
Job #: 1313-99-010T

File Name : Randolph Rd & Weston Canal Rd - AM&PM
Site Code : 00000000
Start Date : 3/14/2018
Page No : 1

Groups Printed- Cars - Trucks

	Weston Canal Rd Eastbound					Weston Canal Rd Westbound					Randolph Rd Northbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	177	1	0	178	41	71	0	0	112	0	0	35	0	35	325
07:15 AM	0	203	5	0	208	49	55	0	0	104	1	0	50	0	51	363
07:30 AM	0	222	1	0	223	37	55	0	0	92	2	0	44	0	46	361
07:45 AM	0	240	6	0	246	57	42	0	0	99	0	0	37	0	37	382
Total	0	842	13	0	855	184	223	0	0	407	3	0	166	0	169	1431
08:00 AM	0	217	7	0	224	36	41	0	0	77	1	0	43	0	44	345
08:15 AM	0	172	3	0	175	37	38	0	0	75	3	0	46	0	49	299
08:30 AM	0	191	4	0	195	31	44	0	0	75	3	0	26	0	29	299
08:45 AM	0	171	3	0	174	25	54	0	0	79	6	0	34	0	40	293
Total	0	751	17	0	768	129	177	0	0	306	13	0	149	0	162	1236
*** BREAK ***																
04:30 PM	0	105	3	0	108	27	183	0	0	210	10	0	71	0	81	399
04:45 PM	0	95	3	0	98	31	210	0	0	241	3	0	52	0	55	394
Total	0	200	6	0	206	58	393	0	0	451	13	0	123	0	136	793
05:00 PM	0	84	2	0	86	33	174	0	0	207	10	0	136	0	146	439
05:15 PM	0	94	1	0	95	30	210	0	0	240	5	0	62	0	67	402
05:30 PM	0	91	0	0	91	28	191	0	0	219	4	0	78	0	82	392
05:45 PM	0	80	1	0	81	32	219	0	0	251	5	0	47	0	52	384
Total	0	349	4	0	353	123	794	0	0	917	24	0	323	0	347	1617
06:00 PM	0	97	2	0	99	34	210	0	0	244	2	0	60	0	62	405
06:15 PM	0	99	3	0	102	36	206	0	0	242	2	0	46	0	48	392
Grand Total	0	2338	45	0	2383	564	2003	0	0	2567	57	0	867	0	924	5874
Apprch %	0	98.1	1.9	0		22	78	0	0		6.2	0	93.8	0		
Total %	0	39.8	0.8	0	40.6	9.6	34.1	0	0	43.7	1	0	14.8	0	15.7	
Cars	0	2298	42	0	2340	554	1973	0	0	2527	55	0	854	0	909	5776
% Cars	0	98.3	93.3	0	98.2	98.2	98.5	0	0	98.4	96.5	0	98.5	0	98.4	98.3
Trucks	0	40	3	0	43	10	30	0	0	40	2	0	13	0	15	98
% Trucks	0	1.7	6.7	0	1.8	1.8	1.5	0	0	1.6	3.5	0	1.5	0	1.6	1.7

Dynamic Traffic, LLC

1904 Main Street, Lake Como, NJ 07719
245 Main Street - Suite 110, Chester, NJ 07930
732-681-0760

E/W: Weston Canal Rd
N/S: Randolph Rd
Town/County: Franklin/Somerset
Job #: 1313-99-010T

File Name : Randolph Rd & Weston Canal Rd - AM&PM Spot Count
Site Code : 00000000
Start Date : 3/7/2019
Page No : 1

Groups Printed- Cars - Trucks

	Weston Canal Rd Eastbound					Weston Canal Rd Westbound					Randolph Rd Northbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	188	3	0	191	44	60	0	0	104	2	0	45	0	47	342
07:15 AM	0	206	2	0	208	42	58	0	0	100	1	0	39	0	40	348
07:30 AM	0	213	5	0	218	50	60	0	0	110	0	0	56	0	56	384
07:45 AM	0	223	4	0	227	54	58	0	0	112	2	0	49	0	51	390
Total	0	830	14	0	844	190	236	0	0	426	5	0	189	0	194	1464
*** BREAK ***																
05:00 PM	0	84	2	0	86	36	190	0	0	226	4	0	89	0	93	405
05:15 PM	0	90	1	0	91	30	195	0	0	225	7	0	82	0	89	405
05:30 PM	0	97	1	0	98	22	183	0	0	205	5	0	70	0	75	378
05:45 PM	0	91	1	0	92	27	191	0	0	218	8	0	57	0	65	375
Total	0	362	5	0	367	115	759	0	0	874	24	0	298	0	322	1563
Grand Total	0	1192	19	0	1211	305	995	0	0	1300	29	0	487	0	516	3027
Apprch %	0	98.4	1.6	0		23.5	76.5	0	0		5.6	0	94.4	0		
Total %	0	39.4	0.6	0	40	10.1	32.9	0	0	42.9	1	0	16.1	0	17	
Cars	0	1174	17	0	1191	300	986	0	0	1286	27	0	478	0	505	2982
% Cars	0	98.5	89.5	0	98.3	98.4	99.1	0	0	98.9	93.1	0	98.2	0	97.9	98.5
Trucks	0	18	2	0	20	5	9	0	0	14	2	0	9	0	11	45
% Trucks	0	1.5	10.5	0	1.7	1.6	0.9	0	0	1.1	6.9	0	1.8	0	2.1	1.5

Dynamic Traffic, LLC

1904 Main Street, Lake Como, NJ 07719
245 Main Street - Suite 110, Chester, NJ 07930
732-681-0760

E/W: Apgar Drive
N/S: Randolph Road
Town/County: Franklin/Somerset
Job #: 1313-99-010T

File Name : Randolph Rd & Apgar Dr AM & PM
Site Code : 00000000
Start Date : 7/10/2018
Page No : 1

Groups Printed- Cars - Single Unit Trucks - Tractor Trailers

	Apgar Drive Westbound					Randolph Road Northbound					Randolph Road Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:30 AM	0	0	1	0	1	0	28	10	0	38	0	27	0	0	27	66
06:45 AM	3	0	1	0	4	0	31	14	0	45	0	39	0	0	39	88
Total	3	0	2	0	5	0	59	24	0	83	0	66	0	0	66	154
07:00 AM	0	0	0	0	0	0	44	8	0	52	0	38	0	0	38	90
07:15 AM	0	0	0	0	0	0	57	6	0	63	4	29	0	0	33	96
07:30 AM	4	0	0	0	4	0	53	8	0	61	4	24	0	0	28	93
07:45 AM	3	0	0	0	3	0	54	9	0	63	10	43	0	0	53	119
Total	7	0	0	0	7	0	208	31	0	239	18	134	0	0	152	398
08:00 AM	3	0	2	0	5	0	53	18	0	71	5	34	0	0	39	115
08:15 AM	2	0	2	0	4	0	38	6	0	44	6	29	0	0	35	83
08:30 AM	2	0	3	0	5	0	44	18	0	62	3	18	0	0	21	88
08:45 AM	6	0	2	0	8	0	39	8	0	47	4	26	0	0	30	85
Total	13	0	9	0	22	0	174	50	0	224	18	107	0	0	125	371
*** BREAK ***																
04:30 PM	5	0	12	0	17	0	58	1	0	59	2	37	0	0	39	115
04:45 PM	4	0	3	0	7	0	53	3	0	56	2	37	0	0	39	102
Total	9	0	15	0	24	0	111	4	0	115	4	74	0	0	78	217
05:00 PM	15	0	7	0	22	0	83	1	0	84	1	36	0	0	37	143
05:15 PM	2	0	4	0	6	0	69	2	0	71	1	48	0	0	49	126
05:30 PM	7	0	6	0	13	0	76	0	0	76	0	44	0	0	44	133
05:45 PM	2	0	3	0	5	0	53	0	0	53	1	57	0	0	58	116
Total	26	0	20	0	46	0	281	3	0	284	3	185	0	0	188	518
06:00 PM	2	0	0	0	2	0	49	2	0	51	2	51	0	0	53	106
06:15 PM	6	0	1	0	7	0	37	1	0	38	1	31	0	0	32	77
Grand Total	66	0	47	0	113	0	919	115	0	1034	46	648	0	0	694	1841
Apprch %	58.4	0	41.6	0		0	88.9	11.1	0		6.6	93.4	0	0		
Total %	3.6	0	2.6	0	6.1	0	49.9	6.2	0	56.2	2.5	35.2	0	0	37.7	
Cars	62	0	46	0	108	0	886	111	0	997	44	621	0	0	665	1770
% Cars	93.9	0	97.9	0	95.6	0	96.4	96.5	0	96.4	95.7	95.8	0	0	95.8	96.1
Single Unit Trucks	4	0	1	0	5	0	17	4	0	21	0	13	0	0	13	39
% Single Unit Trucks	6.1	0	2.1	0	4.4	0	1.8	3.5	0	2	0	2	0	0	1.9	2.1
Tractor Trailers	0	0	0	0	0	0	16	0	0	16	2	14	0	0	16	32
% Tractor Trailers	0	0	0	0	0	0	1.7	0	0	1.5	4.3	2.2	0	0	2.3	1.7

Dynamic Traffic, LLC

1904 Main Street, Lake Como, NJ 07719
245 Main Street - Suite 110, Chester, NJ 07930
732-681-0760

E/W: Apgar Drive
N/S: Randolph Road
Town/County: Franklin/Somerset
Job #: 1313-99-010T

File Name : Randolph Rd & Apgar Dr AM & PM Spot Count
Site Code : 00000000
Start Date : 3/12/2019
Page No : 1

Groups Printed- Cars - Single Unit Trucks - Tractor Trailers

	Apgar Drive Westbound					Randolph Road Northbound					Randolph Road Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	2	0	0	0	2	0	45	7	0	52	3	28	0	0	31	85
07:15 AM	2	0	0	0	2	0	48	9	0	57	2	40	0	0	42	101
07:30 AM	1	0	1	0	2	0	64	5	0	69	5	36	0	0	41	112
07:45 AM	3	0	0	0	3	0	58	5	0	63	7	43	0	0	50	116
Total	8	0	1	0	9	0	215	26	0	241	17	147	0	0	164	414
*** BREAK ***																
05:00 PM	6	0	5	0	11	0	68	4	0	72	0	36	0	0	36	119
05:15 PM	16	0	10	0	26	0	76	0	0	76	2	32	0	0	34	136
05:30 PM	9	0	8	0	17	0	82	1	0	83	1	51	0	0	52	152
05:45 PM	3	0	6	0	9	0	67	1	0	68	1	46	0	0	47	124
Total	34	0	29	0	63	0	293	6	0	299	4	165	0	0	169	531
Grand Total	42	0	30	0	72	0	508	32	0	540	21	312	0	0	333	945
Apprch %	58.3	0	41.7	0		0	94.1	5.9	0		6.3	93.7	0	0		
Total %	4.4	0	3.2	0	7.6	0	53.8	3.4	0	57.1	2.2	33	0	0	35.2	
Cars	39	0	28	0	67	0	487	27	0	514	20	302	0	0	322	903
% Cars	92.9	0	93.3	0	93.1	0	95.9	84.4	0	95.2	95.2	96.8	0	0	96.7	95.6
Single Unit Trucks	3	0	2	0	5	0	12	5	0	17	1	3	0	0	4	26
% Single Unit Trucks	7.1	0	6.7	0	6.9	0	2.4	15.6	0	3.1	4.8	1	0	0	1.2	2.8
Tractor Trailers	0	0	0	0	0	0	9	0	0	9	0	7	0	0	7	16
% Tractor Trailers	0	0	0	0	0	0	1.8	0	0	1.7	0	2.2	0	0	2.1	1.7

Dynamic Traffic, LLC

1904 Main Street, Lake Como, NJ 07719
245 Main Street - Suite 110, Chester, NJ 07930
732-681-0760

E/W: Riverview Dr/PSE&G Driveway
N/S: Apgar Drive
Town/County: Franklin/Somerset
Job #: 0206-99-002T

File Name : Apgar Dr and Riverview Dr and PSEG Driveway - AM
Site Code : 00000000
Start Date : 3/12/2019
Page No : 1

Groups Printed- Cars - Trucks (SU) - Trucks (TT)

	Riverview Drive Eastbound					PSE&G Driveway Westbound					Apgar Drive Northbound					Apgar Drive Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:30 AM	1	0	0	0	1	1	0	0	0	1	1	4	1	0	6	6	8	5	0	19	27
06:45 AM	0	0	1	0	1	2	0	1	0	3	1	3	1	0	5	5	10	6	0	21	30
Total	1	0	1	0	2	3	0	1	0	4	2	7	2	0	11	11	18	11	0	40	57
07:00 AM	0	0	0	0	0	0	0	0	0	0	1	2	1	0	4	7	8	8	0	23	27
07:15 AM	0	0	0	0	0	1	0	0	0	1	0	3	2	0	5	3	8	2	0	13	19
07:30 AM	1	0	0	0	1	1	0	5	0	6	1	6	0	0	7	3	6	7	0	16	30
07:45 AM	0	0	1	0	1	2	0	8	0	10	2	2	0	0	4	5	13	19	0	37	52
Total	1	0	1	0	2	4	0	13	0	17	4	13	3	0	20	18	35	36	0	89	128
08:00 AM	0	0	0	0	0	0	0	0	0	0	1	3	0	0	4	4	10	12	0	26	30
08:15 AM	0	0	1	0	1	2	0	4	0	6	2	3	1	0	6	6	11	5	0	22	35
08:30 AM	1	0	0	0	1	0	0	1	0	1	2	4	1	0	7	3	8	9	0	20	29
08:45 AM	0	0	0	0	0	1	0	2	0	3	1	2	0	0	3	4	9	7	0	20	26
Total	1	0	1	0	2	3	0	7	0	10	6	12	2	0	20	17	38	33	0	88	120
Grand Total	3	0	3	0	6	10	0	21	0	31	12	32	7	0	51	46	91	80	0	217	305
Apprch %	50	0	50	0		32.3	0	67.7	0		23.5	62.7	13.7	0		21.2	41.9	36.9	0		
Total %	1	0	1	0	2	3.3	0	6.9	0	10.2	3.9	10.5	2.3	0	16.7	15.1	29.8	26.2	0	71.1	
Cars	3	0	3	0	6	10	0	21	0	31	12	26	4	0	42	46	81	80	0	207	286
% Cars	100	0	100	0	100	100	0	100	0	100	100	81.2	57.1	0	82.4	100	89	100	0	95.4	93.8
Trucks (SU)	0	0	0	0	0	0	0	0	0	0	0	3	3	0	6	0	6	0	0	6	12
% Trucks (SU)	0	0	0	0	0	0	0	0	0	0	0	9.4	42.9	0	11.8	0	6.6	0	0	2.8	3.9
Trucks (TT)	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	4	0	0	4	7
% Trucks (TT)	0	0	0	0	0	0	0	0	0	0	0	9.4	0	0	5.9	0	4.4	0	0	1.8	2.3

Dynamic Traffic, LLC

1904 Main Street, Lake Como, NJ 07719
245 Main Street - Suite 110, Chester, NJ 07930
732-681-0760

E/W: Riverview Dr/PSE&G Driveway
N/S: Apgar Drive
Town/County: Franklin/Somerset
Job #: 0206-99-002T

File Name : Apgar Dr and Riverview Dr and PSEG Driveway - PM
Site Code : 00000000
Start Date : 3/7/2019
Page No : 1

Groups Printed- Cars - Single Unit Trucks - Tractor Trailers

	Riverview Drive Eastbound					PSE&G Driveway Westbound					Apgar Drive Northbound					Apgar Drive Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:30 PM	7	0	2	0	9	1	1	1	0	3	0	12	0	0	12	1	1	2	0	4	28
04:45 PM	3	0	0	0	3	1	0	0	0	1	0	12	0	0	12	0	4	2	0	6	22
Total	10	0	2	0	12	2	1	1	0	4	0	24	0	0	24	1	5	4	0	10	50
05:00 PM	0	0	0	0	0	0	0	2	0	2	1	15	0	0	16	1	3	0	0	4	22
05:15 PM	1	0	0	0	1	0	0	0	0	0	0	13	0	0	13	0	1	2	0	3	17
05:30 PM	4	0	1	0	5	1	0	1	0	2	0	14	0	0	14	0	1	1	0	2	23
05:45 PM	2	0	0	0	2	1	1	1	0	3	0	16	0	0	16	1	3	2	0	6	27
Total	7	0	1	0	8	2	1	4	0	7	1	58	0	0	59	2	8	5	0	15	89
06:00 PM	3	0	1	0	4	1	0	1	0	2	1	17	0	0	18	1	2	3	0	6	30
06:15 PM	1	0	0	0	1	0	0	1	0	1	0	13	0	0	13	0	3	1	0	4	19
Grand Total	21	0	4	0	25	5	2	7	0	14	2	112	0	0	114	4	18	13	0	35	188
Apprch %	84	0	16	0		35.7	14.3	50	0		1.8	98.2	0	0		11.4	51.4	37.1	0		
Total %	11.2	0	2.1	0	13.3	2.7	1.1	3.7	0	7.4	1.1	59.6	0	0	60.6	2.1	9.6	6.9	0	18.6	
Cars	21	0	4	0	25	5	2	5	0	12	0	112	0	0	112	4	18	13	0	35	184
% Cars	100	0	100	0	100	100	100	71.4	0	85.7	0	100	0	0	98.2	100	100	100	0	100	97.9
Single Unit Trucks	0	0	0	0	0	0	0	2	0	2	2	0	0	0	2	0	0	0	0	0	4
% Single Unit Trucks	0	0	0	0	0	0	0	28.6	0	14.3	100	0	0	0	1.8	0	0	0	0	0	2.1
Tractor Trailers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Tractor Trailers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Dynamic Traffic, LLC

1904 Main Street, Lake Como, NJ 07719
245 Main Street - Suite 110, Chester, NJ 07930
732-681-0760

E/W: Site Driveway/Newtech Driveway
N/S: Apgar Drive
Town/County: Franklin/Somerset
Job #: 0206-99-002T

File Name : Apgar Dr and Site Driveway and Newtech Driveway - AM
Site Code : 00000000
Start Date : 3/12/2019
Page No : 1

Groups Printed- Cars - Trucks (SU) - Trucks (TT)

	Site Driveway Eastbound					Newtech Driveway Westbound					Apgar Drive Northbound					Apgar Drive Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:30 AM	0	0	0	0	0	1	0	0	0	1	0	4	0	0	4	2	8	0	0	10	15
06:45 AM	1	0	0	0	1	0	0	1	0	1	0	3	0	0	3	2	10	0	0	12	17
Total	1	0	0	0	1	1	0	1	0	2	0	7	0	0	7	4	18	0	0	22	32
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	9	0	0	11	12
07:15 AM	1	0	0	0	1	0	0	0	0	0	0	5	0	0	5	1	12	0	0	13	19
07:30 AM	0	0	0	0	0	1	0	0	0	1	0	4	0	0	4	3	10	0	0	13	18
07:45 AM	0	0	0	0	0	0	0	1	0	1	0	5	0	0	5	1	14	0	0	15	21
Total	1	0	0	0	1	1	0	1	0	2	0	15	0	0	15	7	45	0	0	52	70
08:00 AM	0	0	0	0	0	1	0	0	0	1	0	4	0	0	4	2	18	0	0	20	25
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	7	0	0	7	3	18	0	0	21	28
08:30 AM	1	0	0	0	1	0	0	0	0	0	0	4	0	0	4	0	20	0	0	20	25
08:45 AM	0	0	0	0	0	0	0	1	0	1	0	2	0	0	2	1	10	0	0	11	14
Total	1	0	0	0	1	1	0	1	0	2	0	17	0	0	17	6	66	0	0	72	92
Grand Total	3	0	0	0	3	3	0	3	0	6	0	39	0	0	39	17	129	0	0	146	194
Apprch %	100	0	0	0		50	0	50	0		0	100	0	0		11.6	88.4	0	0		
Total %	1.5	0	0	0	1.5	1.5	0	1.5	0	3.1	0	20.1	0	0	20.1	8.8	66.5	0	0	75.3	
Cars	3	0	0	0	3	3	0	3	0	6	0	27	0	0	27	17	118	0	0	135	171
% Cars	100	0	0	0	100	100	0	100	0	100	0	69.2	0	0	69.2	100	91.5	0	0	92.5	88.1
Trucks (SU)	0	0	0	0	0	0	0	0	0	0	0	9	0	0	9	0	7	0	0	7	16
% Trucks (SU)	0	0	0	0	0	0	0	0	0	0	0	23.1	0	0	23.1	0	5.4	0	0	4.8	8.2
Trucks (TT)	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	4	0	0	4	7
% Trucks (TT)	0	0	0	0	0	0	0	0	0	0	0	7.7	0	0	7.7	0	3.1	0	0	2.7	3.6

Dynamic Traffic, LLC

1904 Main Street, Lake Como, NJ 07719
245 Main Street - Suite 110, Chester, NJ 07930
732-681-0760

E/W: Site Driveway/Newtech Driveway
N/S: Apgar Driveway
Town/County: Franklin/Somerset
Job #: 0206-99-002T

File Name : Apgar Dr and Site Driveway and Newtech Driveway - PM
Site Code : 00000000
Start Date : 3/7/2019
Page No : 1

Groups Printed- Cars - Single Unit Trucks - Tractor Trailers

	Site Driveway Eastbound					Newtech Driveway Westbound					Apgar Drive Northbound					Apgar Drive Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	7	0	0	7	0	1	0	0	1	8
04:45 PM	1	0	0	0	1	0	0	1	0	1	0	6	0	0	6	1	2	0	0	3	11
Total	1	0	0	0	1	0	0	1	0	1	0	13	0	0	13	1	3	0	0	4	19
05:00 PM	0	0	0	0	0	0	0	2	0	2	0	12	0	0	12	0	3	1	0	4	18
05:15 PM	1	0	0	0	1	0	0	0	0	0	0	8	0	0	8	0	2	0	0	2	11
05:30 PM	1	0	0	0	1	0	0	1	0	1	0	10	0	0	10	0	2	1	0	3	15
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	9
Total	2	0	0	0	2	0	0	3	0	3	0	39	0	0	39	0	7	2	0	9	53
06:00 PM	1	0	0	0	1	0	0	0	0	0	0	5	0	0	5	2	3	0	0	5	11
06:15 PM	0	0	0	0	0	0	0	3	0	3	0	2	0	0	2	0	5	0	0	5	10
Grand Total	4	0	0	0	4	0	0	7	0	7	0	59	0	0	59	3	18	2	0	23	93
Apprch %	100	0	0	0		0	0	100	0		0	100	0	0		13	78.3	8.7	0		
Total %	4.3	0	0	0	4.3	0	0	7.5	0	7.5	0	63.4	0	0	63.4	3.2	19.4	2.2	0	24.7	
Cars	4	0	0	0	4	0	0	4	0	4	0	57	0	0	57	2	18	2	0	22	87
% Cars	100	0	0	0	100	0	0	57.1	0	57.1	0	96.6	0	0	96.6	66.7	100	100	0	95.7	93.5
Single Unit Trucks	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	1	0	0	0	1	3
% Single Unit Trucks	0	0	0	0	0	0	0	0	0	0	0	3.4	0	0	3.4	33.3	0	0	0	4.3	3.2
Tractor Trailers	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	3
% Tractor Trailers	0	0	0	0	0	0	0	42.9	0	42.9	0	0	0	0	0	0	0	0	0	0	3.2

Appendix C
Capacity Analysis

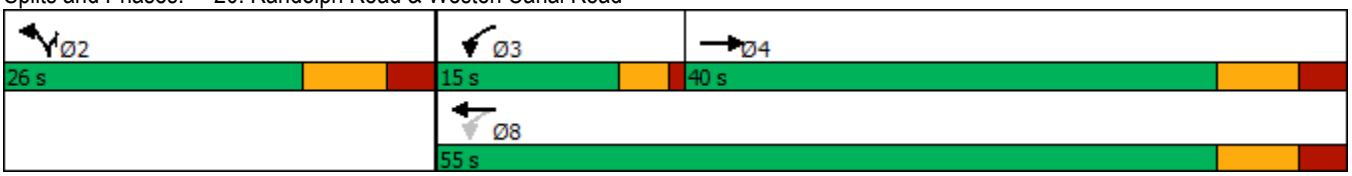
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	721	9	189	275	4	148
Future Volume (vph)	721	9	189	275	4	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	12	11	13
Grade (%)	0%			0%	-5%	
Storage Length (ft)		0	80		200	0
Storage Lanes		0	1		1	1
Taper Length (ft)			40		50	
Right Turn on Red		Yes				Yes
Link Speed (mph)	45			45	40	
Link Distance (ft)	1073			1539	823	
Travel Time (s)	16.3			23.3	14.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	0%	3%	3%	0%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	794	0	205	299	4	161
Turn Type	NA		pm+pt	NA	Prot	Prot
Protected Phases	4		3	8	2	2
Permitted Phases			8			
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	32.0		7.0	32.0	7.0	7.0
Minimum Split (s)	40.0		11.0	40.0	15.0	15.0
Total Split (s)	40.0		15.0	55.0	26.0	26.0
Total Split (%)	49.4%		18.5%	67.9%	32.1%	32.1%
Yellow Time (s)	5.0		3.0	5.0	5.0	5.0
All-Red Time (s)	3.0		1.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0		4.0	8.0	8.0	8.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	Max		None	Max	None	None
Act Effct Green (s)	34.6		51.0	47.0	7.5	7.5
Actuated g/C Ratio	0.49		0.72	0.67	0.11	0.11
v/c Ratio	0.88		0.59	0.24	0.02	0.50
Control Delay	30.7		13.4	5.4	28.2	11.4
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	30.7		13.4	5.4	28.2	11.4
LOS	C		B	A	C	B
Approach Delay	30.7			8.7	11.8	
Approach LOS	C			A	B	
Queue Length 50th (ft)	275		21	42	2	0
Queue Length 95th (ft)	#579		77	81	10	49
Internal Link Dist (ft)	993			1459	743	
Turn Bay Length (ft)			80		200	
Base Capacity (vph)	904		400	1229	456	552
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.88		0.51	0.24	0.01	0.29

Intersection Summary			
Area Type:	Other		
Cycle Length: 81			
Actuated Cycle Length: 70.5			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 21.0		Intersection LOS: C	
Intersection Capacity Utilization 71.5%		ICU Level of Service C	
Analysis Period (min) 15			

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

Splits and Phases: 20: Randolph Road & Weston Canal Road



Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	852	17	187	463	1	17
Future Vol, veh/h	852	17	187	463	1	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	180	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	4	0	1	5	0	24
Mvmt Flow	936	19	205	509	1	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	955	0	1865	946
Stage 1	-	-	-	-	946	-
Stage 2	-	-	-	-	919	-
Critical Hdwy	-	-	4.11	-	6.4	6.44
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.209	-	3.5	3.516
Pot Cap-1 Maneuver	-	-	724	-	81	289
Stage 1	-	-	-	-	381	-
Stage 2	-	-	-	-	392	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	724	-	58	289
Mov Cap-2 Maneuver	-	-	-	-	58	-
Stage 1	-	-	-	-	381	-
Stage 2	-	-	-	-	281	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.4	21.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	58	289	-	-	724	-
HCM Lane V/C Ratio	0.019	0.065	-	-	0.284	-
HCM Control Delay (s)	68.3	18.3	-	-	11.9	-
HCM Lane LOS	F	C	-	-	B	-
HCM 95th %tile Q(veh)	0.1	0.2	-	-	1.2	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	2	160	38	4	163
Future Vol, veh/h	3	2	160	38	4	163
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	3	0	5
Mvmt Flow	3	2	180	43	4	183

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	393	202	0	0	223	0
Stage 1	202	-	-	-	-	-
Stage 2	191	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	615	844	-	-	1358	-
Stage 1	837	-	-	-	-	-
Stage 2	846	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	613	844	-	-	1358	-
Mov Cap-2 Maneuver	613	-	-	-	-	-
Stage 1	837	-	-	-	-	-
Stage 2	843	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	688	1358	-
HCM Lane V/C Ratio	-	-	0.008	0.003	-
HCM Control Delay (s)	-	-	10.3	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	0	1	4	0	1	3	12	5	21	41	21
Future Vol, veh/h	1	0	1	4	0	1	3	12	5	21	41	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	0	0	0	0	25	40	0	9	0
Mvmt Flow	1	0	1	5	0	1	3	14	6	24	48	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	132	134	60	132	143	17	72	0	0	20	0	0
Stage 1	108	108	-	23	23	-	-	-	-	-	-	-
Stage 2	24	26	-	109	120	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	845	760	1011	845	752	1068	1541	-	-	1609	-	-
Stage 1	902	810	-	1000	880	-	-	-	-	-	-	-
Stage 2	999	878	-	901	800	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	832	746	1011	832	738	1068	1541	-	-	1609	-	-
Mov Cap-2 Maneuver	832	746	-	832	738	-	-	-	-	-	-	-
Stage 1	900	797	-	998	878	-	-	-	-	-	-	-
Stage 2	996	876	-	886	787	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	9.2	1.1	1.8
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1541	-	-	913	870	1609	-	-
HCM Lane V/C Ratio	0.002	-	-	0.003	0.007	0.015	-	-
HCM Control Delay (s)	7.3	0	-	9	9.2	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	0	0	1	0	1	0	17	0	7	39	0
Future Vol, veh/h	2	0	0	1	0	1	0	17	0	7	39	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	0	0	0	0	30	0	0	10	0
Mvmt Flow	2	0	0	1	0	1	0	20	0	8	47	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	84	83	47	83	83	20	47	0	0	20	0	0
Stage 1	63	63	-	20	20	-	-	-	-	-	-	-
Stage 2	21	20	-	63	63	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	908	811	1028	909	811	1064	1573	-	-	1609	-	-
Stage 1	953	846	-	1004	883	-	-	-	-	-	-	-
Stage 2	1003	883	-	953	846	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	903	807	1028	905	807	1064	1573	-	-	1609	-	-
Mov Cap-2 Maneuver	903	807	-	905	807	-	-	-	-	-	-	-
Stage 1	953	842	-	1004	883	-	-	-	-	-	-	-
Stage 2	1002	883	-	948	842	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	8.7	0	1.1
HCM LOS	A	A		

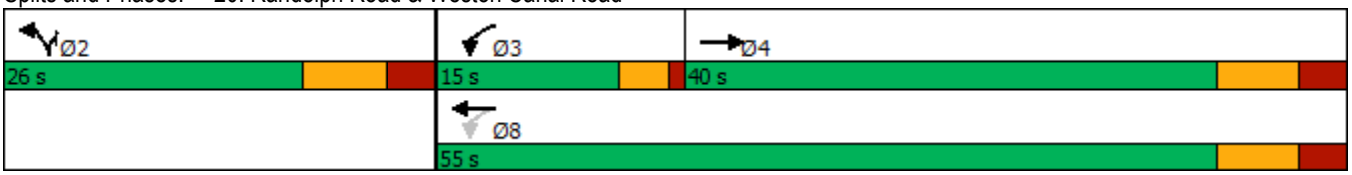
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1573	-	-	903	978	1609	-	-
HCM Lane V/C Ratio	-	-	-	0.003	0.002	0.005	-	-
HCM Control Delay (s)	0	-	-	9	8.7	7.2	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	360	6	133	794	24	323
Future Volume (vph)	360	6	133	794	24	323
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	12	11	13
Grade (%)	0%			0%	-5%	
Storage Length (ft)		0	80		200	0
Storage Lanes		0	1		1	1
Taper Length (ft)			40		50	
Right Turn on Red		Yes				Yes
Link Speed (mph)	45			45	40	
Link Distance (ft)	535			1497	891	
Travel Time (s)	8.1			22.7	15.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	25%	1%	1%	0%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	398	0	145	863	26	351
Turn Type	NA		pm+pt	NA	Prot	Prot
Protected Phases	4		3	8	2	2
Permitted Phases			8			
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	32.0		7.0	32.0	7.0	7.0
Minimum Split (s)	40.0		11.0	40.0	15.0	15.0
Total Split (s)	40.0		15.0	55.0	26.0	26.0
Total Split (%)	49.4%		18.5%	67.9%	32.1%	32.1%
Yellow Time (s)	5.0		3.0	5.0	5.0	5.0
All-Red Time (s)	3.0		1.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0		4.0	8.0	8.0	8.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	Max		None	Max	None	None
Act Effct Green (s)	35.7		51.1	47.1	8.4	8.4
Actuated g/C Ratio	0.50		0.71	0.66	0.12	0.12
v/c Ratio	0.43		0.22	0.70	0.12	0.69
Control Delay	13.7		4.4	12.1	29.1	11.4
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	13.7		4.4	12.1	29.1	11.4
LOS	B		A	B	C	B
Approach Delay	13.7			11.0	12.6	
Approach LOS	B			B	B	
Queue Length 50th (ft)	98		14	189	10	0
Queue Length 95th (ft)	202		40	411	31	68
Internal Link Dist (ft)	455			1417	811	
Turn Bay Length (ft)			80		200	
Base Capacity (vph)	934		720	1237	450	689
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.43		0.20	0.70	0.06	0.51

Intersection Summary			
Area Type:	Other		
Cycle Length: 81			
Actuated Cycle Length: 71.5			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 12.0		Intersection LOS: B	
Intersection Capacity Utilization 61.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 20: Randolph Road & Weston Canal Road



Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	682	1	15	927	0	59
Future Vol, veh/h	682	1	15	927	0	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	180	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	3	0	20	1	0	3
Mvmt Flow	710	1	16	966	0	61

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	711	0	1709	711
Stage 1	-	-	-	-	711	-
Stage 2	-	-	-	-	998	-
Critical Hdwy	-	-	4.3	-	6.4	6.23
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.38	-	3.5	3.327
Pot Cap-1 Maneuver	-	-	811	-	101	431
Stage 1	-	-	-	-	490	-
Stage 2	-	-	-	-	360	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	811	-	99	431
Mov Cap-2 Maneuver	-	-	-	-	99	-
Stage 1	-	-	-	-	490	-
Stage 2	-	-	-	-	353	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	14.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	431	-	-	811	-
HCM Lane V/C Ratio	-	0.143	-	-	0.019	-
HCM Control Delay (s)	0	14.7	-	-	9.5	-
HCM Lane LOS	A	B	-	-	A	-
HCM 95th %tile Q(veh)	-	0.5	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	26	20	281	3	3	185
Future Vol, veh/h	26	20	281	3	3	185
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	4	0	4	10	0	5
Mvmt Flow	29	22	309	3	3	203

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	520	311	0	0	312	0
Stage 1	311	-	-	-	-	-
Stage 2	209	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	513	734	-	-	1260	-
Stage 1	738	-	-	-	-	-
Stage 2	821	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	511	734	-	-	1260	-
Mov Cap-2 Maneuver	511	-	-	-	-	-
Stage 1	738	-	-	-	-	-
Stage 2	819	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	589	1260	-
HCM Lane V/C Ratio	-	-	0.086	0.003	-
HCM Control Delay (s)	-	-	11.7	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	0	1	2	1	4	1	58	0	2	8	5
Future Vol, veh/h	7	0	1	2	1	4	1	58	0	2	8	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	50	50	0	0	0	0	0
Mvmt Flow	9	0	1	2	1	5	1	71	0	2	10	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	93	90	13	91	93	71	16	0	0	71	0	0
Stage 1	17	17	-	73	73	-	-	-	-	-	-	-
Stage 2	76	73	-	18	20	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.7	4.6	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.75	2.65	-	-	2.2	-	-
Pot Cap-1 Maneuver	895	804	1073	898	801	873	1339	-	-	1542	-	-
Stage 1	1008	885	-	942	838	-	-	-	-	-	-	-
Stage 2	938	838	-	1006	883	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	888	802	1073	895	799	873	1339	-	-	1542	-	-
Mov Cap-2 Maneuver	888	802	-	895	799	-	-	-	-	-	-	-
Stage 1	1007	884	-	941	837	-	-	-	-	-	-	-
Stage 2	930	837	-	1004	882	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	9.2	0.1	1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1339	-	-	908	868	1542	-	-
HCM Lane V/C Ratio	0.001	-	-	0.011	0.01	0.002	-	-
HCM Control Delay (s)	7.7	0	-	9	9.2	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	0	0	0	0	3	0	54	0	0	9	2
Future Vol, veh/h	2	0	0	0	0	3	0	54	0	0	9	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	74	74	74	74	74	74	74	74	74
Heavy Vehicles, %	0	0	0	0	0	33	0	3	0	0	0	0
Mvmt Flow	3	0	0	0	0	4	0	73	0	0	12	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	89	87	14	87	88	73	15	0	0	73	0	0
Stage 1	14	14	-	73	73	-	-	-	-	-	-	-
Stage 2	75	73	-	14	15	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	901	807	1072	904	806	909	1616	-	-	1540	-	-
Stage 1	1011	888	-	942	838	-	-	-	-	-	-	-
Stage 2	939	838	-	1011	887	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	897	807	1072	904	806	909	1616	-	-	1540	-	-
Mov Cap-2 Maneuver	897	807	-	904	806	-	-	-	-	-	-	-
Stage 1	1011	888	-	942	838	-	-	-	-	-	-	-
Stage 2	935	838	-	1011	887	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	9	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1616	-	-	897	909	1540	-	-
HCM Lane V/C Ratio	-	-	-	0.003	0.004	-	-	-
HCM Control Delay (s)	0	-	-	9	9	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	769	46	558	314	4	232
Future Volume (vph)	769	46	558	314	4	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	12	11	13
Grade (%)	0%			0%	-5%	
Storage Length (ft)		0	500		200	0
Storage Lanes		0	1		1	1
Taper Length (ft)			50		50	
Right Turn on Red		Yes				Yes
Link Speed (mph)	45			45	40	
Link Distance (ft)	1073			1541	755	
Travel Time (s)	16.3			23.3	12.9	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	3%	0%	5%	4%	0%	15%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	959	0	656	369	5	273
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	2	3
Permitted Phases			8			2
Detector Phase	4		3	8	2	3
Switch Phase						
Minimum Initial (s)	39.0		7.0	32.0	5.0	7.0
Minimum Split (s)	47.0		11.0	40.0	13.0	11.0
Total Split (s)	47.0		30.0	77.0	13.0	30.0
Total Split (%)	52.2%		33.3%	85.6%	14.4%	33.3%
Yellow Time (s)	5.0		3.0	5.0	5.0	3.0
All-Red Time (s)	3.0		1.0	3.0	3.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0		4.0	8.0	8.0	4.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Recall Mode	Max		None	Max	None	None
Act Effct Green (s)	39.2		73.3	75.9	5.0	28.4
Actuated g/C Ratio	0.49		0.92	0.95	0.06	0.36
v/c Ratio	1.06		1.02	0.21	0.04	0.48
Control Delay	70.5		64.7	1.3	38.5	17.5
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	70.5		64.7	1.3	38.5	17.5
LOS	E		E	A	D	B
Approach Delay	70.5			41.9	17.9	
Approach LOS	E			D	B	
Queue Length 50th (ft)	~501		251	0	2	76
Queue Length 95th (ft)	#832		#552	69	13	127
Internal Link Dist (ft)	993			1461	675	
Turn Bay Length (ft)			500		200	
Base Capacity (vph)	903		641	1742	113	573
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0

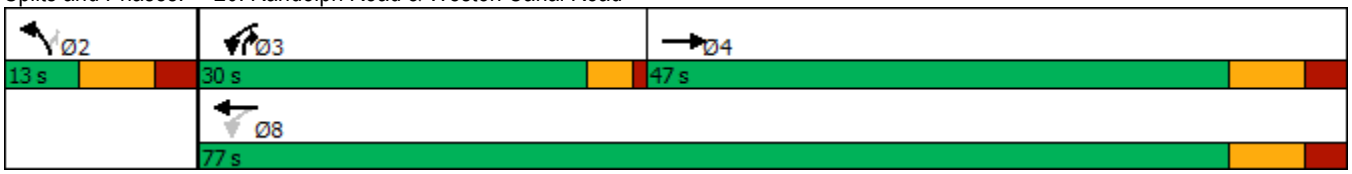
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	1.06		1.02	0.21	0.04	0.48

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 79.6			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.06			
Intersection Signal Delay: 51.0		Intersection LOS: D	
Intersection Capacity Utilization 95.0%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 20: Randolph Road & Weston Canal Road



Intersection	
Int Delay, s/veh	2.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	983	18	271	871	1	18
Future Vol, veh/h	983	18	271	871	1	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	180	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	-3	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	6	0	0	6	0	24
Mvmt Flow	1130	21	311	1001	1	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1151	0	2764	1141
Stage 1	-	-	-	-	1141	-
Stage 2	-	-	-	-	1623	-
Critical Hdwy	-	-	4.1	-	5.8	6.14
Critical Hdwy Stg 1	-	-	-	-	4.8	-
Critical Hdwy Stg 2	-	-	-	-	4.8	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.516
Pot Cap-1 Maneuver	-	-	614	-	35	243
Stage 1	-	-	-	-	372	-
Stage 2	-	-	-	-	235	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	614	-	17	243
Mov Cap-2 Maneuver	-	-	-	-	17	-
Stage 1	-	-	-	-	372	-
Stage 2	-	-	-	-	116	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4	32.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	17	243	-	-	614	-
HCM Lane V/C Ratio	0.068	0.085	-	-	0.507	-
HCM Control Delay (s)	231.6	21.2	-	-	16.7	-
HCM Lane LOS	F	C	-	-	C	-
HCM 95th %tile Q(veh)	0.2	0.3	-	-	2.9	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	983	18	271	870	1	18
Future Vol, veh/h	983	18	271	870	1	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	180	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	-3	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	6	0	0	6	0	24
Mvmt Flow	1130	21	311	1000	1	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1151	0	2763	1141
Stage 1	-	-	-	-	1141	-
Stage 2	-	-	-	-	1622	-
Critical Hdwy	-	-	4.1	-	5.8	6.14
Critical Hdwy Stg 1	-	-	-	-	4.8	-
Critical Hdwy Stg 2	-	-	-	-	4.8	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.516
Pot Cap-1 Maneuver	-	-	614	-	35	243
Stage 1	-	-	-	-	372	-
Stage 2	-	-	-	-	235	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	614	-	17	243
Mov Cap-2 Maneuver	-	-	-	-	17	-
Stage 1	-	-	-	-	372	-
Stage 2	-	-	-	-	116	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4	32.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	17	243	-	-	614	-
HCM Lane V/C Ratio	0.068	0.085	-	-	0.507	-
HCM Control Delay (s)	231.6	21.2	-	-	16.7	-
HCM Lane LOS	F	C	-	-	C	-
HCM 95th %tile Q(veh)	0.2	0.3	-	-	2.9	-

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	80	2	264	39	4	554
Future Vol, veh/h	80	2	264	39	4	554
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	0	0	16	3	0	5
Mvmt Flow	118	3	388	57	6	815

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1244	417	0	0	445	0
Stage 1	417	-	-	-	-	-
Stage 2	827	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	194	640	-	-	1126	-
Stage 1	669	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	192	640	-	-	1126	-
Mov Cap-2 Maneuver	320	-	-	-	-	-
Stage 1	669	-	-	-	-	-
Stage 2	429	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22.6	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	324	1126	-
HCM Lane V/C Ratio	-	-	0.372	0.005	-
HCM Control Delay (s)	-	-	22.6	8.2	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.7	0	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	0	1	4	0	1	3	13	5	22	47	22
Future Vol, veh/h	1	0	1	4	0	1	3	13	5	22	47	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	0	0	0	0	33	40	0	9	0
Mvmt Flow	1	0	1	5	0	1	3	15	6	26	55	26

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	145	147	68	145	157	18	81	0	0	21	0	0
Stage 1	120	120	-	24	24	-	-	-	-	-	-	-
Stage 2	25	27	-	121	133	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	828	748	1001	828	739	1066	1529	-	-	1608	-	-
Stage 1	889	800	-	999	879	-	-	-	-	-	-	-
Stage 2	998	877	-	888	790	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	815	734	1001	815	725	1066	1529	-	-	1608	-	-
Mov Cap-2 Maneuver	815	734	-	815	725	-	-	-	-	-	-	-
Stage 1	887	786	-	997	877	-	-	-	-	-	-	-
Stage 2	995	875	-	872	777	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	9.2	1.1	1.8
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1529	-	-	898	855	1608	-	-
HCM Lane V/C Ratio	0.002	-	-	0.003	0.007	0.016	-	-
HCM Control Delay (s)	7.4	0	-	9	9.2	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	0	0	1	0	1	0	18	0	7	45	0
Future Vol, veh/h	2	0	0	1	0	1	0	18	0	7	45	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	0	0	0	0	30	0	0	10	0
Mvmt Flow	2	0	0	1	0	1	0	22	0	8	54	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	93	92	54	92	92	22	54	0	0	22	0	0
Stage 1	70	70	-	22	22	-	-	-	-	-	-	-
Stage 2	23	22	-	70	70	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	895	802	1019	897	802	1061	1564	-	-	1607	-	-
Stage 1	945	841	-	1002	881	-	-	-	-	-	-	-
Stage 2	1000	881	-	945	841	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	891	798	1019	893	798	1061	1564	-	-	1607	-	-
Mov Cap-2 Maneuver	891	798	-	893	798	-	-	-	-	-	-	-
Stage 1	945	837	-	1002	881	-	-	-	-	-	-	-
Stage 2	999	881	-	940	837	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.1	8.7	0	1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1564	-	-	891	970	1607	-	-
HCM Lane V/C Ratio	-	-	-	0.003	0.002	0.005	-	-
HCM Control Delay (s)	0	-	-	9.1	8.7	7.3	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

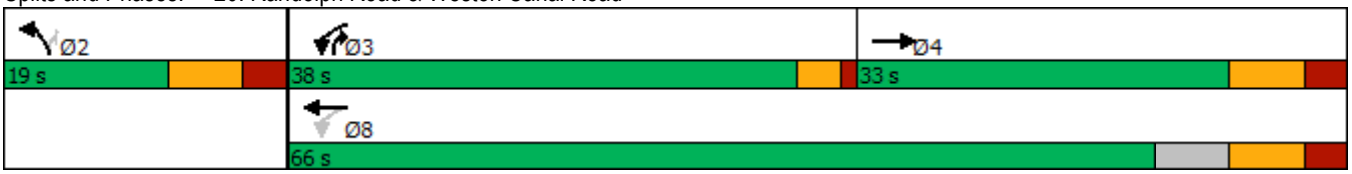
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	405	6	240	849	62	722
Future Volume (vph)	405	6	240	849	62	722
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	12	11	13
Grade (%)	0%			0%	-5%	
Storage Length (ft)		0	500		200	0
Storage Lanes		0	1		1	1
Taper Length (ft)			50		50	
Right Turn on Red		Yes				Yes
Link Speed (mph)	45			45	40	
Link Distance (ft)	1073			1542	836	
Travel Time (s)	16.3			23.4	14.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	1%	25%	8%	1%	0%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	478	0	279	987	72	840
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	2	3
Permitted Phases			8			2
Detector Phase	4		3	8	2	3
Switch Phase						
Minimum Initial (s)	25.0		7.0	25.0	7.0	7.0
Minimum Split (s)	33.0		11.0	33.0	15.0	11.0
Total Split (s)	33.0		38.0	66.0	19.0	38.0
Total Split (%)	36.7%		42.2%	73.3%	21.1%	42.2%
Yellow Time (s)	5.0		3.0	5.0	5.0	3.0
All-Red Time (s)	3.0		1.0	3.0	3.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0		4.0	8.0	8.0	4.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Recall Mode	Max		None	Max	None	None
Act Effct Green (s)	26.8		65.5	63.5	8.5	43.4
Actuated g/C Ratio	0.33		0.79	0.77	0.10	0.53
v/c Ratio	0.78		0.37	0.68	0.39	0.89
Control Delay	39.4		4.7	10.1	43.3	26.5
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	39.4		4.7	10.1	43.3	26.5
LOS	D		A	B	D	C
Approach Delay	39.4			8.9	27.9	
Approach LOS	D			A	C	
Queue Length 50th (ft)	243		33	259	37	300
Queue Length 95th (ft)	#415		63	414	76	434
Internal Link Dist (ft)	993			1462	756	
Turn Bay Length (ft)			500		200	
Base Capacity (vph)	609		819	1456	241	1020
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.78		0.34	0.68	0.30	0.82

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 82.4			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 20.9		Intersection LOS: C	
Intersection Capacity Utilization 76.4%		ICU Level of Service D	
Analysis Period (min) 15			

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

Splits and Phases: 20: Randolph Road & Weston Canal Road



Intersection	
Int Delay, s/veh	3.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1126	1	16	1089	0	136
Future Vol, veh/h	1126	1	16	1089	0	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	180	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	-3	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	0	20	2	0	2
Mvmt Flow	1340	1	19	1296	0	162

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1341	0	2675	1341
Stage 1	-	-	-	-	1341	-
Stage 2	-	-	-	-	1334	-
Critical Hdwy	-	-	4.3	-	5.8	5.92
Critical Hdwy Stg 1	-	-	-	-	4.8	-
Critical Hdwy Stg 2	-	-	-	-	4.8	-
Follow-up Hdwy	-	-	2.38	-	3.5	3.318
Pot Cap-1 Maneuver	-	-	460	-	39	208
Stage 1	-	-	-	-	308	-
Stage 2	-	-	-	-	310	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	460	-	37	208
Mov Cap-2 Maneuver	-	-	-	-	37	-
Stage 1	-	-	-	-	308	-
Stage 2	-	-	-	-	297	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	64.9
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	208	-	-	460	-
HCM Lane V/C Ratio	-	0.778	-	-	0.041	-
HCM Control Delay (s)	0	64.9	-	-	13.2	-
HCM Lane LOS	A	F	-	-	B	-
HCM 95th %tile Q(veh)	-	5.4	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	27	21	711	78	3	309
Future Vol, veh/h	27	21	711	78	3	309
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	4	0	2	10	0	9
Mvmt Flow	40	31	1046	115	4	454

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1566	1104	0	0	1161	0
Stage 1	1104	-	-	-	-	-
Stage 2	462	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	121	259	-	-	609	-
Stage 1	315	-	-	-	-	-
Stage 2	630	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	120	259	-	-	609	-
Mov Cap-2 Maneuver	238	-	-	-	-	-
Stage 1	315	-	-	-	-	-
Stage 2	624	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.3	0	0.1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	247	609	-
HCM Lane V/C Ratio	-	-	0.286	0.007	-
HCM Control Delay (s)	-	-	25.3	11	0
HCM Lane LOS	-	-	D	B	A
HCM 95th %tile Q(veh)	-	-	1.1	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	0	1	2	1	4	1	134	0	2	8	5
Future Vol, veh/h	7	0	1	2	1	4	1	134	0	2	8	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	50	100	2	0	0	0	0
Mvmt Flow	9	0	1	2	1	5	1	163	0	2	10	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	185	182	13	183	185	163	16	0	0	163	0	0
Stage 1	17	17	-	165	165	-	-	-	-	-	-	-
Stage 2	168	165	-	18	20	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.7	5.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.75	3.1	-	-	2.2	-	-
Pot Cap-1 Maneuver	780	716	1073	783	713	771	1143	-	-	1428	-	-
Stage 1	1008	885	-	842	766	-	-	-	-	-	-	-
Stage 2	839	766	-	1006	883	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	773	715	1073	781	712	771	1143	-	-	1428	-	-
Mov Cap-2 Maneuver	773	715	-	781	712	-	-	-	-	-	-	-
Stage 1	1007	884	-	841	765	-	-	-	-	-	-	-
Stage 2	832	765	-	1004	882	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.6	9.8	0.1	1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1143	-	-	801	765	1428	-	-
HCM Lane V/C Ratio	0.001	-	-	0.012	0.011	0.002	-	-
HCM Control Delay (s)	8.2	0	-	9.6	9.8	7.5	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	0	0	0	0	3	0	130	0	0	9	2
Future Vol, veh/h	2	0	0	0	0	3	0	130	0	0	9	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	74	74	74	74	74	74	74	74	74
Heavy Vehicles, %	0	0	0	0	0	33	0	3	0	0	0	0
Mvmt Flow	3	0	0	0	0	4	0	176	0	0	12	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	192	190	14	190	191	176	15	0	0	176	0	0
Stage 1	14	14	-	176	176	-	-	-	-	-	-	-
Stage 2	178	176	-	14	15	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	772	708	1072	774	708	793	1616	-	-	1412	-	-
Stage 1	1011	888	-	831	757	-	-	-	-	-	-	-
Stage 2	828	757	-	1011	887	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	768	708	1072	774	708	793	1616	-	-	1412	-	-
Mov Cap-2 Maneuver	768	708	-	774	708	-	-	-	-	-	-	-
Stage 1	1011	888	-	831	757	-	-	-	-	-	-	-
Stage 2	824	757	-	1011	887	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	9.6	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1616	-	-	768	793	1412	-	-
HCM Lane V/C Ratio	-	-	-	0.004	0.005	-	-	-
HCM Control Delay (s)	0	-	-	9.7	9.6	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	778	46	558	314	6	232
Future Volume (vph)	778	46	558	314	6	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	12	11	13
Grade (%)	0%			0%	-5%	
Storage Length (ft)		0	500		200	0
Storage Lanes		0	1		1	1
Taper Length (ft)			50		50	
Right Turn on Red		Yes				Yes
Link Speed (mph)	45			45	40	
Link Distance (ft)	1073			1541	755	
Travel Time (s)	16.3			23.3	12.9	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	3%	0%	5%	4%	0%	15%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	969	0	656	369	7	273
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	2	3
Permitted Phases			8			2
Detector Phase	4		3	8	2	3
Switch Phase						
Minimum Initial (s)	39.0		7.0	32.0	5.0	7.0
Minimum Split (s)	47.0		11.0	40.0	13.0	11.0
Total Split (s)	47.0		30.0	77.0	13.0	30.0
Total Split (%)	52.2%		33.3%	85.6%	14.4%	33.3%
Yellow Time (s)	5.0		3.0	5.0	5.0	3.0
All-Red Time (s)	3.0		1.0	3.0	3.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0		4.0	8.0	8.0	4.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Recall Mode	Max		None	Max	None	None
Act Effct Green (s)	39.2		73.3	75.9	5.0	28.4
Actuated g/C Ratio	0.49		0.92	0.95	0.06	0.36
v/c Ratio	1.07		1.02	0.21	0.06	0.48
Control Delay	74.2		64.7	1.3	38.7	17.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	74.2		64.7	1.3	38.7	17.7
LOS	E		E	A	D	B
Approach Delay	74.2			41.9	18.2	
Approach LOS	E			D	B	
Queue Length 50th (ft)	~511		251	0	3	76
Queue Length 95th (ft)	#844		#552	69	17	128
Internal Link Dist (ft)	993			1461	675	
Turn Bay Length (ft)			500		200	
Base Capacity (vph)	903		641	1742	113	572
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0

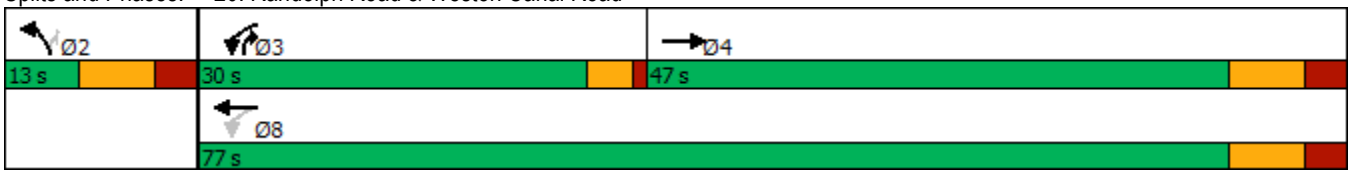
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	1.07		1.02	0.21	0.06	0.48

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 79.6			
Natural Cycle: 140			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.07			
Intersection Signal Delay: 52.7		Intersection LOS: D	
Intersection Capacity Utilization 95.5%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 20: Randolph Road & Weston Canal Road



Intersection	
Int Delay, s/veh	3.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	983	27	322	871	1	29
Future Vol, veh/h	983	27	322	871	1	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	180	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	-3	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	6	0	2	6	0	22
Mvmt Flow	1130	31	370	1001	1	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1161	0	2887	1146
Stage 1	-	-	-	-	1146	-
Stage 2	-	-	-	-	1741	-
Critical Hdwy	-	-	4.12	-	5.8	6.12
Critical Hdwy Stg 1	-	-	-	-	4.8	-
Critical Hdwy Stg 2	-	-	-	-	4.8	-
Follow-up Hdwy	-	-	2.218	-	3.5	3.498
Pot Cap-1 Maneuver	-	-	602	-	29	243
Stage 1	-	-	-	-	370	-
Stage 2	-	-	-	-	209	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	602	-	11	243
Mov Cap-2 Maneuver	-	-	-	-	11	-
Stage 1	-	-	-	-	370	-
Stage 2	-	-	-	-	80	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.4	33.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	11	243	-	-	602	-
HCM Lane V/C Ratio	0.104	0.137	-	-	0.615	-
HCM Control Delay (s)	$ 367.4	22.2	-	-	20.1	-
HCM Lane LOS	F	C	-	-	C	-
HCM 95th %tile Q(veh)	0.3	0.5	-	-	4.2	-

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	87	2	264	72	4	554
Future Vol, veh/h	87	2	264	72	4	554
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	2	0	16	7	0	5
Mvmt Flow	128	3	388	106	6	815

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1268	441	0	0	494	0
Stage 1	441	-	-	-	-	-
Stage 2	827	-	-	-	-	-
Critical Hdwy	6.42	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	186	621	-	-	1080	-
Stage 1	648	-	-	-	-	-
Stage 2	430	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	184	621	-	-	1080	-
Mov Cap-2 Maneuver	313	-	-	-	-	-
Stage 1	648	-	-	-	-	-
Stage 2	426	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.1	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	317	1080	-
HCM Lane V/C Ratio	-	-	0.413	0.005	-
HCM Control Delay (s)	-	-	24.1	8.4	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.9	0	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	0	4	4	0	1	20	19	5	22	77	52
Future Vol, veh/h	6	0	4	4	0	1	20	19	5	22	77	52
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	0	0	0	0	33	40	0	16	0
Mvmt Flow	7	0	5	5	0	1	23	22	6	26	90	60

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	244	246	120	246	273	25	150	0	0	28	0	0
Stage 1	172	172	-	71	71	-	-	-	-	-	-	-
Stage 2	72	74	-	175	202	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	714	660	937	712	637	1057	1444	-	-	1599	-	-
Stage 1	835	760	-	944	840	-	-	-	-	-	-	-
Stage 2	943	837	-	832	738	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	695	638	937	690	615	1057	1444	-	-	1599	-	-
Mov Cap-2 Maneuver	695	638	-	690	615	-	-	-	-	-	-	-
Stage 1	822	746	-	929	827	-	-	-	-	-	-	-
Stage 2	927	824	-	813	725	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	9.9	3.4	1.1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1444	-	-	775	741	1599	-	-
HCM Lane V/C Ratio	0.016	-	-	0.015	0.008	0.016	-	-
HCM Control Delay (s)	7.5	0	-	9.7	9.9	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	0	4	1	0	1	16	35	0	7	48	30
Future Vol, veh/h	8	0	4	1	0	1	16	35	0	7	48	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	25	0	50	0	0	0	25	15	0	0	9	27
Mvmt Flow	10	0	5	1	0	1	19	42	0	8	58	36

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	173	172	76	175	190	42	94	0	0	42	0	0
Stage 1	92	92	-	80	80	-	-	-	-	-	-	-
Stage 2	81	80	-	95	110	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.5	6.7	7.1	6.5	6.2	4.35	-	-	4.1	-	-
Critical Hdwy Stg 1	6.35	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4	3.75	3.5	4	3.3	2.425	-	-	2.2	-	-
Pot Cap-1 Maneuver	741	725	867	792	708	1034	1368	-	-	1580	-	-
Stage 1	861	823	-	934	832	-	-	-	-	-	-	-
Stage 2	873	832	-	917	808	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	729	711	867	776	695	1034	1368	-	-	1580	-	-
Mov Cap-2 Maneuver	729	711	-	776	695	-	-	-	-	-	-	-
Stage 1	849	819	-	921	820	-	-	-	-	-	-	-
Stage 2	860	820	-	907	804	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	9.1	2.4	0.6
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1368	-	-	770	887	1580	-	-
HCM Lane V/C Ratio	0.014	-	-	0.019	0.003	0.005	-	-
HCM Control Delay (s)	7.7	0	-	9.8	9.1	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-

Intersection	
Int Delay, s/veh	5.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2	0	47	25	1	8
Future Vol, veh/h	2	0	47	25	1	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	72	72	72	72	72	72
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	3	0	65	35	1	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	3	0	168	3
Stage 1	-	-	-	-	3	-
Stage 2	-	-	-	-	165	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1632	-	827	1087
Stage 1	-	-	-	-	1025	-
Stage 2	-	-	-	-	869	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1632	-	793	1087
Mov Cap-2 Maneuver	-	-	-	-	793	-
Stage 1	-	-	-	-	1025	-
Stage 2	-	-	-	-	833	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.8	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1044	-	-	1632	-
HCM Lane V/C Ratio	0.012	-	-	0.04	-
HCM Control Delay (s)	8.5	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	-

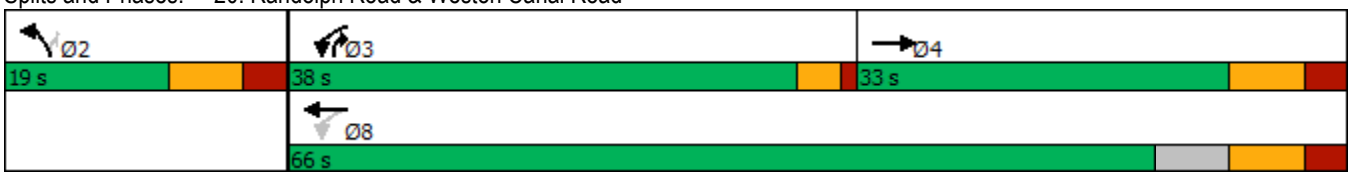
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	407	6	240	849	69	722
Future Volume (vph)	407	6	240	849	69	722
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	12	11	13
Grade (%)	0%			0%	-5%	
Storage Length (ft)		0	500		200	0
Storage Lanes		0	1		1	1
Taper Length (ft)			50		50	
Right Turn on Red		Yes				Yes
Link Speed (mph)	45			45	40	
Link Distance (ft)	1073			1542	836	
Travel Time (s)	16.3			23.4	14.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	1%	25%	8%	1%	0%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	480	0	279	987	80	840
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	2	3
Permitted Phases			8			2
Detector Phase	4		3	8	2	3
Switch Phase						
Minimum Initial (s)	25.0		7.0	25.0	7.0	7.0
Minimum Split (s)	33.0		11.0	33.0	15.0	11.0
Total Split (s)	33.0		38.0	66.0	19.0	38.0
Total Split (%)	36.7%		42.2%	73.3%	21.1%	42.2%
Yellow Time (s)	5.0		3.0	5.0	5.0	3.0
All-Red Time (s)	3.0		1.0	3.0	3.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0		4.0	8.0	8.0	4.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Recall Mode	Max		None	Max	None	None
Act Effct Green (s)	26.8		65.5	63.4	8.6	43.6
Actuated g/C Ratio	0.32		0.79	0.77	0.10	0.53
v/c Ratio	0.79		0.37	0.68	0.43	0.89
Control Delay	39.8		4.9	10.2	44.2	26.5
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	39.8		4.9	10.2	44.2	26.5
LOS	D		A	B	D	C
Approach Delay	39.8			9.1	28.0	
Approach LOS	D			A	C	
Queue Length 50th (ft)	244		34	265	41	301
Queue Length 95th (ft)	#419		65	414	82	435
Internal Link Dist (ft)	993			1462	756	
Turn Bay Length (ft)			500		200	
Base Capacity (vph)	608		815	1454	241	1021
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.79		0.34	0.68	0.33	0.82

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 82.5			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 21.1		Intersection LOS: C	
Intersection Capacity Utilization 76.5%		ICU Level of Service D	
Analysis Period (min) 15			

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

Splits and Phases: 20: Randolph Road & Weston Canal Road



Intersection	
Int Delay, s/veh	9.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1126	3	27	1089	0	181
Future Vol, veh/h	1126	3	27	1089	0	181
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	180	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	-3	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	0	19	2	0	7
Mvmt Flow	1340	4	32	1296	0	215

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1344	0	2702	1342
Stage 1	-	-	-	-	1342	-
Stage 2	-	-	-	-	1360	-
Critical Hdwy	-	-	4.29	-	5.8	5.97
Critical Hdwy Stg 1	-	-	-	-	4.8	-
Critical Hdwy Stg 2	-	-	-	-	4.8	-
Follow-up Hdwy	-	-	2.371	-	3.5	3.363
Pot Cap-1 Maneuver	-	-	461	-	37	~ 203
Stage 1	-	-	-	-	308	-
Stage 2	-	-	-	-	302	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	461	-	34	~ 203
Mov Cap-2 Maneuver	-	-	-	-	34	-
Stage 1	-	-	-	-	308	-
Stage 2	-	-	-	-	281	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	129.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	203	-	-	461	-
HCM Lane V/C Ratio	-	1.061	-	-	0.07	-
HCM Control Delay (s)	0	129.6	-	-	13.4	-
HCM Lane LOS	A	F	-	-	B	-
HCM 95th %tile Q(veh)	-	9.8	-	-	0.2	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	55	21	711	86	3	309
Future Vol, veh/h	55	21	711	86	3	309
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	9	0	2	11	0	9
Mvmt Flow	81	31	1046	126	4	454

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1571	1109	0	0	1172	0
Stage 1	1109	-	-	-	-	-
Stage 2	462	-	-	-	-	-
Critical Hdwy	6.49	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.49	-	-	-	-	-
Critical Hdwy Stg 2	5.49	-	-	-	-	-
Follow-up Hdwy	3.581	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	117	257	-	-	603	-
Stage 1	306	-	-	-	-	-
Stage 2	620	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	116	257	-	-	603	-
Mov Cap-2 Maneuver	231	-	-	-	-	-
Stage 1	306	-	-	-	-	-
Stage 2	614	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	32.8	0	0.1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	238	603	-
HCM Lane V/C Ratio	-	-	0.47	0.007	-
HCM Control Delay (s)	-	-	32.8	11	0
HCM Lane LOS	-	-	D	B	A
HCM 95th %tile Q(veh)	-	-	2.3	0	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	29	0	15	2	1	4	5	158	0	2	15	11
Future Vol, veh/h	29	0	15	2	1	4	5	158	0	2	15	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	50	20	8	0	0	13	0
Mvmt Flow	35	0	18	2	1	5	6	193	0	2	18	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	237	234	25	243	240	193	31	0	0	193	0	0
Stage 1	29	29	-	205	205	-	-	-	-	-	-	-
Stage 2	208	205	-	38	35	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.7	4.3	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.75	2.38	-	-	2.2	-	-
Pot Cap-1 Maneuver	722	670	1057	715	665	740	1473	-	-	1392	-	-
Stage 1	993	875	-	802	736	-	-	-	-	-	-	-
Stage 2	799	736	-	982	870	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	713	666	1057	699	661	740	1473	-	-	1392	-	-
Mov Cap-2 Maneuver	713	666	-	699	661	-	-	-	-	-	-	-
Stage 1	988	874	-	798	732	-	-	-	-	-	-	-
Stage 2	788	732	-	964	869	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	10.1	0.2	0.5
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1473	-	-	802	716	1392	-	-
HCM Lane V/C Ratio	0.004	-	-	0.067	0.012	0.002	-	-
HCM Control Delay (s)	7.5	0	-	9.8	10.1	7.6	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0	0	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	0	14	0	0	3	4	135	0	0	23	9
Future Vol, veh/h	25	0	14	0	0	3	4	135	0	0	23	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	74	74	74	74	74	74	74	74	74
Heavy Vehicles, %	40	0	29	0	0	33	50	3	0	0	0	22
Mvmt Flow	34	0	19	0	0	4	5	182	0	0	31	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	231	229	37	239	235	182	43	0	0	182	0	0
Stage 1	37	37	-	192	192	-	-	-	-	-	-	-
Stage 2	194	192	-	47	43	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.49	7.1	6.5	6.53	4.6	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.86	4	3.561	3.5	4	3.597	2.65	-	-	2.2	-	-
Pot Cap-1 Maneuver	651	674	963	719	669	787	1306	-	-	1405	-	-
Stage 1	890	868	-	814	745	-	-	-	-	-	-	-
Stage 2	728	745	-	972	863	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	646	671	963	702	666	787	1306	-	-	1405	-	-
Mov Cap-2 Maneuver	646	671	-	702	666	-	-	-	-	-	-	-
Stage 1	886	868	-	811	742	-	-	-	-	-	-	-
Stage 2	721	742	-	953	863	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	9.6	0.2	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1306	-	-	733	787	1405	-	-
HCM Lane V/C Ratio	0.004	-	-	0.072	0.005	-	-	-
HCM Control Delay (s)	7.8	0	-	10.3	9.6	0	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0	0	-	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	8	0	10	7	4	36
Future Vol, veh/h	8	0	10	7	4	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	14	0	0
Mvmt Flow	13	0	16	11	6	57

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	13	0	56	13
Stage 1	-	-	-	-	13	-
Stage 2	-	-	-	-	43	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1619	-	957	1073
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	985	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1619	-	947	1073
Mov Cap-2 Maneuver	-	-	-	-	947	-
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	975	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.3	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1059	-	-	1619	-
HCM Lane V/C Ratio	0.06	-	-	0.01	-
HCM Control Delay (s)	8.6	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-