

## FEB 15 2019 CALN TWP RTKO

## STANDARD RIGHT-TO-KNOW REQUEST FORM

| DATE REQUESTED: 2/14/2019  |  |                                    |                               |                         |
|--|--|------------------------------------|-------------------------------|-------------------------|
| REQUEST SUBMITTED BY:  |  |                                    | □ FAX                         | □ IN-PERSON             |
| REQUEST SUBMITTED TO (Age 253 Municipal Dr, Thorndale, PA  | ency name & add                        | lress):                            | )                             |                         |
| NAME OF REQUESTER : Matthe   | w Downs                                |                                    |                               |                         |
| STREET ADDRESS: 1025 Apple   | ville Road                             |                                    |                               |                         |
| CITY/STATE/COUNTY/ZIP(Requ   | ired): West Ches                       | ter, PA Chester Count              | y, 19380                      |                         |
| TELEPHONE (Optional):  |  | _ EMAIL (optional)                 |                               |                         |
| RECORDS REQUESTED: *Provide Please use additional sheets if  |  | detail as possible so the          | e agency can ider             | ntify the information.  |
| -Demolition Permit(s) for WILD<br>1520 FISHERVILLE RD<br>-Construction Permit(s) for WILI<br>1520 FISHERVILLE RD<br>-Traffic & Environmental study(i | O MEADOWS LL                           | C 5030 HORSESHO                    | E PK, 596 N LL                |                         |
| DO YOU WANT COPIES? Ø YE   |  |                                    |                               |                         |
| DO YOU WANT TO INSPECT THE DO YOU WANT CERTIFIED COR   |  |                                    |                               |                         |
| DO YOU WANT TO BE NOTIFIE  |  |                                    | DS \$100? Ø YE                | S □ NO                  |
| ** PLEASE NOTE<br>** IT IS A REQUIRE   | : <u>RETAIN A COP</u><br>D DOCUMENT IF | Y OF THIS REQUES<br>YOU WOULD NEED | T FOR YOUR F<br>TO FILE AN AI | ILES **<br>PPEAL **     |
|  | FOR AGI                                | ENCY USE ONLY                      |                               |                         |
| open-records officer: $\ell$   | Swa                                    |                                    |                               |                         |
| □ I have provided notice to appro  | priate third parties                   | and given them an o                | pportunity to ob              | ject to this request    |
| DATE RECEIVED BY THE AGEN  | ICY: 2/15/10                           | 1                                  | and fac                       | La Day)                 |
| AGENCY FIVE (5) BUSINESS DA  | AY RESPONSE D                          | DUE: 2125/19                       | (closed foreside              | W12. 5. 7.              |
| **Public bodies may fill anonymous   | verbal or written rec                  | wests If the requestor             | wishes to pursue              | the relief and remedie. |

<sup>\*\*</sup>Public bodies may fill anonymous verbal or written requests. If the requestor wishes to pursue the relief and remedies provided for in this Act, the request must be in writing. (Section 702.) Written requests need not include an explanation why information is sought or the intended use of the information unless otherwise required by law. (Section 703.)

## CALN TOWNSHIP

# FIRE CODE FERMIN

Z 0

Justin Olean

NAME

5030 Kristikhe Pii

Site Location

INSPECTIONS REQUIRED FOR THIS PROJECT

SH.

Final

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THIS CARD MUST BE PLACED IN THE OPEN

VIEW AT ALL TIMES.

Contact Caln Township @ 610-384-0600 for Inspections.

(Minimum 48-Hour Notice Required)

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TYPE OF WORK BEING PERFORMED

FIRE CODE OFFICIAL

Date Issued

**Review Corrections Notice- Response** 

Permit #- B-7098

Applicant- Wild Meadows, LLC

Dated- June 21st, 2018.

Please see below responses in order from your Review Corrections Notice received on June  $21^{st}$ , 2019. We apologize for our delayed response. We are now ready to move forward with this demolition permit. Thank you.

## Plan Examiner Comment responses:

- 1. Contractor information and insurance for both property owner and contractor are attached.
- 2. Our cost for the demolition= \$5,000.
- 3. Peco has verified that electric has been shutoff to the property and is no longer in service. (Miss utility will be contacted before any work begins)
- 4. Peco has verified that no gas services this address. (Miss utility will be contacted before any work begins)
- 5. No public water is at this address. (Miss utility will be contacted before any work begins)
- 6. Private sewer system- will be properly disconnected and removed.
- 7. Old Farm house will be demolished and removed. Footers will be removed. (old stone stacked footers) Some of stone walls around farm house will remain for future green space areas.

Thank you for your time,

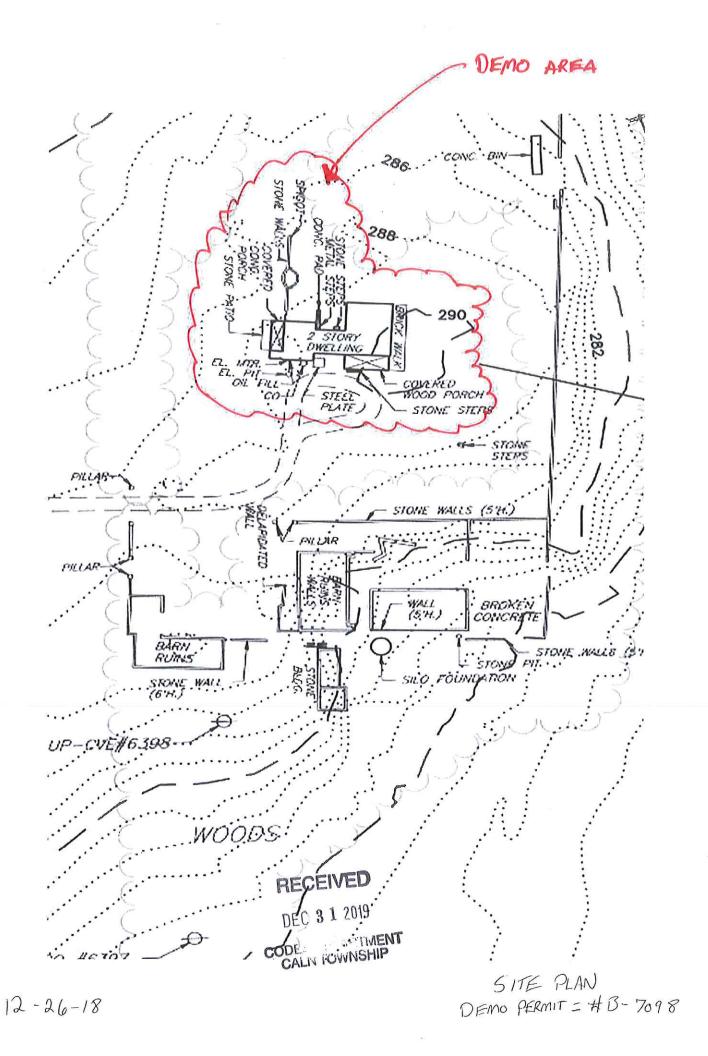
RECEIVED

Sincerely,

DEC 3 1 2019

CODES DEPARTMENT CALN TOWNSHIP

Justin Olear Wild Meadows, LLC 610-324-1918 jolear@regalbuilders.net











## **Archdiocese Property Mixed-Use Development**

Transportation Impact Assessment Caln Township, Chester County

## **For Submission To:**

PennDOT District 6-0 & Caln Township

## ARCHDIOCESE PROPERTY MIXED-USE DEVELOPMENT TRANSPORTATION IMPACT ASSESSMENT

FOR SUBMISSION TO:

Caln Township, Chester County, PA & PennDOT District 6-0

Prepared For:

Wild Meadows, LLC

Mr. Harry Miller 13 Nobles Pond Crossing Dover, DE 19904 April 19, 2018 (Last Revised November 6, 2018) TPD # WIME 00001

Prepared By:

Traffic Planning and Design, Inc.

Sanatoga Commons 2500 East High Street, Suite 650 Pottstown, Pennsylvania 19464

Phone: (610) 326-3100 Fax: (610) 326-9410

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Matthew I. Hammond, P.E.

Executive Vice President
Pennsylvania License Number 071037

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## **EXECUTIVE SUMMARY**

The purpose of this revised study is to examine the potential traffic impact associated with the Proposed Archdiocese Property Mixed-Use Development on the roadway network in Caln Township, Chester County, PA. Based on this evaluation, the following conclusions were reached:

- The project site is located on the southeastern corner of Manor Avenue (S.R. 0322) and Lloyd Avenue.
- The Proposed Site will consist of the following uses:
  - 225 active-adult (attached) homes;
  - 121 active-adult (detached) homes;
  - 20 ksf general retail space.
- The Proposed Site will be served by four (4) driveways:
  - One (1) full-access driveway to Manor Avenue (S.R. 0322), opposite Rock Raymond Road (S.R. 4017);
  - One (1) right-in/right-out driveway to Manor Avenue (S.R. 0322), located approximately 100 feet east of the centerline of the existing Downingtown Animal Hospital driveway.
  - Two (2) full-access driveways to a Lloyd Avenue:
    - One (1) opposite the Park and Ride Lot;
    - One (1) opposite the Beaver Run Road.
- The measured sight distances at the site driveways will exceed PennDOT safe stopping sight distance (SSSD) criteria, and in most cases will satisfy PennDOT desirable sight distance criteria.
- The <u>Proposed Site</u> will generate at total of <u>107 new trips</u> during the weekday A.M. peak hour, <u>134 new trips</u> during the weekday P.M. peak hour, and <u>154 new trips</u> during the SAT Midday peak hour.
- Under all projected (build) conditions with the development of the proposed site, with site-related recommendations outline in Table II, and with and without the future signalization at Manor Avenue (S.R. 0322) and the EB Route 30 Ramps planned for by PennDOT, all study area intersections will satisfy PennDOT ILOS Standards.
- Levels of Service (LOS) for the study area intersections have been summarized in matrix form. **Table I** details the overall intersection LOS for each study area intersection:

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TABLE I LEVEL OF SERVICE DELAY (SECONDS) SUMMARY - ILOS

| LEVEL OF SERVIC                                     | (SECOI    | 103) 301 | A11A1 (1 \ 1 | ILOJ    |                    |                         |
|---|-----------|----------|--------------|---------|--------------------|-------------------------|
|   |           | 2017     |              | 2023    |                    | ILOS                    |
| Intersection  | Peak Hour | Exist    | Base         | Proj.   | Proj. <sup>1</sup> | Standards<br>Satisfied? |
| Manor Avenue (S.R. 0322)                            | AM        | B(15.6)  | B(15.9)      | B(18.7) |                    |                         |
| &   | PM        | A(9.5)   | B(11.2)      | B(13.0) |                    | Yes                     |
| Rock Raymond Road (S.R. 4017)/<br>Proposed Driveway | SAT       | A(8.6)   | A(7.2)       | A(8.4)  |                    |                         |
| Manor Avenue (S.R. 0322)                            | AM        | C(23.3)  | C(28.6)      | C(32.5) |                    |                         |
| &   | PM        | B(12.5)  | B(13.8)      | B(14.7) |                    | Yes                     |
| Lloyd Avenue/<br>Royal Farms Driveway               | SAT       | B(13.4)  | B(12.3)      | B(13.3) |                    |                         |
| Manor Avenue (S.R. 0322)                            | AM        | A(3.6)   | A(4.5)       | A(5.1)  | A(8.0)             |                         |
| &   | PM        | A(3.4)   | C(16.8)      | D(29.7) | A(4.9)             | Yes                     |
| EB Route 30 Ramps                                   | SAT       | A(3.0)   | A(3.9)       | A(4.9)  | A(6.3)             |                         |
| Lloyd Avenue  | AM        | A(0.3)   | A(0.3)       | A(0.4)  |                    |                         |
| &   | PM        | A(0.2)   | A(0.2)       | A(0.5)  |                    | Yes                     |
| Park and Ride/Proposed Driveway                     | SAT       | A(0.2)   | A(0.2)       | A(0.6)  |                    |                         |
| Lloyd Avenue  | AM        | A(4.1)   | A(4.1)       | A(4.1)  |                    |                         |
| &   | PM        | A(2.3)   | A(2.2)       | A(2.2)  |                    | Yes                     |
| GO Carlson Boulevard                                | SAT       | A(2.0)   | A(2.0)       | A(1.9)  |                    |                         |
| Lloyd Avenue  | AM        | A(0.5)   | A(0.4)       | A(1.0)  |                    |                         |
| &   | PM        | A(0.1)   | A(0.1)       | A(0.5)  |                    | Yes                     |
| Beaver Run Road/<br>Proposed Driveway               | SAT       | A(0.4)   | A(0.4)       | A(0.7)  |                    |                         |
| Manor Avenue (S.R. 0322)                            | AM        |          |              | A(0.0)  |                    |                         |
| &   | PM        |          |              | A(0.0)  |                    | Yes                     |
| Proposed RIRO Driveway                              | SAT       |          |              | A(0.0)  |                    |                         |

Exist. = Existing, Base = No-Build, Proj. = Build 1= With Signalization (By Others)

• Site-related recommendations are summarized in **Table II**:

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## TABLE II RECOMMENDATIONS

| Intersection   | Responsible<br>Entity    |  | Recommendation   |  |  |
|--|--------------------------|--|--|--|--|
| Manor Avenue (S.R. 0322)<br>&<br>Rock Raymond Road<br>(S.R. 4017)/<br>Proposed Site Driveway | Applicant                | Align the NB and SB left-turn Restripe the WB Manor Avenue  Prov Maximize the EB Manor Avenue  Work with PennDOT and Caln Township to upgrade Pedestrian/ADA facilities at this intersection, to the extent feasible. Specifically,  | gnal to accommodate the Proposed Driveway as the NB proach of the existing signal.  In movements to avoid split-phasing at the intersection are (S.R. 0322) approach, which is currently a TWCLTL, as a 75 foot left-turn lane ride signal timing optimization enue (S.R. 0322) ingress radii in order to facilitate safe agress to the Proposed Site  Investigate a connection to the existing Royal Farms and Proposed Taco Bell via a marked crosswalk  Investigate a connection to the existing sidewalk on the NE corner of the intersection leading into Downingtown. Note that pedestrian activity is |  |  |
| Manor Avenue (S.R. 0322)<br>&<br>EB Route 30 Ramps   | Applicant<br>PennDOT     | the Department requested: prohibited today via signage  Significantly reduce off-ramp right-turn channelization island (thereby moving the merge of the off-ramp/S.R. 0322 eastbound traffic further west, away from Lloyd Avenue).  |  |  |  |
| Manor Avenue (S.R. 0322)<br>&<br>Proposed RIRO Driveway                                      | (MPMS #87781)  Applicant | Restrict left-turn ingress/egress to and from the proposed site via a raised pork-chop island  Provide adequate egress radii to facilitate access from the site  In lieu of a deceleration lane which is not warranted, maximize the ingress radii on EB Manor Avenue in order to facilitate ingress to the site  Provide a "STOP"-sign on the NB egress approach of the driveway  Work with PennDOT and Caln Township to upgrade Pedestrian/ADA facilities at this intersection, to the extent feasible |  |  |  |
| Lloyd Avenue<br>&<br>Park & Ride/<br>Proposed Site Driveway                                  | Applicant                | Provide a "STOP"-sig<br>Provide "Do Not Block Inter<br>Work with PennDOT and Cali  | ss/egress radii to facilitate access to/from the site gn on the NB egress approach of the driveway section" signage on the EB approach of Lloyd Avenue n Township to upgrade Pedestrian/ADA facilities at this rsection, to the extent feasible  |  |  |
| Lloyd Avenue<br>&<br>Beaver Run Road/<br>Proposed Site Driveway                              | Applicant                | Provide a "STOP"-sig<br>Work with PennDOT and Calı   | ss/egress radii to facilitate access to/from the site<br>on on the WB egress approach of the driveway<br>on Township to upgrade Pedestrian/ADA facilities at this<br>rsection, to the extent feasible  |  |  |

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## INTRODUCTION

Traffic Planning and Design, Inc. (TPD) has completed a Transportation Impact Assessment (TIA) for the Proposed Archdiocese Property Mixed-Use Development in Caln Township, Chester County, Pennsylvania. The project site is located on the southeastern corner of Manor Avenue (S.R. 0322) and Lloyd Avenue, as shown in **Figure 1**. The Proposed Site will consist of the following uses, as shown in **Figure 2**:

- 225 active-adult (attached) homes;
- 121 active-adult (detached) homes;
- 20 ksf general retail space.

The Proposed Site will be served by four (4) driveways:

- One (1) full-access driveway to Manor Avenue (S.R. 0322), opposite Rock Raymond Road (S.R. 4017);
- One (1) right-in/right-out driveway to Manor Avenue (S.R. 0322), located approximately 100 feet east of the centerline of the existing Downingtown Animal Hospital driveway.
- Two (2) full-access driveways to a Lloyd Avenue:
  - o One (1) opposite the Park and Ride Lot;
  - o One (1) opposite the Beaver Run Road.

TPD assumed a build-out year of 2023.

This report has been prepared in accordance with PennDOT's *Policies and Procedures for Transportation Impact Studies*, dated January 28, 2009. The scope of this study was confirmed via a PennDOT Scoping Application, dated December 21, 2017, and subsequent PennDOT Scoping Review Letter, dated January 29, 2018. In addition, this TIA was revised based on review comments contained in PennDOT's EPS Review Letter, dated May 18, 2018. All relevant correspondence pertaining to this project has been included in **Appendix A**.

## **EXISTING ROADWAY NETWORK**

A field review of the existing roadway system in the study area was conducted. The existing roadway characteristics within the study area are summarized in **Table 1**. Photographs of the study area intersections are included in **Appendix B**.

TABLE 1
ROADWAY CHARACTERISTICS WITHIN STUDY AREA

| Roadway           | State Route | Functional Classification/<br>Roadway Type | Predominant<br>Directional<br>Orientation | Average<br>Daily<br>Traffic <sup>1</sup> | Posted<br>Speed<br>Limit |
|-------------------|-------------|--|---|--|--------------------------|
| Route 30          | (S.R. 0030) | Urban Freeway                              | East-West                                 | 75,403                                   | 55 mph                   |
| Manor Avenue      | (S.R. 0322) | Urban Principal Arterial                   | East-West                                 | 12,009                                   | 35-45 mph                |
| Rock Raymond Road | (S.R. 4017) | Urban Collector                            | North-South                               | 2,851                                    | 35 mph                   |
| EB Route 30 Ramps | (S.R. 8010) | Ramps                                      | North-South                               | N/A                                      | N/P                      |
| Lloyd Avenue      | N/A         | Collector                                  | Varies                                    | 4,537                                    | 35 mph                   |

1 = PennDOT iTMS Website (January 2018)

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## TABLE 1 (CONTINUED) ROADWAY CHARACTERISTICS WITHIN STUDY AREA

| Roadway                | State Route | Functional Classification/<br>Roadway Type | Predominant<br>Directional<br>Orientation | Average<br>Daily<br>Traffic <sup>1</sup> | Posted<br>Speed<br>Limit |
|------------------------|-------------|--|---|--|--------------------------|
| GO Carlson Boulevard   | N/A         | Local Road                                 | East-West                                 | N/A                                      | 25 mph                   |
| Beaver Run Road        | N/A         | Local Road                                 | East-West                                 | N/A                                      | 25 mph                   |
| Park and Ride Driveway | N/A         | Driveway                                   | North-South                               | N/A                                      | N/P                      |

1 = PennDOT iTMS Website (January 2018)

## **Bicycle and Pedestrian Facilities**

Based on observations during field visits:

<u>Manor Avenue (S.R. 0322) & Rock Raymond Road (S.R. 4017)</u> – No sidewalk or specific pedestrian/bicycle facilities currently exist at this intersection. Pedestrian activity is restricted via signage. There are no specific bicycle facilities at this intersection.

<u>Manor Avenue (S.R. 0322) & Lloyd Avenue/Royal Farms Driveway</u> – Sidewalk, pedestrian ramps, and crosswalks exist along the Royal Farms site frontage only. Pedestrian activity is restricted on the remaining parts of the intersection via signage. There are no specific bicycle facilities at this intersection.

<u>Manor Avenue (S.R. 0322) & EB Route 30 Ramps</u> – No sidewalk or specific pedestrian/bicycle facilities currently exist at this intersection.

<u>Lloyd Avenue & Park and Ride Driveway</u> – There is no sidewalk at this intersection. There are no ADA/Pedestrian/Bicycle Facilities at this intersection.

<u>Lloyd Avenue & GO Carlson Boulevard</u> – There is no sidewalk at this intersection. There are no ADA/Pedestrian/Bicycle Facilities at this intersection.

<u>Lloyd Avenue & Beaver Run Road</u> – There is no sidewalk at this intersection. There are no ADA/Pedestrian/Bicycle Facilities at this intersection.

## **Mass Transit Facilities**

There are no mass transit services in the Study Area. The closest service is from the Downingtown Train Station (approximately 0.8 miles away).

## **Crash Data Investigation**

Crash data were obtained from PennDOT for the study area intersections. PennDOT defines a <u>reportable</u> crash as follows, "A <u>reportable</u> (crash) is one in which an injury or fatality occurs or if at least one of the vehicles involved requires towing from the scene." <u>Reportable</u> crashes were tabulated for the five-year time period beginning 01/01/2012 and ending 12/31/2016. For a given intersection, PennDOT considers a crash occurrence of 5 reportable, correctable crashes over a continuous twelve-month period during the past five years to be a threshold value, above which the intersection design should be reviewed to examine if corrective measures can be taken to enhance safety. The number of reportable crashes at the study area intersections is shown in **Table 2**.



TABLE 2
PENNDOT TOTAL REPORTABLE CRASH DATA

| Study Area Intersection          | Total Number of Reportable (Correctable) Crashes |      |      |      |      |  |  |  |
|----------------------------------|--|------|------|------|------|--|--|--|
| Study Area Intersection          | 2012   | 2013 | 2014 | 2015 | 2016 |  |  |  |
| Manor Avenue & Rock Raymond Road | 0  | 0    | 1(1) | 0    | 0    |  |  |  |
| Manor Avenue & Lloyd Avenue      | 0  | 1(1) | 2(2) | 2(1) | 1(0) |  |  |  |
| Manor Avenue & EB Route 30 Ramps | 1  | 4(3) | 6(6) | 3(1) | 2(1) |  |  |  |

Total Crashes (Correctable Crashes)

Based on a review of the crash data in **Table 2**, there were no twelve-month periods during the past five years where 5 or more crashes occurred that were deemed correctable, with the exception of at the intersection of Manor Avenue (S.R. 0322) and EB Route 30 Ramps. Of these crashes, the main crash pattern includes angle crashes between vehicles making WB left-turns onto the ramp and EB vehicles travelling straight. At the time these crashes occurred, the geometry of Manor Avenue (S.R. 0322) was different and included two (2) lanes in each direction, which could have attributed to this crash pattern. The pavement markings have since been changed and may have contributed to the reduction of crashes over recent years at both intersections involving the Route 30 Ramps, shown in **Table 2**.

## **EXISTING TRAFFIC CONDITIONS**

## **Manual Turning Movement Counts**

Manual traffic counts were conducted on 15-minute intervals during the weekday morning (7:00 to 9:00 A.M.), weekday evening (4:00 to 6:00 P.M.), and Saturday midday (11:00 A.M. to 1:00 P.M.) peak periods. Data pertaining to heavy vehicles, pedestrians and transit vehicles were observed during the manual counts. Peak hours and count dates for the study area intersections are identified in **Table 3**.

TABLE 3
MANUAL TRAFFIC COUNT INFORMATION<sup>1</sup>

| Intersection                          | Date of Traffic Counts      | Time Period  | Intersection Peak Hour <sup>2</sup> |
|---------------------------------------|-----------------------------|--------------|-------------------------------------|
| Manor Avenue (S.R. 0322)              | Tuesday December 10, 2017   | Weekday A.M. | 7:00 to 8:00 A.M.                   |
| &                                     | Tuesday, December 19, 2017  | Weekday P.M. | 4:15 to 5:15 P.M.                   |
| Rock Raymond Road (S.R. 4017)         | Saturday, December 16, 2017 | SAT Midday   | 11:00 A.M. to 12:00 P.M.            |
| Manor Avenue (S.R. 0322)              | Tuesday December 10, 2017   | Weekday A.M. | 7:15 to 8:15 A.M.                   |
| &                                     | Tuesday, December 19, 2017  | Weekday P.M. | 4:15 to 5:15 P.M.                   |
| Lloyd Avenue/<br>Royal Farms Driveway | Saturday, December 16, 2017 | SAT Midday   | 11:15 A.M. to 12:15 P.M.            |
| Manor Avenue (S.R. 0322)              | Tuesday December 10, 2017   | Weekday A.M. | 7:15 to 8:15 A.M.                   |
| &                                     | Tuesday, December 19, 2017  | Weekday P.M. | 4:15 to 5:15 P.M.                   |
| EB Route 30 Ramps                     | Saturday, December 16, 2017 | SAT Midday   | 11:00 to 12:00 P.M.                 |
| Lloyd Avenue                          | Tuesday, December 19, 2017  | Weekday A.M. | 7:15 to 8:15 A.M.                   |
| &                                     | ruesday, December 19, 2017  | Weekday P.M. | 4:30 to 5:30 P.M.                   |
| Park and Ride Driveway                | Saturday, December 16, 2017 | SAT Midday   | 11:45 A.M. to 12:45 P.M.            |
| Lloyd Avenue                          | Tuesday December 10, 2017   | Weekday A.M. | 7:15 to 8:15 A.M.                   |
| &                                     | Tuesday, December 19, 2017  | Weekday P.M. | 4:30 to 5:30 P.M.                   |
| GO Carlson Boulevard                  | Saturday, December 16, 2017 | SAT Midday   | 11:45 A.M. to 12:45 P.M.            |
| Lloyd Avenue                          | Tuesday December 10, 2017   | Weekday A.M. | 7:00 to 8:00 A.M.                   |
| &                                     | Tuesday, December 19, 2017  | Weekday P.M. | 4:15 to 5:15 P.M.                   |
| Beaver Run Road                       | Saturday, December 16, 2017 | SAT Midday   | 12:00 to 1:00 P.M.                  |

1 = Schools confirmed to be in session

2 = Peak Hour consists of the four consecutive 15-minute intervals where the highest traffic volumes occur.



2017 Existing Condition traffic volumes for the weekday A.M., P.M., and SAT Midday peak hours are illustrated in **Figures 3-5**. Manual traffic count data sheets are provided in **Appendix C**.

## **BASE (NO-BUILD) CONDITIONS**

## **Annual Background Growth**

A background growth factor for the roadways in the study area was developed based on growth factors for August 2017 to July 2018 obtained from the PennDOT Bureau of Planning and Research (BPR). The PennDOT BPR suggests using a background growth trend factor of 0.65% per year in Chester County for urban non-interstate roadways. As such, the background growth factor was applied annually to yield overall growth percentages of 3.96% (0.65% per year compounded over 6 years) for the 2023 Full-Build Year.

## **Nearby Planned Developments**

Based on experience in the Study Area, TPD included traffic associated with the following developments, which may be built and operational by the time the Proposed Site is completed in the future:

- <u>Dwell at Caln PRD</u> A 384-unit residential development located on the southern side of Manor Avenue (S.R. 0322), west of Edges Mill Road. TPD generated and distributed for this development based on a TIS prepared by McMahon Associates. The anticipated buildout for this development is 2019. Therefore, TPD assumed full-buildout under all future (base and projected) conditions).
- <u>Taco Bell</u> A 2.753 ksf (66 seat) fast-food restaurant located on the northwestern corner of Manor Avenue (S.R. 0322) and Rock Raymond Road (S.R. 4017). TPD generated and distributed for this development based on a TIS prepared by TPD. The anticipated buildout for this development is 2019. Therefore, TPD assumed full-buildout under all future (base and projected) conditions).

The additional traffic volumes due to background growth and nearby planned developments were added to the existing traffic data to produce 2023 Base Conditions, as illustrated in **Figures 6-8.** Nearby Planned Development Trip Distribution is included in **Appendix D**.

## SCHEDULED ROADWAY IMPROVEMENTS

Based on a review of the PennDOT 12-Year Plan and the DVRPC Transportation Improvement Program (TIP), there was one (1) specific planned roadway improvements project identified in the vicinity of the proposed site:

"MPMS 87781 – US 30, Coatesville Downingtown Bypass (CER-Eastern Section) – Limits: US 30, from East of Reeceville Rd Interchange to Quarry Rd. This project provides for the final design, right-of-way, utility and construction phases of the Coatesville-Downingtown Bypass Reconstruction - eastern section - by reconstructing and widening the mainline shoulders; replacing and widening the mainline bridge superstructures; constructing new ramps (to complete partial interchanges); reconstructing, realigning, and lengthening all on and off ramps (to provide storage length for traffic signals and/or ramp metering); and reconstructing arterial overpasses. The overall corridor construction cost estimate is \$630 million. MPMS# 14532 provides for the preliminary design portion of this project and the western section, as well as additional study work to determine the approach for this eastern section. MPMS# 84884 contains the construction of the western section. Project CMP (Congestion Management Process) commitments include expansion of Intelligent Transportation Systems (ITS) equipment throughout the

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corridor, signal improvements on parallel arterials, numerous improvements to rail transit stations and services in consultation with SEPTA and Amtrak, improved access to rail stations, sidewalks and other improvements for pedestrians and bicyclists on parallel arterials, investigation of park-and-ride locations, and outreach to employers to promote transportation demand management strategies. See DVRPC's 2016-2017 memorandum on supplemental strategies for details related to this project."

This Project also contemplates physical improvements to the Route 322 interchange, including several options for the on/off ramps, including signalization and/or a diverging diamond interchange (DDI). Funding for this Project Starts in 2019, but construction is not estimated to begin any earlier than 2026. Information pertaining to this project is included in **Appendix E**.

Based on further review comments and coordination with PennDOT, the Applicant has agreed to pursue improvements to the EB Route 30 Off-Ramp channelized right-turn onto EB Route 322. This improvement will eliminate the large sweeping channelized right-turn and replace it with a right-turn lane closer to the existing intersection of EB Route 30 Ramp/Route 322. This improvement will maximize the weaving area on Route 322 between this intersection and Lloyd Avenue, to the east.

Additionally, based on further review comments and coordination with PennDOT, the Department agreed that signalization of the intersection of EB Route 30 Ramp/Route 322 will not be the responsibility of the Applicant, but will rather be part of the future project described above. However, this TIS continues to look at this intersection with and without signalization in the future.

It should be noted that the Royal Farms located opposite Lloyd Avenue recently opened and provided several roadway/signal improvements along Manor Avenue (S.R. 0322) and Rock Raymond Road (S.R. 4017). These improvements are included under existing conditions.

## PROPOSED SITE ACCESS

The Proposed Site will be served by four (4) driveways:

- One (1) full-access driveway to Manor Avenue (S.R. 0322), opposite Rock Raymond Road (S.R. 4017);
- One (1) right-in/right-out driveway to Manor Avenue (S.R. 0322), located approximately 100 feet east of the centerline of the existing Downingtown Animal Hospital driveway.
- Two (2) full-access driveways to a Lloyd Avenue:
  - One (1) opposite the Park and Ride Lot;
  - One (1) opposite the Beaver Run Road.

## **Sight Distance Analysis**

A sight distance analysis was prepared for the proposed site driveways. In general, recommended safe sight distances depend upon the posted speed limit and roadway grades. The existing sight distances at the proposed driveways were measured in accordance with PennDOT Publication 282 <u>Highway Occupancy Permit Guidelines</u> and compared to PennDOT's desirable sight distance standard, which is identified in 67 PA Code Chapter 441.8(h), "Access to and Occupancy of Highways by Driveways and Local Roads." In addition, measured sight distances at the proposed driveways were compared to PennDOT's safe stopping sight distance standard, which is calculated by the following equation:



## $SSSD = 1.47VT + V^2/[30(f\pm g)]$

SSSD = safe stopping sight distance (acceptable sight distance)

V = Vehicle Speed

T = Perception Reaction Time of Driver (2.5 seconds)

f = Coefficient of Friction for Wet Pavements

g = Percent of Roadway Grade Divided by 100

**Table 4** shows the measured, desirable, acceptable (SSSD), and required sight distances at the site driveways for vehicles entering and exiting the site.

TABLE 4
SIGHT DISTANCE ANALYSIS
PROPOSED SITE DRIVEWAYS

|                                   | Blooder                        | Posted Speed         | Sig                    | ht Distanc       | t Distances (feet) |                  |  |  |  |
|-----------------------------------|--------------------------------|----------------------|------------------------|------------------|--------------------|------------------|--|--|--|
|                                   | Direction                      | (mph)                | Grade <sup>1</sup> (%) | DES <sup>2</sup> | SSSD <sup>2</sup>  | EXIST            |  |  |  |
| Manor Avenue Full-Access Driveway |                                |                      |                        |                  |                    |                  |  |  |  |
| Cuiting Mayananta                 | To the left                    | 35                   | -2                     | 440              | 256                | 440³             |  |  |  |
| Exiting Movements                 | To the right                   | 35                   | +4                     | 350              | 236                | 500+             |  |  |  |
| Futoring Loft Turns               | Approaching same direction     | 35                   | +4                     | N/A              | 236                | 500+             |  |  |  |
| Entering Left Turns               | Approaching opposite direction | 35                   | -2                     | 300              | 256                | 340              |  |  |  |
|                                   | Manor A                        | venue RIRO Drivew    | ay                     |                  |                    |                  |  |  |  |
| Cuiting Mayananta                 | To the left                    | 45                   | -2                     | 635              | 398                | 700+             |  |  |  |
| Exiting Movements                 | To the right                   | N/A                  | N/A                    | N/A              | N/A                | N/A              |  |  |  |
| Entering Left Turns               | Approaching same direction     | N/A                  | N/A                    | N/A              | N/A                | N/A              |  |  |  |
| Entering Left Turns               | Approaching opposite direction | N/A                  | N/A                    | N/A              | N/A                | N/A              |  |  |  |
|                                   | Lloyd Avenue Driveway          | / (Opposite Park and | d Ride Driveway)       |                  |                    |                  |  |  |  |
| Cuiting Mayananta                 | To the left                    | 35                   | +1                     | 440              | 245                | 350³             |  |  |  |
| Exiting Movements                 | To the right                   | 35                   | +3                     | 350              | 239                | 3074             |  |  |  |
| Entering Left Turns               | Approaching same direction     | 35                   | +3                     | N/A              | 239                | 262 <sup>4</sup> |  |  |  |
| Entering Left Turns               | Approaching opposite direction | 35                   | +1                     | 300              | 245                | 400 <sup>3</sup> |  |  |  |
|                                   | Lloyd Avenue Drive             | way (Opposite Beav   | er Run Road)           |                  |                    |                  |  |  |  |
| Exiting Movements                 | To the left                    | 35                   | +1                     | 440              | 245                | 500+             |  |  |  |
| exiting iviovements               | To the right                   | 35                   | -1                     | 350              | 252                | 500+             |  |  |  |
| Entoring Loft Turns               | Approaching same direction     | 35                   | -1                     | N/A              | 252                | 500+             |  |  |  |
| Entering Left Turns               | Approaching opposite direction | 35                   | +1                     | 300              | 245                | 500+             |  |  |  |

DES = PennDOT Desirable Sight Distance SSSD = PennDOT Acceptable Sight Distance EXIST = Existing (measured) Sight Distance 1 = Roadway Grade Approaching Driveway

2 = Based on the posted speed

3 = With Vegetation Removal

4 = To Signalized Intersection (Slower Turning Movements)

As shown in **Table 4** above, the measured sight distances at the site driveways will exceed PennDOT safe stopping sight distance (SSSD) criteria, and in most cases will satisfy PennDOT desirable sight distance criteria.

## TRIP GENERATION

The trip generation rates for the proposed site were obtained from the manual *Trip Generation*, Ninth Edition, 2012, an Institute of Transportation Engineers (ITE) Informational Report. The statistics in *Trip Generation* are empirical data based on more than 4,800 trip generation studies. The data are categorized by Land Use Codes, with total vehicular trips for a given land use estimated using an independent variable and statistically generated rates or equations.



**Table 5** shows the rates/equations and directional percentages for the analyzed time periods.

TABLE 5
TRIP GENERATION DATA – PROPOSED SITE

| Land Use                              | Time Period               | Size (X) | Equations                 | Enter % | Pass-By %        |
|---------------------------------------|---------------------------|----------|---------------------------|---------|------------------|
|                                       | Average Weekday           |          | Ln(T) = 0.89*In(X) + 2.06 | 50%     |                  |
| Senior Adult Housing<br>Detached      | Weekday A.M. Peak Hour    | 121 du   | T = 0.17*(X) + 29.95      | 35%     |                  |
|                                       | Weekday P.M. Peak Hour    | 12 i uu  | Ln(T) = 0.75*ln(X) + 0.35 | 61%     |                  |
| (ITE Land Use # 251)                  | Saturday Midday Peak Hour |          | T = 0.23*(X)              | 48%     |                  |
| Carian Adult Haveing                  | Average Weekday           |          | T = 2.98*(X) + 21.05      | 50%     |                  |
| Senior Adult Housing<br>Attached      | Weekday A.M. Peak Hour    | 225du    | T = 0.20*(X) - 0.13       | 34%     |                  |
| (ITE Land Use # 252)                  | Weekday P.M. Peak Hour    | 223uu    | T = 0.24*(X) + 1.64       | 54%     |                  |
| (ITE Land Use # 252)                  | Saturday Midday Peak Hour |          | T = 0.31*(X) + 0.46       | 57%     |                  |
|                                       | Average Weekday           |          | T = 42.70*(X)             | 50%     | N/A              |
| General Retail<br>(ITE Land Use #820) | Weekday A.M. Peak Hour    | 20.0 ksf | T = 0.96*(X)              | 62%     | 24% <sup>1</sup> |
|                                       | Weekday P.M. Peak Hour    | 20.0 KSI | T = 3.71*(X)              | 48%     | 34%              |
|                                       | Saturday Midday Peak Hour |          | T = 4.82*X)               | 52%     | 26%              |

T = Total Trips; X = Independent Variable (ksf, dwelling units) 1 = No Data, Utilized PM Minus 10%

Since the retail is being provided partially as an on-site amenity for the residential portion of the Proposed Site, TPD anticipates interaction between the retail and residential portions of Proposed Site. TPD performed a preliminary interaction and determined the following percentages:

- Average Weekday = 9% (Average of AM and PM)
- Weekday AM = 3%
- Weekday PM = 15%
- SAT Midday = 9% (Average of AM and PM)

The Interaction Worksheets are included in **Appendix G**. The results of the trip generation calculations are summarized in **Table 6**.

TABLE 6
TRIP GENERATION – PROPOSED DEVELOPMENT

| Land Use | Ind      |       |      | Ev    | ternal Tr | inc     | Dag   | s-By Tri | ne   |       | New Trip | ·    |
|----------|----------|-------|------|-------|-----------|---------|-------|----------|------|-------|----------|------|
| Code     | Variable | Total | Int. | Total | Enter     | Exit    | Total | Enter    | Exit | Total | Enter    | Exit |
|          |          |       |      | А     | verage V  | Weekday |       |          |      |       |          |      |
| ITE #251 | 121 du   | 560   | -42  | 518   | 259       | 259     |       |          |      | 518   | 259      | 259  |
| ITE #252 | 225 du   | 692   | -54  | 638   | 319       | 319     |       |          |      | 638   | 319      | 319  |
| ITE #820 | 20.0 ksf | 854   | -94  | 760   | 380       | 380     |       |          |      | 760   | 380      | 380  |
| Total    | -        | 2106  | -190 | 1916  | 958       | 958     | 0     | 0        | 0    | 1916  | 958      | 958  |
|          |          |       |      |       | Weekda    | ay AM   |       |          |      |       |          |      |
| ITE #251 | 121 du   | 51    | -1   | 50    | 18        | 32      | 0     | 0        | 0    | 50    | 18       | 32   |
| ITE #252 | 225 du   | 45    | -1   | 44    | 14        | 30      | 0     | 0        | 0    | 44    | 14       | 30   |
| ITE #820 | 20.0 ksf | 19    | -2   | 17    | 11        | 6       | 4     | 3        | 1    | 13    | 8        | 5    |
| Total    | -        | 115   | -4   | 111   | 43        | 68      | 4     | 3        | 1    | 107   | 40       | 67   |
|          |          |       |      |       | Weekda    | ay PM   |       |          |      |       |          |      |
| ITE #251 | 121 du   | 52    | -7   | 45    | 27        | 18      | 0     | 0        | 0    | 45    | 27       | 18   |
| ITE #252 | 225 du   | 56    | -7   | 49    | 25        | 24      | 0     | 0        | 0    | 49    | 25       | 24   |
| ITE #820 | 20.0 ksf | 74    | -14  | 60    | 32        | 28      | 20    | 11       | 9    | 40    | 21       | 19   |
| Total    |          | 182   | -28  | 154   | 84        | 70      | 20    | 11       | 19   | 134   | 73       | 61   |

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TABLE 6 (CONTINUED)
TRIP GENERATION – PROPOSED DEVELOPMENT

| Land Use | Ind        | Total | T-4-1 l-4 |       | External Trips |      | Pass-By Trips |       |      | New Trips |       |      |
|----------|------------|-------|-----------|-------|----------------|------|---------------|-------|------|-----------|-------|------|
| Code     | Variable   | Total | Int.      | Total | Enter          | Exit | Total         | Enter | Exit | Total     | Enter | Exit |
|          | SAT Midday |       |           |       |                |      |               |       |      |           |       |      |
| ITE #251 | 121 du     | 28    | -2        | 26    | 12             | 14   | 0             | 0     | 0    | 26        | 12    | 14   |
| ITE #252 | 225 du     | 70    | -7        | 63    | 36             | 27   | 0             | 0     | 0    | 63        | 36    | 27   |
| ITE #820 | 20.0 ksf   | 96    | -8        | 88    | 46             | 42   | 23            | 12    | 11   | 65        | 34    | 31   |
| Total    | -          | 194   | -17       | 177   | 94             | 83   | 23            | 12    | 11   | 154       | 82    | 72   |

Based on the information contained in Table 6, the <u>Proposed Site</u> will generate at total of <u>107 new trips</u> during the weekday A.M. peak hour, <u>134 new trips</u> during the weekday P.M. peak hour, and <u>154 new trips</u> during the SAT Midday peak hour.

## TRIP DISTRIBUTION

## **New Trips - Residential**

The distribution and assignment of new trips generated by the residential portion of the proposed development was based upon existing traffic patterns in the Study Area. Based on this evaluation, the new trips for the residential portion of the proposed development were distributed to the local roadway network based on the percentages shown in **Table 7.** 

TABLE 7
TRIP DISTRIBUTION PERCENTAGES – NEW TRIPS - RESIDENTIAL

| Diversities To /Ferror | Assistance To /Forest | Distribution Percentage |  |  |
|------------------------|-----------------------|-------------------------|--|--|
| Direction - To/From    | Assignment - To/From  | AM/PM/SAT               |  |  |
| West                   | via Manor Avenue      | 30%                     |  |  |
| North                  | via Route 30          | 25%                     |  |  |
| East                   | via Manor Avenue      | 21%                     |  |  |
| South                  | via Lloyd Avenue      | 9%                      |  |  |
| North                  | via Rock Raymond Road | 9%                      |  |  |
| South                  | via Route 30          | 6%                      |  |  |

## **New Trips - Retail**

The distribution and assignment of new trips generated by the retail portion of the proposed development was based upon existing traffic patterns in the Study Area. Based on this evaluation, the new trips for the retail portion of the proposed development were distributed to the local roadway network based on the percentages shown in **Table 8.** 



TABLE 8
TRIP DISTRIBUTION PERCENTAGES – NEW TRIPS - RETAIL

| Divertion To/Frame  | Assistant To /Free       | Distribution Percentage |  |  |
|---------------------|--------------------------|-------------------------|--|--|
| Direction - To/From | Assignment - To/From     | AM/PM/SAT               |  |  |
| West                | via Manor Avenue         | 29%                     |  |  |
| North               | via Route 30             | 24%                     |  |  |
| East                | via Manor Avenue         | 20%                     |  |  |
| South               | via Lloyd Avenue         | 9%                      |  |  |
| North               | via Rock Raymond Road    | 8%                      |  |  |
| South               | via Route 30             | 6%                      |  |  |
| West                | via GO Carlson Boulevard | 4%                      |  |  |

## **Pass-By Trips**

The distribution and assignment of pass-by trips generated by the proposed development was based upon existing traffic patterns in the Study Area. Based on this evaluation, the pass-by trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 9.** 

TABLE 9
TRIP DISTRIBUTION PERCENTAGES – PASS-BY TRIPS

| Direction       | Distribution Percentage |     |     |  |  |  |
|-----------------|-------------------------|-----|-----|--|--|--|
| Direction       | AM                      | PM  | SAT |  |  |  |
| EB Manor Avenue | 49%                     | 29% | 32% |  |  |  |
| WB Manor Avenue | 21%                     | 39% | 33% |  |  |  |
| EB Lloyd Avenue | 22%                     | 14% | 16% |  |  |  |
| WB Lloyd Avenue | 8%                      | 18% | 19% |  |  |  |

The distribution of site-generated trips for the proposed development during the weekday A.M., P.M., and Saturday midday peak hours are shown in **Figures 9-14**. The trip assignment percentage information is included in **Appendix H.** 

## **PROJECTED (BUILD) CONDITION TRAFFIC VOLUMES**

The site-generated trips for the proposed development were added to the base (no-build) conditions to develop respective projected (build) condition traffic volumes, as shown in **Figures 15-17.** Volume development spreadsheets are contained in **Appendix I.** 

## LEVELS OF SERVICE FOR AN INTERSECTION

For analysis of intersections, level of service is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. LOS criteria is stated in terms of control delay per vehicle for a one-hour analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The criteria are shown in **Table 10**. Delay, as it relates to level of service, is a complex measure and is dependent upon a number of variables. For signalized intersections, these variables include the quality of vehicle progression, the cycle length, the green time ratio, and the volume/capacity ratio for the lane group in question. For unsignalized intersections, delay is related

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to the availability of gaps in the flow of traffic on the major street and the driver's discretion in selecting an appropriate gap for a particular movement from the minor street (straight across, left or right turn).

## TABLE 10 LEVEL OF SERVICE CRITERIA UNSIGNALIZED AND SIGNALIZED INTERSECTIONS 1

| Lovel of Comics  | Control Delay Pe  | r Vehicle (Seconds) |
|------------------|-------------------|---------------------|
| Level of Service | Signalized        | Unsignalized        |
| А                | < 10              | < 10                |
| В                | > 10 and < 20     | > 10 and < 15       |
| С                | > 20 and < 35     | > 15 and < 25       |
| D                | > 35 and < 55     | > 25 and < 35       |
| E                | > 55 and < 80     | > 35 and < 50       |
| F                | > 80 or v/c > 1.0 | > 50 or v/c > 1.0   |

Obtained from Exhibits 18-4 and 19-1 of the Transportation Research Board's Highway Capacity Manual 2010

## CAPACITY ANALYSIS METHODOLOGY

Capacity analyses were conducted for the weekday A.M., P.M., and Saturday midday peak hours at the study area intersections. These analyses were conducted according to the methodologies contained in the 2010 *Highway Capacity Manual* (HCM) using *Synchro 10* software, a Trafficware product.

The following conditions were analyzed, as applicable:

- 2017 Existing conditions;
- 2023 Base conditions (Build-out year without development);
- 2023 Projected conditions (Build-out year with development).

It should be noted that based on methodologies contained in Chapter 10 of PennDOT's Publication 46, TPD adjusted the following 2010 HCM default values in the *Synchro 10* capacity analysis. These adjustments were made at the signalized intersections within the study area for all time periods based on the study area location being classified as <u>Suburban</u>:

- Base saturation flow rates for signalized intersections. The saturation flow rate was changed from the default value of 1900 to 1800 based on Exhibit 10-9.
- Start-up lost time and extension of effective green time for signalized intersections. The startup lost time was changed from the default value of 2.0 seconds to 2.5 seconds. Based on the total clearance time (yellow plus all-red time) being greater than 5 seconds, the extension of green time was changed from the default value of 2 seconds to 3.5 seconds. These adjusted values were based on Exhibit 10-10.
- Critical and Follow-Up Gap times were adjusted relative to the difference between default and PA
  Default values contained in Exhibits 10-11 and 10-12. As requested by PennDOT, worksheets/tables
  showing how these values were calculated are included in **Appendix J**.

In addition, capacity analyses were conducted at the proposed site driveway intersections under the projected conditions. The capacity analysis worksheets are included in **Appendix K**. The PennDOT-approved signal plans are included in **Appendix L**.



PennDOT's Transportation Impact Study Guidelines outlined in Strike-Off Letter 470-09-4, dated February 12, 2009 contain the following criteria regarding levels of service:

- Page 29 of the Guidelines state that if evaluation of the With Development Horizon Year Scenario to the Without Development Horizon Year Scenario indicates that the overall intersection level of service has dropped, the applicant will be required to mitigate the level of service if the increase in overall intersection delay is greater than 10-seconds. If the overall intersection delay increase is less than or equal to 10-seconds, mitigation of the intersection will not be required.
- Page 29 of the Guidelines state that for mitigation scenarios, applicants are expected to mitigate the
  overall intersection LOS to the original Without Development LOS; the 10-second delay variance is
  not applied to mitigation scenarios. Applicants may be required to address available storage and
  queue lengths at critical movements or approaches even if the overall LOS requirements are met.
- Page 31 of the Guidelines state that if signalization is the preferred alternative for mitigation, overall intersection LOS C in rural areas and LOS D in urban areas is acceptable.
- Page 31 of the Guidelines states new signalized or unsignalized intersection established to serve as
  access to the development shall be designed to operate at minimum LOS C for rural areas, and
  minimum LOS D for urban areas.

Per PennDOT Standards, in order to determine the true impact of the Proposed Site, signal timings were optimized under base (future no build). Those timings were then utilized for each respective projected (future build) scenario.

## LEVELS OF SERVICE IN THE STUDY AREA

Level of service (LOS) matrices for the study area intersections are shown in **Table 11** for the weekday A.M., P.M., Saturday midday peak hours.



TABLE 11
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

|                      |          |         | Weekd    | ay A.M.  |                    |          | Weeko   | day P.M. |                    |         | SAT M   | 1idday   |                    |
|----------------------|----------|---------|----------|----------|--------------------|----------|---------|----------|--------------------|---------|---------|----------|--------------------|
| Intersection         | Movement | 2017    |          | 2023     |                    | 2017     |         | 2023     |                    | 2017    |         | 2023     |                    |
|                      |          | Exist   | Base     | Proj.    | Proj. <sup>1</sup> | Exist    | Base    | Proj.    | Proj. <sup>1</sup> | Exist   | Base    | Proj.    | Proj. <sup>1</sup> |
|                      | EBL      | Α       | Α        | В        |                    | Α        | Α       | В        |                    | Α       | Α       | Α        |                    |
|                      | EBT      | Α       | Α        |          |                    | Α        | Α       |          |                    | Α       | Α       |          |                    |
| Manor Avenue         | EBR      |         |          | Α        |                    |          |         | Α        |                    |         |         | Α        |                    |
| (S.R. 0322)          | WBL      |         |          | В        |                    |          |         | Α        |                    |         |         | Α        |                    |
| &                    | WBT      | В       | В        | C        | -                  | В        | В       | В        | 1                  |         |         | Α        |                    |
| Rock Raymond<br>Road | WBR      | D       | Б        | C        |                    | Б        | Б       | D        |                    | Α       | Α       | А        |                    |
| (S.R. 4017)/         | NBLTR    |         |          | D        |                    |          |         | D        |                    |         |         | С        |                    |
| Proposed             | SBL      | Е       | Е        | D        |                    | D        | D       | D        |                    | D       | D       | C        |                    |
| Driveway             | SBT      |         |          | С        |                    |          |         | D        |                    |         |         | C        |                    |
|                      | SBR      | C       | С        | C        |                    | D        | D       | D        |                    | С       | С       | C        |                    |
|                      | ILOS     | B(15.6) | B(15.9)  | B(18.7)  |                    | A(9.5)   | B(11.2) | B(13.0)  |                    | A(8.6)  | A(7.2)  | A(8.4)   |                    |
|                      | EBL      | В       | В        | В        |                    | Α        | С       | C        |                    | Α       | Α       | В        |                    |
|                      | EBT      | C       | D        | D        |                    | В        | В       | В        |                    | В       | В       | В        |                    |
| Manor Avenue         | EBR      | В       | В        | В        |                    | В        | В       | В        |                    | Α       | В       | В        |                    |
| (S.R. 0322)          | WBL      | В       | С        | С        |                    | Α        | Α       | В        |                    | Α       | Α       | Α        |                    |
| &                    | WBT      | Α       | Α        | Α        |                    | Α        | Α       | Α        |                    | Α       | Α       | Α        |                    |
| Lloyd Avenue/        | WBR      | Α       | Α        | Α        |                    | Α        | Α       | Α        |                    | Α       | Α       | Α        |                    |
| Royal Farms          | NBLT     | D       | D        | D        |                    | D        | D       | D        |                    | С       | С       | С        |                    |
| Driveway             | NBR      | D       | D        | С        |                    | С        | С       | С        |                    | С       | С       | С        |                    |
|                      | SBLT     | D       | D        | D        |                    | D        | С       | С        |                    | С       | С       | С        |                    |
|                      | ILOS     | C(23.3) | C(28.6)  | C(32.5)  |                    | B(12.5)  | B(13.8) | B(14.7)  |                    | B(13.4) | B(12.3) | B(13.3)  |                    |
|                      | EBT      |         |          |          | Α                  |          |         |          | Α                  |         |         |          | Α                  |
| Manor Avenue         | EBR      |         |          |          | Α                  |          |         |          | Α                  |         |         |          | Α                  |
| (S.R. 0322)          | WBL      | В       | C        | C        | В                  | В        | В       | В        | Α                  | В       | В       | В        | Α                  |
| &                    | WBT      |         |          |          | Α                  |          |         |          | Α                  |         |         |          | Α                  |
| EB Route 30          | NBL      | F(58.4) | F(117.3) | F(169.4) | Е                  | F(203.3) | F(999+) | F(999+)  | Е                  | E       | F(92.8) | F(153.8) | D                  |
| Ramps                | NBR      | С       | С        | С        | Α                  | С        | С       | С        | Α                  | В       | С       | С        | Α                  |
|                      | ILOS     | A(3.6)  | A(4.5)   | A(5.1)   | A(8.0)             | A(3.4)   | C(16.8) | D(29.7)  | A(4.9)             | A(3.0)  | A(3.9)  | A(4.9)   | A(6.3)             |
| House Avenue         | EBL      | Α       | Α        | Α        |                    | Α        | Α       | Α        |                    | Α       | Α       | Α        |                    |
| Lloyd Avenue<br>&    | WBL      |         |          | Α        |                    |          |         | Α        |                    |         |         | Α        |                    |
| Park and Ride/       | NB       |         |          | В        |                    |          |         | В        |                    |         |         | В        |                    |
| Proposed             | SB       | С       | С        | С        |                    | В        | В       | С        |                    | В       | В       | В        |                    |
| Driveway             | ILOS     | A(0.3)  | A(0.3)   | A(0.4)   |                    | A(0.2)   | A(0.2)  | A(0.5)   |                    | A(0.2)  | A(0.2)  | A(0.6)   |                    |

Exist. = Existing, Base = No-Build, Proj. = Build 1= With Signalization (By Others)



TABLE 11 (CONTINUED)
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

| ELVEL OF SERVICE DELAT (SECONDS) SOMMARY      |          |        |           |        |        |              |        |        |            |        |  |
|---|----------|--------|-----------|--------|--------|--------------|--------|--------|------------|--------|--|
|   |          | W      | eekday A. | .M.    | W      | Weekday P.M. |        |        | SAT Midday |        |  |
| Intersection                                  | Movement | 2017   | 20        | 23     | 2017   | 20           | 23     | 2017   | 20         | 23     |  |
|   |          | Exist  | Base      | Proj.  | Exist  | Base         | Proj.  | Exist  | Base       | Proj.  |  |
| Lloyd Avenue                                  | EB       | В      | С         | С      | В      | В            | С      | В      | В          | В      |  |
| &   | NBL      | Α      | Α         | Α      | Α      | Α            | Α      | Α      | Α          | Α      |  |
| GO Carlson<br>Boulevard                       | ILOS     | A(4.1) | A(4.1)    | A(4.1) | A(2.3) | A(2.2)       | A(2.2) | A(2.0) | A(2.0)     | A(1.9) |  |
| Lloyd Avenue                                  | EB       | В      | В         | В      | В      | В            | В      | В      | В          | В      |  |
| &   | WB       |        |           | В      |        |              | В      |        |            | В      |  |
| Beaver Run Road/                              | NBL      | Α      | Α         | Α      | Α      | Α            | Α      | Α      | Α          | Α      |  |
| Proposed                                      | SBL      | 1      |           | Α      |        |              | Α      |        |            | Α      |  |
| Driveway                                      | ILOS     | A(0.5) | A(0.4)    | A(1.0) | A(0.1) | A(0.1)       | A(0.5) | A(0.4) | A(0.4)     | A(0.7) |  |
| Manor Avenue                                  | NBR      |        |           | Α      |        |              | В      |        |            | В      |  |
| (S.R. 0322)<br>&<br>Proposed RIRO<br>Driveway | ILOS     |        |           | A(0.0) |        |              | A(0.0) |        |            | A(0.0) |  |

Exist. = Existing, Base = No-Build, Proj. = Build

As shown in **Table 11**, under all projected (build) conditions with the development of the proposed site, with site-related recommendations outline in **Table 14**, and with or without the future signalization at Manor Avenue (S.R. 0322) and the EB Route 30 Ramps planned for by PennDOT, all study area intersections will satisfy PennDOT ILOS Standards.

## 95TH PERCENTILE QUEUE ANALYSIS

Queue analyses were conducted at the study area intersections using *Synchro 10* software. For this analysis, the 95<sup>th</sup> percentile queue is defined as the queue length that is exceeded in 5% of the signal cycles. As an example, for a signal with a 90-second cycle, this means that the 95<sup>th</sup> percentile queue length will be exceeded during 2 of the 40 signal cycles that occur during the peak hour. The queue analysis results are for the 2026 Design Year are summarized in **Table 12** for the analyzed peak hours.

TABLE 12
95TH PERCENTILE OUEUE ANALYSIS

| 331117 ERCEIVITE QUEUE ANALISIS |          |                                       |      |                    |            |                    |        |                    |  |
|---------------------------------|----------|---------------------------------------|------|--------------------|------------|--------------------|--------|--------------------|--|
|                                 |          |                                       |      | 95 <sup>th</sup> F | Percentile | Queues (           | (Feet) |                    |  |
| Interception                    | Mayamant | Available<br>Stacking<br>(Base/Proj.) |      |                    | 20         | 23                 |        |                    |  |
| Intersection                    | Movement |                                       | А    | М                  | Р          | М                  | SAT    |                    |  |
|                                 |          |                                       | Base | Proj. <sup>1</sup> | Base       | Proj. <sup>1</sup> | Base   | Proj. <sup>1</sup> |  |
|                                 | EBL      | 145 <sup>2</sup>                      | 230  | 253                | 55         | 58                 | <25    | 25                 |  |
|                                 | EBT      | נסטבז                                 | 63   | 102                | <25        | <25                | <25    | <25                |  |
| Manor Avenue (S.R. 0322)        | EBR      | [325]                                 |      | 103                |            | <23                |        | <b>\</b> 23        |  |
| &                               | WBL      | /75                                   |      | <25                |            | <25                |        | <25                |  |
| Rock Raymond Road               | WBTR     |                                       | 280  | 318                | 548        | 588                | 255    | 260                |  |
| (S.R. 4017)/                    | NBLTR    |                                       |      | 63                 |            | 55                 |        | 40                 |  |
| Proposed Driveway               | SBL      | 230                                   | 358  | 345                | 98         | 95                 | 63     | 58                 |  |
|                                 | SBT      |                                       |      | 1.42               |            | 105                |        | го                 |  |
|                                 | SBR      |                                       | 255  | 143                | 183        | 105                | 95     | 58                 |  |

[Distance to Adjacent Study Area Intersection]

<sup>1</sup>With Site-Related Recommendations, <sup>2</sup>TWCLTL So Available Storage is Longer



## TABLE 12 (CONTINUED) 95TH PERCENTILE QUEUE ANALYSIS

|   | JULITE   | RCENTILE (       | ZOLUL |                    |      |                    | (F ()  |                    |
|---|----------|------------------|-------|--------------------|------|--------------------|--------|--------------------|
|   |          | Available        |       | 95" F              |      | Queues             | (Feet) |                    |
| Intersection  | Movement | Stacking         |       |                    |      | )23                |        |                    |
|   |          | (Base/Proj.)     |       | М                  |      | М                  | SA     |                    |
|   |          |                  | Base  | Proj. <sup>1</sup> | Base | Proj. <sup>1</sup> | Base   | Proj. <sup>1</sup> |
|   | EBL      | 190              | 38    | 38                 | 55   | 58                 | 30     | 33                 |
|   | EBT      | [465]            | 1000  | 1108               | 413  | 458                | 333    | 375                |
| Manar Avanua (C.D. 0222)                                | EBR      | 385              | 72    | 80                 | 153  | 168                | 90     | 100                |
| Manor Avenue (S.R. 0322)<br>&                           | WBL      | 150 <sup>2</sup> | 95    | 103                | 58   | 63                 | 30     | 33                 |
| Lloyd Avenue/   | WBT      | [600]            | <25   | <25                | 40   | 38                 | <25    | <25                |
| Royal Farms Driveway                                    | WBR      | 150              | <25   | <25                | <25  | <25                | <25    | <25                |
|   | NBLT     |                  | 340   | 363                | 272  | 285                | 205    | 220                |
|   | NBR      | 150              | 195   | 195                | 58   | 58                 | <25    | <25                |
|   | SBLTR    |                  | 75    | 75                 | 95   | 95                 | 65     | 65                 |
|   | EBT      | [600]            |       | 520                |      | 380                |        | 335                |
|   | EBR      |                  |       | <25                |      | <25                |        | <25                |
| Manor Avenue (S.R. 0322)<br>&                           | WBL      | 250              | 72    | 220                | 35   | 90                 | 40     | 85                 |
| EB Route 30 Ramps                                       | WBT      | [465]            |       | <25                |      | <25                |        | <25                |
|   | NBL      |                  | 30    | 25                 | 100  | 33                 | 42     | 33                 |
|   | NBR      |                  | 60    | <25                | 68   | <25                | 40     | <25                |
| Lloyd Avenue  | EBL      | [755]            | <25   | <25                | <25  | <25                | <25    | <25                |
| &   | WBL      | [225]            |       | <25                |      | <25                |        | <25                |
| Park and Ride/  | NB       |                  |       | <25                |      | <25                |        | <25                |
| Proposed Driveway                                       | SB       |                  | <25   | <25                | <25  | <25                | <25    | <25                |
| Lloyd Avenue  | EB       |                  | 40    | 43                 | <25  | <25                | <25    | <25                |
| &<br>GO Carlson Boulevard                               | NBL      | [450]            | <25   | <25                | <25  | <25                | <25    | <25                |
| Lloyd Avenue  | EB       |                  | <25   | <25                | <25  | <25                | <25    | <25                |
| &   | WB       |                  |       | <25                |      | <25                |        | <25                |
| Beaver Run Road/<br>Proposed Driveway                   | NBL      |                  | <25   | <25                | <25  | <25                | <25    | <25                |
|   | SBL      | [450]            |       | <25                |      | <25                |        | <25                |
| Manor Avenue (S.R. 0322)<br>&<br>Proposed RIRO Driveway | NBR      |                  |       | <25                |      | <25                |        | <25                |

[Distance to Adjacent Study Area Intersection]

<sup>1</sup>With Signalization (By Others)

<sup>2</sup>TWCLTL So Available Storage is Longer

Queue analysis worksheets are included with the capacity analysis worksheets provided in **Appendix K**.

## **AUXILIARY TURN LANE ANALYSIS**

## Methodology

TPD evaluated auxiliary turn lane warrants at the Proposed Driveways. The warrant analysis methodology contained within Chapter 11 of PennDOT's *Publication 46*, Section 11.17 and Strike-Off Letter 470-08-07 was utilized for this evaluation.

## **Findings**

**Table 13** summarizes the results of the auxiliary turn lane analysis at the site access intersections.

Page 14———— www.TrafficPD.com



TABLE 13
AUXILIARY TURN LANE ANALYSIS SUMMARY

| Intersection                        | Auxiliary Lane     | Warrant<br>Satisfied? | Required<br>Lane<br>Length | Proposed Lane<br>Length |
|-------------------------------------|--------------------|-----------------------|----------------------------|-------------------------|
| Proposed Manor Avenue Driveway @    | WB Left-Turn Lane  | Yes                   | 75′                        | 75 <sup>′</sup>         |
| Rock Raymond Road                   | EB Right-Turn Lane | No                    |                            |                         |
| Proposed Manor Avenue RIRO Driveway | EB Right-Turn Lane | No                    |                            | Maximize Ingress Radii  |
| Proposed Lloyd Avenue Driveway @    | WB Left-Turn Lane  | No                    |                            |                         |
| Park and Ride Driveway              | EB Right-Turn Lane | No                    |                            |                         |
| Proposed Lloyd Avenue Driveway @    | SB Left-Turn Lane  | No                    |                            |                         |
| Beaver Run Road                     | NB Right-Turn Lane | No                    |                            |                         |

The calculations for the auxiliary turn lane warrants are included in **Appendix M**.

## **SIGNAL WARRANT ANALYSIS**

As requested by PennDOT in their Scoping Review (dated January 29, 2018), TPD performed a Signal Warrant Analysis at the intersection of Manor Avenue (S.R. 0322) and EB Route 30 Ramps. TPD evaluated warrants at this intersection two (2) ways:

- With both directions of Manor Avenue (S.R. 0322) as the Major Roadway and the Northbound approach of the EB Route 30 Ramp as the Minor Roadway. It should be noted that, based on the existing geometry of the intersection (large right-turn radii), both the EBR and NBR movements were excluded as they would not be part of any future signalization.
- With the EB direction of Manor Avenue (S.R. 0322) as the Major Roadway and the WBL movement of Manor Avenue (S.R. 0322) as the Minor Roadway.

As such, TPD evaluated three (3) applicable signal warrants contained in the 2009 MUTCD and PennDOT Publication 46/412, as follows:

- Warrant 2 (Four-Hour Vehicular Volume)
- Warrant 3 (Peak Hour Volume)
- Warrant 7 (Crash Experience)

Based on the results of this warrant analysis:

- <u>None of the warrants are satisfied</u> under 2023 Projected Conditions (future with development) when the intersection is evaluated with the NB approach of the EB Route 30 Ramp as the Minor Roadway.
- Warrant 2 and Warrant 3 <u>are satisfied</u> under 2018 Existing Conditions (today without the development) when the intersection is evaluated with the EB direction of Manor Avenue (S.R. 0322) as the Major Roadway and the WBL movement of Manor Avenue (S.R. 0322) as the Minor Roadway.

Therefore, projected condition analyses at the intersection were evaluated <u>with and without</u> signalization. However, as shown above, signal warrants <u>are not</u> warranted due to the development of the Proposed Site. Furthermore, as stated before, there is a long-range (funded) project for this interchange (MPMS 87781) that includes signalization of this intersection. *Additionally, based on further review comments and coordination with PennDOT, the Department agreed that signalization of the intersection of EB* 



Route 30 Ramp/Route 322 will not be the responsibility of the Applicant, but will rather be part of the future project described above. Signal Warrants are included in Appendix N.

## **RECOMMENDATIONS**

TPD has made the following recommendations in relation to the Proposed Development in Caln Township, as outlined in **Table 14**:

TABLE 14
RECOMMENDATIONS

| Intersection  | Responsible<br>Entity    |  | Recommendation   |  |  |  |
|---|--------------------------|--|--|--|--|--|
|   |                          | Re-design the intersection/signal to accommodate the Proposed Driveway as the NB approach of the existing signal.  |  |  |  |  |
| Manor Avenue (S.R. 0322)                                    |                          | Align the NB and SB left-turn movements to avoid split-phasing at the intersection   |  |  |  |  |
|   |                          | Restripe the WB Manor Avenue (S.R. 0322) approach, which is currently a TWCLTL, as   |  |  |  |  |
|   |                          | Duran  | a 75 foot left-turn lane   |  |  |  |
| &   |                          |  | ride signal timing optimization<br>enue (S.R. 0322) ingress radii in order to facilitate safe      |  |  |  |
| Rock Raymond Road<br>(S.R. 4017)/<br>Proposed Site Driveway | Applicant                |  | ngress to the Proposed Site  |  |  |  |
|   |                          | Work with PennDOT and<br>Caln Township to upgrade  | Investigate a connection to the existing Royal Farms and Proposed Taco Bell via a marked crosswalk |  |  |  |
|   |                          | Pedestrian/ADA facilities at   | Investigate a connection to the existing sidewalk on   |  |  |  |
|   |                          | this intersection, to the extent feasible. Specifically,   | the NE corner of the intersection leading into   |  |  |  |
|   |                          | the Department requested:  | Downingtown. Note that pedestrian activity is<br>prohibited today via signage                      |  |  |  |
| Manor Avenue (S.R. 0322)                                    | Applicant                | Significantly reduce off-ramp right-turn channelization island (thereby moving the merge of the off-ramp/S.R. 0322 eastbound traffic further west, away from Lloyd |  |  |  |  |
| &   |                          |  | Avenue).   |  |  |  |
| EB Route 30 Ramps   | PennDOT<br>(MPMS #87781) | Signalization of the Intersection  |  |  |  |  |
|   |                          | Restrict left-turn ingress/egress to and from the proposed site via a raised pork-chop island  |  |  |  |  |
| Manor Avenue (S.R. 0322)                                    |                          | Provide adequate egress radii to facilitate access from the site   |  |  |  |  |
| 8   | Applicant                | In lieu of a deceleration lane which is not warranted, maximize the ingress radii on EB  |  |  |  |  |
| Proposed RIRO Driveway                                      | ''                       | Manor Avenue in order to facilitate ingress to the site  |  |  |  |  |
|   |                          | Provide a "STOP"-sign on the NB egress approach of the driveway  Work with PennDOT and Caln Township to upgrade Pedestrian/ADA facilities at this                  |  |  |  |  |
|   |                          |  | rsection, to the extent feasible   |  |  |  |
| Lloyd Avenue  |                          | •  | ss/egress radii to facilitate access to/from the site  |  |  |  |
| &   | A I: t                   |  | gn on the NB egress approach of the driveway   |  |  |  |
| Park & Ride/  | Applicant                | Provide "Do Not Block Intersection" signage on the EB approach of Lloyd Avenue   |  |  |  |  |
| Proposed Site Driveway                                      |                          | Work with PennDOT and Caln Township to upgrade Pedestrian/ADA facilities at the intersection, to the extent feasible   |  |  |  |  |
| Lloyd Avenue  |                          | Provide adequate ingre   | ss/egress radii to facilitate access to/from the site  |  |  |  |
| &   | Applicant                |  | n on the WB egress approach of the driveway  |  |  |  |
| Beaver Run Road/<br>Proposed Site Driveway                  | Applicant                | Work with PennDOT and Caln Township to upgrade Pedestrian/ADA facilities at this intersection, to the extent feasible  |  |  |  |  |
| Proposed Site Driveway                                      |                          | rsection, to the extent feasible   |  |  |  |  |

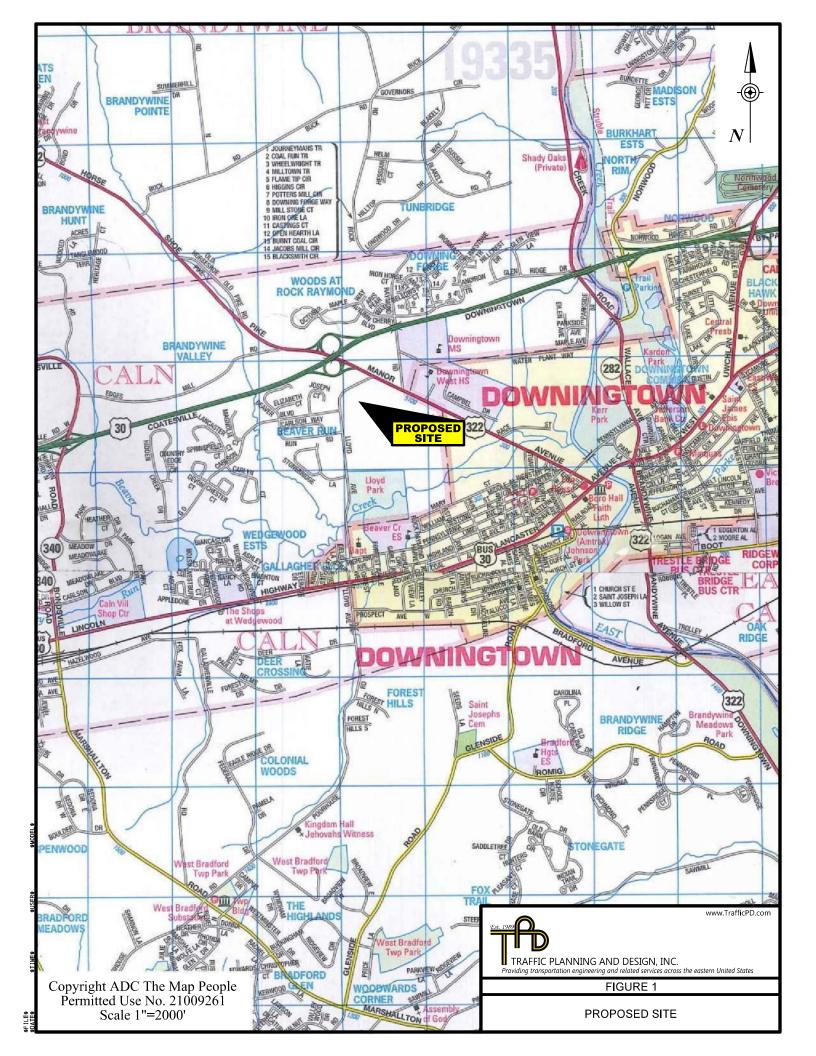
As part of PennDOT's HOP process, the applicant will coordinate and fund the implementation of the recommended roadway improvements. Preliminary construction costs have not been determined at this time.

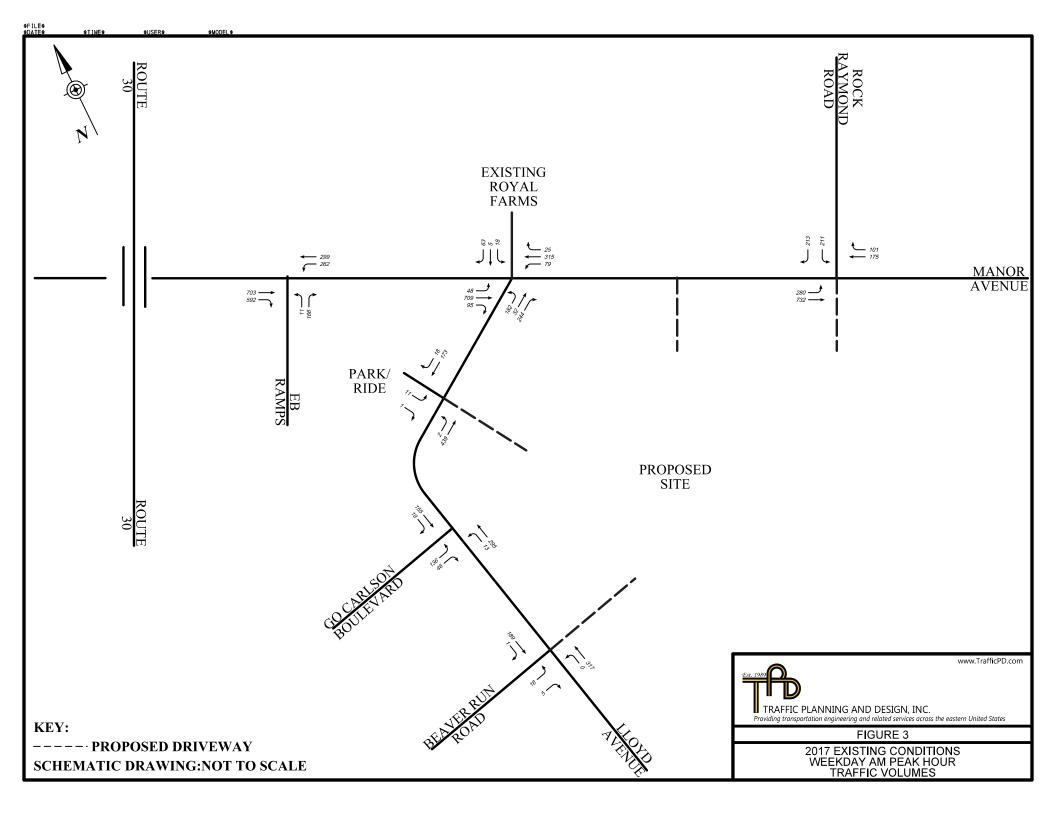


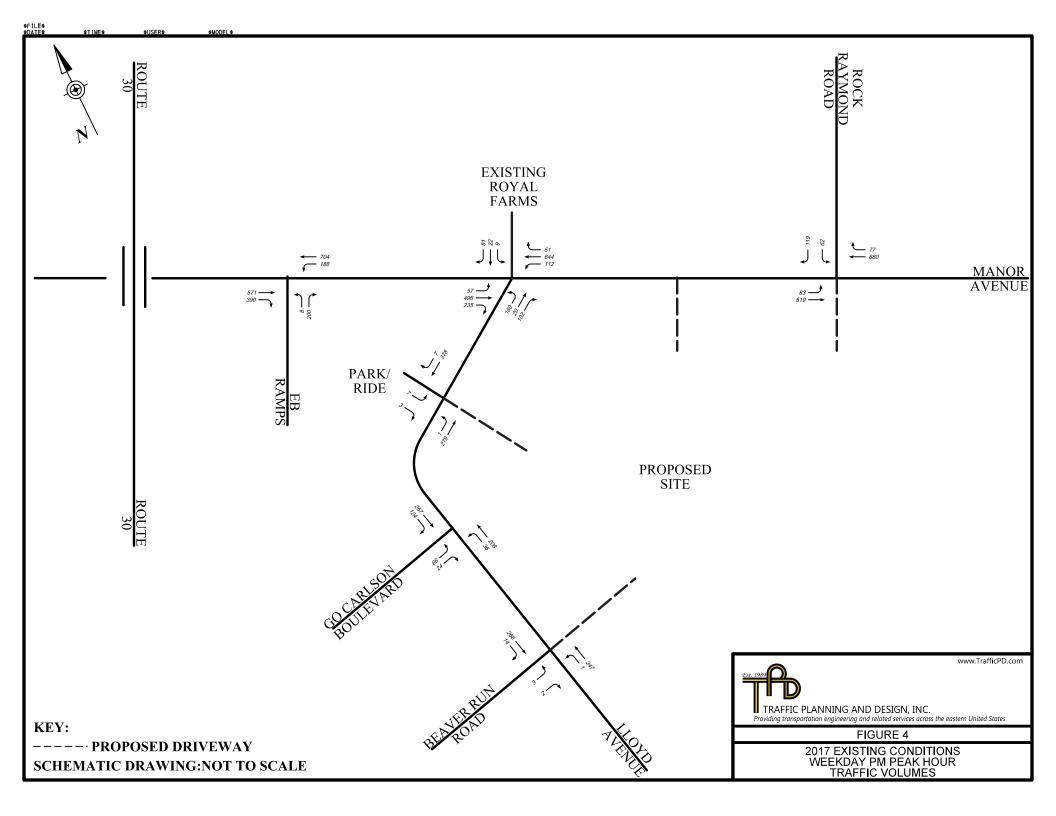
## **CONCLUSIONS**

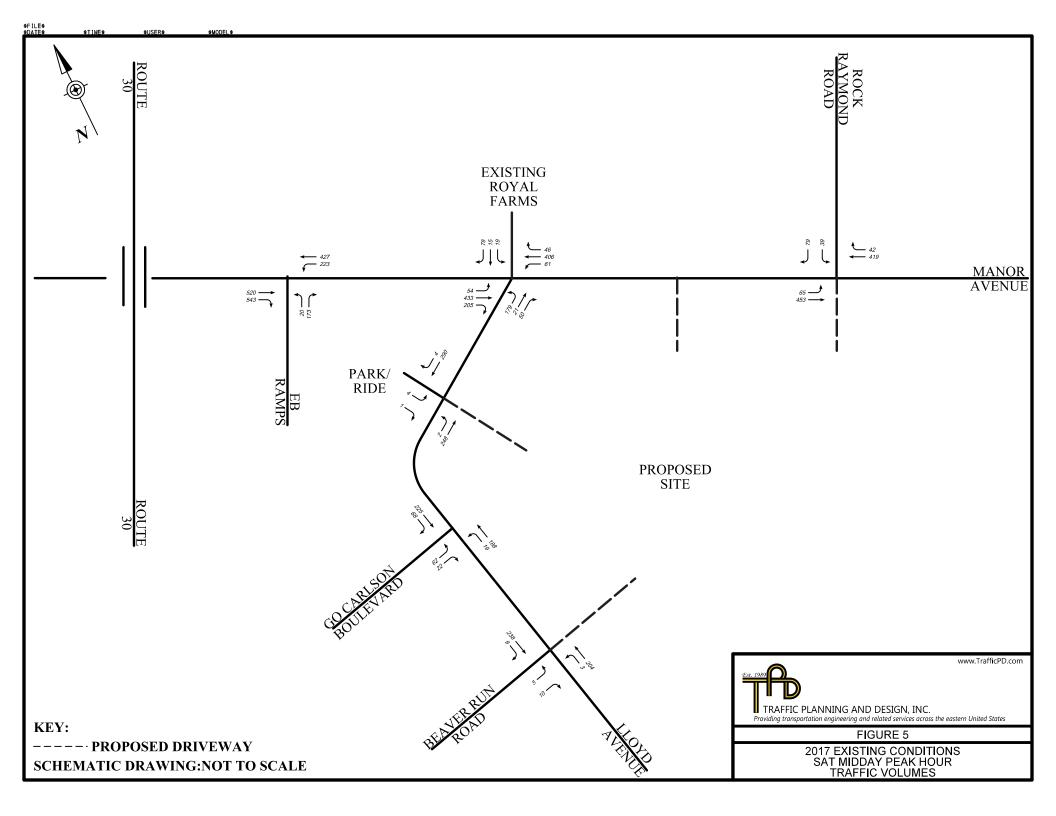
Based on the results of the transportation impact assessment, TPD offers the following conclusions:

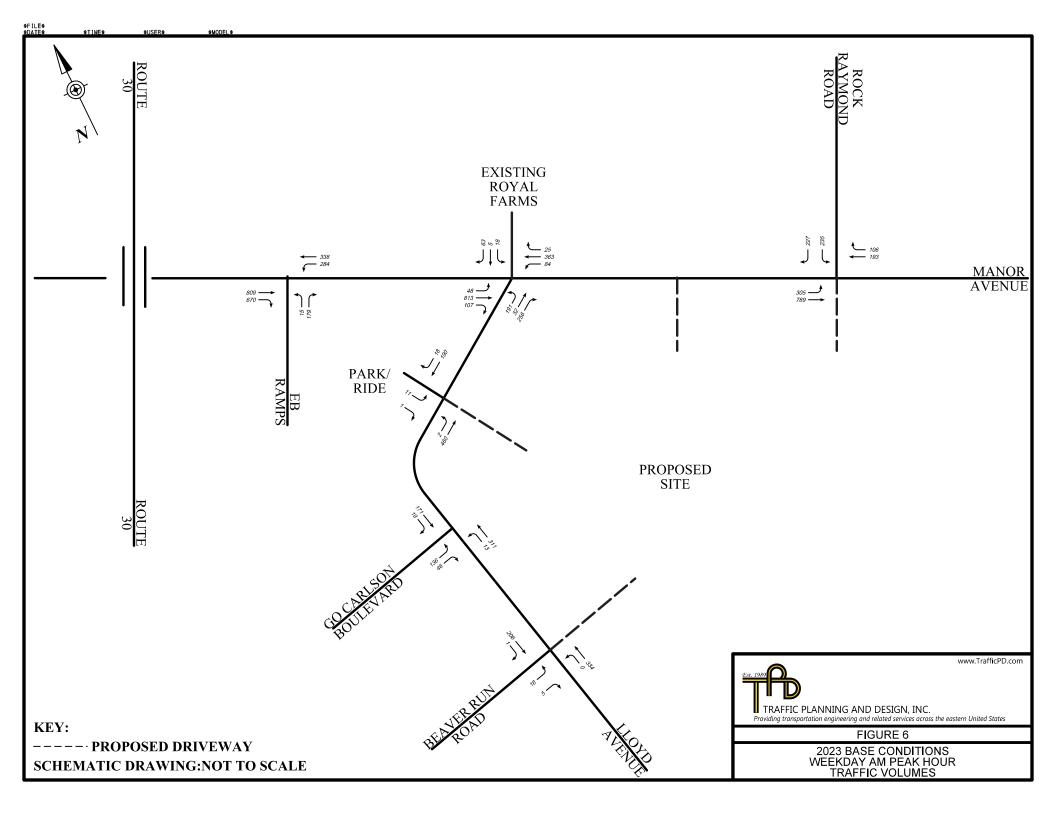
- The project site is located on the southeastern corner of Manor Avenue (S.R. 0322) and Lloyd Avenue.
- The Proposed Site will consist of the following uses:
  - 225 active-adult (attached) homes;
  - 121 active-adult (detached) homes;
  - 20 ksf general retail space.
- The Proposed Site will be served by four (4) driveways:
  - One (1) full-access driveway to Manor Avenue (S.R. 0322), opposite Rock Raymond Road (S.R. 4017);
  - One (1) right-in/right-out driveway to Manor Avenue (S.R. 0322), located approximately 100 feet east of the centerline of the existing Downingtown Animal Hospital driveway.
  - Two (2) full-access driveways to a Lloyd Avenue:
    - One (1) opposite the Park and Ride Lot;
    - One (1) opposite the Beaver Run Road.
- The measured sight distances at the site driveways will exceed PennDOT safe stopping sight distance (SSSD) criteria, and in most cases will satisfy PennDOT desirable sight distance criteria.
- The <u>Proposed Site</u> will generate at total of <u>107 new trips</u> during the weekday A.M. peak hour, <u>134 new trips</u> during the weekday P.M. peak hour, and <u>154 new trips</u> during the SAT Midday peak hour.
- Under all projected (build) conditions with the development of the proposed site, with site-related recommendations outline in Table 14, and with and without the future signalization at Manor Avenue (S.R. 0322) and the EB Route 30 Ramps planned for by PennDOT, all study area intersections will satisfy PennDOT ILOS Standards.

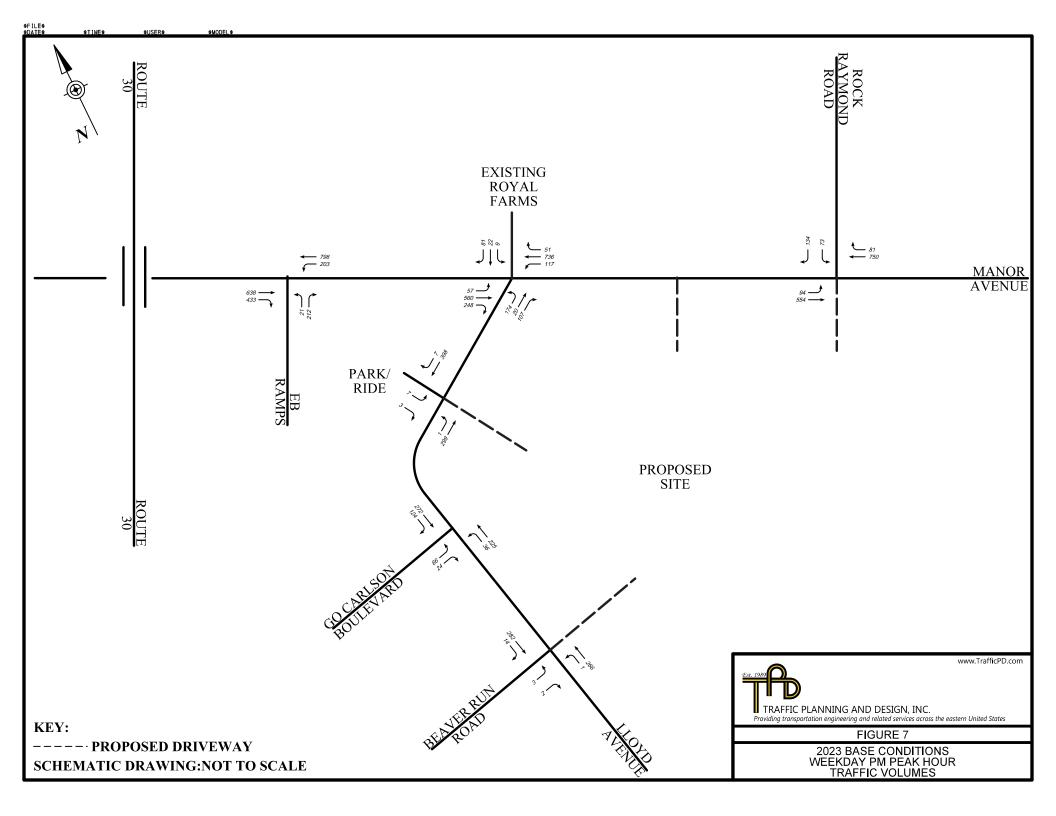


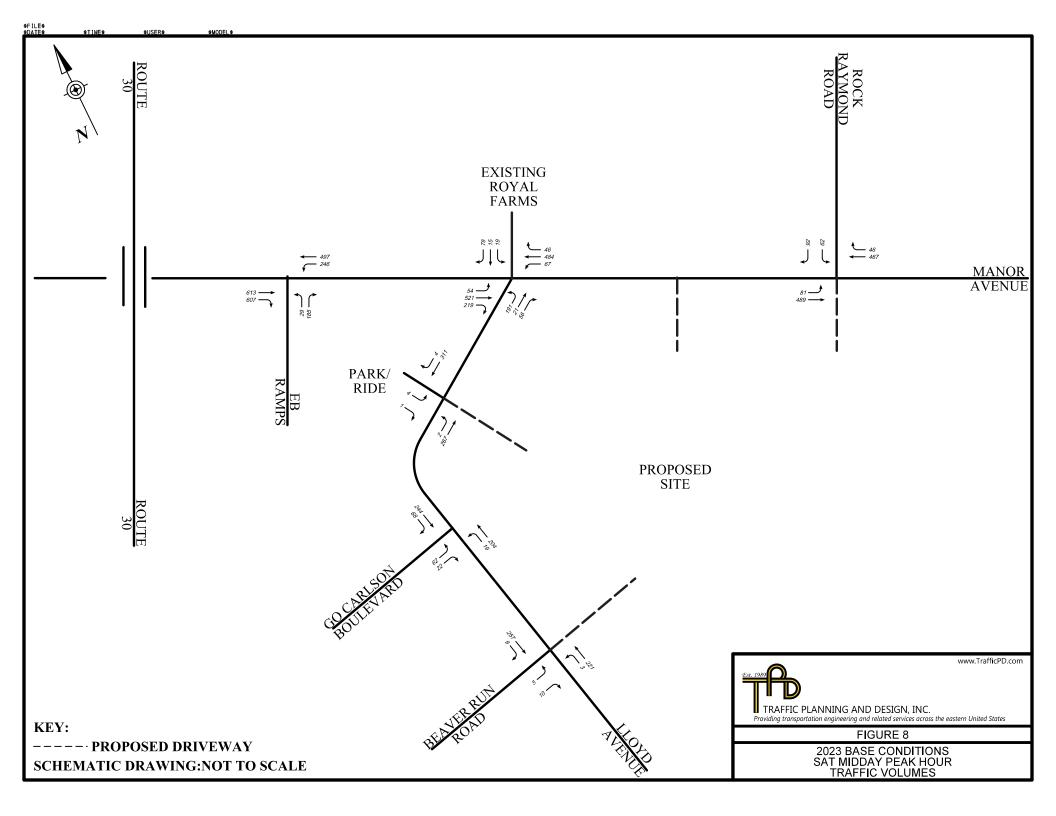


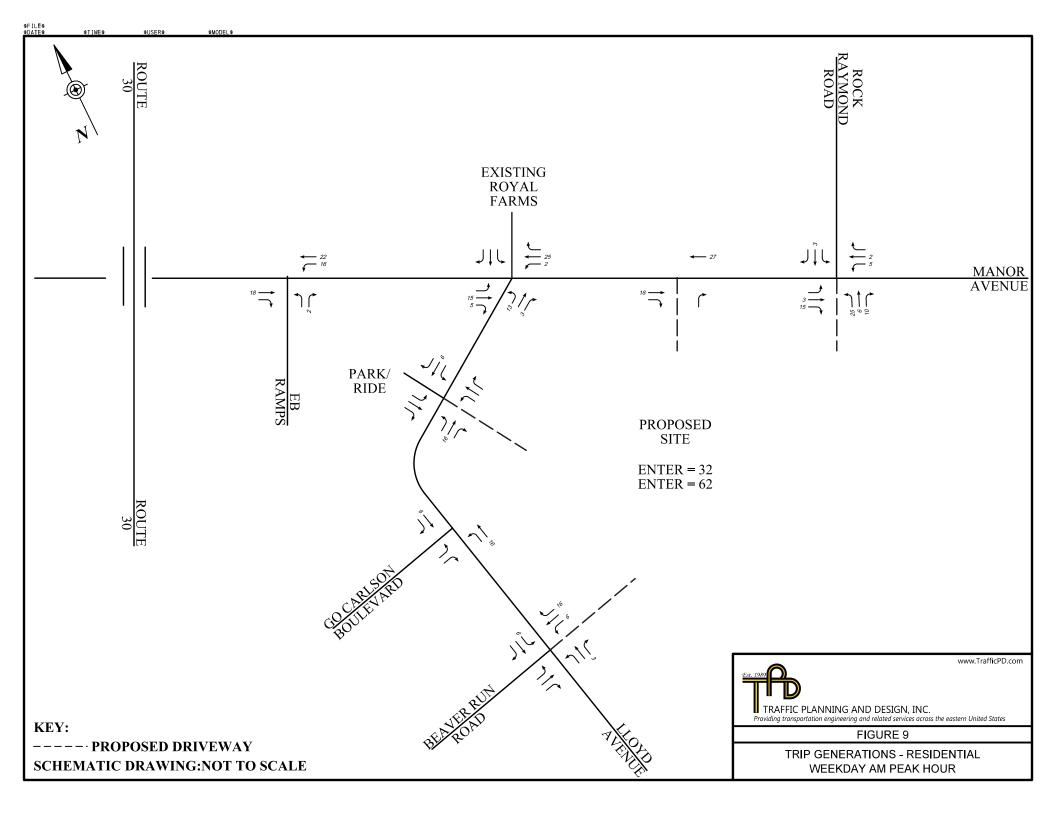


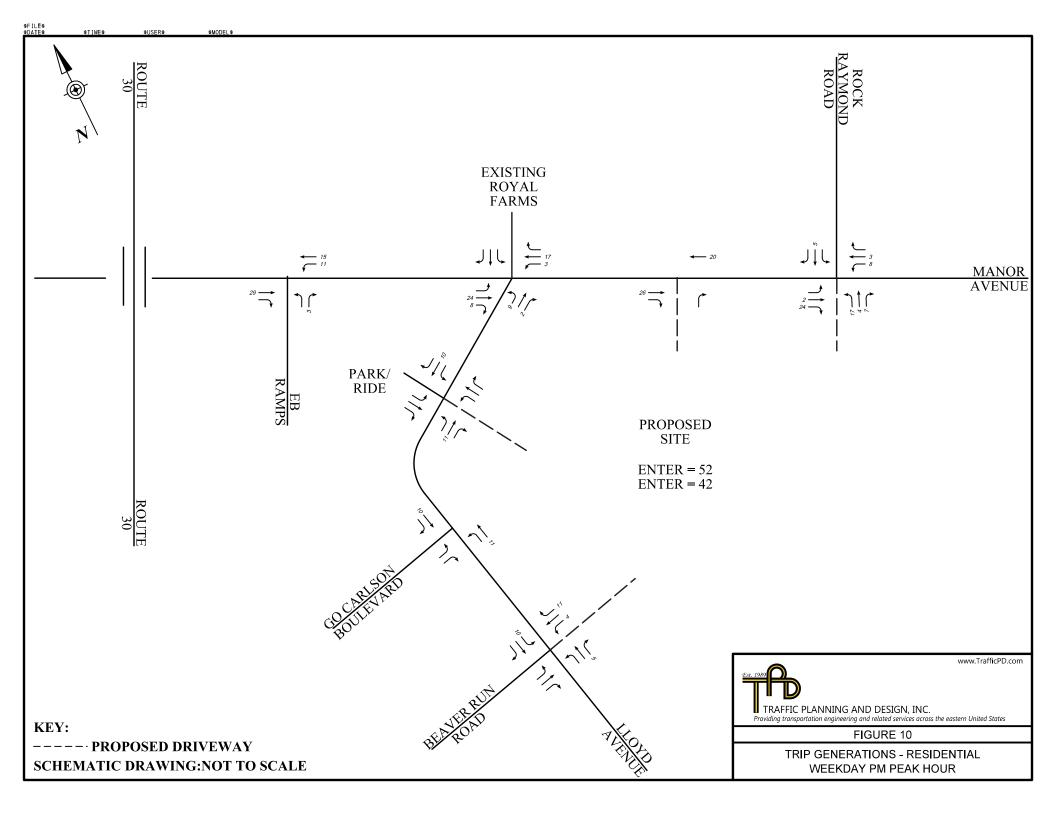


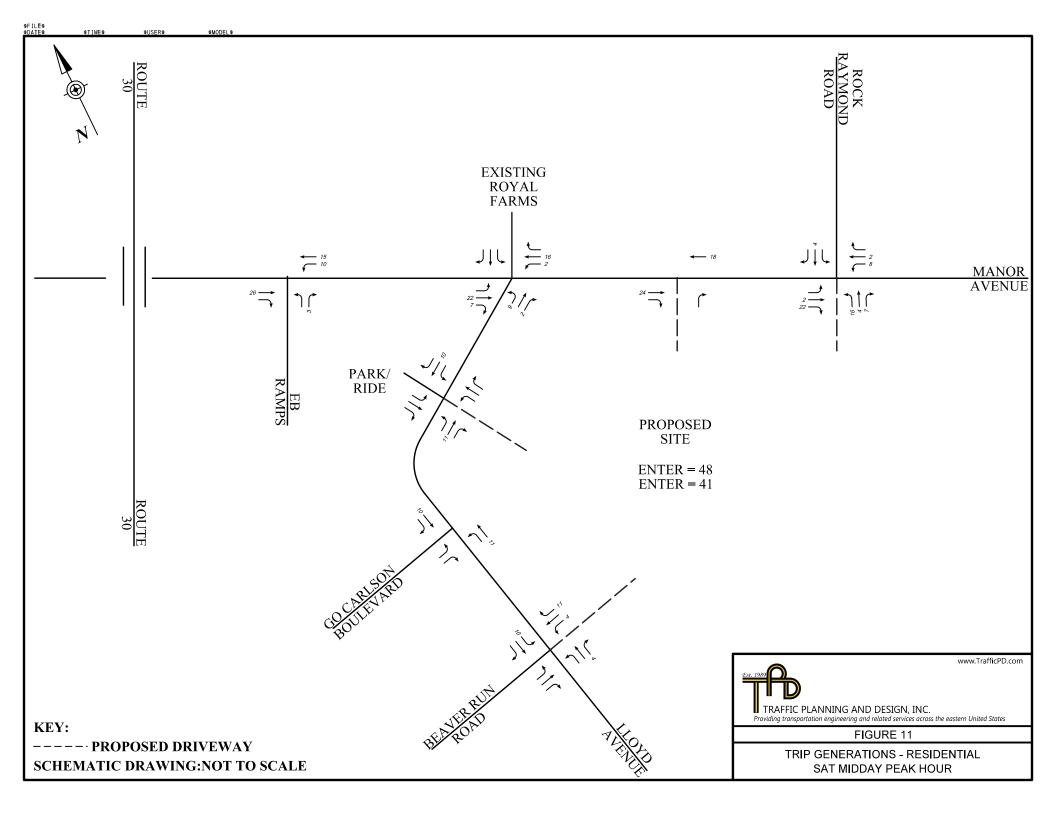


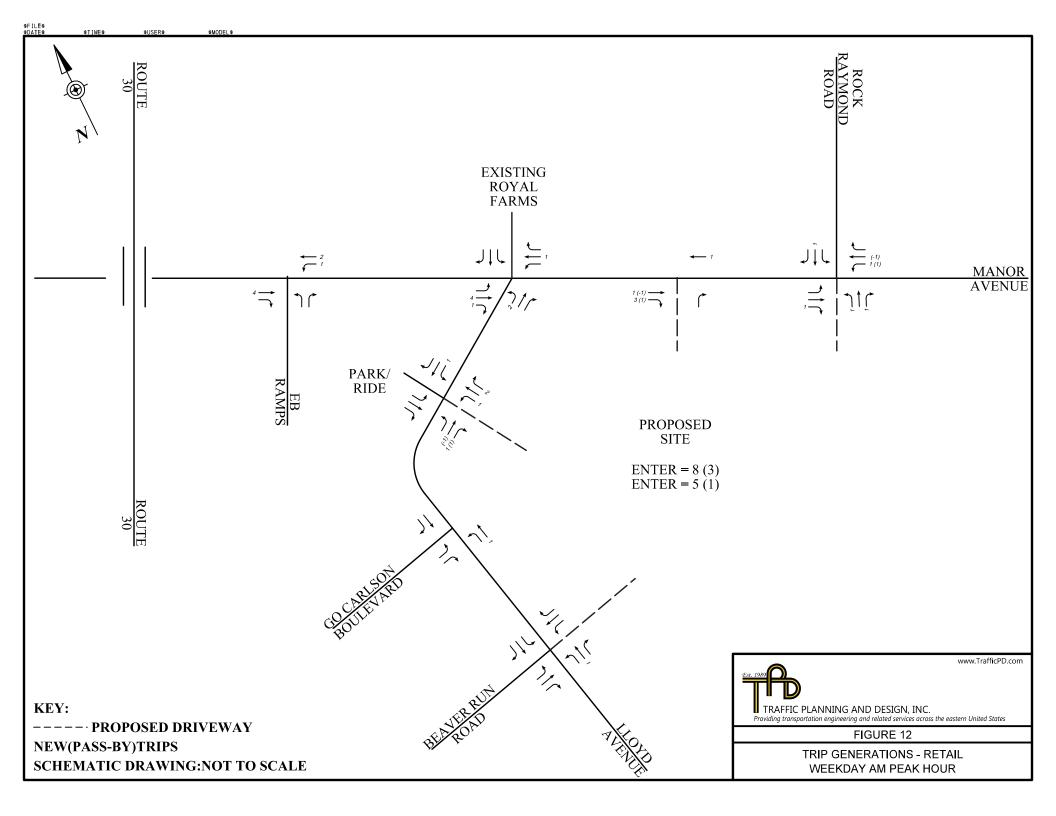


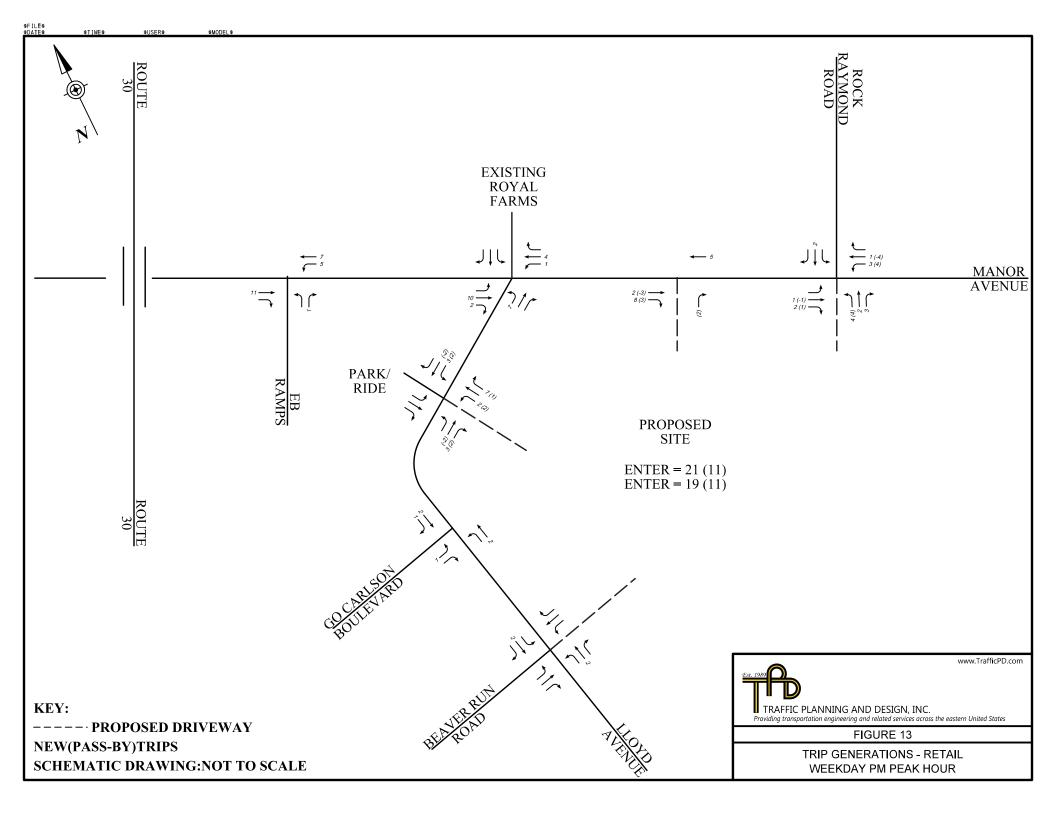


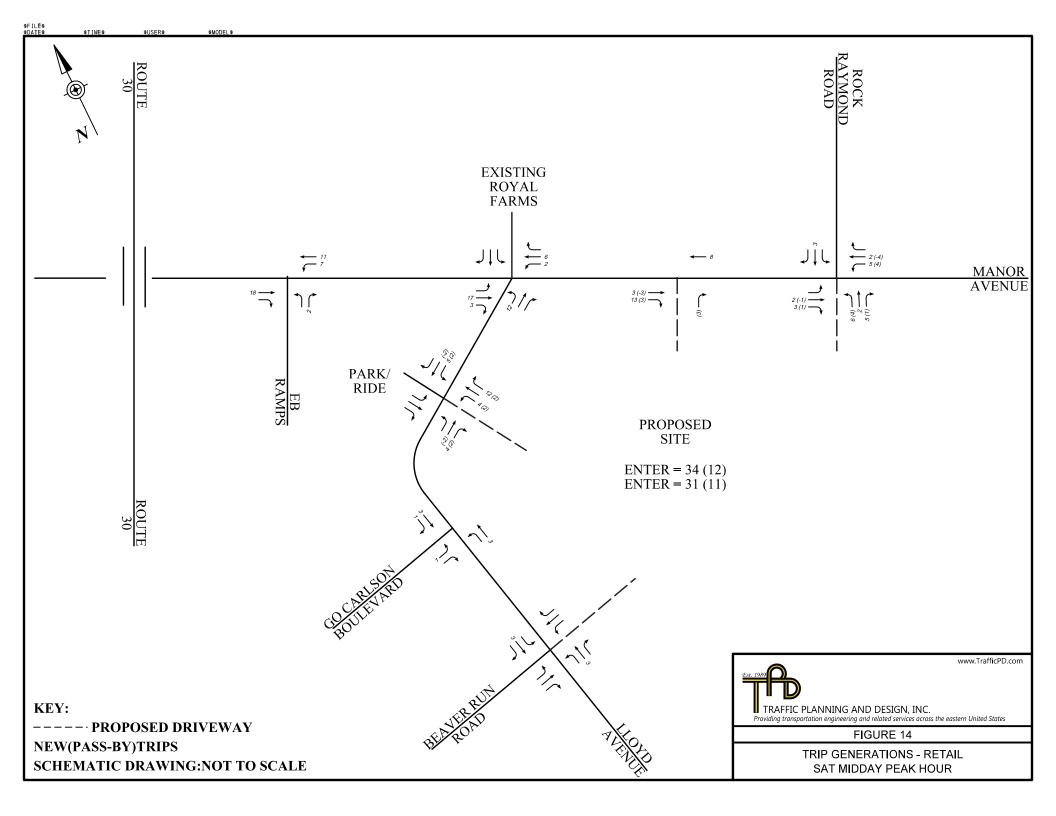


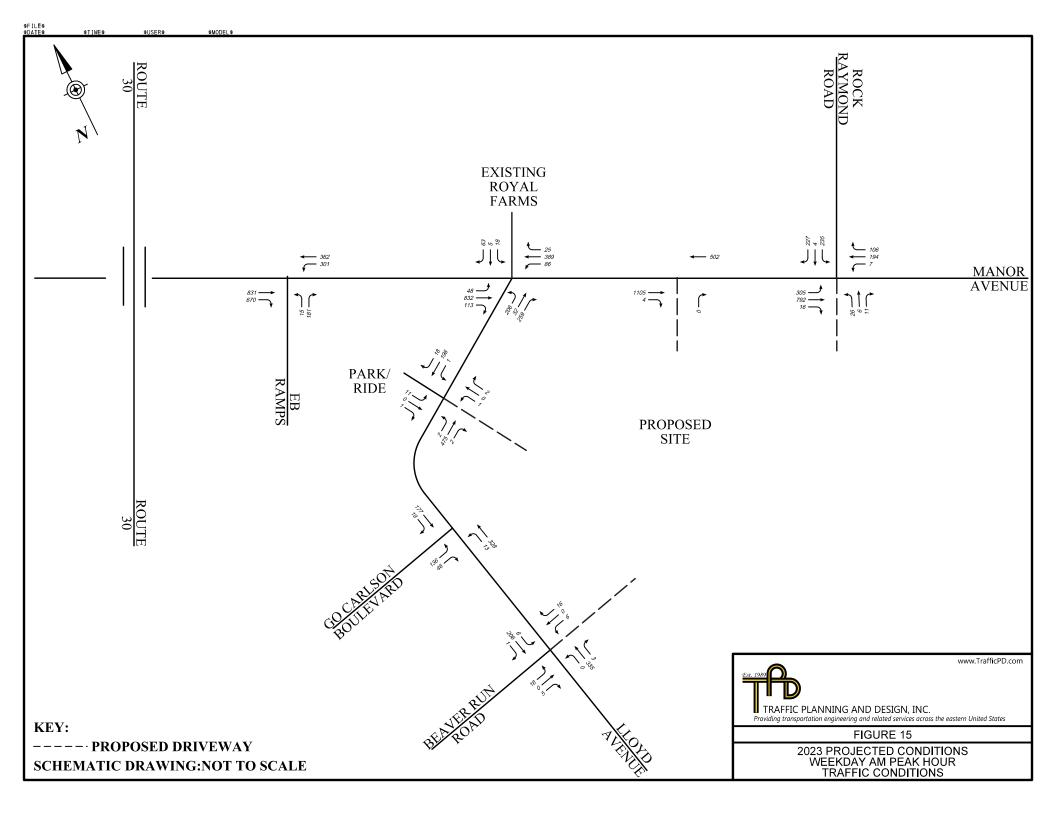


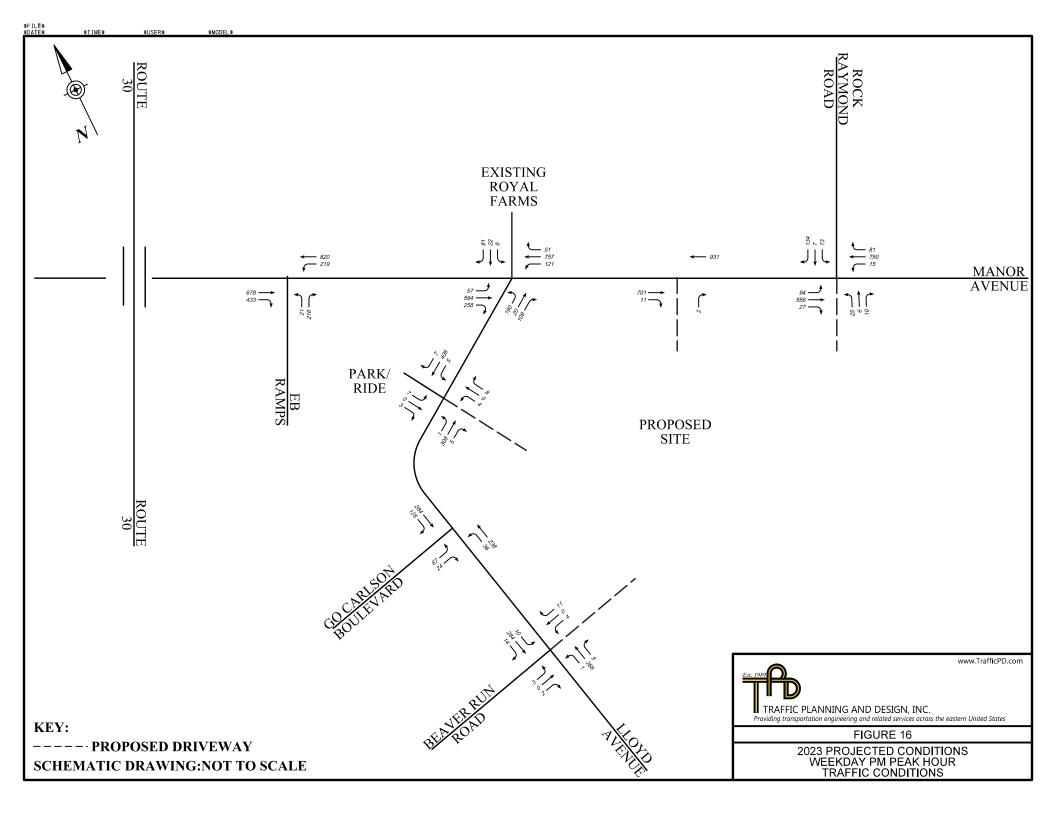


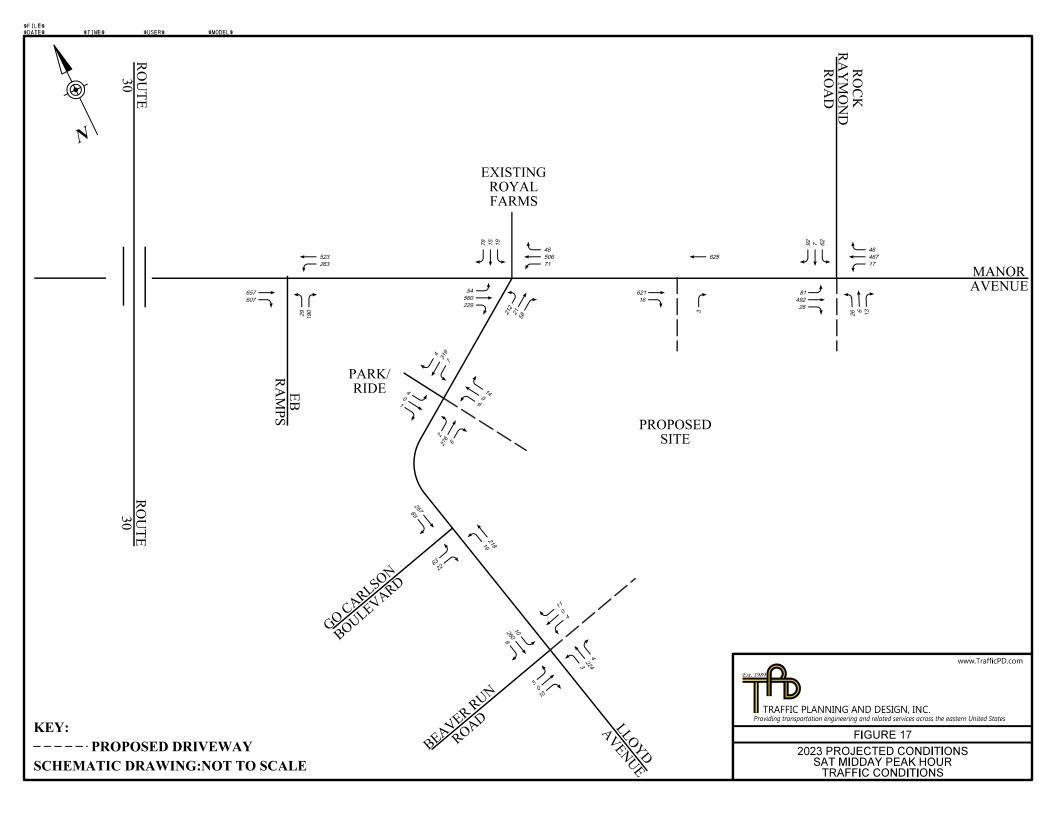












# APPENDIX A PROJECT CORRESPONDENCE



**Date:** 05/18/2018

**Subject:** Highway Occupancy Permit Application No. 158882 - Returned For Revisions

**To:** Wild Meadows, LLC

13 Nobles Pond Crossing

Dover, DE 19904

**From:** PennDOT Engineering District 6-0

7000 Geerdes Boulevard King of Prussia, PA 19406

### Dear Applicant,

PennDOT has reviewed your application for completeness, consistency and compliance with applicable Department Regulations. This review has identified issues that must be addressed in order for our review to continue.

The Department's review comments are attached.

Once the comments have been addressed, please resubmit the application and associated material for further review.

Upon resubmission, the applicant's engineer should put together a letter that describes how each comment has been addressed and where each can be found. This will help expedite the review. For guidance on HOP applications refer to 67 PA Code, Chapter 441, Chapter 459 and PennDOT Publication 282, "Highway Occupancy Permit Guidelines". Additional comments may follow upon review of the resubmitted application.

If you have any questions regarding this matter, you may contact the Department's representative, Andrew Parker, P.E., PTOE of McCormick Taylor, Inc. at 610-640-3500.



## **Response Comments Date:** 05/18/2018

**Application Number: 158882** 

#### **Form Letter Notes**

- (1) \* Upon resubmission, the applicant's engineer should put together a letter that describes how each comment has been addressed and where each can be found in the plan set. A copy of these comments and any previously submitted plans should also be provided.
  - \* Additional comments may follow upon review of the resubmitted application. If you have any questions pertaining to the technical aspects of this review, please contact the Department's representative, Andrew Parker, P.E., PTOE of McCormick Taylor, Inc. at 610-640-3500.
  - \* For guidance on Highway Occupancy Permit applications refer to PA Code Title 67, Chapter 441, Chapter 459 and PennDOT Publication 282. This will help expedite the review.

#### General

- (1) The Department requires written evidence, prior to the issuance of a permit, that Caln Township is aware of the project and has had the opportunity to comment. Provide written evidence (e.g. municipal engineering review, council or planning commission meeting minutes, executed TE-160, etc.), which is less than one year old, to satisfy this requirement. (PA Code, Title 67, Chapter 441.3(j)).
- (2) Be advised that this Highway Occupancy Permit involves the modification of an existing traffic signal and coordinated signal system. As such, the permittee must retain the design professional responsible for the traffic signal design to ensure they are available as appropriate and reasonable for construction and inspection related field meetings as well as post-installation to address timing or other field adjustments. The permit will not be closed out until final as-built drawings, approved by the municipality, are provided to the Department on mylar (signed) and electronically (Autocad). This will be a condition of the permit.

#### **Application**

- (1) As a reminder, please refer to Comment 14 of the Department's Scoping Application review letter for C17-022XP dated January 29, 2018 with respect to items to consider for the access design and formal HOP application.
- (2) Permit processing, review, and inspection fees are required. A check/money order in the amount of

#### **Transportation Impact Study/Transportation Impact Assessment**

- (1) The following comments pertain the Transportation Impact Assessment (TIA) submitted by Traffic Planning and Design (TPD), last revised April 19, 2018:
  - a. As previously noted, the applicant for Wild Meadows must coordinate with the applicant for the proposed Taco Bell (EPS No. 152572), to be located directly across S.R. 0322 (Manor Avenue). This coordination is required to ensure that the TIA reflects consistent assumptions regarding trip generation volumes and access movements, and that proposed and/or required mitigation measures in terms of roadway improvements, intersection/signal improvements, and pedestrian facility improvements are appropriately addressed. As part of this coordination, it is noted that the applicant must ensure the following mitigation elements are constructed as part of the Wild Meadows development if they were not already constructed as part of the Taco Bell development (assuming the Taco Bell is constructed first as anticipated):
  - i) Provide a pedestrian connection from the Wild Meadows development to the Royal Farms and proposed Taco Bell on the north side of S.R. 0322. This will require a marked crosswalk across the west leg of the signalized intersection of S.R. 0322 and S.R. 4017 (Rock Raymond Road).
  - ii) Provide a pedestrian connection from the development to the existing sidewalk on the north side of S.R. 0322 east of S.R 4017 that leads into Downingtown. This will include a crosswalk across the north leg of the signalized intersection.
  - iii) Modify the intersection of S.R. 0322 & Eastbound Route 30 Bypass Ramps by significantly reducing off-ramp right-turn channelization island (thereby moving the merge of the off-ramp/S.R. 0322 eastbound traffic further west, away from Lloyd Avenue). Signalization and potential other improvements at this intersection will be deferred until a later time as part of PennDOT's US 30 and S.R. 0322 interchange project (MPMS 87781).

#### (2) TIA continued:

- b. Queues on northbound Lloyd Avenue at S.R. 0322 (Manor Avenue) will at times extend back past the proposed driveway opposite the existing Park & Ride egress. Modify signal timings or provide other mitigation as needed to address the projected queues on northbound Lloyd Avenue, or consider moving the proposed driveway further from S.R. 0322.
- c. On Lloyd Avenue at the future driveway proposed to be located opposite the Park & Ride egress, provide a 75-foot left-turn lane on southbound Lloyd Avenue and a 75-foot right-turn lane on northbound Lloyd Avenue. This will require widening of Lloyd Avenue along the site frontage. These turn lanes are recommended to serve the commercial portion of the development that would

utilize this proposed driveway.

- d. Include full details of the previous weaving analysis performed as part of the Royal Farms TIS (EPS No. 97984) as an appendix.
- e. As previously noted, the median on the proposed driveway opposite S.R. 4017 (Rock Raymond Road) will not be permitted due to concerns regarding driveway alignment and sight distance. Drivers on the southbound S.R. 4017 approach must have a clear view of vehicles on the northbound driveway approach, and vice-versa.
- f. The Department strongly encourages installing a signal at the one-lane bridge on Lloyd Avenue just over one-half mile south of S.R. 0322 (Manor Avenue) to address traffic control and delays. The applicant must continue to discuss this improvement with the Township, and contribute towards it as appropriate. Provide the Department with an update on the status of the possible signal, including documentation of correspondence with Caln Township indicating their position on the signalization of the one-lane bridge and what involvement they require, if any, from the Wild Meadows development for the signal.
- g. Future submissions should clearly indicate the location of the proposed Right-In/Right-Out driveway on S.R. 0322 (Manor Avenue) on site plan and HOP plans.

#### Right-Of-Way (Design Manual Part III, Chapter 3)

(1) Provide an area of dedicated right-of-way along the S.R. 0322 (Manor Avenue) site frontage as needed to accommodate potential future widening/improvements along S.R. 0322 as part of PennDOT's US 30 and S.R. 0322 interchange project (MPMS 87781). The right-of-way dedication should be shown to accommodate an additional 12' travel lane and 8' shoulder, with additional area reserved for signage. No permanent fixtures should be constructed within the proposed right-of-way area.



#### WWW.TRAFFICPD.COM

#### April 19, 2018

Mr. Francis Hanney Traffic Services Manager PennDOT District 6-0 7000 Geerdes Boulevard King of Prussia, PA 19406-1525

#### **RE: Scoping Application Response Letter**

Archdiocese Property Mixed-Use Development Caln Township, Chester County, PA TPD# WIME.00001 Log# C17-022XP Application# PRE 1467

Dear Mr. Hanney:

This letter pertains to the proposed Archdiocese Property Development in Caln Township, Chester County, PA. Traffic Planning and Design, Inc. (TPD) has prepared this response letter to address the scoping comments provided by PennDOT in their Scoping Review Letter, dated January 29, 2018. These comments pertained to TPD's TIS Scoping Application, dated December 21, 2017. For the discussion below, PennDOT's comments are shown in *italic* type, with the corresponding TPD response shown in **bold** type:

#### **SCOPING APPLICATION REVIEW COMMENTS**

1. The study area must be expanded to include the intersection of S.R. 0322 (Manor Avenue) & eastbound Route 30 Bypass Ramps.

Response: Will comply.

2. As previously discussed during reviews of the application for the nearby Royal Farms that opened in late 2017 (EPS Application No. 97984 — Caln-Horseshoe, L.P.), the Department is concerned about the weave maneuver between the eastbound Route 30 Bypass off-ramp right turn onto S.R. 0322 and the signalized intersection at Lloyd Avenue. There were discussions about potential mitigation measures to be considered in the future, including a concept whereby the existing eastbound Route 30 Bypass off-ramp right-turn channelization island would be reduced and the merge point of the off-ramp/S.R. 0322 traffic moved further to the west, thereby providing a longer weaving section. Further analysis is warranted now that the Royal Farms has opened and with updated traffic projections for the proposed Wild Meadows development. Re-evaluate the intersection and weaving operations in this area, including the aforementioned modification of the off-ramp right-turn island/merge point as well as potential signalization of the intersection of S.R. 0322 & eastbound Route 30 Bypass Ramps.

Response: TPD is aware of the improvements that will be funded under MPMS 87781 (Discussed in the TIA), which include:

- a. Signalization at the EB Route 30 Ramp
- b. Reduction of the channelized right turn (as suggested in review comment)
- c. Evaluation of a diverging diamond interchange (DDI).

It is TPD's understanding that these improvements are funded after the buildout year of the TIA. Furthermore, based on a comparison between the projected volumes contained in the Royal Farms TIS (AM/PM/SAT) and the actual counts collected at the constructed Royal Farms driveway (AM/PM/SAT):

- a. The actual EBL entering the Royal Farms is approximately 21% less than in the Royal Farms TIS
- b. The actual EBR entering onto Lloyd Avenue is approximately 38% less than in the Royal Farms TIS
- c. The actual EBT entering on SR 0322 is approximately 2% less than in the Royal Farms TIS

Therefore, it is TPD's opinion that the results of the Weaving Analysis previously provided in the Royal Farms TIS will not degrade.

3. The proposed site driveway that would intersect S.R. 0322 (Manor Avenue) opposite S.R. 4017 (Rock Raymond Road) must be properly aligned/designed with an emphasis on intersection safety and operations. The side-street left-turn lanes must be aligned directly opposite one another to allow for concurrent left-turn signal phasing. Split phasing will not be allowed. The driveway median indicated on the submitted conceptual site plan will not be permitted as shown due to concerns regarding driveway alignment, lane configurations required to achieve acceptable capacity/operations, and sight distance.

Response: So noted.

4. The Department is aware of previous discussions between Caln Township and other developers regarding possible signalization of the one-lane bridge on Lloyd Avenue just over one-half mile south of S.R. 0322 (Manor Avenue). Lloyd Avenue is under the jurisdiction of Caln Township, and the Department generally supports the idea of installing a signal to address traffic control and delays at the one-lane bridge. Adding a signal will involve review and approval of signal permit plans by the Department. Coordinate with Caln Township and provide the Department with an update on the status of a potential signal at the bridge.

Response: Based on further coordination, it is TPD's understanding that this improvement will not be pursued as part of this project based on the minimal impact caused by the Proposed Development.

5. The PennDOT project number, C17-022XP, for this scoping application review must be referenced when the formal Highway Occupancy Permit (HOP) application is submitted.

Response: Will comply.

6. Please note that District 6-0 is accepting TIA submissions via EPS. This will provide a more efficient and timely review of the submissions for the applicants while also assisting the Department with document management. Note that utilizing EPS will require a formal permit application be made for the access: therefore, submissions should be sure to include:

- a. Atransmittal letter including responses to Scoping comments or comments from previous reviews
- b. Scoping Meeting Request Form (if previously submitted)
- C. Minutes of the Scoping meeting or any previous minutes
- d. Forms M950-MPC and M950-AA (as appropriate)
- e. Previously completed municipal reviews (ifany)
- f. Electronic copies of capacity analysis files (e.g. HCS or Synchro)

#### Response: Will comply to the extent feasible as part of the first EPS Submission.

- 7. The following Scoping elements appear acceptable:
  - a. Study Type (TIA)
  - b. Development Schedule
  - c. Trip Generation
  - d. Analysis Periods (AM peak, PM peak and Saturday MID day peak)
  - e. *Growth Rate (0.65%)*
  - f. Analysis Type (Synchro 10 and HCM 2010)
  - g. Sight Distance Analysis
  - h. Turn Lane/Length Analysis
  - i. Queuing Analysis
  - j. Crash Analysis
  - k. Other Analyses As Needed

Response: So noted.

8. All weekday traffic counts should be conducted while schools are in session.

Response: Will comply – The traffic counts were conducted when Downingtown School District was in session.

9. All traffic count data should reflect volumes occurring after the Royal Farms at S.R. 0322 (Manor Avenue) & Lloyd Avenue opened in late 2017.

Response: Will comply – The traffic counts were conducted <u>after</u> the Royal Farms was open and operational.

10. The Department will comment on the assumed Trip Distribution and Assignment when submitted.

Response: So noted.

11. Provide a pedestrian connection from the development to the Royal Farms on the north side of S.R. 0322 (Manor Avenue). This would require a marked crosswalk across S.R. 0322 (Manor Avenue) at the signalized intersection(s) at Lloyd Avenue and/or S.R. 4017 (Rock Raymond Road).

Response: Will comply to the extent feasible. It should be noted that pedestrian activity crossing S.R. 0322 is currently restricted via signage, however the Applicant will work with PennDOT, Caln

Township and the Applicant for the proposed Taco Bell to determine the appropriate pedestrian related improvements at the subject intersection.

12. Provide a pedestrian connection from the development to the existing sidewalk on the north side of S.R. 0322 (Manor Avenue) east of S.R 4017 (Rock Raymond Road) that leads into Downingtown.

Response: Will Comply to the extent feasible. It should be noted that pedestrian activity is currently restricted at the intersection via signage, however the Applicant will work with PennDOT, Caln Township and the Applicant for the proposed Taco Bell to determine the appropriate pedestrian related improvements at the subject intersection.

13. The applicant for Wild Meadows must coordinate with the applicant for the proposed Taco Bell (EPS Application No. 152572 — Summerwood Corporation), to be located directly across S.R. 0322 (Manor Avenue) from Wild Meadows. This coordination is required to ensure that the TIA reflects consistent assumptions regarding trip generation volumes and access movements, and that proposed and/or required mitigation measures in terms of roadway improvements, intersection/signal improvements, and pedestrian facility improvements are appropriately addressed. A crosswalk across the west leg of S.R. 0322 at S.R. 4017 (Rock Raymond Road) is strongly recommended to accommodate anticipated pedestrian activity between the proposed residential development on the south side of S.R. 0322 and the commercial establishments (Royal Farms and proposed Taco Bell) on the north side of S.R. 0322.

#### Response: Will Comply to the extent feasible.

- 14. With respect to the access design and formal permit application, please ensure that the following items are addressed:
  - a. Please be advised that pursuant to and in accordance with Title 67, Chapter 441.8(h)(2)(iv) of the code, the Safe Stopping Sight Distance is the absolute minimum acceptable sight distance for all driveways. Sight distance values obtained from the use of reduction factors which fall below the Safe Stopping Sight Distance will not be accepted by the Department. It is the designer's responsibility to ensure that this minimum requirement is satisfied.
  - b. It should be understood that in accordance with PennDOT Strike-Off Letter 470-10-03 and pursuant to section 421 of the State Highway Law (36 P.S. § 670-421) the installation of drainage facilities within the Legal Right-of-Way may necessitate additional permitting requirements, including, but not limited to, a separate Highway Occupancy Permit from the Municipality for the future maintenance of the new drainage facilities.
  - c. Truck turning templates must be provided to ensure that the driveway intersection can safely accommodate a WB-62 design vehicle. If the largest permitted vehicle type to utilize the proposed site access is smaller than the WB-62, then a note must be included on the plans indicating the vehicle size and the truck turning templates for that vehicle size must be provided; the largest permitted vehicle size will become a condition of the permit.
  - d. ADA compliance within the limits of work (along the access frontage at a minimum) must be evaluated in the final design (i.e. new/modified facilities, impact to SEPTA bus stops, etc.). Ensure that all pedestrian improvements along the site frontages, at all site access points, and at the signalized intersections are ADA compliant.
  - e. Consistent with current Department Policy, applicants for Highway Occupancy Permits must apply for an EPS Business Partner ID (BPID). The BPID is to be used in the establishment of a billing account for the invoicing of inspection costs. For information on obtaining a BPID, you may visit:

https://www.dot14.state.pa.us/EPS/home/manaeeBPReyistration .1sp

[Please make sure that you follow the instructions that are in the "PINK" area]. After a BPID is obtained and activated by the system administrator, please provide the following information in the applicant contact information tab under "Applicant Team":

- *i)* BPID (please ensure that the BPID is searchable through the "looking glass" feature)
- ii) Contact information (name/title/phone/email) for a "general" contact person (person that typically deals with the Highway Occupancy Permit application process)
- iii) Contact information (name/title/phone/email) for a "billing" contact person (person that typically deals with the Highway Occupancy Permit invoicing process)

Response: Will comply.

Thank you for your continuing review, and please call if there is any further information you require with regards to these responses.

Sincerely,

TRAFFIC PLANNING AND DESIGN, INC.

Matthew I. Hammond, P.E.

Mitthe &

Executive Vice President

MHammond@TrafficPD.com

Attachments: PennDOT Scoping Review (01/29/2018)

Cc: Kristen Denne, Township Manager, Caln Township

Project Team TPD File



January 29, 2018

CALN TOWNSHIP, CHESTER COUNTY
S.R. 0332 (MANOR AVENUE) AND S.R. 4017 (ROCK RAYMOND ROAD)
HIGHWAY OCCUPANCY PERMIT APPLICATION NO. PRE1467
WILD MEADOWS, LLC
TRAFFIC LOG NO.: C17-022XP
SCOPING APPLICATION REVIEW

Matthew I. Hammond, P.E. Traffic Planning and Design, Inc. 2500 E. High Street, Suite 650 Pottstown, PA 19464

Dear Mr. Hammond:

The Department has reviewed the Scoping Application submission for compliance with applicable Department Regulations. This preliminary review has identified deficiencies that must be addressed in order for your application submission to be processed as efficiently as possible.

The Department understands that the provided analysis is preliminary in nature. As such, the Department reserves the right to make future additional comments based on the formal submission of a complete Transportation Impact Assessment (TIA).

Our comments on your preliminary submission are as follows:

#### SCOPING COMMENTS

- 1. The study area must be expanded to include the intersection of S.R. 0322 (Manor Avenue) & eastbound Route 30 Bypass Ramps.
- 2. As previously discussed during reviews of the application for the nearby Royal Farms that opened in late 2017 (EPS Application No. 97984 Caln-Horseshoe, L.P.), the Department is concerned about the weave maneuver between the eastbound Route 30 Bypass off-ramp right turn onto S.R. 0322 and the signalized intersection at Lloyd Avenue. There were discussions about potential mitigation measures to be considered in the future, including a concept whereby the existing eastbound Route 30 Bypass off-ramp right-turn channelization island would be reduced and the merge point of the off-ramp/S.R. 0322 traffic moved further to the west, thereby providing a longer weaving section. Further analysis is warranted now that the Royal Farms has opened and with updated traffic projections for the proposed Wild Meadows development. Re-evaluate the intersection and weaving operations in this area, including the aforementioned modification of the off-ramp right-turn island / merge point as well as potential signalization of the intersection of S.R. 0322 & eastbound Route 30 Bypass Ramps.

- 3. The proposed site driveway that would intersect S.R. 0322 (Manor Avenue) opposite S.R. 4017 (Rock Raymond Road) must be properly aligned/designed with an emphasis on intersection safety and operations. The side-street left-turn lanes must be aligned directly opposite one another to allow for concurrent left-turn signal phasing. Split phasing will not be allowed. The driveway median indicated on the submitted conceptual site plan will not be permitted as shown due to concerns regarding driveway alignment, lane configurations required to achieve acceptable capacity/operations, and sight distance.
- 4. The Department is aware of previous discussions between Caln Township and other developers regarding possible signalization of the one-lane bridge on Lloyd Avenue just over one-half mile south of S.R. 0322 (Manor Avenue). Lloyd Avenue is under the jurisdiction of Caln Township, and the Department generally supports the idea of installing a signal to address traffic control and delays at the one-lane bridge. Adding a signal will involve review and approval of signal permit plans by the Department. Coordinate with Caln Township and provide the Department with an update on the status of a potential signal at the bridge.
- 5. The PennDOT project number, C17-022XP, for this scoping application review must be referenced when the formal Highway Occupancy Permit (HOP) application is submitted.
- 6. Please note that District 6-0 is accepting TIA submissions via EPS. This will provide a more efficient and timely review of the submissions for the applicants while also assisting the Department with document management. Note that utilizing EPS will require a formal permit application be made for the access; therefore, submissions should be sure to include:
  - a. A transmittal letter including responses to Scoping comments or comments from previous reviews
  - b. Scoping Meeting Request Form (if previously submitted)
  - c. Minutes of the Scoping meeting or any previous minutes
  - d. Forms M950-MPC and M950-AA (as appropriate)
  - e. Previously completed municipal reviews (if any)
  - f. Electronic copies of capacity analysis files (e.g. HCS or Synchro)
- 7. The following Scoping elements appear acceptable:
  - a. Study Type (TIA)
  - b. Development Schedule
  - c. Trip Generation
  - d. Analysis Periods (AM peak, PM peak and Saturday MID day peak)
  - e. Growth Rate (0.65%)
  - f. Analysis Type (Synchro 10 and HCM 2010)
  - g. Sight Distance Analysis
  - h. Turn Lane/Length Analysis
  - i. Queuing Analysis
  - j. Crash Analysis

HOP APPLICATION NO. pre1467 TRAFFIC LOG: C17-022XP PAGE 3

- k. Other Analyses As Needed
- 8. All weekday traffic counts should be conducted while schools are in session.
- 9. All traffic count data should reflect volumes occurring after the Royal Farms at S.R. 0322 (Manor Avenue) & Lloyd Avenue opened in late 2017.
- 10. The Department will comment on the assumed Trip Distribution and Assignment when submitted.
- 11. Provide a pedestrian connection from the development to the Royal Farms on the north side of S.R. 0322 (Manor Avenue). This would require a marked crosswalk across S.R. 0322 (Manor Avenue) at the signalized intersection(s) at Lloyd Avenue and/or S.R. 4017 (Rock Raymond Road).
- 12. Provide a pedestrian connection from the development to the existing sidewalk on the north side of S.R. 0322 (Manor Avenue) east of S.R 4017 (Rock Raymond Road) that leads into Downingtown.
- 13. The applicant for Wild Meadows must coordinate with the applicant for the proposed Taco Bell (EPS Application No. 152572 Summerwood Corporation), to be located directly across S.R. 0322 (Manor Avenue) from Wild Meadows. This coordination is required to ensure that the TIA reflects consistent assumptions regarding trip generation volumes and access movements, and that proposed and/or required mitigation measures in terms of roadway improvements, intersection/signal improvements, and pedestrian facility improvements are appropriately addressed. A crosswalk across the west leg of S.R. 0322 at S.R. 4017 (Rock Raymond Road) is strongly recommended to accommodate anticipated pedestrian activity between the proposed residential development on the south side of S.R. 0322 and the commercial establishments (Royal Farms and proposed Taco Bell) on the north side of S.R. 0322.
- 14. With respect to the access design and formal permit application, please ensure that the following items are addressed:
  - a. Please be advised that pursuant to and in accordance with Title 67, Chapter 441.8(h)(2)(iv) of the code, the Safe Stopping Sight Distance is the absolute minimum acceptable sight distance for all driveways. Sight distance values obtained from the use of reduction factors which fall below the Safe Stopping Sight Distance will not be accepted by the Department. It is the designer's responsibility to ensure that this minimum requirement is satisfied.
  - b. It should be understood that in accordance with PennDOT Strike-Off Letter 470-10-03 and pursuant to section 421 of the State Highway Law (36 P.S. § 670-421) the installation of drainage facilities within the Legal Right-of-Way may necessitate additional permitting requirements, including, but not limited to, a separate Highway Occupancy Permit from the Municipality for the future maintenance of the new drainage facilities.
  - c. Truck turning templates must be provided to ensure that the driveway intersection can safely accommodate a WB-62 design vehicle. If the largest permitted vehicle type to utilize the proposed site access is smaller than the WB-62, then a note must be included on the plans indicating the vehicle size and the truck turning templates for that vehicle

HOP APPLICATION NO. pre1467 TRAFFIC LOG: C17-022XP PAGE 4

size must be provided; the largest permitted vehicle size will become a condition of the permit.

- d. ADA compliance within the limits of work (along the access frontage at a minimum) must be evaluated in the final design (i.e. new/modified facilities, impact to SEPTA bus stops, etc.). Ensure that all pedestrian improvements along the site frontages, at all site access points, and at the signalized intersections are ADA compliant.
- e. Consistent with current Department Policy, applicants for Highway Occupancy Permits must apply for an EPS Business Partner ID (BPID). The BPID is to be used in the establishment of a billing account for the invoicing of inspection costs. For information on obtaining a BPID, you may visit:

## https://www.dot14.state.pa.us/EPS/home/manageBPRegistration.jsp

[Please make sure that you follow the instructions that are in the "PINK" area]. After a BPID is obtained and activated by the system administrator, please provide the following information in the applicant contact information tab under "Applicant Team":

- i) BPID (please ensure that the BPID is searchable through the "looking glass" feature)
- ii) Contact information (name/title/phone/email) for a "general" contact person (person that typically deals with the Highway Occupancy Permit application process)
- iii) Contact information (name/title/phone/email) for a "billing" contact person (person that typically deals with the Highway Occupancy Permit invoicing process)

The Department has performed this preliminary review based only on the limited information provided. We reserve the right to make future, additional, detailed comments based on the formal submission and application for a Highway Occupancy Permit. If you have any questions pertaining to the technical aspects of this review, please contact Andrew Parker, P.E., PTOE of McCormick Taylor, Inc. at 610.640.3500 or ajparker@mccormicktaylor.com.

Respectfully,

Francis J. Hanney

Senior Manager Traffic Services Division

Engineering District 6-0

cc: M. Miele, P.E.

A. Patel, P.E.

Traffic Services File

Caln Township

Chester County Planning Commission



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#### **December 21, 2017**

Mr. Fran Hanney PennDOT District 6-0 7000 Geerdes Blvd King of Prussia, PA 19406

#### **RE: TRANSPORTATION IMPACT ASSESSMENT (TIA) SCOPING APPLICATION**

Archdiocese Property Residential/Commercial Development

Caln Township, Chester County, Pa

TPD No. WIME.00001

Dear Mr. Hanney:

On behalf of the Wild Meadows, LLC, Traffic Planning and Design, Inc. (TPD) has prepared the following TIA Scoping Application for the above referenced project.

Scoping Meeting Date: TBD Applicant: Wild Meadows, LLC

Applicant's Consultant: Traffic Planning and Design, Inc. (TPD) – Matthew Hammond

Applicant's Primary Contact: Harry Miller, Wild Meadows, LLC

1. LOCATION OF PROPOSED DEVELOPMENT:

PennDOT Engineering Dist: 6-0 County: Chester

Municipality: Caln Township

State Route(s): Route 322 (S.R. 0322)

Rock Raymond Road (S.R. 4017)

Please refer to the attached **Figure 1** which shows the project location. The proposed conceptual site plan is **attached**.

- 2. DESCRIPTION OF PROPOSED DEVELOPMENT:
  - Proposed Site Access:
    - One (1) full-access driveway to Route 322 (S.R. 0322), opposite Rock Raymond Road (S.R. 4017);
    - One (1) right-in/right-out driveway to Route 322 (S.R. 0322) between Lloyd Avenue and Rock Raymond Road (S.R. 4017) serving the Commercial/Retail area;
    - Two (2) full-access driveways to Lloyd Avenue.
  - Proposed Land Uses (assumed):
    - 150 active-adult (detached) homes;

- 150 active-adult (attached) homes;
- 20.0 ksf retail space.
- Community Linkages (access to neighboring properties, cross easements, pedestrian and transit accommodations): N/A
- 3. DEVELOPMENT SCHEDULE AND STAGING:
  - Anticipated Opening Date: 2023
  - Design Year: N/A
  - Proposed Development/Staging: N/A
- 4. TRIP GENERATION:

Trip generation for the proposed development will be based on:

- ITE Trip Generation Manual.
  - ITE Land Use #251 (Senior Adult Housing Detached)
  - ITE Land Use #252 (Senior Adult Housing Attached)
  - ITE Land Use #820 (General Retail)
- Other independent surveys.

TABLE 1
TRIP GENERATION DATA – PROPOSED SITE

| Land Use                        | Time Period            | Size (X) | Equations/Rates           | Enter<br>% | Pass<br>% |
|---------------------------------|------------------------|----------|---------------------------|------------|-----------|
|                                 | Average Weekday        |          | Ln(T) = 0.89*In(X) + 2.06 | 50%        |           |
| Senior Adult Housing – Detached | Weekday A.M. Peak Hour | 150 du   | T = 0.17*(X) + 29.95      | 35%        |           |
| (ITE Land Use # 251)            | Weekday P.M. Peak Hour | 150 du   | Ln(T) = 0.75*ln(X) + 0.35 | 61%        |           |
|                                 | SAT Midday Peak Hour   |          | T = 0.23*(X)              | 48%        |           |
|                                 | Average Weekday        |          | T = 2.98*(X) + 21.05      | 50%        |           |
| Senior Adult Housing – Attached | Weekday A.M. Peak Hour | 150 d.   | T = 0.20*(X) - 0.13       | 34%        |           |
| (ITE Land Use # 252)            | Weekday P.M. Peak Hour | 150 du   | T = 0.24*(X) + 1.64       | 54%        |           |
|                                 | SAT Midday Peak Hour   |          | T = 0.31*(X) + 0.46       | 57%        |           |
|                                 | Average Weekday        |          | T = 42.70*(X)             | 50%        | N/A       |
| General Retail                  | Weekday A.M. Peak Hour | 20.0 ksf | T = 0.96*(X)              | 62%        | 24%¹      |
| (ITE Land Use #820)             | Weekday P.M. Peak Hour | 20.0 KST | T = 3.71*(X)              | 48%        | 34%       |
|                                 | SAT Midday Peak Hour   |          | T = 4.82*X)               | 52%        | 26%       |

T = Total Trips; X = Independent Variable (ksf, dwelling units) 1 = No Data. Utilized PM Minus 10%

Since the retail is being provided partially as an on-site amenity for the residential portion of the Proposed Site, TPD anticipates interaction between the retail and residential portions of Proposed Site. TPD performed a preliminary interaction and determined the following percentages:

- Average Weekday = 10% (Average of AM and PM)
- Weekday AM = 4%
- Weekday PM = 16%
- SAT Midday = 10% (Average of AM and PM)

The Preliminary Interaction Worksheets are included in the attachments of this Scoping Application.

The results of the trip generation calculations are summarized in **Table 2**.

TABLE 2
TRIP GENERATION – PROPOSED DEVELOPMENT

| Land Use   | Ind             |       |      | Ex    | ternal Tr | ips   | Pas   | s-By Tri | os   | 1     | New Trip | s    |
|------------|-----------------|-------|------|-------|-----------|-------|-------|----------|------|-------|----------|------|
| Code       | Variable        | Total | Int. | Total | Enter     | Exit  | Total | Enter    | Exit | Total | Enter    | Exit |
|            | Average Weekday |       |      |       |           |       |       |          |      |       |          |      |
| ITE #251   | 150 du          | 680   | -64  | 616   | 308       | 308   |       |          |      | 616   | 308      | 308  |
| ITE #252   | 150 du          | 470   | -38  | 432   | 216       | 216   |       |          |      | 432   | 216      | 216  |
| ITE #820   | 20.0 ksf        | 854   | -98  | 756   | 378       | 378   |       |          |      | 756   | 378      | 378  |
| Total      |                 | 2004  | -200 | 1804  | 902       | 902   | 0     | 0        | 0    | 1804  | 902      | 902  |
| Weekday AM |                 |       |      |       |           |       |       |          |      |       |          |      |
| ITE #251   | 150 du          | 55    | -1   | 54    | 18        | 36    | 0     | 0        | 0    | 54    | 18       | 36   |
| ITE #252   | 150 du          | 30    | -1   | 29    | 10        | 19    | 0     | 0        | 0    | 29    | 10       | 19   |
| ITE #820   | 20.0 ksf        | 19    | -2   | 17    | 11        | 6     | 4     | 2        | 2    | 13    | 9        | 4    |
| Total      |                 | 104   | -4   | 100   | 39        | 61    | 4     | 2        | 2    | 96    | 37       | 59   |
|            |                 |       |      |       | Weekda    | ay PM |       |          |      |       |          |      |
| ITE #251   | 150 du          | 61    | -9   | 52    | 31        | 21    | 0     | 0        | 0    | 52    | 31       | 21   |
| ITE #252   | 150 du          | 38    | -5   | 33    | 17        | 16    | 0     | 0        | 0    | 33    | 17       | 16   |
| ITE #820   | 20.0 ksf        | 74    | -14  | 60    | 32        | 28    | 20    | 10       | 10   | 40    | 22       | 18   |
| Total      |                 | 173   | -28  | 145   | 80        | 65    | 20    | 10       | 10   | 125   | 70       | 55   |
|            |                 |       |      |       | SAT Mi    | dday  |       |          |      |       |          |      |
| ITE #251   | 150 du          | 35    | -6   | 29    | 14        | 15    | 0     | 0        | 0    | 29    | 14       | 15   |
| ITE #252   | 150 du          | 47    | -4   | 43    | 25        | 18    | 0     | 0        | 0    | 43    | 25       | 18   |
| ITE #820   | 20.0 ksf        | 96    | -8   | 88    | 46        | 42    | 23    | 12       | 11   | 65    | 34       | 31   |
| Total      |                 | 178   | -18  | 160   | 85        | 75    | 23    | 12       | 11   | 137   | 73       | 64   |

- 5. ESTIMATED DAILY TRIP GENERATION/DRIVEWAY CLASSIFICATION:
  - a. Estimated Daily Trip Generation of Proposed Development: 1804 trips/day or 902 vehicles/day
  - b. Driveway Classification Based on Trip Generation and Three (3) Access Points: <u>Three (3) Low Volume Driveways</u>

| 6.         | TRANSPORTATION IMPACT STUDY REQUIRED?  |
|------------|--|
|            | No   |
|            | Yes, based on:   |
|            | 3,000 or more vehicle trips/day generated  |
|            | During any one-hour time period, 100 or more new (added) vehicle trips generated |
|            | entering or 100 or more new (added) vehicle trips generated exiting              |
|            | development.   |
|            | Other considerations as described below:   |
| <i>7</i> . | TRAFFIC IMPACT ASSESSMENT REQUIRED?   No   Yes                                   |

- 8. TIA STUDY AREA:
  - Roadway and Study Intersections
    - Route 322 (S.R. 0322) and Rock Raymond Road (S.R. 4017)/Proposed Driveway;
    - Route 322 (S.R. 0322) and Lloyd Avenue/Royal Farms Driveway;
    - Lloyd Avenue and Park and Ride Driveway/Proposed Driveway;
    - Lloyd Avenue and GO Carlson Boulevard;
    - Lloyd Avenue and Beaver Run Road/Proposed Driveway.
  - Land use context (Refer to Smart Transportation Handbook)

- Will be addressed in the TIA
- Known Congestion Areas
  - TBD
- Known Safety Concerns
  - TBD
- Known Environmental Constraints
  - TBD
- Pedestrian/Bike Review (Community Centers, Parks, Schools, etc.)
  - Will be addressed in the TIA
- Transit Review (Current routes/stops)
  - Will be addressed in the TIA

| 9. | STUDY AREA | TYPE: |
|----|------------|-------|
|    |            |       |

Urban Rural Rural

#### 10. TIS ANALYSIS PERIOD AND TIMES:

- Weekday A.M. peak hour (7:00-9:00 A.M.)
- Weekday P.M. peak hour (4:00-6:00 P.M.)
- Saturday Midday peak hour (11:00 A.M.-1:00 P.M.)

#### **Study Years to be evaluated:**

- 2017 Existing Conditions
- 2023 Opening Year Conditions

#### 11. TRAFFIC ADJUSTMENT FACTORS:

- a. Seasonal Adjustment: (Identify counts requiring adjustment and methodology): None
- b. Annual Base Traffic Growth: <u>0.65%/year based on PennDOT Bureau of Planning and Research</u> (BPR) data pertaining to urban non-interstate roadways in Chester County.
- c. Pass-By Trips: <u>See Tables 1-2 (above)</u>
- d. Captured Trips for Multi-Use Sites: See Table 2 (above)
- e. Modal Split Reductions: None
- f. Other Reduction: None

#### 12. OTHER PROJECTS WITHIN STUDY AREA TO BE ADDED TO BASE TRAFFIC:

To be determined. At a minimum, the following will be included:

- <u>Dwell at Caln PRD</u> a 384-unit residential development located on the southern side of Route 322, west of Edges Mill Road. TPD will account for this site based on a TIS prepared by McMahon Associates. The anticipated build-out for this development is 2019.
- <u>Taco Bell</u> a 2.703 ksf fast-food restaurant with 66 seats located on the northwestern quadrant of the intersection of Route 322 and Rock Raymond Road. TPD will account for this site based on a TIA concurrently being performed by TPD. The anticipated build-out for this development is 2019.

#### 13. TRIP DISTRIBUTION AND ASSIGNMENT:

TPD recommends distributing and assigning trips to the surrounding roadways based upon an evaluation of the following: (1) existing traffic patterns, (2) roadways surrounding the site, and (3) the proposed site driveway location and configuration.

#### 14. APPROVAL OF DATA COLLECTION ELEMENTS AND METHODOLOGIES:

| Location   | Time Period            | Count Type     |  |
|--|------------------------|----------------|--|
| All Evicting "Doodwoy and Study                                  | Weekday A.M. Peak Hour | Manual Turning |  |
| All Existing "Roadway and Study Intersections" noted in #8 above | Weekday P.M. Peak Hour | Manual Turning |  |
| Intersections noted in #6 above                                  | SAT Midday Peak Hour   | Movement Count |  |

#### 15. CAPACITY/LOS ANALYSIS:

Capacity analyses to be conducted at the study area intersections for the peak hours and study years to be evaluated according to the methodologies contained in the 2010 <u>HCM</u> (where applicable), utilizing SYNCHRO 10 software. In addition, capacity analyses will be conducted at the proposed site driveway intersection under opening year conditions.

- 16. ROADWAY IMPROVEMENTS/MODIFICATIONS BY OTHERS TO BE INCLUDED: TBD
- 17. OTHER NEEDED ANALYSES:
  - a. Sight Distance Analysis: Yes
  - b. Signal Warrant Analysis: As needed
  - c. Required Signal Phasing/Timing Modifications: As Needed
  - d. Traffic Signal Corridor/Network Analysis: As Needed
  - e. Analysis of the Need for Turning Lanes: Yes
  - f. Turning Lane Lengths: <u>Utilizing Pub. 46, Chapter 11</u>
  - g. Left Turn Signal Phasing Analysis: As Needed
  - h. Queuing Analysis: <u>Utilizing HCM 2010 Methodology</u>
  - i. Gap Studies: As Needed
  - j. Crash Analysis: Yes
  - k. Weaving Analysis: As Needed
  - I. Other Required Studies: As Needed
- 18. ADDITIONAL COMMENTS OR RECOMMENDATIONS RELATIVE TO THE SCOPE OF THE TIS:

TBD

TRAFFIC PLANNING AND DESIGN, INC.

Matthew I. Hammond, P.E.

Executive Vice President mhammond@TrafficPD.com

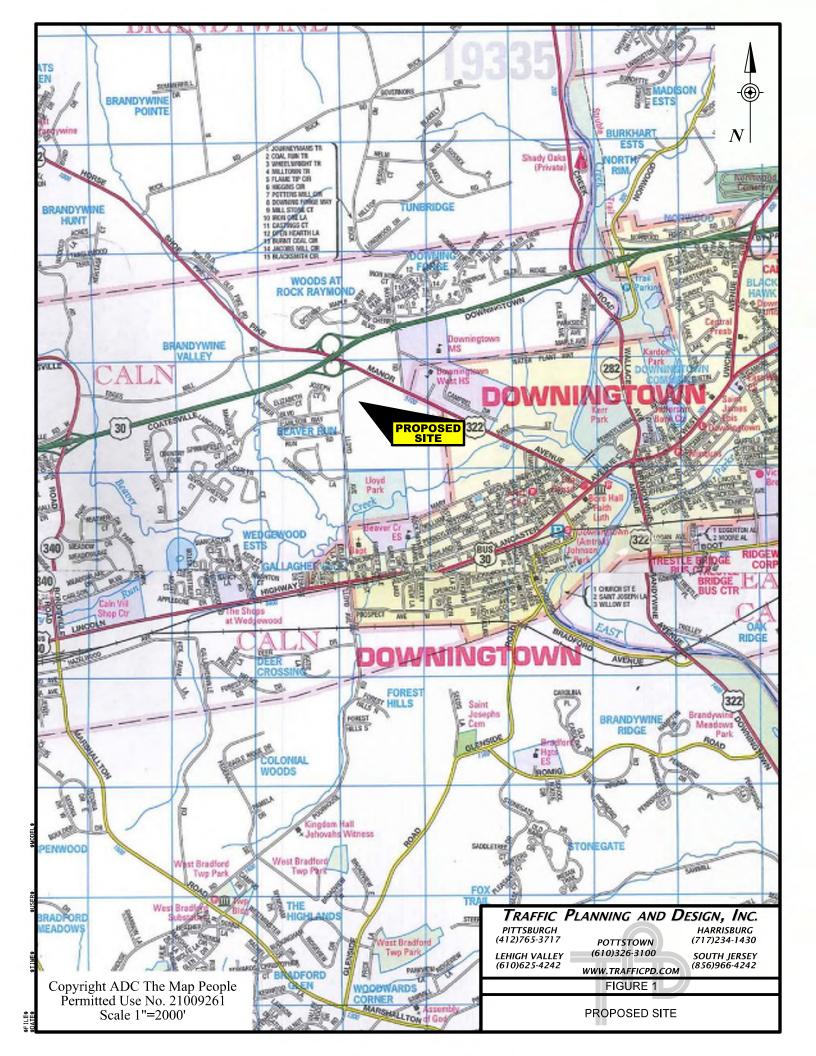
Attachments: Figure 1 – Study Area

Preliminary Interaction Worksheets Royal Farms TIS (2015-11-20) Conceptual Site Plan

cc: Kristen Denne, Caln Township Manager

Project Team (via Email) TPD File





| NCHRP 684 Internal Trip Capture Estimation Tool |                              |  |               |            |  |  |  |
|---|------------------------------|--|---------------|------------|--|--|--|
| Project Name:                                   | WIME.00001                   |  | Organization: | TPD        |  |  |  |
| Project Location:                               | Caln Township/Chester County |  | Performed By: | mb         |  |  |  |
| Scenario Description:                           | Projected Conditions         |  | Date:         | 12/19/2017 |  |  |  |
| Analysis Year:                                  |                              |  | Checked By:   |            |  |  |  |
| Analysis Period:                                | AM Street Peak Hour          |  | Date:         |            |  |  |  |

| Land Use                         | Developme | ent Data ( <i>For Inf</i> | ormation Only) |       | Estimated Vehicle-Trips <sup>3</sup> |         |
|----------------------------------|-----------|---------------------------|----------------|-------|--------------------------------------|---------|
| Land Ose                         | ITE LUCs1 | Quantity                  | Units          | Total | Entering                             | Exiting |
| Office                           |           |                           |                | 0     |                                      |         |
| Retail                           | 820       | 20                        | ksf            | 19    | 12                                   | 7       |
| Restaurant                       |           |                           |                | 0     |                                      |         |
| Cinema/Entertainment             |           |                           |                | 0     |                                      |         |
| Residential                      | 251 / 252 | 300                       | du             | 85    | 29                                   | 56      |
| Hotel                            |           |                           |                | 0     |                                      |         |
| All Other Land Uses <sup>2</sup> |           |                           |                | 0     |                                      |         |
|                                  |           |                           |                | 104   | 41                                   | 63      |

| Table 2-A: Mode Split and Vehicle Occupancy Estimates |            |              |                 |  |               |           |                 |  |
|---|------------|--------------|-----------------|--|---------------|-----------|-----------------|--|
| Land Use  |            | Entering Tri | ps              |  | Exiting Trips |           |                 |  |
| Land USE  | Veh. Occ.4 | % Transit    | % Non-Motorized |  | Veh. Occ.4    | % Transit | % Non-Motorized |  |
| Office  |            |              |                 |  |               |           |                 |  |
| Retail  |            |              |                 |  |               |           |                 |  |
| Restaurant  |            |              |                 |  |               |           |                 |  |
| Cinema/Entertainment                                  |            |              |                 |  |               |           |                 |  |
| Residential   |            |              |                 |  |               |           |                 |  |
| Hotel   |            |              |                 |  |               |           |                 |  |
| All Other Land Uses <sup>2</sup>                      |            |              |                 |  |               |           |                 |  |

| Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance) |        |                  |            |                      |             |       |  |  |  |  |
|---|--------|------------------|------------|----------------------|-------------|-------|--|--|--|--|
| Origin (From)   |        | Destination (To) |            |                      |             |       |  |  |  |  |
| Origin (From)   | Office | Retail           | Restaurant | Cinema/Entertainment | Residential | Hotel |  |  |  |  |
| Office  |        |                  |            |                      |             |       |  |  |  |  |
| Retail  |        |                  |            |                      |             |       |  |  |  |  |
| Restaurant  |        |                  |            |                      |             |       |  |  |  |  |
| Cinema/Entertainment  |        |                  |            |                      |             |       |  |  |  |  |
| Residential   |        |                  |            |                      |             |       |  |  |  |  |
| Hotel   |        |                  |            |                      |             |       |  |  |  |  |

| Table 4-A: Internal Person-Trip Origin-Destination Matrix* |        |        |            |                      |             |       |  |  |
|--|--------|--------|------------|----------------------|-------------|-------|--|--|
| Destination (To)   |        |        |            |                      |             |       |  |  |
| Origin (From)  | Office | Retail | Restaurant | Cinema/Entertainment | Residential | Hotel |  |  |
| Office   |        | 0      | 0          | 0                    | 0           | 0     |  |  |
| Retail   | 0      |        | 0          | 0                    | 1           | 0     |  |  |
| Restaurant   | 0      | 0      |            | 0                    | 0           | 0     |  |  |
| Cinema/Entertainment                                       | 0      | 0      | 0          |                      | 0           | 0     |  |  |
| Residential  | 0      | 1      | 0          | 0                    |             | 0     |  |  |
| Hotel  | 0      | 0      | 0          | 0                    | 0           |       |  |  |

| Table 5-A: Computations Summary           |       |          |         |  |  |  |  |
|---|-------|----------|---------|--|--|--|--|
|   | Total | Entering | Exiting |  |  |  |  |
| All Person-Trips                          | 104   | 41       | 63      |  |  |  |  |
| Internal Capture Percentage               | 4%    | 5%       | 3%      |  |  |  |  |
|   |       |          |         |  |  |  |  |
| External Vehicle-Trips <sup>5</sup>       | 100   | 39       | 61      |  |  |  |  |
| External Transit-Trips <sup>6</sup>       | 0     | 0        | 0       |  |  |  |  |
| External Non-Motorized Trips <sup>6</sup> | 0     | 0        | 0       |  |  |  |  |

| Table 6-A: Internal Trip Capture Percentages by Land Use |                |               |  |  |  |  |  |
|--|----------------|---------------|--|--|--|--|--|
| Land Use   | Entering Trips | Exiting Trips |  |  |  |  |  |
| Office   | N/A            | N/A           |  |  |  |  |  |
| Retail   | 8%             | 14%           |  |  |  |  |  |
| Restaurant   | N/A            | N/A           |  |  |  |  |  |
| Cinema/Entertainment                                     | N/A            | N/A           |  |  |  |  |  |
| Residential  | 3%             | 2%            |  |  |  |  |  |
| Hotel  | N/A            | N/A           |  |  |  |  |  |

<sup>1</sup>Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

<sup>6</sup>Person-Trips

\*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

<sup>&</sup>lt;sup>2</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

<sup>&</sup>lt;sup>3</sup>Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual* ).

<sup>&</sup>lt;sup>4</sup>Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

<sup>&</sup>lt;sup>5</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

| Project Name:    | WIME.00001          |
|------------------|---------------------|
| Analysis Period: | AM Street Peak Hour |

| Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends |           |                   |               |  |           |                              |               |
|--|-----------|-------------------|---------------|--|-----------|------------------------------|---------------|
| Land Use   | Tab       | le 7-A (D): Enter | ing Trips     |  |           | Table 7-A (O): Exiting Trips | 3             |
| Land Use   | Veh. Occ. | Vehicle-Trips     | Person-Trips* |  | Veh. Occ. | Vehicle-Trips                | Person-Trips* |
| Office   | 1.00      | 0                 | 0             |  | 1.00      | 0                            | 0             |
| Retail   | 1.00      | 12                | 12            |  | 1.00      | 7                            | 7             |
| Restaurant   | 1.00      | 0                 | 0             |  | 1.00      | 0                            | 0             |
| Cinema/Entertainment   | 1.00      | 0                 | 0             |  | 1.00      | 0                            | 0             |
| Residential  | 1.00      | 29                | 29            |  | 1.00      | 56                           | 56            |
| Hotel  | 1.00      | 0                 | 0             |  | 1.00      | 0                            | 0             |

| Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin) |                  |        |            |                      |             |       |  |  |  |
|--|------------------|--------|------------|----------------------|-------------|-------|--|--|--|
| Origin (From)  | Destination (To) |        |            |                      |             |       |  |  |  |
| Origin (From)  | Office           | Retail | Restaurant | Cinema/Entertainment | Residential | Hotel |  |  |  |
| Office   |                  | 0      | 0          | 0                    | 0           | 0     |  |  |  |
| Retail   | 2                |        | 1          | 0                    | 1           | 0     |  |  |  |
| Restaurant   | 0                | 0      |            | 0                    | 0           | 0     |  |  |  |
| Cinema/Entertainment   | 0                | 0      | 0          |                      | 0           | 0     |  |  |  |
| Residential  | 1                | 1      | 11         | 0                    |             | 0     |  |  |  |
| Hotel  | 0                | 0      | 0          | 0                    | 0           |       |  |  |  |

| Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination) |        |        |            |                      |             |       |  |
|---|--------|--------|------------|----------------------|-------------|-------|--|
| Origin (From)   |        |        |            | Destination (To)     |             |       |  |
| Origin (From)   | Office | Retail | Restaurant | Cinema/Entertainment | Residential | Hotel |  |
| Office  |        | 4      | 0          | 0                    | 0           | 0     |  |
| Retail  | 0      |        | 0          | 0                    | 1           | 0     |  |
| Restaurant  | 0      | 1      |            | 0                    | 1           | 0     |  |
| Cinema/Entertainment  | 0      | 0      | 0          |                      | 0           | 0     |  |
| Residential   | 0      | 2      | 0          | 0                    |             | 0     |  |
| Hotel   | 0      | 0      | 0          | 0                    | 0           |       |  |

|                                  | Table 9-A (D): Internal and External Trips Summary (Entering Trips) |                  |       |  |                         |                      |                            |  |
|----------------------------------|---|------------------|-------|--|-------------------------|----------------------|----------------------------|--|
| Destination Land Use             |   | Person-Trip Esti | mates |  | External Trips by Mode* |                      |                            |  |
| Destination Land Use             | Internal  | External         | Total |  | Vehicles <sup>1</sup>   | Transit <sup>2</sup> | Non-Motorized <sup>2</sup> |  |
| Office                           | 0   | 0                | 0     |  | 0                       | 0                    | 0                          |  |
| Retail                           | 1   | 11               | 12    |  | 11                      | 0                    | 0                          |  |
| Restaurant                       | 0   | 0                | 0     |  | 0                       | 0                    | 0                          |  |
| Cinema/Entertainment             | 0   | 0                | 0     |  | 0                       | 0                    | 0                          |  |
| Residential                      | 1   | 28               | 29    |  | 28                      | 0                    | 0                          |  |
| Hotel                            | 0   | 0                | 0     |  | 0                       | 0                    | 0                          |  |
| All Other Land Uses <sup>3</sup> | 0   | 0                | 0     |  | 0                       | 0                    | 0                          |  |

|                                  | Table 9-A (O): Internal and External Trips Summary (Exiting Trips) |                  |       |   |                         |                      |                            |  |
|----------------------------------|--|------------------|-------|---|-------------------------|----------------------|----------------------------|--|
| Origin Land Han                  | 1  | Person-Trip Esti | mates |   | External Trips by Mode* |                      |                            |  |
| Origin Land Use                  | Internal   | External         | Total | 1 | Vehicles <sup>1</sup>   | Transit <sup>2</sup> | Non-Motorized <sup>2</sup> |  |
| Office                           | 0  | 0                | 0     |   | 0                       | 0                    | 0                          |  |
| Retail                           | 1  | 6                | 7     |   | 6                       | 0                    | 0                          |  |
| Restaurant                       | 0  | 0                | 0     |   | 0                       | 0                    | 0                          |  |
| Cinema/Entertainment             | 0  | 0                | 0     |   | 0                       | 0                    | 0                          |  |
| Residential                      | 1  | 55               | 56    |   | 55                      | 0                    | 0                          |  |
| Hotel                            | 0  | 0                | 0     | 1 | 0                       | 0                    | 0                          |  |
| All Other Land Uses <sup>3</sup> | 0  | 0                | 0     |   | 0                       | 0                    | 0                          |  |

<sup>1</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

<sup>2</sup>Person-Trips

<sup>3</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator \*Indicates computation that has been rounded to the nearest whole number.

|                       | NCHRP 684 Internal Trip Capture Estimation Tool |               |               |            |  |  |  |  |  |  |
|-----------------------|---|---------------|---------------|------------|--|--|--|--|--|--|
| Project Name:         | WIME.00001                                      | Organization: | TPD           |            |  |  |  |  |  |  |
| Project Location:     | Caln Township/Chester County                    |               | Performed By: | mb         |  |  |  |  |  |  |
| Scenario Description: | Projected Conditions                            |               | Date:         | 12/19/2017 |  |  |  |  |  |  |
| Analysis Year:        |   | Checked By:   |               |            |  |  |  |  |  |  |
| Analysis Period:      | Analysis Period: PM Street Peak Hour Date:      |               |               |            |  |  |  |  |  |  |

| Land Use                         | Developme | ent Data (For Info | ormation Only) |       | Estimated Vehicle-Trips <sup>3</sup> |         |
|----------------------------------|-----------|--------------------|----------------|-------|--------------------------------------|---------|
| Land Use                         | ITE LUCs1 | Quantity           | Units          | Total | Entering                             | Exiting |
| Office                           |           |                    |                | 0     |                                      |         |
| Retail                           | 820       | 20                 | ksf            | 74    | 36                                   | 38      |
| Restaurant                       |           |                    |                | 0     |                                      |         |
| Cinema/Entertainment             |           |                    |                | 0     |                                      |         |
| Residential                      | 251 / 252 | 300                | du             | 99    | 58                                   | 41      |
| Hotel                            |           |                    |                | 0     |                                      |         |
| All Other Land Uses <sup>2</sup> |           |                    |                | 0     |                                      |         |
|                                  |           |                    |                | 173   | 94                                   | 79      |

| Table 2-P: Mode Split and Vehicle Occupancy Estimates |            |             |                 |            |               |                 |
|---|------------|-------------|-----------------|------------|---------------|-----------------|
|   |            | Entering Tr | ips             |            | Exiting Trips |                 |
| Land Use  | Veh. Occ.4 | % Transit   | % Non-Motorized | Veh. Occ.⁴ | % Transit     | % Non-Motorized |
| Office  |            |             |                 |            |               |                 |
| Retail  |            |             |                 |            |               |                 |
| Restaurant  |            |             |                 |            |               |                 |
| Cinema/Entertainment                                  |            |             |                 |            |               |                 |
| Residential   |            |             |                 |            |               |                 |
| Hotel   |            |             |                 |            |               |                 |
| All Other Land Uses <sup>2</sup>                      |            |             |                 |            |               |                 |

|                      | Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance) |        |            |                      |             |       |  |
|----------------------|---|--------|------------|----------------------|-------------|-------|--|
| Origin (From)        |   |        |            | Destination (To)     |             |       |  |
| Origin (From)        | Office  | Retail | Restaurant | Cinema/Entertainment | Residential | Hotel |  |
| Office               |   |        |            |                      |             |       |  |
| Retail               |   |        |            |                      |             |       |  |
| Restaurant           |   |        |            |                      |             |       |  |
| Cinema/Entertainment |   |        |            |                      |             |       |  |
| Residential          |   |        |            |                      |             |       |  |
| Hotel                |   |        |            |                      |             |       |  |

| Table 4-P: Internal Person-Trip Origin-Destination Matrix* |        |        |            |                      |             |       |  |
|--|--------|--------|------------|----------------------|-------------|-------|--|
| Origin (Frame)   |        |        |            | Destination (To)     |             |       |  |
| Origin (From)  | Office | Retail | Restaurant | Cinema/Entertainment | Residential | Hotel |  |
| Office   |        | 0      | 0          | 0                    | 0           | 0     |  |
| Retail   | 0      |        | 0          | 0                    | 10          | 0     |  |
| Restaurant   | 0      | 0      |            | 0                    | 0           | 0     |  |
| Cinema/Entertainment                                       | 0      | 0      | 0          |                      | 0           | 0     |  |
| Residential  | 0      | 4      | 0          | 0                    |             | 0     |  |
| Hotel  | 0      | 0      | 0          | 0                    | 0           |       |  |

| Table 5-P: Computations Summary           |     |     |     |  |  |  |  |  |  |
|---|-----|-----|-----|--|--|--|--|--|--|
| Total Entering Exiting                    |     |     |     |  |  |  |  |  |  |
| All Person-Trips                          | 173 | 94  | 79  |  |  |  |  |  |  |
| Internal Capture Percentage               | 16% | 15% | 18% |  |  |  |  |  |  |
|   |     |     |     |  |  |  |  |  |  |
| External Vehicle-Trips <sup>5</sup>       | 145 | 80  | 65  |  |  |  |  |  |  |
| External Transit-Trips <sup>6</sup>       | 0   | 0   | 0   |  |  |  |  |  |  |
| External Non-Motorized Trips <sup>6</sup> | 0   | 0   | 0   |  |  |  |  |  |  |

| Table 6-P: Internal Trip Capture Percentages by Land Use |                |               |  |  |  |  |  |
|--|----------------|---------------|--|--|--|--|--|
| Land Use   | Entering Trips | Exiting Trips |  |  |  |  |  |
| Office   | N/A            | N/A           |  |  |  |  |  |
| Retail   | 11%            | 26%           |  |  |  |  |  |
| Restaurant   | N/A            | N/A           |  |  |  |  |  |
| Cinema/Entertainment                                     | N/A            | N/A           |  |  |  |  |  |
| Residential  | 17%            | 10%           |  |  |  |  |  |
| Hotel  | N/A            | N/A           |  |  |  |  |  |

<sup>1</sup>Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

<sup>2</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

<sup>3</sup>Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

<sup>4</sup>Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be

<sup>5</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

<sup>6</sup>Person-Trips

\*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

| Project Name:    | WIME.00001          |
|------------------|---------------------|
| Analysis Period: | PM Street Peak Hour |

|                      | Ta        | able 7-P: Conver              | sion of Vehicle-Tr | ip E | nds to Person-Trip En        | ds            |               |
|----------------------|-----------|-------------------------------|--------------------|------|------------------------------|---------------|---------------|
| Land Use             | Table     | Table 7-P (D): Entering Trips |                    |      | Table 7-P (O): Exiting Trips |               |               |
| Land Use             | Veh. Occ. | Vehicle-Trips                 | Person-Trips*      | 1    | Veh. Occ.                    | Vehicle-Trips | Person-Trips* |
| Office               | 1.00      | 0                             | 0                  |      | 1.00                         | 0             | 0             |
| Retail               | 1.00      | 36                            | 36                 | Ī    | 1.00                         | 38            | 38            |
| Restaurant           | 1.00      | 0                             | 0                  | 1    | 1.00                         | 0             | 0             |
| Cinema/Entertainment | 1.00      | 0                             | 0                  |      | 1.00                         | 0             | 0             |
| Residential          | 1.00      | 58                            | 58                 |      | 1.00                         | 41            | 41            |
| Hotel                | 1.00      | 0                             | 0                  | Ī    | 1.00                         | 0             | 0             |

|                      | Table 8-P ( | O): Internal Pers | son-Trip Origin-De | stination Matrix (Computed | at Origin)  |       |  |  |  |
|----------------------|-------------|-------------------|--------------------|----------------------------|-------------|-------|--|--|--|
| Origin (From)        |             | Destination (To)  |                    |                            |             |       |  |  |  |
| Oligili (Floili)     | Office      | Retail            | Restaurant         | Cinema/Entertainment       | Residential | Hotel |  |  |  |
| Office               |             | 0                 | 0                  | 0                          | 0           | 0     |  |  |  |
| Retail               | 1           |                   | 11                 | 2                          | 10          | 2     |  |  |  |
| Restaurant           | 0           | 0                 |                    | 0                          | 0           | 0     |  |  |  |
| Cinema/Entertainment | 0           | 0                 | 0                  |                            | 0           | 0     |  |  |  |
| Residential          | 2           | 17                | 9                  | 0                          |             | 1     |  |  |  |
| Hotel                | 0           | 0                 | 0                  | 0                          | 0           |       |  |  |  |

| O-i-i- (F)           |        | Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)  Destination (To) |            |                      |             |       |  |  |
|----------------------|--------|---|------------|----------------------|-------------|-------|--|--|
| Origin (From)        | Office | Retail  | Restaurant | Cinema/Entertainment | Residential | Hotel |  |  |
| Office               |        | 3   | 0          | 0                    | 2           | 0     |  |  |
| Retail               | 0      |   | 0          | 0                    | 27          | 0     |  |  |
| Restaurant           | 0      | 18  |            | 0                    | 9           | 0     |  |  |
| Cinema/Entertainment | 0      | 1   | 0          |                      | 2           | 0     |  |  |
| Residential          | 0      | 4   | 0          | 0                    |             | 0     |  |  |
| Hotel                | 0      | 1   | 0          | 0                    | 0           |       |  |  |

|                                  | Tal                   | ole 9-P (D): Inter | nal and External T | rips | Summary (Entering Ti    | rips)                |                            |
|----------------------------------|-----------------------|--------------------|--------------------|------|-------------------------|----------------------|----------------------------|
| 5                                | Person-Trip Estimates |                    |                    |      | External Trips by Mode* |                      |                            |
| Destination Land Use             | Internal              | External           | Total              | 1    | Vehicles <sup>1</sup>   | Transit <sup>2</sup> | Non-Motorized <sup>2</sup> |
| Office                           | 0                     | 0                  | 0                  | 1    | 0                       | 0                    | 0                          |
| Retail                           | 4                     | 32                 | 36                 | 1    | 32                      | 0                    | 0                          |
| Restaurant                       | 0                     | 0                  | 0                  | 1    | 0                       | 0                    | 0                          |
| Cinema/Entertainment             | 0                     | 0                  | 0                  | 1    | 0                       | 0                    | 0                          |
| Residential                      | 10                    | 48                 | 58                 | 1    | 48                      | 0                    | 0                          |
| Hotel                            | 0                     | 0                  | 0                  | 1    | 0                       | 0                    | 0                          |
| All Other Land Uses <sup>3</sup> | 0                     | 0                  | 0                  |      | 0                       | 0                    | 0                          |

|                                  | Та                    | ble 9-P (O): Inter | nal and External 1 | Γrip: | s Summary (Exiting Tri  | os)                  |                            |
|----------------------------------|-----------------------|--------------------|--------------------|-------|-------------------------|----------------------|----------------------------|
| 0                                | Person-Trip Estimates |                    |                    |       | External Trips by Mode* |                      |                            |
| Origin Land Use                  | Internal              | External           | Total              | Ī     | Vehicles <sup>1</sup>   | Transit <sup>2</sup> | Non-Motorized <sup>2</sup> |
| Office                           | 0                     | 0                  | 0                  | 1     | 0                       | 0                    | 0                          |
| Retail                           | 10                    | 28                 | 38                 | 1     | 28                      | 0                    | 0                          |
| Restaurant                       | 0                     | 0                  | 0                  | Ī     | 0                       | 0                    | 0                          |
| Cinema/Entertainment             | 0                     | 0                  | 0                  | 1     | 0                       | 0                    | 0                          |
| Residential                      | 4                     | 37                 | 41                 | 1     | 37                      | 0                    | 0                          |
| Hotel                            | 0                     | 0                  | 0                  | 1     | 0                       | 0                    | 0                          |
| All Other Land Uses <sup>3</sup> | 0                     | 0                  | 0                  |       | 0                       | 0                    | 0                          |

<sup>1</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

## TRAFFIC PLANNING



## AND DESIGN, INC.

## **Caln Royal Farms**

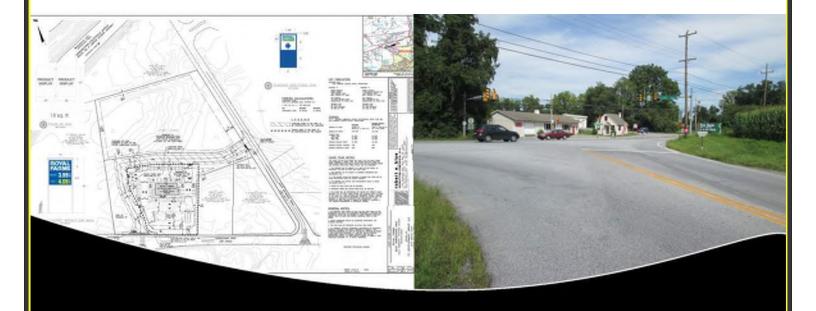
Transportation Impact Study Caln Township, Chester County

## For Submission To:

PennDOT District 6-0 & Caln Township

January 9, 2015 (Last Revised: November 20, 2015)

TPD# FCDG.A.00003



2500 E. High Street Suite 650 Pottstown, PA 19464 610.326.3100 TPD@TrafficPD.com

## CALN ROYAL FARMS TRANSPORTATION IMPACT STUDY

For Submission to:

### Caln Township, Chester County, PA & PennDOT District 6-0

### Prepared For:

Mr. Carl Freedman Caln Horseshoe, L.P. 201A Berlin Road Cherry Hill, NJ 08034 January 9, 2015 (Last Revised November 20, 2015) TPD # FCDG.A.00003

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#### **EXECUTIVE SUMMARY**

The purpose of this study is to examine the potential traffic impact associated with the proposed development on the roadway network in Caln Township, Chester County, PA. Based on this evaluation, the following conclusions were reached:

- The project site is located on the northwestern quadrant of the intersection of Route 322 (S.R. 0322) and Rock Raymond Road (S.R. 4017). The proposed site will consist of a 5,379 s.f. Royal Farms convenience market with sixteen (16) fueling positions.
- Access to the proposed site will be served by two (2) full-access driveway locations, as follows:
  - One (1) full-access driveway on the northern side of Route 322 (S.R. 0322), opposite Lloyd Avenue. This driveway will form the fourth leg of the existing signal with Lloyd Avenue.
  - One (1) full-access driveway on the western side of Rock Raymond Road (S.R. 4017), north of Route 322 (S.R. 0322).
- The measured sight distances at the proposed site driveways will satisfy all PennDOT's sight distance requirements.
- The proposed development will generate approximately <u>99 new trips</u> during the weekday A.M. peak hour and <u>103 new trips</u> during the weekday P.M. peak hour.
- Under 2021 Projected Conditions, with the site-related recommendations, all levels of service at the study area intersection comply with the requirements outlined in PennDOT's TIS Guidelines.
- Traffic Planning and Design Inc. (TPD) recommends the following roadway improvements as outlined at the study area intersections:

#### Route 322 (S.R. 0322) & Rock Raymond Road (S.R. 4017)

- Optimize signal timings.
- Work with Caln Township and PennDOT to provide adequate ADA facilities where applicable.

#### Route 322 (S.R. 0322) & Lloyd Avenue/Proposed Site Driveway

- Provide a 175-foot long left-turn lane on eastbound Route 322 (S.R. 0322).
- Provide a 150-foot long right-turn lane on westbound Route 322 (S.R. 0322).
- Provide a 150-foot long right-turn lane on northbound Lloyd Avenue.
- Provide adequate turning radii in order to optimize ingress/egress.
- Optimize signal timings.
- Work with Caln Township and PennDOT to provide adequate ADA facilities where applicable.



• Widen along Route 322 (S.R. 0322) to connect the left-turn lanes at Lloyd Ave and Rock Raymond Road with a two-way center left turn lane (TWCLTL), in order to maximize available left-turn stacking at both intersections.

#### Rock Raymond Road (S.R. 4017) & Proposed Site Driveway

- Provide "STOP" signage on the eastbound driveway approach for vehicles exiting the proposed site.
- Provide "Do Not Block Intersection" signage along Rock Raymond Road for the proposed driveway.
- Provide adequate turning radii in order to optimize ingress/egress.
- Work with Caln Township, PennDOT, and Downingtown School District to provide adequate ADA facilities where applicable.

As part of PennDOT's HOP process, the applicant will coordinate and fund the implementation of the recommended roadway improvements. Preliminary construction costs have not been determined at this time.

• Levels of Service (LOS) for the study area intersections have been summarized in matrix form. **Table I** details the overall intersection LOS for each study area intersection.



TABLE I LEVEL OF SERVICE DELAY (SECONDS)

|                        |          |          | Weekday AM Peak Hour |                    |          |                    |  |
|------------------------|----------|----------|----------------------|--------------------|----------|--------------------|--|
| Intersection           | Movement | 2014     | 2016                 | 2016               | 2021     | 2021               |  |
|                        |          | Existing | Base                 | Proj. <sup>1</sup> | Base     | Proj. <sup>1</sup> |  |
|                        | EBL      | A        | A                    | A                  | A        | A                  |  |
| Rock Raymond Road      | EBT      | A        | A                    | A                  | A        | A                  |  |
| (S.R. 4017)            | WBT      | В        | В                    | В                  | В        | В                  |  |
| &                      | WBR      |          |                      |                    |          |                    |  |
| Route 322              | SBL      | Е        | Е                    | Е                  | Е        | Е                  |  |
| (S.R. 0322)            | SBR      | D        | D                    | D                  | D        | D                  |  |
|                        | ILOS     | B(13.7)  | B(14.1)              | B(15.8)            | B(14.9)  | B(17.1)            |  |
|                        | EBL      |          |                      | В                  |          | В                  |  |
|                        | EBT      | D        | D                    | D                  | F(88.4)  | D                  |  |
|                        | EBR      | В        | В                    | В                  | В        | В                  |  |
|                        | WBL      | C        | C                    | C                  | D        | C                  |  |
| Lloyd Avenue/ Proposed | WBT      | A        | A                    | A                  | A        | A                  |  |
| Driveway               | WBR      |          |                      | A                  |          | A                  |  |
| &                      | NBL      |          |                      | D                  |          | Е                  |  |
| Route 322              | NBT      | F(162.1) | F(183.1)             | (183.1)            |          | E                  |  |
| (S.R. 0322)            | NBR      |          |                      | D                  |          | D                  |  |
|                        | SBL      |          |                      |                    |          |                    |  |
|                        | SBT      |          |                      | D                  |          | D                  |  |
|                        | SBR      |          |                      |                    |          |                    |  |
|                        | ILOS     | E(65.7)  | E(74.2)              | C(28.3)            | F(110.3) | D(35.4)            |  |
| EB Route 30 Ramps      | NBL      | F(146.5) | F(252.3)             | F(210.7)           | F(770.3) | F(540.7)           |  |
| &                      | NBR      | C        | C                    | C                  | C        | С                  |  |
| Route 322              | WBL      | В        | В                    | В                  | В        | В                  |  |
| (S.R. 0322)            | ILOS     | A(3.9)   | A(5.2)               | A(4.9)             | B(11.2)  | A(8.9)             |  |
|                        | EBL      | A        | A                    | A                  | A        | A                  |  |
|                        | EBT      |          | A                    | A                  | В        | В                  |  |
| WB Route 30 Ramps      | WBT      |          | Α.                   | ٨                  | Α.       | ٨                  |  |
| &<br>Route 322         | WBR      |          | A                    | A                  | A        | A                  |  |
| (S.R. 0322)            | SBL      | F(416.9) | D                    | D                  | D        | D                  |  |
| (B.K. 0322)            | SBR      | В        |                      | -                  |          |                    |  |
|                        | ILOS     | E(37.0)  | B(12.0)              | B(13.1)            | B(13.8)  | B(15.1)            |  |
| Rock Raymond Road      | EB       |          |                      | В                  |          | В                  |  |
| (S.R. 4017)            | NBL      |          |                      | A                  |          | A                  |  |
| &<br>Proposed Driveway | ILOS     |          |                      | A(1.4)             |          | A(1.3)             |  |

Base = No-Build scenario, Projected = Build scenario, ILOS = Overall Intersection Level of Service
Unsignalized ILOS calculated in accordance with Figure 5 of *Policies and Procedures for Transportation Impact Studies*.

1 = With Site- Related Improvements



#### TABLE II LEVEL OF SERVICE DELAY (SECONDS)

| Intersection  Rock Raymond Road | Movement<br>EBL | 2014<br>Existing | 2016    | 2016               | 2021     | 2021               |
|---------------------------------|-----------------|------------------|---------|--------------------|----------|--------------------|
| Rock Raymond Road               |                 | Existing         |         |                    | 2021     | 2021               |
| Rock Raymond Road               |                 |                  | Base    | Proj. <sup>1</sup> | Base     | Proj. <sup>1</sup> |
| Rock Raymond Road               |                 | A                | A       | A                  | В        | В                  |
| Trous rungimenta rrouta         | EBT             | A                | A       | A                  | A        | A                  |
| (S.R. 4017)                     | WBT             | В                | В       | D                  | В        | В                  |
| &                               | WBR             | В                | В       | В                  | В        | В                  |
| Route 322                       | SBL             | D                | D       | D                  | D        | D                  |
| (S.R. 0322)                     | SBR             | D                | D       | D                  | D        | D                  |
|                                 | ILOS            | A(9.7)           | B(10.6) | B(12.5)            | B(13.6)  | B(15.6)            |
|                                 | EBL             |                  |         | В                  |          | В                  |
|                                 | EBT             | В                | В       | В                  | С        | В                  |
|                                 | EBR             | В                | В       | В                  | В        | В                  |
|                                 | WBL             | A                | В       | A                  | В        | В                  |
| Lloyd Avenue/ Proposed          | WBT             | A                | A       | A                  | A        | A                  |
| Driveway                        | WBR             |                  |         | A                  |          | A                  |
| &                               | NBL             |                  |         | D                  |          | D                  |
| Route 322                       | NBT             | D                | D       | D                  | D        | ע                  |
| (S.R. 0322)                     | NBR             |                  |         | С                  |          | С                  |
|                                 | SBL             |                  |         |                    |          |                    |
|                                 | SBT             |                  |         | D                  |          | D                  |
|                                 | SBR             |                  |         |                    |          |                    |
|                                 | ILOS            | B(13.1)          | B(13.9) | B(12.8)            | B(16.0)  | B(13.9)            |
| EB Route 30 Ramps               | NBL             | F(684.7)         | F(999+) | F(260.3)           | F(999+)  | F(688.8)           |
| &                               | NBR             | С                | С       | D                  | D        | Е                  |
| Route 322                       | WBL             | A                | В       | В                  | В        | В                  |
| (S.R. 0322)                     | ILOS            | C(16.0)          | E(37.0) | A(8.4)             | F(205.5) | C(19.8)            |
|                                 | EBL             | A                | С       | С                  | D        | D                  |
| WD D 4 20 D                     | EBT             |                  | В       | В                  | В        | С                  |
| WB Route 30 Ramps               | WBT             |                  | В       | В                  | С        | С                  |
| &<br>Route 322                  | WBR             |                  | В       | ъ                  |          |                    |
| (S.R. 0322)                     | SBL             | F(999+)          | D       | D                  | D        | D                  |
| (D.R. 0322)                     | SBR             | F(449.3)         |         |                    |          |                    |
|                                 | ILOS            | F(377.8)         | C(21.5) | C(22.7)            | C(26.2)  | C(27.8)            |
| Rock Raymond Road               | EB              |                  |         | A                  |          | A                  |
| (S.R. 4017)                     | NBL             |                  |         | A                  |          | A                  |
| & Proposed Driveway             | ILOS            |                  |         | A(1.8)             |          | A(1.6)             |

Base = No-Build scenario, Projected = Build scenario, ILOS = Overall Intersection Level of Service
Unsignalized ILOS calculated in accordance with Figure 5 of *Policies and Procedures for Transportation Impact Studies*.

1 = With Site- Related Improvements



#### **INTRODUCTION**

Traffic Planning and Design, Inc. (TPD) has completed a Transportation Impact Study (TIS) for the proposed Caln Royal Farms in Caln Township, Chester County, Pennsylvania. The project site is located on the northwestern quadrant of the intersection of Route 322 (S.R. 0322) and Rock Raymond Road (S.R. 4017), as shown in **Figure 1**. As shown in **Figure 2**, the proposed site will consist of a 5,379 s.f. Royal Farms convenience market with sixteen (16) fueling positions. For the purposes of this study, TPD assumed a 2016 opening year and a 2021 design year.

This report has been prepared in accordance with PennDOT's *Policies and Procedures for Transportation Impact Studies*, dated January 28, 2009. This TIS has been revised based on review comments contained in the following letters:

- Caln Township (February 10, 2015 Letter);
- PennDOT (February 18, 2015 Letter);
- Two (2) project meetings with the Department on February 23, 2015, and July 9, 2015, respectively;
- Caln Township (October 4, 2015 Letter);

All relevant correspondence pertaining to this project has been included in **Appendix A**.

#### Site Access Locations

Access to the proposed site will be served by two (2) full-access driveway locations, as follows:

- One (1) full-access driveway on the northern side of Route 322 (S.R. 0322), opposite Lloyd Avenue. This driveway will form the fourth leg of the existing signal with Lloyd Avenue.
- One (1) full-access driveway on the western side of Rock Raymond Road (S.R. 4017), north of Route 322 (S.R. 0322).

#### **EXISTING ROADWAY NETWORK**

A field review of the existing roadway system in the study area was conducted. The existing roadway characteristics within the study area are summarized in **Table 1**. Photographs of the study area intersections are included in **Appendix B**.



### TABLE 1 ROADWAY CHARACTERISTICS WITHIN STUDY AREA

| Roadway              | State<br>Route | PennDOT<br>Functional<br>Classification/<br>Roadway Type | Predominant<br>Directional<br>Orientation | Posted<br>Speed<br>Limit | AADT <sup>1</sup>                          |
|----------------------|----------------|--|---|--------------------------|--|
| Route 30             | S.R. 0030      | Urban Freeway  | East-West                                 | 55 mph                   | $EB = 11,970^{2}$ $WB = 28,476^{3}$        |
| Route 322            | S.R. 0322      | Urban Principal<br>Arterial                              | East-West                                 | 35-45 mph                | 18,186 <sup>4</sup><br>10,907 <sup>5</sup> |
| Rock Raymond<br>Road | S.R. 4017      | Urban Collector  | North-South                               | 35 mph                   | 2,322                                      |
| EB Route 30<br>Ramps | S.R. 8010      | Ramps  | North-South                               | N/P                      | 9,865 <sup>2</sup>                         |
| WB Route 30<br>Ramps | S.R. 8010      | Ramps  | North-South                               | N/P                      | 9,250 <sup>2</sup>                         |
| Lloyd Avenue         | N/A            | Collector  | North-South                               | 35 mph                   | 4,490                                      |

- PennDOT iTMS Website (March 2015)
  - 2. ADT minus EB Ramp ADT
  - 3. ADT minus WB Ramp ADT
  - 4. North of Route 30 Interchange
  - 5. South of Rock Raymond Road
- 6. Estimated Based on Peak Hour Counts

#### Land Use Context

In Chapter 4 of the <u>Smart Transportation Guidebook</u>, dated March 2008, there is guidance pertaining to defining the land use context(s) for a given area. Based upon review of this information, the land uses surrounding the proposed site best fits the Suburban Neighborhood as described below:

**Suburban Neighborhood**, "predominately low density residential communities... typically arranged in a curvilinear internal system of streets with limited connections to regional road network or surrounding streets. . . . Neighborhoods can include community facilities such as schools, churches, recreational facilities, and some other stores and offices. When suburban houses line and arterial roadway but have their primary access to frontage roads or rear access roads, it is possible to classify this area as a suburban corridor."

#### Roadway Type

In Chapter 5 of the <u>Smart Transportation Guidebook</u>, there is guidance pertaining to defining the transportation context(s) for a given area. Comparing the existing condition roadway characteristics to the various options presented in Table 5.1 of the <u>Smart Transportation Guidebook</u>, the study area roadways best fit the following categories, as described below:

**Community Arterial**, traffic volumes of 5,000 to 25,000 vehicles per day, intersection spacing of 300 to 1,320 feet, a desired operating speed of 25-55 mph, and a description as follows: "often classified as Minor Arterial in traditional classification but may include road segments classified as Principal Arterial."



• Route 322 (S.R. 0322)

**Neighborhood Collector**, traffic volumes of <6,000 vehicles per day, intersection spacing of 300 to 660 feet, a desired operating speed of 25-35 mph, and a description as follows: "similar in appearance to local roadways. Typically classified as Minor Collector."

- Rock Raymond Road (S.R. 4017)
- Lloyd Avenue

The applicable excerpts from the <u>Smart Transportation Guidebook</u> related to land use contexts, roadway types, and the associated design criteria are included in **Appendix C**.

#### Multi-Modal Facilities

Based on observations during field visits at the study area intersections, there are no specific pedestrian or bicycle facilities at the study area intersections.

The closest regional rail service is provided at the Downingtown Train Station located less than one (1) mile away. Bus service is provided along Lincoln Highway via KRAPF Route A.

#### Crash Data Investigation

Crash data were obtained from PennDOT for the study area intersections. PennDOT defines a reportable crash as follows, "A reportable (crash) is one in which an injury or fatality occurs or if at least one of the vehicles involved requires towing from the scene." Reportable crashes were tabulated for the five-year time period beginning 1/1/2009 and ending 12/31/2013. For a given intersection, PennDOT considers a crash occurrence of 5 reportable, correctable crashes over a continuous twelve-month period during the past five years to be a threshold value, above which the intersection design should be reviewed to examine if corrective measures can be taken to enhance safety. The number of reportable crashes at the study area intersections is shown in **Table 2.** 

TABLE 2
PENNDOT REPORTABLE (CORRECTIBLE) CRASH DATA

| Study Avec Intersection       | Number of Reportable (Correctible) Crashes |      |      |      |      |  |  |
|-------------------------------|--|------|------|------|------|--|--|
| Study Area Intersection       | 2009                                       | 2010 | 2011 | 2012 | 2013 |  |  |
| Route 322 (S.R. 0322)         |  |      |      |      |      |  |  |
| &                             | 0(0)                                       | 0(0) | 0(0) | 0(0) | 1(0) |  |  |
| Rock Raymond Road (S.R. 4017) |  |      |      |      |      |  |  |
| Route 322 (S.R. 0322)         |  |      |      |      |      |  |  |
| &                             | 0(0)                                       | 0(0) | 1(0) | 0(0) | 1(0) |  |  |
| Lloyd Avenue                  |  |      |      |      |      |  |  |
| Route 322 (S.R. 0322)         |  |      |      |      |      |  |  |
| &                             | 2(2)                                       | 5(2) | 1(1) | 3(1) | 4(2) |  |  |
| EB Route 30 Ramps             |  |      |      |      |      |  |  |
| Route 322 (S.R. 0322)         |  |      |      |      |      |  |  |
| &                             | 4(2)                                       | 1(0) | 3(3) | 4(0) | 7(5) |  |  |
| WB Route 30 Ramps             |  |      |      |      | ·    |  |  |

Total Reportable (Correctible)



Based on a review of the crash data, there were no continuous twelve-month periods during the past five years where 5 or more crashes occurred that were deemed correctable at the study area intersections, with the exception of the intersection of Route 322 and the WB Route 30 Ramps. This intersection experienced high instances of tailgating. It should be noted that, signalization has been proposed at this intersection in conjunction with another project. As requested by PennDOT, collision diagrams were prepared under separate cover at Route 322 and both Route 30 Ramps.

#### **EXISTING TRAFFIC CONDITIONS**

Manual traffic counts were conducted on 15-minute intervals during the weekday morning (7:00 to 9:00 A.M.) and weekday evening (4:00 to 6:00 P.M.) peak periods. Data pertaining to heavy vehicles, pedestrians and transit vehicles were observed during the manual counts. Peak hours and count dates for the study area intersections are identified in **Table 3**.

TABLE 3
MANUAL TRAFFIC COUNT INFORMATION

| Intersection                    | Date of Traffic Counts       | Time<br>Period | Intersection<br>Peak Hour <sup>1</sup> |
|---------------------------------|------------------------------|----------------|--|
| Route 322 (S.R. 0322)           | Thursday, September 4, 2014  | Weekday A.M.   | 7:00 to 8:00 A.M.                      |
| & Rock Raymond Road (S.R. 4017) | Wednesday, September 3, 2014 | Weekday P.M.   | 5:00 to 6:00 P.M.                      |
| Route 322 (S.R. 0322)           | Thursday, September 4, 2014  | Weekday A.M.   | 7:00 to 8:00 A.M.                      |
| &<br>Lloyd Avenue               | Wednesday, September 3, 2014 | Weekday P.M.   | 5:00 to 6:00 P.M.                      |
| Route 322 (S.R. 0322) &         | Thursday, September 4, 2014  | Weekday A.M.   | 7:15 to 8:15 A.M.                      |
| EB Route 30 Ramps               | Wednesday, September 3, 2014 | Weekday P.M.   | 5:00 to 6:00 P.M.                      |
| Route 322 (S.R. 0322)           | Thursday, September 4, 2014  | Weekday A.M.   | 7:00 to 8:00 A.M.                      |
| & WB Route 30 Ramps             | Wednesday, September 3, 2014 | Weekday P.M.   | 5:00 to 6:00 P.M.                      |

<sup>1 =</sup> Peak Hour consists of the four consecutive 15-minute intervals where the highest traffic volumes occur.

It should be noted that Downingtown School District was in session when these counts were performed. 2014 Existing Condition traffic volumes for the weekday A.M. and P.M. peak hours are illustrated in Figures 3-4. Manual traffic count data sheets are provided in Appendix D.



#### **BASE (NO-BUILD) CONDITIONS**

#### **Background Growth**

A background growth factor for the roadways in the study area was developed based on growth factors for July 2012 to July 2013 obtained from the PennDOT Bureau of Planning and Research (BPR). The PennDOT BPR suggests using a background growth trend factor of 1.91% per year in Chester County for urban non-interstate roadways. As such, the background growth factor was applied annually to yield overall growth percentage of 3.86% (1.91% per year compounded for 2 years) to develop 2016 future conditions, and 14.16% (1.91% per year compounded for 7 years) to develop 2021 future conditions.

#### Nearby Proposed Development

Base (no-build) traffic conditions were calculated to include traffic volumes from proposed developments, which though not operating under existing conditions, may be operating by the opening of the proposed development. Based on a meeting with Township Staff, the following nearby planned development was specifically included in this study:

**Dwell at Caln PRD** a 384-unit residential development located on the southern side of Route 322, west of Edges Mill Road. TPD generated and distributed for the proposed site based on a TIS prepared by McMahon Associates. The anticipated build-out for this development is 2019. Therefore, TPD assumed 40% build-out under 2016 and 100% build-out under 2021, for this study.

The additional traffic volumes due to background growth and nearby development were added to the existing traffic data to produce 2016 and 2021 Base (no-build) Condition traffic volumes, as illustrated in **Figures 5-8**. Nearby Development Data is included in **Appendix E**. The trip assignments assumed for each nearby development are itemized in the volume development spreadsheets provided in **Appendix F**.

#### SCHEDULED ROADWAY IMPROVEMENTS

Based on a review of the PennDOT 12-Year Program and the DVRPC Transportation Improvement Program (TIP), there are no planned roadway improvements at the study area intersections. Based on further correspondence with Township Staff, the signals along Route 322 (S.R. 0322) in the Study Area, were recently updated by the Township to optimize progression along Route 322 (S.R. 0322) due to recent pattern changes from school traffic. Therefore, TPD will optimize signal timings under base (future no build) conditions, for the purposes of the analysis presented in this TIS.

Based on a review of the TIS prepared for the Dwell at Caln PRD development, a signal is proposed at the intersection of Route 322 (S.R. 0322) and the WB Route 30 Ramps. A concept plan depicting this improvement is included in **Appendix E** with the Nearby Development Data. This improvement was included under base conditions.



#### PROPOSED SITE ACCESS

#### Site Access Locations

Access to the proposed site will be served by two (2) full-access driveway locations, as follows:

- One (1) full-access driveway on the northern side of Route 322 (S.R. 0322), opposite Lloyd Avenue. This driveway will form the fourth leg of the existing signal with Lloyd Avenue.
- One (1) full-access driveway on the western side of Rock Raymond Road (S.R. 4017), north of Route 322 (S.R. 0322).

#### Sight Distance Analysis

A sight distance analysis was prepared for the proposed site driveways. In general, recommended safe sight distances depend upon the posted speed limit and roadway grades. The existing sight distances at the proposed driveways were measured in accordance with PennDOT Publication 282 Highway Occupancy Permit Guidelines and compared to PennDOT's desirable sight distance standard, which is identified in 67 PA Code Chapter 441.8(h), "Access to and Occupancy of Highways by Driveways and Local Roads." In addition, measured sight distances at the proposed driveways were compared to PennDOT's safe stopping sight distance standard, which is calculated by the following equation.

#### $SSSD = 1.47VT + V^{2}/[30(f\pm g)]$

SSSD = safe stopping sight distance (acceptable sight distance)

V = Vehicle Speed

T = Perception Reaction Time of Driver (2.5 seconds)

f = Coefficient of Friction for Wet Pavements

g = Percent of Roadway Grade Divided by 100

**Tables 4-5** show the measured, desirable, acceptable (SSSD), and required sight distances at the proposed site driveways for vehicles entering and exiting the site.

TABLE 4 SIGHT DISTANCE ANALYSIS PROPOSED ROUTE 322 DRIVEWAY

|            |                                | Posted      | Sight Distances (feet) |                  |                   |       |
|------------|--------------------------------|-------------|------------------------|------------------|-------------------|-------|
|            | Direction                      | Speed (mph) | Grade <sup>1</sup> (%) | DES <sup>2</sup> | SSSD <sup>3</sup> | EXIST |
| Exiting    | To the left                    | 45          | -1                     | 635              | 471               | 635+4 |
| Movements  | To the right                   | 45          | -2                     | 570              | 481               | 800+  |
| Entering   | Approaching same direction     | 45          | -2                     | N/A              | 481               | 800+  |
| Left Turns | Approaching opposite direction | 45          | -1                     | 445              | 471               | 670   |

DES = PennDOT Desirable Sight Distance

SSSD = PennDOT Acceptable Sight Distance

EXIST = Existing (measured) Sight Distance

N/A = Not Applicable

1 = Roadway Grade Approaching Driveway

2 = At Posted Speed Limit

3 = At Posted Speed Limit + 5mph

4 = With Removal of On-Site Vegetation



## TABLE 5 SIGHT DISTANCE ANALYSIS PROPOSED ROCK RAYOND ROAD DRIVEWAY

|            |                                | Posted      | Sight Distances (feet) |                  |                   |                  |  |
|------------|--------------------------------|-------------|------------------------|------------------|-------------------|------------------|--|
|            | Direction                      | Speed (mph) | Grade <sup>1</sup> (%) | DES <sup>2</sup> | SSSD <sup>3</sup> | EXIST            |  |
| Exiting    | To the left                    | 35          | +5                     | 440              | 291               | 800+             |  |
| Movements  | To the right                   | 35          | -5                     | 350              | 345               | 435 <sup>4</sup> |  |
| Entering   | Approaching same direction     | 35          | -5                     | N/A              | 345               | 390 <sup>4</sup> |  |
| Left Turns | Approaching opposite direction | 35          | +5                     | 300              | 291               | 800+             |  |

DES = PennDOT Desirable Sight Distance

SSSD = PennDOT Acceptable Sight Distance

EXIST = Existing (measured) Sight Distance

N/A = Not Applicable

1 = Roadway Grade Approaching Driveway

2 = At Posted Speed Limit

3 = At Posted Speed Limit + 5mph

4 = To Route 322

As shown in **Tables 4-5**, the measured sight distances at the proposed site driveways will satisfy all PennDOT's sight distance requirements.

#### **TRIP GENERATION**

The trip generation rates for the proposed site were obtained from the manual <u>Trip Generation</u>, Ninth Edition, 2012, an Institute of Transportation Engineers (ITE) Informational Report. The statistics in <u>Trip Generation</u> are empirical data based on more than 4,800 trip generation studies. The data are categorized by Land Use Codes, with total vehicular trips for a given land use estimated using an independent variable and statistically generated rates or equations.

Due to the close proximity of this site to the Route 30 interchange, PennDOT requested that the trip generation of the proposed site account for "diverted link" trips. **Table 6** shows the rates/equations and directional percentages utilized for the analyzed time periods.

TABLE 6
PROPOSED SITE
TRIP GENERATION DATA

| Time Period                                 | Rates             | Entering | Primary <sup>1</sup> | Diverted Link <sup>1</sup> | Pass-By <sup>1</sup> |  |  |
|---|-------------------|----------|----------------------|----------------------------|----------------------|--|--|
| ITE #853 – Convenience Market with Gasoline |                   |          |                      |                            |                      |  |  |
| Average Weekday                             | $T = 845.6*(X^2)$ | 50%      | N/A                  | N/A                        | N/A                  |  |  |
| Weekday A.M.                                | $T = 16.57*(X^3)$ | 50%      | 11%                  | 26%                        | 63%                  |  |  |
| Weekday P.M.                                | $T = 19.07*(X^3)$ | 50%      | 17%                  | 17%                        | 66%                  |  |  |

T = Total Trips, X = independent variable (ksf/fp)

1 = Averages from Tables F.15 and F.16 from Trip Gen Handbook, 3<sup>rd</sup> Edition

2 = ksf (used per PennDOT standards for average weekday)

3 = fueling positions (generates highest during peak hour)

The calculated trip generation for the proposed development is shown in **Table 7**.



## TABLE 7 TRIP GENERATION SUMMARY PROPOSED SITE

|                 |           | 7F 1  | New '         |      |                              | Trips |      |       | Pass-By Trips |      |       |
|-----------------|-----------|-------|---------------|------|------------------------------|-------|------|-------|---------------|------|-------|
| Peak Hour       | Size (X)  | Total | Primary Trips |      | ry Trips Diverted Link Trips |       |      | ras   | 88-БУ 11      | rips |       |
|                 |           | Trips | Enter         | Exit | Total                        | Enter | Exit | Total | Enter         | Exit | Total |
| Average Weekday | 5.379 ksf | 4548  | 2274          | 2274 | 4548                         | N/A   | N/A  | N/A   | N/A           | N/A  | N/A   |
| Weekday A.M.    | 16 fm     | 265   | 15            | 14   | 29                           | 35    | 35   | 70    | 83            | 83   | 166   |
| Weekday P.M.    | 16 fp     | 305   | 26            | 25   | 51                           | 26    | 26   | 52    | 101           | 101  | 202   |

**X** = Independent Variable (ksf, thousand square feet)

Based on the trip generation analysis summarized in **Table 7**, the proposed development will generate approximately **99 new trips** during the weekday A.M. peak hour and **103 new trips** during the weekday P.M. peak hour.

#### **TRIP DISTRIBUTION**

#### Primary Trips

The distribution of primary trips generated by the proposed development was based on the local road network, the existing traffic patterns, the proposed use of the site, and the site driveway locations. The primary trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 8**.

TABLE 8
TRIP DISTRIBUTION PERCENTAGES – PRIMARY TRIPS

| Direction - To/From | Assignment<br>(To/From) | Distribution Percentage AM/PM |
|---------------------|-------------------------|-------------------------------|
| West                | via Route 322           | 31%                           |
| East                | via Route 322           | 19%                           |
| North               | via Route 30            | 26%                           |
| NOTUI               | via Rock Raymond Road   | 8%                            |
| South               | via Lloyd Avenue        | 11%                           |
| South               | via Route 30            | 5%                            |

#### Diverted Link Trips

The distribution of diverted link trips generated by the proposed development was based on the ADT's of the local road network. The diverted link trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 9**.



TABLE 9
TRIP DISTRIBUTION PERCENTAGES – DIVERTED LINK TRIPS

| DIRECTION                                     | Distribution Percentage |
|---|-------------------------|
| DIRECTION                                     | AM/PM                   |
| Southbound via Route 30                       | 49%                     |
| Northbound via Route 30                       | 20%                     |
| Eastbound via Route 322 (To/From NB Route 30) | 29%                     |
| Eastbound via Route 322 (To/From SB Route 30) | 2%                      |

#### Pass-By Trips

Pass-by trips were established based on the existing traffic patterns in the vicinity of the site and the location and configuration of the site driveways. The percentages used for the distribution of pass-by trips to the project site are shown below in **Table 10**.

TABLE 10
TRIP DISTRIBUTION PERCENTAGES – PASS-BY TRIPS

| Dimention                        | Pass-by Trip Distribution Percentage |              |  |  |  |
|----------------------------------|--------------------------------------|--------------|--|--|--|
| Direction                        | Weekday A.M.                         | Weekday P.M. |  |  |  |
| Eastbound Route 322              | 42%                                  | 43%          |  |  |  |
| Westbound Route 322              | 23%                                  | 39%          |  |  |  |
| Southbound via Rock Raymond Road | 19%                                  | 9%           |  |  |  |
| Northbound via Rock Raymond Road | 16%                                  | 9%           |  |  |  |

The assignment of site-generated trips for the proposed development during the weekday A.M. and P.M. peak hours are shown in **Figures 9-10**.

#### PROJECTED (BUILD) CONDITION TRAFFIC VOLUMES

The site-generated trips were added to the 2016 and 2021 Base (no-build) Condition traffic volumes to develop 2016 and 2021 Projected (build) Condition traffic volumes as shown in **Figures 11-14**.

#### LEVELS OF SERVICE FOR AN INTERSECTION

For analysis of intersections, level of service is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. LOS criteria is stated in terms of control delay per vehicle for a one-hour analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The criteria are shown in **Table 10**. Delay, as it relates to level of service, is a complex measure and is dependent upon a number of variables. For signalized intersections, these variables include the quality of vehicle progression, the cycle length, the green time ratio, and the volume/capacity ratio for the lane group in question. For unsignalized intersections, delay is related to the availability of gaps in the flow of



traffic on the major street and the driver's discretion in selecting an appropriate gap for a particular movement from the minor street (straight across, left or right turn).

TABLE 10 LEVEL OF SERVICE CRITERIA UNSIGNALIZED AND SIGNALIZED INTERSECTIONS <sup>1</sup>

| Loyal of Compies | Control Delay Per Vehicle (Seconds) |                             |  |  |  |  |  |  |  |  |
|------------------|-------------------------------------|-----------------------------|--|--|--|--|--|--|--|--|
| Level of Service | Signalized                          | Unsignalized                |  |  |  |  |  |  |  |  |
| A                | ≤ 10                                | ≤ 10                        |  |  |  |  |  |  |  |  |
| В                | $> 10 \text{ and } \le 20$          | $> 10 \text{ and } \leq 15$ |  |  |  |  |  |  |  |  |
| С                | $> 20 \text{ and } \le 35$          | $> 15 \text{ and } \le 25$  |  |  |  |  |  |  |  |  |
| D                | $> 35 \text{ and } \le 55$          | $> 25 \text{ and } \le 35$  |  |  |  |  |  |  |  |  |
| E                | $> 55 \text{ and } \leq 80$         | $> 35 \text{ and } \leq 50$ |  |  |  |  |  |  |  |  |
| F                | $> 80^2$                            | $> 50^2$                    |  |  |  |  |  |  |  |  |

<sup>&</sup>lt;sup>1</sup> Obtained from Exhibits 18-4 and 19-1 of the Transportation Research Board's *Highway Capacity Manual 2010*<sup>2</sup> Or a V/C Ratio > 1.00

#### CAPACITY ANALYSIS METHODOLOGY

Capacity analyses were conducted for the weekday A.M. and P.M. peak hours at the study area intersections. These analyses were conducted according to the methodologies contained in the 2010 *Highway Capacity Manual* (HCM) using *Synchro 8* software, a Trafficware product. The following conditions were analyzed, as applicable:

- 2014 Existing Conditions;
- 2016 Base Conditions (Build-out year without development);
- 2016 Projected Conditions (Build-out year without development);
- 2021 Base Conditions (Design year without development);
- 2021 Projected Conditions (Design year without development).

In addition, capacity analyses were conducted at the proposed site driveway intersections under the projected conditions. The capacity analysis worksheets are included in **Appendix G**. The PennDOT-approved signal plans are included in **Appendix H**.

It should be noted that based on methodologies contained in Chapter 10 of PennDOT's Publication 46, TPD adjusted the following 2010 HCM default values in the *Synchro 8* capacity analysis. These adjustments were made at the signalized intersections within the study area for all time periods based on the study area location being classified as <u>Suburban</u>:

• The Pennsylvania default values for signalized intersections in a suburban land use context contained in Chapter 10 of PennDOT's *Publication 46* were utilized for the base saturation flow rate (1800 pcphpl), start-up lost time (2.5 seconds), extension of effective green time (3.5 seconds) and number of left turn sneakers (2 vehicles).



• The Pennsylvania default values for two-way stop controlled intersections in a suburban land use context contained in Chapter 10 of PennDOT's *Publication 46* were utilized for the base critical headway and base follow-up headways.

PennDOT's Transportation Impact Study Guidelines outlined in Strike-Off Letter 470-09-4, dated February 12, 2009 contain the following criteria regarding levels of service:

- Page 29 of the Guidelines state that if evaluation of the With Development Horizon Year Scenario to the Without Development Horizon Year Scenario indicates that the overall intersection level of service has dropped, the applicant will be required to mitigate the level of service if the increase in overall intersection delay is greater than 10-seconds. If the overall intersection delay increase is less than or equal to 10-seconds, mitigation of the intersection will not be required.
- Page 29 of the Guidelines state that for mitigation scenarios, applicants are expected to mitigate the overall intersection LOS to the original Without Development LOS; the 10-second delay variance is not applied to mitigation scenarios. Applicants may be required to address available storage and queue lengths at critical movements or approaches even if the overall LOS requirements are met.
- Page 31 of the Guidelines state that if signalization is the preferred alternative for mitigation, overall intersection LOS C in rural areas and LOS D in urban areas is acceptable.
- Page 31 of the Guidelines states new signalized or unsignalized intersection established to serve as access to the development shall be designed to operate at minimum LOS C for rural areas, and minimum LOS D for urban areas.

#### LEVELS OF SERVICE IN THE STUDY AREA

Levels of service (LOS) at the study area intersections for the weekday A.M. and P.M. peak hours are summarized in **Table I** contained within the Executive Summary. As shown in **Table I**, with the site-related recommendations, all levels of service at the study area intersection comply with the requirements outlined in PennDOT's TIS Guidelines. It should be noted that, with the proposed improvements at the intersection of Route 322 and Lloyd Avenue/Proposed Site Driveway, SYNCHRO shows an improvement in the operations at the adjacent intersection of Route 322 and the EB Route 30 Ramps, as it assumes an improvement in progression on Route 322. Although TPD believes these improvements will cause improved operations at the EB Ramps, TPD feels that the results shown in Table I exaggerate the benefit of these improvements.

#### Township LOS Standards

Caln Township Ordinances set forth LOS Standards that define LOS D, E, or F as deficient. These ordinances also request that all TIS document the improvements needed in order to achieve LOS C or better (ILOS and movement). The February 10, 2015 Township Review Letter has requested this documentation "for future long-term traffic improvement planning." Based on this investigation, the following improvements would be needed under 2021 Projected Conditions:

### CALN ROYAL FARMS - TRANSPORTATION IMPACT STUDY CALN TOWNSHIP, CHESTER COUNTY, PA



- Route 322 & Rock Raymond Road Widen WB Route 322 to provide an additional through/right lane. Shorten the existing cycle lengths during the AM and PM peak hours to 75-80 seconds.
- Route 322 & Lloyd Avenue/Proposed Driveway Widen WB Route 322 to provide an additional through/right lane in lieu of the proposed right-turn lane into the proposed site. Widen EB Route 322 to provide an additional through/right lane in lieu of the existing right-turn lane onto Lloyd Avenue. Shorten the existing cycle lengths during the AM and PM peak hours to 75-80 seconds.
- <u>Route 322 & WB Route 30 Ramps</u> In addition to the roadway improvements assumed under base conditions of this TIS (Signalization and Restriping), shorten the existing cycle lengths during the AM and PM peak hours to 75-80 seconds.
- Route 322 & EB Route 30 Ramps Provide signalization with shortened cycle lengths during the AM and PM peak hours of 75-80 seconds. Restripe the existing Route 322 cross-section to revert to two lanes in the EB and WB directions of Route 322 (shared EB thru/right and shared WB left/thru).

This list is being provided at the request of the Township, for informational purposes only.

#### Weave Analysis

TPD prepared a weave analysis utilizing HCM 2010 for the EB Route 30 Off Ramp movements and the SB Route 322 movements. This analysis assumed the off ramp at the existing location, as well as a second location further west as part of future development, closer to where the left-turn from the EB Route 30 Off Ramp accesses Route 322. This second condition assumes potential modification of the off ramp in the future. These analyses are also included in **Appendix G**.

#### 95TH PERCENTILE QUEUE ANALYSIS

Queue analyses were conducted at the signalized study area intersection using *Synchro 8* software. For this analysis, the 95<sup>th</sup> percentile queue is defined as the queue length that is exceeded in 5% of the signal cycles. As an example, for a signal with a 90-second cycle, this means that the 95<sup>th</sup> percentile queue length will be exceeded during 2 of the 40 signal cycles that occur during the peak hour. The queue analysis results are summarized in **Table 11** for the analyzed peak hours.



**TABLE 11** 95<sup>TH</sup> PERCENTILE QUEUE ANALYSIS

|                                     | 93            | FERCEN           |                  |              | lay AM                         | Weekday PM   |                                |  |  |
|-------------------------------------|---------------|------------------|------------------|--------------|--------------------------------|--------------|--------------------------------|--|--|
| Intersection                        | Lane<br>Group | Storage Existing | Proposed         | 2021<br>Base | 2021<br>Projected <sup>1</sup> | 2021<br>Base | 2021<br>Projected <sup>1</sup> |  |  |
| Route 322                           | EBL           | 145              | 150 <sup>2</sup> | 115          | 160                            | 93           | 110                            |  |  |
| (S.R. 0322)                         | EBT           | [57              | 8]               | <25          | 38                             | <25          | <25                            |  |  |
| &                                   | WBTR          |                  |                  | 300          | 315                            | 715          | 758                            |  |  |
| Rock Raymond                        | SBL           | 16               | 5                | 305          | 340                            | 83           | 113                            |  |  |
| Road<br>(S.R. 4017)                 | SBR           | [43              | 5]               | 255          | 280                            | 190          | 213                            |  |  |
|                                     | EBL           |                  | (175)            |              | 55                             |              | 53                             |  |  |
|                                     | EBT           | [25              |                  | 1335         | 1065                           | 513          | 468                            |  |  |
|                                     | EBR           | [25              | 0]               | 60           | 55                             | 235          | 228                            |  |  |
| Route 322                           | WBL           | 165              | 150 <sup>2</sup> | 118          | 103                            | 93           | 90                             |  |  |
| (S.R. 0322)                         | WBT           | [57              | 8]               | <25          | <25                            | 28           | <25                            |  |  |
| &                                   | WBR           |                  | (150)            |              | <25                            |              | <25                            |  |  |
| Lloyd Avenue/<br>Proposed Site      | NBL<br>NBT    |                  |                  | 1695         | 420                            | 343          | 250                            |  |  |
| Driveway                            | NBR           | (100)            | (150)            | 1093         | 345                            | 343          | 65                             |  |  |
| Direway                             | SBL           |                  | (130)            |              | 343                            |              | 03                             |  |  |
|                                     | SBT           |                  |                  |              | 93                             |              | 95                             |  |  |
|                                     | SBR           |                  |                  |              | 13                             | <u></u>      | 1 /3                           |  |  |
| Route 322<br>(S.R. 0322)            | WBL           | [49              | 5]               | 65           | 78                             | <25          | 25                             |  |  |
| & EB Route 30                       | NBL           |                  |                  | 105          | 38                             | 245          | 93                             |  |  |
| Ramps                               | NBR           |                  |                  | 45           | 55                             | 100          | 118                            |  |  |
| •                                   | EBL           | 75               | 3                | 130          | <25                            | 33           | 33                             |  |  |
| Route 322                           | EBT           |                  |                  | 265          | 588                            | 443          | 458                            |  |  |
| (S.R. 0322)<br>&                    | WBT           | F40              | <i>c</i> 1       | 110          | 110                            | (70          | 712                            |  |  |
| WB Route 30                         | WBR           | [48              | 5]               | 118          | 118                            | 678          | 713                            |  |  |
| Ramps                               | SBL           |                  |                  | 1305         | 298                            | 550          | 573                            |  |  |
| Kamps                               | SBR           |                  |                  |              |                                |              |                                |  |  |
| Rock Raymond<br>Road<br>(S.R. 4017) | NBL           |                  | [435]            |              | <25                            |              | <25                            |  |  |
| & Proposed Site Driveway            | EB            |                  |                  |              | <25                            |              | <25                            |  |  |

Queue analysis worksheets are included with the capacity analysis worksheets provided in **Appendix** G.

<sup>[--] =</sup> Distance to Adjacent Study Intersection
(--) = Proposed Stacking
1 = With Site-Related Recommendations
2 = With Improvements a TWCLTL will be provided, A Total of 578' will be available between these two movements 3 = 75' Based on the Concept Plan. However, this lane is a TWCLTL that continues on to provide 500+'



#### **AUXILIARY TURN LANE ANALYSIS**

#### <u>Methodology</u>

TPD evaluated auxiliary turn lane warrants in the study area. The warrant analysis was conducted according to the methodologies contained in Chapter 11 of PennDOT's *Publication 46* and Strike-Off Letter 470-08-07.

#### *Findings*

**Table 12** summarizes the results of the auxiliary turn lane analysis.

TABLE 12 AUXILIARY TURN LANE ANALYSIS SUMMARY

| Intersection           | Auxiliary Lane     | Warrant<br>Satisfied? | Required<br>Lane<br>Length | Proposed<br>Lane<br>Length |
|------------------------|--------------------|-----------------------|----------------------------|----------------------------|
| Route 322              | EB Left-Turn Lane  | Yes                   | 175'                       | 175'                       |
| &<br>Lloyd Avenue/     | WB Right-Turn Lane | Yes                   | 150'                       | 150'                       |
| Proposed Site Driveway | NB Right-Turn Lane | Not<br>Evaluated      |                            | 150'                       |
| Rock Raymond Road<br>& | SB Right-Turn Lane | No                    |                            |                            |
| Proposed Site Driveway | NB Left-Turn Lane  | No                    |                            |                            |

Auxiliary turn lane warrant worksheets are included in **Appendix I**. In addition, contained within **Appendix J** is a concept plan outlining the proposed roadway improvements discussed above.

#### **RECOMMENDATIONS**

TPD has made the following recommendations in relation to the proposed development in Caln Township:

#### Route 322 (S.R. 0322) & Rock Raymond Road (S.R. 4017)

- Optimize signal timings.
- Work with Caln Township and PennDOT to provide adequate ADA facilities where applicable.

#### Route 322 (S.R. 0322) & Lloyd Avenue/Proposed Site Driveway

- Provide a 175-foot long left-turn lane on eastbound Route 322 (S.R. 0322).
- Provide a 150-foot long right-turn lane on westbound Route 322 (S.R. 0322).
- Provide a 150-foot long right-turn lane on northbound Lloyd Avenue.
- Provide adequate turning radii in order to optimize ingress/egress.



- Optimize signal timings.
- Work with Caln Township and PennDOT to provide adequate ADA facilities where applicable.
- Widen along Route 322 (S.R. 0322) to connect the left-turn lanes at Lloyd Ave and Rock Raymond Road with a two-way center left turn lane (TWCLTL), in order to maximize available left-turn stacking at both intersections.

#### Rock Raymond Road (S.R. 4017) & Proposed Site Driveway

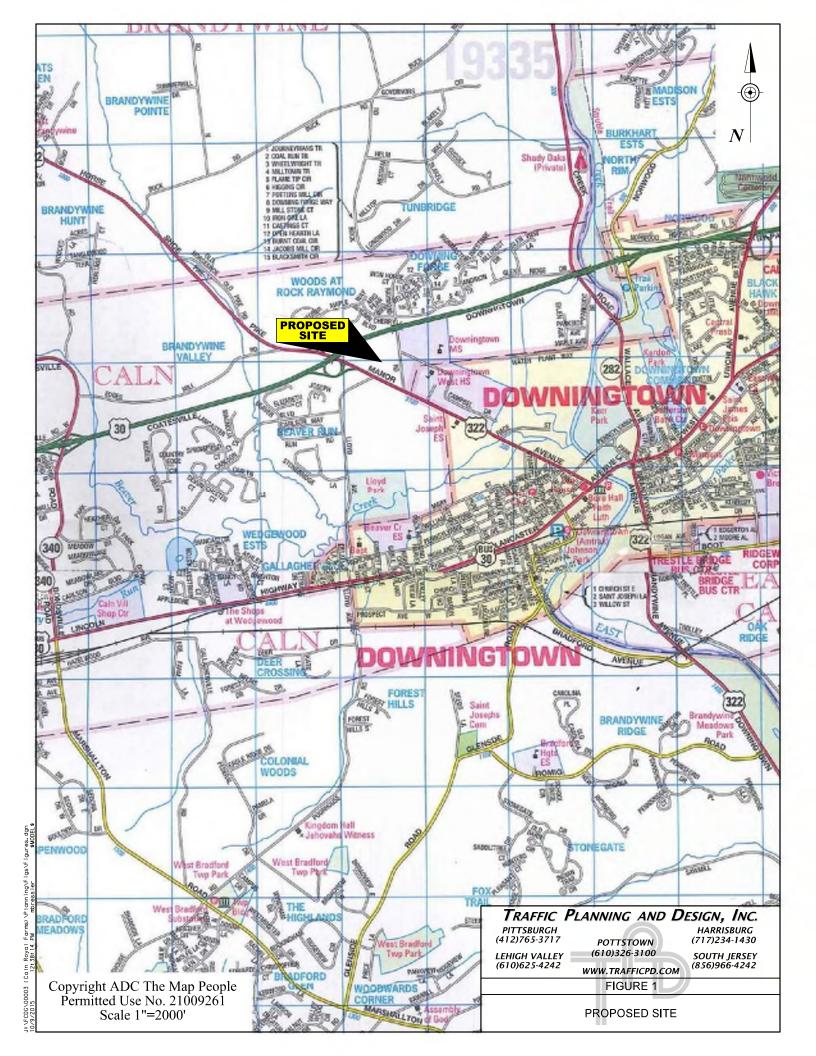
- Provide "STOP" signage on the eastbound driveway approach for vehicles exiting the proposed site.
- Provide "Do Not Block Intersection" signage along Rock Raymond Road for the proposed driveway.
- Provide adequate turning radii in order to optimize ingress/egress.
- Work with Caln Township, PennDOT, and Downingtown School District to provide adequate ADA facilities where applicable.

As part of PennDOT's HOP process, the applicant will coordinate and fund the implementation of the recommended roadway improvements. Preliminary construction costs have not been determined at this time.

#### **CONCLUSIONS**

Based on the results of the transportation impact study, TPD offers the following conclusions:

- The project site is located on the northwestern quadrant of the intersection of Route 322 (S.R. 0322) and Rock Raymond Road (S.R. 4017). The proposed site will consist of a 5,379 s.f. Royal Farms convenience market with sixteen (16) fueling positions.
- Access to the proposed site will be served by two (2) full-access driveway locations, as follows:
  - One (1) full-access driveway on the northern side of Route 322 (S.R. 0322), opposite Lloyd Avenue. This driveway will form the fourth leg of the existing signal with Lloyd Avenue.
  - One (1) full-access driveway on the western side of Rock Raymond Road (S.R. 4017), north of Route 322 (S.R. 0322).
- The measured sight distances at the proposed site driveways will satisfy all PennDOT's sight distance requirements.
- The proposed development will generate approximately <u>99 new trips</u> during the weekday A.M. peak hour and <u>103 new trips</u> during the weekday P.M. peak hour.
- Under 2021 Projected Conditions, with the site-related recommendations, all levels of service at the study area intersection comply with the requirements outlined in PennDOT's TIS Guidelines.



# APPENDIX D MANUAL TRAFFIC COUNT PRINTOUTS



Counter:: MIO Counted By:: JM/RK Weather:: Clear

# Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Route 322 & Rock Raymond Road - AM & PM Site Code: Start Date: 09/03/2014 Page No: 1

#### **Turning Movement Data**

|                     | Turning woverherit Data |      |       |      |               |           |      |       |      | 1             | Pook Poymend Deed |      |       |       |               |                   |      |       |       |               |               |  |
|---------------------|-------------------------|------|-------|------|---------------|-----------|------|-------|------|---------------|-------------------|------|-------|-------|---------------|-------------------|------|-------|-------|---------------|---------------|--|
|                     | Route 322               |      |       |      |               | Route 322 |      |       |      |               | Private Driveway  |      |       |       |               | Rock Raymond Road |      |       |       |               |               |  |
| Start Time          | Eastbound               |      |       |      |               | Westbound |      |       |      | Northbound .  |                   |      |       |       | Southbound    |                   |      |       |       |               |               |  |
|                     | Left                    | Thru | Right | Peds | App.<br>Total | Left      | Thru | Right | Peds | App.<br>Total | Left              | Thru | Right | Peds  | App.<br>Total | Left              | Thru | Right | Peds  | App.<br>Total | Int.<br>Total |  |
| 4:00 PM             | 23                      | 84   | 0     | 0    | 107           | 0         | 135  | 17    | 0    | 152           | 0                 | 0    | 0     | 0     | 0             | 6                 | 0    | 19    | 3     | 25            | 284           |  |
| 4:15 PM             | 49                      | 93   | 0     | 0    | 142           | 0         | 138  | 30    | 0    | 168           | 0                 | 0    | 0     | 0     | 0             | 8                 | 0    | 24    | 0     | 32            | 342           |  |
| 4:30 PM             | 30                      | 77   | 0     | 0    | 107           | 0         | 143  | 17    | 0    | 160           | 0                 | 0    | 0     | 0     | 0             | 30                | 0    | 51    | 0     | 81            | 348           |  |
| 4:45 PM             | 27                      | 95   | 0     | 0    | 122           | 0         | 166  | 20    | 0    | 186           | 0                 | 0    | 0     | 0     | 0             | 16                | 0    | 33    | 0     | 49            | 357           |  |
| Hourly Total        | 129                     | 349  | 0     | 0    | 478           | 0         | 582  | 84    | 0    | 666           | 0                 | 0    | 0     | 0     | 0             | 60                | 0    | 127   | 3     | 187           | 1331          |  |
| 5:00 PM             | 26                      | 119  | 0     | 0    | 145           | 0         | 165  | 16    | 0    | 181           | 0                 | 0    | 0     | 2     | 0             | 16                | 0    | 36    | 0     | 52            | 378           |  |
| 5:15 PM             | 35                      | 112  | 0     | 0    | 147           | 0         | 158  | 23    | 0    | 181           | 0                 | 0    | 0     | 0     | 0             | 19                | 0    | 39    | 0     | 58            | 386           |  |
| 5:30 PM             | 30                      | 137  | 0     | 0    | 167           | 0         | 176  | 15    | 0    | 191           | 0                 | 0    | 0     | 0     | 0             | 13                | 0    | 37    | 0     | 50            | 408           |  |
| 5:45 PM             | 19                      | 123  | 0     | 0    | 142           | 0         | 183  | 24    | 0    | 207           | 0                 | 0    | 0     | 0     | 0             | 5                 | 0    | 11    | 0     | 16            | 365           |  |
| Hourly Total        | 110                     | 491  | 0     | 0    | 601           | 0         | 682  | 78    | 0    | 760           | 0                 | 0    | 0     | 2     | 0             | 53                | 0    | 123   | 0     | 176           | 1537          |  |
| 6:00 PM             | 0                       | 0    | 0     | 0    | 0             | 0         | 0    | 0     | 0    | 0             | 0                 | 0    | 0     | 0     | 0             | 0                 | 0    | 0     | 0     | 0             | 0             |  |
| *** BREAK ***       | -                       | -    | -     | -    | -             | -         | -    | -     | -    | -             | -                 | -    | -     | -     | -             | -                 | -    | -     | -     | -             | -             |  |
| Hourly Total        | 0                       | 0    | 0     | 0    | 0             | 0         | 0    | 0     | 0    | 0             | 0                 | 0    | 0     | 0     | 0             | 0                 | 0    | 0     | 0     | 0             | 0             |  |
| 7:00 AM             | 74                      | 185  | 0     | 0    | 259           | 0         | 27   | 14    | 0    | 41            | 0                 | 0    | 0     | 0     | 0             | 58                | 0    | 36    | 1     | 94            | 394           |  |
| 7:15 AM             | 94                      | 183  | 0     | 0    | 277           | 0         | 47   | 32    | 0    | 79            | 0                 | 0    | 0     | 0     | 0             | 27                | 0    | 35    | 0     | 62            | 418           |  |
| 7:30 AM             | 28                      | 136  | 0     | 0    | 164           | 0         | 93   | 18    | 0    | 111           | 0                 | 0    | 0     | 0     | 0             | 62                | 0    | 76    | 0     | 138           | 413           |  |
| 7:45 AM             | 10                      | 166  | 0     | 0    | 176           | 0         | 56   | 9     | 0    | 65            | 0                 | 0    | 0     | 0     | 0             | 19                | 0    | 27    | 0     | 46            | 287           |  |
| Hourly Total        | 206                     | 670  | 0     | 0    | 876           | 0         | 223  | 73    | 0    | 296           | 0                 | 0    | 0     | 0     | 0             | 166               | 0    | 174   | 1     | 340           | 1512          |  |
| 8:00 AM             | 10                      | 165  | 0     | 0    | 175           | 0         | 90   | 2     | 0    | 92            | 0                 | 0    | 0     | 0     | 0             | 9                 | 0    | 26    | 0     | 35            | 302           |  |
| 8:15 AM             | 7                       | 109  | 0     | 0    | 116           | 0         | 59   | 8     | 0    | 67            | 0                 | 0    | 0     | 0     | 0             | 12                | 0    | 22    | 0     | 34            | 217           |  |
| 8:30 AM             | 11                      | 107  | 0     | 0    | 118           | 0         | 60   | 6     | 0    | 66            | 0                 | 0    | 0     | 0     | 0             | 13                | 0    | 19    | 2     | 32            | 216           |  |
| 8:45 AM             | 22                      | 123  | 0     | 0    | 145           | 0         | 80   | 16    | 0    | 96            | 0                 | 0    | 0     | 0     | 0             | 23                | 0    | 26    | 0     | 49            | 290           |  |
| Hourly Total        | 50                      | 504  | 0     | 0    | 554           | 0         | 289  | 32    | 0    | 321           | 0                 | 0    | 0     | 0     | 0             | 57                | 0    | 93    | 2     | 150           | 1025          |  |
| 9:00 AM             | 0                       | 0    | 0     | 0    | 0             | 0         | 0    | 0     | 0    | 0             | 0                 | 0    | 0     | 0     | 0             | 0                 | 0    | 0     | 0     | 0             | 0             |  |
| Grand Total         | 495                     | 2014 | 0     | 0    | 2509          | 0         | 1776 | 267   | 0    | 2043          | 0                 | 0    | 0     | 2     | 0             | 336               | 0    | 517   | 6     | 853           | 5405          |  |
| Approach %          | 19.7                    | 80.3 | 0.0   | -    | -             | 0.0       | 86.9 | 13.1  | -    | -             | NaN               | NaN  | NaN   | -     | -             | 39.4              | 0.0  | 60.6  | -     | -             | -             |  |
| Total %             | 9.2                     | 37.3 | 0.0   | -    | 46.4          | 0.0       | 32.9 | 4.9   | -    | 37.8          | 0.0               | 0.0  | 0.0   | -     | 0.0           | 6.2               | 0.0  | 9.6   | -     | 15.8          | -             |  |
| Lights              | 454                     | 1911 | 0     | -    | 2365          | 0         | 1703 | 225   | -    | 1928          | 0                 | 0    | 0     | -     | 0             | 298               | 0    | 484   | -     | 782           | 5075          |  |
| % Lights            | 91.7                    | 94.9 | -     | -    | 94.3          | -         | 95.9 | 84.3  | -    | 94.4          | -                 | -    | -     | -     | -             | 88.7              | -    | 93.6  | -     | 91.7          | 93.9          |  |
| Other Vehicles      | 41                      | 101  | 0     | -    | 142           | 0         | 73   | 41    | -    | 114           | 0                 | 0    | 0     | -     | 0             | 38                | 0    | 33    | -     | 71            | 327           |  |
| % Other<br>Vehicles | 8.3                     | 5.0  | -     | -    | 5.7           | -         | 4.1  | 15.4  | -    | 5.6           | -                 | -    | -     | -     | -             | 11.3              | -    | 6.4   | -     | 8.3           | 6.0           |  |
| Bicycles on<br>Road | 0                       | 2    | 0     | -    | 2             | 0         | 0    | 1     | -    | 1             | 0                 | 0    | 0     | -     | 0             | 0                 | 0    | 0     | -     | 0             | 3             |  |
| % Bicycles on Road  | 0.0                     | 0.1  | -     | -    | 0.1           | -         | 0.0  | 0.4   | -    | 0.0           | -                 |      |       |       | -             | 0.0               | -    | 0.0   | -     | 0.0           | 0.1           |  |
| Pedestrians         | -                       | -    | -     | 0    | -             | -         | -    | -     | 0    | -             | -                 | -    | -     | 2     | -             | -                 | -    | -     | 6     | -             | -             |  |
| % Pedestrians       | -                       | -    | -     | -    | -             | -         | -    | -     | -    | -             | -                 | -    | -     | 100.0 | -             | -                 | -    | -     | 100.0 | -             | -             |  |



Counter:: MIO Counted By:: JM/RK Weather:: Clear

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Count Name: Route 322 & Rock Raymond Road - AM & PM Site Code: Start Date: 09/03/2014 Page No: 2

Rock Raymond Road [N] Out Total In R Р Route 322 [E] 09/03/2014 4:00 PM Ending At 09/04/2014 9:15 AM 253 Lights Other Vehicles Bicycles on Road Pedestrians R 

**Turning Movement Data Plot** 

In Private Driveway [S]

Total

Out



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Count Name: Route 322 & Rock Raymond Road - AM & PM Site Code: Start Date: 09/03/2014 Page No: 3

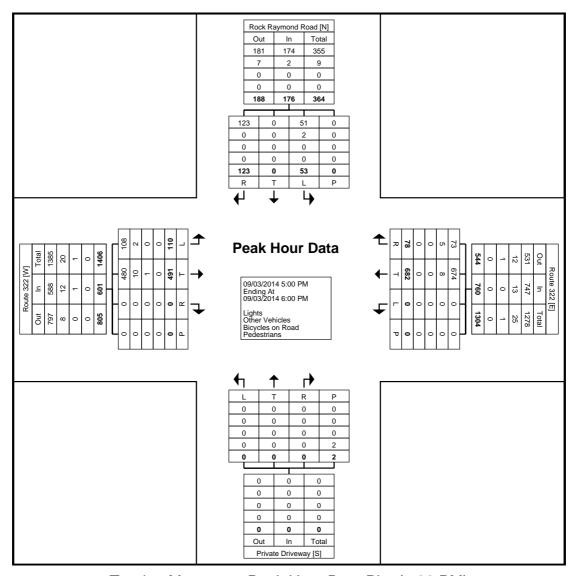
#### Turning Movement Peak Hour Data (5:00 PM)

|                       |       |       | Route 32<br>astboun |      |               |       |       | Route 32:<br>Vestboun |      |               |       |       | ate Drive | •     | ,             |       |       | Raymono |      |               |               |
|-----------------------|-------|-------|---------------------|------|---------------|-------|-------|-----------------------|------|---------------|-------|-------|-----------|-------|---------------|-------|-------|---------|------|---------------|---------------|
| Start Time            | Left  | Thru  | Right               | Peds | App.<br>Total | Left  | Thru  | Right                 | Peds | App.<br>Total | Left  | Thru  | Right     | Peds  | App.<br>Total | Left  | Thru  | Right   | Peds | App.<br>Total | Int.<br>Total |
| 5:00 PM               | 26    | 119   | 0                   | 0    | 145           | 0     | 165   | 16                    | 0    | 181           | 0     | 0     | 0         | 2     | 0             | 16    | 0     | 36      | 0    | 52            | 378           |
| 5:15 PM               | 35    | 112   | 0                   | 0    | 147           | 0     | 158   | 23                    | 0    | 181           | 0     | 0     | 0         | 0     | 0             | 19    | 0     | 39      | 0    | 58            | 386           |
| 5:30 PM               | 30    | 137   | 0                   | 0    | 167           | 0     | 176   | 15                    | 0    | 191           | 0     | 0     | 0         | 0     | 0             | 13    | 0     | 37      | 0    | 50            | 408           |
| 5:45 PM               | 19    | 123   | 0                   | 0    | 142           | 0     | 183   | 24                    | 0    | 207           | 0     | 0     | 0         | 0     | 0             | 5     | 0     | 11      | 0    | 16            | 365           |
| Total                 | 110   | 491   | 0                   | 0    | 601           | 0     | 682   | 78                    | 0    | 760           | 0     | 0     | 0         | 2     | 0             | 53    | 0     | 123     | 0    | 176           | 1537          |
| Approach %            | 18.3  | 81.7  | 0.0                 | -    | -             | 0.0   | 89.7  | 10.3                  | -    | -             | NaN   | NaN   | NaN       | -     |               | 30.1  | 0.0   | 69.9    | -    |               | -             |
| Total %               | 7.2   | 31.9  | 0.0                 | -    | 39.1          | 0.0   | 44.4  | 5.1                   | -    | 49.4          | 0.0   | 0.0   | 0.0       | -     | 0.0           | 3.4   | 0.0   | 8.0     | -    | 11.5          | -             |
| PHF                   | 0.786 | 0.896 | 0.000               | -    | 0.900         | 0.000 | 0.932 | 0.813                 | -    | 0.918         | 0.000 | 0.000 | 0.000     | -     | 0.000         | 0.697 | 0.000 | 0.788   | -    | 0.759         | 0.942         |
| Lights                | 108   | 480   | 0                   | -    | 588           | 0     | 674   | 73                    | -    | 747           | 0     | 0     | 0         | -     | 0             | 51    | 0     | 123     | -    | 174           | 1509          |
| % Lights              | 98.2  | 97.8  | -                   | -    | 97.8          | -     | 98.8  | 93.6                  | -    | 98.3          | •     | -     | -         | -     | -             | 96.2  | -     | 100.0   | -    | 98.9          | 98.2          |
| Other Vehicles        | 2     | 10    | 0                   | -    | 12            | 0     | 8     | 5                     | -    | 13            | 0     | 0     | 0         | -     | 0             | 2     | 0     | 0       | -    | 2             | 27            |
| % Other<br>Vehicles   | 1.8   | 2.0   | -                   | -    | 2.0           | -     | 1.2   | 6.4                   | -    | 1.7           | -     | -     | -         | -     | -             | 3.8   | -     | 0.0     | -    | 1.1           | 1.8           |
| Bicycles on<br>Road   | 0     | 1     | 0                   | -    | 1             | 0     | 0     | 0                     | -    | 0             | 0     | 0     | 0         | -     | 0             | 0     | 0     | 0       | -    | 0             | 1             |
| % Bicycles on<br>Road | 0.0   | 0.2   | -                   | -    | 0.2           | -     | 0.0   | 0.0                   | -    | 0.0           | 1     | _     | _         | -     | _             | 0.0   | _     | 0.0     | -    | 0.0           | 0.1           |
| Pedestrians           | -     | -     | -                   | 0    | -             | -     | -     | -                     | 0    | -             | -     |       |           | 2     |               | -     |       | -       | 0    | _             | -             |
| % Pedestrians         | -     | -     | -                   | -    | -             | -     | -     | -                     | -    | -             | -     | -     | -         | 100.0 | -             | -     | -     | -       | -    | -             | -             |



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Count Name: Route 322 & Rock Raymond Road - AM & PM Site Code: Start Date: 09/03/2014 Page No: 4



Turning Movement Peak Hour Data Plot (5:00 PM)



## Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Route 322 & Rock Raymond Road - AM & PM Site Code: Start Date: 09/03/2014 Page No: 5

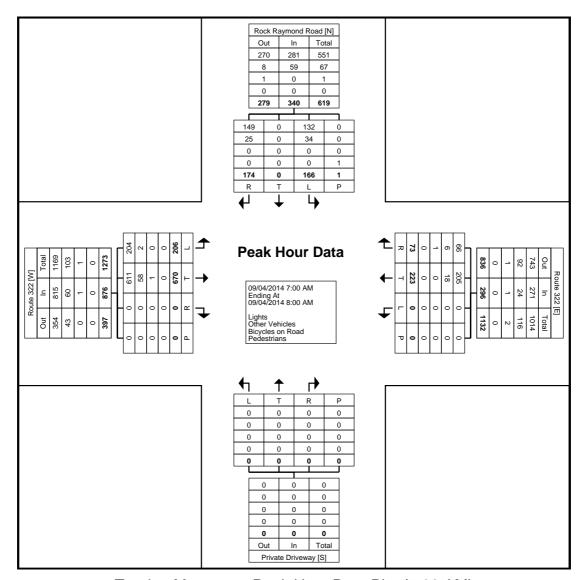
#### Turning Movement Peak Hour Data (7:00 AM)

|                       |       |       | Route 32 |      |               |       |       | Route 32:<br>Vestboun |      |               |       |       | ate Drive | •    | ,             |       |       | Raymono<br>outhbour |       |               |               |
|-----------------------|-------|-------|----------|------|---------------|-------|-------|-----------------------|------|---------------|-------|-------|-----------|------|---------------|-------|-------|---------------------|-------|---------------|---------------|
| Start Time            | Left  | Thru  | Right    | Peds | App.<br>Total | Left  | Thru  | Right                 | Peds | App.<br>Total | Left  | Thru  | Right     | Peds | App.<br>Total | Left  | Thru  | Right               | Peds  | App.<br>Total | Int.<br>Total |
| 7:00 AM               | 74    | 185   | 0        | 0    | 259           | 0     | 27    | 14                    | 0    | 41            | 0     | 0     | 0         | 0    | 0             | 58    | 0     | 36                  | 1     | 94            | 394           |
| 7:15 AM               | 94    | 183   | 0        | 0    | 277           | 0     | 47    | 32                    | 0    | 79            | 0     | 0     | 0         | 0    | 0             | 27    | 0     | 35                  | 0     | 62            | 418           |
| 7:30 AM               | 28    | 136   | 0        | 0    | 164           | 0     | 93    | 18                    | 0    | 111           | 0     | 0     | 0         | 0    | 0             | 62    | 0     | 76                  | 0     | 138           | 413           |
| 7:45 AM               | 10    | 166   | 0        | 0    | 176           | 0     | 56    | 9                     | 0    | 65            | 0     | 0     | 0         | 0    | 0             | 19    | 0     | 27                  | 0     | 46            | 287           |
| Total                 | 206   | 670   | 0        | 0    | 876           | 0     | 223   | 73                    | 0    | 296           | 0     | 0     | 0         | 0    | 0             | 166   | 0     | 174                 | 1     | 340           | 1512          |
| Approach %            | 23.5  | 76.5  | 0.0      | -    | -             | 0.0   | 75.3  | 24.7                  | -    | -             | NaN   | NaN   | NaN       | -    | -             | 48.8  | 0.0   | 51.2                | -     | -             | -             |
| Total %               | 13.6  | 44.3  | 0.0      | -    | 57.9          | 0.0   | 14.7  | 4.8                   | -    | 19.6          | 0.0   | 0.0   | 0.0       | -    | 0.0           | 11.0  | 0.0   | 11.5                | -     | 22.5          | -             |
| PHF                   | 0.548 | 0.905 | 0.000    | -    | 0.791         | 0.000 | 0.599 | 0.570                 | -    | 0.667         | 0.000 | 0.000 | 0.000     | -    | 0.000         | 0.669 | 0.000 | 0.572               | -     | 0.616         | 0.904         |
| Lights                | 204   | 611   | 0        | -    | 815           | 0     | 205   | 66                    | -    | 271           | 0     | 0     | 0         | -    | 0             | 132   | 0     | 149                 | -     | 281           | 1367          |
| % Lights              | 99.0  | 91.2  | -        | -    | 93.0          | -     | 91.9  | 90.4                  | -    | 91.6          | •     | -     | -         | -    | -             | 79.5  | -     | 85.6                | -     | 82.6          | 90.4          |
| Other Vehicles        | 2     | 58    | 0        | -    | 60            | 0     | 18    | 6                     | -    | 24            | 0     | 0     | 0         | -    | 0             | 34    | 0     | 25                  | -     | 59            | 143           |
| % Other<br>Vehicles   | 1.0   | 8.7   | -        | -    | 6.8           | -     | 8.1   | 8.2                   | -    | 8.1           | -     | -     | -         | -    | -             | 20.5  | -     | 14.4                | -     | 17.4          | 9.5           |
| Bicycles on<br>Road   | 0     | 1     | 0        | -    | 1             | 0     | 0     | 1                     | -    | 1             | 0     | 0     | 0         | -    | 0             | 0     | 0     | 0                   | -     | 0             | 2             |
| % Bicycles on<br>Road | 0.0   | 0.1   | -        | -    | 0.1           | -     | 0.0   | 1.4                   | -    | 0.3           | -     |       | _         | -    | _             | 0.0   | _     | 0.0                 | -     | 0.0           | 0.1           |
| Pedestrians           | -     | -     | -        | 0    | -             | -     | -     | -                     | 0    | -             | -     | -     | -         | 0    | -             | -     | -     | -                   | 1     | -             | -             |
| % Pedestrians         | -     | -     |          | -    | -             | -     | -     |                       | -    | -             | -     | -     |           | -    | -             | -     | -     | -                   | 100.0 | -             | -             |



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Count Name: Route 322 & Rock Raymond Road - AM & PM Site Code: Start Date: 09/03/2014 Page No: 6



Turning Movement Peak Hour Data Plot (7:00 AM)



## Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Route 322 & Lloyd Avenue - AM & PM Site Code: Start Date: 09/03/2014 Page No: 1

**Turning Movement Data** 

|                    | 1    |       |       | 1 4        | iiiiiig i | MOVELL |       | ומ         |      |       |       |            |            |
|--------------------|------|-------|-------|------------|-----------|--------|-------|------------|------|-------|-------|------------|------------|
|                    |      | Route | e 322 |            |           | Rout   | e 322 |            |      | Lloyd | l Ave |            |            |
| Start Time         |      | Eastb | ound  |            |           | West   | bound |            |      | North | oound |            |            |
|                    | Thru | Right | Peds  | App. Total | Left      | Thru   | Peds  | App. Total | Left | Right | Peds  | App. Total | Int. Total |
| 4:00 PM            | 90   | 75    | 0     | 165        | 14        | 147    | 0     | 161        | 26   | 16    | 0     | 42         | 368        |
| 4:15 PM            | 117  | 67    | 0     | 184        | 28        | 140    | 0     | 168        | 55   | 24    | 0     | 79         | 431        |
| 4:30 PM            | 96   | 74    | 0     | 170        | 36        | 155    | 0     | 191        | 45   | 13    | 0     | 58         | 419        |
| 4:45 PM            | 99   | 73    | 0     | 172        | 33        | 159    | 0     | 192        | 41   | 25    | 0     | 66         | 430        |
| Hourly Total       | 402  | 289   | 0     | 691        | 111       | 601    | 0     | 712        | 167  | 78    | 0     | 245        | 1648       |
| 5:00 PM            | 125  | 87    | 0     | 212        | 37        | 176    | 0     | 213        | 34   | 19    | 0     | 53         | 478        |
| 5:15 PM            | 140  | 96    | 0     | 236        | 31        | 157    | 0     | 188        | 45   | 22    | 0     | 67         | 491        |
| 5:30 PM            | 136  | 86    | 0     | 222        | 43        | 168    | 0     | 211        | 54   | 24    | 0     | 78         | 511        |
| 5:45 PM            | 118  | 101   | 0     | 219        | 29        | 164    | 0     | 193        | 38   | 18    | 0     | 56         | 468        |
| Hourly Total       | 519  | 370   | 0     | 889        | 140       | 665    | 0     | 805        | 171  | 83    | 0     | 254        | 1948       |
| 6:00 PM            | 0    | 0     | 0     | 0          | 0         | 0      | 0     | 0          | 0    | 0     | 0     | 0          | 0          |
| *** BREAK ***      | -    |       | -     | -          | -         |        | -     | -          | -    |       | -     | -          | -          |
| Hourly Total       | 0    | 0     | 0     | 0          | 0         | 0      | 0     | 0          | 0    | 0     | 0     | 0          | 0          |
| 7:00 AM            | 183  | 16    | 0     | 199        | 9         | 49     | 0     | 58         | 47   | 85    | 0     | 132        | 389        |
| 7:15 AM            | 170  | 14    | 0     | 184        | 22        | 51     | 0     | 73         | 61   | 106   | 0     | 167        | 424        |
| 7:30 AM            | 150  | 24    | 0     | 174        | 37        | 145    | 0     | 182        | 70   | 25    | 0     | 95         | 451        |
| 7:45 AM            | 155  | 23    | 0     | 178        | 8         | 73     | 0     | 81         | 58   | 39    | 0     | 97         | 356        |
| Hourly Total       | 658  | 77    | 0     | 735        | 76        | 318    | 0     | 394        | 236  | 255   | 0     | 491        | 1620       |
| 8:00 AM            | 132  | 37    | 0     | 169        | 14        | 91     | 0     | 105        | 62   | 36    | 0     | 98         | 372        |
| 8:15 AM            | 108  | 28    | 0     | 136        | 11        | 78     | 0     | 89         | 61   | 13    | 0     | 74         | 299        |
| 8:30 AM            | 105  | 29    | 0     | 134        | 8         | 67     | 1     | 75         | 66   | 21    | 0     | 87         | 296        |
| 8:45 AM            | 116  | 21    | 0     | 137        | 12        | 93     | 0     | 105        | 49   | 27    | 0     | 76         | 318        |
| Hourly Total       | 461  | 115   | 0     | 576        | 45        | 329    | . 1   | 374        | 238  | 97    | 0     | 335        | 1285       |
| 9:00 AM            | 0    | 0     | 0     | 0          | 0         | 0      | 0     | 0          | 0    | 0     | 0     | 0          | 0          |
| Grand Total        | 2040 | 851   | 0     | 2891       | 372       | 1913   | 1     | 2285       | 812  | 513   | 0     | 1325       | 6501       |
| Approach %         | 70.6 | 29.4  | -     | -          | 16.3      | 83.7   | -     | -          | 61.3 | 38.7  | -     | -          | -          |
| Total %            | 31.4 | 13.1  | -     | 44.5       | 5.7       | 29.4   | -     | 35.1       | 12.5 | 7.9   | -     | 20.4       | -          |
| Lights             | 1934 | 837   | -     | 2771       | 351       | 1836   | -     | 2187       | 790  | 475   | -     | 1265       | 6223       |
| % Lights           | 94.8 | 98.4  | -     | 95.8       | 94.4      | 96.0   | -     | 95.7       | 97.3 | 92.6  | -     | 95.5       | 95.7       |
| Other Vehicles     | 106  | 14    | -     | 120        | 21        | 77     | -     | 98         | 22   | 36    | -     | 58         | 276        |
| % Other Vehicles   | 5.2  | 1.6   | -     | 4.2        | 5.6       | 4.0    | -     | 4.3        | 2.7  | 7.0   | -     | 4.4        | 4.2        |
| Bicycles on Road   | 0    | 0     | -     | 0          | 0         | 0      | _     | 0          | 0    | 2     | -     | 2          | 2          |
| % Bicycles on Road | 0.0  | 0.0   | -     | 0.0        | 0.0       | 0.0    | -     | 0.0        | 0.0  | 0.4   | -     | 0.2        | 0.0        |
| Pedestrians        | -    | -     | 0     | -          | -         | -      | 1     | -          | -    | -     | 0     | -          | -          |
| % Pedestrians      | -    | -     | -     | -          | -         | -      | 100.0 | -          | -    | _     | -     | -          | -          |
|                    |      |       |       |            |           |        |       |            |      |       |       |            |            |



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Count Name: Route 322 & Lloyd Avenue - AM & PM Site Code: Start Date: 09/03/2014 Page No: 2

|               |              |        |            |       |       |                |               |            |   |    |       |       |            |   |        |          |  | Fa Out 0 0 0 0 0 0 0 0 0   | -                  | Approx   In   | each | n [N] Total 0 0 0 0 0                |  |          |       |            |   |   |    |            |                |   |      |      |   |              |  |
|---------------|--------------|--------|------------|-------|-------|----------------|---------------|------------|---|----|-------|-------|------------|---|--------|----------|--|--|--------------------|---|------|--------------------------------------|--|----------|-------|------------|---|---|----|------------|----------------|---|------|------|---|--------------|--|
| Route 322 [W] | Out In Total | 3 2771 | 99 120 219 | 0 0 0 | 0 0 0 | 2725 2891 5616 | $\frac{1}{4}$ | 0 837 1934 | ; | 4- | 0 0 0 | 0 0 0 | 0 851 2040 | + | -<br>: | <b>→</b> |  | 09/03/2<br>Ending<br>09/04/2<br>Lights<br>Other \<br>Bicycle<br>Pedest | At<br>2014<br>/ehi | 4 9:15  | ΑN   | л                                    |  | <b>←</b> | Т L Р | 1913 372 1 | 0 | 0 | 21 | 1836 351 0 | 2553 2285 4838 | + | 98 2 | 2187 | 5 | Route 322 [E |  |
|               |              |        |            |       |       |                |               |            |   |    |       |       |            |   |        |          |  | L 790 22 0 0 812 L 1188 35 0 0 1223 Out                                | 3                  | R<br>475<br>36<br>2<br>0<br>513<br>1265<br>58<br>2<br>0<br>1325<br>In | 5    | P 0 0 0 0 0 0 2453 93 2 0 2548 Total |  |          |       |            |   |   |    |            |                |   |      |      |   |              |  |

**Turning Movement Data Plot** 



Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Route 322 & Lloyd Avenue - AM & PM Site Code: Start Date: 09/03/2014 Page No: 3

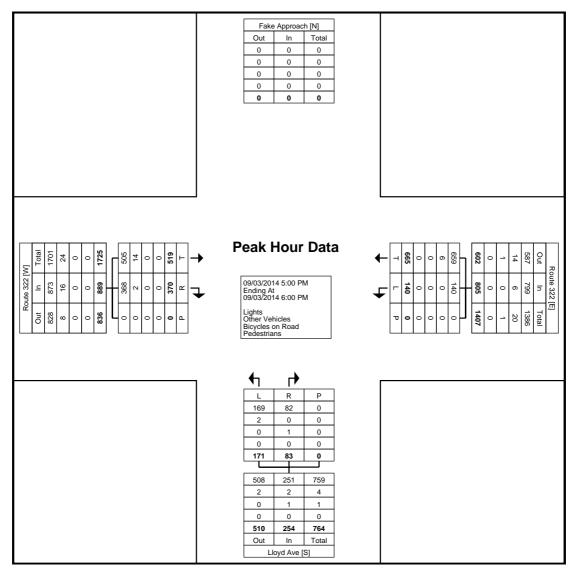
Turning Movement Peak Hour Data (5:00 PM)

| 1                  | i     |       |       | ig iviov   | ,,,,, | · oan i | ioui D | יטוע וט.ק  | , , , , , , , |       |       |            | 1          |
|--------------------|-------|-------|-------|------------|-------|---------|--------|------------|---------------|-------|-------|------------|------------|
|                    |       | Route | e 322 |            |       | Route   | e 322  |            |               | Lloyd | d Ave |            |            |
| Start Time         |       | Eastb | ound  |            |       | West    | bound  |            |               | North | bound |            |            |
| Start Time         | Thru  | Right | Peds  | App. Total | Left  | Thru    | Peds   | App. Total | Left          | Right | Peds  | App. Total | Int. Total |
| 5:00 PM            | 125   | 87    | 0     | 212        | 37    | 176     | 0      | 213        | 34            | 19    | 0     | 53         | 478        |
| 5:15 PM            | 140   | 96    | 0     | 236        | 31    | 157     | 0      | 188        | 45            | 22    | 0     | 67         | 491        |
| 5:30 PM            | 136   | 86    | 0     | 222        | 43    | 168     | 0      | 211        | 54            | 24    | 0     | 78         | 511        |
| 5:45 PM            | 118   | 101   | 0     | 219        | 29    | 164     | 0      | 193        | 38            | 18    | 0     | 56         | 468        |
| Total              | 519   | 370   | 0     | 889        | 140   | 665     | 0      | 805        | 171           | 83    | 0     | 254        | 1948       |
| Approach %         | 58.4  | 41.6  | -     | -          | 17.4  | 82.6    | -      | -          | 67.3          | 32.7  | -     | -          | -          |
| Total %            | 26.6  | 19.0  | -     | 45.6       | 7.2   | 34.1    | -      | 41.3       | 8.8           | 4.3   | -     | 13.0       | -          |
| PHF                | 0.927 | 0.916 | -     | 0.942      | 0.814 | 0.945   | -      | 0.945      | 0.792         | 0.865 | -     | 0.814      | 0.953      |
| Lights             | 505   | 368   | -     | 873        | 140   | 659     | -      | 799        | 169           | 82    | -     | 251        | 1923       |
| % Lights           | 97.3  | 99.5  | -     | 98.2       | 100.0 | 99.1    | -      | 99.3       | 98.8          | 98.8  | -     | 98.8       | 98.7       |
| Other Vehicles     | 14    | 2     | -     | 16         | 0     | 6       | -      | 6          | 2             | 0     | -     | 2          | 24         |
| % Other Vehicles   | 2.7   | 0.5   | -     | 1.8        | 0.0   | 0.9     | -      | 0.7        | 1.2           | 0.0   | -     | 0.8        | 1.2        |
| Bicycles on Road   | 0     | 0     | -     | 0          | 0     | 0       | -      | 0          | 0             | 1     | -     | 1          | 1          |
| % Bicycles on Road | 0.0   | 0.0   | -     | 0.0        | 0.0   | 0.0     | -      | 0.0        | 0.0           | 1.2   | -     | 0.4        | 0.1        |
| Pedestrians        | -     | -     | 0     | -          | -     | -       | 0      | -          | -             | -     | 0     | -          | -          |
| % Pedestrians      | -     | -     | -     | -          | -     | -       | -      | -          | -             | -     | -     | -          | -          |



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Turning Movement Peak Hour Data Plot (5:00 PM)



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Count Name: Route 322 & Lloyd Avenue - AM & PM Site Code: Start Date: 09/03/2014 Page No: 5

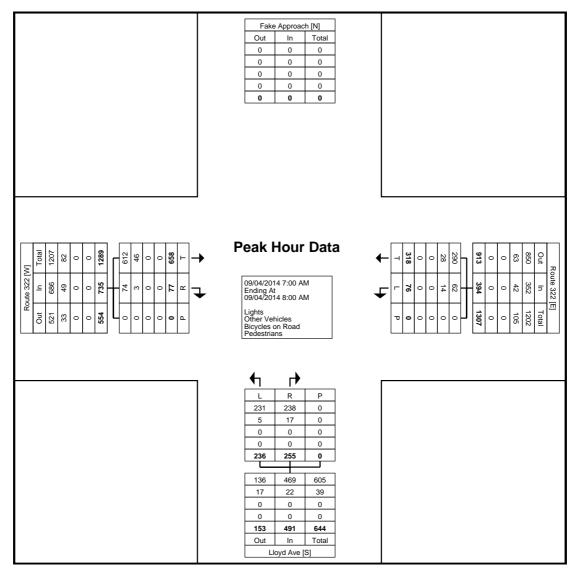
#### Turning Movement Peak Hour Data (7:00 AM)

|                    |       | Route | € 322 |            |       | Route | e 322 | ,          | ·     | Lloyd | d Ave |            |            |
|--------------------|-------|-------|-------|------------|-------|-------|-------|------------|-------|-------|-------|------------|------------|
| Start Time         |       | Eastb | ound  |            |       | Westh | oound |            |       | North | bound |            |            |
| Start Time         | Thru  | Right | Peds  | App. Total | Left  | Thru  | Peds  | App. Total | Left  | Right | Peds  | App. Total | Int. Total |
| 7:00 AM            | 183   | 16    | 0     | 199        | 9     | 49    | 0     | 58         | 47    | 85    | 0     | 132        | 389        |
| 7:15 AM            | 170   | 14    | 0     | 184        | 22    | 51    | 0     | 73         | 61    | 106   | 0     | 167        | 424        |
| 7:30 AM            | 150   | 24    | 0     | 174        | 37    | 145   | 0     | 182        | 70    | 25    | 0     | 95         | 451        |
| 7:45 AM            | 155   | 23    | 0     | 178        | 8     | 73    | 0     | 81         | 58    | 39    | 0     | 97         | 356        |
| Total              | 658   | 77    | 0     | 735        | 76    | 318   | 0     | 394        | 236   | 255   | 0     | 491        | 1620       |
| Approach %         | 89.5  | 10.5  | -     | -          | 19.3  | 80.7  | -     | -          | 48.1  | 51.9  | -     | -          | -          |
| Total %            | 40.6  | 4.8   | -     | 45.4       | 4.7   | 19.6  | -     | 24.3       | 14.6  | 15.7  | -     | 30.3       | -          |
| PHF                | 0.899 | 0.802 | -     | 0.923      | 0.514 | 0.548 | -     | 0.541      | 0.843 | 0.601 | -     | 0.735      | 0.898      |
| Lights             | 612   | 74    | -     | 686        | 62    | 290   | -     | 352        | 231   | 238   | -     | 469        | 1507       |
| % Lights           | 93.0  | 96.1  | -     | 93.3       | 81.6  | 91.2  | -     | 89.3       | 97.9  | 93.3  | -     | 95.5       | 93.0       |
| Other Vehicles     | 46    | 3     | -     | 49         | 14    | 28    | -     | 42         | 5     | 17    | -     | 22         | 113        |
| % Other Vehicles   | 7.0   | 3.9   | -     | 6.7        | 18.4  | 8.8   | -     | 10.7       | 2.1   | 6.7   | -     | 4.5        | 7.0        |
| Bicycles on Road   | 0     | 0     | -     | 0          | 0     | 0     | -     | 0          | 0     | 0     | -     | 0          | 0          |
| % Bicycles on Road | 0.0   | 0.0   | -     | 0.0        | 0.0   | 0.0   | -     | 0.0        | 0.0   | 0.0   | -     | 0.0        | 0.0        |
| Pedestrians        | -     | -     | 0     | -          | -     | -     | 0     | -          | -     | -     | 0     | -          | -          |
| % Pedestrians      |       | -     | -     | -          | -     | -     | -     | -          | -     | -     | -     | -          | -          |



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Count Name: Route 322 & Lloyd Avenue - AM & PM Site Code: Start Date: 09/03/2014 Page No: 6



Turning Movement Peak Hour Data Plot (7:00 AM)

#### Route 322 & EB Route 30 Ramps Caln Township, Chester County

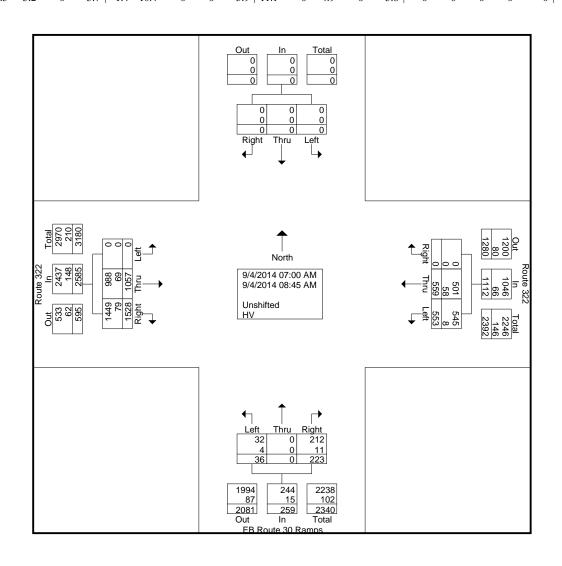
Counter: 11 Counted by: R.Kearney Weather: Clear File Name: 2014-09-04 AM 322\_EB Ramps

Site Code : 00000000 Start Date : 9/4/2014 Page No : 1

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| Cuarma | Duintad | Unshifted . | TIX7 |
|--------|---------|-------------|------|
|        |         |             |      |

|   |             |      | R    | oute 3 | 322  |            |      | R    | oute 3 | 22   | _          | I    | EB Ro | ute 30 | Ramj | ps         |      |      |        |      |            |              |              |            |
|---|-------------|------|------|--------|------|------------|------|------|--------|------|------------|------|-------|--------|------|------------|------|------|--------|------|------------|--------------|--------------|------------|
|   |             |      | E    | astbou | ınd  |            |      | W    | estbou | ınd  |            |      | No    | rthbou | ınd  |            |      | So   | uthbou | ınd  |            |              |              |            |
|   | Start Time  | Left | Thru | Right  | RTOR | App. Total | Left | Thru | Right  | RTOR | App. Total | Left | Thru  | Right  | RTOR | App. Total | Left | Thru | Right  | Peds | App. Total | Exclu. Total | Inclu. Total | Int. Total |
|   | 07:00 AM    | 0    | 183  | 216    | 0    | 399        | 57   | 41   | 0      | 0    | 98         | 1    | 0     | 18     | 0    | 19         | 0    | 0    | 0      | 0    | 0          | 0            | 516          | 516        |
|   | 07:15 AM    | 0    | 159  | 175    | 0    | 334        | 49   | 42   | 0      | 0    | 91         | 4    | 0     | 27     | 0    | 31         | 0    | 0    | 0      | 0    | 0          | 0            | 456          | 456        |
|   | 07:30 AM    | 0    | 137  | 205    | 0    | 342        | 117  | 104  | 0      | 0    | 221        | 9    | 0     | 13     | 0    | 22         | 0    | 0    | 0      | 0    | 0          | 0            | 585          | 585        |
|   | 07:45 AM    | 0    | 127  | 229    | 0    | 356        | 81   | 71   | 0      | 0    | 152        | 5    | 0     | 31     | 0    | 36         | 0    | 0    | 0      | 0    | 0          | 0            | 544          | 544        |
|   | Total       | 0    | 606  | 825    | 0    | 1431       | 304  | 258  | 0      | 0    | 562        | 19   | 0     | 89     | 0    | 108        | 0    | 0    | 0      | 0    | 0          | 0            | 2101         | 2101       |
|   |             |      |      |        |      |            |      |      |        |      |            |      |       |        |      |            |      |      |        |      |            |              |              |            |
|   | 08:00 AM    | 0    | 144  | 189    | 0    | 333        | 65   | 75   | 0      | 0    | 140        | 2    | 0     | 45     | 0    | 47         | 0    | 0    | 0      | 0    | 0          | 0            | 520          | 520        |
|   | 08:15 AM    | 0    | 97   | 169    | 0    | 266        | 67   | 73   | 0      | 0    | 140        | 4    | 0     | 27     | 0    | 31         | 0    | 0    | 0      | 0    | 0          | 0            | 437          | 437        |
|   | 08:30 AM    | 0    | 104  | 176    | 0    | 280        | 59   | 71   | 0      | 0    | 130        | 6    | 0     | 30     | 0    | 36         | 0    | 0    | 0      | 0    | 0          | 0            | 446          | 446        |
| _ | 08:45 AM    | 0    | 106  | 169    | 0    | 275        | 58   | 82   | 0      | 0    | 140        | 5    | 0     | 32     | 0    | 37         | 0    | 0    | 0      | 0    | 0          | 0            | 452          | 452        |
|   | Total       | 0    | 451  | 703    | 0    | 1154       | 249  | 301  | 0      | 0    | 550        | 17   | 0     | 134    | 0    | 151        | 0    | 0    | 0      | 0    | 0          | 0            | 1855         | 1855       |
|   |             |      |      |        |      |            |      |      |        |      |            |      |       |        |      |            |      |      |        |      |            |              |              |            |
|   | Grand Total | 0    | 1057 | 1528   | 0    | 2585       | 553  | 559  | 0      | 0    | 1112       | 36   | 0     | 223    | 0    | 259        | 0    | 0    | 0      | 0    | 0          | 0            | 3956         | 3956       |
|   | Apprch %    | 0    | 40.9 | 59.1   |      |            | 49.7 | 50.3 | 0      |      |            | 13.9 | 0     | 86.1   |      |            | 0    | 0    | 0      |      |            |              |              |            |
|   | Total %     | 0    | 26.7 | 38.6   |      | 65.3       | 14   | 14.1 | 0      |      | 28.1       | 0.9  | 0     | 5.6    |      | 6.5        | 0    | 0    | 0      |      | 0          | 0            | 100          |            |
|   | Unshifted   | 0    | 988  | 1449   |      | 2437       | 545  | 501  | 0      |      | 1046       | 32   | 0     | 212    |      | 244        | 0    | 0    | 0      |      | 0          | 0            | 0            | 3727       |
| _ | % Unshifted | 0    | 93.5 | 94.8   | 0    | 94.3       | 98.6 | 89.6 | 0      | 0    | 94.1       | 88.9 | 0     | 95.1   | 0    | 94.2       | 0    | 0    | 0      | 0    | 0          | 0            | 0            | 94.2       |
|   | HV          | 0    | 69   | 79     |      | 148        | 8    | 58   | 0      |      | 66         | 4    | 0     | 11     |      | 15         | 0    | 0    | 0      |      | 0          | 0            | 0            | 229        |
|   | % HV        | 0    | 6.5  | 5.2    | 0    | 5.7        | 1.4  | 10.4 | 0      | 0    | 5.9        | 11.1 | 0     | 4.9    | 0    | 5.8        | 0    | 0    | 0      | 0    | 0          | 0            | 0            | 5.8        |

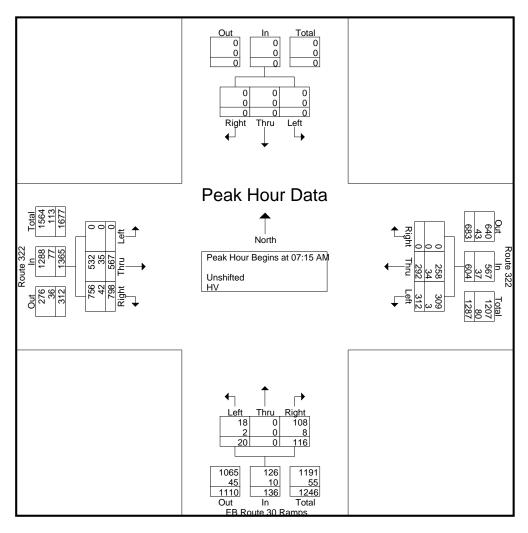


#### Route 322 & EB Route 30 Ramps Caln Township, Chester County

File Name: 2014-09-04 AM 322\_EB Ramps

Site Code : 00000000 Start Date : 9/4/2014 Page No : 2

|                         |             |            | e 322      |            |      | Rout  |       |            | EI   | B Route |       | ps         |      |       |       |            |            |
|-------------------------|-------------|------------|------------|------------|------|-------|-------|------------|------|---------|-------|------------|------|-------|-------|------------|------------|
|                         |             | Eastl      | ound       |            |      | Westl | ound  |            |      | North   | bound |            |      | South | bound |            |            |
| Start Time              | Left        | Thru       | Right      | App. Total | Left | Thru  | Right | App. Total | Left | Thru    | Right | App. Total | Left | Thru  | Right | App. Total | Int. Total |
| Peak Hour Analysis From | m 07:00 AM  | to 08:45 A | M - Peak 1 | 1 of 1     |      |       |       |            |      |         |       |            |      |       |       |            |            |
| Peak Hour for En        | tire Inters | section E  | Begins at  | 07:15 AM   | I    |       |       |            |      |         |       |            |      |       |       |            |            |
| 07:15 AM                | 0           | 159        | 175        | 334        | 49   | 42    | 0     | 91         | 4    | 0       | 27    | 31         | 0    | 0     | 0     | 0          | 456        |
| 07:30 AM                | 0           | 137        | 205        | 342        | 117  | 104   | 0     | 221        | 9    | 0       | 13    | 22         | 0    | 0     | 0     | 0          | 585        |
| 07:45 AM                | 0           | 127        | 229        | 356        | 81   | 71    | 0     | 152        | 5    | 0       | 31    | 36         | 0    | 0     | 0     | 0          | 544        |
| 08:00 AM                | 0           | 144        | 189        | 333        | 65   | 75    | 0     | 140        | 2    | 0       | 45    | 47         | 0    | 0     | 0     | 0          | 520        |
| Total Volume            | 0           | 567        | 798        | 1365       | 312  | 292   | 0     | 604        | 20   | 0       | 116   | 136        | 0    | 0     | 0     | 0          | 2105       |
| % App. Total            | 0           | 41.5       | 58.5       |            | 51.7 | 48.3  | 0     |            | 14.7 | 0       | 85.3  |            | 0    | 0     | 0     |            |            |
| PHF                     | .000        | .892       | .871       | .959       | .667 | .702  | .000  | .683       | .556 | .000    | .644  | .723       | .000 | .000  | .000  | .000       | .900       |
| Unshifted               | 0           | 532        | 756        | 1288       | 309  | 258   | 0     | 567        | 18   | 0       | 108   | 126        | 0    | 0     | 0     | 0          | 1981       |
| % Unshifted             | 0           | 93.8       | 94.7       | 94.4       | 99.0 | 88.4  | 0     | 93.9       | 90.0 | 0       | 93.1  | 92.6       | 0    | 0     | 0     | 0          | 94.1       |
| HV                      | 0           | 35         | 42         | 77         | 3    | 34    | 0     | 37         | 2    | 0       | 8     | 10         | 0    | 0     | 0     | 0          | 124        |
| % HV                    | 0           | 6.2        | 5.3        | 5.6        | 1.0  | 11.6  | 0     | 6.1        | 10.0 | 0       | 6.9   | 7.4        | 0    | 0     | 0     | 0          | 5.9        |



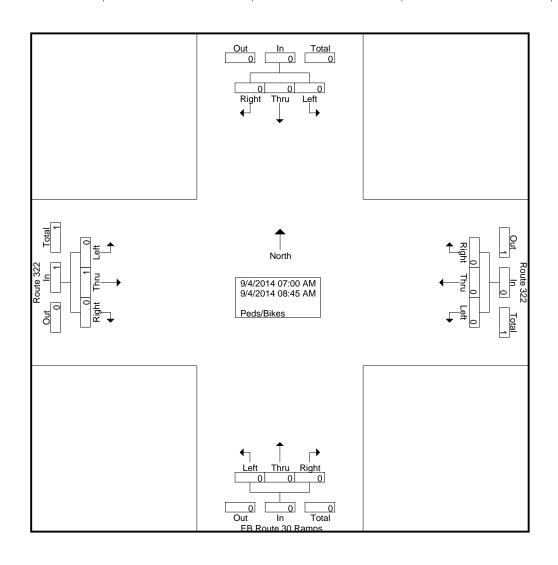
#### Route 322 & EB Route 30 Ramps Caln Township, Chester County

Counter: 11 Counted by: R.Kearney Weather: Clear File Name: 2014-09-04 AM 322\_EB Ramps

Site Code : 00000000 Start Date : 9/4/2014 Page No : 1

**Groups Printed- Peds/Bikes** 

|             |      |      |        |      |            |      |      |         |      | Groups     | 1 111111 | <u>u- 1 cc</u> | 13/13/112 | CO   |            |      |      |       |      |            | i            |              |            |
|-------------|------|------|--------|------|------------|------|------|---------|------|------------|----------|----------------|-----------|------|------------|------|------|-------|------|------------|--------------|--------------|------------|
|             |      | R    | oute 3 | 22   |            |      | R    | Coute 3 | 22   |            | ]        | EB Ro          | ute 30    | Ramp | ps         |      |      |       |      |            |              |              |            |
|             |      | E    | astbou | ınd  |            |      | W    | estbou  | ınd  |            |          | No             | rthbo     | und  |            |      | So   | uthbo | und  |            |              |              |            |
| Start Time  | Left | Thru | Right  | RTOR | App. Total | Left | Thru | Right   | RTOR | App. Total | Left     | Thru           | Right     | RTOR | App. Total | Left | Thru | Right | Peds | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 07:00 AM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0       | 0    | 0          | 0        | 0              | 0         | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0            | 0            | 0          |
| 07:15 AM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0       | 0    | 0          | 0        | 0              | 0         | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0            | 0            | 0          |
| 07:30 AM    | 0    | 1    | 0      | 0    | 1          | 0    | 0    | 0       | 0    | 0          | 0        | 0              | 0         | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0            | 1            | 1          |
| 07:45 AM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0       | 0    | 0          | 0        | 0              | 0         | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0            | 0            | 0          |
| Total       | 0    | 1    | 0      | 0    | 1          | 0    | 0    | 0       | 0    | 0          | 0        | 0              | 0         | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0            | 1            | 1          |
|             |      |      |        |      |            |      |      |         |      |            |          |                |           |      |            |      |      |       |      |            |              |              |            |
| 08:00 AM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0       | 0    | 0          | 0        | 0              | 0         | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0            | 0            | 0          |
| 08:15 AM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0       | 0    | 0          | 0        | 0              | 0         | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0            | 0            | 0          |
| 08:30 AM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0       | 0    | 0          | 0        | 0              | 0         | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0            | 0            | 0          |
| 08:45 AM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0       | 0    | 0          | 0        | 0              | 0         | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0            | 0            | 0          |
| Total       | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0       | 0    | 0          | 0        | 0              | 0         | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0            | 0            | 0          |
|             |      |      |        |      |            |      |      |         |      |            |          |                |           |      |            |      |      |       |      |            |              |              |            |
| Grand Total | 0    | 1    | 0      | 0    | 1          | 0    | 0    | 0       | 0    | 0          | 0        | 0              | 0         | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0            | 1            | 1          |
| Apprch %    | 0    | 100  | 0      |      |            | 0    | 0    | 0       |      |            | 0        | 0              | 0         |      |            | 0    | 0    | 0     |      |            |              |              |            |
| Total %     | 0    | 100  | 0      |      | 100        | 0    | 0    | 0       |      | 0          | 0        | 0              | 0         |      | 0          | 0    | 0    | 0     |      | 0          | 0            | 100          |            |

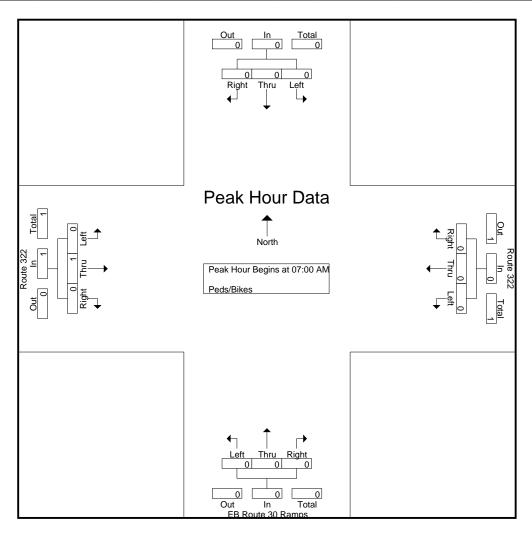


#### Route 322 & EB Route 30 Ramps Caln Township, Chester County

File Name: 2014-09-04 AM 322\_EB Ramps

Site Code : 00000000 Start Date : 9/4/2014 Page No : 2

|                         |              |            | e 322<br>oound |            |      |      | e 322<br>bound |            | El   |      | 30 Ram | ps         |      | South | bound |            |            |
|-------------------------|--------------|------------|----------------|------------|------|------|----------------|------------|------|------|--------|------------|------|-------|-------|------------|------------|
| Start Time              | Left         | Thru       | Right          | App. Total | Left | Thru | Right          | App. Total | Left | Thru | Right  | App. Total | Left | Thru  | Right | App. Total | Int. Total |
| Peak Hour Analysis From | m 07:00 AM   | to 08:45 A | M - Peak 1     | 1 of 1     |      |      |                |            |      |      |        |            |      |       |       |            |            |
| Peak Hour for En        | ntire Inters | section E  | Begins at      | 07:00 AM   | 1    |      |                |            |      |      |        |            |      |       |       |            |            |
| 07:00 AM                | 0            | 0          | 0              | 0          | 0    | 0    | 0              | 0          | 0    | 0    | 0      | 0          | 0    | 0     | 0     | 0          | 0          |
| 07:15 AM                | 0            | 0          | 0              | 0          | 0    | 0    | 0              | 0          | 0    | 0    | 0      | 0          | 0    | 0     | 0     | 0          | 0          |
| 07:30 AM                | 0            | 1          | 0              | 1          | 0    | 0    | 0              | 0          | 0    | 0    | 0      | 0          | 0    | 0     | 0     | 0          | 1          |
| 07:45 AM                | 0            | 0          | 0              | 0          | 0    | 0    | 0              | 0          | 0    | 0    | 0      | 0          | 0    | 0     | 0     | 0          | 0          |
| Total Volume            | 0            | 1          | 0              | 1          | 0    | 0    | 0              | 0          | 0    | 0    | 0      | 0          | 0    | 0     | 0     | 0          | 1          |
| % App. Total            | 0            | 100        | 0              |            | 0    | 0    | 0              |            | 0    | 0    | 0      |            | 0    | 0     | 0     |            |            |
| PHF                     | .000         | .250       | .000           | .250       | .000 | .000 | .000           | .000       | .000 | .000 | .000   | .000       | .000 | .000  | .000  | .000       | .250       |



#### Route 322 & EB Route 30 Ramps Caln Township, Chester County

Counter: 17

Counted by: JMuthersbaugh

Weather: Clear

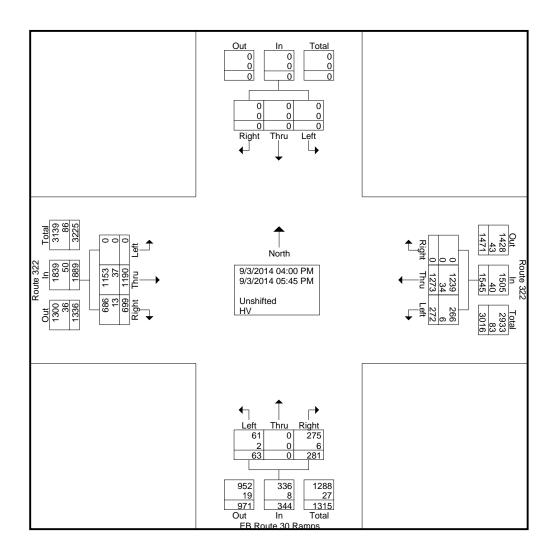
File Name: 2014-09-03 PM 322\_EB Ramps

Site Code : 00000000 Start Date : 9/3/2014

Page No : 1

Groups Printed- Unshifted - HV

|             |      |              |         |      |            |      |      |        |      | oupsi      |      |       |        |      |            |      |      |        |      |            |              |              |            |
|-------------|------|--------------|---------|------|------------|------|------|--------|------|------------|------|-------|--------|------|------------|------|------|--------|------|------------|--------------|--------------|------------|
|             |      | R            | Route 3 | 22   |            |      | R    | oute 3 | 22   |            | 1    | EB Ro | ute 30 | Ram  | ps         |      |      |        |      |            |              |              |            |
|             |      | $\mathbf{E}$ | astbou  | ınd  |            |      | W    | estbou | ınd  |            |      | No    | rthbo  | and  |            |      | So   | uthbou | ınd  |            |              |              |            |
| Start Time  | Left | Thru         | Right   | RTOR | App. Total | Left | Thru | Right  | RTOR | App. Total | Left | Thru  | Right  | RTOR | App. Total | Left | Thru | Right  | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 04:00 PM    | 0    | 125          | 80      | 0    | 205        | 33   | 137  | 0      | 0    | 170        | 4    | 0     | 20     | 0    | 24         | 0    | 0    | 0      | 0    | 0          | 0            | 399          | 399        |
| 04:15 PM    | 0    | 140          | 81      | 0    | 221        | 43   | 162  | 0      | 0    | 205        | 3    | 0     | 38     | 0    | 41         | 0    | 0    | 0      | 0    | 0          | 0            | 467          | 467        |
| 04:30 PM    | 0    | 139          | 77      | 0    | 216        | 31   | 167  | 0      | 0    | 198        | 4    | 0     | 18     | 0    | 22         | 0    | 0    | 0      | 0    | 0          | 0            | 436          | 436        |
| 04:45 PM    | 0    | 110          | 88      | 0    | 198        | 28   | 139  | 0      | 0    | 167        | 11   | 0     | 29     | 0    | 40         | 0    | 0    | 0      | 0    | 0          | 0            | 405          | 405        |
| Total       | 0    | 514          | 326     | 0    | 840        | 135  | 605  | 0      | 0    | 740        | 22   | 0     | 105    | 0    | 127        | 0    | 0    | 0      | 0    | 0          | 0            | 1707         | 1707       |
|             |      |              |         |      |            |      |      |        |      |            |      |       |        |      |            |      |      |        |      |            |              |              |            |
| 05:00 PM    | 0    | 154          | 93      | 0    | 247        | 31   | 164  | 0      | 0    | 195        | 4    | 0     | 37     | 0    | 41         | 0    | 0    | 0      | 0    | 0          | 0            | 483          | 483        |
| 05:15 PM    | 0    | 189          | 89      | 0    | 278        | 32   | 158  | 0      | 0    | 190        | 9    | 0     | 45     | 0    | 54         | 0    | 0    | 0      | 0    | 0          | 0            | 522          | 522        |
| 05:30 PM    | 0    | 147          | 112     | 0    | 259        | 44   | 176  | 0      | 0    | 220        | 14   | 0     | 55     | 0    | 69         | 0    | 0    | 0      | 0    | 0          | 0            | 548          | 548        |
| 05:45 PM    | 0    | 186          | 79      | 0    | 265        | 30   | 170  | 0      | 0    | 200        | 14   | 0     | 39     | 0    | 53         | 0    | 0    | 0      | 0    | 0          | 0            | 518          | 518        |
| Total       | 0    | 676          | 373     | 0    | 1049       | 137  | 668  | 0      | 0    | 805        | 41   | 0     | 176    | 0    | 217        | 0    | 0    | 0      | 0    | 0          | 0            | 2071         | 2071       |
|             |      |              |         |      |            |      |      |        |      |            |      |       |        |      |            |      |      |        |      |            |              |              |            |
| Grand Total | 0    | 1190         | 699     | 0    | 1889       | 272  | 1273 | 0      | 0    | 1545       | 63   | 0     | 281    | 0    | 344        | 0    | 0    | 0      | 0    | 0          | 0            | 3778         | 3778       |
| Apprch %    | 0    | 63           | 37      |      |            | 17.6 | 82.4 | 0      |      |            | 18.3 | 0     | 81.7   |      |            | 0    | 0    | 0      |      |            |              |              |            |
| Total %     | 0    | 31.5         | 18.5    |      | 50         | 7.2  | 33.7 | 0      |      | 40.9       | 1.7  | 0     | 7.4    |      | 9.1        | 0    | 0    | 0      |      | 0          | 0            | 100          |            |
| Unshifted   | 0    | 1153         | 686     |      | 1839       | 266  | 1239 | 0      |      | 1505       | 61   | 0     | 275    |      | 336        | 0    | 0    | 0      |      | 0          | 0            | 0            | 3680       |
| % Unshifted | 0    | 96.9         | 98.1    | 0    | 97.4       | 97.8 | 97.3 | 0      | 0    | 97.4       | 96.8 | 0     | 97.9   | 0    | 97.7       | 0    | 0    | 0      | 0    | 0          | 0            | 0            | 97.4       |
| HV          | 0    | 37           | 13      |      | 50         | 6    | 34   | 0      |      | 40         | 2    | 0     | 6      |      | 8          | 0    | 0    | 0      |      | 0          | 0            | 0            | 98         |
| % HV        | 0    | 3.1          | 1.9     | 0    | 2.6        | 2.2  | 2.7  | 0      | 0    | 2.6        | 3.2  | 0     | 2.1    | 0    | 2.3        | 0    | 0    | 0      | 0    | 0          | 0            | 0            | 2.6        |

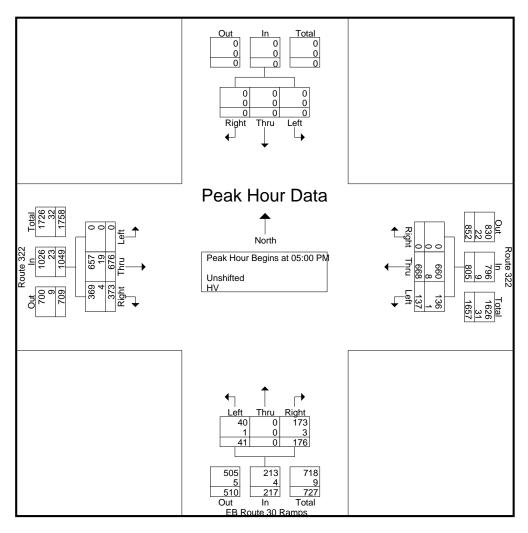


#### Route 322 & EB Route 30 Ramps Caln Township, Chester County

File Name: 2014-09-03 PM 322\_EB Ramps

Site Code : 000000000 Start Date : 9/3/2014 Page No : 2

|                         |            |            | e 322       |            |      | Rout  |       |            | EI   | B Route |       | ps         |      | C41-1 |       |            |            |
|-------------------------|------------|------------|-------------|------------|------|-------|-------|------------|------|---------|-------|------------|------|-------|-------|------------|------------|
|                         |            |            | ound        |            |      | Westl |       |            | -    |         | bound |            |      | South |       |            |            |
| Start Time              | Left       | Thru       | Right       | App. Total | Left | Thru  | Right | App. Total | Left | Thru    | Right | App. Total | Left | Thru  | Right | App. Total | Int. Total |
| Peak Hour Analysis From | m 04:00 PM | to 05:45 P | PM - Peak 1 | 1 of 1     |      |       |       |            |      |         |       |            |      |       |       |            |            |
| Peak Hour for En        | tire Inter | section E  | Begins at   | 05:00 PM   |      |       |       |            |      |         |       |            |      |       |       |            |            |
| 05:00 PM                | 0          | 154        | 93          | 247        | 31   | 164   | 0     | 195        | 4    | 0       | 37    | 41         | 0    | 0     | 0     | 0          | 483        |
| 05:15 PM                | 0          | 189        | 89          | 278        | 32   | 158   | 0     | 190        | 9    | 0       | 45    | 54         | 0    | 0     | 0     | 0          | 522        |
| 05:30 PM                | 0          | 147        | 112         | 259        | 44   | 176   | 0     | 220        | 14   | 0       | 55    | 69         | 0    | 0     | 0     | 0          | 548        |
| 05:45 PM                | 0          | 186        | 79          | 265        | 30   | 170   | 0     | 200        | 14   | 0       | 39    | 53         | 0    | 0     | 0     | 0          | 518        |
| Total Volume            | 0          | 676        | 373         | 1049       | 137  | 668   | 0     | 805        | 41   | 0       | 176   | 217        | 0    | 0     | 0     | 0          | 2071       |
| % App. Total            | 0          | 64.4       | 35.6        |            | 17   | 83    | 0     |            | 18.9 | 0       | 81.1  |            | 0    | 0     | 0     |            |            |
| PHF                     | .000       | .894       | .833        | .943       | .778 | .949  | .000  | .915       | .732 | .000    | .800  | .786       | .000 | .000  | .000  | .000       | .945       |
| Unshifted               | 0          | 657        | 369         | 1026       | 136  | 660   | 0     | 796        | 40   | 0       | 173   | 213        | 0    | 0     | 0     | 0          | 2035       |
| % Unshifted             | 0          | 97.2       | 98.9        | 97.8       | 99.3 | 98.8  | 0     | 98.9       | 97.6 | 0       | 98.3  | 98.2       | 0    | 0     | 0     | 0          | 98.3       |
| HV                      | 0          | 19         | 4           | 23         | 1    | 8     | 0     | 9          | 1    | 0       | 3     | 4          | 0    | 0     | 0     | 0          | 36         |
| % HV                    | 0          | 2.8        | 1.1         | 2.2        | 0.7  | 1.2   | 0     | 1.1        | 2.4  | 0       | 1.7   | 1.8        | 0    | 0     | 0     | 0          | 1.7        |



#### Route 322 & EB Route 30 Ramps Caln Township, Chester County

Counter: 17

Counted by: JMuthersbaugh

Weather: Clear

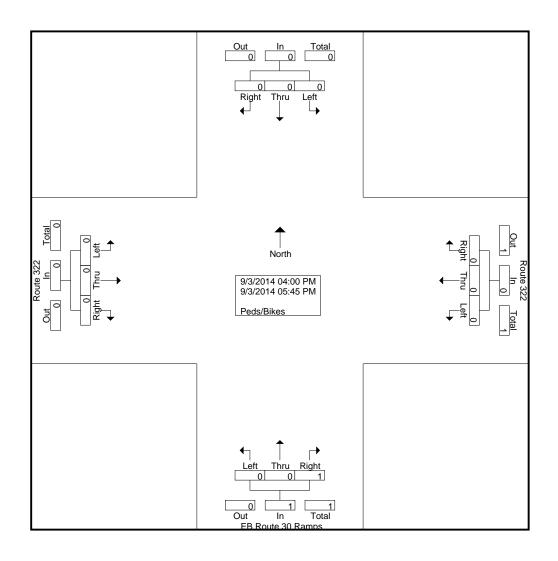
File Name: 2014-09-03 PM 322\_EB Ramps

Site Code : 00000000

Start Date : 9/3/2014 Page No : 1

**Groups Printed- Peds/Bikes** 

|             |      | R    | oute 3 | 22   |            |      | R    | oute 3 | 22   | -          | ]    | EB Ro | ute 30 | Ram  | ps         |      |      |        |      |            |              |              |            |
|-------------|------|------|--------|------|------------|------|------|--------|------|------------|------|-------|--------|------|------------|------|------|--------|------|------------|--------------|--------------|------------|
|             |      | Ea   | stbou  | ınd  |            |      | W    | estbou | ınd  |            |      | No    | rthbo  | und  |            |      | So   | uthbou | und  |            |              |              |            |
| Start Time  | Left | Thru | Right  | RTOR | App. Total | Left | Thru | Right  | RTOR | App. Total | Left | Thru  | Right  | RTOR | App. Total | Left | Thru | Right  | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 04:00 PM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0            | 0            | 0          |
| 04:15 PM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0            | 0            | 0          |
| 04:30 PM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0            | 0            | 0          |
| 04:45 PM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0            | 0            | 0_         |
| Total       | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0            | 0            | 0          |
|             |      |      |        |      |            |      |      |        |      |            |      |       |        |      |            |      |      |        |      |            |              |              |            |
| 05:00 PM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0            | 0            | 0          |
| 05:15 PM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0            | 0            | 0          |
| 05:30 PM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0     | 1      | 1    | 1          | 0    | 0    | 0      | 0    | 0          | 1            | 1            | 2          |
| 05:45 PM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0            | 0            | 0          |
| Total       | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0     | 1      | 1    | 1          | 0    | 0    | 0      | 0    | 0          | 1            | 1            | 2          |
|             |      |      |        |      |            |      |      |        |      |            |      |       |        |      |            |      |      |        |      |            |              |              |            |
| Grand Total | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0     | 1      | 1    | 1          | 0    | 0    | 0      | 0    | 0          | 1            | 1            | 2          |
| Apprch %    | 0    | 0    | 0      |      |            | 0    | 0    | 0      |      |            | 0    | 0     | 100    |      |            | 0    | 0    | 0      |      |            |              |              |            |
| Total %     | 0    | 0    | 0      |      | 0          | 0    | 0    | 0      |      | 0          | 0    | 0     | 100    |      | 100        | 0    | 0    | 0      |      | 0          | 50           | 50           |            |

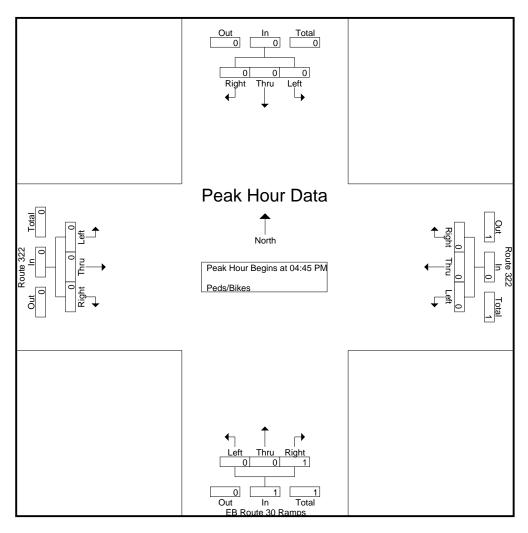


#### Route 322 & EB Route 30 Ramps Caln Township, Chester County

File Name: 2014-09-03 PM 322\_EB Ramps

Site Code : 00000000 Start Date : 9/3/2014 Page No : 2

|                         |             | Route<br>Eastb |          |            |      | Rout<br>Westl |       |            | El   | B Route<br>North | 30 Ram<br>bound | nps        |      | South | bound |            |            |
|-------------------------|-------------|----------------|----------|------------|------|---------------|-------|------------|------|------------------|-----------------|------------|------|-------|-------|------------|------------|
| Start Time              | Left        | Thru           | Right    | App. Total | Left | Thru          | Right | App. Total | Left | Thru             | Right           | App. Total | Left | Thru  | Right | App. Total | Int. Total |
| Peak Hour Analysis From | m 04:00 PM  | to 05:45 P     | M - Peak | 1 of 1     |      |               |       |            |      |                  |                 |            |      |       |       |            |            |
| Peak Hour for En        | tire Inters | section B      | egins at | t 04:45 PM |      |               |       |            |      |                  |                 |            |      |       |       |            |            |
| 04:45 PM                | 0           | 0              | 0        | 0          | 0    | 0             | 0     | 0          | 0    | 0                | 0               | 0          | 0    | 0     | 0     | 0          | 0          |
| 05:00 PM                | 0           | 0              | 0        | 0          | 0    | 0             | 0     | 0          | 0    | 0                | 0               | 0          | 0    | 0     | 0     | 0          | 0          |
| 05:15 PM                | 0           | 0              | 0        | 0          | 0    | 0             | 0     | 0          | 0    | 0                | 0               | 0          | 0    | 0     | 0     | 0          | 0          |
| 05:30 PM                | 0           | 0              | 0        | 0          | 0    | 0             | 0     | 0          | 0    | 0                | 1               | 1          | 0    | 0     | 0     | 0          | 1          |
| Total Volume            | 0           | 0              | 0        | 0          | 0    | 0             | 0     | 0          | 0    | 0                | 1               | 1          | 0    | 0     | 0     | 0          | 1          |
| % App. Total            | 0           | 0              | 0        |            | 0    | 0             | 0     |            | 0    | 0                | 100             |            | 0    | 0     | 0     |            |            |
| PHF                     | .000        | .000           | .000     | .000       | .000 | .000          | .000  | .000       | .000 | .000             | .250            | .250       | .000 | .000  | .000  | .000       | .250       |



#### Route 322 & WB Route 30 Ramps Caln Township, Chester County

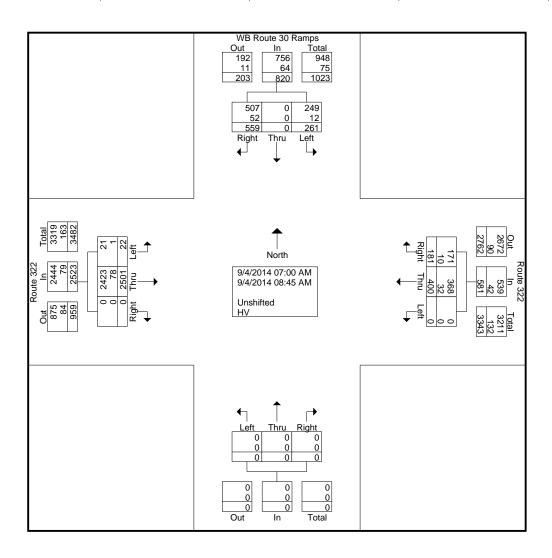
Counter: 26 Counted by: M.Dao Weather: Clear File Name: 2014-09-04 AM 322\_WB Ramps

Site Code : 00000000 Start Date : 9/4/2014 Page No : 1

Page No

|   | Groups | Printed- | Unshifted - HV |  |
|---|--------|----------|----------------|--|
| 2 | _      |          |                |  |

|             |      | R    | oute 3 | 22   |            |      | R    | oute 3 | 22   |            |      |      |        |      |            | V    | VB Ro | ute 30 | Ram  | ps         |              |              |            |
|-------------|------|------|--------|------|------------|------|------|--------|------|------------|------|------|--------|------|------------|------|-------|--------|------|------------|--------------|--------------|------------|
|             |      | E    | astbou | ınd  |            |      | W    | estbou | ınd  |            |      | No   | rthbou | ınd  |            |      | So    | uthbou | ınd  |            |              |              |            |
| Start Time  | Left | Thru | Right  | RTOR | App. Total | Left | Thru | Right  | RTOR | App. Total | Left | Thru | Right  | RTOR | App. Total | Left | Thru  | Right  | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 07:00 AM    | 2    | 375  | 0      | 0    | 377        | 0    | 26   | 18     | 0    | 44         | 0    | 0    | 0      | 0    | 0          | 63   | 0     | 44     | 0    | 107        | 0            | 528          | 528        |
| 07:15 AM    | 2    | 268  | 0      | 0    | 270        | 0    | 28   | 8      | 0    | 36         | 0    | 0    | 0      | 0    | 0          | 67   | 0     | 59     | 0    | 126        | 0            | 432          | 432        |
| 07:30 AM    | 0    | 332  | 0      | 0    | 332        | 0    | 77   | 25     | 0    | 102        | 0    | 0    | 0      | 0    | 0          | 17   | 0     | 67     | 0    | 84         | 0            | 518          | 518        |
| 07:45 AM    | 2    | 315  | 0      | 0    | 317        | 0    | 60   | 25     | 0    | 85         | 0    | 0    | 0      | 0    | 0          | 23   | 0     | 89     | 0    | 112        | 0            | 514          | 514        |
| Total       | 6    | 1290 | 0      | 0    | 1296       | 0    | 191  | 76     | 0    | 267        | 0    | 0    | 0      | 0    | 0          | 170  | 0     | 259    | 0    | 429        | 0            | 1992         | 1992       |
|             |      |      |        |      |            |      |      |        |      |            |      |      |        |      |            |      |       |        |      |            |              |              |            |
| 08:00 AM    | 4    | 331  | 0      | 0    | 335        | 0    | 43   | 29     | 0    | 72         | 0    | 0    | 0      | 0    | 0          | 27   | 0     | 52     | 0    | 79         | 0            | 486          | 486        |
| 08:15 AM    | 5    | 265  | 0      | 0    | 270        | 0    | 50   | 35     | 0    | 85         | 0    | 0    | 0      | 0    | 0          | 25   | 0     | 76     | 0    | 101        | 0            | 456          | 456        |
| 08:30 AM    | 5    | 301  | 0      | 0    | 306        | 0    | 49   | 16     | 0    | 65         | 0    | 0    | 0      | 0    | 0          | 15   | 0     | 93     | 0    | 108        | 0            | 479          | 479        |
| 08:45 AM    | 2    | 314  | 0      | 0    | 316        | 0    | 67   | 25     | 0    | 92         | 0    | 0    | 0      | 0    | 0          | 24   | 0     | 79     | 0    | 103        | 0            | 511          | 511        |
| Total       | 16   | 1211 | 0      | 0    | 1227       | 0    | 209  | 105    | 0    | 314        | 0    | 0    | 0      | 0    | 0          | 91   | 0     | 300    | 0    | 391        | 0            | 1932         | 1932       |
|             |      |      |        |      |            |      |      |        |      |            |      |      |        |      |            |      |       |        |      |            |              |              |            |
| Grand Total | 22   | 2501 | 0      | 0    | 2523       | 0    | 400  | 181    | 0    | 581        | 0    | 0    | 0      | 0    | 0          | 261  | 0     | 559    | 0    | 820        | 0            | 3924         | 3924       |
| Apprch %    | 0.9  | 99.1 | 0      |      |            | 0    | 68.8 | 31.2   |      |            | 0    | 0    | 0      |      |            | 31.8 | 0     | 68.2   |      |            |              |              |            |
| Total %     | 0.6  | 63.7 | 0      |      | 64.3       | 0    | 10.2 | 4.6    |      | 14.8       | 0    | 0    | 0      |      | 0          | 6.7  | 0     | 14.2   |      | 20.9       | 0            | 100          |            |
| Unshifted   | 21   | 2423 | 0      |      | 2444       | 0    | 368  | 171    |      | 539        | 0    | 0    | 0      |      | 0          | 249  | 0     | 507    |      | 756        | 0            | 0            | 3739       |
| % Unshifted | 95.5 | 96.9 | 0      | 0    | 96.9       | 0    | 92   | 94.5   | 0    | 92.8       | 0    | 0    | 0      | 0    | 0          | 95.4 | 0     | 90.7   | 0    | 92.2       | 0            | 0            | 95.3       |
| HV          | 1    | 78   | 0      |      | 79         | 0    | 32   | 10     |      | 42         | 0    | 0    | 0      |      | 0          | 12   | 0     | 52     |      | 64         | 0            | 0            | 185        |
| % HV        | 4.5  | 3.1  | 0      | 0    | 3.1        | 0    | 8    | 5.5    | 0    | 7.2        | 0    | 0    | 0      | 0    | 0          | 4.6  | 0     | 9.3    | 0    | 7.8        | 0            | 0            | 4.7        |

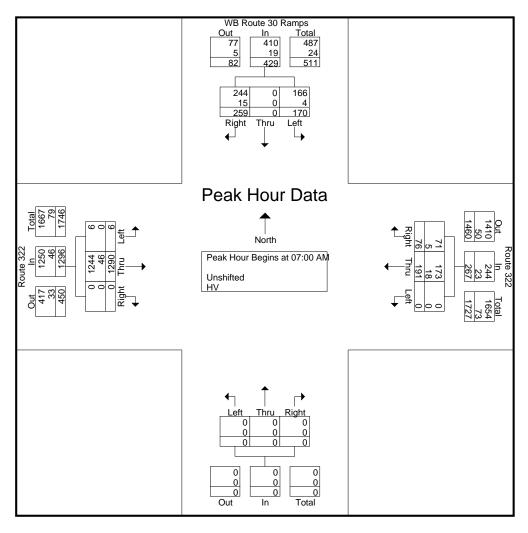


#### Route 322 & WB Route 30 Ramps Caln Township, Chester County

File Name: 2014-09-04 AM 322\_WB Ramps

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|                         |            |            | e 322<br>ound |            |      |      | e 322<br>oound |            |      | North | bound |            | W    | B Route<br>South | 30 Ran<br>bound | nps        |            |
|-------------------------|------------|------------|---------------|------------|------|------|----------------|------------|------|-------|-------|------------|------|------------------|-----------------|------------|------------|
| Start Time              | Left       | Thru       | Right         | App. Total | Left | Thru | Right          | App. Total | Left | Thru  | Right | App. Total | Left | Thru             | Right           | App. Total | Int. Total |
| Peak Hour Analysis From | m 07:00 AM | to 08:45 A | M - Peak 1    | of 1       |      |      |                |            |      |       |       |            |      |                  |                 |            |            |
| Peak Hour for En        | tire Inter | section E  | Begins at     | 07:00 AM   | [    |      |                |            |      |       |       |            |      |                  |                 |            |            |
| 07:00 AM                | 2          | 375        | 0             | 377        | 0    | 26   | 18             | 44         | 0    | 0     | 0     | 0          | 63   | 0                | 44              | 107        | 528        |
| 07:15 AM                | 2          | 268        | 0             | 270        | 0    | 28   | 8              | 36         | 0    | 0     | 0     | 0          | 67   | 0                | 59              | 126        | 432        |
| 07:30 AM                | 0          | 332        | 0             | 332        | 0    | 77   | 25             | 102        | 0    | 0     | 0     | 0          | 17   | 0                | 67              | 84         | 518        |
| 07:45 AM                | 2          | 315        | 0             | 317        | 0    | 60   | 25             | 85         | 0    | 0     | 0     | 0          | 23   | 0                | 89              | 112        | 514        |
| Total Volume            | 6          | 1290       | 0             | 1296       | 0    | 191  | 76             | 267        | 0    | 0     | 0     | 0          | 170  | 0                | 259             | 429        | 1992       |
| % App. Total            | 0.5        | 99.5       | 0             |            | 0    | 71.5 | 28.5           |            | 0    | 0     | 0     |            | 39.6 | 0                | 60.4            |            |            |
| PHF                     | .750       | .860       | .000          | .859       | .000 | .620 | .760           | .654       | .000 | .000  | .000  | .000       | .634 | .000             | .728            | .851       | .943       |
| Unshifted               | 6          | 1244       | 0             | 1250       | 0    | 173  | 71             | 244        | 0    | 0     | 0     | 0          | 166  | 0                | 244             | 410        | 1904       |
| % Unshifted             | 100        | 96.4       | 0             | 96.5       | 0    | 90.6 | 93.4           | 91.4       | 0    | 0     | 0     | 0          | 97.6 | 0                | 94.2            | 95.6       | 95.6       |
| HV                      | 0          | 46         | 0             | 46         | 0    | 18   | 5              | 23         | 0    | 0     | 0     | 0          | 4    | 0                | 15              | 19         | 88         |
| % HV                    | 0          | 3.6        | 0             | 3.5        | 0    | 9.4  | 6.6            | 8.6        | 0    | 0     | 0     | 0          | 2.4  | 0                | 5.8             | 4.4        | 4.4        |



#### Route 322 & WB Route 30 Ramps Caln Township, Chester County

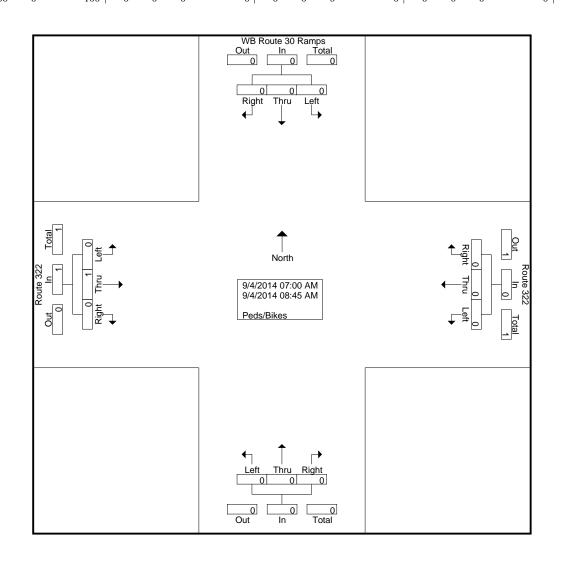
Counter: 26 Counted by: M.Dao Weather: Clear File Name: 2014-09-04 AM 322\_WB Ramps

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| Groups | Printed | l- Peds | /Bikes |
|--------|---------|---------|--------|
|        |         |         |        |

|             |      | R    | oute 3 | 322  |            |      | R    | oute 3 | 22   | _          |      |      |       |      |            | 7    | VB Ro | ute 30 | Ram  | ps         |              |              |            |
|-------------|------|------|--------|------|------------|------|------|--------|------|------------|------|------|-------|------|------------|------|-------|--------|------|------------|--------------|--------------|------------|
|             |      | Ea   | stbou  | ınd  |            |      | W    | estbou | ınd  |            |      | No   | rthbo | und  |            |      | So    | uthbou | und  |            |              |              |            |
| Start Time  | Left | Thru | Right  | RTOR | App. Total | Left | Thru | Right  | RTOR | App. Total | Left | Thru | Right | RTOR | App. Total | Left | Thru  | Right  | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 07:00 AM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0            | 0            | 0          |
| 07:15 AM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0            | 0            | 0          |
| 07:30 AM    | 0    | 1    | 0      | 0    | 1          | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0            | 1            | 1          |
| 07:45 AM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0            | 0            | 0          |
| Total       | 0    | 1    | 0      | 0    | 1          | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0            | 1            | 1          |
|             |      |      |        |      |            |      |      |        |      |            |      |      |       |      |            |      |       |        |      |            |              |              |            |
| 08:00 AM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0            | 0            | 0          |
| 08:15 AM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0            | 0            | 0          |
| 08:30 AM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0            | 0            | 0          |
| 08:45 AM    | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0            | 0            | 0          |
| Total       | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0            | 0            | 0          |
|             |      |      |        |      |            |      |      |        |      |            |      |      |       |      |            |      |       |        |      |            |              |              |            |
| Grand Total | 0    | 1    | 0      | 0    | 1          | 0    | 0    | 0      | 0    | 0          | 0    | 0    | 0     | 0    | 0          | 0    | 0     | 0      | 0    | 0          | 0            | 1            | 1          |
| Apprch %    | 0    | 100  | 0      |      |            | 0    | 0    | 0      |      |            | 0    | 0    | 0     |      |            | 0    | 0     | 0      |      |            |              |              |            |
| Total %     | 0    | 100  | 0      |      | 100        | 0    | 0    | 0      |      | 0          | 0    | 0    | 0     |      | 0          | 0    | 0     | 0      |      | 0          | 0            | 100          |            |

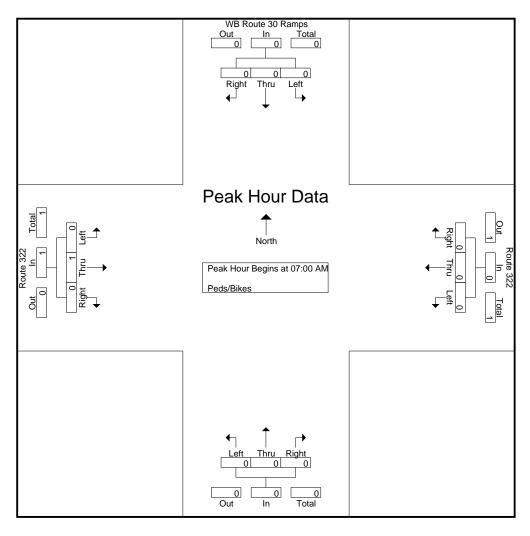


#### Route 322 & WB Route 30 Ramps Caln Township, Chester County

File Name: 2014-09-04 AM 322\_WB Ramps

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|                         |             |            | e 322      |            |      |       | e 322 |            |      |       |       |            | W    | B Route |       | ıps        |            |
|-------------------------|-------------|------------|------------|------------|------|-------|-------|------------|------|-------|-------|------------|------|---------|-------|------------|------------|
|                         |             | Easth      | ound       |            |      | Westl | ound  |            |      | North | bound |            |      | South   | bound |            |            |
| Start Time              | Left        | Thru       | Right      | App. Total | Left | Thru  | Right | App. Total | Left | Thru  | Right | App. Total | Left | Thru    | Right | App. Total | Int. Total |
| Peak Hour Analysis From | m 07:00 AM  | to 08:45 A | M - Peak 1 | 1 of 1     |      |       |       |            |      |       |       |            |      |         |       |            |            |
| Peak Hour for En        | tire Inters | section E  | Begins at  | 07:00 AM   | ſ    |       |       |            |      |       |       |            |      |         |       |            |            |
| 07:00 AM                | 0           | 0          | 0          | 0          | 0    | 0     | 0     | 0          | 0    | 0     | 0     | 0          | 0    | 0       | 0     | 0          | 0          |
| 07:15 AM                | 0           | 0          | 0          | 0          | 0    | 0     | 0     | 0          | 0    | 0     | 0     | 0          | 0    | 0       | 0     | 0          | 0          |
| 07:30 AM                | 0           | 1          | 0          | 1          | 0    | 0     | 0     | 0          | 0    | 0     | 0     | 0          | 0    | 0       | 0     | 0          | 1          |
| 07:45 AM                | 0           | 0          | 0          | 0          | 0    | 0     | 0     | 0          | 0    | 0     | 0     | 0          | 0    | 0       | 0     | 0          | 0          |
| Total Volume            | 0           | 1          | 0          | 1          | 0    | 0     | 0     | 0          | 0    | 0     | 0     | 0          | 0    | 0       | 0     | 0          | 1          |
| % App. Total            | 0           | 100        | 0          |            | 0    | 0     | 0     |            | 0    | 0     | 0     |            | 0    | 0       | 0     |            |            |
| PHF                     | .000        | .250       | .000       | .250       | .000 | .000  | .000  | .000       | .000 | .000  | .000  | .000       | .000 | .000    | .000  | .000       | .250       |



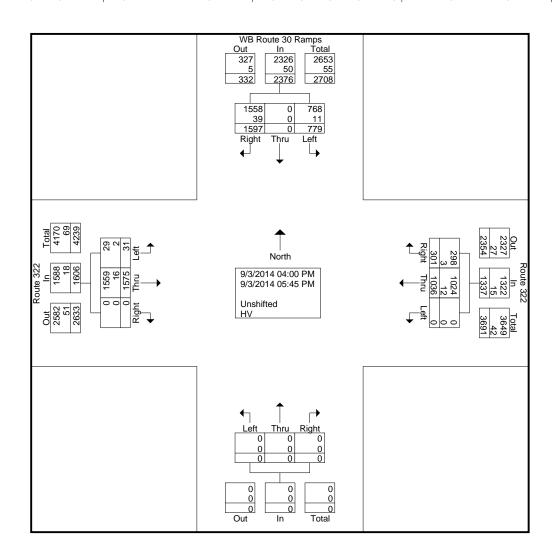
#### Route 322 & WB Route 30 Ramps Caln Township, Chester County

Counter: 26 Counted by: M.Dao Weather: Clear File Name: 2014-09-03 PM 322\_WB Ramps

Site Code : 00000000 Start Date : 9/3/2014 Page No : 1

**Groups Printed- Unshifted - HV** 

|             |      | R    | oute 3 | 22   |            |      | R    | oute 3 | 22   | •          |      |      |        |      |            | 7    | VB Ro | ute 30 | Ram  | ps         |              |              |            |
|-------------|------|------|--------|------|------------|------|------|--------|------|------------|------|------|--------|------|------------|------|-------|--------|------|------------|--------------|--------------|------------|
|             |      | E    | astbou | ınd  |            |      | W    | estbou | ınd  |            |      | No   | rthbou | ınd  |            |      | So    | uthbo  | und  |            |              |              |            |
| Start Time  | Left | Thru | Right  | RTOR | App. Total | Left | Thru | Right  | RTOR | App. Total | Left | Thru | Right  | RTOR | App. Total | Left | Thru  | Right  | RTOR | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 04:00 PM    | 4    | 182  | 0      | 0    | 186        | 0    | 112  | 28     | 0    | 140        | 0    | 0    | 0      | 0    | 0          | 94   | 0     | 237    | 0    | 331        | 0            | 657          | 657        |
| 04:15 PM    | 5    | 179  | 0      | 0    | 184        | 0    | 122  | 36     | 0    | 158        | 0    | 0    | 0      | 0    | 0          | 88   | 0     | 214    | 0    | 302        | 0            | 644          | 644        |
| 04:30 PM    | 5    | 181  | 0      | 0    | 186        | 0    | 119  | 50     | 0    | 169        | 0    | 0    | 0      | 0    | 0          | 93   | 0     | 209    | 0    | 302        | 0            | 657          | 657        |
| 04:45 PM    | 1    | 185  | 0      | 0    | 186        | 0    | 102  | 43     | 0    | 145        | 0    | 0    | 0      | 0    | 0          | 94   | 0     | 168    | 0    | 262        | 0            | 593          | 593        |
| Total       | 15   | 727  | 0      | 0    | 742        | 0    | 455  | 157    | 0    | 612        | 0    | 0    | 0      | 0    | 0          | 369  | 0     | 828    | 0    | 1197       | 0            | 2551         | 2551       |
|             |      |      |        |      |            |      |      |        |      |            |      |      |        |      |            |      |       |        |      |            |              |              |            |
| 05:00 PM    | 5    | 192  | 0      | 0    | 197        | 0    | 126  | 40     | 0    | 166        | 0    | 0    | 0      | 0    | 0          | 118  | 0     | 182    | 0    | 300        | 0            | 663          | 663        |
| 05:15 PM    | 3    | 282  | 0      | 0    | 285        | 0    | 161  | 41     | 0    | 202        | 0    | 0    | 0      | 0    | 0          | 96   | 0     | 185    | 0    | 281        | 0            | 768          | 768        |
| 05:30 PM    | 5    | 183  | 0      | 0    | 188        | 0    | 155  | 28     | 0    | 183        | 0    | 0    | 0      | 0    | 0          | 93   | 0     | 195    | 0    | 288        | 0            | 659          | 659        |
| 05:45 PM    | 3    | 191  | 0      | 0    | 194        | 0    | 139  | 35     | 0    | 174        | 0    | 0    | 0      | 0    | 0          | 103  | 0     | 207    | 0    | 310        | 0            | 678          | 678        |
| Total       | 16   | 848  | 0      | 0    | 864        | 0    | 581  | 144    | 0    | 725        | 0    | 0    | 0      | 0    | 0          | 410  | 0     | 769    | 0    | 1179       | 0            | 2768         | 2768       |
|             |      |      |        |      |            |      |      |        |      |            |      |      |        |      |            |      |       |        |      |            |              |              |            |
| Grand Total | 31   | 1575 | 0      | 0    | 1606       | 0    | 1036 | 301    | 0    | 1337       | 0    | 0    | 0      | 0    | 0          | 779  | 0     | 1597   | 0    | 2376       | 0            | 5319         | 5319       |
| Apprch %    | 1.9  | 98.1 | 0      |      |            | 0    | 77.5 | 22.5   |      |            | 0    | 0    | 0      |      |            | 32.8 | 0     | 67.2   |      |            |              |              |            |
| Total %     | 0.6  | 29.6 | 0      |      | 30.2       | 0    | 19.5 | 5.7    |      | 25.1       | 0    | 0    | 0      |      | 0          | 14.6 | 0     | 30     |      | 44.7       | 0            | 100          |            |
| Unshifted   | 29   | 1559 | 0      |      | 1588       | 0    | 1024 | 298    |      | 1322       | 0    | 0    | 0      |      | 0          | 768  | 0     | 1558   |      | 2326       | 0            | 0            | 5236       |
| % Unshifted | 93.5 | 99   | 0      | 0    | 98.9       | 0    | 98.8 | 99     | 0    | 98.9       | 0    | 0    | 0      | 0    | 0          | 98.6 | 0     | 97.6   | 0    | 97.9       | 0            | 0            | 98.4       |
| HV          | 2    | 16   | 0      |      | 18         | 0    | 12   | 3      |      | 15         | 0    | 0    | 0      |      | 0          | 11   | 0     | 39     |      | 50         | 0            | 0            | 83         |
| % HV        | 6.5  | 1    | 0      | 0    | 1.1        | 0    | 1.2  | 1      | 0    | 1.1        | 0    | 0    | 0      | 0    | 0          | 1.4  | 0     | 2.4    | 0    | 2.1        | 0            | 0            | 1.6        |

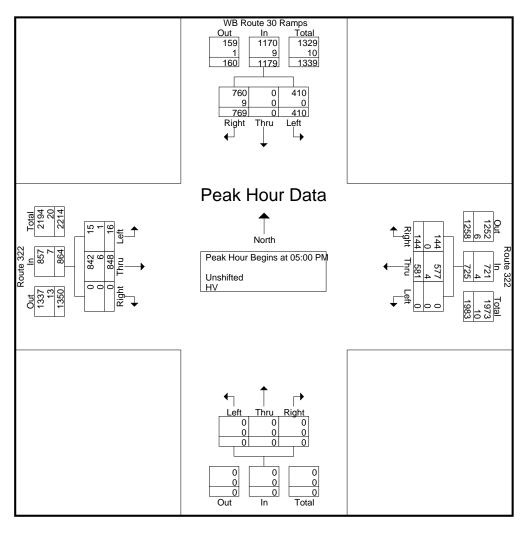


#### Route 322 & WB Route 30 Ramps Caln Township, Chester County

File Name: 2014-09-03 PM 322\_WB Ramps

Site Code : 00000000 Start Date : 9/3/2014 Page No : 2

|                         |            | Rout<br>Easth |            |            |      |      | e 322<br>bound |            |      | North | bound |            | W    | B Route<br>South | 30 Ran<br>bound | nps        |            |
|-------------------------|------------|---------------|------------|------------|------|------|----------------|------------|------|-------|-------|------------|------|------------------|-----------------|------------|------------|
| Start Time              | Left       | Thru          | Right      | App. Total | Left | Thru | Right          | App. Total | Left | Thru  | Right | App. Total | Left | Thru             | Right           | App. Total | Int. Total |
| Peak Hour Analysis From | m 04:00 PM | to 05:45 P    | M - Peak 1 | of 1       |      |      |                |            |      |       |       |            |      |                  |                 |            |            |
| Peak Hour for En        | tire Inter | section E     | Begins at  | 05:00 PM   |      |      |                |            |      |       |       |            |      |                  |                 |            |            |
| 05:00 PM                | 5          | 192           | 0          | 197        | 0    | 126  | 40             | 166        | 0    | 0     | 0     | 0          | 118  | 0                | 182             | 300        | 663        |
| 05:15 PM                | 3          | 282           | 0          | 285        | 0    | 161  | 41             | 202        | 0    | 0     | 0     | 0          | 96   | 0                | 185             | 281        | 768        |
| 05:30 PM                | 5          | 183           | 0          | 188        | 0    | 155  | 28             | 183        | 0    | 0     | 0     | 0          | 93   | 0                | 195             | 288        | 659        |
| 05:45 PM                | 3          | 191           | 0          | 194        | 0    | 139  | 35             | 174        | 0    | 0     | 0     | 0          | 103  | 0                | 207             | 310        | 678        |
| Total Volume            | 16         | 848           | 0          | 864        | 0    | 581  | 144            | 725        | 0    | 0     | 0     | 0          | 410  | 0                | 769             | 1179       | 2768       |
| % App. Total            | 1.9        | 98.1          | 0          |            | 0    | 80.1 | 19.9           |            | 0    | 0     | 0     |            | 34.8 | 0                | 65.2            |            |            |
| PHF                     | .800       | .752          | .000       | .758       | .000 | .902 | .878           | .897       | .000 | .000  | .000  | .000       | .869 | .000             | .929            | .951       | .901       |
| Unshifted               | 15         | 842           | 0          | 857        | 0    | 577  | 144            | 721        | 0    | 0     | 0     | 0          | 410  | 0                | 760             | 1170       | 2748       |
| % Unshifted             | 93.8       | 99.3          | 0          | 99.2       | 0    | 99.3 | 100            | 99.4       | 0    | 0     | 0     | 0          | 100  | 0                | 98.8            | 99.2       | 99.3       |
| HV                      | 1          | 6             | 0          | 7          | 0    | 4    | 0              | 4          | 0    | 0     | 0     | 0          | 0    | 0                | 9               | 9          | 20         |
| % HV                    | 6.3        | 0.7           | 0          | 0.8        | 0    | 0.7  | 0              | 0.6        | 0    | 0     | 0     | 0          | 0    | 0                | 1.2             | 0.8        | 0.7        |



### APPENDIX E NEARBY DEVELOPMENT DATA

#### **Site Characteristics**

This section presents the details regarding the proposed site, including the incremental increase in traffic volumes generated by the development during the peak hours and the distribution of this site traffic to the study area roadways, as well as the proposed site access configuration, traffic control, and sight distance requirements.

#### Trip Generation

Traffic volumes generated by the proposed development were prepared based on trip generation data compiled from numerous studies contained in the Institute of Transportation Engineers (ITE) publication, *Trip Generation, 9th Edition.* **Table 2** presents the anticipated vehicular trip generation for the proposed development.

|                                  |           |            |    | •                   |           |           |                      |           |
|----------------------------------|-----------|------------|----|---------------------|-----------|-----------|----------------------|-----------|
|                                  |           |            |    | kday Mo<br>Peak Hou | -         |           | day Afte<br>Peak Hou |           |
| Land Use                         | Units     | Daily      | In | Out                 | Total     | In        | Out                  | Total     |
| Apartments <sup>1</sup>          | 180       | 1,214      | 18 | 74                  | 92        | 76        | 41                   | 117       |
| Townhouses <sup>2</sup>          | 175       | 1,046      | 14 | 67                  | 81        | 64        | 31                   | 95        |
| Single Family Homes <sup>3</sup> | <u>29</u> | <u>336</u> | Z  | <u>23</u>           | <u>30</u> | <u>21</u> | <u>13</u>            | <u>34</u> |
| Total                            | 384       | 2,596      | 39 | 164                 | 203       | 161       | 85                   | 246       |

Table 2. Vehicular Trip Generation

#### Trip Distribution and Assignment

Site-generated traffic will approach and depart the site via different routes depending on factors such as the existing traffic patterns, location of major roadways, and the location of the development's site access. The distribution percentages for the anticipated directions of approach and departure and traffic assignment percentages are illustrated in Figure 4A. Application of the percentages illustrated in Figure 4A to the new peak hour trips contained in Table 2, provides an estimate of site traffic to be added to the study area. The site-generated traffic is shown in Figure 4B.

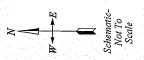
#### Site Access Configuration and Traffic Control

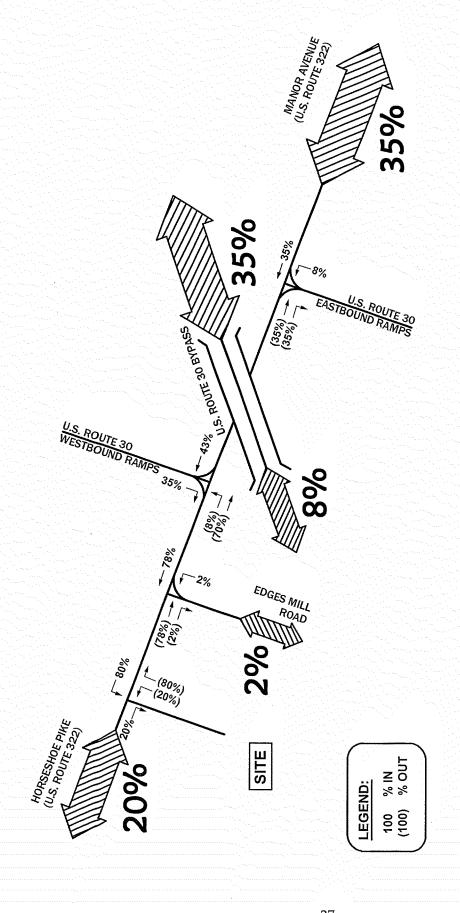
Access to the Dwell at Caln community is proposed along U.S. Route 322 approximately 2,000 feet west of Edges Mill Road, based on the site plan, dated March 31, 2014, prepared by D. L. Howell and Associates, Inc.

<sup>1 –</sup> ITE Land Use Code 220 for Low-Rise Apartment Building.

<sup>2 -</sup> ITE Land Use Code 230 for Residential Condominium/Townhouse.

<sup>3 -</sup> ITE Land Use Code 210 for Single Family Detached Housing.





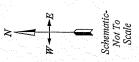


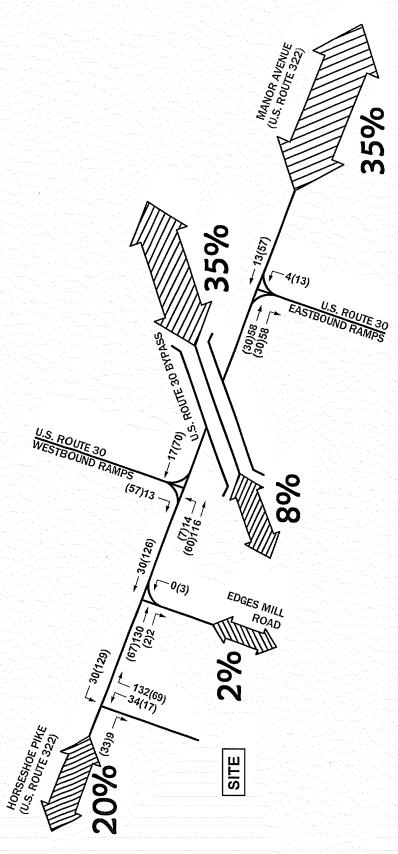
## **FIGURE 4A**

Directions of Approach and Departure

# DWELL AT CALN DEVELOPMENT CALN TOWNSHIP, CHESTER COUNTY, PA

- 27 -





LEGEND:

10 WEEKDAY AM PEAK HOUR (10) WEEKDAY PM PEAK HOUR

## FIGURE 4B

Site Traffic Assignment

# OWELL AT CALN DEVELOPMENT CALN TOWNSHIP, CHESTER COUNTY, PA

#### **Proposed Development Improvements**

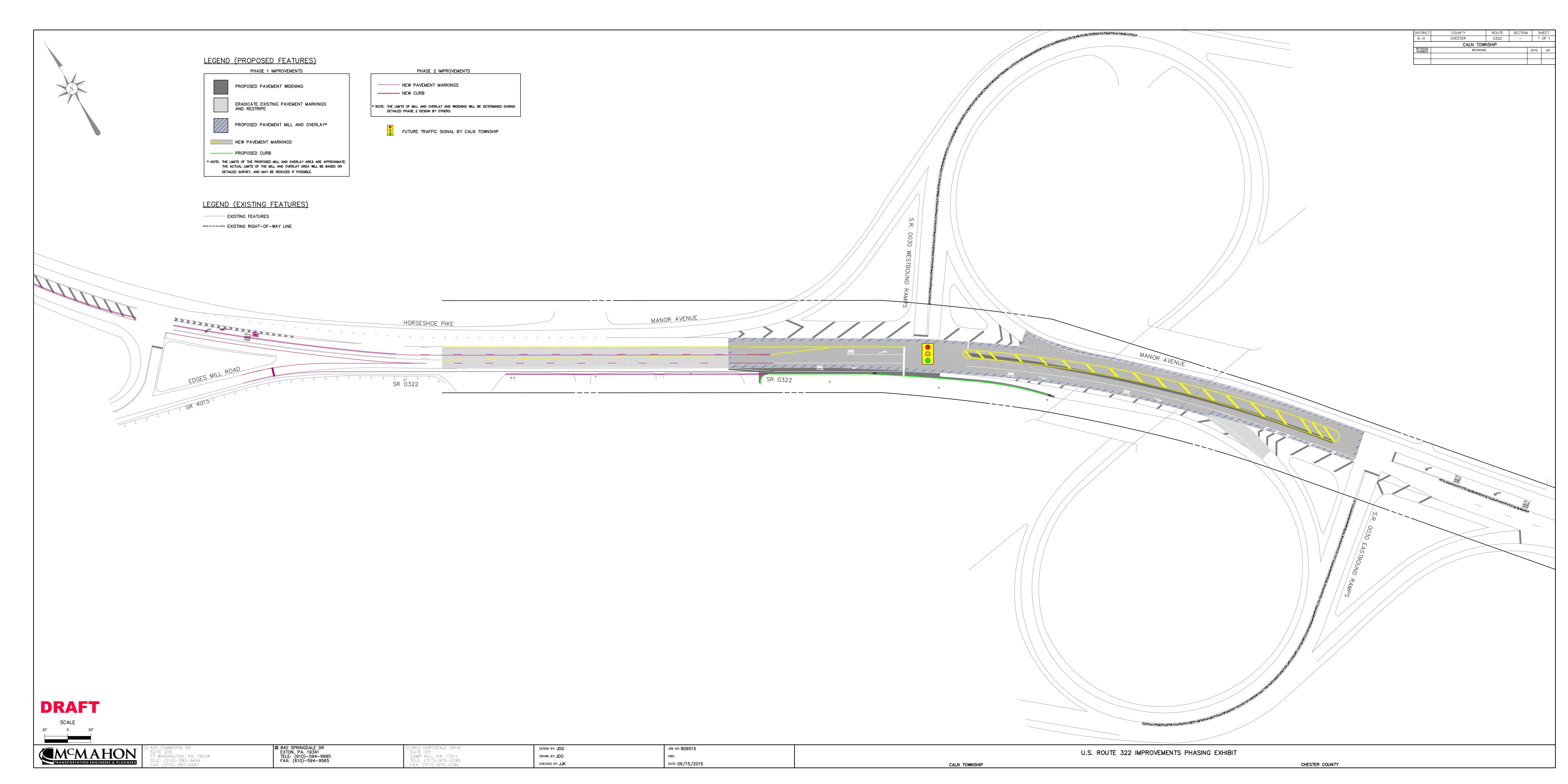
In conjunction with the Dwell at Caln residential development, the following improvements are recommended and proposed, and they are also consistent with prior approvals by Caln Township for this site.

#### **Transportation Impact Study Improvements**

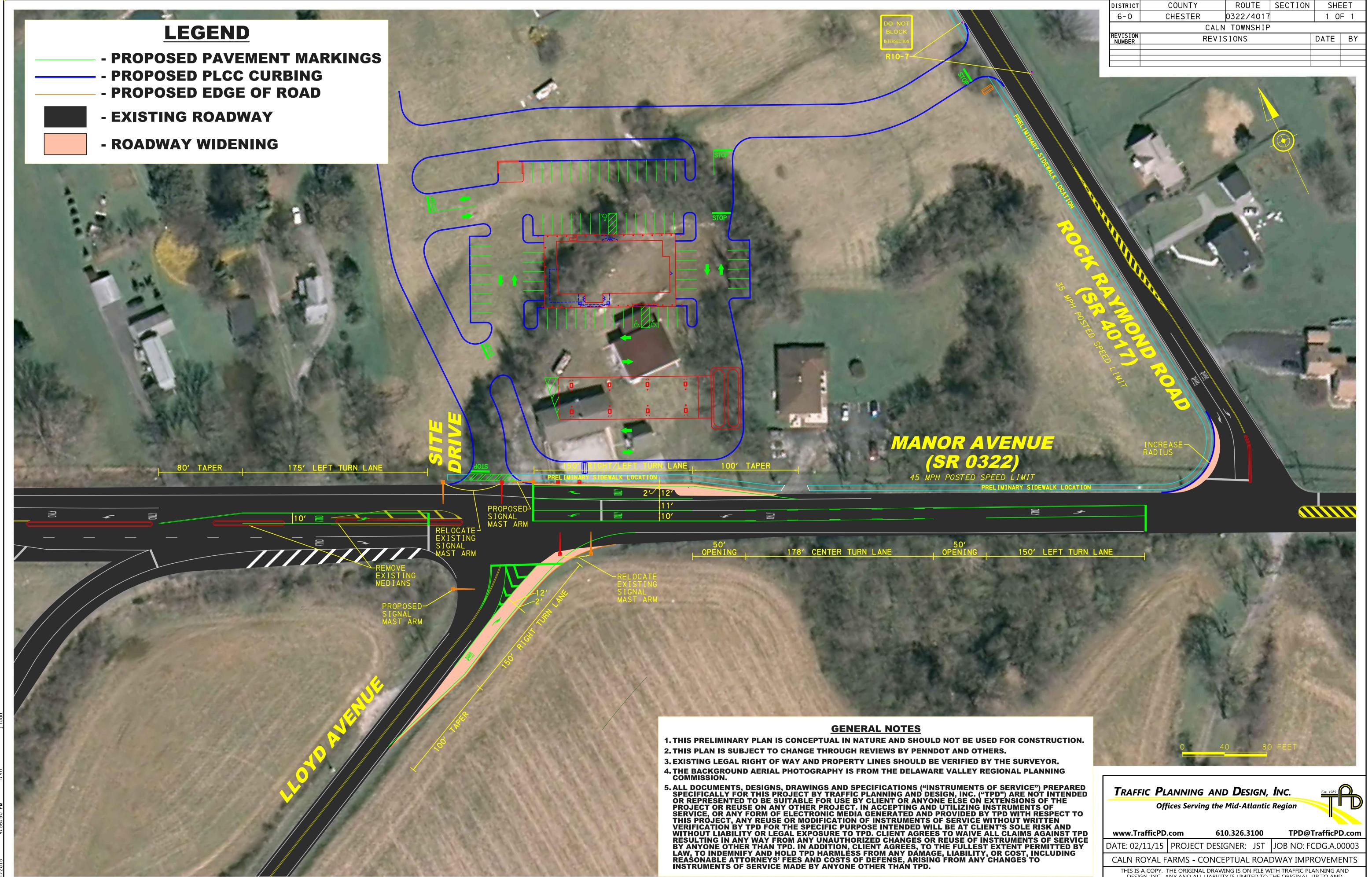
- Manor Avenue (U.S. Route 322) and Site Access signalize the site access; widen eastbound U.S. Route 322 for a right-turn deceleration lane; widen westbound U.S. Route 322 for a separate left-turn lane; and provide separate left- and right-turn lanes and one ingress lane on the site access in a boulevard style.
- Manor Avenue (U.S. Route 322) and Westbound U.S Route 30 On/Off-ramps signalize the intersection, and restripe the eastbound U.S. Route 322 approach to provide a shared through/left-turn lane and a separate through lane. Also, provide traffic signal coordination and interconnection with the adjacent signalized intersections at Lloyd Avenue and the proposed traffic signal at the site access.

#### **Qualitative Evaluation Improvements**

- Manor Avenue (U.S. Route 322) and Lloyd Avenue optimize the traffic signal timings and
  cycle length to improve overall traffic conditions, as well as provide traffic signal
  coordination and interconnection with the adjacent signalized intersections at Rock
  Raymond Road and with the proposed traffic signal at the westbound U.S. Route 30 On/Offramps.
- Manor Avenue (U.S. Route 322) and Rock Raymond Road optimize the traffic signal timings and cycle length to improve overall traffic conditions along the U.S. Route 322 corridor, as well as provide traffic signal coordination and interconnection with the adjacent signalized intersections at Lloyd Avenue.



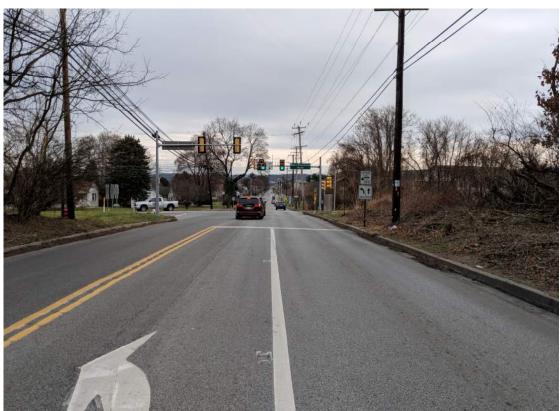
### APPENDIX J CONCEPT PLANS



THIS IS A COPY. THE ORIGINAL DRAWING IS ON FILE WITH TRAFFIC PLANNING AND DESIGN, INC. ANY AND ALL LIABILITY IS LIMITED TO THE ORIGINAL, UP TO AND INCLUDING THE LAST REVISIONS.

#### **APPENDIX B**

**STUDY AREA PHOTOGRAPHS** 



EB Manor Ave (SR 0322) Direction / Road:

Approach / Departure: Approach

**Distance:** 50 feet



Direction / Road: EB Manor Ave (SR 0322)

Approach / Departure: Departure

Distance:



WB Manor Ave (SR 0322) Direction / Road:

Approach / Departure: Approach

Distance: 50 feet



**Direction / Road:** WB Manor Ave (SR 0322)

Approach / Departure: Departure

Distance:



SB Rock Raymond Road Direction / Road:

Approach / Departure: Approach

**Distance:** 200 feet



**Direction / Road:** NB Rock Raymond Road

Approach / Departure: Departure

Distance:



EB Manor Ave (SR 0322) Direction / Road:

Approach / Departure: Approach

**Distance:** 50 feet



**Direction / Road:** EB Manor Ave (SR 0322)

Approach / Departure: Departure



WB Manor Ave (SR 0322) Direction / Road:

Approach / Departure: Approach

**Distance:** 50 feet



**Direction / Road:** WB Manor Ave (SR 0322)

Approach / Departure: Departure



**Direction / Road:** NB Lloyd Avenue Approach / Departure: Approach

**Distance:** 200 feet



**Direction / Road:** 

Approach / Departure: Departure

Date Taken:

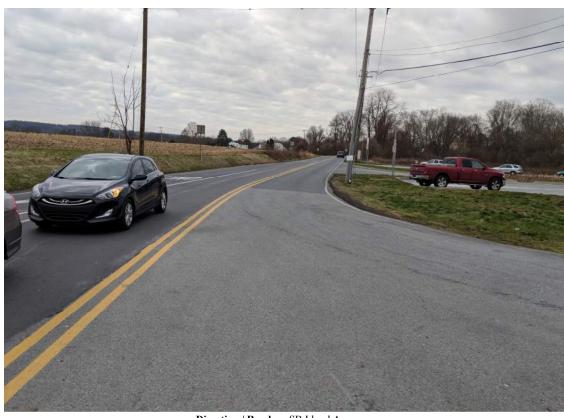




Direction / Road: SB Royal Farms Driveway

Approach / Departure: Approach

**Distance:** 50 feet



**Direction / Road:** SB Lloyd Avenue

Approach / Departure: Departure



EB Manor Ave (SR 0322) Direction / Road:

Approach / Departure: Approach **Distance:** 200 feet



**Direction / Road:** EB Manor Ave (SR 0322)

Approach / Departure: Departure



**Direction / Road:** WB Manor Ave (SR 0322)

Approach / Departure: Approach Distance: 200 feet



**Direction / Road:** WB Manor Ave (SR 0322)

Approach / Departure: Departure



Direction / Road: SB Route 30 EB Ramps

Approach / Departure: Approach

**Distance:** 200 feet



**Direction / Road:** SB Route 30 EB Ramps

Approach / Departure: Departure



EB Lloyd Avenue **Direction / Road:** Approach / Departure: Approach

> Distance: 200 feet



Approach / Departure: Departure



WB Lloyd Avenue **Direction / Road:** Approach / Departure: Approach

Distance: 200 feet



**Direction / Road:** Approach / Departure: Departure





SB Park and Ride Driveway Direction / Road:

Approach / Departure: Approach

Distance: 200 feet



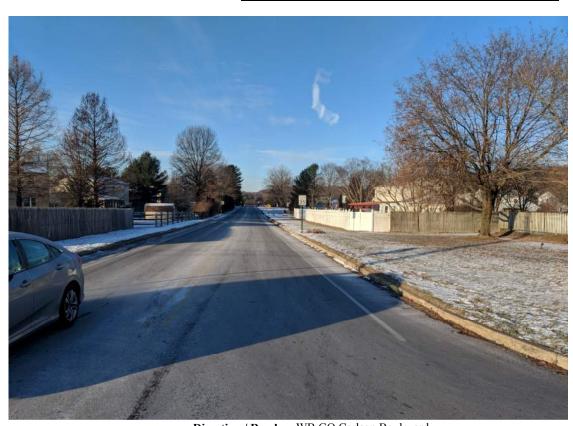
**Direction / Road:** NB Park and Ride Driveway

Approach / Departure: Departure



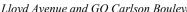
Direction / Road: EB GO Carlson Boulevard Approach / Departure: Approach

Distance: 200 feet



Direction / Road: WB GO Carlson Boulevard

Approach / Departure: Departure





NB Lloyd Avenue Direction / Road: Approach / Departure: Approach

Distance: 200 feet



**Direction / Road:** NB Lloyd Avenue

Departure Approach / Departure:

*Job* #:



SB Lloyd Avenue Direction / Road: Approach / Departure: Approach

> Distance: 200 feet



**Direction / Road:** SB Lloyd Avenue

Approach / Departure: Departure



EB Beaver Run Road Direction / Road: Approach / Departure: Approach

> Distance: 50 feet



Direction / Road: WB Beaver Run Road Approach / Departure: Departure



Direction / Road: NB Lloyd Avenue
Approach / Departure: Approach

Distance: 50 feet





SB Lloyd Avenue Direction / Road: Approach / Departure: Approach

Distance: 50 feet



Direction / Road: SB Lloyd Avenue Approach / Departure: Departure

## **APPENDIX C** *MANUAL COUNT PRINTOUTS*



# Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Rock Raymond Road & Route 322 Site Code: Start Date: 12/16/2017 Page No: 1

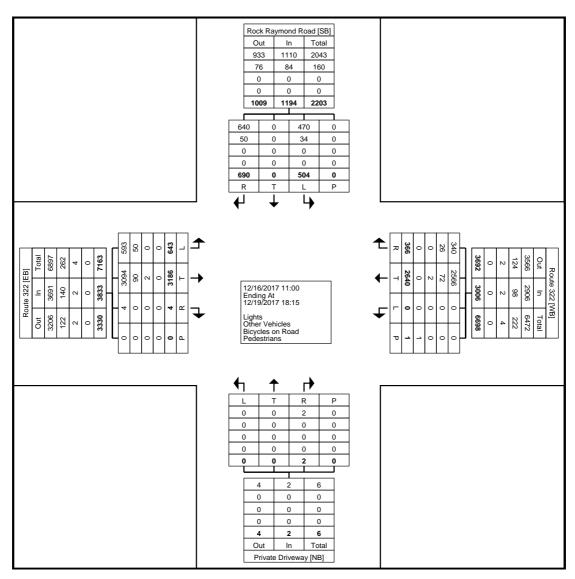
**Turning Movement Data** 

|                     | ı          |              |          |                    |      |               |      |              |            | 1 11111            | y ivi | OVC           | IIICI |      | ala   |                    |      |               |            |      |            |                    |      |               |               |
|---------------------|------------|--------------|----------|--------------------|------|---------------|------|--------------|------------|--------------------|-------|---------------|-------|------|-------|--------------------|------|---------------|------------|------|------------|--------------------|------|---------------|---------------|
|                     |            |              | Route    |                    |      |               |      |              |            | 322                |       |               |       | F    |       | Driveway           | /    |               |            | Ro   | ck Rayn    |                    | oad  |               |               |
|                     |            |              | Eastb    | ound               |      |               |      |              | West       | ound               |       |               |       |      | North | bound              |      |               |            |      | South      | oound              |      |               |               |
| Start Time          | Left       | Thru         | Right    | Right<br>on<br>Red | Peds | App.<br>Total | Left | Thru         | Right      | Right<br>on<br>Red | Peds  | App.<br>Total | Left  | Thru | Right | Right<br>on<br>Red | Peds | App.<br>Total | Left       | Thru | Right      | Right<br>on<br>Red | Peds | App.<br>Total | Int.<br>Total |
| 11:00               | 25         | 122          | 0        | 0                  | 0    | 147           | 0    | 98           | 9          | 0                  | 0     | 107           | 0     | 0    | 0     | 0                  | 0    | 0             | 12         | 0    | 14         | 9                  | 0    | 35            | 289           |
| 11:15               | 12         | 115          | 0        | 0                  | 0    | 127           | 0    | 100          | 8          | 0                  | 0     | 108           | 0     | 0    | 0     | 0                  | 0    | 0             | 14         | 0    | 17         | 11                 | 0    | 42            | 277           |
| 11:30               | 13         | 112          | 0        | 0                  | 0    | 125           | 0    | 108          | 9          | 0                  | 0     | 117           | 0     | 0    | 0     | 0                  | 0    | 0             | 7          | 0    | 4          | 9                  | 0    | 20            | 262           |
| 11:45               | 15         | 104          | 1        | 0                  | 0    | 120           | 0    | 113          | 14         | 2                  | 0     | 129           | 0     | 0    | 0     | 0                  | 0    | 0             | 6          | 0    | 2          | 13                 | 0    | 21            | 270           |
| Hourly Total        | 65         | 453          | 1        | 0                  | 0    | 519           | 0    | 419          | 40         | 2                  | 0     | 461           | 0     | 0    | 0     | 0                  | 0    | 0             | 39         | 0    | 37         | 42                 | 0    | 118           | 1098          |
| 12:00               | 17         | 105          | 0        | 0                  | 0    | 122           | 0    | 99           | 11         | 0                  | 0     | 110           | 0     | 0    | 0     | 1                  | 0    | 1             | 23         | 0    | 15         | 12                 | 0    | 50            | 283           |
| 12:15               | 13         | 109          | 0        | 0                  | 0    | 122           | 0    | 106          | 13         | 0                  | 0     | 119           | 0     | 0    | 0     | 0                  | 0    | 0             | 12         | 0    | 16         | 9                  | 0    | 37            | 278           |
| 12:30               | 20         | 102          | 0        | 0                  | 0    | 122           | 0    | 98           | 7          | 0                  | 0     | 105           | 0     | 0    | 0     | 0                  | 0    | 0             | 12         | 0    | 7          | 9                  | 0    | 28            | 255           |
| 12:45               | 16         | 100          | 0        | 0                  | 0    | 116           | 0    | 103          | 9          | 0                  | 0     | 112           | 0     | 0    | 0     | 0                  | 0    | 0             | 12         | 0    | 12         | 5                  | 0    | 29            | 257           |
| Hourly Total        | 66         | 416          | 0        | 0                  | 0    | 482           | 0    | 406          | 40         | 0                  | 0     | 446           | 0     | 0    | 0     | 1                  | 0    | 1             | 59         | 0    | 50         | 35                 | 0    | 144           | 1073          |
| *** BREAK ***       | -          | -            | -        | -                  | -    | -             | -    |              | -          | -                  | -     | -             | -     | -    | -     |                    | -    | -             | -          | -    |            | -                  | -    | -             |               |
| 7:00                | 76         | 193          | 0        | 0                  | 0    | 269           | 0    | 40           | 28         | 1                  | 0     | 69            | 0     | 0    | 0     | 0                  | 0    | 0             | 56         | 0    | 14         | 34                 | 0    | 104           | 442           |
| 7:15                | 123        | 185          | 0        | 0                  | 0    | 308           | 0    | 28           | 32         | 7                  | 0     | 67            | 0     | 0    | 0     | 0                  | 0    | 0             | 64         | 0    | 22         | 31                 | 0    | 117           | 492           |
| 7:30                | 68         | 182          | 0        | 0                  | 0    | 250           | 0    | 57           | 21         | 3                  | 0     | 81            | 0     | 0    | 0     | 0                  | 0    | 0             | 73         | 0    | 47         | 41                 | 0    | 161           | 492           |
| 7:45                | 13         | 172          | 0        | 0                  | 0    | 185           | 0    | 50           | 9          | 0                  | 0     | 59            | 0     | 0    | 0     | 0                  | 0    | 0             | 18         | 0    | 4          | 20                 | 0    | 42            | 286           |
| Hourly Total        | 280        | 732          | 0        | 0                  | 0    | 1012          | 0    | 175          | 90         | 11                 | 0     | 276           | 0     | 0    | 0     | 0                  | 0    | 0             | 211        | 0    | 87         | 126                | 0    | 424           | 1712          |
| 8:00                | 17         | 217          | 1        | 0                  | 0    | 235           | 0    | 97           | 10         | 1                  | 0     | 108           | 0     | 0    | 0     | 0                  | 0    | 0             | 15         | 0    | 6          | 12                 | 0    | 33            | 376           |
| 8:15                | 12         | 134          | 1        | 0                  | 0    | 147           | 0    | 84           | 7          | 0                  | 0     | 91            | 0     | 0    | 0     | 0                  | 0    | 0             | 15         | 0    | 8          | 19                 | 0    | 42            | 280           |
| 8:30                | 20         | 138          | 0        | 0                  | 0    | 158           | 0    | 61           | 10         | 0                  | 0     | 71            | 0     | 0    | 0     | 0                  | 0    | 0             | 21         | 0    | 7          | 14                 | 0    | 42            | 271           |
| 8:45                | 29         | 135          | 0        | 0                  | 0    | 164           | 0    | 72           | 16         | 0                  | 0     | 88            | 0     | 0    | 0     | 0                  | 0    | 0             | 34         | 0    | 11         | 27                 | 0    | 72            | 324           |
| Hourly Total        | 78         | 624          | 2        | 0                  | 0    | 704           | 0    | 314          | 43         | 11                 | 0     | 358           | 0     | 0    | 0     | 0                  | 0    | 0             | 85         | 0    | 32         | 72                 | 0    | 189           | 1251          |
| *** BREAK ***       | -          |              |          | -                  |      |               | -    |              |            | -                  | -     | -             | -     |      |       |                    | -    | -             | -          |      |            | -                  | -    | -             |               |
| 16:00               | 18         | 116          | 0        | 0                  | 0    | 134           | 0    | 160          | 21         | 0                  | 0     | 181           | 0     | 0    | 0     | 0                  | 0    | 0             | 15         | 0    | 14         | 10                 | 0    | 39            | 354           |
| 16:15               | 23         | 111          | 1        | 0                  | 0    | 135           | 0    | 167          | 21         | 0                  | 11    | 188           | 0     | 0    | 0     | 0                  | 0    | 0             | 11         | 0    | 14         | 17                 | 0    | 42            | 365           |
| 16:30               | 23         | 139          | 0        | 0                  | 0    | 162           | 0    | 169          | 22         | 2                  | 0     | 193           | 0     | 0    | 0     | 1                  | 0    | 1             | 16         | 0    | 20         | 14                 | 0    | 50            | 406           |
| 16:45               | 18         | 160          | 0        | 0                  | 0    | 178           | 0    | 165          | 13         | 0                  | 0     | 178           | 0     | 0    | 0     | 0                  | 0    | 0             | 17         | 0    | 9          | 12                 | 0    | 38            | 394           |
| Hourly Total        | 82         | 526          | 1        | 0                  | 0    | 609           | 0    | 661          | 77         | 2                  | 1     | 740           | 0     | 0    | 0     | 1                  | 0    | 1             | 59         | 0    | 57         | 53                 | 0    | 169           | 1519          |
| 17:00               | 19         | 108          | 0        | 0                  | 0    | 127           | 0    | 179          | 19         | 0                  | 0     | 198           | 0     | 0    | 0     | 0                  | 0    | 0             | 18         | 0    | 15         | 18                 | 0    | 51            | 376           |
| 17:15               | 17         | 113          | 0        | 0                  | 0    | 130           | 0    | 163          | 17         | 0                  | 0     | 180           | 0     | 0    | 0     | 0                  | 0    | 0             | 17         | 0    | 9          | 14                 | 0    | 40            | 350           |
| 17:30               | 22         | 95           | 0        | 0                  | 0    | 117           | 0    | 166          | 13         | 1                  | 0     | 180           | 0     | 0    | 0     | 0                  | 0    | 0             | 14         | 0    | 5          | 17                 | 0    | 36            | 333           |
| 17:45               | 14         | 119          | 0        | 0                  | 0    | 133           | 0    | 156          | 10         | 0                  | 0     | 166           | 0     | 0    | 0     | 0                  | 0    | 0             | 2          | 0    | 5          | 16                 | 0    | 23            | 322           |
| Hourly Total        | 72         | 435          | 0        | 0                  | 0    | 507           | 0    | 664          | 59         | 1                  | 0     | 724           | 0     | 0    | 0     | 0                  | 0    | 0             | 51         | 0    | 34         | 65                 | 0    | 150           | 1381          |
| 18:00               | 0          | 0            | 0        | 0                  | 0    | 0             | 0    | 1 0040       | 0          | 0                  | 0     | 1             | 0     | 0    | 0     | 0                  | 0    | 0             | 0          | 0    | 0          | 0                  | 0    | 0             | 1             |
| Grand Total         | 643        | 3186         | 4        | 0                  | 0    | 3833          | 0    | 2640         | 349        | 17                 | 1     | 3006          | 0     | 0    | 0     | 2                  | 0    | 2             | 504        | 0    | 297        | 393                | 0    | 1194          | 8035          |
| Approach %          | 16.8       | 83.1         | 0.1      | 0.0                |      | 47.7          | 0.0  | 87.8<br>32.9 | 11.6       | 0.6                |       | 37.4          | 0.0   | 0.0  | 0.0   | 100.0              | _    |               | 42.2       | 0.0  | 24.9       | 32.9<br>4.9        |      | 110           |               |
| Total % Lights      | 8.0<br>593 | 39.7<br>3094 | 0.0<br>4 | 0.0                |      | 3691          | 0.0  | 2566         | 4.3<br>323 | 0.2<br>17          |       | 2906          | 0.0   | 0.0  | 0.0   | 0.0                |      | 0.0           | 6.3<br>470 | 0.0  | 3.7<br>270 | 370                |      | 14.9<br>1110  | 7709          |
| % Lights            | 92.2       | 97.1         | 100.0    | -                  |      | 96.3          |      | 97.2         | 92.6       | 100.0              |       | 96.7          | -     |      |       | 100.0              |      | 100.0         | 93.3       |      | 90.9       | 94.1               |      | 93.0          | 95.9          |
| Other               |            | -            |          |                    |      |               |      |              |            |                    |       |               |       |      |       |                    |      |               |            | -    |            |                    |      |               |               |
| Vehicles<br>% Other | 50         | 90           | 0        | 0                  | -    | 140           | 0    | 72           | 26         | 0                  | -     | 98            | 0     | 0    | 0     | 0                  | -    | 0             | 34         | 0    | 27         | 23                 | -    | 84            | 322           |
| Vehicles            | 7.8        | 2.8          | 0.0      | -                  | -    | 3.7           | -    | 2.7          | 7.4        | 0.0                | -     | 3.3           | -     | -    | -     | 0.0                | -    | 0.0           | 6.7        | -    | 9.1        | 5.9                | -    | 7.0           | 4.0           |
| Bicycles on<br>Road | 0          | 2            | 0        | 0                  | -    | 2             | 0    | 2            | 0          | 0                  | -     | 2             | 0     | 0    | 0     | 0                  | -    | 0             | 0          | 0    | 0          | 0                  | -    | 0             | 4             |
| % Bicycles on Road  | 0.0        | 0.1          | 0.0      | -                  | -    | 0.1           | -    | 0.1          | 0.0        | 0.0                | -     | 0.1           | -     | -    | -     | 0.0                | -    | 0.0           | 0.0        | -    | 0.0        | 0.0                | -    | 0.0           | 0.0           |
| Pedestrians         | -          |              |          | -                  | 0    |               | -    |              | -          | -                  | 1     | -             | -     |      |       |                    | 0    |               | -          |      |            | -                  | 0    | -             | -             |
| %<br>Pedestrians    | -          | -            | -        | -                  | -    | -             | -    | -            | -          | -                  | 100.0 | -             | -     | -    | -     | -                  | -    | -             | -          | -    | -          | -                  | -    | -             | -             |



### Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Rock Raymond Road & Route 322 Site Code: Start Date: 12/16/2017 Page No: 2



**Turning Movement Data Plot** 



# Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Rock Raymond Road & Route 322 Site Code: Start Date: 12/16/2017 Page No: 3

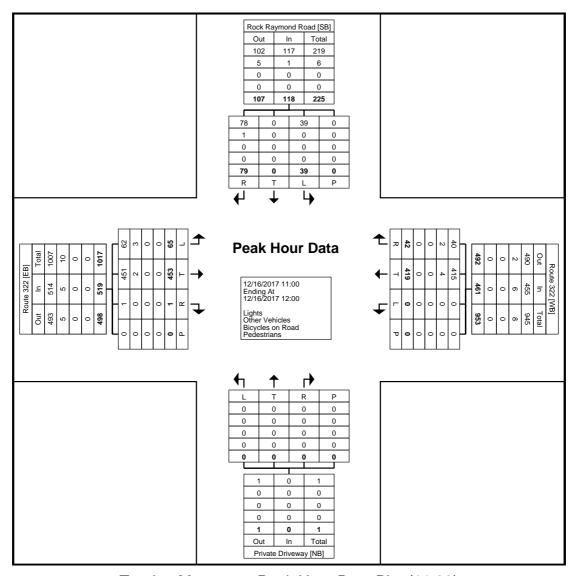
Turning Movement Peak Hour Data (11:00)

|                     |       |       |       |                    |      | •             | <u>~</u> |       | *.0 * | 0                  | 0    |               |       | <b>о</b> а. | -         | ∽ (.               |      | σ,            |       |       |         |                    |      |               |               |
|---------------------|-------|-------|-------|--------------------|------|---------------|----------|-------|-------|--------------------|------|---------------|-------|-------------|-----------|--------------------|------|---------------|-------|-------|---------|--------------------|------|---------------|---------------|
|                     |       |       | Route | e 322              |      |               |          |       | Rout  | e 322              |      |               |       | F           | Private D | Orivewa            | У    |               |       | Ro    | ck Rayn | nond Ro            | oad  |               |               |
|                     |       |       | Eastb | ound               |      |               |          |       | West  | bound              |      |               |       |             | North     | oound              |      |               |       |       | South   | bound              |      |               |               |
| Start Time          | Left  | Thru  | Right | Right<br>on<br>Red | Peds | App.<br>Total | Left     | Thru  | Right | Right<br>on<br>Red | Peds | App.<br>Total | Left  | Thru        | Right     | Right<br>on<br>Red | Peds | App.<br>Total | Left  | Thru  | Right   | Right<br>on<br>Red | Peds | App.<br>Total | Int.<br>Total |
| 11:00               | 25    | 122   | 0     | 0                  | 0    | 147           | 0        | 98    | 9     | 0                  | 0    | 107           | 0     | 0           | 0         | 0                  | 0    | 0             | 12    | 0     | 14      | 9                  | 0    | 35            | 289           |
| 11:15               | 12    | 115   | 0     | 0                  | 0    | 127           | 0        | 100   | 8     | 0                  | 0    | 108           | 0     | 0           | 0         | 0                  | 0    | 0             | 14    | 0     | 17      | 11                 | 0    | 42            | 277           |
| 11:30               | 13    | 112   | 0     | 0                  | 0    | 125           | 0        | 108   | 9     | 0                  | 0    | 117           | 0     | 0           | 0         | 0                  | 0    | 0             | 7     | 0     | 4       | 9                  | 0    | 20            | 262           |
| 11:45               | 15    | 104   | 1     | 0                  | 0    | 120           | 0        | 113   | 14    | 2                  | 0    | 129           | 0     | 0           | 0         | 0                  | 0    | 0             | 6     | 0     | 2       | 13                 | 0    | 21            | 270           |
| Total               | 65    | 453   | 1     | 0                  | 0    | 519           | 0        | 419   | 40    | 2                  | 0    | 461           | 0     | 0           | 0         | 0                  | 0    | 0             | 39    | 0     | 37      | 42                 | 0    | 118           | 1098          |
| Approach %          | 12.5  | 87.3  | 0.2   | 0.0                | -    | -             | 0.0      | 90.9  | 8.7   | 0.4                | -    | -             | 0.0   | 0.0         | 0.0       | 0.0                | -    | -             | 33.1  | 0.0   | 31.4    | 35.6               | -    | -             | -             |
| Total %             | 5.9   | 41.3  | 0.1   | 0.0                | -    | 47.3          | 0.0      | 38.2  | 3.6   | 0.2                | -    | 42.0          | 0.0   | 0.0         | 0.0       | 0.0                | -    | 0.0           | 3.6   | 0.0   | 3.4     | 3.8                | -    | 10.7          | -             |
| PHF                 | 0.650 | 0.928 | 0.250 | 0.000              | -    | 0.883         | 0.000    | 0.927 | 0.714 | 0.250              | -    | 0.893         | 0.000 | 0.000       | 0.000     | 0.000              | -    | 0.000         | 0.696 | 0.000 | 0.544   | 0.808              | -    | 0.702         | 0.950         |
| Lights              | 62    | 451   | 1     | 0                  | -    | 514           | 0        | 415   | 38    | 2                  | -    | 455           | 0     | 0           | 0         | 0                  | -    | 0             | 39    | 0     | 36      | 42                 | -    | 117           | 1086          |
| % Lights            | 95.4  | 99.6  | 100.0 | -                  | -    | 99.0          | -        | 99.0  | 95.0  | 100.0              | -    | 98.7          | -     | -           | -         | -                  | -    | -             | 100.0 | -     | 97.3    | 100.0              | -    | 99.2          | 98.9          |
| Other<br>Vehicles   | 3     | 2     | 0     | 0                  | -    | 5             | 0        | 4     | 2     | 0                  | -    | 6             | 0     | 0           | 0         | 0                  | -    | 0             | 0     | 0     | 1       | 0                  | -    | 1             | 12            |
| % Other<br>Vehicles | 4.6   | 0.4   | 0.0   | -                  | -    | 1.0           | -        | 1.0   | 5.0   | 0.0                | -    | 1.3           | -     | -           | -         | -                  | -    | -             | 0.0   | -     | 2.7     | 0.0                | -    | 0.8           | 1.1           |
| Bicycles on<br>Road | 0     | 0     | 0     | 0                  | -    | 0             | 0        | 0     | 0     | 0                  | -    | 0             | 0     | 0           | 0         | 0                  | -    | 0             | 0     | 0     | 0       | 0                  | -    | 0             | 0             |
| % Bicycles on Road  | 0.0   | 0.0   | 0.0   | -                  | -    | 0.0           | -        | 0.0   | 0.0   | 0.0                | -    | 0.0           | -     | -           | -         | -                  | -    | _             | 0.0   | -     | 0.0     | 0.0                | -    | 0.0           | 0.0           |
| Pedestrians         | -     | -     | -     | -                  | 0    | -             | -        | -     |       | -                  | 0    | -             | -     |             | _         | -                  | 0    | _             | -     |       |         | -                  | 0    | -             | -             |
| %<br>Pedestrians    | -     | -     | -     | -                  | -    | -             | -        | -     | -     | -                  | -    | -             | -     | -           | -         | -                  | -    | -             | -     | -     | -       | -                  | -    | -             | -             |



### Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Rock Raymond Road & Route 322 Site Code: Start Date: 12/16/2017 Page No: 4



Turning Movement Peak Hour Data Plot (11:00)



# Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Rock Raymond Road & Route 322 Site Code: Start Date: 12/16/2017 Page No: 5

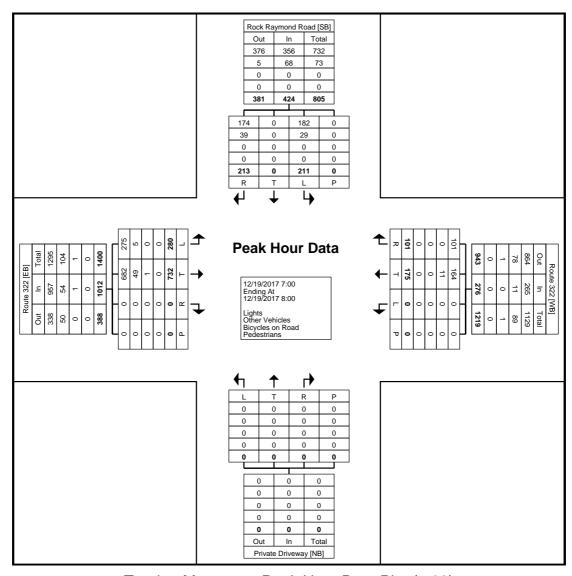
Turning Movement Peak Hour Data (7:00)

|                     |       |       |       |                    |      | •             | , w   | 9     |       | • • •              |      |               | ·     |       |           | .~ (               |      | ',            |       |       |         |                    |      |               |               |
|---------------------|-------|-------|-------|--------------------|------|---------------|-------|-------|-------|--------------------|------|---------------|-------|-------|-----------|--------------------|------|---------------|-------|-------|---------|--------------------|------|---------------|---------------|
|                     |       |       | Route | e 322              |      |               |       |       | Route | e 322              |      |               |       | F     | Private D | Drivewa            | ıy   |               |       | Ro    | ck Rayn | nond Ro            | oad  |               |               |
|                     |       |       | Eastb | ound               |      |               |       |       | West  | bound              |      |               |       |       | North     | oound              |      |               |       |       | South   | oound              |      |               |               |
| Start Time          | Left  | Thru  | Right | Right<br>on<br>Red | Peds | App.<br>Total | Left  | Thru  | Right | Right<br>on<br>Red | Peds | App.<br>Total | Left  | Thru  | Right     | Right<br>on<br>Red | Peds | App.<br>Total | Left  | Thru  | Right   | Right<br>on<br>Red | Peds | App.<br>Total | Int.<br>Total |
| 7:00                | 76    | 193   | 0     | 0                  | 0    | 269           | 0     | 40    | 28    | 1                  | 0    | 69            | 0     | 0     | 0         | 0                  | 0    | 0             | 56    | 0     | 14      | 34                 | 0    | 104           | 442           |
| 7:15                | 123   | 185   | 0     | 0                  | 0    | 308           | 0     | 28    | 32    | 7                  | 0    | 67            | 0     | 0     | 0         | 0                  | 0    | 0             | 64    | 0     | 22      | 31                 | 0    | 117           | 492           |
| 7:30                | 68    | 182   | 0     | 0                  | 0    | 250           | 0     | 57    | 21    | 3                  | 0    | 81            | 0     | 0     | 0         | 0                  | 0    | 0             | 73    | 0     | 47      | 41                 | 0    | 161           | 492           |
| 7:45                | 13    | 172   | 0     | 0                  | 0    | 185           | 0     | 50    | 9     | 0                  | 0    | 59            | 0     | 0     | 0         | 0                  | 0    | 0             | 18    | 0     | 4       | 20                 | 0    | 42            | 286           |
| Total               | 280   | 732   | 0     | 0                  | 0    | 1012          | 0     | 175   | 90    | 11                 | 0    | 276           | 0     | 0     | 0         | 0                  | 0    | 0             | 211   | 0     | 87      | 126                | 0    | 424           | 1712          |
| Approach %          | 27.7  | 72.3  | 0.0   | 0.0                | -    | -             | 0.0   | 63.4  | 32.6  | 4.0                | -    | -             | 0.0   | 0.0   | 0.0       | 0.0                | -    | -             | 49.8  | 0.0   | 20.5    | 29.7               | -    | -             | -             |
| Total %             | 16.4  | 42.8  | 0.0   | 0.0                | -    | 59.1          | 0.0   | 10.2  | 5.3   | 0.6                | -    | 16.1          | 0.0   | 0.0   | 0.0       | 0.0                | -    | 0.0           | 12.3  | 0.0   | 5.1     | 7.4                | -    | 24.8          | -             |
| PHF                 | 0.569 | 0.948 | 0.000 | 0.000              | -    | 0.821         | 0.000 | 0.768 | 0.703 | 0.393              | -    | 0.852         | 0.000 | 0.000 | 0.000     | 0.000              | -    | 0.000         | 0.723 | 0.000 | 0.463   | 0.768              | -    | 0.658         | 0.870         |
| Lights              | 275   | 682   | 0     | 0                  | -    | 957           | 0     | 164   | 90    | 11                 | -    | 265           | 0     | 0     | 0         | 0                  | -    | 0             | 182   | 0     | 68      | 106                | -    | 356           | 1578          |
| % Lights            | 98.2  | 93.2  | -     | -                  | -    | 94.6          | -     | 93.7  | 100.0 | 100.0              | -    | 96.0          | -     | -     | -         | -                  | -    | -             | 86.3  | -     | 78.2    | 84.1               | -    | 84.0          | 92.2          |
| Other<br>Vehicles   | 5     | 49    | 0     | 0                  | -    | 54            | 0     | 11    | 0     | 0                  | -    | 11            | 0     | 0     | 0         | 0                  | -    | 0             | 29    | 0     | 19      | 20                 | -    | 68            | 133           |
| % Other<br>Vehicles | 1.8   | 6.7   | -     | -                  | -    | 5.3           | -     | 6.3   | 0.0   | 0.0                | -    | 4.0           | -     | -     | -         | -                  | -    | -             | 13.7  | -     | 21.8    | 15.9               | -    | 16.0          | 7.8           |
| Bicycles on<br>Road | 0     | 1     | 0     | 0                  | -    | 1             | 0     | 0     | 0     | 0                  | -    | 0             | 0     | 0     | 0         | 0                  | -    | 0             | 0     | 0     | 0       | 0                  | -    | 0             | 1             |
| % Bicycles on Road  | 0.0   | 0.1   | -     | -                  | -    | 0.1           | -     | 0.0   | 0.0   | 0.0                | -    | 0.0           | -     | -     | _         | -                  | -    | -             | 0.0   | -     | 0.0     | 0.0                | -    | 0.0           | 0.1           |
| Pedestrians         | -     | -     | -     | -                  | 0    | -             | -     | -     | _     | -                  | 0    | -             | -     |       |           | -                  | 0    | _             | -     |       | -       | -                  | 0    | -             | -             |
| %<br>Pedestrians    | -     | -     | -     | -                  | -    | -             | -     | -     | -     | -                  | -    | -             | -     | -     | -         | -                  | -    | -             | -     | -     | -       | -                  | -    | -             | -             |



### Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Rock Raymond Road & Route 322 Site Code: Start Date: 12/16/2017 Page No: 6



Turning Movement Peak Hour Data Plot (7:00)



# Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Rock Raymond Road & Route 322 Site Code: Start Date: 12/16/2017 Page No: 7

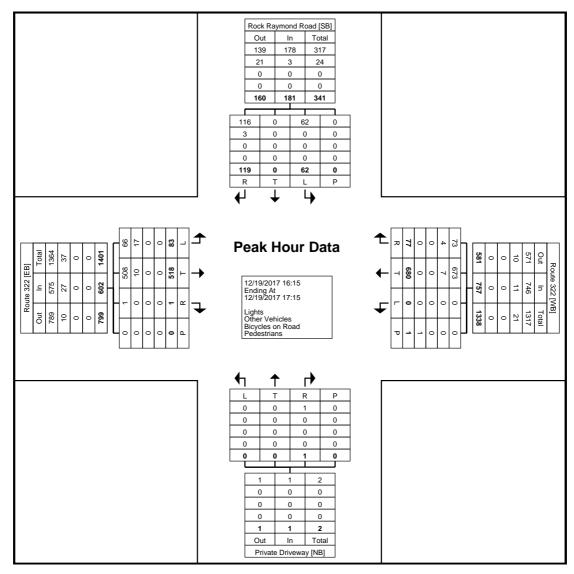
Turning Movement Peak Hour Data (16:15)

|                     |       |       | Route | e 322              |      |               |       | 3     | Rout  | e 322              |       |               |       | F     | Private I | Drivewa            | y    | - ,           |       | Ro    | ck Rayn | nond R             | oad  |               |               |
|---------------------|-------|-------|-------|--------------------|------|---------------|-------|-------|-------|--------------------|-------|---------------|-------|-------|-----------|--------------------|------|---------------|-------|-------|---------|--------------------|------|---------------|---------------|
|                     |       |       | Eastb | ound               |      |               |       |       | West  | bound              |       |               |       |       | North     | bound              |      |               |       |       | South   | bound              |      |               |               |
| Start Time          | Left  | Thru  | Right | Right<br>on<br>Red | Peds | App.<br>Total | Left  | Thru  | Right | Right<br>on<br>Red | Peds  | App.<br>Total | Left  | Thru  | Right     | Right<br>on<br>Red | Peds | App.<br>Total | Left  | Thru  | Right   | Right<br>on<br>Red | Peds | App.<br>Total | Int.<br>Total |
| 16:15               | 23    | 111   | 1     | 0                  | 0    | 135           | 0     | 167   | 21    | 0                  | 1     | 188           | 0     | 0     | 0         | 0                  | 0    | 0             | 11    | 0     | 14      | 17                 | 0    | 42            | 365           |
| 16:30               | 23    | 139   | 0     | 0                  | 0    | 162           | 0     | 169   | 22    | 2                  | 0     | 193           | 0     | 0     | 0         | 1                  | 0    | 1             | 16    | 0     | 20      | 14                 | 0    | 50            | 406           |
| 16:45               | 18    | 160   | 0     | 0                  | 0    | 178           | 0     | 165   | 13    | 0                  | 0     | 178           | 0     | 0     | 0         | 0                  | 0    | 0             | 17    | 0     | 9       | 12                 | 0    | 38            | 394           |
| 17:00               | 19    | 108   | 0     | 0                  | 0    | 127           | 0     | 179   | 19    | 0                  | 0     | 198           | 0     | 0     | 0         | 0                  | 0    | 0             | 18    | 0     | 15      | 18                 | 0    | 51            | 376           |
| Total               | 83    | 518   | 1     | 0                  | 0    | 602           | 0     | 680   | 75    | 2                  | 1     | 757           | 0     | 0     | 0         | 1                  | 0    | 1             | 62    | 0     | 58      | 61                 | 0    | 181           | 1541          |
| Approach %          | 13.8  | 86.0  | 0.2   | 0.0                | -    | -             | 0.0   | 89.8  | 9.9   | 0.3                | -     | -             | 0.0   | 0.0   | 0.0       | 100.0              | -    | -             | 34.3  | 0.0   | 32.0    | 33.7               | -    | -             |               |
| Total %             | 5.4   | 33.6  | 0.1   | 0.0                | -    | 39.1          | 0.0   | 44.1  | 4.9   | 0.1                | -     | 49.1          | 0.0   | 0.0   | 0.0       | 0.1                | -    | 0.1           | 4.0   | 0.0   | 3.8     | 4.0                | -    | 11.7          |               |
| PHF                 | 0.902 | 0.809 | 0.250 | 0.000              | -    | 0.846         | 0.000 | 0.950 | 0.852 | 0.250              | -     | 0.956         | 0.000 | 0.000 | 0.000     | 0.250              | -    | 0.250         | 0.861 | 0.000 | 0.725   | 0.847              | -    | 0.887         | 0.949         |
| Lights              | 66    | 508   | 1     | 0                  | -    | 575           | 0     | 673   | 71    | 2                  | -     | 746           | 0     | 0     | 0         | 1                  | -    | 1             | 62    | 0     | 55      | 61                 | -    | 178           | 1500          |
| % Lights            | 79.5  | 98.1  | 100.0 | -                  | -    | 95.5          | -     | 99.0  | 94.7  | 100.0              | -     | 98.5          | -     |       |           | 100.0              | -    | 100.0         | 100.0 |       | 94.8    | 100.0              | -    | 98.3          | 97.3          |
| Other<br>Vehicles   | 17    | 10    | 0     | 0                  | -    | 27            | 0     | 7     | 4     | 0                  | -     | 11            | 0     | 0     | 0         | 0                  | -    | 0             | 0     | 0     | 3       | 0                  | -    | 3             | 41            |
| % Other<br>Vehicles | 20.5  | 1.9   | 0.0   | -                  | -    | 4.5           | -     | 1.0   | 5.3   | 0.0                | -     | 1.5           | -     | -     | -         | 0.0                | -    | 0.0           | 0.0   | -     | 5.2     | 0.0                | -    | 1.7           | 2.7           |
| Bicycles on Road    | 0     | 0     | 0     | 0                  | -    | 0             | 0     | 0     | 0     | 0                  | -     | 0             | 0     | 0     | 0         | 0                  | -    | 0             | 0     | 0     | 0       | 0                  | -    | 0             | 0             |
| % Bicycles on Road  | 0.0   | 0.0   | 0.0   | -                  | -    | 0.0           | 1     | 0.0   | 0.0   | 0.0                | -     | 0.0           | -     | -     | -         | 0.0                | -    | 0.0           | 0.0   | -     | 0.0     | 0.0                | -    | 0.0           | 0.0           |
| Pedestrians         | -     | -     | _     | -                  | 0    |               | -     | -     |       | -                  | 1     | _             | -     | _     |           | -                  | 0    |               | -     |       |         | -                  | 0    | -             |               |
| %<br>Pedestrians    | -     | -     | -     | -                  | -    | -             | -     | -     | -     | -                  | 100.0 | -             | -     | -     | -         | -                  | -    | -             | -     | -     | -       | -                  | -    | -             | -             |



### Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Rock Raymond Road & Route 322 Site Code: Start Date: 12/16/2017 Page No: 8



Turning Movement Peak Hour Data Plot (16:15)



## Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Lloyd Avenue/Royal Farms Driveway & Route 322 Site Code: Start Date: 12/16/2017 Page No: 1

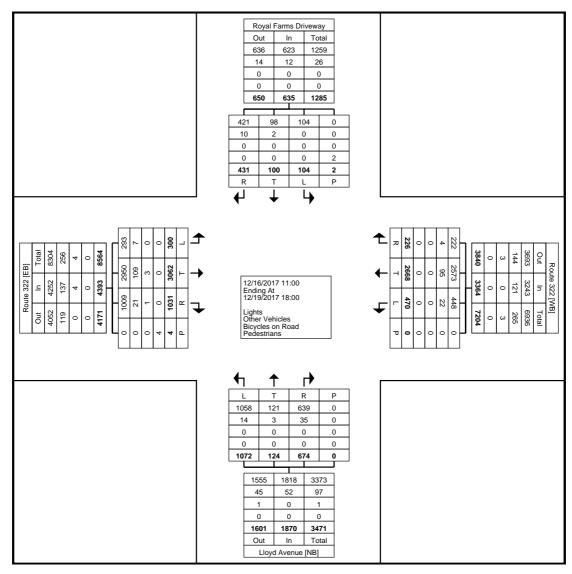
**Turning Movement Data** 

|                     | 1    |      | _     |                    |       |               | İ    |      |       |                    | y ivi | OVC           |      | יוו  | ala     |                    |      |               | ı     | _    |       |                    |       |               | l             |
|---------------------|------|------|-------|--------------------|-------|---------------|------|------|-------|--------------------|-------|---------------|------|------|---------|--------------------|------|---------------|-------|------|-------|--------------------|-------|---------------|---------------|
|                     |      |      | Route |                    |       |               |      |      | Route |                    |       |               |      |      | Lloyd A |                    |      |               |       | Roy  |       | s Drive            | way   |               |               |
|                     |      |      | Eastb | ound               |       |               |      |      | West  | oound              |       |               |      |      | North   | bound              |      |               |       |      | South | bound              |       |               |               |
| Start Time          | Left | Thru | Right | Right<br>on<br>Red | Peds  | App.<br>Total | Left | Thru | Right | Right<br>on<br>Red | Peds  | App.<br>Total | Left | Thru | Right   | Right<br>on<br>Red | Peds | App.<br>Total | Left  | Thru | Right | Right<br>on<br>Red | Peds  | App.<br>Total | Int.<br>Total |
| 11:00               | 18   | 121  | 35    | 14                 | 0     | 188           | 19   | 96   | 6     | 0                  | 0     | 121           | 43   | 8    | 8       | 8                  | 0    | 67            | 5     | 4    | 13    | 4                  | 0     | 26            | 402           |
| 11:15               | 15   | 107  | 32    | 11                 | 2     | 165           | 21   | 100  | 9     | 1                  | 0     | 131           | 48   | 7    | 5       | 10                 | 0    | 70            | 5     | 3    | 9     | 11                 | 0     | 28            | 394           |
| 11:30               | 9    | 111  | 31    | 12                 | 0     | 163           | 11   | 96   | 13    | 2                  | 0     | 122           | 39   | 3    | 5       | 5                  | 0    | 52            | 8     | 4    | 15    | 8                  | 0     | 35            | 372           |
| 11:45               | 14   | 102  | 40    | 21                 | 0     | 177           | 11   | 110  | 6     | 1                  | 0     | 128           | 48   | 4    | 6       | 6                  | 0    | 64            | 4     | 2    | 10    | 4                  | 0     | 20            | 389           |
| Hourly Total        | 56   | 441  | 138   | 58                 | 2     | 693           | 62   | 402  | 34    | 4                  | 0     | 502           | 178  | 22   | 24      | 29                 | 0    | 253           | 22    | 13   | 47    | 27                 | 0     | 109           | 1557          |
| 12:00               | 16   | 113  | 43    | 15                 | 0     | 187           | 18   | 100  | 12    | 2                  | 0     | 132           | 44   | 7    | 4       | 9                  | 0    | 64            | 2     | 6    | 8     | 13                 | 0     | 29            | 412           |
| 12:15               | 10   | 105  | 24    | 19                 | 0     | 158           | 15   | 105  | 5     | 6                  | 0     | 131           | 46   | 5    | 4       | 8                  | 0    | 63            | 5     | 8    | 13    | 10                 | 0     | 36            | 388           |
| 12:30               | 18   | 102  | 45    | 10                 | 0     | 175           | 11   | 98   | 9     | 1                  | 0     | 119           | 48   | 3    | 5       | 5                  | 0    | 61            | 5     | 5    | 5     | 8                  | 0     | 23            | 378           |
| 12:45               | 14   | 97   | 38    | 14                 | 0     | 163           | 11   | 97   | 7     | 4                  | 0     | 119           | 42   | 5    | 9       | 5                  | 0    | 61            | 10    | 4    | 15    | 9                  | 0     | 38            | 381           |
| Hourly Total        | 58   | 417  | 150   | 58                 | 0     | 683           | 55   | 400  | 33    | 13                 | 0     | 501           | 180  | 20   | 22      | 27                 | 0    | 249           | 22    | 23   | 41    | 40                 | 0     | 126           | 1559          |
| *** BREAK ***       | -    | -    |       | -                  | -     | -             | -    | -    | -     | -                  | -     | -             | -    | -    |         | -                  | -    | -             | -     | -    | -     | -                  | -     | -             | -             |
| 7:00                | 6    | 209  | 17    | 3                  | 0     | 235           | 12   | 77   | 2     | 1                  | 0     | 92            | 49   | 0    | 32      | 23                 | 0    | 104           | 3     | 0    | 5     | 7                  | 0     | 15            | 446           |
| 7:15                | 11   | 221  | 17    | 1                  | 2     | 250           | 16   | 65   | 2     | 0                  | 0     | 83            | 24   | 6    | 38      | 42                 | 0    | 110           | 2     | 2    | 4     | 4                  | 2     | 12            | 455           |
| 7:30                | 13   | 177  | 16    | 1                  | 0     | 207           | 34   | 105  | 5     | 2                  | 0     | 146           | 59   | 9    | 36      | 35                 | 0    | 139           | 7     | 5    | 6     | 12                 | 0     | 30            | 522           |
| 7:45                | 14   | 139  | 23    | 4                  | 0     | 180           | 12   | 53   | 3     | 3                  | 0     | 71            | 53   | 8    | 11      | 26                 | 0    | 98            | 5     | 4    | 11    | 11                 | 0     | 31            | 380           |
| Hourly Total        | 44   | 746  | 73    | 9                  | 2     | 872           | 74   | 300  | 12    | 6                  | 0     | 392           | 185  | 23   | 117     | 126                | 0    | 451           | 17    | 11   | 26    | 34                 | 2     | 88            | 1803          |
| 8:00                | 10   | 172  | 27    | 6                  | 0     | 215           | 17   | 92   | 9     | 1                  | 0     | 119           | 46   | 9    | 45      | 11                 | 0    | 111           | 4     | 4    | 10    | 5                  | 0     | 23            | 468           |
| 8:15                | 11   | 115  | 22    | 2                  | 0     | 150           | 23   | 84   | 5     | 3                  | 0     | 115           | 40   | 3    | 12      | 22                 | 0    | 77            | 3     | 2    | 6     | 15                 | 0     | 26            | 368           |
| 8:30                | 6    | 122  | 10    | 4                  | 0     | 142           | 16   | 67   | 3     | 1                  | 0     | 87            | 59   | 2    | 12      | 16                 | 0    | 89            | 7     | 2    | 6     | 5                  | 0     | 20            | 338           |
| 8:45                | 11   | 135  | 16    | 5                  | 0     | 167           | 16   | 89   | 4     | 0                  | 0     | 109           | 51   | 6    | 21      | 11                 | 0    | 89            | 5     | 3    | 4     | 3                  | 0     | 15            | 380           |
| Hourly Total        | 38   | 544  | 75    | 17                 | 0     | 674           | 72   | 332  | 21    | 5                  | 0     | 430           | 196  | 20   | 90      | 60                 | 0    | 366           | 19    | 11   | 26    | 28                 | 0     | 84            | 1554          |
| *** BREAK ***       | -    | -    | -     | -                  | -     | -             | -    | -    | -     | -                  | -     | -             | -    | -    | -       | -                  | -    | -             | -     | -    | -     | -                  | -     | -             | -             |
| 16:00               | 11   | 110  | 37    | 10                 | 0     | 168           | 25   | 149  | 7     | 5                  | 0     | 186           | 34   | 3    | 11      | 10                 | 0    | 58            | 5     | 3    | 2     | 20                 | 0     | 30            | 442           |
| 16:15               | 15   | 120  | 44    | 8                  | 0     | 187           | 22   | 158  | 9     | 6                  | 0     | 195           | 40   | 5    | 11      | 9                  | 0    | 65            | 2     | 3    | 15    | 8                  | 0     | 28            | 475           |
| 16:30               | 15   | 138  | 52    | 6                  | 0     | 211           | 34   | 157  | 6     | 8                  | 0     | 205           | 46   | 3    | 8       | 12                 | 0    | 69            | 1     | 5    | 17    | 8                  | 0     | 31            | 516           |
| 16:45               | 12   | 137  | 50    | 7                  | 0     | 206           | 28   | 157  | 2     | 2                  | 0     | 189           | 40   | 6    | 21      | 13                 | 0    | 80            | 5     | 8    | 12    | 5                  | 0     | 30            | 505           |
| Hourly Total        | 53   | 505  | 183   | 31                 | 0     | 772           | 109  | 621  | 24    | 21                 | 0     | 775           | 160  | 17   | 51      | 44                 | 0    | 272           | 13    | 19   | 46    | 41                 | 0     | 119           | 1938          |
| 17:00               | 15   | 101  | 61    | 7                  | 0     | 184           | 28   | 172  | 12    | 6                  | 0     | 218           | 34   | 6    | 11      | 17                 | 0    | 68            | 1     | 6    | 10    | 6                  | 0     | 23            | 493           |
| 17:15               | 11   | 101  | 52    | 6                  | 0     | 170           | 27   | 142  | 8     | 5                  | 0     | 182           | 39   | 7    | 14      | 5                  | 0    | 65            | 4     | 7    | 14    | 11                 | 0     | 36            | 453           |
| 17:30               | 13   | 101  | 48    | 10                 | 0     | 172           | 17   | 163  | 5     | 2                  | 0     | 187           | 53   | 5    | 6       | 10                 | 0    | 74            | 2     | 6    | 9     | 12                 | 0     | 29            | 462           |
| 17:45               | 12   | 106  | 47    | 8                  | 0     | 173           | 26   | 136  | 9     | 6                  | 0     | 177           | 47   | 4    | 10      | 11                 | 0    | 72            | 4     | 4    | 7     | 6                  | 0     | 21            | 443           |
| Hourly Total        | 51   | 409  | 208   | 31                 | 0     | 699           | 98   | 613  | 34    | 19                 | 0     | 764           | 173  | 22   | 41      | 43                 | 0    | 279           | 11    | 23   | 40    | 35                 | 0     | 109           | 1851          |
| Grand Total         | 300  | 3062 | 827   | 204                | 4     | 4393          | 470  | 2668 | 158   | 68                 | 0     | 3364          | 1072 | 124  | 345     | 329                | 0    | 1870          | 104   | 100  | 226   | 205                | 2     | 635           | 10262         |
| Approach %          | 6.8  | 69.7 | 18.8  | 4.6                | -     | -             | 14.0 | 79.3 | 4.7   | 2.0                | -     | -             | 57.3 | 6.6  | 18.4    | 17.6               | -    | -             | 16.4  | 15.7 | 35.6  | 32.3               | -     | -             | -             |
| Total %             | 2.9  | 29.8 | 8.1   | 2.0                | -     | 42.8          | 4.6  | 26.0 | 1.5   | 0.7                | -     | 32.8          | 10.4 | 1.2  | 3.4     | 3.2                | -    | 18.2          | 1.0   | 1.0  | 2.2   | 2.0                | -     | 6.2           | -             |
| Lights              | 293  | 2950 | 809   | 200                | -     | 4252          | 448  | 2573 | 155   | 67                 | -     | 3243          | 1058 | 121  | 324     | 315                | -    | 1818          | 104   | 98   | 219   | 202                | -     | 623           | 9936          |
| % Lights            | 97.7 | 96.3 | 97.8  | 98.0               | -     | 96.8          | 95.3 | 96.4 | 98.1  | 98.5               | -     | 96.4          | 98.7 | 97.6 | 93.9    | 95.7               | -    | 97.2          | 100.0 | 98.0 | 96.9  | 98.5               | -     | 98.1          | 96.8          |
| Other<br>Vehicles   | 7    | 109  | 18    | 3                  | -     | 137           | 22   | 95   | 3     | 1                  | -     | 121           | 14   | 3    | 21      | 14                 | -    | 52            | 0     | 2    | 7     | 3                  | -     | 12            | 322           |
| % Other<br>Vehicles | 2.3  | 3.6  | 2.2   | 1.5                | -     | 3.1           | 4.7  | 3.6  | 1.9   | 1.5                | -     | 3.6           | 1.3  | 2.4  | 6.1     | 4.3                | -    | 2.8           | 0.0   | 2.0  | 3.1   | 1.5                | -     | 1.9           | 3.1           |
| Bicycles on<br>Road | 0    | 3    | 0     | 1                  | -     | 4             | 0    | 0    | 0     | 0                  | -     | 0             | 0    | 0    | 0       | 0                  | -    | 0             | 0     | 0    | 0     | 0                  | -     | 0             | 4             |
| % Bicycles on Road  | 0.0  | 0.1  | 0.0   | 0.5                | -     | 0.1           | 0.0  | 0.0  | 0.0   | 0.0                | -     | 0.0           | 0.0  | 0.0  | 0.0     | 0.0                | -    | 0.0           | 0.0   | 0.0  | 0.0   | 0.0                | -     | 0.0           | 0.0           |
| Pedestrians         | -    |      |       | -                  | 4     | -             | -    |      |       | -                  | 0     | -             | -    | -    |         |                    | 0    |               | -     | -    | -     | -                  | 2     | -             | -             |
| %<br>Pedestrians    | -    | -    | -     | -                  | 100.0 | -             | -    | -    | -     | -                  | -     | -             | -    | -    | -       | -                  | -    | -             | -     | -    | -     | -                  | 100.0 | -             | -             |



### Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Lloyd Avenue/Royal Farms Driveway & Route 322 Site Code: Start Date: 12/16/2017 Page No: 2



**Turning Movement Data Plot** 



## Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Lloyd Avenue/Royal Farms Driveway & Route 322 Site Code: Start Date: 12/16/2017 Page No: 3

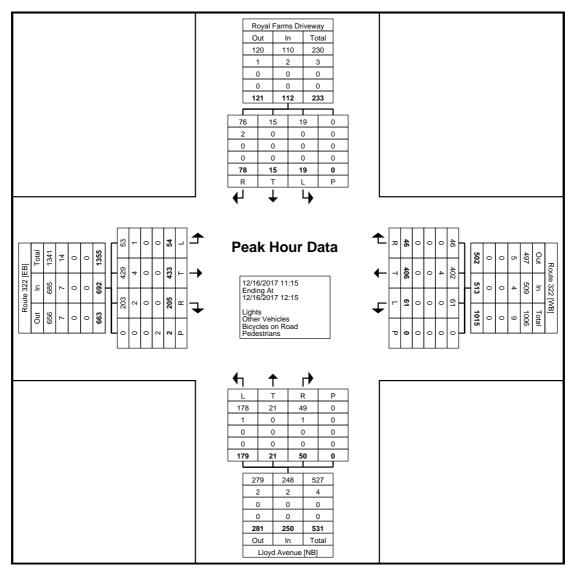
Turning Movement Peak Hour Data (11:15)

|                     | 1     |       |       |                    |       |               | I     | •     |       |                    |      |               | ĺ     |       |         | `                  |      | ,             | 1     |       |         |                    |      |               | 1             |
|---------------------|-------|-------|-------|--------------------|-------|---------------|-------|-------|-------|--------------------|------|---------------|-------|-------|---------|--------------------|------|---------------|-------|-------|---------|--------------------|------|---------------|---------------|
|                     |       |       | Route | e 322              |       |               |       |       | Rout  | e 322              |      |               |       |       | Lloyd A | Avenue             |      |               |       | Roy   | al Farm | s Drive            | way  |               |               |
|                     |       |       | Eastb | ound               |       |               |       |       | West  | bound              |      |               |       |       | North   | bound              |      |               |       |       | South   | oound              |      |               |               |
| Start Time          | Left  | Thru  | Right | Right<br>on<br>Red | Peds  | App.<br>Total | Left  | Thru  | Right | Right<br>on<br>Red | Peds | App.<br>Total | Left  | Thru  | Right   | Right<br>on<br>Red | Peds | App.<br>Total | Left  | Thru  | Right   | Right<br>on<br>Red | Peds | App.<br>Total | Int.<br>Total |
| 11:15               | 15    | 107   | 32    | 11                 | 2     | 165           | 21    | 100   | 9     | 1                  | 0    | 131           | 48    | 7     | 5       | 10                 | 0    | 70            | 5     | 3     | 9       | 11                 | 0    | 28            | 394           |
| 11:30               | 9     | 111   | 31    | 12                 | 0     | 163           | 11    | 96    | 13    | 2                  | 0    | 122           | 39    | 3     | 5       | 5                  | 0    | 52            | 8     | 4     | 15      | 8                  | 0    | 35            | 372           |
| 11:45               | 14    | 102   | 40    | 21                 | 0     | 177           | 11    | 110   | 6     | 1                  | 0    | 128           | 48    | 4     | 6       | 6                  | 0    | 64            | 4     | 2     | 10      | 4                  | 0    | 20            | 389           |
| 12:00               | 16    | 113   | 43    | 15                 | 0     | 187           | 18    | 100   | 12    | 2                  | 0    | 132           | 44    | 7     | 4       | 9                  | 0    | 64            | 2     | 6     | 8       | 13                 | 0    | 29            | 412           |
| Total               | 54    | 433   | 146   | 59                 | 2     | 692           | 61    | 406   | 40    | 6                  | 0    | 513           | 179   | 21    | 20      | 30                 | 0    | 250           | 19    | 15    | 42      | 36                 | 0    | 112           | 1567          |
| Approach %          | 7.8   | 62.6  | 21.1  | 8.5                | -     | -             | 11.9  | 79.1  | 7.8   | 1.2                | -    | -             | 71.6  | 8.4   | 8.0     | 12.0               | -    | -             | 17.0  | 13.4  | 37.5    | 32.1               | -    | -             | -             |
| Total %             | 3.4   | 27.6  | 9.3   | 3.8                | -     | 44.2          | 3.9   | 25.9  | 2.6   | 0.4                | -    | 32.7          | 11.4  | 1.3   | 1.3     | 1.9                | -    | 16.0          | 1.2   | 1.0   | 2.7     | 2.3                | -    | 7.1           | -             |
| PHF                 | 0.844 | 0.958 | 0.849 | 0.702              | -     | 0.925         | 0.726 | 0.923 | 0.769 | 0.750              | -    | 0.972         | 0.932 | 0.750 | 0.833   | 0.750              | -    | 0.893         | 0.594 | 0.625 | 0.700   | 0.692              | -    | 0.800         | 0.951         |
| Lights              | 53    | 429   | 144   | 59                 | -     | 685           | 61    | 402   | 40    | 6                  | -    | 509           | 178   | 21    | 20      | 29                 | -    | 248           | 19    | 15    | 40      | 36                 | -    | 110           | 1552          |
| % Lights            | 98.1  | 99.1  | 98.6  | 100.0              | -     | 99.0          | 100.0 | 99.0  | 100.0 | 100.0              | -    | 99.2          | 99.4  | 100.0 | 100.0   | 96.7               | -    | 99.2          | 100.0 | 100.0 | 95.2    | 100.0              | -    | 98.2          | 99.0          |
| Other<br>Vehicles   | 1     | 4     | 2     | 0                  | -     | 7             | 0     | 4     | 0     | 0                  | -    | 4             | 1     | 0     | 0       | 1                  | -    | 2             | 0     | 0     | 2       | 0                  | -    | 2             | 15            |
| % Other<br>Vehicles | 1.9   | 0.9   | 1.4   | 0.0                | -     | 1.0           | 0.0   | 1.0   | 0.0   | 0.0                | -    | 0.8           | 0.6   | 0.0   | 0.0     | 3.3                | -    | 0.8           | 0.0   | 0.0   | 4.8     | 0.0                | -    | 1.8           | 1.0           |
| Bicycles on Road    | 0     | 0     | 0     | 0                  | -     | 0             | 0     | 0     | 0     | 0                  | -    | 0             | 0     | 0     | 0       | 0                  | -    | 0             | 0     | 0     | 0       | 0                  | -    | 0             | 0             |
| % Bicycles on Road  | 0.0   | 0.0   | 0.0   | 0.0                | -     | 0.0           | 0.0   | 0.0   | 0.0   | 0.0                | -    | 0.0           | 0.0   | 0.0   | 0.0     | 0.0                | -    | 0.0           | 0.0   | 0.0   | 0.0     | 0.0                | -    | 0.0           | 0.0           |
| Pedestrians         | -     | -     | -     | -                  | 2     | -             | -     | -     | -     | -                  | 0    | -             | -     | -     | -       | -                  | 0    | -             | -     | -     | -       | -                  | 0    | -             | -             |
| %<br>Pedestrians    | -     | -     | -     | -                  | 100.0 | -             | -     | -     | -     | -                  | -    | -             | -     | -     | -       | -                  | -    | -             | -     | -     | -       | -                  | -    | -             | -             |



### Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Lloyd Avenue/Royal Farms Driveway & Route 322 Site Code: Start Date: 12/16/2017 Page No: 4



Turning Movement Peak Hour Data Plot (11:15)



## Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Lloyd Avenue/Royal Farms Driveway & Route 322 Site Code: Start Date: 12/16/2017 Page No: 5

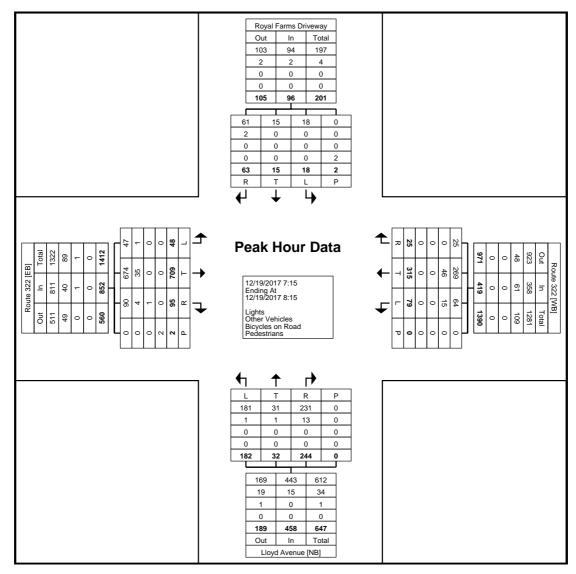
Turning Movement Peak Hour Data (7:15)

|                     | i .   |       |       |                    |       |               | 1     | 9     |       |                    |      |               | i     |       |         |                    |      | ,             | 1     |       |         |                    |       |               | 1             |
|---------------------|-------|-------|-------|--------------------|-------|---------------|-------|-------|-------|--------------------|------|---------------|-------|-------|---------|--------------------|------|---------------|-------|-------|---------|--------------------|-------|---------------|---------------|
|                     |       |       | Route | 322                |       |               |       |       | Route | e 322              |      |               |       |       | Lloyd / | Avenue             |      |               |       | Roy   | al Farm | s Drive            | way   |               | 1             |
|                     |       |       | Eastb | ound               |       |               |       |       | West  | bound              |      |               |       |       | North   | bound              |      |               |       |       | South   | bound              |       |               | 1             |
| Start Time          | Left  | Thru  | Right | Right<br>on<br>Red | Peds  | App.<br>Total | Left  | Thru  | Right | Right<br>on<br>Red | Peds | App.<br>Total | Left  | Thru  | Right   | Right<br>on<br>Red | Peds | App.<br>Total | Left  | Thru  | Right   | Right<br>on<br>Red | Peds  | App.<br>Total | Int.<br>Total |
| 7:15                | 11    | 221   | 17    | 1                  | 2     | 250           | 16    | 65    | 2     | 0                  | 0    | 83            | 24    | 6     | 38      | 42                 | 0    | 110           | 2     | 2     | 4       | 4                  | 2     | 12            | 455           |
| 7:30                | 13    | 177   | 16    | 1                  | 0     | 207           | 34    | 105   | 5     | 2                  | 0    | 146           | 59    | 9     | 36      | 35                 | 0    | 139           | 7     | 5     | 6       | 12                 | 0     | 30            | 522           |
| 7:45                | 14    | 139   | 23    | 4                  | 0     | 180           | 12    | 53    | 3     | 3                  | 0    | 71            | 53    | 8     | 11      | 26                 | 0    | 98            | 5     | 4     | 11      | 11                 | 0     | 31            | 380           |
| 8:00                | 10    | 172   | 27    | 6                  | 0     | 215           | 17    | 92    | 9     | 1                  | 0    | 119           | 46    | 9     | 45      | 11                 | 0    | 111           | 4     | 4     | 10      | 5                  | 0     | 23            | 468           |
| Total               | 48    | 709   | 83    | 12                 | 2     | 852           | 79    | 315   | 19    | 6                  | 0    | 419           | 182   | 32    | 130     | 114                | 0    | 458           | 18    | 15    | 31      | 32                 | 2     | 96            | 1825          |
| Approach %          | 5.6   | 83.2  | 9.7   | 1.4                | -     | -             | 18.9  | 75.2  | 4.5   | 1.4                | -    | -             | 39.7  | 7.0   | 28.4    | 24.9               | -    | -             | 18.8  | 15.6  | 32.3    | 33.3               | -     | -             | -             |
| Total %             | 2.6   | 38.8  | 4.5   | 0.7                | -     | 46.7          | 4.3   | 17.3  | 1.0   | 0.3                | -    | 23.0          | 10.0  | 1.8   | 7.1     | 6.2                | -    | 25.1          | 1.0   | 0.8   | 1.7     | 1.8                | -     | 5.3           | -             |
| PHF                 | 0.857 | 0.802 | 0.769 | 0.500              | -     | 0.852         | 0.581 | 0.750 | 0.528 | 0.500              | -    | 0.717         | 0.771 | 0.889 | 0.722   | 0.679              | -    | 0.824         | 0.643 | 0.750 | 0.705   | 0.667              | -     | 0.774         | 0.874         |
| Lights              | 47    | 674   | 79    | 11                 | -     | 811           | 64    | 269   | 19    | 6                  | -    | 358           | 181   | 31    | 123     | 108                | -    | 443           | 18    | 15    | 30      | 31                 | -     | 94            | 1706          |
| % Lights            | 97.9  | 95.1  | 95.2  | 91.7               | -     | 95.2          | 81.0  | 85.4  | 100.0 | 100.0              | -    | 85.4          | 99.5  | 96.9  | 94.6    | 94.7               | -    | 96.7          | 100.0 | 100.0 | 96.8    | 96.9               | -     | 97.9          | 93.5          |
| Other<br>Vehicles   | 1     | 35    | 4     | 0                  | -     | 40            | 15    | 46    | 0     | 0                  | -    | 61            | 1     | 1     | 7       | 6                  | -    | 15            | 0     | 0     | 1       | 1                  | -     | 2             | 118           |
| % Other<br>Vehicles | 2.1   | 4.9   | 4.8   | 0.0                | -     | 4.7           | 19.0  | 14.6  | 0.0   | 0.0                | -    | 14.6          | 0.5   | 3.1   | 5.4     | 5.3                | -    | 3.3           | 0.0   | 0.0   | 3.2     | 3.1                | -     | 2.1           | 6.5           |
| Bicycles on<br>Road | 0     | 0     | 0     | 1                  | -     | 1             | 0     | 0     | 0     | 0                  | -    | 0             | 0     | 0     | 0       | 0                  | -    | 0             | 0     | 0     | 0       | 0                  | -     | 0             | 1             |
| % Bicycles on Road  | 0.0   | 0.0   | 0.0   | 8.3                | -     | 0.1           | 0.0   | 0.0   | 0.0   | 0.0                | -    | 0.0           | 0.0   | 0.0   | 0.0     | 0.0                | -    | 0.0           | 0.0   | 0.0   | 0.0     | 0.0                | -     | 0.0           | 0.1           |
| Pedestrians         | -     | -     | -     | -                  | 2     | -             | -     | -     | -     | -                  | 0    | -             | -     | -     | -       | -                  | 0    | -             | -     | -     | -       | -                  | 2     | -             | -             |
| %<br>Pedestrians    | -     | -     | -     | -                  | 100.0 | -             | -     | -     | -     | -                  | -    | -             | -     | -     | -       | -                  | -    | -             | -     | -     | -       | -                  | 100.0 | -             | -             |



### Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Lloyd Avenue/Royal Farms Driveway & Route 322 Site Code: Start Date: 12/16/2017 Page No: 6



Turning Movement Peak Hour Data Plot (7:15)



## Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Lloyd Avenue/Royal Farms Driveway & Route 322 Site Code: Start Date: 12/16/2017 Page No: 7

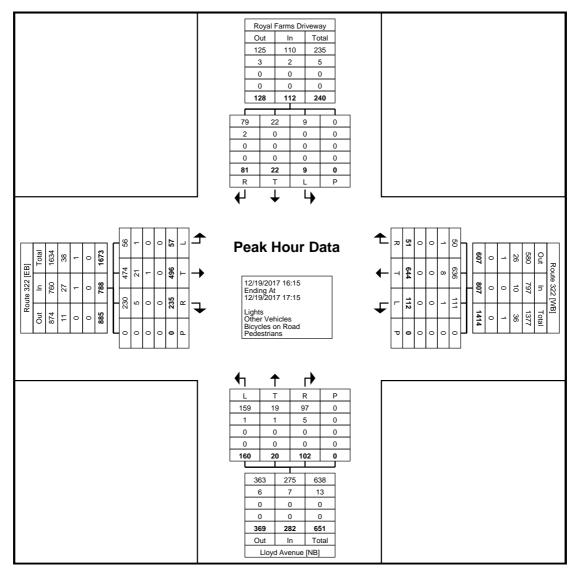
Turning Movement Peak Hour Data (16:15)

|                     | l .   |       |       |                    |      |               |       | 9     |       |                    |      |               | ı     |       |         | (                  |      | - /           | l     | _     |         |                    |      | 1             | 1             |
|---------------------|-------|-------|-------|--------------------|------|---------------|-------|-------|-------|--------------------|------|---------------|-------|-------|---------|--------------------|------|---------------|-------|-------|---------|--------------------|------|---------------|---------------|
|                     |       |       | Route | 322                |      |               |       |       | Rout  | e 322              |      |               |       |       | Lloyd A | Avenue             |      |               |       | Roy   | al Farm | is Drive           | way  |               |               |
|                     |       |       | Eastb | ound               |      |               |       |       | West  | bound              |      |               |       |       | North   | oound              |      |               |       |       | South   | bound              |      |               |               |
| Start Time          | Left  | Thru  | Right | Right<br>on<br>Red | Peds | App.<br>Total | Left  | Thru  | Right | Right<br>on<br>Red | Peds | App.<br>Total | Left  | Thru  | Right   | Right<br>on<br>Red | Peds | App.<br>Total | Left  | Thru  | Right   | Right<br>on<br>Red | Peds | App.<br>Total | Int.<br>Total |
| 16:15               | 15    | 120   | 44    | 8                  | 0    | 187           | 22    | 158   | 9     | 6                  | 0    | 195           | 40    | 5     | 11      | 9                  | 0    | 65            | 2     | 3     | 15      | 8                  | 0    | 28            | 475           |
| 16:30               | 15    | 138   | 52    | 6                  | 0    | 211           | 34    | 157   | 6     | 8                  | 0    | 205           | 46    | 3     | 8       | 12                 | 0    | 69            | 1     | 5     | 17      | 8                  | 0    | 31            | 516           |
| 16:45               | 12    | 137   | 50    | 7                  | 0    | 206           | 28    | 157   | 2     | 2                  | 0    | 189           | 40    | 6     | 21      | 13                 | 0    | 80            | 5     | 8     | 12      | 5                  | 0    | 30            | 505           |
| 17:00               | 15    | 101   | 61    | 7                  | 0    | 184           | 28    | 172   | 12    | 6                  | 0    | 218           | 34    | 6     | 11      | 17                 | 0    | 68            | 1     | 6     | 10      | 6                  | 0    | 23            | 493           |
| Total               | 57    | 496   | 207   | 28                 | 0    | 788           | 112   | 644   | 29    | 22                 | 0    | 807           | 160   | 20    | 51      | 51                 | 0    | 282           | 9     | 22    | 54      | 27                 | 0    | 112           | 1989          |
| Approach %          | 7.2   | 62.9  | 26.3  | 3.6                | -    | -             | 13.9  | 79.8  | 3.6   | 2.7                | -    | -             | 56.7  | 7.1   | 18.1    | 18.1               | -    | -             | 8.0   | 19.6  | 48.2    | 24.1               | -    | -             | -             |
| Total %             | 2.9   | 24.9  | 10.4  | 1.4                | -    | 39.6          | 5.6   | 32.4  | 1.5   | 1.1                | -    | 40.6          | 8.0   | 1.0   | 2.6     | 2.6                | -    | 14.2          | 0.5   | 1.1   | 2.7     | 1.4                | -    | 5.6           | -             |
| PHF                 | 0.950 | 0.899 | 0.848 | 0.875              | -    | 0.934         | 0.824 | 0.936 | 0.604 | 0.688              | -    | 0.925         | 0.870 | 0.833 | 0.607   | 0.750              | -    | 0.881         | 0.450 | 0.688 | 0.794   | 0.844              | -    | 0.903         | 0.964         |
| Lights              | 56    | 474   | 203   | 27                 | -    | 760           | 111   | 636   | 28    | 22                 | -    | 797           | 159   | 19    | 48      | 49                 | -    | 275           | 9     | 22    | 52      | 27                 | -    | 110           | 1942          |
| % Lights            | 98.2  | 95.6  | 98.1  | 96.4               | -    | 96.4          | 99.1  | 98.8  | 96.6  | 100.0              | -    | 98.8          | 99.4  | 95.0  | 94.1    | 96.1               | -    | 97.5          | 100.0 | 100.0 | 96.3    | 100.0              | -    | 98.2          | 97.6          |
| Other<br>Vehicles   | 1     | 21    | 4     | 1                  | -    | 27            | 1     | 8     | 1     | 0                  | -    | 10            | 1     | 1     | 3       | 2                  | -    | 7             | 0     | 0     | 2       | 0                  | -    | 2             | 46            |
| % Other<br>Vehicles | 1.8   | 4.2   | 1.9   | 3.6                | -    | 3.4           | 0.9   | 1.2   | 3.4   | 0.0                | -    | 1.2           | 0.6   | 5.0   | 5.9     | 3.9                | -    | 2.5           | 0.0   | 0.0   | 3.7     | 0.0                | -    | 1.8           | 2.3           |
| Bicycles on Road    | 0     | 1     | 0     | 0                  | -    | 1             | 0     | 0     | 0     | 0                  | -    | 0             | 0     | 0     | 0       | 0                  | -    | 0             | 0     | 0     | 0       | 0                  | -    | 0             | 1             |
| % Bicycles on Road  | 0.0   | 0.2   | 0.0   | 0.0                | -    | 0.1           | 0.0   | 0.0   | 0.0   | 0.0                | -    | 0.0           | 0.0   | 0.0   | 0.0     | 0.0                | -    | 0.0           | 0.0   | 0.0   | 0.0     | 0.0                | -    | 0.0           | 0.1           |
| Pedestrians         | -     | -     | -     | -                  | 0    | -             | -     | -     | -     | -                  | 0    | -             | -     | -     | -       | -                  | 0    | -             | -     | -     | -       | -                  | 0    | -             | _             |
| %<br>Pedestrians    | -     | -     | -     | -                  | -    | -             | -     | -     | -     | -                  | -    | -             | -     | -     | -       | -                  | -    | -             | -     | -     | -       | -                  | -    | -             | -             |



### Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Lloyd Avenue/Royal Farms Driveway & Route 322 Site Code: Start Date: 12/16/2017 Page No: 8



Turning Movement Peak Hour Data Plot (16:15)



# Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Route 30 Bypass EB Ramps& Route 322 Site Code: Start Date: 12/16/2017 Page No: 1

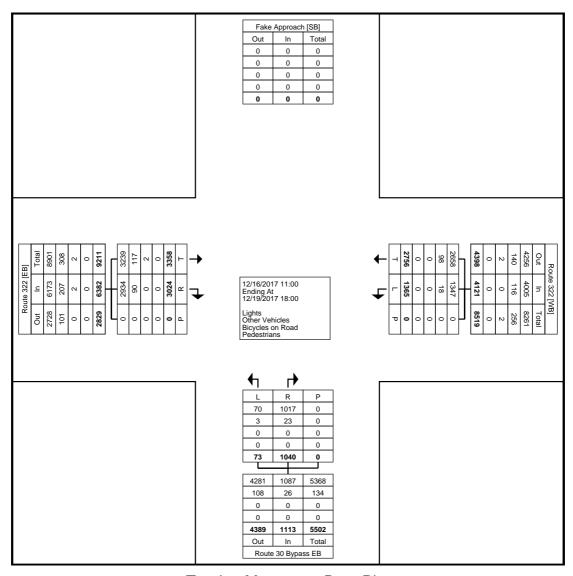
**Turning Movement Data** 

|   | 1    |       |       | ΙŲ         | iming i | wovem | ient D | aเa        |      |               |            |            |            |
|---|------|-------|-------|------------|---------|-------|--------|------------|------|---------------|------------|------------|------------|
|   |      | Route | e 322 |            |         | Route | e 322  |            | F    | Route 30 Bypa | ass EB Ram | ips        |            |
| Start Time                              |      | Eastb | ound  |            |         | Westh | oound  |            |      | North         | bound      |            |            |
| Start Time                              | Thru | Right | Peds  | App. Total | Left    | Thru  | Peds   | App. Total | Left | Right         | Peds       | App. Total | Int. Total |
| 11:00                                   | 134  | 123   | 0     | 257        | 48      | 107   | 0      | 155        | 2    | 47            | 0          | 49         | 461        |
| 11:15                                   | 136  | 135   | 0     | 271        | 59      | 105   | 0      | 164        | 7    | 40            | 0          | 47         | 482        |
| 11:30                                   | 120  | 139   | 0     | 259        | 62      | 98    | 0      | 160        | 5    | 40            | 0          | 45         | 464        |
| 11:45                                   | 130  | 146   | 0     | 276        | 54      | 117   | 0      | 171        | 6    | 46            | 0          | 52         | 499        |
| Hourly Total                            | 520  | 543   | 0     | 1063       | 223     | 427   | 0      | 650        | 20   | 173           | 0          | 193        | 1906       |
| 12:00                                   | 134  | 113   | 0     | 247        | 57      | 95    | 0      | 152        | 2    | 53            | 0          | 55         | 454        |
| 12:15                                   | 131  | 148   | 0     | 279        | 51      | 125   | 0      | 176        | 2    | 31            | 0          | 33         | 488        |
| 12:30                                   | 126  | 124   | 0     | 250        | 55      | 106   | 0      | 161        | 3    | 46            | 0          | 49         | 460        |
| 12:45                                   | 129  | 134   | 0     | 263        | 47      | 98    | 0      | 145        | 5    | 40            | 0          | 45         | 453        |
| Hourly Total                            | 520  | 519   | 0     | 1039       | 210     | 424   | 0      | 634        | 12   | 170           | 0          | 182        | 1855       |
| *** BREAK ***                           | -    | -     | -     | -          | -       | -     | -      | -          | -    | -             | -          | -          | -          |
| 7:00                                    | 184  | 138   | 0     | 322        | 77      | 54    | 0      | 131        | 1    | 42            | 0          | 43         | 496        |
| 7:15                                    | 202  | 116   | 0     | 318        | 49      | 53    | 0      | 102        | 1    | 49            | 0          | 50         | 470        |
| 7:30                                    | 181  | 163   | 0     | 344        | 73      | 90    | 0      | 163        | 3    | 35            | 0          | 38         | 545        |
| 7:45                                    | 143  | 170   | 0     | 313        | 74      | 58    | 0      | 132        | 5    | 34            | 0          | 39         | 484        |
| Hourly Total                            | 710  | 587   | 0     | 1297       | 273     | 255   | 0      | 528        | 10   | 160           | 0          | 170        | 1995       |
| 8:00                                    | 177  | 143   | 0     | 320        | 66      | 98    | 0      | 164        | 2    | 48            | 0          | 50         | 534        |
| 8:15                                    | 108  | 132   | 0     | 240        | 67      | 76    | 0      | 143        | 3    | 44            | 0          | 47         | 430        |
| 8:30                                    | 105  | 164   | 0     | 269        | 75      | 67    | 0      | 142        | 4    | 38            | 0          | 42         | 453        |
| 8:45                                    | 119  | 163   | 0     | 282        | 62      | 79    | 0      | 141        | 1    | 48            | 0          | 49         | 472        |
| Hourly Total                            | 509  | 602   | 0     | 1111       | 270     | 320   | 0      | 590        | 10   | 178           | 0          | 188        | 1889       |
| *** BREAK ***                           | -    | -     | -     | -          | -       | -     | -      | -          | -    | -             | -          | -          | -          |
| 16:00                                   | 117  | 78    | 0     | 195        | 52      | 142   | 0      | 194        | 2    | 49            | 0          | 51         | 440        |
| 16:15                                   | 129  | 93    | 0     | 222        | 53      | 183   | 0      | 236        | 0    | 47            | 0          | 47         | 505        |
| 16:30                                   | 159  | 132   | 0     | 291        | 42      | 180   | 0      | 222        | 3    | 55            | 0          | 58         | 571        |
| 16:45                                   | 149  | 80    | 0     | 229        | 51      | 164   | 0      | 215        | 3    | 51            | 0          | 54         | 498        |
| Hourly Total                            | 554  | 383   | 0     | 937        | 198     | 669   | 0      | 867        | 8    | 202           | 0          | 210        | 2014       |
| 17:00                                   | 134  | 85    | 0     | 219        | 42      | 177   | 0      | 219        | 2    | 47            | 0          | 49         | 487        |
| 17:15                                   | 150  | 94    | 0     | 244        | 52      | 158   | 0      | 210        | 4    | 36            | 0          | 40         | 494        |
| 17:30                                   | 124  | 106   | 0     | 230        | 55      | 188   | 0      | 243        | 6    | 36            | 0          | 42         | 515        |
| 17:45                                   | 137  | 105   | 0     | 242        | 42      | 138   | 0      | 180        | 1    | 38            | 0          | 39         | 461        |
| Hourly Total                            | 545  | 390   | 0     | 935        | 191     | 661   | 0      | 852        | 13   | 157           | 0          | 170        | 1957       |
| Grand Total                             | 3358 | 3024  | 0     | 6382       | 1365    | 2756  | 0      | 4121       | 73   | 1040          | 0          | 1113       | 11616      |
| Approach %                              | 52.6 | 47.4  | -     | -          | 33.1    | 66.9  | -      | -          | 6.6  | 93.4          | -          |            | -          |
| Total %                                 | 28.9 | 26.0  | -     | 54.9       | 11.8    | 23.7  | -      | 35.5       | 0.6  | 9.0           | -          | 9.6        | -          |
| Lights                                  | 3239 | 2934  | _     | 6173       | 1347    | 2658  | _      | 4005       | 70   | 1017          | _          | 1087       | 11265      |
| % Lights                                | 96.5 | 97.0  | -     | 96.7       | 98.7    | 96.4  | -      | 97.2       | 95.9 | 97.8          | -          | 97.7       | 97.0       |
| Other Vehicles                          | 117  | 90    | -     | 207        | 18      | 98    | -      | 116        | 3    | 23            | -          | 26         | 349        |
| % Other Vehicles                        | 3.5  | 3.0   | -     | 3.2        | 1.3     | 3.6   | -      | 2.8        | 4.1  | 2.2           |            | 2.3        | 3.0        |
| Bicycles on Road                        | 2    | 0     | -     | 2          | 0       | 0     | -      | 0          | 0    | 0             | -          | 0          | 2          |
| % Bicycles on Road                      | 0.1  | 0.0   | -     | 0.0        | 0.0     | 0.0   | -      | 0.0        | 0.0  | 0.0           | -          | 0.0        | 0.0        |
| Pedestrians                             | -    |       | 0     |            | -       | -     | 0      | -          | -    | -             | 0          | -          | -          |
| % Pedestrians                           | -    | -     | -     | -          | -       | -     | -      | -          | -    |               | -          | -          |            |
| ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, |      |       |       |            |         |       |        |            |      | -             | -          |            |            |



### Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Route 30 Bypass EB Ramps& Route 322 Site Code: Start Date: 12/16/2017 Page No: 2



**Turning Movement Data Plot** 



## Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Route 30 Bypass EB Ramps& Route 322 Site Code: Start Date: 12/16/2017 Page No: 3

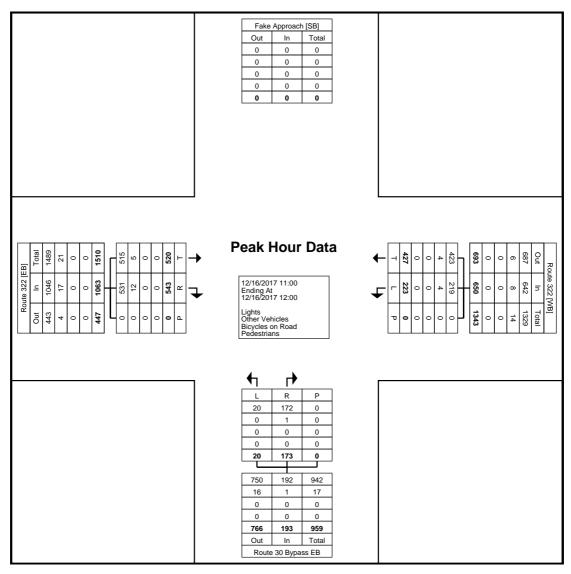
Turning Movement Peak Hour Data (11:00)

|                    |       |       |       |            |       |       |       | ١.         | ,     |               |            |            |            |
|--------------------|-------|-------|-------|------------|-------|-------|-------|------------|-------|---------------|------------|------------|------------|
|                    |       | Route | e 322 |            |       | Route | e 322 |            | F     | Route 30 Bypa | ass EB Ram | ips        |            |
| Start Time         |       | Eastb | ound  |            |       | West  | oound |            |       | North         | bound      |            |            |
| Start Time         | Thru  | Right | Peds  | App. Total | Left  | Thru  | Peds  | App. Total | Left  | Right         | Peds       | App. Total | Int. Total |
| 11:00              | 134   | 123   | 0     | 257        | 48    | 107   | 0     | 155        | 2     | 47            | 0          | 49         | 461        |
| 11:15              | 136   | 135   | 0     | 271        | 59    | 105   | 0     | 164        | 7     | 40            | 0          | 47         | 482        |
| 11:30              | 120   | 139   | 0     | 259        | 62    | 98    | 0     | 160        | 5     | 40            | 0          | 45         | 464        |
| 11:45              | 130   | 146   | 0     | 276        | 54    | 117   | 0     | 171        | 6     | 46            | 0          | 52         | 499        |
| Total              | 520   | 543   | 0     | 1063       | 223   | 427   | 0     | 650        | 20    | 173           | 0          | 193        | 1906       |
| Approach %         | 48.9  | 51.1  | -     | -          | 34.3  | 65.7  | -     | -          | 10.4  | 89.6          | -          | -          | -          |
| Total %            | 27.3  | 28.5  | -     | 55.8       | 11.7  | 22.4  | -     | 34.1       | 1.0   | 9.1           | -          | 10.1       | -          |
| PHF                | 0.956 | 0.930 | -     | 0.963      | 0.899 | 0.912 | -     | 0.950      | 0.714 | 0.920         | -          | 0.928      | 0.955      |
| Lights             | 515   | 531   | -     | 1046       | 219   | 423   | -     | 642        | 20    | 172           | -          | 192        | 1880       |
| % Lights           | 99.0  | 97.8  | -     | 98.4       | 98.2  | 99.1  | -     | 98.8       | 100.0 | 99.4          | -          | 99.5       | 98.6       |
| Other Vehicles     | 5     | 12    | -     | 17         | 4     | 4     | -     | 8          | 0     | 1             | -          | 1          | 26         |
| % Other Vehicles   | 1.0   | 2.2   | -     | 1.6        | 1.8   | 0.9   | -     | 1.2        | 0.0   | 0.6           | -          | 0.5        | 1.4        |
| Bicycles on Road   | 0     | 0     | -     | 0          | 0     | 0     | -     | 0          | 0     | 0             | -          | 0          | 0          |
| % Bicycles on Road | 0.0   | 0.0   | -     | 0.0        | 0.0   | 0.0   | -     | 0.0        | 0.0   | 0.0           | -          | 0.0        | 0.0        |
| Pedestrians        | -     | -     | 0     | -          | -     | -     | 0     | -          | -     | -             | 0          | -          | -          |
| % Pedestrians      | -     | -     | -     | -          | -     | -     | -     | -          | -     | -             | -          | -          | -          |



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Count Name: Route 30 Bypass EB Ramps& Route 322 Site Code: Start Date: 12/16/2017 Page No: 4



Turning Movement Peak Hour Data Plot (11:00)



### Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Route 30 Bypass EB Ramps& Route 322 Site Code: Start Date: 12/16/2017 Page No: 5

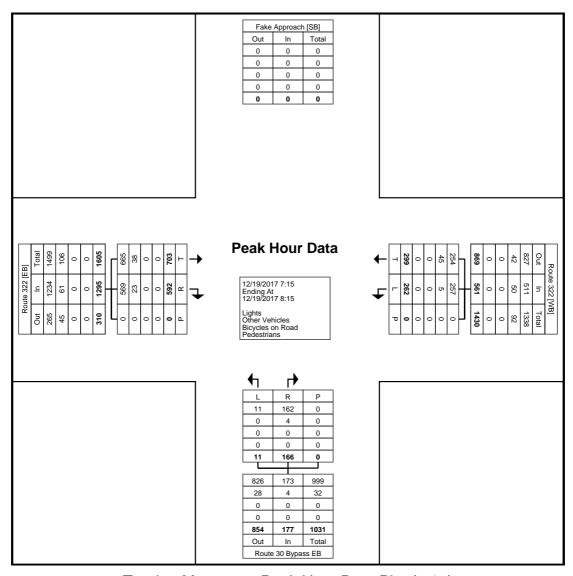
Turning Movement Peak Hour Data (7:15)

|                    | •     |       |       |            |       |       |       | ١,         | ,     |               |            |            |            |
|--------------------|-------|-------|-------|------------|-------|-------|-------|------------|-------|---------------|------------|------------|------------|
|                    |       | Route | e 322 |            |       | Route | 322   |            | F     | Route 30 Bypa | ass EB Ram | ps         |            |
| Start Time         |       | Eastb | ound  |            |       | West  | oound |            |       | North         | oound      |            |            |
| Start Time         | Thru  | Right | Peds  | App. Total | Left  | Thru  | Peds  | App. Total | Left  | Right         | Peds       | App. Total | Int. Total |
| 7:15               | 202   | 116   | 0     | 318        | 49    | 53    | 0     | 102        | 1     | 49            | 0          | 50         | 470        |
| 7:30               | 181   | 163   | 0     | 344        | 73    | 90    | 0     | 163        | 3     | 35            | 0          | 38         | 545        |
| 7:45               | 143   | 170   | 0     | 313        | 74    | 58    | 0     | 132        | 5     | 34            | 0          | 39         | 484        |
| 8:00               | 177   | 143   | 0     | 320        | 66    | 98    | 0     | 164        | 2     | 48            | 0          | 50         | 534        |
| Total              | 703   | 592   | 0     | 1295       | 262   | 299   | 0     | 561        | 11    | 166           | 0          | 177        | 2033       |
| Approach %         | 54.3  | 45.7  | -     | -          | 46.7  | 53.3  | -     | -          | 6.2   | 93.8          | -          | -          | -          |
| Total %            | 34.6  | 29.1  | -     | 63.7       | 12.9  | 14.7  | -     | 27.6       | 0.5   | 8.2           | -          | 8.7        | -          |
| PHF                | 0.870 | 0.871 | -     | 0.941      | 0.885 | 0.763 | -     | 0.855      | 0.550 | 0.847         | -          | 0.885      | 0.933      |
| Lights             | 665   | 569   | -     | 1234       | 257   | 254   | -     | 511        | 11    | 162           | -          | 173        | 1918       |
| % Lights           | 94.6  | 96.1  | -     | 95.3       | 98.1  | 84.9  | -     | 91.1       | 100.0 | 97.6          | -          | 97.7       | 94.3       |
| Other Vehicles     | 38    | 23    | -     | 61         | 5     | 45    | -     | 50         | 0     | 4             | -          | 4          | 115        |
| % Other Vehicles   | 5.4   | 3.9   | -     | 4.7        | 1.9   | 15.1  | -     | 8.9        | 0.0   | 2.4           | -          | 2.3        | 5.7        |
| Bicycles on Road   | 0     | 0     | -     | 0          | 0     | 0     | -     | 0          | 0     | 0             | -          | 0          | 0          |
| % Bicycles on Road | 0.0   | 0.0   | -     | 0.0        | 0.0   | 0.0   | -     | 0.0        | 0.0   | 0.0           | -          | 0.0        | 0.0        |
| Pedestrians        | -     | -     | 0     | -          | -     | -     | 0     | -          | -     | -             | 0          | -          | -          |
| % Pedestrians      | -     | -     | -     | -          | -     | -     | -     | -          | -     | -             | -          | -          | -          |



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Count Name: Route 30 Bypass EB Ramps& Route 322 Site Code: Start Date: 12/16/2017 Page No: 6



Turning Movement Peak Hour Data Plot (7:15)



### Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 mbressler@trafficpd.com

Count Name: Route 30 Bypass EB Ramps& Route 322 Site Code: Start Date: 12/16/2017 Page No: 7

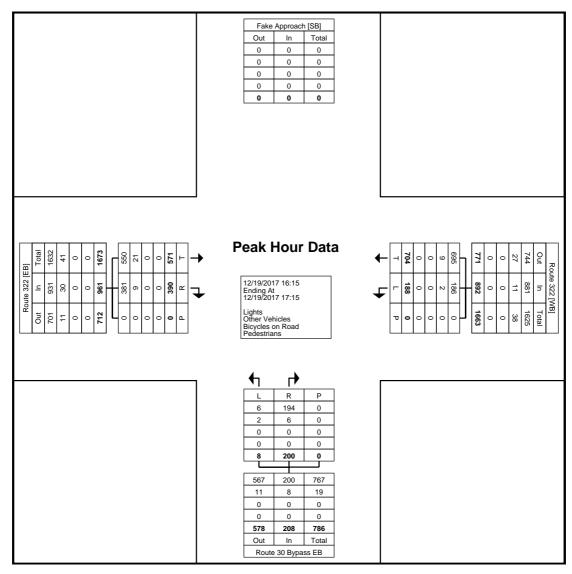
Turning Movement Peak Hour Data (16:15)

|                    |       |       |       |            |       |       |       | ١,         | ,     |               |           |            |            |
|--------------------|-------|-------|-------|------------|-------|-------|-------|------------|-------|---------------|-----------|------------|------------|
|                    |       | Route | e 322 |            |       | Route | 322   |            | F     | Route 30 Bypa | ss EB Ram | ips        |            |
| Start Time         |       | Easth | ound  |            |       | West  | oound |            |       | North         | oound     |            |            |
| Start Time         | Thru  | Right | Peds  | App. Total | Left  | Thru  | Peds  | App. Total | Left  | Right         | Peds      | App. Total | Int. Total |
| 16:15              | 129   | 93    | 0     | 222        | 53    | 183   | 0     | 236        | 0     | 47            | 0         | 47         | 505        |
| 16:30              | 159   | 132   | 0     | 291        | 42    | 180   | 0     | 222        | 3     | 55            | 0         | 58         | 571        |
| 16:45              | 149   | 80    | 0     | 229        | 51    | 164   | 0     | 215        | 3     | 51            | 0         | 54         | 498        |
| 17:00              | 134   | 85    | 0     | 219        | 42    | 177   | 0     | 219        | 2     | 47            | 0         | 49         | 487        |
| Total              | 571   | 390   | 0     | 961        | 188   | 704   | 0     | 892        | 8     | 200           | 0         | 208        | 2061       |
| Approach %         | 59.4  | 40.6  | -     | -          | 21.1  | 78.9  | -     | -          | 3.8   | 96.2          | -         | -          | -          |
| Total %            | 27.7  | 18.9  | -     | 46.6       | 9.1   | 34.2  | -     | 43.3       | 0.4   | 9.7           | -         | 10.1       | -          |
| PHF                | 0.898 | 0.739 | -     | 0.826      | 0.887 | 0.962 | -     | 0.945      | 0.667 | 0.909         | -         | 0.897      | 0.902      |
| Lights             | 550   | 381   | -     | 931        | 186   | 695   | -     | 881        | 6     | 194           | -         | 200        | 2012       |
| % Lights           | 96.3  | 97.7  | -     | 96.9       | 98.9  | 98.7  | -     | 98.8       | 75.0  | 97.0          | -         | 96.2       | 97.6       |
| Other Vehicles     | 21    | 9     | -     | 30         | 2     | 9     | -     | 11         | 2     | 6             | -         | 8          | 49         |
| % Other Vehicles   | 3.7   | 2.3   | -     | 3.1        | 1.1   | 1.3   | -     | 1.2        | 25.0  | 3.0           | -         | 3.8        | 2.4        |
| Bicycles on Road   | 0     | 0     | -     | 0          | 0     | 0     | -     | 0          | 0     | 0             | -         | 0          | 0          |
| % Bicycles on Road | 0.0   | 0.0   | -     | 0.0        | 0.0   | 0.0   | -     | 0.0        | 0.0   | 0.0           | -         | 0.0        | 0.0        |
| Pedestrians        | -     | -     | 0     | -          | -     | -     | 0     | -          | -     | -             | 0         | -          | -          |
| % Pedestrians      | -     | -     | -     | -          | -     | -     | -     | -          | -     | -             | -         | -          | -          |



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Count Name: Route 30 Bypass EB Ramps& Route 322 Site Code: Start Date: 12/16/2017 Page No: 8



Turning Movement Peak Hour Data Plot (16:15)



## Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 jhudak@trafficpd.com

Count Name: Park and Ride Driveways & Lloyd Avenue Site Code: Start Date: 12/16/2017 Page No: 1

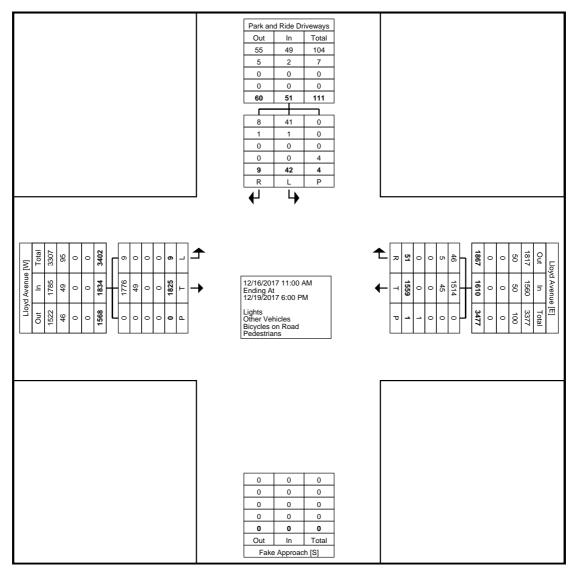
**Turning Movement Data** 

|                    |       |         |        | ΙŲ         | iiiiiiig i | MOVELL |        | ala        | 1    |              |              |            | 1          |
|--------------------|-------|---------|--------|------------|------------|--------|--------|------------|------|--------------|--------------|------------|------------|
|                    |       | Lloyd A | Avenue |            |            | Lloyd  | Avenue |            |      | Park and Ric | de Driveways | s          |            |
|                    |       | Eastb   | ound   |            |            | West   | tbound |            |      | South        | bound        |            |            |
| Start Time         | Left  | Thru    | Peds   | App. Total | Thru       | Right  | Peds   | App. Total | Left | Right        | Peds         | App. Total | Int. Total |
| 11:00 AM           | 0     | 71      | 0      | 71         | 67         | 2      | 0      | 69         | 2    | 0            | 0            | 2          | 142        |
| 11:15 AM           | 0     | 70      | 0      | 70         | 72         | 0      | 0      | 72         | 1    | 0            | 0            | 1          | 143        |
| 11:30 AM           | 0     | 52      | 0      | 52         | 56         | 1      | 0      | 57         | 0    | 0            | 0            | 0          | 109        |
| 11:45 AM           | 1     | 63      | 0      | 64         | 70         | 1      | 0      | 71         | 2    | 0            | 0            | 2          | 137        |
| Hourly Total       | 1     | 256     | 0      | 257        | 265        | 4      | 0      | 269        | 5    | 0            | 0            | 5          | 531        |
| 12:00 PM           | 1     | 59      | 0      | 60         | 75         | 2      | 0      | 77         | 0    | 0            | 0            | 0          | 137        |
| 12:15 PM           | 0     | 65      | 0      | 65         | 74         | 0      | 0      | 74         | 2    | 0            | 0            | 2          | 141        |
| 12:30 PM           | 0     | 61      | 0      | 61         | 71         | 1      | 0      | 72         | 0    | 1            | 0            | 1          | 134        |
| 12:45 PM           | 1     | 55      | 0      | 56         | 70         | 2      | 0      | 72         | 1    | 0            | 0            | 1          | 129        |
| Hourly Total       | 2     | 240     | 0      | 242        | 290        | 5      | 0      | 295        | 3    | 1            | 0            | 4          | 541        |
| *** BREAK ***      | -     | -       | -      | -          | •          | -      | -      | -          | 1    |              | -            | -          | -          |
| 7:00 AM            | 1     | 109     | 0      | 110        | 31         | 2      | 0      | 33         | 1    | 0            | 0            | 1          | 144        |
| 7:15 AM            | 0     | 106     | 0      | 106        | 34         | 2      | 0      | 36         | 2    | 0            | 2            | 2          | 144        |
| 7:30 AM            | 2     | 137     | 0      | 139        | 55         | 3      | 0      | 58         | 2    | 0            | 0            | 2          | 199        |
| 7:45 AM            | 0     | 85      | 0      | 85         | 34         | 6      | 0      | 40         | 2    | 0            | 0            | 2          | 127        |
| Hourly Total       | 3     | 437     | 0      | 440        | 154        | 13     | 0      | 167        | 7    | 0            | 2            | 7          | 614        |
| 8:00 AM            | 0     | 111     | 0      | 111        | 50         | 7      | 0      | 57         | 5    | 1            | 0            | 6          | 174        |
| 8:15 AM            | 0     | 78      | 0      | 78         | 43         | 4      | 0      | 47         | 3    | 1            | 0            | 4          | 129        |
| 8:30 AM            | 0     | 91      | 0      | 91         | 32         | 0      | 0      | 32         | 0    | 0            | 0            | 0          | 123        |
| 8:45 AM            | 1     | 88      | 0      | 89         | 39         | 1      | 0      | 40         | 1    | 1            | 0            | 2          | 131        |
| Hourly Total       | 1     | 368     | 0      | 369        | 164        | 12     | 0      | 176        | 9    | 3            | 0            | 12         | 557        |
| *** BREAK ***      | -     | -       | -      | -          | -          | -      | -      | -          | -    | -            | -            | -          | -          |
| 4:00 PM            | 0     | 53      | 0      | 53         | 76         | 3      | 0      | 79         | 5    | 0            | 0            | 5          | 137        |
| 4:15 PM            | 0     | 65      | 0      | 65         | 71         | 2      | 0      | 73         | 1    | 1            | 0            | 2          | 140        |
| 4:30 PM            | 1     | 65      | 0      | 66         | 96         | 2      | 1      | 98         | 5    | 0            | 2            | 5          | 169        |
| 4:45 PM            | 0     | 80      | 0      | 80         | 95         | 2      | 0      | 97         | 2    | 1            | 0            | 3          | 180        |
| Hourly Total       | 1     | 263     | 0      | 264        | 338        | 9      | 1      | 347        | 13   | 2            | 2            | 15         | 626        |
| 5:00 PM            | 0     | 65      | 0      | 65         | 89         | 2      | 0      | 91         | 0    | 2            | 0            | 2          | 158        |
| 5:15 PM            | 0     | 69      | 0      | 69         | 98         | 1      | 0      | 99         | 0    | 0            | 0            | 0          | 168        |
| 5:30 PM            | 1     | 69      | 0      | 70         | 76         | 2      | 0      | 78         | 3    | 1            | 0            | 4          | 152        |
| 5:45 PM            | 0     | 58      | 0      | 58         | 85         | 3      | 0      | 88         | 2    | 0            | 0            | 2          | 148        |
| Hourly Total       | 1     | 261     | 0      | 262        | 348        | 8      | 0      | 356        | 5    | 3            | 0            | 8          | 626        |
| Grand Total        | 9     | 1825    | 0      | 1834       | 1559       | 51     | 1      | 1610       | 42   | 9            | 4            | 51         | 3495       |
| Approach %         | 0.5   | 99.5    | -      | -          | 96.8       | 3.2    | -      | -          | 82.4 | 17.6         | -            | -          | -          |
| Total %            | 0.3   | 52.2    | -      | 52.5       | 44.6       | 1.5    | -      | 46.1       | 1.2  | 0.3          | -            | 1.5        | -          |
| Lights             | 9     | 1776    | -      | 1785       | 1514       | 46     | -      | 1560       | 41   | 8            | -            | 49         | 3394       |
| % Lights           | 100.0 | 97.3    | -      | 97.3       | 97.1       | 90.2   | -      | 96.9       | 97.6 | 88.9         | -            | 96.1       | 97.1       |
| Other Vehicles     | 0     | 49      | -      | 49         | 45         | 5      | -      | 50         | 1    | 1            | -            | 2          | 101        |
| % Other Vehicles   | 0.0   | 2.7     | -      | 2.7        | 2.9        | 9.8    | -      | 3.1        | 2.4  | 11.1         | -            | 3.9        | 2.9        |
| Bicycles on Road   | 0     | 0       | -      | 0          | 0          | 0      | -      | 0          | 0    | 0            | -            | 0          | 0          |
| % Bicycles on Road | 0.0   | 0.0     | -      | 0.0        | 0.0        | 0.0    | -      | 0.0        | 0.0  | 0.0          | -            | 0.0        | 0.0        |
| Pedestrians        | -     | -       | 0      | -          | -          | -      | 1      | -          | -    | -            | 4            | -          | -          |
| % Pedestrians      | -     | -       | -      | -          | -          | -      | 100.0  | -          | -    | -            | 100.0        | -          | -          |
|                    |       |         |        |            |            |        | -      |            |      | -            |              |            |            |



## Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 jhudak@trafficpd.com

Count Name: Park and Ride Driveways & Lloyd Avenue Site Code: Start Date: 12/16/2017 Page No: 2



**Turning Movement Data Plot** 



# Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 jhudak@trafficpd.com

Count Name: Park and Ride Driveways & Lloyd Avenue Site Code: Start Date: 12/16/2017 Page No: 3

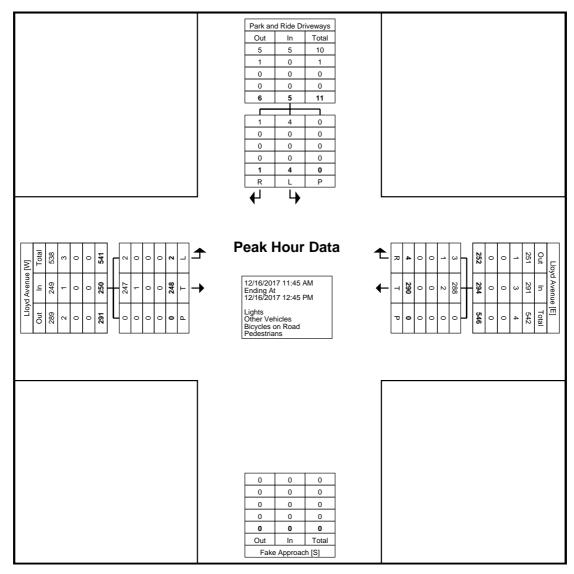
Turning Movement Peak Hour Data (11:45 AM)

|                    |       |         | . •    | 9          | 🔾     | • • • • • • | <b>-</b> | ~          |       | ,            |             |            |            |
|--------------------|-------|---------|--------|------------|-------|-------------|----------|------------|-------|--------------|-------------|------------|------------|
|                    |       | Lloyd A | Avenue | _          |       | Lloyd A     | Avenue   |            |       | Park and Rid | de Driveway | s          |            |
| Start Time         |       | Easth   | ound   |            |       | West        | oound    |            |       | South        | bound       |            |            |
| Start Time         | Left  | Thru    | Peds   | App. Total | Thru  | Right       | Peds     | App. Total | Left  | Right        | Peds        | App. Total | Int. Total |
| 11:45 AM           | 1     | 63      | 0      | 64         | 70    | 1           | 0        | 71         | 2     | 0            | 0           | 2          | 137        |
| 12:00 PM           | 1     | 59      | 0      | 60         | 75    | 2           | 0        | 77         | 0     | 0            | 0           | 0          | 137        |
| 12:15 PM           | 0     | 65      | 0      | 65         | 74    | 0           | 0        | 74         | 2     | 0            | 0           | 2          | 141        |
| 12:30 PM           | 0     | 61      | 0      | 61         | 71    | 1           | 0        | 72         | 0     | 1            | 0           | 1          | 134        |
| Total              | 2     | 248     | 0      | 250        | 290   | 4           | 0        | 294        | 4     | 1            | 0           | 5          | 549        |
| Approach %         | 0.8   | 99.2    | -      | -          | 98.6  | 1.4         | -        | -          | 80.0  | 20.0         | -           | -          | -          |
| Total %            | 0.4   | 45.2    | -      | 45.5       | 52.8  | 0.7         | -        | 53.6       | 0.7   | 0.2          | -           | 0.9        | -          |
| PHF                | 0.500 | 0.954   | -      | 0.962      | 0.967 | 0.500       | -        | 0.955      | 0.500 | 0.250        | -           | 0.625      | 0.973      |
| Lights             | 2     | 247     | -      | 249        | 288   | 3           | -        | 291        | 4     | 1            | -           | 5          | 545        |
| % Lights           | 100.0 | 99.6    | -      | 99.6       | 99.3  | 75.0        | -        | 99.0       | 100.0 | 100.0        | -           | 100.0      | 99.3       |
| Other Vehicles     | 0     | 1       | -      | 1          | 2     | 1           | -        | 3          | 0     | 0            | -           | 0          | 4          |
| % Other Vehicles   | 0.0   | 0.4     | -      | 0.4        | 0.7   | 25.0        | -        | 1.0        | 0.0   | 0.0          | -           | 0.0        | 0.7        |
| Bicycles on Road   | 0     | 0       | -      | 0          | 0     | 0           | -        | 0          | 0     | 0            | -           | 0          | 0          |
| % Bicycles on Road | 0.0   | 0.0     | -      | 0.0        | 0.0   | 0.0         | -        | 0.0        | 0.0   | 0.0          | -           | 0.0        | 0.0        |
| Pedestrians        | -     | -       | 0      | -          | -     | -           | 0        | -          | •     | -            | 0           | -          | -          |
| % Pedestrians      | _     | -       | _      | -          | -     | -           | _        | -          | _     | -            | _           | -          | _          |



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Count Name: Park and Ride Driveways & Lloyd Avenue Site Code: Start Date: 12/16/2017 Page No: 4



Turning Movement Peak Hour Data Plot (11:45 AM)



# Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 jhudak@trafficpd.com

Count Name: Park and Ride Driveways & Lloyd Avenue Site Code: Start Date: 12/16/2017 Page No: 5

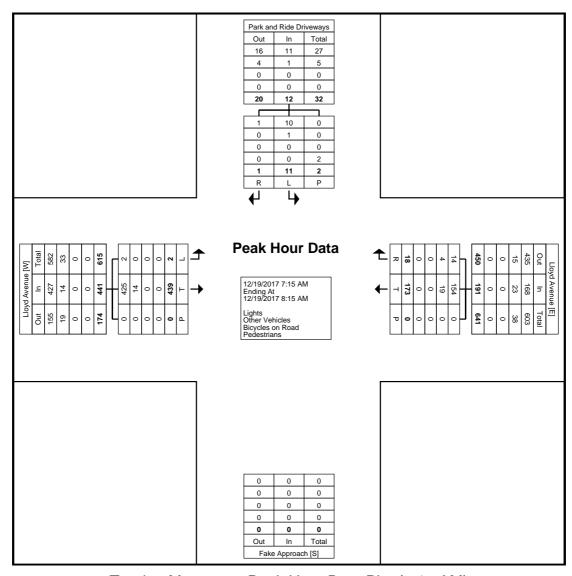
Turning Movement Peak Hour Data (7:15 AM)

|                    |       |         | . •    | . 9        |       | . ••    |        | ~ (        | ,     |              |              |            |            |
|--------------------|-------|---------|--------|------------|-------|---------|--------|------------|-------|--------------|--------------|------------|------------|
|                    |       | Lloyd A | Avenue | _          |       | Lloyd A | Avenue |            |       | Park and Rid | de Driveways | 3          |            |
| Start Time         |       | Easth   | oound  |            |       | Westl   | oound  |            |       | South        | bound        |            |            |
| Start Time         | Left  | Thru    | Peds   | App. Total | Thru  | Right   | Peds   | App. Total | Left  | Right        | Peds         | App. Total | Int. Total |
| 7:15 AM            | 0     | 106     | 0      | 106        | 34    | 2       | 0      | 36         | 2     | 0            | 2            | 2          | 144        |
| 7:30 AM            | 2     | 137     | 0      | 139        | 55    | 3       | 0      | 58         | 2     | 0            | 0            | 2          | 199        |
| 7:45 AM            | 0     | 85      | 0      | 85         | 34    | 6       | 0      | 40         | 2     | 0            | 0            | 2          | 127        |
| 8:00 AM            | 0     | 111     | 0      | 111        | 50    | 7       | 0      | 57         | 5     | 1            | 0            | 6          | 174        |
| Total              | 2     | 439     | 0      | 441        | 173   | 18      | 0      | 191        | 11    | 1            | 2            | 12         | 644        |
| Approach %         | 0.5   | 99.5    | -      | -          | 90.6  | 9.4     | -      | -          | 91.7  | 8.3          | -            | -          | -          |
| Total %            | 0.3   | 68.2    | -      | 68.5       | 26.9  | 2.8     | -      | 29.7       | 1.7   | 0.2          | -            | 1.9        | -          |
| PHF                | 0.250 | 0.801   | -      | 0.793      | 0.786 | 0.643   | -      | 0.823      | 0.550 | 0.250        | -            | 0.500      | 0.809      |
| Lights             | 2     | 425     | -      | 427        | 154   | 14      | -      | 168        | 10    | 1            | -            | 11         | 606        |
| % Lights           | 100.0 | 96.8    | -      | 96.8       | 89.0  | 77.8    | -      | 88.0       | 90.9  | 100.0        | -            | 91.7       | 94.1       |
| Other Vehicles     | 0     | 14      | -      | 14         | 19    | 4       | -      | 23         | 1     | 0            | -            | 1          | 38         |
| % Other Vehicles   | 0.0   | 3.2     | -      | 3.2        | 11.0  | 22.2    | -      | 12.0       | 9.1   | 0.0          | -            | 8.3        | 5.9        |
| Bicycles on Road   | 0     | 0       | -      | 0          | 0     | 0       | -      | 0          | 0     | 0            | -            | 0          | 0          |
| % Bicycles on Road | 0.0   | 0.0     | -      | 0.0        | 0.0   | 0.0     | -      | 0.0        | 0.0   | 0.0          | -            | 0.0        | 0.0        |
| Pedestrians        | -     | -       | 0      | -          | -     | -       | 0      | -          | -     | -            | 2            | -          | -          |
| % Pedestrians      | _     | -       | -      | _          | -     | -       | _      | _          | -     | -            | 100.0        | _          | -          |



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Count Name: Park and Ride Driveways & Lloyd Avenue Site Code: Start Date: 12/16/2017 Page No: 6



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



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Count Name: Park and Ride Driveways & Lloyd Avenue Site Code: Start Date: 12/16/2017 Page No: 7

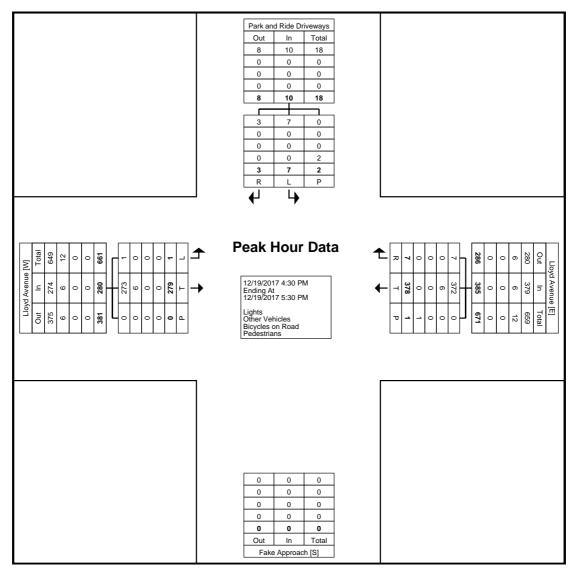
Turning Movement Peak Hour Data (4:30 PM)

|                    | _     |         |        | .9         |       |         |        | ~ (        |       |              |              |            |            |
|--------------------|-------|---------|--------|------------|-------|---------|--------|------------|-------|--------------|--------------|------------|------------|
|                    |       | Lloyd A | Avenue | _          |       | Lloyd A | Avenue |            |       | Park and Ric | de Driveways | 3          |            |
| Start Time         |       | Easth   | ound   |            |       | West    | oound  |            |       | South        | bound        |            |            |
| Start Time         | Left  | Thru    | Peds   | App. Total | Thru  | Right   | Peds   | App. Total | Left  | Right        | Peds         | App. Total | Int. Total |
| 4:30 PM            | 1     | 65      | 0      | 66         | 96    | 2       | 1      | 98         | 5     | 0            | 2            | 5          | 169        |
| 4:45 PM            | 0     | 80      | 0      | 80         | 95    | 2       | 0      | 97         | 2     | 1            | 0            | 3          | 180        |
| 5:00 PM            | 0     | 65      | 0      | 65         | 89    | 2       | 0      | 91         | 0     | 2            | 0            | 2          | 158        |
| 5:15 PM            | 0     | 69      | 0      | 69         | 98    | 1       | 0      | 99         | 0     | 0            | 0            | 0          | 168        |
| Total              | 1     | 279     | 0      | 280        | 378   | 7       | 1      | 385        | 7     | 3            | 2            | 10         | 675        |
| Approach %         | 0.4   | 99.6    | -      | -          | 98.2  | 1.8     | -      | -          | 70.0  | 30.0         | -            | -          | -          |
| Total %            | 0.1   | 41.3    | -      | 41.5       | 56.0  | 1.0     | -      | 57.0       | 1.0   | 0.4          | -            | 1.5        | -          |
| PHF                | 0.250 | 0.872   | -      | 0.875      | 0.964 | 0.875   | -      | 0.972      | 0.350 | 0.375        | -            | 0.500      | 0.938      |
| Lights             | 1     | 273     | -      | 274        | 372   | 7       | -      | 379        | 7     | 3            | -            | 10         | 663        |
| % Lights           | 100.0 | 97.8    | -      | 97.9       | 98.4  | 100.0   | -      | 98.4       | 100.0 | 100.0        | -            | 100.0      | 98.2       |
| Other Vehicles     | 0     | 6       | -      | 6          | 6     | 0       | -      | 6          | 0     | 0            | -            | 0          | 12         |
| % Other Vehicles   | 0.0   | 2.2     | -      | 2.1        | 1.6   | 0.0     | -      | 1.6        | 0.0   | 0.0          | -            | 0.0        | 1.8        |
| Bicycles on Road   | 0     | 0       | -      | 0          | 0     | 0       | -      | 0          | 0     | 0            | -            | 0          | 0          |
| % Bicycles on Road | 0.0   | 0.0     | -      | 0.0        | 0.0   | 0.0     | -      | 0.0        | 0.0   | 0.0          | -            | 0.0        | 0.0        |
| Pedestrians        | -     | -       | 0      | -          | -     | -       | 1      | -          | -     | -            | 2            | -          | -          |
| % Pedestrians      | _     | -       | -      | -          | -     | -       | 100.0  | -          | _     | _            | 100.0        | -          | _          |



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Count Name: Park and Ride Driveways & Lloyd Avenue Site Code: Start Date: 12/16/2017 Page No: 8



Turning Movement Peak Hour Data Plot (4:30 PM)



## Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 jhudak@trafficpd.com

Count Name: Lloyd Avenue & GO Carlson Boulevard Site Code: Start Date: 12/16/2017 Page No: 1

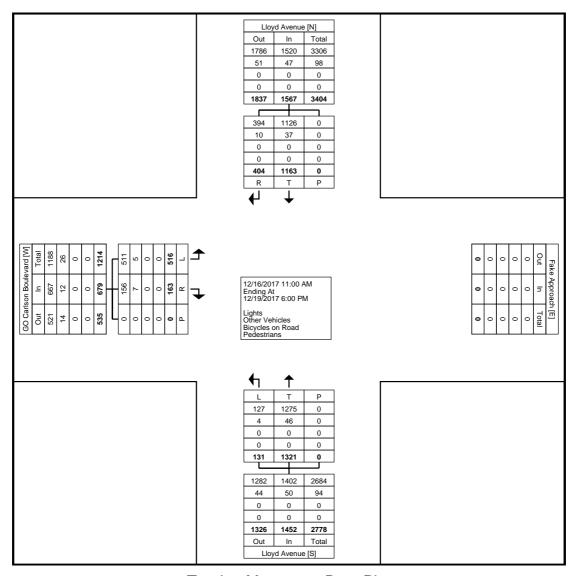
**Turning Movement Data** 

|                    |      |            |             | ΙŲ         | iming i | wovem   | ient D | aเa        |      |         |        |            | 1          |
|--------------------|------|------------|-------------|------------|---------|---------|--------|------------|------|---------|--------|------------|------------|
|                    |      | GO Carlsor | n Boulevard |            |         | Lloyd A | Avenue |            |      | Lloyd A | Avenue |            |            |
| Start Time         |      | Easth      | oound       |            |         | North   | bound  |            |      | South   | bound  |            |            |
|                    | Left | Right      | Peds        | App. Total | Left    | Thru    | Peds   | App. Total | Thru | Right   | Peds   | App. Total | Int. Total |
| 11:00 AM           | 19   | . 8        | 0           | 27         | 4       | 48      | 0      | 52         | 47   | 21      | 0      | 68         | 147        |
| 11:15 AM           | 20   | 6          | 0           | 26         | 2       | 53      | 0      | 55         | 53   | 15      | 0      | 68         | 149        |
| 11:30 AM           | 17   | 4          | 0           | 21         | 6       | 32      | 0      | 38         | 45   | 12      | 0      | 57         | 116        |
| 11:45 AM           | 14   | 5          | 0           | 19         | 2       | 46      | 0      | 48         | 49   | 24      | 0      | 73         | 140        |
| Hourly Total       | 70   | 23         | 0           | 93         | 14      | 179     | 0      | 193        | 194  | 72      | 0      | 266        | 552        |
| 12:00 PM           | 17   | 8          | 0           | 25         | 5       | 49      | 0      | 54         | 52   | 21      | 0      | 73         | 152        |
| 12:15 PM           | 14   | 3          | 0           | 17         | 4       | 48      | 0      | 52         | 64   | 10      | 0      | 74         | 143        |
| 12:30 PM           | 17   | 6          | 0           | 23         | 8       | 45      | 0      | 53         | 60   | 13      | 0      | 73         | 149        |
| 12:45 PM           | 16   | 4          | 0           | 20         | 6       | 41      | 0      | 47         | 51   | 17      | 0      | 68         | 135        |
| Hourly Total       | 64   | 21         | 0           | 85         | 23      | 183     | 0      | 206        | 227  | 61      | 0      | 288        | 579        |
| *** BREAK ***      | -    | -          | -           | -          | -       | _       | -      | -          | -    |         | -      | -          | -          |
| 7:00 AM            | 31   | 15         | 0           | 46         | 3       | 86      | 0      | 89         | 27   | 4       | 0      | 31         | 166        |
| 7:15 AM            | 30   | 19         | 0           | 49         | 1       | 90      | 0      | 91         | 29   | 4       | 0      | 33         | 173        |
| 7:30 AM            | 37   | 7          | 0           | 44         | 5       | 80      | 0      | 85         | 51   | 5       | 0      | 56         | 185        |
| 7:45 AM            | 28   | 9          | 0           | 37         | 4       | 58      | 0      | 62         | 30   | 5       | 0      | 35         | 134        |
| Hourly Total       | 126  | 50         | 0           | 176        | 13      | 314     | 0      | 327        | 137  | 18      | 0      | 155        | 658        |
| 8:00 AM            | 41   | 11         | 0           | 52         | 3       | 67      | 0      | 70         | 45   | 5       | 0      | 50         | 172        |
| 8:15 AM            | 23   | 9          | 0           | 32         | 1       | 60      | 0      | 61         | 37   | 8       | 0      | 45         | 138        |
| 8:30 AM            | 26   | 4          | 0           | 30         | 6       | 61      | 0      | 67         | 24   | 6       | 0      | 30         | 127        |
| 8:45 AM            | 29   | 3          | 0           | 32         | 1       | 60      | 0      | 61         | 35   | 6       | 0      | 41         | 134        |
| Hourly Total       | 119  | 27         | 0           | 146        | 11      | 248     | 0      | 259        | 141  | 25      | 0      | 166        | 571        |
| *** BREAK ***      | -    | -          | -           | -          | -       | -       | -      | -          | -    | -       | -      | -          | -          |
| 4:00 PM            | 13   | 3          | 0           | 16         | 11      | 42      | 0      | 53         | 51   | 23      | 0      | 74         | 143        |
| 4:15 PM            | 12   | 7          | 0           | 19         | 10      | 54      | 0      | 64         | 55   | 20      | 0      | 75         | 158        |
| 4:30 PM            | 13   | 8          | 0           | 21         | 8       | 48      | 0      | 56         | 64   | 29      | 0      | 93         | 170        |
| 4:45 PM            | 11   | 7          | 0           | 18         | 5       | 70      | 0      | 75         | 68   | 29      | 0      | 97         | 190        |
| Hourly Total       | 49   | 25         | 0           | 74         | 34      | 214     | 0      | 248        | 238  | 101     | 0      | 339        | 661        |
| 5:00 PM            | 14   | 5          | 0           | 19         | 6       | 51      | 0      | 57         | 59   | 35      | 0      | 94         | 170        |
| 5:15 PM            | 28   | 4          | 0           | 32         | 17      | 39      | 0      | 56         | 66   | 31      | 0      | 97         | 185        |
| 5:30 PM            | 25   | 3          | 0           | 28         | 9       | 47      | 0      | 56         | 48   | 29      | 0      | 77         | 161        |
| 5:45 PM            | 21   | 5          | 0           | 26         | 4       | 46      | 0      | 50         | 53   | 32      | 0      | 85         | 161        |
| Hourly Total       | 88   | 17         | 0           | 105        | 36      | 183     | 0      | 219        | 226  | 127     | 0      | 353        | 677        |
| Grand Total        | 516  | 163        | 0           | 679        | 131     | 1321    | 0      | 1452       | 1163 | 404     | 0      | 1567       | 3698       |
| Approach %         | 76.0 | 24.0       | -           | -          | 9.0     | 91.0    | -      | -          | 74.2 | 25.8    | -      | -          | -          |
| Total %            | 14.0 | 4.4        | -           | 18.4       | 3.5     | 35.7    | -      | 39.3       | 31.4 | 10.9    | -      | 42.4       | -          |
| Lights             | 511  | 156        | -           | 667        | 127     | 1275    | -      | 1402       | 1126 | 394     | -      | 1520       | 3589       |
| % Lights           | 99.0 | 95.7       | -           | 98.2       | 96.9    | 96.5    | -      | 96.6       | 96.8 | 97.5    | -      | 97.0       | 97.1       |
| Other Vehicles     | 5    | 7          | -           | 12         | 4       | 46      | -      | 50         | 37   | 10      | -      | 47         | 109        |
| % Other Vehicles   | 1.0  | 4.3        | -           | 1.8        | 3.1     | 3.5     | -      | 3.4        | 3.2  | 2.5     | -      | 3.0        | 2.9        |
| Bicycles on Road   | 0    | 0          | -           | 0          | 0       | 0       | -      | 0          | 0    | 0       | -      | 0          | 0          |
| % Bicycles on Road | 0.0  | 0.0        | -           | 0.0        | 0.0     | 0.0     | -      | 0.0        | 0.0  | 0.0     | -      | 0.0        | 0.0        |
| Pedestrians        | -    | -          | 0           | -          | -       | -       | 0      | -          | -    | -       | 0      | -          | -          |
| % Pedestrians      | -    | -          | -           | -          | -       | -       | -      | -          | -    | -       | -      | -          | -          |
|                    | •——  |            |             |            |         | -       |        | -          |      |         |        |            |            |



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Count Name: Lloyd Avenue & GO Carlson Boulevard Site Code: Start Date: 12/16/2017 Page No: 2



**Turning Movement Data Plot** 



# Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 jhudak@trafficpd.com

Count Name: Lloyd Avenue & GO Carlson Boulevard Site Code: Start Date: 12/16/2017 Page No: 3

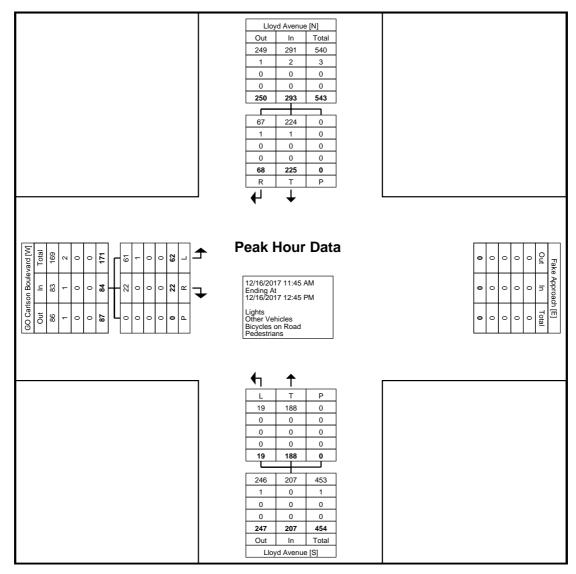
Turning Movement Peak Hour Data (11:45 AM)

|                    |       |            |             |            |       |         |        | ١ .        |       | ,       |        |            |            |
|--------------------|-------|------------|-------------|------------|-------|---------|--------|------------|-------|---------|--------|------------|------------|
|                    |       | GO Carlson | n Boulevard |            |       | Lloyd A | Avenue |            |       | Lloyd A | Avenue |            |            |
| Start Time         |       | Easth      | ound        |            |       | North   | oound  |            |       | South   | bound  |            |            |
| Start Time         | Left  | Right      | Peds        | App. Total | Left  | Thru    | Peds   | App. Total | Thru  | Right   | Peds   | App. Total | Int. Total |
| 11:45 AM           | 14    | 5          | 0           | 19         | 2     | 46      | 0      | 48         | 49    | 24      | 0      | 73         | 140        |
| 12:00 PM           | 17    | 8          | 0           | 25         | 5     | 49      | 0      | 54         | 52    | 21      | 0      | 73         | 152        |
| 12:15 PM           | 14    | 3          | 0           | 17         | 4     | 48      | 0      | 52         | 64    | 10      | 0      | 74         | 143        |
| 12:30 PM           | 17    | 6          | 0           | 23         | 8     | 45      | 0      | 53         | 60    | 13      | 0      | 73         | 149        |
| Total              | 62    | 22         | 0           | 84         | 19    | 188     | 0      | 207        | 225   | 68      | 0      | 293        | 584        |
| Approach %         | 73.8  | 26.2       | -           | -          | 9.2   | 90.8    | -      | -          | 76.8  | 23.2    | -      | -          | -          |
| Total %            | 10.6  | 3.8        | -           | 14.4       | 3.3   | 32.2    | -      | 35.4       | 38.5  | 11.6    | -      | 50.2       | -          |
| PHF                | 0.912 | 0.688      | -           | 0.840      | 0.594 | 0.959   | -      | 0.958      | 0.879 | 0.708   | -      | 0.990      | 0.961      |
| Lights             | 61    | 22         | -           | 83         | 19    | 188     | -      | 207        | 224   | 67      | -      | 291        | 581        |
| % Lights           | 98.4  | 100.0      | -           | 98.8       | 100.0 | 100.0   | -      | 100.0      | 99.6  | 98.5    | -      | 99.3       | 99.5       |
| Other Vehicles     | 1     | 0          | -           | 1          | 0     | 0       | -      | 0          | 1     | 1       | -      | 2          | 3          |
| % Other Vehicles   | 1.6   | 0.0        | -           | 1.2        | 0.0   | 0.0     | -      | 0.0        | 0.4   | 1.5     | -      | 0.7        | 0.5        |
| Bicycles on Road   | 0     | 0          | -           | 0          | 0     | 0       | -      | 0          | 0     | 0       | -      | 0          | 0          |
| % Bicycles on Road | 0.0   | 0.0        | -           | 0.0        | 0.0   | 0.0     | -      | 0.0        | 0.0   | 0.0     | -      | 0.0        | 0.0        |
| Pedestrians        | -     | -          | 0           | -          | -     | -       | 0      | -          | -     | -       | 0      | -          | -          |
| % Pedestrians      | -     | -          | -           | -          | -     | -       | -      | -          | -     | -       | -      | -          | -          |



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Count Name: Lloyd Avenue & GO Carlson Boulevard Site Code: Start Date: 12/16/2017 Page No: 4



Turning Movement Peak Hour Data Plot (11:45 AM)



### Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 jhudak@trafficpd.com

Count Name: Lloyd Avenue & GO Carlson Boulevard Site Code: Start Date: 12/16/2017 Page No: 5

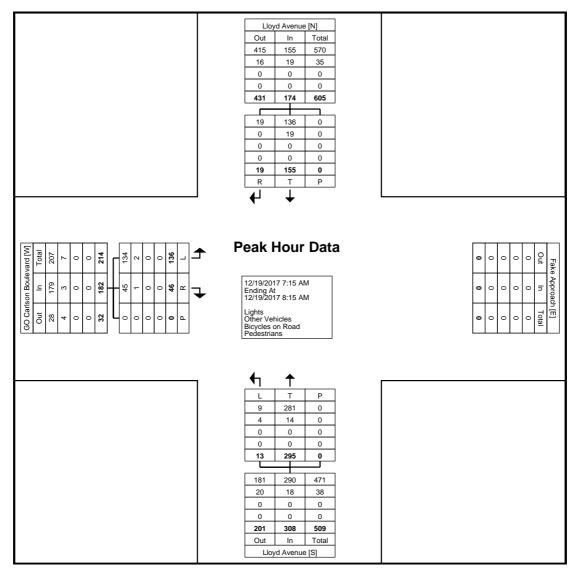
Turning Movement Peak Hour Data (7:15 AM)

|                    |       | GO Carlsor | . Davilavand | •          |       | المنتما ا |       | `          | ,     | ا امریما ا |       |            | 1          |
|--------------------|-------|------------|--------------|------------|-------|-----------|-------|------------|-------|------------|-------|------------|------------|
|                    |       |            |              |            |       | Lloyd A   |       |            |       | Lloyd A    |       |            | 1          |
| Start Time         |       | Eastb      | oound        |            |       | North     | oound |            |       | South      | bound |            |            |
| Start Time         | Left  | Right      | Peds         | App. Total | Left  | Thru      | Peds  | App. Total | Thru  | Right      | Peds  | App. Total | Int. Total |
| 7:15 AM            | 30    | 19         | 0            | 49         | 1     | 90        | 0     | 91         | 29    | 4          | 0     | 33         | 173        |
| 7:30 AM            | 37    | 7          | 0            | 44         | 5     | 80        | 0     | 85         | 51    | 5          | 0     | 56         | 185        |
| 7:45 AM            | 28    | 9          | 0            | 37         | 4     | 58        | 0     | 62         | 30    | 5          | 0     | 35         | 134        |
| 8:00 AM            | 41    | 11         | 0            | 52         | 3     | 67        | 0     | 70         | 45    | 5          | 0     | 50         | 172        |
| Total              | 136   | 46         | 0            | 182        | 13    | 295       | 0     | 308        | 155   | 19         | 0     | 174        | 664        |
| Approach %         | 74.7  | 25.3       | -            | -          | 4.2   | 95.8      | -     | -          | 89.1  | 10.9       | -     | -          | -          |
| Total %            | 20.5  | 6.9        | -            | 27.4       | 2.0   | 44.4      | -     | 46.4       | 23.3  | 2.9        | -     | 26.2       | -          |
| PHF                | 0.829 | 0.605      | -            | 0.875      | 0.650 | 0.819     | -     | 0.846      | 0.760 | 0.950      | -     | 0.777      | 0.897      |
| Lights             | 134   | 45         | -            | 179        | 9     | 281       | -     | 290        | 136   | 19         | -     | 155        | 624        |
| % Lights           | 98.5  | 97.8       | -            | 98.4       | 69.2  | 95.3      | -     | 94.2       | 87.7  | 100.0      | -     | 89.1       | 94.0       |
| Other Vehicles     | 2     | 1          | -            | 3          | 4     | 14        | -     | 18         | 19    | 0          | -     | 19         | 40         |
| % Other Vehicles   | 1.5   | 2.2        | -            | 1.6        | 30.8  | 4.7       | -     | 5.8        | 12.3  | 0.0        | -     | 10.9       | 6.0        |
| Bicycles on Road   | 0     | 0          | -            | 0          | 0     | 0         | -     | 0          | 0     | 0          | -     | 0          | 0          |
| % Bicycles on Road | 0.0   | 0.0        | -            | 0.0        | 0.0   | 0.0       | -     | 0.0        | 0.0   | 0.0        | -     | 0.0        | 0.0        |
| Pedestrians        | -     | -          | 0            | -          | -     | -         | 0     | -          | -     | -          | 0     | -          | -          |
| % Pedestrians      | -     | _          | -            | -          | -     | _         | -     | -          | -     | -          | -     | -          | -          |



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Count Name: Lloyd Avenue & GO Carlson Boulevard Site Code: Start Date: 12/16/2017 Page No: 6



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



### Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 jhudak@trafficpd.com

Count Name: Lloyd Avenue & GO Carlson Boulevard Site Code: Start Date: 12/16/2017 Page No: 7

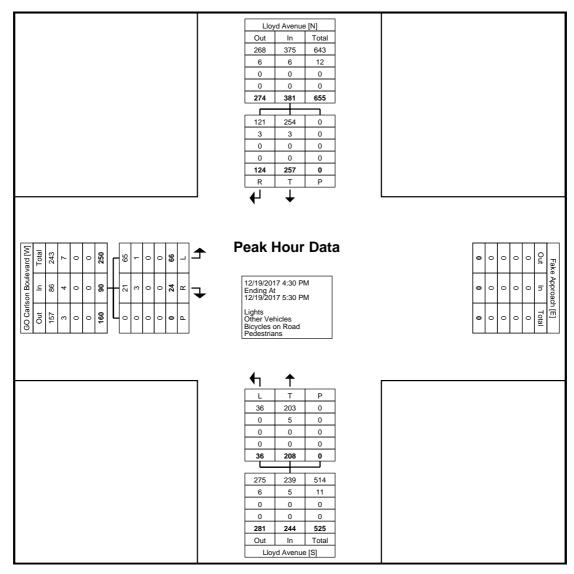
Turning Movement Peak Hour Data (4:30 PM)

|                    |       | GO Carlsor | n Boulevard | _          |       | Lloyd A | Avenue |            | •     | Lloyd A | Avenue |            |            |
|--------------------|-------|------------|-------------|------------|-------|---------|--------|------------|-------|---------|--------|------------|------------|
| Ota et Tiera       |       | Easth      | oound       |            |       | North   | oound  |            |       | South   | bound  |            |            |
| Start Time         | Left  | Right      | Peds        | App. Total | Left  | Thru    | Peds   | App. Total | Thru  | Right   | Peds   | App. Total | Int. Total |
| 4:30 PM            | 13    | 8          | 0           | 21         | 8     | 48      | 0      | 56         | 64    | 29      | 0      | 93         | 170        |
| 4:45 PM            | 11    | 7          | 0           | 18         | 5     | 70      | 0      | 75         | 68    | 29      | 0      | 97         | 190        |
| 5:00 PM            | 14    | 5          | 0           | 19         | 6     | 51      | 0      | 57         | 59    | 35      | 0      | 94         | 170        |
| 5:15 PM            | 28    | 4          | 0           | 32         | 17    | 39      | 0      | 56         | 66    | 31      | 0      | 97         | 185        |
| Total              | 66    | 24         | 0           | 90         | 36    | 208     | 0      | 244        | 257   | 124     | 0      | 381        | 715        |
| Approach %         | 73.3  | 26.7       | -           | -          | 14.8  | 85.2    | -      | -          | 67.5  | 32.5    | -      | -          | -          |
| Total %            | 9.2   | 3.4        | -           | 12.6       | 5.0   | 29.1    | -      | 34.1       | 35.9  | 17.3    | -      | 53.3       | -          |
| PHF                | 0.589 | 0.750      | -           | 0.703      | 0.529 | 0.743   | -      | 0.813      | 0.945 | 0.886   | -      | 0.982      | 0.941      |
| Lights             | 65    | 21         | -           | 86         | 36    | 203     | -      | 239        | 254   | 121     | -      | 375        | 700        |
| % Lights           | 98.5  | 87.5       | -           | 95.6       | 100.0 | 97.6    | -      | 98.0       | 98.8  | 97.6    | -      | 98.4       | 97.9       |
| Other Vehicles     | 1     | 3          | -           | 4          | 0     | 5       | -      | 5          | 3     | 3       | -      | 6          | 15         |
| % Other Vehicles   | 1.5   | 12.5       | -           | 4.4        | 0.0   | 2.4     | -      | 2.0        | 1.2   | 2.4     | -      | 1.6        | 2.1        |
| Bicycles on Road   | 0     | 0          | -           | 0          | 0     | 0       | -      | 0          | 0     | 0       | -      | 0          | 0          |
| % Bicycles on Road | 0.0   | 0.0        | -           | 0.0        | 0.0   | 0.0     | -      | 0.0        | 0.0   | 0.0     | -      | 0.0        | 0.0        |
| Pedestrians        | -     | -          | 0           | -          | -     | -       | 0      | -          | -     | -       | 0      | -          | -          |
| % Pedestrians      | _     | -          | _           | -          | -     | -       | -      | _          | _     | _       | -      | -          | -          |



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Count Name: Lloyd Avenue & GO Carlson Boulevard Site Code: Start Date: 12/16/2017 Page No: 8



Turning Movement Peak Hour Data Plot (4:30 PM)



## Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 jhudak@trafficpd.com

Count Name: Lloyd Avenue Beaver Run Road Site Code: Start Date: 12/16/2017 Page No: 1

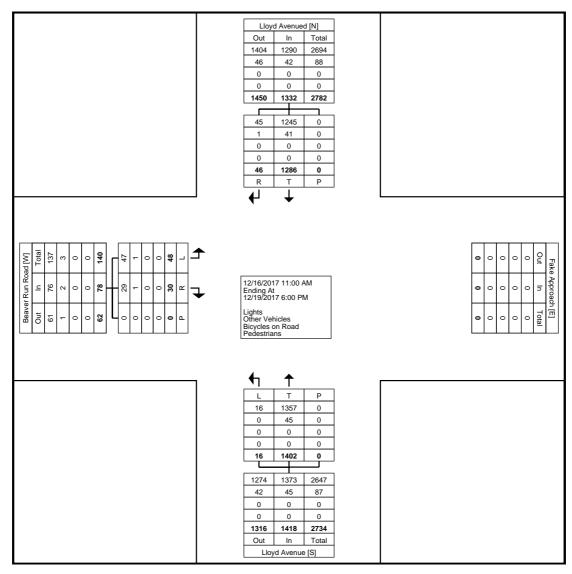
**Turning Movement Data** 

|                    |      |          |         | ΙŲ         | iiiiiiig i | MOVELL  | IEIII D | ala        |      |         |        |            |            |
|--------------------|------|----------|---------|------------|------------|---------|---------|------------|------|---------|--------|------------|------------|
|                    |      | Beaver R | un Road |            |            | Lloyd A | Avenue  |            |      | Lloyd A | venued |            |            |
| O: . T             |      | Eastb    | ound    |            |            | North   | bound   |            |      | South   | bound  |            |            |
| Start Time         | Left | Right    | Peds    | App. Total | Left       | Thru    | Peds    | App. Total | Thru | Right   | Peds   | App. Total | Int. Total |
| 11:00 AM           | 4    | 1        | 0       | 5          | 0          | 46      | 0       | 46         | 57   | 3       | 0      | 60         | 111        |
| 11:15 AM           | 2    | 2        | 0       | 4          | 0          | 52      | 0       | 52         | 53   | 1       | 0      | 54         | 110        |
| 11:30 AM           | 2    | 0        | 0       | 2          | 3          | 41      | 0       | 44         | 55   | 2       | 0      | 57         | 103        |
| 11:45 AM           | 0    | 0        | 0       | 0          | 1          | 42      | 0       | 43         | 49   | 1       | 0      | 50         | 93         |
| Hourly Total       | 8    | 3        | 0       | 11         | 4          | 181     | 0       | 185        | 214  | 7       | 0      | 221        | 417        |
| 12:00 PM           | 1    | 2        | 0       | 3          | 0          | 56      | 0       | 56         | 67   | 4       | 0      | 71         | 130        |
| 12:15 PM           | 3    | . 4      | 0       | 7          | 0          | 48      | 0       | 48         | 57   | 3       | 0      | 60         | 115        |
| 12:30 PM           | 1    | 2        | 0       | 3          | 2          | 52      | 0       | 54         | 61   | 1       | 0      | 62         | 119        |
| 12:45 PM           | 0    | 2        | 0       | 2          | 1          | 48      | 0       | 49         | 53   | 1       | 0      | 54         | 105        |
| Hourly Total       | 5    | 10       | 0       | 15         | 3          | 204     | 0       | 207        | 238  | 9       | 0      | 247        | 469        |
| *** BREAK ***      | -    | -        | -       | -          | -          | -       | -       | -          | -    | -       | -      | -          | -          |
| 7:00 AM            | 6    | 1        | 0       | 7          | 0          | 94      | 0       | 94         | 44   | 0       | 0      | 44         | 145        |
| 7:15 AM            | 1    | 3        | 0       | 4          | 0          | 82      | 0       | 82         | 49   | 0       | 0      | 49         | 135        |
| 7:30 AM            | 4    | 1        | 0       | 5          | 0          | 78      | 0       | 78         | 54   | 0       | 0      | 54         | 137        |
| 7:45 AM            | 5    | 0        | 0       | 5          | 0          | 63      | 0       | 63         | 42   | 1       | 0      | 43         | 111        |
| Hourly Total       | 16   | 5        | 0       | 21         | 0          | 317     | 0       | 317        | 189  | 1       | 0      | 190        | 528        |
| 8:00 AM            | 4    | 1        | 0       | 5          | 0          | 64      | 0       | 64         | 56   | 0       | 0      | 56         | 125        |
| 8:15 AM            | 2    | 2        | 0       | 4          | 0          | 56      | 0       | 56         | 44   | 1       | 0      | 45         | 105        |
| 8:30 AM            | 3    | 1        | 0       | 4          | 0          | 63      | 0       | 63         | 26   | 3       | 0      | 29         | 96         |
| 8:45 AM            | 1    | 3        | 0       | 4          | 0          | 50      | 0       | 50         | 41   | 0       | 0      | 41         | 95         |
| Hourly Total       | 10   | 7        | 0       | 17         | 0          | 233     | 0       | 233        | 167  | 4       | 0      | 171        | 421        |
| *** BREAK ***      | -    | -        | -       |            | -          | -       | -       | -          | -    | -       | -      | -          | -          |
| 4:00 PM            | 2    | 1        | 0       | 3          | 2          | 59      | 0       | 61         | 46   | 3       | 0      | 49         | 113        |
| 4:15 PM            | 2    | 1        | 0       | 3          | 0          | 58      | 0       | 58         | 64   | 4       | 0      | 68         | 129        |
| 4:30 PM            | 0    | 0        | 0       | 0          | 0          | 61      | 0       | 61         | 70   | 2       | 0      | 72         | 133        |
| 4:45 PM            | 0    | 1        | 0       | . 1        | 0          | 73      | 0       | 73         | 66   | 4       | 0      | 70         | 144        |
| Hourly Total       | 4    | 3        | 0       | 7          | 2          | 251     | 0       | 253        | 246  | 13      | 0      | 259        | 519        |
| 5:00 PM            | 1    | 0        | 0       | 1          | 1          | 55      | 0       | 56         | 66   | 4       | 0      | 70         | 127        |
| 5:15 PM            | 0    | 1        | 0       | . 1        | 2          | 58      | 0       | 60         | 59   | 3       | 0      | 62         | 123        |
| 5:30 PM            | 2    | 1        | 0       | 3          | 1          | 48      | 0       | 49         | 50   | 4       | 0      | 54         | 106        |
| 5:45 PM            | 2    | 0        | 0       | 2          | 3          | 55      | 0       | 58         | 57   | 1       | 0      | 58         | 118        |
| Hourly Total       | 5    | 2        | 0       | 7          | 7          | 216     | 0       | 223        | 232  | 12      | 0      | 244        | 474        |
| Grand Total        | 48   | 30       | 0       | 78         | 16         | 1402    | 0       | 1418       | 1286 | 46      | 0      | 1332       | 2828       |
| Approach %         | 61.5 | 38.5     | -       | -          | 1.1        | 98.9    | -       | -          | 96.5 | 3.5     | -      | -          | -          |
| Total %            | 1.7  | 1.1      | -       | 2.8        | 0.6        | 49.6    | -       | 50.1       | 45.5 | 1.6     | -      | 47.1       | -          |
| Lights             | 47   | 29       | -       | 76         | 16         | 1357    | -       | 1373       | 1245 | 45      | -      | 1290       | 2739       |
| % Lights           | 97.9 | 96.7     | -       | 97.4       | 100.0      | 96.8    | -       | 96.8       | 96.8 | 97.8    | -      | 96.8       | 96.9       |
| Other Vehicles     | 1    | 1        | -       | 2          | 0          | 45      | -       | 45         | 41   | 1       | -      | 42         | 89         |
| % Other Vehicles   | 2.1  | 3.3      | -       | 2.6        | 0.0        | 3.2     | -       | 3.2        | 3.2  | 2.2     | -      | 3.2        | 3.1        |
| Bicycles on Road   | 0    | 0        | -       | 0          | 0          | 0       | -       | 0          | 0    | 0       | -      | 0          | 0          |
| % Bicycles on Road | 0.0  | 0.0      | -       | 0.0        | 0.0        | 0.0     | -       | 0.0        | 0.0  | 0.0     | -      | 0.0        | 0.0        |
| Pedestrians        | -    | -        | 0       | -          | -          | -       | 0       | -          | -    | -       | 0      | -          | -          |
| % Pedestrians      | -    |          | -       | -          | -          | -       | -       | -          | -    | -       | -      | -          | -          |
|                    |      |          |         |            |            |         |         |            |      |         |        |            |            |



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Count Name: Lloyd Avenue Beaver Run Road Site Code: Start Date: 12/16/2017 Page No: 2



**Turning Movement Data Plot** 



### Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 jhudak@trafficpd.com

Count Name: Lloyd Avenue Beaver Run Road Site Code: Start Date: 12/16/2017 Page No: 3

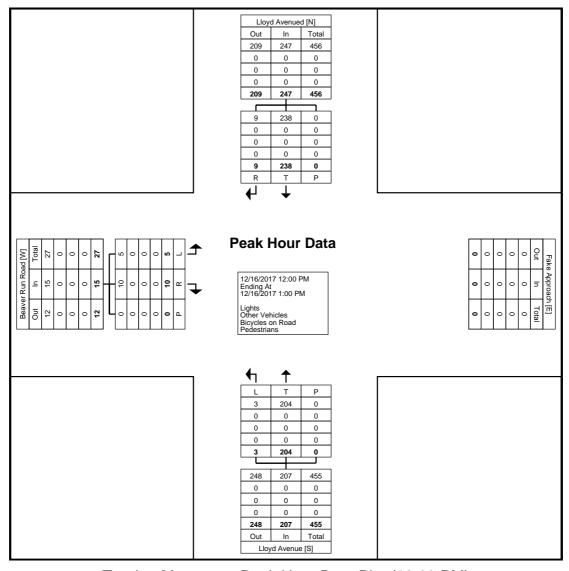
### Turning Movement Peak Hour Data (12:00 PM)

|                    |       | Beaver F | un Road | _          |       | Lloyd A | Avenue | •          |       | Lloyd A | venued |            |            |
|--------------------|-------|----------|---------|------------|-------|---------|--------|------------|-------|---------|--------|------------|------------|
| Start Time         |       | Easth    | ound    |            |       | North   | oound  |            |       | South   | bound  |            |            |
| Start Time         | Left  | Right    | Peds    | App. Total | Left  | Thru    | Peds   | App. Total | Thru  | Right   | Peds   | App. Total | Int. Total |
| 12:00 PM           | 1     | 2        | 0       | 3          | 0     | 56      | 0      | 56         | 67    | 4       | 0      | 71         | 130        |
| 12:15 PM           | 3     | 4        | 0       | 7          | 0     | 48      | 0      | 48         | 57    | 3       | 0      | 60         | 115        |
| 12:30 PM           | 1     | 2        | 0       | 3          | 2     | 52      | 0      | 54         | 61    | 1       | 0      | 62         | 119        |
| 12:45 PM           | 0     | 2        | 0       | 2          | 1     | 48      | 0      | 49         | 53    | 1       | 0      | 54         | 105        |
| Total              | 5     | 10       | 0       | 15         | 3     | 204     | 0      | 207        | 238   | 9       | 0      | 247        | 469        |
| Approach %         | 33.3  | 66.7     | -       | -          | 1.4   | 98.6    | -      | -          | 96.4  | 3.6     | -      | -          | -          |
| Total %            | 1.1   | 2.1      | -       | 3.2        | 0.6   | 43.5    | -      | 44.1       | 50.7  | 1.9     | -      | 52.7       | -          |
| PHF                | 0.417 | 0.625    | -       | 0.536      | 0.375 | 0.911   | -      | 0.924      | 0.888 | 0.563   | -      | 0.870      | 0.902      |
| Lights             | 5     | 10       | -       | 15         | 3     | 204     | -      | 207        | 238   | 9       | -      | 247        | 469        |
| % Lights           | 100.0 | 100.0    | -       | 100.0      | 100.0 | 100.0   | -      | 100.0      | 100.0 | 100.0   | -      | 100.0      | 100.0      |
| Other Vehicles     | 0     | 0        | -       | 0          | 0     | 0       | -      | 0          | 0     | 0       | -      | 0          | 0          |
| % Other Vehicles   | 0.0   | 0.0      | -       | 0.0        | 0.0   | 0.0     | -      | 0.0        | 0.0   | 0.0     | -      | 0.0        | 0.0        |
| Bicycles on Road   | 0     | 0        | -       | 0          | 0     | 0       | -      | 0          | 0     | 0       | -      | 0          | 0          |
| % Bicycles on Road | 0.0   | 0.0      | -       | 0.0        | 0.0   | 0.0     | -      | 0.0        | 0.0   | 0.0     | -      | 0.0        | 0.0        |
| Pedestrians        | -     | -        | 0       | -          | -     | -       | 0      | -          | -     | -       | 0      | -          | -          |
| % Pedestrians      | _     | -        | -       | -          | -     | _       | -      | _          | _     | _       | -      | -          | -          |



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Count Name: Lloyd Avenue Beaver Run Road Site Code: Start Date: 12/16/2017 Page No: 4



Turning Movement Peak Hour Data Plot (12:00 PM)



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Count Name: Lloyd Avenue Beaver Run Road Site Code: Start Date: 12/16/2017 Page No: 5

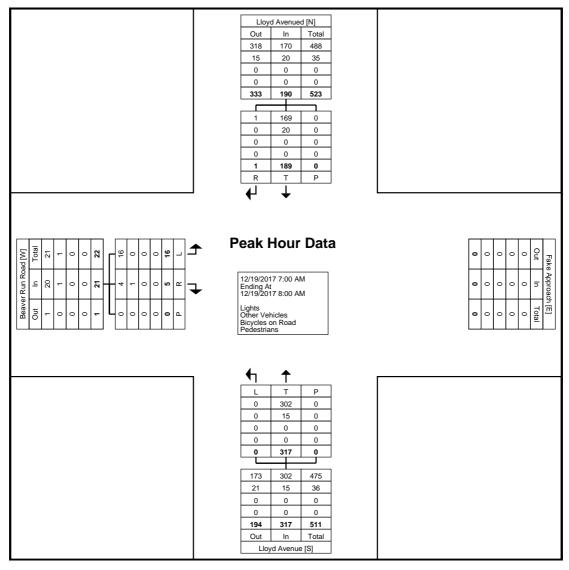
Turning Movement Peak Hour Data (7:00 AM)

|                    |       | Beaver F | Run Road |            |       | Lloyd A | Avenue |            |       |       |      |            |            |
|--------------------|-------|----------|----------|------------|-------|---------|--------|------------|-------|-------|------|------------|------------|
| Start Time         |       | Easth    | oound    |            |       | North   | oound  |            |       |       |      |            |            |
| Start Time         | Left  | Right    | Peds     | App. Total | Left  | Thru    | Peds   | App. Total | Thru  | Right | Peds | App. Total | Int. Total |
| 7:00 AM            | 6     | 1        | 0        | 7          | 0     | 94      | 0      | 94         | 44    | 0     | 0    | 44         | 145        |
| 7:15 AM            | 1     | 3        | 0        | 4          | 0     | 82      | 0      | 82         | 49    | 0     | 0    | 49         | 135        |
| 7:30 AM            | 4     | 1        | 0        | 5          | 0     | 78      | 0      | 78         | 54    | 0     | 0    | 54         | 137        |
| 7:45 AM            | 5     | 0        | 0        | 5          | 0     | 63      | 0      | 63         | 42    | 1     | 0    | 43         | 111        |
| Total              | 16    | 5        | 0        | 21         | 0     | 317     | 0      | 317        | 189   | 1     | 0    | 190        | 528        |
| Approach %         | 76.2  | 23.8     | -        | -          | 0.0   | 100.0   | -      | -          | 99.5  | 0.5   | -    | -          | -          |
| Total %            | 3.0   | 0.9      | -        | 4.0        | 0.0   | 60.0    | -      | 60.0       | 35.8  | 0.2   | -    | 36.0       | -          |
| PHF                | 0.667 | 0.417    | -        | 0.750      | 0.000 | 0.843   | -      | 0.843      | 0.875 | 0.250 | -    | 0.880      | 0.910      |
| Lights             | 16    | 4        | -        | 20         | 0     | 302     | -      | 302        | 169   | 1     | -    | 170        | 492        |
| % Lights           | 100.0 | 80.0     | -        | 95.2       | -     | 95.3    | -      | 95.3       | 89.4  | 100.0 | -    | 89.5       | 93.2       |
| Other Vehicles     | 0     | 1        | -        | 1          | 0     | 15      | -      | 15         | 20    | 0     | -    | 20         | 36         |
| % Other Vehicles   | 0.0   | 20.0     | -        | 4.8        | -     | 4.7     | -      | 4.7        | 10.6  | 0.0   | -    | 10.5       | 6.8        |
| Bicycles on Road   | 0     | 0        | -        | 0          | 0     | 0       | -      | 0          | 0     | 0     | -    | 0          | 0          |
| % Bicycles on Road | 0.0   | 0.0      | _        | 0.0        | -     | 0.0     | -      | 0.0        | 0.0   | 0.0   | -    | 0.0        | 0.0        |
| Pedestrians        | -     | -        | 0        | -          | -     | -       | 0      | -          | -     | -     | 0    | -          | -          |
| % Pedestrians      | -     | -        | -        | -          | -     | -       | -      | -          | -     | -     | -    | -          | -          |



### Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 jhudak@trafficpd.com

Count Name: Lloyd Avenue Beaver Run Road Site Code: Start Date: 12/16/2017 Page No: 6



Turning Movement Peak Hour Data Plot (7:00 AM)



# Traffic Planning and Design, Inc 2500 East High Street Suite 650 Pottstown, Pennsylvania, United States 19464 610.326.3100 jhudak@trafficpd.com

Count Name: Lloyd Avenue Beaver Run Road Site Code: Start Date: 12/16/2017 Page No: 7

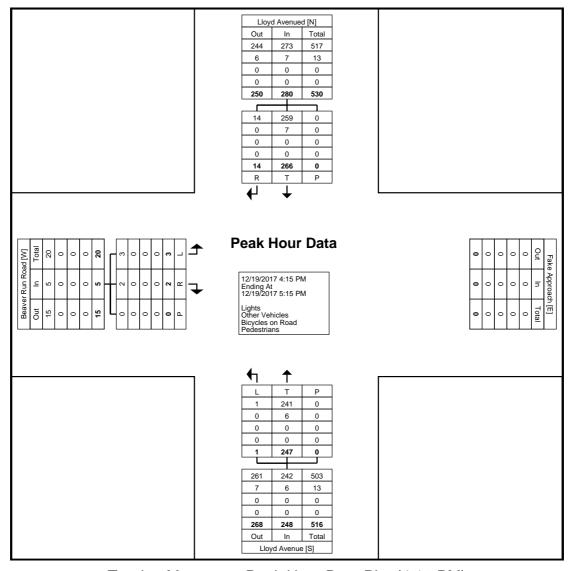
Turning Movement Peak Hour Data (4:15 PM)

|                    | i     |          |          |            |              |       |       | ١,         | ,     |       |      |            |            |
|--------------------|-------|----------|----------|------------|--------------|-------|-------|------------|-------|-------|------|------------|------------|
|                    |       | Beaver R | Run Road |            | Lloyd Avenue |       |       |            |       |       |      |            |            |
| Start Time         |       | Eastb    | ound     |            |              | North | oound |            |       |       |      |            |            |
|                    | Left  | Right    | Peds     | App. Total | Left         | Thru  | Peds  | App. Total | Thru  | Right | Peds | App. Total | Int. Total |
| 4:15 PM            | 2     | 1        | 0        | 3          | 0            | 58    | 0     | 58         | 64    | 4     | 0    | 68         | 129        |
| 4:30 PM            | 0     | 0        | 0        | 0          | 0            | 61    | 0     | 61         | 70    | 2     | 0    | 72         | 133        |
| 4:45 PM            | 0     | 1        | 0        | 1          | 0            | 73    | 0     | 73         | 66    | 4     | 0    | 70         | 144        |
| 5:00 PM            | 1     | 0        | 0        | 1          | 1            | 55    | 0     | 56         | 66    | 4     | 0    | 70         | 127        |
| Total              | 3     | 2        | 0        | 5          | 1            | 247   | 0     | 248        | 266   | 14    | 0    | 280        | 533        |
| Approach %         | 60.0  | 40.0     | -        | -          | 0.4          | 99.6  | -     | -          | 95.0  | 5.0   | -    | -          | -          |
| Total %            | 0.6   | 0.4      | -        | 0.9        | 0.2          | 46.3  | -     | 46.5       | 49.9  | 2.6   | -    | 52.5       | -          |
| PHF                | 0.375 | 0.500    | -        | 0.417      | 0.250        | 0.846 | -     | 0.849      | 0.950 | 0.875 | -    | 0.972      | 0.925      |
| Lights             | 3     | 2        | -        | 5          | 1            | 241   | -     | 242        | 259   | 14    | -    | 273        | 520        |
| % Lights           | 100.0 | 100.0    | -        | 100.0      | 100.0        | 97.6  | -     | 97.6       | 97.4  | 100.0 | -    | 97.5       | 97.6       |
| Other Vehicles     | 0     | 0        | -        | 0          | 0            | 6     | -     | 6          | 7     | 0     | -    | 7          | 13         |
| % Other Vehicles   | 0.0   | 0.0      | -        | 0.0        | 0.0          | 2.4   | -     | 2.4        | 2.6   | 0.0   | -    | 2.5        | 2.4        |
| Bicycles on Road   | 0     | 0        | -        | 0          | 0            | 0     | -     | 0          | 0     | 0     | -    | 0          | 0          |
| % Bicycles on Road | 0.0   | 0.0      | -        | 0.0        | 0.0          | 0.0   | -     | 0.0        | 0.0   | 0.0   | -    | 0.0        | 0.0        |
| Pedestrians        | -     | -        | 0        | -          | -            | -     | 0     | -          | -     | -     | 0    | -          | -          |
| % Pedestrians      | -     | -        | -        | -          | -            | -     | -     | -          | -     | -     | -    | -          | -          |



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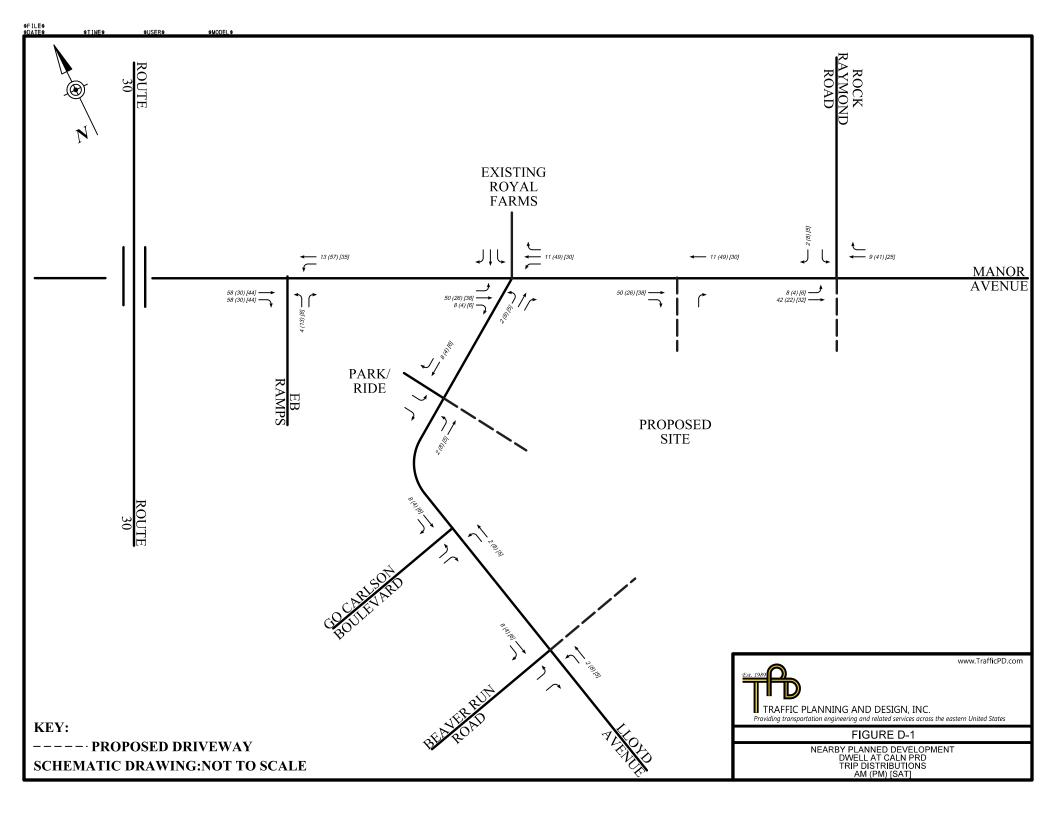
Count Name: Lloyd Avenue Beaver Run Road Site Code: Start Date: 12/16/2017 Page No: 8

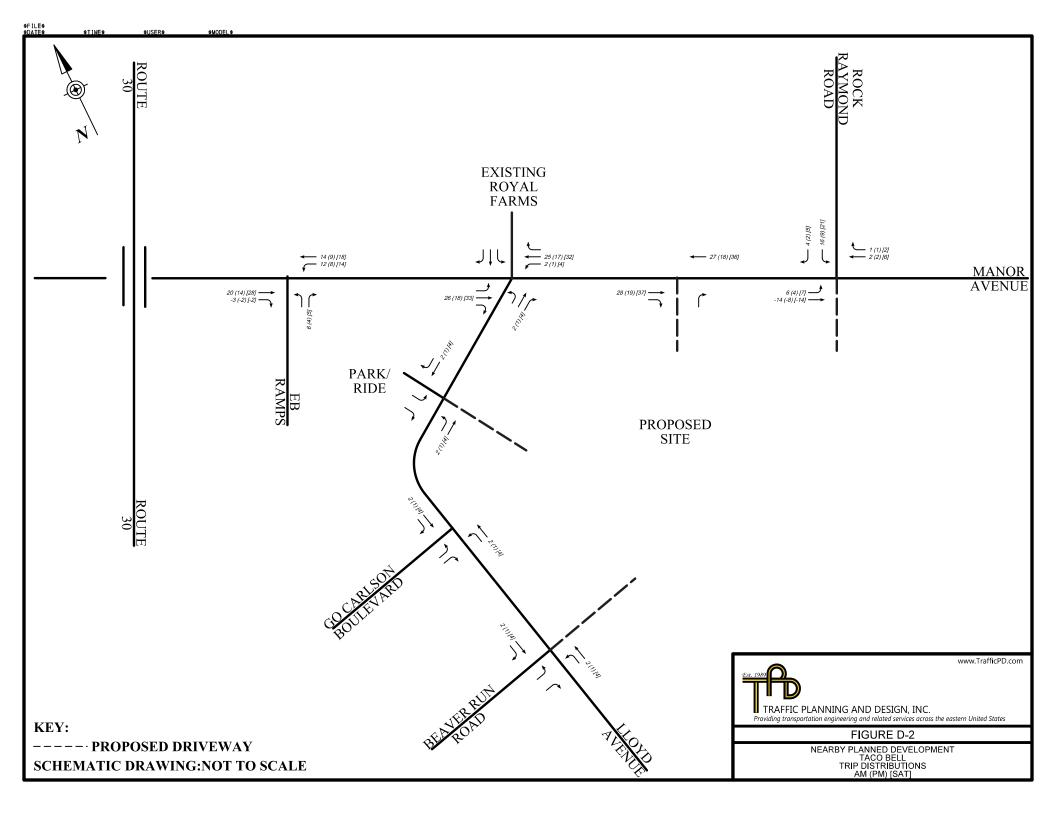


Turning Movement Peak Hour Data Plot (4:15 PM)

### **APPENDIX D**

### **NEARBY DEVELOPMENT TRIP DISTRIBUTIONS**





### **APPENDIX E**PLANNED ROADWAY PROJECTS

US 322 Interchange Page 1 of 5





HOME

PROJECT INFORMATION

NEWS AND OUTREACH

COMMUTING

### US 322 Interchange

The existing interchange of US 30 and US 322 provides both eastbound and westbound on-ramps and off-ramps.

### **EXISTING CONDITIONS**

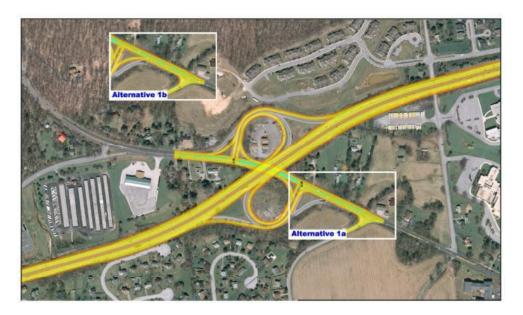


### **CONCEPTUAL DESIGN ALTERNATIVES**

Under the Conceptual Design phase, two potential alternatives are being evaluation for the US 322 Interchange:

US 322 ALTERNATIVE 1, MAY 2017

US 322 Interchange Page 2 of 5



- US 30 Mainline is 3 lanes in each direction
- Similar to existing partial Cloverleaf Interchange configuration partial
- Westbound Ramps Intersection is signalized
- US 30 Eastbound Ramps Intersection Alternative 1a
  - Signalized along Eastbound Off-ramp approach
  - Eastbound Off ramp combines left and right turn lane at signal
- US 30 Eastbound Ramps Intersection Alternative 1b
  - Stop control along Eastbound Off-ramp approach
  - Eastbound Off ramp has right turn merge lane

US 322 ALTERNATIVE 2, MAY 2017

US 322 Interchange Page 3 of 5



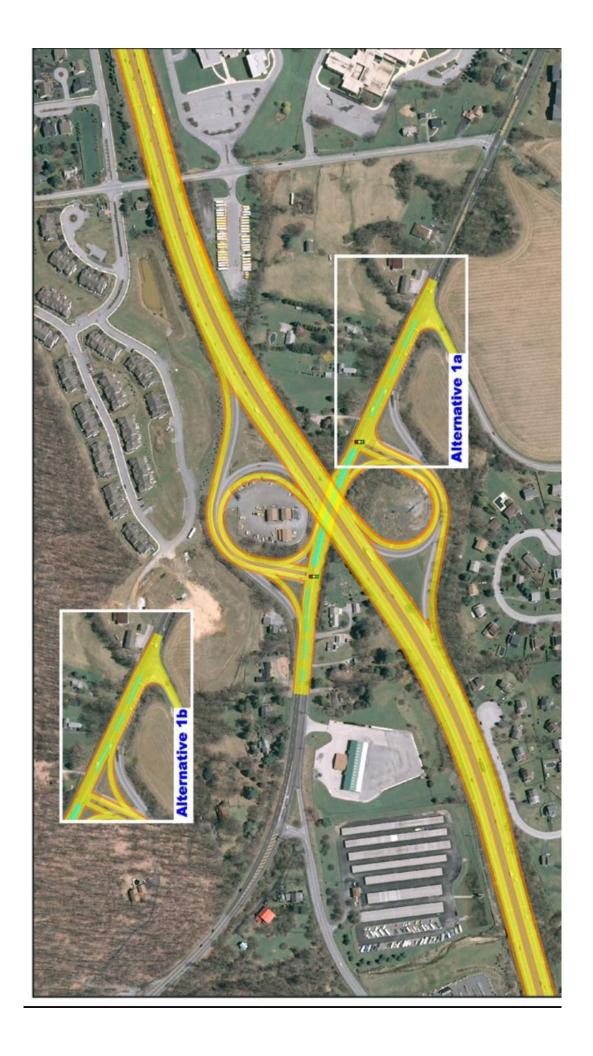
- US 30 Mainline is 3 lanes in each direction
- Diverging Diamond Interchange (DDI) at US 322
- Eliminates the need for left-turning vehicles traveling onto or off interstate to cross the paths of approaching through vehicles
- Two synced traffic signals for US 322 eastbound and westbound through movements
- Traffic signal for US 30 westbound off-ramp right turn at US 322

### **ENVIRONMENTAL RESOURCES**

The significant environmental features of the section are relatively limited consisting include, potential historic properties, a school, and four streams. There are numerous older buildings found primarily along US 322 that may have historic significance and will require evaluation. The Downingtown Area School District complex is located to the south of US 30 east of the US 322 interchange. Within the complex the Downingtown Middle School and several athletic fields abut US 30. The streams in the section are all small, unnamed tributaries. The two found west of US 322 tributaries of Beaver Creek and the two east of US 322 tributaries of the East Branch of the Brandywine Creek.

### **CONTACT US**

Contact us to tell us what you think.







January 30, 2018

#### **Project Report**



Air Quality Status:

#### Federal Fiscal Year 2017 DVRPC TIP

County: Chester

Project ID: 87781 Municipality: Caln

Title: Reconstruct US 30 Bypass Route: 30

Improvement Type: Reconstruct

**Exempt Code:** 

Work Can Begin: 02/09/2026 (Estimated) Completion Date:

Project Limits East Reeceville Road (SR 4005) Interchanges to Business Route 30/Lincoln Hwy (SR 3070) overpass.

Narrative: Reconsturction of mainline pavement

East of Reeciville Road (SR 4005) Interchange to Business Route 30 Lincoln Highway

(SR 3070) pass

#### **TIP Program Years**

| Phase        | Fund | Fiscal Year 2017 | Fiscal Year 2018 | Fiscal Year 2019 | Fiscal Year 2020 | 2nd 4 Years  | 3rd 4 Years   |
|--------------|------|------------------|------------------|------------------|------------------|--------------|---------------|
| Final Design | STP  | \$0              | \$0              | \$158,000        | \$0              | \$0          | \$0           |
| Final Design | STU  | \$0              | \$0              | \$0              | \$0              | \$6,520,000  | \$0           |
| Final Design | NHPP | \$0              | \$0              | \$6,000,000      | \$7,842,000      | \$0          | \$0           |
| Utility      | NHPP | \$0              | \$0              | \$0              | \$0              | \$752,000    | \$0           |
| Utility      | 581  | \$0              | \$0              | \$0              | \$0              | \$187,000    | \$0           |
| Right of Way | 581  | \$0              | \$0              | \$0              | \$0              | \$3,810,000  | \$0           |
| Construction | NHPP | \$0              | \$0              | \$0              | \$0              | \$27,956,000 | \$200,575,582 |
| Construction | STP  | \$0              | \$0              | \$0              | \$0              | \$0          | \$37,006,000  |
| Construction | STU  | \$0              | \$0              | \$0              | \$0              | \$0          | \$86,471,000  |
| Construction | 581  | \$0              | \$0              | \$0              | \$0              | \$8,188,000  | \$76,418,714  |
|              |      | \$0              | \$0              | \$6,158,000      | \$7,842,000      | \$47,413,000 | \$400,471,296 |

Total Twelve Year Program Costs - \$461,884,296

TIP Project Details Page 1 of 2



## **TIP Project Details**

## MPMS 87781: US 30, Coatesville Downingtown Bypass (CER-Eastern Section)

### East Caln Township, Chester County

AQ Code: 2045M

CMP Code: 7E (www.dvrpc.org//www.dvrpc.org/asp/cmp/PACMP2015Detail.asp?

corridor=7&subcorridor=E)

Limits: US 30, from East of Reeceville Rd Interchange to Quarry Rd.

Sponsor:

This project provides for the final design, right-of-way, utility and construction phases of the Coatesville-Downingtown Bypass Reconstruction - eastern section - by reconstructing and widening the mainline shoulders; replacing and widening the mainline bridge superstructures; constructing new ramps (to complete partial interchanges); reconstructing, realigning, and lengthening all on and off ramps (to provide storage length for traffic signals and/or ramp metering); and reconstructing arterial overpasses. The overall corridor construction cost estimate is \$630 million. MPMS# 14532 provides for the preliminary design portion of this project and the western section, as well as additional study work to determine the approach for this eastern section. MPMS# 84884 contains the construction of the western section. Project CMP (Congestion Management Process) commitments include expansion of Intelligent Transportation Systems (ITS) equipment throughout the corridor, signal improvements on parallel arterials, numerous improvements to rail transit stations and services in consultation with SEPTA and Amtrak, improved access to rail stations, sidewalks and other improvements for pedestrians and bicyclists on parallel arterials, investigation of park-and-ride locations, and outreach to employers to promote transportation demand management strategies. See DVRPC□s 2016-2017 memorandum on supplemental strategies for details related to this project.

TIP Project Details Page 2 of 2

TIP Program Years (\$000) Later FYs

| Phase    | Fund      | 2017 | 2018 | 2019 | 2020  | 2021-2024 | 2025-2028 |
|----------|-----------|------|------|------|-------|-----------|-----------|
| FD       | TOLL      | 0    | 0    | 0    | 0     | 0         | 0         |
| FD       | STP       | 0    | 0    | 158  | 0     | 0         | 0         |
| FD       | STU       | 0    | 0    | 0    | 0     | 6520      | 0         |
| FD       | NHPP      | 0    | 0    | 6000 | 7842  | 0         | 0         |
| ROW      | 581       | 0    | 0    | 0    | 0     | 3810      | 0         |
| UTL      | 581       | 0    | 0    | 0    | 0     | 187       | 0         |
| UTL      | NHPP      | 0    | 0    | 0    | 0     | 752       | 0         |
| CON      | 581       | 0    | 0    | 0    | 0     | 8188      | 76420     |
| CON      | STU       | 0    | 0    | 0    | 0     | 0         | 86471     |
| CON      | STP       | 0    | 0    | 0    | 0     | 0         | 37006     |
| CON      | NHPP      | 0    | 0    | 0    | 0     | 27956     | 201575    |
| Fiscal Y | ear Total | 0    | 0    | 6158 | 7842  | 47413     | 401472    |
| Total FY | 2017-202  | 20   |      |      | 14000 | Later FY  | 448885    |

# APPENDIX F CONFLICT FACTOR EVALUATION

#### LEFT TURN SIGNALIZATION DOCUMENTATION

2023 Projected Conditions

COUNTY: <u>Chester County</u> MUNICIPALITY: <u>Caln Township</u>

INTERSECTION: Manor Avenue (E/W) @ Rock Raymond/Proposed Driveway

|          |           | Left Turn             |           |        | Opposing |            | Calculated             | Required        |
|----------|-----------|-----------------------|-----------|--------|----------|------------|------------------------|-----------------|
| Time     | Direction | <b>Exclusive Lane</b> | Per Cycle | Volume | Volume   | # of Lanes | <b>Conflict Factor</b> | Conflict Factor |
| AM PEAK  | WB L      | Y                     | 0.22      | 7      | 808      | 1          | 5,656                  | 50,000          |
| PM PEAK  | WB L      | Y                     | 0.42      | 15     | 583      | 1          | 8,745                  | 50,000          |
| SAT PEAK | WB L      | Y                     | 0.47      | 17     | 518      | 1          | 8,806                  | 50,000          |

\*Volumes based upon 2023 Projected Conditions

AM Cycle Length (Seconds) - 115
PM Cycle Length (Seconds) - 100
SAT Cycle Length (Seconds) - 75

| DIRECTION | LEFT TURN PHASES Warrant Satified |           |  |  |  |
|-----------|-----------------------------------|-----------|--|--|--|
| DIRECTION | Prot/Perm                         | Prot/Proh |  |  |  |
| Eastbound | NO                                | NO        |  |  |  |
| Westbound | NO                                | NO        |  |  |  |

Protected/Permitted

No Turn Lane >35,000 one lane >45,000 two lane Turn Lane >50,000 one lane >65,000 two lane

Protected/Prohibited

Turn Lane >67,500 one lane >90,000 two lane

# **APPENDIX G** *INTERACTION WORKSHEETS*

| NCHRP 684 Internal Trip Capture Estimation Tool |                              |  |               |            |  |  |  |  |
|---|------------------------------|--|---------------|------------|--|--|--|--|
| Project Name:                                   | WIME.00001                   |  | Organization: | TPD        |  |  |  |  |
| Project Location:                               | Caln Township/Chester County |  | Performed By: | mb         |  |  |  |  |
| Scenario Description:                           | Projected Conditions         |  | Date:         | 10/29/2018 |  |  |  |  |
| Analysis Year:                                  |                              |  | Checked By:   |            |  |  |  |  |
| Analysis Period:                                | AM Street Peak Hour          |  | Date:         |            |  |  |  |  |

|                                  |                       | ent Data (For Info | •     |   | stimates (Single-Use Site Estimate)  Estimated Vehicle-Trips <sup>3</sup> |          |         |  |
|----------------------------------|-----------------------|--------------------|-------|---|---|----------|---------|--|
| Land Use                         | ITE LUCs <sup>1</sup> | Quantity           | Units | - | Total   | Entering | Exiting |  |
| Office                           |                       |                    |       |   | 0   |          |         |  |
| Retail                           | 820                   | 20                 | ksf   |   | 19  | 12       | 7       |  |
| Restaurant                       |                       |                    |       |   | 0   |          |         |  |
| Cinema/Entertainment             |                       |                    |       |   | 0   |          |         |  |
| Residential                      | 251 / 252             | 346                | du    |   | 96  | 33       | 63      |  |
| Hotel                            |                       |                    |       |   | 0   |          |         |  |
| All Other Land Uses <sup>2</sup> |                       |                    |       |   | 0   |          |         |  |
|                                  |                       |                    |       |   | 115   | 45       | 70      |  |

|                                  | Table 2-A: Mode Split and Vehicle Occupancy Estimates |           |                 |            |           |                 |  |  |
|----------------------------------|---|-----------|-----------------|------------|-----------|-----------------|--|--|
| Entering Trips                   |   | •         | Exiting Trips   |            |           |                 |  |  |
| Land Use                         | Veh. Occ.4  | % Transit | % Non-Motorized | Veh. Occ.4 | % Transit | % Non-Motorized |  |  |
| Office                           |   |           |                 |            |           |                 |  |  |
| Retail                           |   |           |                 |            |           |                 |  |  |
| Restaurant                       |   |           |                 |            |           |                 |  |  |
| Cinema/Entertainment             |   |           |                 |            |           |                 |  |  |
| Residential                      |   |           |                 |            |           |                 |  |  |
| Hotel                            |   |           |                 |            |           |                 |  |  |
| All Other Land Uses <sup>2</sup> |   |           |                 |            |           |                 |  |  |

| Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance) |        |        |            |                      |             |       |  |
|---|--------|--------|------------|----------------------|-------------|-------|--|
| Origin (From)   |        |        |            | Destination (To)     |             |       |  |
| Origin (From)   | Office | Retail | Restaurant | Cinema/Entertainment | Residential | Hotel |  |
| Office  |        |        |            |                      |             |       |  |
| Retail  |        |        |            |                      |             |       |  |
| Restaurant  |        |        |            |                      |             |       |  |
| Cinema/Entertainment  |        |        |            |                      |             |       |  |
| Residential   |        |        |            |                      |             |       |  |
| Hotel   |        |        |            |                      |             |       |  |

| Table 4-A: Internal Person-Trip Origin-Destination Matrix* |        |        |            |                      |             |       |  |  |
|--|--------|--------|------------|----------------------|-------------|-------|--|--|
| Destination (To)   |        |        |            |                      |             |       |  |  |
| Origin (From)  | Office | Retail | Restaurant | Cinema/Entertainment | Residential | Hotel |  |  |
| Office   |        | 0      | 0          | 0                    | 0           | 0     |  |  |
| Retail   | 0      |        | 0          | 0                    | 1           | 0     |  |  |
| Restaurant   | 0      | 0      |            | 0                    | 0           | 0     |  |  |
| Cinema/Entertainment                                       | 0      | 0      | 0          |                      | 0           | 0     |  |  |
| Residential  | 0      | 1      | 0          | 0                    |             | 0     |  |  |
| Hotel  | 0      | 0      | 0          | 0                    | 0           |       |  |  |

| Table 5-A: Computations Summary           |       |          |         |  |  |  |  |
|---|-------|----------|---------|--|--|--|--|
|   | Total | Entering | Exiting |  |  |  |  |
| All Person-Trips                          | 115   | 45       | 70      |  |  |  |  |
| Internal Capture Percentage               | 3%    | 4%       | 3%      |  |  |  |  |
|   |       |          |         |  |  |  |  |
| External Vehicle-Trips <sup>5</sup>       | 111   | 43       | 68      |  |  |  |  |
| External Transit-Trips <sup>6</sup>       | 0     | 0        | 0       |  |  |  |  |
| External Non-Motorized Trips <sup>6</sup> | 0     | 0        | 0       |  |  |  |  |

| Table 6-A: Internal Trip Capture Percentages by Land Use |                |               |  |  |  |  |
|--|----------------|---------------|--|--|--|--|
| Land Use   | Entering Trips | Exiting Trips |  |  |  |  |
| Office   | N/A            | N/A           |  |  |  |  |
| Retail   | 8%             | 14%           |  |  |  |  |
| Restaurant   | N/A            | N/A           |  |  |  |  |
| Cinema/Entertainment                                     | N/A            | N/A           |  |  |  |  |
| Residential  | 3%             | 2%            |  |  |  |  |
| Hotel  | N/A            | N/A           |  |  |  |  |

<sup>1</sup>Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

<sup>6</sup>Person-Trips

\*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

<sup>&</sup>lt;sup>2</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

<sup>&</sup>lt;sup>3</sup>Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual* ).

<sup>&</sup>lt;sup>4</sup>Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

<sup>&</sup>lt;sup>5</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

| Project Name:    | WIME.00001          |
|------------------|---------------------|
| Analysis Period: | AM Street Peak Hour |

| Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends |           |                   |               |  |           |                              |               |
|--|-----------|-------------------|---------------|--|-----------|------------------------------|---------------|
| Land Use   | Tab       | le 7-A (D): Enter | ing Trips     |  |           | Table 7-A (O): Exiting Trips | 1             |
| Land Use   | Veh. Occ. | Vehicle-Trips     | Person-Trips* |  | Veh. Occ. | Vehicle-Trips                | Person-Trips* |
| Office   | 1.00      | 0                 | 0             |  | 1.00      | 0                            | 0             |
| Retail   | 1.00      | 12                | 12            |  | 1.00      | 7                            | 7             |
| Restaurant   | 1.00      | 0                 | 0             |  | 1.00      | 0                            | 0             |
| Cinema/Entertainment   | 1.00      | 0                 | 0             |  | 1.00      | 0                            | 0             |
| Residential  | 1.00      | 33                | 33            |  | 1.00      | 63                           | 63            |
| Hotel  | 1.00      | 0                 | 0             |  | 1.00      | 0                            | 0             |

| Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin) |                  |        |            |                      |             |       |  |
|--|------------------|--------|------------|----------------------|-------------|-------|--|
| Origin (Fram)  | Destination (To) |        |            |                      |             |       |  |
| Origin (From)  | Office           | Retail | Restaurant | Cinema/Entertainment | Residential | Hotel |  |
| Office   |                  | 0      | 0          | 0                    | 0           | 0     |  |
| Retail   | 2                |        | 1          | 0                    | 1           | 0     |  |
| Restaurant   | 0                | 0      |            | 0                    | 0           | 0     |  |
| Cinema/Entertainment   | 0                | 0      | 0          |                      | 0           | 0     |  |
| Residential  | 1                | 1      | 13         | 0                    |             | 0     |  |
| Hotel  | 0                | 0      | 0          | 0                    | 0           |       |  |

| Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination) |                  |        |            |                      |             |       |  |
|---|------------------|--------|------------|----------------------|-------------|-------|--|
| Origin (Fram)   | Destination (To) |        |            |                      |             |       |  |
| Origin (From)   | Office           | Retail | Restaurant | Cinema/Entertainment | Residential | Hotel |  |
| Office  |                  | 4      | 0          | 0                    | 0           | 0     |  |
| Retail  | 0                |        | 0          | 0                    | 1           | 0     |  |
| Restaurant  | 0                | 1      |            | 0                    | 2           | 0     |  |
| Cinema/Entertainment  | 0                | 0      | 0          |                      | 0           | 0     |  |
| Residential   | 0                | 2      | 0          | 0                    |             | 0     |  |
| Hotel   | 0                | 0      | 0          | 0                    | 0           |       |  |

|                                  | Table 9-A (D): Internal and External Trips Summary (Entering Trips) |                       |       |  |                         |                      |                            |  |
|----------------------------------|---|-----------------------|-------|--|-------------------------|----------------------|----------------------------|--|
| Destination Land Use             | ı   | Person-Trip Estimates |       |  | External Trips by Mode* |                      |                            |  |
| Destination Land Use             | Internal  | External              | Total |  | Vehicles <sup>1</sup>   | Transit <sup>2</sup> | Non-Motorized <sup>2</sup> |  |
| Office                           | 0   | 0                     | 0     |  | 0                       | 0                    | 0                          |  |
| Retail                           | 1   | 11                    | 12    |  | 11                      | 0                    | 0                          |  |
| Restaurant                       | 0   | 0                     | 0     |  | 0                       | 0                    | 0                          |  |
| Cinema/Entertainment             | 0   | 0                     | 0     |  | 0                       | 0                    | 0                          |  |
| Residential                      | 1   | 32                    | 33    |  | 32                      | 0                    | 0                          |  |
| Hotel                            | 0   | 0                     | 0     |  | 0                       | 0                    | 0                          |  |
| All Other Land Uses <sup>3</sup> | 0   | 0                     | 0     |  | 0                       | 0                    | 0                          |  |

|                                  | Table 9-A (O): Internal and External Trips Summary (Exiting Trips) |                  |       |  |                         |                      |                            |  |
|----------------------------------|--|------------------|-------|--|-------------------------|----------------------|----------------------------|--|
| Origin Land Has                  |  | Person-Trip Esti | mates |  | External Trips by Mode* |                      |                            |  |
| Origin Land Use                  | Internal   | External         | Total |  | Vehicles <sup>1</sup>   | Transit <sup>2</sup> | Non-Motorized <sup>2</sup> |  |
| Office                           | 0  | 0                | 0     |  | 0                       | 0                    | 0                          |  |
| Retail                           | 1  | 6                | 7     |  | 6                       | 0                    | 0                          |  |
| Restaurant                       | 0  | 0                | 0     |  | 0                       | 0                    | 0                          |  |
| Cinema/Entertainment             | 0  | 0                | 0     |  | 0                       | 0                    | 0                          |  |
| Residential                      | 1  | 62               | 63    |  | 62                      | 0                    | 0                          |  |
| Hotel                            | 0  | 0                | 0     |  | 0                       | 0                    | 0                          |  |
| All Other Land Uses <sup>3</sup> | 0  | 0                | 0     |  | 0                       | 0                    | 0                          |  |

<sup>1</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

<sup>2</sup>Person-Trips

<sup>3</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator \*Indicates computation that has been rounded to the nearest whole number.

|                       | NCHRP 684 Internal Trip Capture Estimation Tool |       |               |            |  |  |  |  |
|-----------------------|---|-------|---------------|------------|--|--|--|--|
| Project Name:         | WIME.00001                                      |       | Organization: | TPD        |  |  |  |  |
| Project Location:     | Caln Township/Chester County                    |       | Performed By: | mb         |  |  |  |  |
| Scenario Description: | Projected Conditions                            |       | Date:         | 10/29/2018 |  |  |  |  |
| Analysis Year:        | Analysis Year:                                  |       |               |            |  |  |  |  |
| Analysis Period:      | PM Street Peak Hour                             | Date: |               |            |  |  |  |  |

|                                  | Developme | ent Data (For Infe | ormation Only) |       | Estimated Vehicle-Trips <sup>3</sup> |         |
|----------------------------------|-----------|--------------------|----------------|-------|--------------------------------------|---------|
| Land Use                         | ITE LUCs1 | Quantity           | Units          | Total | Entering                             | Exiting |
| Office                           |           |                    |                | 0     |                                      |         |
| Retail                           | 820       | 20                 | ksf            | 74    | 36                                   | 38      |
| Restaurant                       |           |                    |                | 0     |                                      |         |
| Cinema/Entertainment             |           |                    |                | 0     |                                      |         |
| Residential                      | 251 / 252 | 346                | du             | 108   | 62                                   | 46      |
| Hotel                            |           |                    |                | 0     |                                      |         |
| All Other Land Uses <sup>2</sup> |           |                    |                | 0     |                                      |         |
|                                  |           |                    |                | 182   | 98                                   | 84      |

|                                  | Table 2-P: Mode Split and Vehicle Occupancy Estimates |             |                 |            |               |                 |  |
|----------------------------------|---|-------------|-----------------|------------|---------------|-----------------|--|
|                                  |   | Entering Tr | ips             |            | Exiting Trips |                 |  |
| Land Use                         | Veh. Occ.4  | % Transit   | % Non-Motorized | Veh. Occ.⁴ | % Transit     | % Non-Motorized |  |
| Office                           |   |             |                 |            |               |                 |  |
| Retail                           |   |             |                 |            |               |                 |  |
| Restaurant                       |   |             |                 |            |               |                 |  |
| Cinema/Entertainment             |   |             |                 |            |               |                 |  |
| Residential                      |   |             |                 |            |               |                 |  |
| Hotel                            |   |             |                 |            |               |                 |  |
| All Other Land Uses <sup>2</sup> |   |             |                 |            |               |                 |  |

| Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance) |        |        |            |                      |             |       |
|---|--------|--------|------------|----------------------|-------------|-------|
| Origin (From)   |        |        |            | Destination (To)     |             |       |
| Origin (From)   | Office | Retail | Restaurant | Cinema/Entertainment | Residential | Hotel |
| Office  |        |        |            |                      |             |       |
| Retail  |        |        |            |                      |             |       |
| Restaurant  |        |        |            |                      |             |       |
| Cinema/Entertainment  |        |        |            |                      |             |       |
| Residential   |        |        |            |                      |             |       |
| Hotel   |        |        |            |                      |             |       |

| Table 4-P: Internal Person-Trip Origin-Destination Matrix <sup>⋆</sup> |        |                  |            |                      |             |       |  |  |
|--|--------|------------------|------------|----------------------|-------------|-------|--|--|
| Origin (From)  |        | Destination (To) |            |                      |             |       |  |  |
| Origin (From)  | Office | Retail           | Restaurant | Cinema/Entertainment | Residential | Hotel |  |  |
| Office   |        | 0                | 0          | 0                    | 0           | 0     |  |  |
| Retail   | 0      |                  | 0          | 0                    | 10          | 0     |  |  |
| Restaurant   | 0      | 0                |            | 0                    | 0           | 0     |  |  |
| Cinema/Entertainment   | 0      | 0                | 0          |                      | 0           | 0     |  |  |
| Residential  | 0      | 4                | 0          | 0                    |             | 0     |  |  |
| Hotel  | 0      | 0                | 0          | 0                    | 0           |       |  |  |

| Table 5-P: Computations Summary           |     |     |     |  |  |  |  |
|---|-----|-----|-----|--|--|--|--|
| Total Entering Exiting                    |     |     |     |  |  |  |  |
| All Person-Trips                          | 182 | 98  | 84  |  |  |  |  |
| Internal Capture Percentage               | 15% | 14% | 17% |  |  |  |  |
|   |     |     |     |  |  |  |  |
| External Vehicle-Trips <sup>5</sup>       | 154 | 84  | 70  |  |  |  |  |
| External Transit-Trips <sup>6</sup>       | 0   | 0   | 0   |  |  |  |  |
| External Non-Motorized Trips <sup>6</sup> | 0   | 0   | 0   |  |  |  |  |

| Table 6-P: Internal Trip Capture Percentages by Land Use |                |               |  |  |  |  |  |
|--|----------------|---------------|--|--|--|--|--|
| Land Use   | Entering Trips | Exiting Trips |  |  |  |  |  |
| Office   | N/A            | N/A           |  |  |  |  |  |
| Retail   | 11%            | 26%           |  |  |  |  |  |
| Restaurant   | N/A            | N/A           |  |  |  |  |  |
| Cinema/Entertainment                                     | N/A            | N/A           |  |  |  |  |  |
| Residential  | 16%            | 9%            |  |  |  |  |  |
| Hotel  | N/A            | N/A           |  |  |  |  |  |

<sup>1</sup>Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

<sup>2</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

<sup>3</sup>Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

<sup>4</sup>Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be <sup>5</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

<sup>6</sup>Person-Trips

\*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

| Project Name:    | WIME.00001          |
|------------------|---------------------|
| Analysis Period: | PM Street Peak Hour |

|                      | T         | able 7-P: Conver    | sion of Vehicle-Tr | ip E | nds to Person-Trip En        | ds            |               |  |  |  |
|----------------------|-----------|---------------------|--------------------|------|------------------------------|---------------|---------------|--|--|--|
| Land Use             | Table     | e 7-P (D): Entering | Trips              |      | Table 7-P (O): Exiting Trips |               |               |  |  |  |
| Land USE             | Veh. Occ. | Vehicle-Trips       | ips Person-Trips*  |      | Veh. Occ.                    | Vehicle-Trips | Person-Trips* |  |  |  |
| Office               | 1.00      | 0                   | 0                  | 1    | 1.00                         | 0             | 0             |  |  |  |
| Retail               | 1.00      | 36                  | 36                 |      | 1.00                         | 38            | 38            |  |  |  |
| Restaurant           | 1.00      | 0                   | 0                  |      | 1.00                         | 0             | 0             |  |  |  |
| Cinema/Entertainment | 1.00      | 0                   | 0                  |      | 1.00                         | 0             | 0             |  |  |  |
| Residential          | 1.00      | 62                  | 62                 |      | 1.00                         | 46            | 46            |  |  |  |
| Hotel                | 1.00      | 0                   | 0                  |      | 1.00                         | 0             | 0             |  |  |  |

|                      | Table 8-P (0 | D): Internal Pers | on-Trip Origin-De | stination Matrix (Computed | at Origin)  |       |
|----------------------|--------------|-------------------|-------------------|----------------------------|-------------|-------|
| Origin (From)        |              |                   |                   | Destination (To)           |             |       |
| Oligili (Floili)     | Office       | Retail            | Restaurant        | Cinema/Entertainment       | Residential | Hotel |
| Office               |              | 0                 | 0                 | 0                          | 0           | 0     |
| Retail               | 1            |                   | 11                | 2                          | 10          | 2     |
| Restaurant           | 0            | 0                 |                   | 0                          | 0           | 0     |
| Cinema/Entertainment | 0            | 0                 | 0                 |                            | 0           | 0     |
| Residential          | 2            | 19                | 10                | 0                          |             | 1     |
| Hotel                | 0            | 0                 | 0                 | 0                          | 0           |       |

|                      | Table 8-P (D): | Internal Person | -Trip Origin-Desti | nation Matrix (Computed at | Destination) |   |
|----------------------|----------------|-----------------|--------------------|----------------------------|--------------|---|
| Origin (Fram)        |                |                 |                    | Destination (To)           |              |   |
| Origin (From)        | Office         | Retail          | Restaurant         | Residential                | Hotel        |   |
| Office               |                | 3               | 0                  | 0                          | 2            | 0 |
| Retail               | 0              |                 | 0                  | 0                          | 29           | 0 |
| Restaurant           | 0              | 18              |                    | 0                          | 10           | 0 |
| Cinema/Entertainment | 0              | 1               | 0                  |                            | 2            | 0 |
| Residential          | 0              | 4               | 0                  | 0                          |              | 0 |
| Hotel                | 0              | 1               | 0                  | 0                          | 0            |   |

|                                  | Tal      | ole 9-P (D): Interi | nal and External T | rips | Summary (Entering Tr    | ips)                 |                            |  |  |  |
|----------------------------------|----------|---------------------|--------------------|------|-------------------------|----------------------|----------------------------|--|--|--|
| Destination Land Lles            | Р        | erson-Trip Estima   | ites               |      | External Trips by Mode* |                      |                            |  |  |  |
| Destination Land Use             | Internal | External            | Total              | Ī    | Vehicles <sup>1</sup>   | Transit <sup>2</sup> | Non-Motorized <sup>2</sup> |  |  |  |
| Office                           | 0        | 0                   | 0                  | Ī    | 0                       | 0                    | 0                          |  |  |  |
| Retail                           | 4        | 32                  | 36                 | Ī    | 32                      | 0                    | 0                          |  |  |  |
| Restaurant                       | 0        | 0                   | 0                  | Ī    | 0                       | 0                    | 0                          |  |  |  |
| Cinema/Entertainment             | 0        | 0                   | 0                  | Ī    | 0                       | 0                    | 0                          |  |  |  |
| Residential                      | 10       | 52                  | 62                 | Ī    | 52                      | 0                    | 0                          |  |  |  |
| Hotel                            | 0        | 0                   | 0                  | Ī    | 0                       | 0                    | 0                          |  |  |  |
| All Other Land Uses <sup>3</sup> | 0        | 0                   | 0                  |      | 0                       | 0                    | 0                          |  |  |  |

|                                  | Та       | ble 9-P (O): Inter | nal and External 1 | Γrip | s Summary (Exiting Trip | os)                  |                            |  |  |  |  |
|----------------------------------|----------|--------------------|--------------------|------|-------------------------|----------------------|----------------------------|--|--|--|--|
| Origin Land Llos                 | Pe       | erson-Trip Estima  | tes                |      | External Trips by Mode* |                      |                            |  |  |  |  |
| Origin Land Use                  | Internal | External           | Total              |      | Vehicles <sup>1</sup>   | Transit <sup>2</sup> | Non-Motorized <sup>2</sup> |  |  |  |  |
| Office                           | 0        | 0                  | 0                  |      | 0                       | 0                    | 0                          |  |  |  |  |
| Retail                           | 10       | 28                 | 38                 |      | 28                      | 0                    | 0                          |  |  |  |  |
| Restaurant                       | 0        | 0                  | 0                  |      | 0                       | 0                    | 0                          |  |  |  |  |
| Cinema/Entertainment             | 0        | 0                  | 0                  |      | 0                       | 0                    | 0                          |  |  |  |  |
| Residential                      | 4        | 42                 | 46                 |      | 42                      | 0                    | 0                          |  |  |  |  |
| Hotel                            | 0        | 0                  | 0                  |      | 0                       | 0                    | 0                          |  |  |  |  |
| All Other Land Uses <sup>3</sup> | 0        | 0                  | 0                  |      | 0                       | 0                    | 0                          |  |  |  |  |

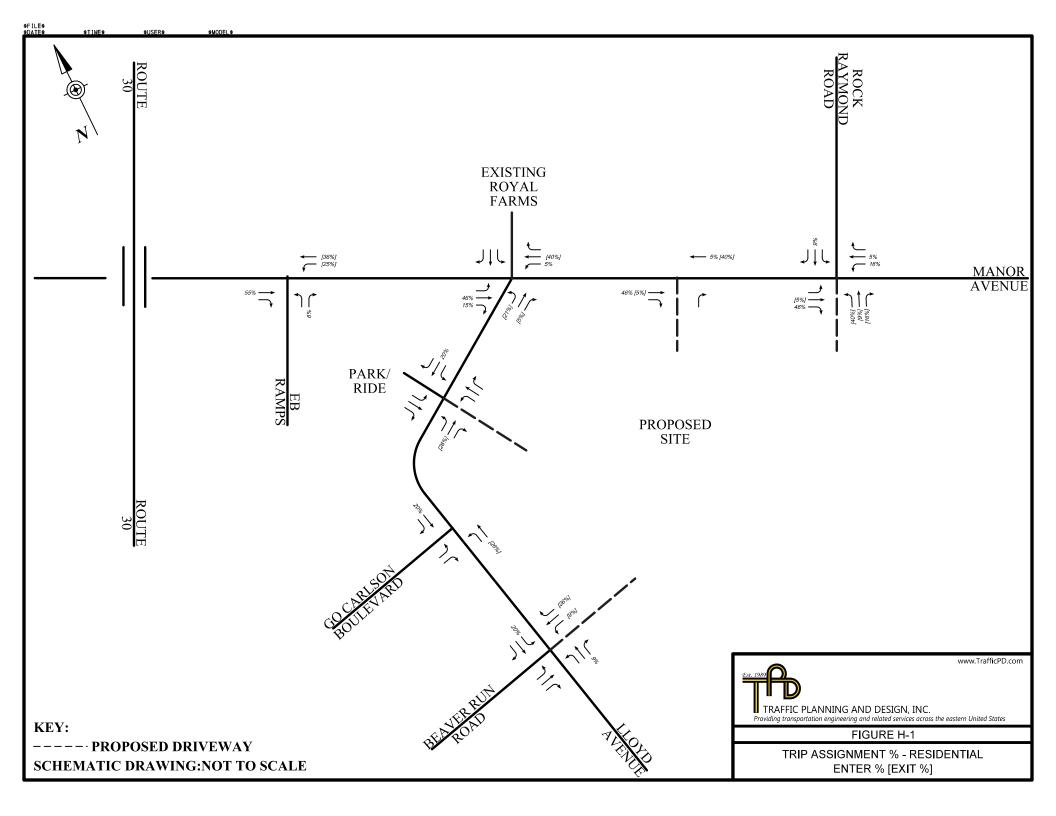
<sup>1</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

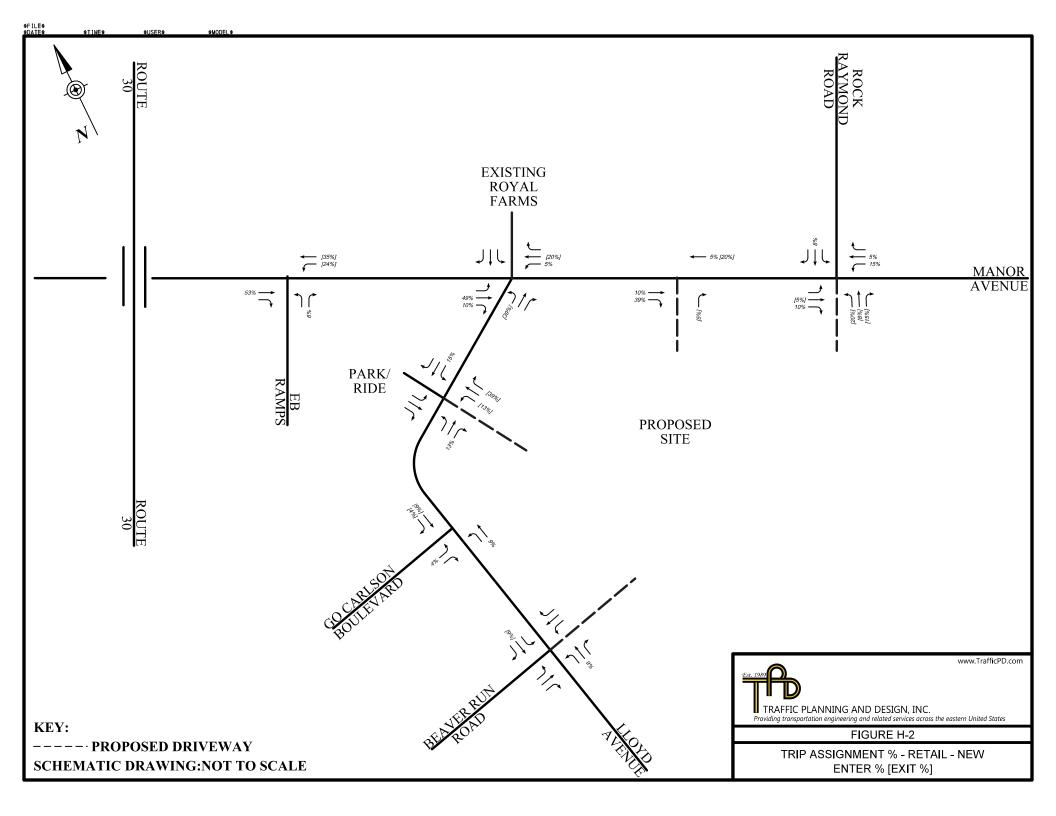
<sup>2</sup>Person-Trips

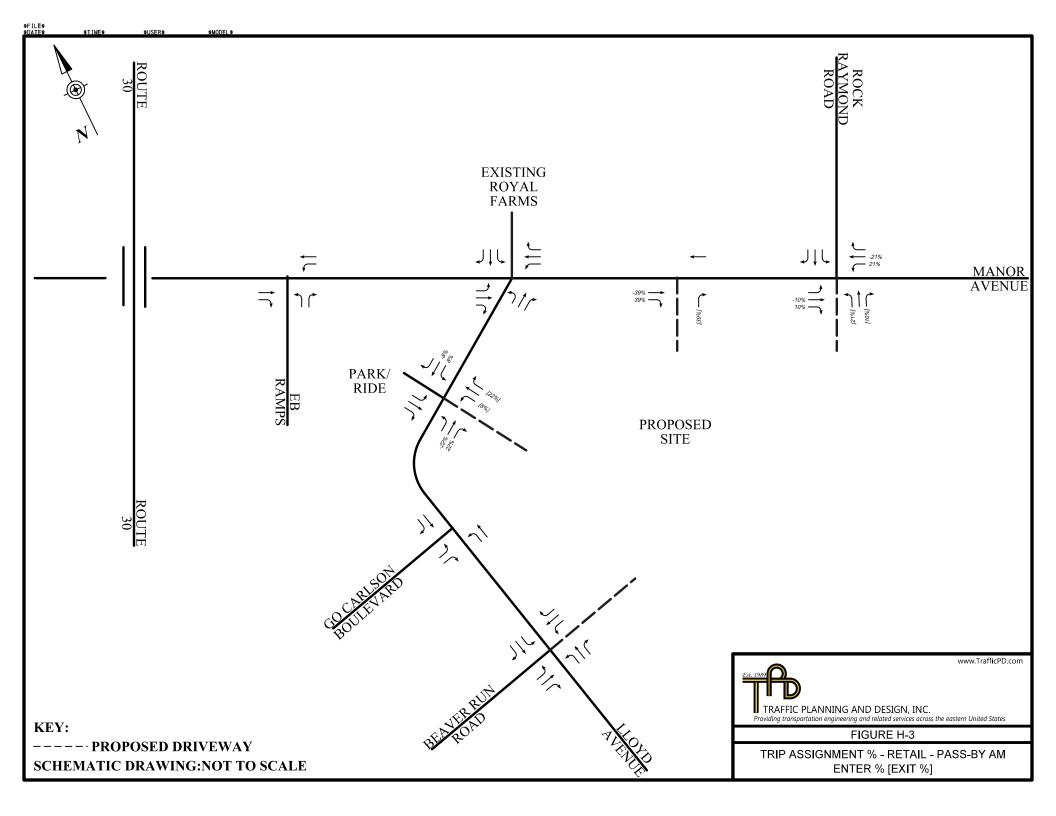
<sup>3</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

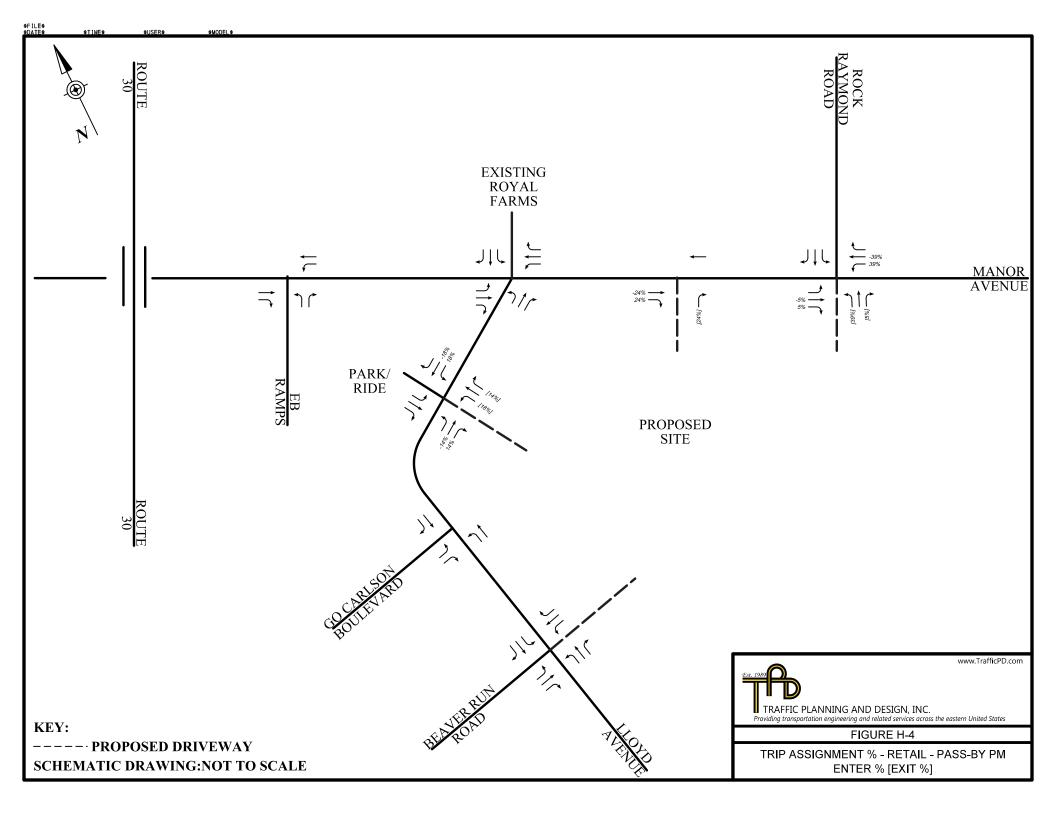
\*Indicates computation that has been rounded to the nearest whole number.

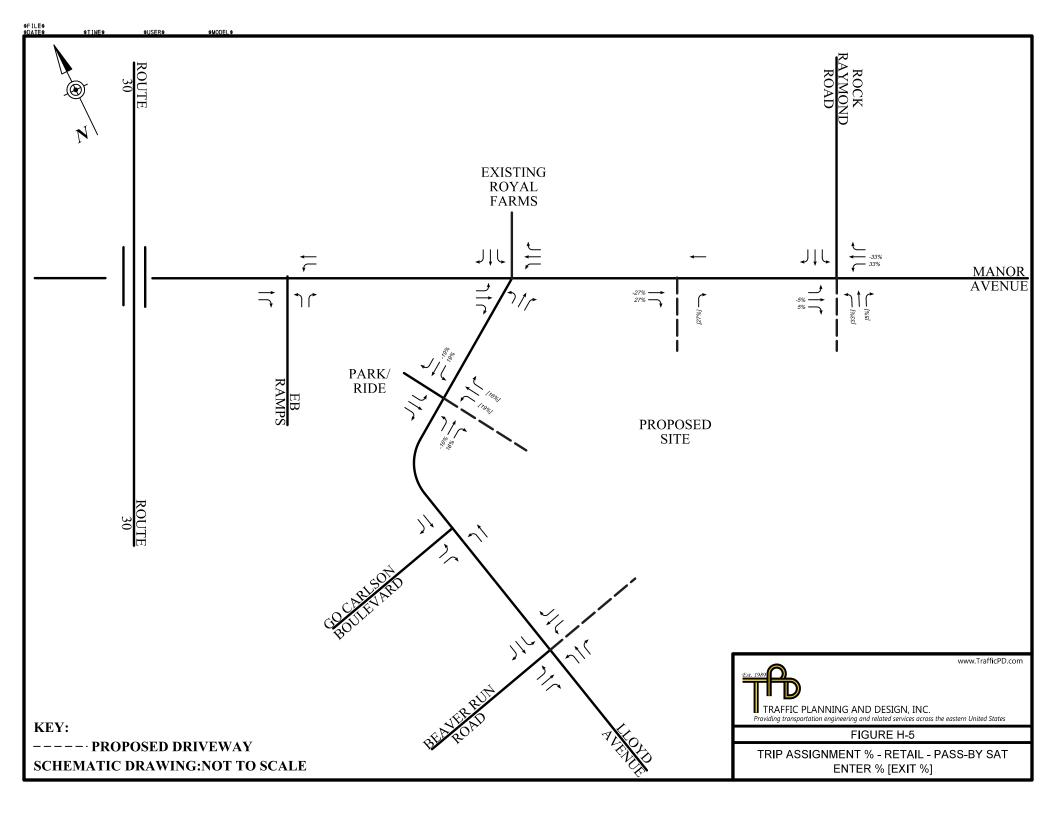
# **APPENDIX H**TRIP ASSIGNMENT DATA











## **APPENDIX I**

### **VOLUME DEVELOPMENT SPREADSHEETS**

TPD# WIME.00001

| 10/29/2018   |             |                   |             |          |                   |             |            |                    |            |            |                                       |             |                        |
|--|-------------|-------------------|-------------|----------|-------------------|-------------|------------|--------------------|------------|------------|---------------------------------------|-------------|------------------------|
| Traffic Volumes Worksheet<br>Intersection:                                       |             |                   |             | Route 32 | 2 (S.R. 0322      | ) & Rock Ra | aymond Roa | ad (S.R. 401       | 7)/Propose | d Driveway |                                       |             |                        |
| Synchro Node:  | 1           | Adjacent inters   | sections:   |          | West              | 0           | East       | 0                  | North      | 0          | South                                 | 0           |                        |
| Time Period: Weekday A.M. Peak Hour  |             |                   |             |          |                   |             |            |                    |            |            |                                       |             |                        |
|  |             | Eastbound         |             |          | Westbound         |             | 1          | Northbound         |            | ı          | Southbound                            |             | Intersection           |
|  | left        | thru              | right       | left     | thru              | right       | left       | thru               | right      | left       | thru                                  | right       | Volume                 |
| 2017 Existing Counts Balancing   | 280         | 732               |             |          | 175               | 101         |            |                    |            | 211        |                                       | 213         | 1712<br>0              |
| 2017 Existing Volumes (Balanced)   | 280         | 732               |             |          | 175               | 101         |            |                    |            | 211        |                                       | 213         | 1712                   |
| Base growth (0.65% compounded for 6 yrs)   | 11          | 29                |             |          | 7                 | 4           |            |                    |            | 8          |                                       | 8           | 67                     |
| Dwell at Caln PRD (384 units)  | 8           | 42                |             |          | 9                 | 1           |            |                    |            | 40         |                                       | 2           | 61                     |
| Taco Bell (2.753ksf)   | 6           | -14               |             |          | 2                 |             |            |                    |            | 16         |                                       | 4           | 15                     |
| 2023 Base Volumes  | 305         | 789               |             |          | 193               | 106         |            |                    |            | 235        |                                       | 227         | 1855                   |
|  | Residential |                   | P-By Retail |          |                   |             |            |                    |            |            |                                       |             |                        |
| ENTE<br>EX   |             | - 8<br>- 5        | 3           |          |                   |             |            |                    |            |            |                                       |             |                        |
|  |             |                   |             |          |                   | I           |            |                    | I          | ı          |                                       | I           | 1                      |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit       |             | 5.0%              | 46.0%       | 16.0%    | 5.0%              |             | 40.0%      | 9.0%               | 16.0%      |            | 9.0%                                  |             |                        |
| Trip Assignment % - Retail New Enter   |             |                   | 10.0%       | 15.0%    | 5.0%              |             |            |                    |            |            | 8.0%                                  |             |                        |
| Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter     |             | 5.0%<br>-10.0%    | 10.0%       | 21.0%    | -21.0%            |             | 20.0%      | 8.0%               | 15.0%      |            |                                       |             |                        |
| Trip Assignment % - Retail Pass-by Exit  |             | -                 | 15          |          | -                 |             | 21.0%      | -                  | 10.0%      |            | 3                                     |             | 60                     |
| Residential Trips Retail New Trips   |             | 3                 | 15<br>1     | 5<br>1   | 2                 |             | 25<br>1    | 6                  | 10         |            | 1                                     |             | 69<br>5                |
| Retail Pass-by Trips   |             |                   |             | (1)      | (-1)              | 1           |            |                    |            |            |                                       | 1           | 0                      |
| 2023 Projected Volumes   | 305         | 792               | 16          | 7        | 194               | 106         | 26         | 6                  | 11         | 235        | 4                                     | 227         | 1929                   |
| Time Period: Weekday P.M. Peak Hour  |             |                   |             |          |                   |             |            |                    |            |            |                                       |             |                        |
|  |             |                   |             | •        |                   |             |            |                    |            |            |                                       |             |                        |
|  | left        | Eastbound<br>thru | right       | left     | Westbound<br>thru | right       | left       | Northbound<br>thru | right      | left       | Southbound<br>thru                    | right       | Intersection<br>Volume |
| 2017 Existing Counts   | 83          | 519               |             |          | 680               | 77          |            |                    | <u> </u>   | 62         |                                       | 119         | 1540                   |
| Balancing 2017 Existing Volumes (Balanced)                                       | 83          | 519               |             |          | 680               | 77          |            |                    |            | 62         |                                       | 119         | 0<br><b>1540</b>       |
|  |             |                   |             |          |                   |             |            | 1                  |            |            |                                       |             |                        |
| Base growth (0.65% compounded for 6 yrs)  Dwell at Caln PRD (384 units)          | 3 4         | 21<br>22          |             |          | 27<br>41          | 3           |            |                    |            | 2          |                                       | 5<br>8      | 61<br>75               |
| Taco Bell (2.753ksf)   | 4           | -8                |             |          | 2                 | 1           |            |                    |            | 9          |                                       | 2           | 10                     |
| 2023 Base Volumes  | 94          | 554               |             |          | 750               | 81          |            |                    |            | 73         |                                       | 134         | 1686                   |
|  | Residential | New Retail        | P-By Retail |          |                   |             |            |                    |            |            |                                       |             |                        |
| ENTE   | R = 52      | 21                | 11          |          |                   |             |            |                    |            |            |                                       |             |                        |
| EX   | IT = 42     | 19                | 9           | 1        |                   |             |            |                    |            |            |                                       |             |                        |
| Trip Assignment % - Residential Enter  |             | 5.00/             | 46.0%       | 16.0%    | 5.0%              |             | 40.00/     | 0.00/              | 40.00/     |            | 9.0%                                  |             |                        |
| Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter        |             | 5.0%              | 10.0%       | 15.0%    | 5.0%              |             | 40.0%      | 9.0%               | 16.0%      |            | 8.0%                                  |             |                        |
| Trip Assignment % - Retail New Exit  |             | 5.0%              | E 00/       | 20.00/   | 20.00/            |             | 20.0%      | 8.0%               | 15.0%      |            |                                       |             |                        |
| Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit |             | -5.0%             | 5.0%        | 39.0%    | -39.0%            |             | 39.0%      |                    | 5.0%       |            |                                       |             |                        |
| Residential Trips Retail New Trips   |             | 2                 | 24          | 8        | 3                 |             | 17<br>4    | 4 2                | 7          |            | 5<br>2                                |             | 70<br>18               |
| Retail Pass-by Trips   |             | (-1)              | (1)         | (4)      | (-4)              |             | (4)        | - 2                | ,          |            | 2                                     |             | 4                      |
| 2023 Projected Volumes   | 94          | 556               | 27          | 15       | 750               | 81          | 25         | 6                  | 10         | 73         | 7                                     | 134         | 1778                   |
|  |             |                   | -           |          |                   |             |            |                    |            |            |                                       |             |                        |
| Time Period: Saturday Midday Peak Hour   |             |                   |             |          |                   |             |            |                    |            |            |                                       |             |                        |
|  | left.       | Eastbound         | el minde    | le#      | Westbound         | el alas     | le6        | Northbound         | ni mlad    | left       | Southbound                            | date        | Intersection           |
| 2017 Existing Counts   | left<br>65  | thru<br>453       | right       | left     | thru<br>419       | right<br>42 | left       | thru               | right      | left<br>39 | tnru                                  | right<br>79 | Volume<br>1097         |
| Balancing  | 65          | 453               |             |          | 419               | 42          |            |                    |            | 39         |                                       | 79          | 0<br>1097              |
| 2017 Existing Volumes (Balanced)   | 60          |                   |             |          |                   |             |            | l<br>              |            |            | · · · · · · · · · · · · · · · · · · · | 19          |                        |
| Base growth (0.65% compounded for 6 yrs)  Dwell at Caln PRD (384 units)          | 3 6         | 18<br>32          |             |          | 17<br>25          | 2           |            |                    |            | 2          | 1                                     | 3<br>5      | 45<br>68               |
| Taco Bell (2.753ksf)   | 7           | -14               |             |          | 6                 | 2           |            |                    |            | 21         |                                       | 5           | 27                     |
| 2023 Base Volumes  | 81          | 489               |             |          | 467               | 46          |            |                    |            | 62         | 1                                     | 92          | 1237                   |
|  | •           | New Retail        | P.Ry Potell | •        |                   |             |            | •                  |            |            |                                       |             |                        |
| ENTE   | R = 48      | 34                | 12          | ]        |                   |             |            |                    |            |            |                                       |             |                        |
| EX   | IT = 41     | 31                | 11          | j        |                   |             |            |                    |            |            |                                       |             |                        |
| Trip Assignment % - Residential Enter  |             |                   | 46.0%       | 16.0%    | 5.0%              |             |            |                    |            |            | 9.0%                                  |             |                        |
| Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter        |             | 5.0%              | 10.0%       | 15.0%    | 5.0%              |             | 40.0%      | 9.0%               | 16.0%      |            | 8.0%                                  |             |                        |
| Trip Assignment % - Retail New Exit  |             | 5.0%              |             |          |                   |             | 20.0%      | 8.0%               | 15.0%      |            | 0.070                                 |             |                        |
| Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit |             | -5.0%             | 5.0%        | 33.0%    | -33.0%            |             | 33.0%      |                    | 5.0%       | -          | 1                                     |             |                        |
| Residential Trips  |             | 2                 | 22          | 8        | 2                 |             | 16         | 4                  | 7          |            | 4                                     |             | 65                     |
| Retail New Trips Retail Pass-by Trips  |             | 2                 | 3           | 5        | 2                 | l           | 6 (4)      | 2                  | 5          | <b> </b>   | 3                                     | 1           | 28<br>5                |
|  |             | (-1)              | (1)         | (4)      | (-4)              |             | (4)        |                    | (1)        |            |                                       |             |                        |
| 2023 Projected Volumes   | 81          | (-1)<br>492       | (1)         | (4)      | (-4)<br>467       | 46          | 26         | 6                  | (1)        | 62         | 7                                     | 92          | 1335                   |

81 492 26 17 467 46 26 6 13 62 7 92 1335

2023 Projected Volumes

|   | Route 322 (S.R. 0322) & Lloyd Avenue/Royal Farms Driveway |      |   |      |   |       |   |       |   |  |  |  |
|---|---|------|---|------|---|-------|---|-------|---|--|--|--|
| 2 | Adjacent intersections:                                   | West | 0 | East | 0 | North | 0 | South | 0 |  |  |  |

#### Time Period: Weekday A.M. Peak Hour

|  |      | Eastbound |       |      | Westbound |       |      | Northbound |       |      | Southbound |       |        |
|--|------|-----------|-------|------|-----------|-------|------|------------|-------|------|------------|-------|--------|
|  | left | thru      | right | left | thru      | right | left | thru       | right | left | thru       | right | Volume |
| 2017 Existing Counts                     | 48   | 709       | 95    | 79   | 315       | 25    | 182  | 32         | 244   | 18   | 5          | 63    | 1815   |
| Balancing                                |      |           |       |      |           |       |      |            |       |      |            |       | 0      |
| 2017 Existing Volumes (Balanced)         | 48   | 709       | 95    | 79   | 315       | 25    | 182  | 32         | 244   | 18   | 5          | 63    | 1815   |
|  | •    | •         | •     |      | •         |       |      | •          |       |      | •          |       |        |
| Base growth (0.65% compounded for 6 yrs) |      | 28        | 4     | 3    | 12        |       | 7    |            | 10    |      |            |       | 64     |
| Dwell at Caln PRD (384 units)            |      | 50        | 8     |      | 11        |       | 2    |            |       |      |            |       | 71     |
| Taco Bell (2.753ksf)                     |      | 26        |       | 2    | 25        |       |      |            | 2     |      |            |       | 55     |
|  | •    | •         | •     |      | •         |       |      |            |       |      | •          |       |        |
| 2023 Base Volumes                        | 48   | 813       | 107   | 84   | 363       | 25    | 191  | 32         | 256   | 18   | 5          | 63    | 2005   |

|         | Residential | New Retail | P-By Retail |
|---------|-------------|------------|-------------|
| ENTER = | 32          | 8          | 3           |
| EXIT =  | 62          | 5          | 1           |

| 2023 Projected Volumes                   | 48 | 832   | 113   | 86   | 389   | 25 | 206   | 32 | 259  | 18 | 5 | 63 | 2076 |
|--|----|-------|-------|------|-------|----|-------|----|------|----|---|----|------|
| Retail Pass-by Trips                     |    |       |       |      |       |    |       |    |      |    |   |    | 0    |
| Retail New Trips                         |    | 4     | 1     |      | 1     |    | 2     |    |      |    |   |    | 8    |
| Residential Trips                        |    | 15    | 5     | 2    | 25    |    | 13    |    | 3    |    |   |    | 63   |
| Trip Assignment % - Retail Pass-by Exit  |    |       |       |      |       |    |       |    |      |    |   |    |      |
| Trip Assignment % - Retail Pass-by Enter |    |       |       |      |       |    |       |    |      |    |   |    |      |
| Trip Assignment % - Retail New Exit      |    |       |       |      | 20.0% |    | 39.0% |    |      |    |   |    |      |
| Trip Assignment % - Retail New Enter     |    | 49.0% | 10.0% | 5.0% |       |    |       |    |      |    |   |    |      |
| Trip Assignment % - Residential Exit     |    |       |       |      | 40.0% |    | 21.0% |    | 5.0% |    |   |    |      |
| Trip Assignment % - Residential Enter    |    | 46.0% | 15.0% | 5.0% |       |    |       |    |      |    |   |    | l    |

#### Time Period: Weekday P.M. Peak Hour

|  |      | Eastbound |       |      | Westbound |       |      | Northbound |       |      | Southbound |       | Intersection |
|--|------|-----------|-------|------|-----------|-------|------|------------|-------|------|------------|-------|--------------|
|  | left | thru      | right | left | thru      | right | left | thru       | right | left | thru       | right | Volume       |
| 2017 Existing Counts                     | 57   | 496       | 235   | 112  | 644       | 51    | 160  | 20         | 102   | 9    | 22         | 81    | 1989         |
| Balancing                                |      |           |       |      |           |       |      |            |       |      |            |       | 0            |
| 2017 Existing Volumes (Balanced)         | 57   | 496       | 235   | 112  | 644       | 51    | 160  | 20         | 102   | 9    | 22         | 81    | 1989         |
|  |      |           |       |      |           |       |      |            |       |      |            |       |              |
| Base growth (0.65% compounded for 6 yrs) |      | 20        | 9     | 4    | 26        |       | 6    |            | 4     |      |            |       | 69           |
| Dwell at Caln PRD (384 units)            |      | 26        | 4     |      | 49        |       | 8    |            |       |      |            |       | 87           |
| Taco Bell (2.753ksf)                     |      | 18        |       | 1    | 17        |       |      |            | 1     |      |            |       | 37           |
|  |      |           |       |      |           |       |      |            |       |      |            |       |              |
| 2023 Base Volumes                        | 57   | 560       | 248   | 117  | 736       | 51    | 174  | 20         | 107   | 9    | 22         | 81    | 2182         |

|         | Residential | New Retail | P-By Retail |
|---------|-------------|------------|-------------|
| ENTER = | 52          | 21         | 11          |
| EXIT =  | 42          | 19         | 9           |

| Trip Assignment % - Residential Enter    |    | 46.0% | 15.0% | 5.0% |       |    | 1     |    |      |   |    |    |      |
|--|----|-------|-------|------|-------|----|-------|----|------|---|----|----|------|
| Trip Assignment % - Residential Exit     |    |       |       |      | 40.0% |    | 21.0% |    | 5.0% |   |    |    |      |
| Trip Assignment % - Retail New Enter     |    | 49.0% | 10.0% | 5.0% |       |    |       |    |      |   |    |    |      |
| Trip Assignment % - Retail New Exit      |    |       |       |      | 20.0% |    | 39.0% |    |      |   |    |    |      |
| Trip Assignment % - Retail Pass-by Enter |    |       |       |      |       |    |       |    |      |   |    |    |      |
| Trip Assignment % - Retail Pass-by Exit  |    |       |       |      |       |    |       |    |      |   |    |    |      |
| Residential Trips                        |    | 24    | 8     | 3    | 17    |    | 9     |    | 2    |   |    |    | 63   |
| Retail New Trips                         |    | 10    | 2     | 1    | 4     |    | 7     |    |      |   |    |    | 24   |
| Retail Pass-by Trips                     |    |       |       |      |       |    |       |    |      |   |    |    | 0    |
|  |    |       |       |      |       |    |       |    |      |   |    |    |      |
| 2023 Projected Volumes                   | 57 | 594   | 258   | 121  | 757   | 51 | 190   | 20 | 109  | 9 | 22 | 81 | 2269 |

#### Time Period: Saturday Midday Peak Hour

|  |      | Eastbound |       |      | Westbound |       |      | Northbound |       |      | Southbound |       | Intersection |
|--|------|-----------|-------|------|-----------|-------|------|------------|-------|------|------------|-------|--------------|
|  | left | thru      | right | left | thru      | right | left | thru       | right | left | thru       | right | Volume       |
| 2017 Existing Counts                     | 54   | 433       | 205   | 61   | 406       | 46    | 179  | 21         | 50    | 19   | 15         | 78    | 1567         |
| Balancing                                |      |           |       |      |           |       |      |            |       |      |            |       | 0            |
| 2017 Existing Volumes (Balanced)         | 54   | 433       | 205   | 61   | 406       | 46    | 179  | 21         | 50    | 19   | 15         | 78    | 1567         |
|  |      |           |       |      |           |       |      |            |       |      |            |       |              |
| Base growth (0.65% compounded for 6 yrs) |      | 17        | 8     | 2    | 16        |       | 7    |            | 2     |      |            |       | 52           |
| Dwell at Caln PRD (384 units)            |      | 38        | 6     |      | 30        |       | 5    |            |       |      |            |       | 79           |
| Taco Bell (2.753ksf)                     |      | 33        |       | 4    | 32        |       |      |            | 4     |      |            |       | 73           |
|  |      |           |       | •    |           |       | •    |            |       | •    |            |       |              |
| 2023 Base Volumes                        | 54   | 521       | 219   | 67   | 484       | 46    | 191  | 21         | 56    | 19   | 15         | 78    | 1771         |

|         | Residential | New Retail | P-By Retail |
|---------|-------------|------------|-------------|
| ENTER = | 48          | 34         | 12          |
| EXIT =  | 41          | 31         | 11          |
|         |             |            |             |

|   |    |       |       | _    |       |    |       |    |      |    |    |    | _    |
|---|----|-------|-------|------|-------|----|-------|----|------|----|----|----|------|
| Trip Assignment % - Residential Enter                                       |    | 46.0% | 15.0% | 5.0% |       |    |       |    |      |    |    |    |      |
| Trip Assignment % - Residential Exit  |    |       |       |      | 40.0% |    | 21.0% |    | 5.0% |    |    |    |      |
| Trip Assignment % - Retail New Enter<br>Trip Assignment % - Retail New Exit |    | 49.0% | 10.0% | 5.0% |       |    |       |    |      |    |    |    |      |
| Trip Assignment % - Retail New Exit   |    |       |       |      | 20.0% |    | 39.0% |    |      |    |    |    |      |
| Trip Assignment % - Retail Pass-by Enter                                    |    |       |       |      |       |    |       |    |      |    |    |    |      |
| Trip Assignment % - Retail Pass-by Exit                                     |    |       |       |      |       |    |       |    |      |    |    |    |      |
| Residential Trips   |    | 22    | 7     | 2    | 16    |    | 9     |    | 2    |    |    |    | 58   |
| Retail New Trips  |    | 17    | 3     | 2    | 6     |    | 12    |    |      |    |    |    | 40   |
| Retail Pass-by Trips  |    |       |       |      |       |    |       |    |      |    |    |    | 0    |
|   |    |       |       |      |       |    |       |    |      |    |    | •  |      |
| 2023 Projected Volumes  | 54 | 560   | 229   | 71   | 506   | 46 | 212   | 21 | 58   | 19 | 15 | 78 | 1869 |

TPD# WIME.00001

| 10/29/2018   |                   |                  |  |   |   |   |        |                                 |                    |   |      |                    |       |  |
|--|-------------------|------------------|--|---|---|---|--------|---------------------------------|--------------------|---|------|--------------------|-------|--|
| Traffic Volumes Worksheet  |                   |                  |  |   |   |   |        |                                 |                    |   |      |                    |       |  |
| Intersection:  |                   |                  |  |   |   |   |        |                                 | Route 30 Ra        |   |      |                    |       |  |
| Synchro Node:  |                   | 3                | Adjacent inters  | ections:  |   | West  | 0      | East                            | 0                  | North                                     | 0    | South              | 0     |  |
| Time Period: Weekday A.M. Peak Hour  |                   |                  |  |   |   |   |        |                                 |                    |   |      |                    |       |  |
|  |                   |                  |  |   |   |   |        |                                 |                    |   |      |                    |       |  |
|  |                   |                  | Eastbound  |   |   | Westbound   |        |                                 | Northbound         |   |      | Southbound         |       | Intersection   |
| 2047 5 1 4 1 2   |                   | left             | thru   | right   | left  | thru  | right  | left                            | thru               | right                                     | left | thru               | right | Volume   |
| 2017 Existing Counts Balancing   |                   |                  | 703  | 592   | 262   | 299   |        | 11                              |                    | 166                                       |      |                    |       | <b>2033</b><br>0   |
| 2017 Existing Volumes (Balanced)   |                   |                  | 703  | 592   | 262   | 299   |        | 11                              |                    | 166                                       |      |                    |       | 2033   |
|  |                   |                  |  |   |   |   |        |                                 | 1                  |   |      | 1                  |       |  |
| Base growth (0.65% compounded for 6 yrs)   |                   |                  | 28   | 23  | 10  | 12  |        | 0                               |                    | 7   |      |                    |       | 80   |
| Dwell at Caln PRD (384 units)  |                   |                  | 58   | 58  |   | 13  |        | 4                               |                    |   |      |                    |       | 133  |
| Taco Bell (2.753ksf)   |                   |                  | 20   | -3  | 12  | 14  |        |                                 |                    | 6   |      |                    |       | 49   |
| 2023 Base Volumes  |                   |                  | 809  | 670   | 284   | 338   |        | 15                              |                    | 179                                       |      | 1                  |       | 2295   |
| 2020 Dase Volumes  |                   |                  | 003  | 0/0   | 204   | 330   |        | 10                              |                    | 173                                       |      |                    |       | 2233   |
|  |                   | Residential      | New Retail   | P-By Retail   |   |   |        |                                 |                    |   |      |                    |       |  |
|  | ENTER =           | 32               | 8  | 3   |   |   |        |                                 |                    |   |      |                    |       |  |
|  | EXIT =            | 62               | 5  | 1   |   |   |        |                                 |                    |   |      |                    |       |  |
| Trip Assignment % - Residential Enter  |                   |                  | 55.0%  |   |   |   |        |                                 |                    | 6.0%                                      |      |                    |       |  |
| Trip Assignment % - Residential Exit   |                   |                  | 33.0 /6  |   | 25.0%   | 36.0%   |        |                                 | -                  | 0.076                                     |      |                    |       |  |
| Trip Assignment % - Retail New Enter   |                   |                  | 53.0%  |   | 20.070  | 00.070  |        |                                 |                    | 6.0%                                      |      |                    |       |  |
| Trip Assignment % - Retail New Exit  |                   |                  |  |   | 24.0%   | 35.0%   |        |                                 |                    |   |      |                    |       |  |
| Trip Assignment % - Retail Pass-by Enter   |                   |                  |  |   |   |   |        |                                 |                    |   |      |                    |       |  |
| Trip Assignment % - Retail Pass-by Exit  |                   |                  |  |   | ,.  | 0.5   |        |                                 |                    |   |      | 1                  |       |  |
| Residential Trips  |                   |                  | 18<br>4  |   | 16<br>1   | 22  |        |                                 |                    | 2   |      |                    |       | 58<br>7  |
| Retail New Trips Retail Pass-by Trips  |                   |                  | 4  | ļ   | 1   | 2   |        |                                 | 1                  |   |      | <b> </b>           |       | 7  |
| Install I doo-uy Ilipo   |                   | l                | l  | 1   | l   |   |        | l                               | ıi                 |   | l    | 1                  |       | U  |
| 2023 Projected Volumes   |                   |                  | 831  | 670   | 301   | 362   |        | 15                              | 1                  | 181                                       |      |                    |       | 2360   |
|  |                   | •                | •  | •   |   |   |        |                                 |                    |   |      | •                  |       |  |
| Time Period: Weekday P.M. Peak Hour  |                   |                  |  |   |   |   |        |                                 |                    |   |      |                    |       |  |
| <u> </u>   |                   |                  |  |   |   |   |        |                                 |                    |   |      |                    |       |  |
|  |                   | left             | Eastbound<br>thru  | right   | left  | Westbound<br>thru   | right  | left                            | Northbound<br>thru | right                                     | left | Southbound<br>thru | right | Intersection<br>Volume   |
| 2017 Existing Counts   |                   | leit             | 571  | right<br>390  | 188   | 704   | rigrit | 8                               | triru              | right<br>200                              | ieit | triru              | right | 2061   |
| Balancing  |                   |                  | •  |   |   |   |        |                                 |                    | 200                                       |      |                    |       | 0  |
| 2017 Existing Volumes (Balanced)   |                   |                  | 571  | 390   | 188   | 704   |        | 8                               |                    | 200                                       |      |                    |       | 2061   |
|  |                   |                  |  | •   |   |   |        |                                 |                    |   |      | •                  |       |  |
| Base growth (0.65% compounded for 6 yrs)   |                   |                  | 23   | 15  | 7   | 28  |        | 0                               |                    | 8   |      |                    |       | 81   |
| Dwell at Caln PRD (384 units)  |                   |                  | 30   | 30  | _   | 57  |        | 13                              |                    |   |      |                    |       | 130  |
| Taco Bell (2.753ksf)   |                   |                  | 14   | -2  | 8   | 9   |        |                                 |                    | 4   |      |                    |       | 33   |
|  |                   |                  |  |   |   |   |        |                                 |                    |   |      |                    |       |  |
| 12023 Rase Volumes   |                   |                  | 638  | 433   | 203   | 798   |        | 21                              |                    | 212                                       |      |                    |       | 2305   |
| 2023 Base Volumes  |                   |                  | 638  | 433   | 203   | 798   |        | 21                              |                    | 212                                       |      |                    |       | 2305   |
| 2023 Base Volumes  |                   | Residential      | New Retail   | P-By Retail   | 203   | 798   |        | 21                              |                    | 212                                       |      |                    |       | 2305   |
| 2023 Base Volumes  | ENTER =           | 52               | New Retail   | P-By Retail   | 203   | 798   |        | 21                              |                    | 212                                       |      |                    |       | 2305   |
| 2023 Base Volumes  | ENTER =<br>EXIT = |                  | New Retail   | P-By Retail   | 203   | 798   |        | 21                              |                    | 212                                       |      |                    |       | 2305   |
|  |                   | 52               | New Retail<br>21<br>19   | P-By Retail   | 203   | 798   |        | 21                              |                    |   |      |                    |       | 2305   |
| Trip Assignment % - Residential Enter  |                   | 52               | New Retail   | P-By Retail   |   |   |        | 21                              |                    | 6.0%                                      |      |                    |       | 2305   |
| Trip Assignment % - Residential Enter<br>Trip Assignment % - Residential Exit  |                   | 52               | New Retail 21 19 55.0%   | P-By Retail   | 25.0%   | 798<br>36.0%  |        | 21                              |                    |   |      |                    |       | 2305   |
| Trip Assignment % - Residential Enter<br>Trip Assignment % - Residential Exit<br>Trip Assignment % - Retail New Enter<br>Trip Assignment % - Retail New Exit   |                   | 52               | New Retail<br>21<br>19   | P-By Retail   |   |   |        | 21                              |                    | 6.0%                                      |      |                    |       | 2305   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail New Exit  |                   | 52               | New Retail 21 19 55.0%   | P-By Retail   | 25.0%   | 36.0%   |        | 21                              |                    | 6.0%                                      |      |                    |       | 2305   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit   |                   | 52               | New Retail 21 19 55.0% 53.0%   | P-By Retail   | 25.0%<br>24.0%  | 36.0%<br>35.0%  |        | 21                              |                    | 6.0%                                      |      |                    |       |  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips   |                   | 52               | New Retail 21 19 55.0% 53.0%   | P-By Retail   | 25.0%<br>24.0%  | 36.0%<br>35.0%  |        | 21                              |                    | 6.0%                                      |      |                    |       | 58   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Residential Trips Retail New Trips  |                   | 52               | New Retail 21 19 55.0% 53.0%   | P-By Retail   | 25.0%<br>24.0%  | 36.0%<br>35.0%  |        | 21                              |                    | 6.0%                                      |      |                    |       | 58 24  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips   |                   | 52               | New Retail 21 19 55.0% 53.0%   | P-By Retail   | 25.0%<br>24.0%  | 36.0%<br>35.0%  |        | 21                              |                    | 6.0%                                      |      |                    |       | 58   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Residential Trips Retail New Trips  |                   | 52               | New Retail 21 19 55.0% 53.0%   | P-By Retail   | 25.0%<br>24.0%  | 36.0%<br>35.0%  |        | 21                              |                    | 6.0%                                      |      |                    |       | 58 24  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes  |                   | 52               | New Retail 21 19 55.0% 53.0% 29 11   | P-By Retail 11 9  | 25.0%<br>24.0%<br>11<br>5                               | 36.0%<br>35.0%<br>15<br>7   |        |                                 |                    | 6.0%                                      |      |                    |       | 58<br>24<br>0  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips Retail Pass-by Trips  |                   | 52               | New Retail 21 19 55.0% 53.0% 29 11   | P-By Retail 11 9  | 25.0%<br>24.0%<br>11<br>5                               | 36.0%<br>35.0%<br>15<br>7   |        |                                 |                    | 6.0%                                      |      |                    |       | 58<br>24<br>0  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes  |                   | 52               | New Retail   21   19     19  | P-By Retail 11 9  | 25.0%<br>24.0%<br>11<br>5                               | 36.0%<br>35.0%<br>15<br>7   |        |                                 |                    | 6.0%                                      |      |                    |       | 58<br>24<br>0  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes  |                   | 52 42            | New Retail 21 19 55.0% 53.0% 29 11 Eastbound   | P-By Retail 11 9  | 25.0%<br>24.0%<br>111<br>5                              | 36.0%<br>35.0%<br>15<br>7   | right  | 21                              | Northbound         | 6.0%                                      | left | Southbound         | right | 58 24 0 2387   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  |                   | 52               | New Retail   21   19     19  | P-By Retail 11 9  | 25.0%<br>24.0%<br>11<br>5                               | 36.0%<br>35.0%<br>15<br>7   | right  |                                 | Northbound thru    | 6.0%                                      | left | Southbound         | right | 58<br>24<br>0  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Peass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes Time Period: Saturday Midday Peak Hour 2017 Existing Counts Balancing  |                   | 52 42            | New Retail   21   19     55.0%     53.0%     29   11     678     Eastbound thru   520  | P-By Retail 11 9 9 433  | 25.0% 24.0% 11 5 219                                    | 36.0%<br>35.0%<br>15<br>7<br>820<br>Westbound<br>thru<br>427                | right  | 21 left 20                      |                    | 6.0%<br>6.0%<br>3<br>1<br>216             | left |                    | right | 58   24   0  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes Time Period: Saturday Midday Peak Hour 2017 Existing Counts   |                   | 52 42            | New Retail   21   19   | P-By Retail 11 9 433  | 25.0%<br>24.0%<br>11<br>5<br>219                        | 36.0%<br>35.0%<br>15<br>7<br>820  | right  | 21 left                         |                    | 6.0%<br>6.0%<br>3<br>1<br>216             | left |                    | right | 58 24 0 2387 Intersection Volume 1906  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail New Trips 2023 Projected Volumes Time Period: Saturday Midday Peak Hour 2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)   |                   | 52 42            | New Retail 21 19 19 55.0% 53.0% 53.0% 678 Eastbound thru 520 520   | P-By Retail 11 9 433 433  | 25.0% 24.0% 11 5 219 left 223 223                       | 36.0%<br>35.0%<br>15<br>7<br>820<br>Westbound<br>thru<br>427                | right  | 21<br>left<br>20<br>20          |                    | 6.0% 6.0% 3 1 216 right 173               | left |                    | right | 58 58 24 0 2387 2387 Volume 1996 0 1996  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Counts Balancing Balancing Balancing Balancing Balancing Balancing Balanced)   |                   | 52 42            | New Retail   21   19   19     55.0%     53.0%     29   11     678     Eastbound thru   520   520   21  | P-By Retail 11 9 433  | 25.0% 24.0% 11 5 219                                    | 36.0%<br>35.0%<br>15<br>7<br>820<br>Westbound<br>thru<br>427<br>427         | right  | 21 left 20 20 1                 |                    | 6.0%<br>6.0%<br>3<br>1<br>216             | left |                    | right | 58 24 0 2387 2387 Intersection Volume 1906 0 1906 77   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes Time Period: Saturday Midday Peak Hour 2017 Existing Counts Balancing 2017 Existing Volumes (Balanced) Base growth (0.65% compounded for 6 yrs) Dwell at Caln PRD (384 units)  |                   | 52 42            | New Retail 21 19 19 55.0% 53.0% 53.0% 678 Eastbound thru 520 520 21 44   | P-By Retail 11 9 433 433 543 543                                | 25.0% 24.0% 11 5 219 left 223 9                         | 36.0% 35.0% 15 7 820 Westbound thru 427 427 17 35                           | right  | 21<br>left<br>20<br>20          |                    | 6.0% 6.0% 3 1 216 right 173 7             | left |                    | right | 58 58 24 0 0 2387 2387 2387 1906 1906 77 131   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Counts Balancing Balancing Balancing Balancing Balancing Balancing Balanced)   |                   | 52 42            | New Retail   21   19   19     55.0%     53.0%     29   11     678     Eastbound thru   520   520   21  | P-By Retail 11 9 433  | 25.0% 24.0% 11 5 219 left 223 223                       | 36.0%<br>35.0%<br>15<br>7<br>820<br>Westbound<br>thru<br>427<br>427         | right  | 21 left 20 20 1                 |                    | 6.0% 6.0% 3 1 216 right 173               | left |                    | right | 58 24 0 2387 2387 Intersection Volume 1906 0 1906 77   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes Time Period: Saturday Midday Peak Hour 2017 Existing Counts Balancing 2017 Existing Volumes (Balanced) Base growth (0.65% compounded for 6 yrs) Dwell at Caln PRD (384 units)  |                   | 52 42            | New Retail 21 19 19 55.0% 53.0% 53.0% 678 Eastbound thru 520 520 21 44   | P-By Retail 11 9 433 433 543 543                                | 25.0% 24.0% 11 5 219 left 223 9                         | 36.0% 35.0% 15 7 820 Westbound thru 427 427 17 35                           | right  | 21 left 20 20 1                 |                    | 6.0% 6.0% 3 1 216 right 173 7             | left |                    | right | 58 58 24 0 0 2387 2387 2387 1906 1906 77 131   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pws-by Exit Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Caln PRD (384 units) Taco Bell (2.753ksf)   |                   | 52<br>42         | New Retail   21   19   19   19   19   19   19   19   | P-By Retail 11 9 433 433 543 543 607                            | 25.0% 24.0% 11 5 219 219 223 223                        | 36.0% 35.0% 15 7 820 Westbound thru 427 427 17 35 18                        | right  | 21   left   20   20   1   8   8 |                    | 6.0% 6.0% 3 1 216 right 173 7 5           | left |                    | right | 58 58 24 0 0 2387 2387 2387 1906 1906 1906 1906 1906 1906 1906 1906  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pws-by Exit Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Caln PRD (384 units) Taco Bell (2.753ksf)   | EXIT =            | 52<br>42         | New Retail   21   19   19     55.0%     53.0%     29   11     678     678     520     520     21   44   28     613     New Retail   New Retail | P-By Retail 11 9 433 433 right 543 543 22 44 -2 607 P-By Retail | 25.0% 24.0% 11 5 219 219 223 223                        | 36.0% 35.0% 15 7 820 Westbound thru 427 427 17 35 18                        | right  | 21   left   20   20   1   8   8 |                    | 6.0% 6.0% 3 1 216 right 173 7 5           | left |                    | right | 58 58 24 0 0 2387 2387 2387 1906 1906 1906 1906 1906 1906 1906 1906  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pws-by Exit Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Caln PRD (384 units) Taco Bell (2.753ksf)   | EXIT =            | 52<br>42<br>left | New Retail 21 19 19 55.0% 55.0% 53.0%  29 21 11 678  Eastbound thru 520 221 444 28 613 New Retail  | P-By Retail 11 9 433 433 543 543 544 -2 607 P-By Retail 12      | 25.0% 24.0% 11 5 219 219 223 223                        | 36.0% 35.0% 15 7 820 Westbound thru 427 427 17 35 18                        | right  | 21   left   20   20   1   8   8 |                    | 6.0% 6.0% 3 1 216 right 173 7 5           | left |                    | right | 58 58 24 0 0 2387 2387 2387 1906 1906 1906 1906 1906 1906 1906 1906  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pws-by Exit Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Caln PRD (384 units) Taco Bell (2.753ksf)   | EXIT =            | 52<br>42         | New Retail   21   19   19     55.0%     53.0%     29   11     678     678     520     520     21   44   28     613     New Retail   New Retail | P-By Retail 11 9 433 433 right 543 543 22 44 -2 607 P-By Retail | 25.0% 24.0% 11 5 219 219 223 223                        | 36.0% 35.0% 15 7 820 Westbound thru 427 427 17 35 18                        | right  | 21   left   20   20   1   8   8 |                    | 6.0% 6.0% 3 1 216 right 173 7 5           | left |                    | right | 58 58 24 0 0 2387 2387 2387 1906 1906 1906 1906 1906 1906 1906 1906  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Caln PRD (384 units) Taco Bell (2.75%ksf) 2023 Base Volumes  | EXIT =            | 52<br>42<br>left | New Retail   21   19   19   19   19   19   19   19   | P-By Retail 11 9 433 433 543 543 544 -2 607 P-By Retail 12      | 25.0% 24.0% 11 5 219 219 223 223                        | 36.0% 35.0% 15 7 820 Westbound thru 427 427 17 35 18                        | right  | 21   left   20   20   1   8   8 |                    | 6.0% 6.0% 3 1 1 216 173 173 7 5 185       | left |                    | right | 58 58 24 0 0 2387 2387 2387 1906 1906 1906 1906 1906 1906 1906 1906  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Cath PRD (384 units) Taco Bell (2.753ksf) 2023 Base Volumes   | EXIT =            | 52<br>42<br>left | New Retail 21 19 19 55.0% 55.0% 53.0%  29 21 11 678  Eastbound thru 520 221 444 28 613 New Retail  | P-By Retail 11 9 433 433 543 543 544 -2 607 P-By Retail 12      | 25.0% 24.0% 11 5 219 219 223 223                        | 36.0% 35.0% 15 7 820 Westbound thru 427 427 17 35 18                        | right  | 21   left   20   20   1   8   8 |                    | 6.0% 6.0% 3 1 216 right 173 7 5           | left |                    | right | 58 58 24 0 0 2387 2387 2387 1906 1906 1906 1906 1906 1906 1906 1906  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Ress-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Caln PRD (384 units) Taco Bell (2.753ksf)  2023 Base Volumes  Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit   | EXIT =            | 52<br>42<br>left | New Retail   21   19   19   19   19   19   19   19   | P-By Retail 11 9 433 433 543 543 544 -2 607 P-By Retail 12      | 25.0% 24.0% 111 5 219 219 223 9 14 246                  | 36.0% 35.0% 35.0% 15 7 820 Westbound thru 427 427 17 35 18 497              | right  | 21   left   20   20   1   8   8 |                    | 6.0% 6.0% 3 1 1 216 173 173 7 5 185       | left |                    | right | 58 58 24 0 0 2387 2387 2387 1906 1906 1906 1906 1906 1906 1906 1906  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips  2023 Projected Volumes Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Counts Balancing 2017 Existing Volumes (Balanced) Base growth (0.65% compounded for 6 yrs) Dwell at Caln PRD (334 units) Taco Bell (2.753ksf)  2023 Base Volumes  Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit  | EXIT =            | 52<br>42<br>left | New Retail   21   19   19   19   19   19   19   19   | P-By Retail 11 9 433 433 543 543 544 -2 607 P-By Retail 12      | 25.0% 24.0% 11 5 219 219 223 223 9 14 246               | 36.0% 35.0% 15 7 820 Westbound thru 427 427 17 35 18                        | right  | 21   left   20   20   1   8   8 |                    | 6.0% 6.0% 3 1 216 216 173 173 7 5 185     | ieft |                    | right | 58 58 24 0 0 2387 2387 2387 1906 1906 1906 1906 1906 1906 1906 1906  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Exit Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Caln PRD (384 units) Taco Bell (2.753ksf)  2023 Base Volumes  Trip Assignment % - Residential Exit Trip Assignment % - Retail New Exit | EXIT =            | 52<br>42<br>left | New Retail   21   19   19   19   19   19   19   19   | P-By Retail 11 9 433 433 543 543 544 -2 607 P-By Retail 12      | 25.0% 24.0% 111 5 219 219 223 9 14 246                  | 36.0% 35.0% 35.0% 15 7 820 Westbound thru 427 427 17 35 18 497              | right  | 21   left   20   20   1   8   8 |                    | 6.0% 6.0% 3 1 216 216 173 173 7 5 185     | left |                    | right | 58 58 24 0 0 2387 2387 2387 1906 1906 1906 1906 1906 1906 1906 1906  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Caln PRD (384 units) Taco Bell (2.753ksf) 2023 Base Volumes  Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Exit Trip Assignment % - Retail Pass-by Exit  | EXIT =            | 52<br>42<br>left | New Retail   21   19   19     55.0%     53.0%       678  | P-By Retail 11 9 433 433 543 543 544 -2 607 P-By Retail 12      | 25.0% 24.0%  11 5 219  219  219  223 223 9 14 246       | 36.0% 35.0% 15 7 820 Westbound thru 427 427 17 35 18 497 36.0% 35.0%        | right  | 21   left   20   20   1   8   8 |                    | 6.0% 6.0% 3 1 216 216 7 173 173 7 5 185   | left |                    | right | 58   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced) Base growth (0.65% compounded for 6 yrs) Dwell at Cala PRD (384 units) Taco Bell (2.753ksf) 2023 Base Volumes  Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Exit Residential Trips  | EXIT =            | 52<br>42<br>left | New Retail   21   19   19   19   19   19   19   19   | P-By Retail 11 9 433 433 543 543 544 -2 607 P-By Retail 12      | 25.0% 24.0%  11 5  219  219  223  223  9 14  246  25.0% | 36.0% 35.0% 15 7 820 Westbound thru 427 427 17 35 18 497                    | right  | 21   left   20   20   1   8   8 |                    | 6.0% 6.0% 3 1 216 216 7 173 7 5 185 6.0%  | left |                    | right | Section   Sect |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced) Base growth (0.65% compounded for 6 yrs) Dwell at Caln PRD (384 units) Taco Bell (2.753ks) 2023 Base Volumes  Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips   | EXIT =            | 52<br>42<br>left | New Retail   21   19   19     55.0%     53.0%       678  | P-By Retail 11 9 433 433 543 543 544 -2 607 P-By Retail 12      | 25.0% 24.0%  11 5 219  219  219  223 223 9 14 246       | 36.0% 35.0% 15 7 820 Westbound thru 427 427 17 35 18 497 36.0% 35.0%        | right  | 21   left   20   20   1   8   8 |                    | 6.0% 6.0% 3 1 216 216 7 173 173 7 5 185   | left |                    | right | 58   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancial 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Caln PRD (384 units) Taco Bell (2.753ksf)  2023 Base Volumes  Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips  | EXIT =            | 52<br>42<br>left | New Retail   21   19   19   19   19   15.0%   29   11   11   11   11   11   11   11  | P-By Retail 11 9 433 433 433 543 543 543 607 P-By Retail 12 11  | 25.0% 24.0% 111 5 219 219 223 223 9 14 248 25.0% 24.0%  | 36.0% 35.0% 15 7 820 820 Westbound thru 427 427 17 35 18 18 497 36.0% 35.0% | right  | 21 left 20 20 1 8 29            |                    | 6.0% 6.0% 3 1 216 216 7 173 173 6.0% 6.0% | left |                    | right | S8   24   0  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail Pass-by Exit Residential Trips Retail Pass-by Trips 2023 Projected Volumes Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing Balancing Duel at Cain PRD (384 units) Taco Bell (2.753ksf) 2023 Base Volumes  Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Exit Trip Assignment % - Retail New Exit Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Exit Residential Trips Residential Trips Residential Trips Retail New Exit Residential Trips Retail New Trips                                     | EXIT =            | 52<br>42<br>left | New Retail   21   19   19   19   19   19   19   19   | P-By Retail 11 9 433 433 543 543 544 -2 607 P-By Retail 12      | 25.0% 24.0%  11 5  219  219  223  223  9 14  246  25.0% | 36.0% 35.0% 15 7 820 Westbound thru 427 427 17 35 18 497                    | right  | 21   left   20   20   1   8   8 |                    | 6.0% 6.0% 3 1 216 216 7 173 7 5 185 6.0%  | left |                    | right | S8   24   0  |

|             |                 |           | Lloy      |  |   |                       | 1  |   |  |  |   |  |
|-------------|-----------------|-----------|-----------|--|---|-----------------------|--|---|--|--|---|--|
| 8           | Adjacent inters | sections: |           | West   | 0   | East                  | 0  | North   | 0  | South  | 0   | J  |
|             |                 |           |           |  |   |                       |  |   |  |  |   |  |
| 1           | Fasthound       |           |           | Westhound  |   |                       | Northhound                                     |   | ı  | Southhound   |   | Intersection   |
| left        | thru            | right     | left      | thru   | right   | left                  | thru   | right   | left   |  | right   | Volume   |
| 2           | 439             |           |           | 173  | 18  |                       |  |   | 11   |  | 1   | 644  |
| _           | 420             |           |           | 470  | 40  |                       |  |   | - 44   |  |   | 0<br><b>644</b>  |
| 2           | 439             |           |           | 1/3  | 10  |                       |  |   | 111  | J  | - 1   | 644  |
|             | 17              |           |           | 7  |   |                       |  |   |  |  |   | 24   |
|             | 2               |           |           | 8  |   |                       |  |   |  |  |   | 10   |
|             | 2               |           |           | 2  |   |                       |  |   |  |  |   | 4  |
| 2           | 460             |           |           | 190  | 18  |                       |  |   | 11   |  | 1   | 682  |
| •           | •               |           | •         |  |   |                       | •  |   |  | •  |   | •  |
|             |                 |           | 7         |  |   |                       |  |   |  |  |   |  |
|             |                 | 1         |           |  |   |                       |  |   |  |  |   |  |
|             |                 |           |           |  |   |                       |  |   |  |  |   |  |
|             |                 |           |           | 20.0%  |   |                       |  |   |  |  |   |  |
| 1           | 26.0%           | 12.0%     | 15.00/    |  |   | 1                     |  |   | <u> </u>   | 1  |   | 1  |
| 1           | 1               | 13.076    | 15.0%     |  | 1   | 13.0%                 |  | 39.0%   | <del>                                     </del>               |  |   | 1  |
| 1           | -22.0%          | 22.0%     | 8.0%      | -8.0%  | 1   | 10.070                |  | 55.070  | 1  |  |   |  |
|             |                 |           |           |  |   | 8.0%                  |  | 22.0%   |  |  |   |  |
|             | 16              | <u> </u>  |           | 6  |   | <u> </u>              |  |   | 1  |  |   | 22   |
| +           | (-1)            |           | 1         | 1  | <del>                                     </del>  | 1                     |  | 2   | <del>                                     </del>               | -  |   | 5  |
|             | (-1)            | (1)       | 1         | 1  | 1   | 1                     | 1  | l   | 1  | 1  | l   |  |
| 2           | 475             | 2         | 1         | 196  | 18  | 1                     | 0  | 2   | 11   | 0  | 1   | 709  |
|             |                 |           |           |  |   |                       |  |   |  |  |   |  |
| 1           | Faatharind      |           | ı         | Masthauad  |   |                       | Northborond                                    |   |  | Caudhhainad  |   | Intersectio  |
| left        |                 | right     | left      |  | right   | left                  |  | right   | left   |  | right   | Volume   |
| 1           | 279             | ngn       | 1011      | 378  | 7   | 1011                  | unu  | ngin  | 7  |  | 3   | 675  |
|             |                 |           |           |  |   |                       |  |   |  |  |   | 0  |
| 1           | 279             |           |           | 378  | 7   |                       |  |   | 7  |  | 3   | 675  |
|             | 11              |           |           | 15   | I   | I                     |  |   | 1  |  |   | 26   |
|             | 8               |           |           | 4  |   |                       |  |   |  |  |   | 12   |
|             | 1               |           |           | 1  |   |                       |  |   |  |  |   | 2  |
|             | 200             | 1         |           | 200  | 7   |                       |  |   | 7  | 1  | ,   | 715  |
| - '         | 299             | 1         |           | 330  |   | 1                     | I  |   |  | -I   | 3   | 715  |
| Residential |                 |           |           |  |   |                       |  |   |  |  |   |  |
|             |                 |           |           |  |   |                       |  |   |  |  |   |  |
| = 42        | 19              | 9         |           |  |   |                       |  |   |  |  |   |  |
|             | I               |           |           | 20.0%  | I   | I                     |  |   | 1  |  |   |  |
|             | 26.0%           |           |           |  |   |                       |  |   |  |  |   |  |
|             |                 | 13.0%     | 15.0%     |  |   |                       |  |   |  |  |   |  |
|             | 44.00/          | 44.00/    | 40.00/    | 40.00/   |   | 13.0%                 |  | 39.0%   |  |  |   |  |
| +           | -14.0%          | 14.0%     | 18.0%     | -18.0%   |   | 18.0%                 |  | 14.0%   | 1  | 1  |   | 1  |
| 1           | 11              | 1         |           | 10   | 1   | 15.070                |  | 11.070  | 1  | 1  |   | 21   |
|             |                 | 3         | 3         |  |   | 2                     |  | 7   |  |  |   | 15   |
| -           | (-2)            | (2)       | (2)       | (-2)   | l   | (2)                   |  | (1)   | l  | 1  |   | 3  |
| 1           | 308             | 5         | 5         | 406  | 7   | 4                     | 0  | 8   | 7  | 0  | 3   | 754  |
| · ·         |                 |           |           |  | · ·   |                       |  |   |  |  |   |  |
|             |                 |           |           |  |   |                       |  |   |  |  |   |  |
|             | Eastbound       |           |           | Westbound  |   |                       | Northbound                                     |   |  | Southbound   |   | Intersectio  |
| left        | thru            | right     | left      | thru   | right   | left                  | thru   | right   | left   | thru   | right   | Volume   |
| 2           | 248             |           |           | 290  | 4   | 1                     |  |   | 4  | 1  | 1   | 549  |
| 2           | 248             | 1         |           | 290  | 4   | 1                     |  |   | 4  | 1  | 1   | 0<br><b>549</b>  |
| 1 -         | 440             | 1         | 1         | 250  |   | 1                     | 1  |   |  | 1  |   | 043  |
|             | 10              |           |           | 11   |   |                       |  |   |  |  |   | 21   |
|             | 5               |           |           | 6  |   |                       |  |   |  |  |   | 11   |
| -           | 4               | 1         | L         | 4  | ļ   | <u> </u>              |  |   | 1  | 1  |   | 8  |
| 2           | 267             |           |           | 311  | 4   |                       |  |   | 4  | 1  | 1   | 589  |
| •           |                 |           |           |  |   |                       |  |   |  |  |   |  |
|             |                 |           | 7         |  |   |                       |  |   |  |  |   |  |
|             | 34<br>31        | 12<br>11  |           |  |   |                       |  |   |  |  |   |  |
|             |                 |           |           |  |   |                       |  |   |  |  |   |  |
|             | 2     2         | Eastbound | Eastbound | Eastbound   Ieft   Introduction   Ieft   Introduction   Ieft   Introduction   Ieft   Introduction   Ieft   Introduction   Ieft   Ieft | Eastbound   Westbound   left   thru   right   left   thru   173   173   173   174   left   left | Eastbound   Westbound | B   Adjacent infersections:   Westbound   East | Residential   Residential | S   Adjacent Intersections:   West   0   East   0   Northbound | Eastbound   Westbound   Northbound   Information   Infor | Secret Intersections:   West   0   East   0   North   6   South | Registroard   P-By Retail   Eastboard   Eastboard   P-By Retail   Eastboard   Eastboar |

20.0%

-19.0%

10

(-2)

13.0%

19.0%

4 (2)

276 6 7 319 4 6 0 14 4 0 1 639

39.0%

16.0%

12

15.0%

19.0%

5 (2)

26.0%

-16.0%

11

(-2)

16.0%

4 (2)

Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips

2023 Projected Volumes

|   |                         | LI   | oyd Avenue | & GO Carl | son Bouleva | ard   |   |       |   |  |
|---|-------------------------|------|------------|-----------|-------------|-------|---|-------|---|--|
| 9 | Adjacent intersections: | West | 0          | East      | 0           | North | 0 | South | 0 |  |

#### Time Period: Weekday A.M. Peak Hour

|  |      | Eastbound |       |      | Westbound |       |      | Northbound thru right 295 295 |       |      | Southbound |       | Intersection |
|--|------|-----------|-------|------|-----------|-------|------|-------------------------------|-------|------|------------|-------|--------------|
|  | left | thru      | right | left | thru      | right | left | thru                          | right | left | thru       | right | Volume       |
| 2017 Existing Counts                     | 136  |           | 46    |      |           |       | 13   | 295                           |       |      | 155        | 19    | 664          |
| Balancing                                |      |           |       |      |           |       |      |                               |       |      |            |       | 0            |
| 2017 Existing Volumes (Balanced)         | 136  |           | 46    |      |           |       | 13   | 295                           |       |      | 155        | 19    | 664          |
|  |      |           |       |      |           |       |      |                               |       |      |            |       |              |
| Base growth (0.65% compounded for 6 yrs) |      |           |       |      |           |       |      | 12                            |       |      | 6          |       | 18           |
| Dwell at Caln PRD (384 units)            |      |           |       |      |           |       |      | 2                             |       |      | 8          |       | 10           |
| Taco Bell (2.753ksf)                     |      |           |       |      |           |       |      | 2                             |       |      | 2          |       | 4            |
|  |      | •         |       |      |           |       |      |                               |       |      |            | •     |              |
| 2023 Base Volumes                        | 136  |           | 46    |      |           |       | 13   | 311                           |       |      | 171        | 19    | 696          |

|         | Residential | New Retail | P-By Retail |
|---------|-------------|------------|-------------|
| ENTER = | 32          | 8          | 3           |
| EXIT =  | 62          | 5          | 1           |

|   |      |    | - |  |    |       |  |       |      |     |
|---|------|----|---|--|----|-------|--|-------|------|-----|
| Trip Assignment % - Residential Enter   |      |    |   |  |    |       |  | 20.0% |      |     |
| Trip Assignment % - Residential Exit<br>Trip Assignment % - Retail New Enter        |      |    |   |  |    | 26.0% |  |       |      |     |
| Trip Assignment % - Retail New Enter  | 4.0% |    |   |  |    | 9.0%  |  |       |      |     |
| Trip Assignment % - Retail New Exit   |      |    |   |  |    |       |  | 9.0%  | 4.0% |     |
| Trip Assignment % - Retail Pass-by Enter  |      |    |   |  |    |       |  |       |      |     |
| Trip Assignment % - Retail Pass-by Enter<br>Trip Assignment % - Retail Pass-by Exit |      |    |   |  |    |       |  |       |      |     |
| Residential Trips   |      |    |   |  |    | 16    |  | 6     |      | 22  |
| Retail New Trips  |      |    |   |  |    | 1     |  |       |      | 1   |
| Retail Pass-by Trips  |      |    |   |  |    |       |  |       |      | 0   |
|   |      |    |   |  |    |       |  |       |      |     |
| 2023 Projected Volumes  | 136  | 46 |   |  | 13 | 328   |  | 177   | 19   | 719 |

#### Time Period: Weekday P.M. Peak Hour

|  |      | Eastbound |       |      | Westbound |       |      | Northbound |       |      | Southbound |       | Intersection |
|--|------|-----------|-------|------|-----------|-------|------|------------|-------|------|------------|-------|--------------|
|  | left | thru      | right | left | thru      | right | left | thru       | right | left | thru       | right | Volume       |
| 2017 Existing Counts                     | 66   |           | 24    |      |           |       | 36   | 208        |       |      | 257        | 124   | 715          |
| Balancing                                |      |           |       |      |           |       |      |            |       |      |            |       | 0            |
| 2017 Existing Volumes (Balanced)         | 66   |           | 24    |      |           |       | 36   | 208        |       |      | 257        | 124   | 715          |
|  |      | •         | •     |      |           | •     |      |            | •     |      | •          | •     |              |
| Base growth (0.65% compounded for 6 yrs) |      |           |       |      |           |       |      | 8          |       |      | 10         |       | 18           |
| Dwell at Caln PRD (384 units)            |      |           |       |      |           |       |      | 8          |       |      | 4          |       | 12           |
| Taco Bell (2.753ksf)                     |      |           |       |      |           |       |      | 1          |       |      | 1          |       | 2            |
|  |      |           |       |      |           |       |      |            |       |      |            |       |              |
| 2023 Base Volumes                        | 66   |           | 24    |      |           |       | 36   | 225        |       |      | 272        | 124   | 747          |

|         | Residential | New Retail | P-By Retail |
|---------|-------------|------------|-------------|
| ENTER = | 52          | 21         | 11          |
| FYIT =  | 42          | 10         | 0           |

|      |   |    |   |   |   |    |       |                         |                       | 20.0%                  |  |   |
|------|---|----|---|---|---|----|-------|-------------------------|-----------------------|------------------------|--|---|
|      |   |    |   |   |   |    | 26.0% |                         |                       |                        |  |   |
| 4.0% |   |    |   |   |   |    | 9.0%  |                         |                       |                        |  |   |
|      |   |    |   |   |   |    |       |                         |                       | 9.0%                   | 4.0%                                       |   |
|      |   |    |   |   |   |    |       |                         |                       |                        |  |   |
|      |   |    |   |   |   |    |       |                         |                       |                        |  |   |
|      |   |    |   |   |   |    | 11    |                         |                       | 10                     |  | 21  |
| 1    |   |    |   |   |   |    | 2     |                         |                       | 2                      | 1  | 6   |
|      |   |    |   |   |   |    |       |                         |                       |                        |  | 0   |
|      |   |    |   |   |   |    |       |                         |                       |                        |  |   |
| 67   | ' | 24 |   |   |   | 36 | 238   |                         |                       | 284                    | 125  | 774   |
|      | 1 | 1  | 1 | 1 | 1 | 1  | 1     | 4.0% 9.0%<br>111<br>1 2 | 4.0% 9.0% 11 11 1 2 2 | 4.0% 9.0% 111 11 2 2 1 | 4.0% 9.0% 9.0% 9.0% 11 10 10 1 2 2 2 2 2 2 | 10 26.0% 9.0% 9.0% 4.0% 9.0% 11 10 10 1 2 2 1 1 |

#### Time Period: Saturday Midday Peak Hour

|  |      | Eastbound |       |      | Westbound |       | Northbound |      |       |      | Intersection |       |        |
|--|------|-----------|-------|------|-----------|-------|------------|------|-------|------|--------------|-------|--------|
|  | left | thru      | right | left | thru      | right | left       | thru | right | left | thru         | right | Volume |
| 2017 Existing Counts                     | 62   |           | 22    |      |           |       | 19         | 188  |       |      | 225          | 68    | 584    |
| Balancing                                |      |           |       |      |           |       |            |      |       |      |              |       | 0      |
| 2017 Existing Volumes (Balanced)         | 62   |           | 22    |      |           |       | 19         | 188  |       |      | 225          | 68    | 584    |
|  |      |           |       |      |           |       |            |      |       |      |              |       |        |
| Base growth (0.65% compounded for 6 yrs) |      |           |       |      |           |       |            | 7    |       |      | 9            |       | 16     |
| Dwell at Caln PRD (384 units)            |      |           |       |      |           |       |            | 5    |       |      | 6            |       | 11     |
| Taco Bell (2.753ksf)                     |      |           |       |      |           |       |            | 4    |       |      | 4            |       | 8      |
|  |      |           |       | -    |           |       | -          |      |       |      | •            | •     | •      |
| 2023 Base Volumes                        | 62   |           | 22    |      |           |       | 19         | 204  |       |      | 244          | 68    | 619    |

|         | Residential | New Retail | P-By Retail |
|---------|-------------|------------|-------------|
| ENTER = | 48          | 34         | 12          |
| EVIT -  |             | 1          | •           |

|   |      |    | - |  |    |       | _ |       | -    | _   |
|---|------|----|---|--|----|-------|---|-------|------|-----|
| Trip Assignment % - Residential Enter   |      |    |   |  |    |       |   | 20.0% |      | ĺ   |
| Trip Assignment % - Residential Exit  |      |    |   |  |    | 26.0% |   |       |      | ĺ   |
| Trip Assignment % - Retail New Enter<br>Trip Assignment % - Retail New Exit         | 4.0% |    |   |  |    | 9.0%  |   |       |      | ĺ   |
| Trip Assignment % - Retail New Exit   |      |    |   |  |    |       |   | 9.0%  | 4.0% | ĺ   |
| Trip Assignment % - Retail Pass-by Enter  |      |    |   |  |    |       |   |       |      | ĺ   |
| Trip Assignment % - Retail Pass-by Enter<br>Trip Assignment % - Retail Pass-by Exit |      |    |   |  |    |       |   |       |      |     |
| Residential Trips   |      |    |   |  |    | 11    |   | 10    |      | 21  |
| Retail New Trips  | 1    |    |   |  |    | 3     |   | 3     | 1    | 8   |
| Retail Pass-by Trips  |      |    |   |  |    |       |   |       |      | 0   |
|   |      |    |   |  |    |       |   |       |      |     |
| 2023 Projected Volumes  | 63   | 22 |   |  | 19 | 218   |   | 257   | 69   | 648 |

|    |                         | Lloyd Ave | nue & Beav | er Run Roa | d/Proposed | Driveway |   |       |   |  |
|----|-------------------------|-----------|------------|------------|------------|----------|---|-------|---|--|
| 10 | Adjacent intersections: | West      | 0          | East       | 0          | North    | 0 | South | 0 |  |

#### Time Period: Weekday A.M. Peak Hour

|  |      | Eastbound |       |      | Westbound |       |      | Northbound |       |      | Southbound |       |        |
|--|------|-----------|-------|------|-----------|-------|------|------------|-------|------|------------|-------|--------|
|  | left | thru      | right | left | thru      | right | left | thru       | right | left | thru       | right | Volume |
| 2017 Existing Counts                     | 16   |           | 5     |      |           |       | 0    | 317        |       |      | 189        | 1     | 528    |
| Balancing                                |      |           |       |      |           |       |      |            |       |      |            |       | 0      |
| 2017 Existing Volumes (Balanced)         | 16   |           | 5     |      |           |       | 0    | 317        |       |      | 189        | 1     | 528    |
|  |      | •         | •     |      | •         |       |      |            |       |      |            |       | •      |
| Base growth (0.65% compounded for 6 yrs) |      |           |       |      |           |       |      | 13         |       |      | 7          |       | 20     |
| Dwell at Caln PRD (384 units)            |      |           |       |      |           |       |      | 2          |       |      | 8          |       | 10     |
| Taco Bell (2.753ksf)                     |      |           |       |      |           |       |      | 2          |       |      | 2          |       | 4      |
|  |      |           | •     |      |           |       |      |            |       |      | •          |       | -      |
| 2023 Raca Volumes                        | 16   |           | - 5   |      |           |       |      | 334        |       |      | 206        | - 1   | 562    |

|         | Residential | New Retail | P-By Retail |
|---------|-------------|------------|-------------|
| ENTER = | 32          | 8          | 3           |
| EXIT =  | 62          | 5          | 1           |

| 2023 Projected Volumes                   | 16 | 0 | 5 | 6    | 0 | 16    | 0 | 335  | 3    | 6     | 206  | 1 | 594 |
|--|----|---|---|------|---|-------|---|------|------|-------|------|---|-----|
|  | •  | • | • | •    |   | •     |   |      |      | •     |      | • |     |
| Retail Pass-by Trips                     |    |   |   |      |   |       |   |      |      |       |      |   | 0   |
| Retail New Trips                         |    |   |   |      |   |       |   | 1    |      |       |      |   | 1   |
| Residential Trips                        |    |   |   | 6    |   | 16    |   |      | 3    | 6     |      |   | 31  |
| Trip Assignment % - Retail Pass-by Exit  |    |   |   |      |   |       |   |      |      |       |      |   | i   |
| Trip Assignment % - Retail Pass-by Enter |    |   |   |      |   |       |   |      |      |       |      |   | i   |
| Trip Assignment % - Retail New Exit      |    |   |   |      |   |       |   |      |      |       | 9.0% |   | i   |
| Trip Assignment % - Retail New Enter     |    |   |   |      |   |       |   | 9.0% |      |       |      |   |     |
| Trip Assignment % - Residential Exit     |    |   |   | 9.0% |   | 26.0% |   |      |      |       |      |   | 1   |
| Trip Assignment % - Residential Enter    |    |   |   |      |   |       |   |      | 9.0% | 20.0% |      |   | i   |

#### Time Period: Weekday P.M. Peak Hour

|  |      | Eastbound |       |      | Westbound |       | Northbound |      | Southbound |      |      | Intersection |        |
|--|------|-----------|-------|------|-----------|-------|------------|------|------------|------|------|--------------|--------|
|  | left | thru      | right | left | thru      | right | left       | thru | right      | left | thru | right        | Volume |
| 2017 Existing Counts                     | 3    |           | 2     |      |           |       | 1          | 247  |            |      | 266  | 14           | 533    |
| Balancing                                |      |           |       |      |           |       |            |      |            |      |      |              | 0      |
| 2017 Existing Volumes (Balanced)         | 3    |           | 2     |      |           |       | 1          | 247  |            |      | 266  | 14           | 533    |
|  |      |           |       |      | •         | •     |            |      | •          |      |      |              |        |
| Base growth (0.65% compounded for 6 yrs) |      |           |       |      |           |       |            | 10   |            |      | 11   |              | 21     |
| Dwell at Caln PRD (384 units)            |      |           |       |      |           |       |            | 8    |            |      | 4    |              | 12     |
| Taco Bell (2.753ksf)                     |      |           |       |      |           |       |            | 1    |            |      | 1    |              | 2      |
|  |      |           |       |      |           |       |            |      |            |      |      |              |        |
| 2023 Base Volumes                        | 3    |           | 2     |      |           |       | 1          | 266  |            |      | 282  | 14           | 568    |

|         | Residential | New Retail | P-By Retail |
|---------|-------------|------------|-------------|
| ENTER = | 52          | 21         | 11          |
| FYIT =  | 42          | 10         | •           |

| Trip Assignment % - Residential Enter    |   |   |   |      |   |       |   |      | 9.0% | 20.0% |      |    |     |
|--|---|---|---|------|---|-------|---|------|------|-------|------|----|-----|
| Trip Assignment % - Residential Exit     |   |   |   | 9.0% |   | 26.0% |   |      |      |       |      |    |     |
| Trip Assignment % - Retail New Enter     |   |   |   |      |   |       |   | 9.0% |      |       |      |    |     |
| Trip Assignment % - Retail New Exit      |   |   |   |      |   |       |   |      |      |       | 9.0% |    |     |
| Trip Assignment % - Retail Pass-by Enter |   |   |   |      |   |       |   |      |      |       |      |    |     |
| Trip Assignment % - Retail Pass-by Exit  |   |   |   |      |   |       |   |      |      |       |      |    |     |
| Residential Trips                        |   |   |   | 4    |   | 11    |   |      | 5    | 10    |      |    | 30  |
| Retail New Trips                         |   |   |   |      |   |       |   | 2    |      |       | 2    |    | 4   |
| Retail Pass-by Trips                     |   |   |   |      |   |       |   |      |      |       |      |    | 0   |
|  |   |   |   |      |   |       |   |      |      |       |      |    |     |
| 2023 Projected Volumes                   | 3 | 0 | 2 | 4    | 0 | 11    | 1 | 268  | 5    | 10    | 284  | 14 | 602 |

#### Time Period: Saturday Midday Peak Hour

|  |      | Eastbound |       |      | Westbound |       |      | Northbound |       |      | Southbound |       | Intersection |
|--|------|-----------|-------|------|-----------|-------|------|------------|-------|------|------------|-------|--------------|
|  | left | thru      | right | left | thru      | right | left | thru       | right | left | thru       | right | Volume       |
| 2017 Existing Counts                     | 5    |           | 10    |      |           |       | 3    | 204        |       |      | 238        | 9     | 469          |
| Balancing                                |      |           |       |      |           |       |      |            |       |      |            |       | 0            |
| 2017 Existing Volumes (Balanced)         | 5    |           | 10    |      |           |       | 3    | 204        |       |      | 238        | 9     | 469          |
|  |      |           |       |      |           |       |      |            |       |      |            |       |              |
| Base growth (0.65% compounded for 6 yrs) |      |           |       |      |           |       |      | 8          |       |      | 9          |       | 17           |
| Dwell at Caln PRD (384 units)            |      |           |       |      |           |       |      | 5          |       |      | 6          |       | 11           |
| Taco Bell (2.753ksf)                     |      |           |       |      |           |       |      | 4          |       |      | 4          |       | 8            |
|  |      |           |       |      |           |       |      |            |       |      |            |       |              |
| 2023 Base Volumes                        | 5    |           | 10    |      |           |       | 3    | 221        |       |      | 257        | 9     | 505          |

|         | Residential | New Retail | P-By Retail |
|---------|-------------|------------|-------------|
| ENTER = | 48          | 34         | 12          |
| EXIT =  | 41          | 31         | 11          |
|         |             |            |             |

|  |   |   |    | -    |   |       |   |      |      | _     |      |   | _   |
|--|---|---|----|------|---|-------|---|------|------|-------|------|---|-----|
| Trip Assignment % - Residential Enter    |   |   |    |      |   |       |   |      | 9.0% | 20.0% |      |   |     |
| Trip Assignment % - Residential Exit     |   |   |    | 9.0% |   | 26.0% |   |      |      |       |      |   |     |
| Trip Assignment % - Retail New Enter     |   |   |    |      |   |       |   | 9.0% |      |       |      |   |     |
| Trip Assignment % - Retail New Exit      |   |   |    |      |   |       |   |      |      |       | 9.0% |   |     |
| Trip Assignment % - Retail Pass-by Enter |   |   |    |      |   |       |   |      |      |       |      |   |     |
| Trip Assignment % - Retail Pass-by Exit  |   |   |    |      |   |       |   |      |      |       |      |   |     |
| Residential Trips                        |   |   |    | 4    |   | 11    |   |      | 4    | 10    |      |   | 29  |
| Retail New Trips                         |   |   |    |      |   |       |   | 3    |      |       | 3    |   | 6   |
| Retail Pass-by Trips                     |   |   |    |      |   |       |   |      |      |       |      |   | 0   |
|  |   |   |    |      |   |       |   |      |      |       |      |   |     |
| 2023 Projected Volumes                   | 5 | 0 | 10 | 4    | 0 | 11    | 3 | 224  | 4    | 10    | 260  | 9 | 540 |

TPD# WIME.00001

| 10/29/2018  |  |  |   |      |   |       |          |                    |                            |      |                    |       |  |
|---|--|--|---|------|---|-------|----------|--------------------|----------------------------|------|--------------------|-------|--|
| Traffic Volumes Worksheet   |  |  |   |      |   |       |          |                    |                            |      |                    |       |  |
| Intersection:   |  |  |   |      |   |       |          | d RIRO Reta        |                            |      |                    |       |  |
| Synchro Node:   | 11   | Adjacent inter   | sections:   |      | West  | 0     | East     | 0                  | North                      | 0    | South              | 0     |  |
| Time Period: Weekday A.M. Peak Hour   |  |  |   |      |   |       |          |                    |                            |      |                    |       |  |
|   | -  | Faatharad  |   | ı    | Masharad  |       | 1        | Masthhaimd         |                            |      | Cardbharad         |       | Interception   |
|   | left   | Eastbound<br>thru  | right   | left | Westbound<br>thru   | right | left     | Northbound<br>thru | right                      | left | Southbound<br>thru | right | Intersection<br>Volume   |
| 2017 Existing Counts  |  |  | g   |      |   |       |          |                    |                            |      |                    |       | 0  |
| Balancing   |  | 971  |   |      | 419   |       |          |                    |                            |      |                    |       | 1390   |
| 2017 Existing Volumes (Balanced)  |  | 971  |   |      | 419   |       |          |                    |                            |      |                    |       | 1390   |
| Base growth (0.65% compounded for 6 yrs)  | 1  | 38   |   |      | 17  |       |          | 1 1                |                            |      |                    |       | 55   |
| Dwell at Caln PRD (384 units)   |  | 50   |   |      | 11  |       |          |                    |                            |      |                    |       | 61   |
| Taco Bell (2.753ksf)  |  | 28   |   |      | 27  |       |          |                    |                            |      |                    |       | 55   |
| 2023 Base Volumes   |  | 1087   | 1   | 1    | 474   |       | 1        |                    |                            |      |                    |       | 1561   |
| 2023 Base Volumes   |  | 1007   | l   | ļ    | 4/4   |       | ļ        |                    |                            |      | -1                 |       | 1301   |
|   | Resident   |  |   | _    |   |       |          |                    |                            |      |                    |       |  |
| E   | NTER = 32  | 8  | 3   |      |   |       |          |                    |                            |      |                    |       |  |
|   | EXIT = 62  | 5  | 1   | 1    |   |       |          |                    |                            |      |                    |       |  |
| Trip Assignment % - Residential Enter   |  | 46.0%  |   |      | 5.0%  |       |          |                    |                            |      |                    |       | 1  |
| Trip Assignment % - Residential Exit  |  | 5.0%   |   |      | 40.0%   |       |          |                    |                            |      |                    |       |  |
| Trip Assignment % - Retail New Enter  |  | 10.0%  | 39.0%   | ļ    | 5.0%  |       | <u> </u> | 1                  |                            |      |                    |       | <b> </b>   |
| Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter  |  | -39.0%   | 39.0%   |      | 20.0%   |       | -        | +                  |                            |      |                    |       | <b> </b>   |
| Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit  |  | -39.0%   | 33.0%   |      | -   |       |          |                    | 39.0%                      |      | +                  |       | 1  |
| Residential Trips   | 1  | 18   | 1   |      | 27  |       |          |                    | 070                        |      | 1                  |       | 45   |
| Retail New Trips  |  | 1  | 3   |      | 1   |       |          |                    |                            |      |                    |       | 5  |
| Retail Pass-by Trips  |  | (-1)   | (1)   |      |   |       |          |                    |                            |      |                    |       | 0  |
| 2023 Projected Volumes  |  | 1105   | 4   |      | 502   |       |          |                    | 0                          |      |                    |       | 1611   |
|   |  | 1 1100   |   |      |   |       |          |                    |                            |      | 1                  | 1     |  |
| Time Period: Weekday P.M. Peak Hour   |  |  |   |      |   |       |          |                    |                            |      |                    |       |  |
|   |  | F  |   |      | 147   |       |          | No other const     |                            |      | 0                  |       |  |
|   | left   | Eastbound<br>thru  | right   | left | Westbound<br>thru   | right | left     | Northbound<br>thru | right                      | left | Southbound<br>thru | right | Intersection<br>Volume   |
| 2017 Existing Counts  | icit   | unu  | rigiti  | icit | tilla   | ngnt  | ICIL     | unu                | ngnt                       | ICIL | unu                | ngni  | 0  |
| Balancing   |  | 607  |   |      | 807   |       |          |                    |                            |      |                    |       | 1414   |
| 2017 Existing Volumes (Balanced)  |  | 607  |   |      | 807   |       |          |                    |                            |      |                    |       | 1414   |
| D   |  |  | 1   | 1    |   |       | 1        |                    |                            |      |                    |       | F0 1   |
| Base growth (0.65% compounded for 6 yrs)  Dwell at Caln PRD (384 units)   |  | 24<br>26   |   |      | 32<br>49  |       |          |                    |                            |      | -                  |       | 56<br>75   |
| Taco Bell (2.753ksf)  |  | 19   |   |      | 18  |       |          |                    |                            |      |                    |       | 37   |
|   |  |  |   |      |   |       |          |                    |                            |      |                    |       |  |
|   |  |  | ,   |      |   |       |          |                    |                            |      |                    |       |  |
| 2023 Base Volumes   |  | 676  |   |      | 906   |       | I        |                    |                            |      |                    |       | 1582   |
| 2023 Base Volumes   | Resident   | •  | P-By Retail   |      | 906   |       |          |                    |                            |      |                    |       | 1582   |
|   | Resident   | ial New Retail   | 11  |      | 906   |       |          |                    |                            |      |                    |       | 1582   |
|   | Resident<br>  NTER =   52<br>  EXIT =   42       | ial New Retail   |   | ]    | 906   |       |          |                    |                            | I    |                    |       | 1582   |
| E   | NTER = 52  | ial New Retail 21 19   | 11  | ]    |   |       |          |                    |                            |      |                    |       | 1582   |
| E Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit  | NTER = 52  | New Retail   21   19   | 11  | ]    | 5.0%  |       |          |                    |                            |      |                    |       | 1582   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter   | NTER = 52  | ial New Retail 21 19   | 11  | ]    | 5.0%<br>40.0%<br>5.0%   |       |          |                    |                            |      |                    |       | 1582   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit   | NTER = 52  | New Retail   21   19     46.0%   5.0%   10.0%  | 39.0%   |      | 5.0%  |       |          |                    |                            |      |                    |       | 1582   |
| Frip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-up Enter  | NTER = 52  | New Retail 21 19 46.0% 5.0%  | 9   |      | 5.0%<br>40.0%<br>5.0%   |       |          |                    | 0.00                       |      |                    |       | 1582   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Exit Trip Assignment % - Retail Pass-by Exit   | NTER = 52  | New Retail   21   19   46.0%   5.0%   10.0%   -24.0%   | 39.0%   |      | 5.0%<br>40.0%<br>5.0%<br>20.0%  |       |          |                    | 24.0%                      |      |                    |       |  |
| Frip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-up Enter  | NTER = 52  | New Retail   21   19     46.0%   5.0%   10.0%  | 39.0%   |      | 5.0%<br>40.0%<br>5.0%   |       |          |                    | 24.0%                      |      |                    |       | 1582<br>1582<br>46<br>15   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips  | NTER = 52  | New Retail   21   19   46.0%   5.0%   10.0%   -24.0%   26  | 39.0%<br>24.0%  |      | 5.0%<br>40.0%<br>5.0%<br>20.0%  |       |          |                    | 24.0%                      |      |                    |       | 46   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips Retail Pass-by Trips   | NTER = 52  | New Retail   21   19   19   46.0%   5.0%   10.0%   -24.0%   26   2   (-3)  | 39.0%<br>24.0%<br>8<br>(3)  |      | 5.0%<br>40.0%<br>5.0%<br>20.0%  |       |          |                    | (2)                        |      |                    |       | 46<br>15<br>2  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Residential Trips Retail New Trips   | NTER = 52  | New Retail   21   19   46.0%   5.0%   10.0%   -24.0%   26   2  | 39.0%<br>24.0%  |      | 5.0%<br>40.0%<br>5.0%<br>20.0%  |       |          |                    |                            |      |                    |       | 46   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips Retail Pass-by Trips   | NTER = 52  | New Retail   21   19   19   46.0%   5.0%   10.0%   -24.0%   26   2   (-3)  | 39.0%<br>24.0%<br>8<br>(3)  |      | 5.0%<br>40.0%<br>5.0%<br>20.0%  |       |          |                    | (2)                        |      |                    |       | 46<br>15<br>2  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes  | NTER = 52  | New Retail   21   19   | 39.0%<br>24.0%<br>8<br>(3)  |      | 5.0%<br>40.0%<br>5.0%<br>20.0%<br>20<br>5   |       |          |                    | (2)                        |      |                    |       | 46<br>15<br>2  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes  | NTER = 52<br>EXIT = 42                           | New Retail   21   19   46.0%   5.0%   10.0%   -24.0%   26   2   (-3)   701   Eastbound   | 39.0%<br>24.0%<br>8<br>(3)  | left | 5.0%<br>40.0%<br>5.0%<br>20.0%<br>20<br>5   | right | left     | Northbound         | (2)                        | left | Southbound         | ight  | 46<br>15<br>2<br>1645  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips  2023 Projected Volumes Time Period: Saturday Midday Peak Hour  | NTER = 52  | New Retail   21   19   | 39.0%<br>24.0%<br>8<br>(3)  | left | 5.0%<br>40.0%<br>5.0%<br>20.0%<br>20<br>5   | right | left     | Northbound         | (2)                        | left | Southbound         | right | 46<br>15<br>2  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Z023 Projected Volumes Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing  | NTER = 52<br>EXIT = 42                           | New Retail   21   19   19   19   19   10   10   10   1   | 39.0%<br>24.0%<br>8<br>(3)  | left | 5.0%<br>40.0%<br>5.0%<br>20.0%<br>20<br>5   | right | left     |                    | (2)                        | left |                    | right | 46<br>  15<br>  2<br>  1645<br>  Intersection<br>  Volume<br>  0<br>  1015   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips  2023 Projected Volumes Time Period: Saturday Midday Peak Hour  | NTER = 52<br>EXIT = 42                           | New Retail   21   19   19   19   19   19   19   19   | 39.0%<br>24.0%<br>8<br>(3)  | left | 5.0%<br>40.0%<br>5.0%<br>20.0%<br>20<br>5   | right | left     |                    | (2)                        | left |                    | right | 46   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail New Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)   | NTER = 52<br>EXIT = 42                           | New Retail   21   19   | 39.0%<br>24.0%<br>8<br>(3)  | left | 5.0%<br>40.0%<br>5.0%<br>20.0%<br>20<br>5<br>Westbound<br>thru<br>513<br>513                                      | right | left     |                    | (2)                        | left |                    | right | 46<br>  15<br>  2<br>  1645<br>  Intersection<br>  Volume<br>  0<br>  1015<br>  1015   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Exit Residential Trips Retail Res Trips Retail Res Trips Retail Pass-by Trips  2023 Projected Volumes Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs)   | NTER = 52<br>EXIT = 42                           | New Retail   21   19   19   19   19   19   19   10   10  | 39.0%<br>24.0%<br>8<br>(3)  | left | 5.0%<br>40.0%<br>5.0%<br>20.0%<br>20.0%<br>5<br>5<br>5<br>1<br>931<br>Westbound<br>thru<br>513<br>513             | right | ieft     |                    | (2)                        | left |                    | right | 46   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail New Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)   | NTER = 52<br>EXIT = 42                           | New Retail   21   19   | 39.0%<br>24.0%<br>8<br>(3)  | left | 5.0%<br>40.0%<br>5.0%<br>20.0%<br>20<br>5<br>Westbound<br>thru<br>513<br>513                                      | right | left     |                    | (2)                        | left |                    | right | 46<br>  15<br>  2<br>  1645<br>  Intersection<br>  Volume<br>  0<br>  1015<br>  1015   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Exit Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Cain PRD (384 units) Taco Bell (2.753ksf)  | NTER = 52<br>EXIT = 42                           | New Retail   21   19   | 39.0%<br>24.0%<br>8<br>(3)  | left | 5.0% 40.0% 5.0% 5.0% 20.0%  20 5  931  Westbound thru 513 613 20 30 36  | right | left     |                    | (2)                        | left |                    | right | 46   46   15   2   1645     1645     1015   1015   1015   1015   40   68   73   1015   1016 |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Exit Trip Assignment % - Retail Pass-by Exit Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Cain PRD (384 units)   | NTER = 52<br>EXIT = 42                           | New Retail   21   19   | 39.0%<br>24.0%<br>8<br>(3)  | left | 5.0% 40.0% 5.0% 5.0% 20.0%  20 5  931  Westbound thru 513 613 30  | right | left     |                    | (2)                        | left |                    | right | 46<br>  45<br>  15<br>  2<br>  1645<br>  Intersection<br>  Volume<br>  0<br>  0<br>  1015<br>  1015<br>  40<br>  68  |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Peas-by Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Cain PRD (384 units) Taco Bell (2-758sts)  2023 Base Volumes  | NTER = 52 EXIT = 42    10                        | New Retail   21   19   | 39.0%<br>24.0%<br>8 (3)   | left | 5.0% 40.0% 5.0% 5.0% 20.0%  20 5  931  Westbound thru 513 613 20 30 36  | right | left     |                    | (2)                        | left |                    | right | 46   46   15   2   1645     1645     1015   1015   1015   1015   40   68   73   1015   1016 |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Peas-by Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Cain PRD (384 units) Taco Bell (2-758sts)  2023 Base Volumes  | NTER = 52 EXIT = 42  lieft    Resident NTER = 48 | New Retail   21   19   19   19   19   19   19   19   | 39.0% 24.0% 8 (3) 11 right P-By Retail  | left | 5.0% 40.0% 5.0% 5.0% 20.0%  20 5  931  Westbound thru 513 613 20 30 36  | right | left     |                    | (2)                        | left |                    | right | 46   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Peas-by Enter Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Cain PRD (384 units) Taco Bell (2-758sts)  2023 Base Volumes  | NTER = 52 EXIT = 42    10                        | New Retail   21   19   46.0%   5.0%   10.0%   26   2   (-3)   701  | 39.0% 24.0% 8 (3) 11 right  | left | 5.0% 40.0% 5.0% 5.0% 20.0%  20 5  931  Westbound thru 513 613 20 30 36  | right | left     |                    | (2)                        | left |                    | right | 46   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Cain PRD (384 units) Taco Bell (2.753ksf) 2023 Base Volumes   | NTER = 52 EXIT = 42  lieft    Resident NTER = 48 | New Retail   21   19   19   19   19   19   19   19   | 39.0% 24.0% 8 (3) 11 right P-By Retail  | left | 5.0% 40.0% 5.0% 20.0% 20.0%  20 5  931  Westbound thru 513 513 20 30 36 599                                       | right | left     |                    | (2)                        | left |                    | right | 46   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Ress-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Dwell at Calin PRD (384 units) Taco Bell (2.753ksf)  2023 Base Volumes  | NTER = 52 EXIT = 42  lieft    Resident NTER = 48 | New Retail   21   19   46.0% | 39.0% 24.0% 8 (3) 11 right P-By Retail  | left | 5.0% 40.0% 5.0% 5.0% 20.0%  20 5  931  Westbound thru 513 613 613 613 615 619 619 619 619 619 619 619 619 619 619 | right | left     |                    | (2)                        | left |                    | right | 46   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail New Trips Retail Pass-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Dwell at Calin PRD (384 units) Taco Bell (2.753ksf)  2023 Base Volumes  | NTER = 52 EXIT = 42  lieft    Resident NTER = 48 | New Retail   21   19   19   19   19   19   19   19   | 39.0% 24.0% 8 (3) 11 right P-By Retail  | left | 5.0% 40.0% 5.0% 20.0% 20.0% 20 5  931  Westbound thru 513 513 513 20 30 36 599                                    | right | left     |                    | (2)                        | left |                    | right | 46   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Caln PRD (384 units) Taco Bell (2.753ksf) 2023 Base Volumes  E  Trip Assignment % - Residential Enter Trip Assignment % - Residential Enter Trip Assignment % - Retail New Enter   | NTER = 52 EXIT = 42  lieft    Resident NTER = 48 | New Retail   21   19     46.0%   5.0%   10.0%     24.0%     26   2   (-3)     701  | 11 9 39.0% 24.0% 8 (3) 11 11 right P-By Retail 11 11 11 11 11 11 11 11 11 11 11 11 11 | left | 5.0% 40.0% 5.0% 20.0% 20 5 5  931  Westbound thru 513 513 20 30 36 599  | right | left     |                    | (2)                        | left |                    | right | 46   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Exit Trip Assignment % - Retail Pass-by Exit Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Cain PRD (384 units) Taco Bell (2.753ksf)  2023 Base Volumes  E  Trip Assignment % - Residential Exit Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter | NTER = 52 EXIT = 42  lieft    Resident NTER = 48 | New Retail   21   19   19   19   19   19   19   19   | 11 9 39.0% 24.0% 8 (3) 11 11 right P-By Retail 11                                     | left | 5.0% 40.0% 5.0% 20.0% 20.0% 20 5  931  Westbound thru 513 513 513 20 30 36 599                                    | right | left     |                    | (2) 2 right                | left |                    | right | 46   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail Pass-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Calin PRD (384 units) Taco Bell (2.753ksf) 2023 Base Volumes  E  Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit   | NTER = 52 EXIT = 42  lieft    Resident NTER = 48 | New Retail   21   19   46.0%   5.0%   10.0%   26   2   (-3)   701     Eastbound thru   502   20   38   37   597     34   31   46.0%   5.0%   10.0%   10.0%   -27.0%  | 11 9 39.0% 24.0% 8 (3) 11 11 right P-By Retail 11 11 11 11 11 11 11 11 11 11 11 11 11 | left | 5.0% 40.0% 5.0% 20.0% 20.0%  20 5 5.0% 20.0%  931  Westbound thru 513 513 20 30 36 40.0% 5.0% 40.0% 5.0% 5.0%     | right | left     |                    | (2)                        | left |                    | right | 46   15   2   1645     1645     1015   40   68   73   1196     1196     1016     1 |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Exit Trip Assignment % - Retail Pass-by Exit Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail New Trips Retail Pass-by Trips 2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Cain PRD (384 units) Taco Bell (2.753ksf)  2023 Base Volumes  E  Trip Assignment % - Residential Exit Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter | NTER = 52 EXIT = 42  lieft    Resident NTER = 48 | New Retail   21   19     46.0%   5.0%   10.0%     24.0%     26   2   (-3)     701  | 11 9 39.0% 24.0% 8 (3) 11 11 right P-By Retail 11 11 11 11 11 11 11 11 11 11 11 11 11 | left | 5.0% 40.0% 5.0% 20.0% 20.0% 20 5  931  Westbound thru 513 513 513 20 30 36 599                                    | right | left     |                    | (2) 2 right                | left |                    | right | 46   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pass-by Exit Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Trips Retail Pass-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Volumes (Balanced) Base growth (0.65% compounded for 6 yrs) Dwell at Calin PRD (384 units) Taco Bell (2.753ksf)  2023 Base Volumes  Trip Assignment % - Residential Exit Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Exit Residential Trips   | NTER = 52 EXIT = 42  lieft    Resident NTER = 48 | New Retail   21   19   46.0%   5.0%   10.0%   24.0%   26   2   (-3)   701     Eastbound thru   5.02   5.02   2.0   38   37   5.97     5.97     5.0%   10.0%   10.0%   24.0%  | 11 9 39.0% 24.0% 8 (3) 11 11 right 11 11 11 11 11 11 11 11 11 11 11 11 11             | left | 5.0% 40.0% 5.0% 5.0% 20.0% 20 5 5 931  Westbound thru 513 513 30 36 599  5.0% 40.0% 20.0%                         | right | left     |                    | (2) 2 right                | left |                    | right | 46   |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail New Exit Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail Pass-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Calin PRD (384 units) Taco Bell (2.753kr)  2023 Base Volumes  Exit Compounded for 6 yrs) Trip Assignment % - Residential Exit Trip Assignment % - Retail New Exit Trip Assignment % - Retail New Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail New Exit Prips Retail Pass-by Trips Retail Pass-by Trips Retail Pass-by Trips  | NTER = 52 EXIT = 42  lieft    Resident NTER = 48 | New Retail   19  | 11 9 39.0% 24.0% 8 (3) 11 11 11 12 12 11 11 11 11 11 11 11 11                         | left | 5.0% 40.0% 5.0% 20.0% 20.0%  931  Westbound thru 513 513 613 613 640.0% 5.0% 40.0% 5.0% 18 8                      | right | left     |                    | (2)<br>2<br>right<br>27.0% | left |                    | right | 46   15   2   1645    |
| Trip Assignment % - Residential Enter Trip Assignment % - Residential Exit Trip Assignment % - Residential Exit Trip Assignment % - Retail New Enter Trip Assignment % - Retail Pew Exit Trip Assignment % - Retail Pass-by Enter Trip Assignment % - Retail Pass-by Exit Residential Trips Retail Pass-by Trips  2023 Projected Volumes  Time Period: Saturday Midday Peak Hour  2017 Existing Counts Balancing 2017 Existing Counts Balancing 2017 Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Caln PRD (384 units) Taco Bell (2.753ksf)  2023 Base Volumes  Existing Volumes  Existing Volumes  Existing Volumes (Balanced)  Base growth (0.65% compounded for 6 yrs) Dwell at Caln PRD (384 units) Taco Bell (2.753ksf)  2023 Base Volumes   | NTER = 52 EXIT = 42  lieft    Resident NTER = 48 | New Retail   19  | 11 9 39.0% 24.0% 8 (3) 11 11 11 12 12 11 11 11 11 11 11 11 11                         | left | 5.0% 40.0% 5.0% 5.0% 20.0% 20 5 5 931  Westbound thru 513 513 30 36 599  5.0% 40.0% 20.0%                         | right | ieft     |                    | (2)<br>2<br>right          | left |                    | right | 46   15   2   1645   1655    |

## **APPENDIX J**

CRITICAL/FOLLOW-UP GAP DATA

## CRITICAL HEADWAY CALCULATIONS FOR TWSC INTERSECTION WITHIN SUBURBAN LAND USE CONTEXT BASED ON PENNSYLVANIA DEFAULT VALUES FROM CHAPTER 10 OF PENNDOT PUBLICATION 46

 $t_{c,x}$ =  $t_{c, base} + t_{c,HV}^* P_{HV} + t_{c,G}^* G - t_{3,LT}$ 

where:

 $t_{c,x}$ = critical headway for movement x (s)

 $t_{c,base}$  = base crtitcal headway from Chapter 10 of PennDOT Publication 46

= adjustment factor for heavy vehciles (1.0 for major streets with one lane in each direction;  $t_{c,HV}$ 

2.0 for major streets with two or three lanes in each direction) (s) = proportion of heavy vehciles for movement (expressed as a decimal; e.g., P<sub>HV</sub>=0.02 for 2% heavy vehciles)  $\mathsf{P}_{\mathsf{HV}}$ 

= adjustment factor for grade (0.1 for Movement 9 and 12; 0.2 for Movements 7,8,10, and 11) (s)  $t_{c,G}$ 

= percent grade (expressed as an integer; e.g., G= -2 for a 2% downhill grade)

t<sub>c,base</sub> = adjustment factor for intersction geometry (0.7 for minor street left-turn movement at three-leg intersections; 0.0 otherwise) (s)

|       |     |     |     |     | LEFT | TURN | IFRO | VI MA. | OR R | OADW | AY - T | WO LA | ANES | (t  | = 4.3) |     |     |     |     |     |     |
|-------|-----|-----|-----|-----|------|------|------|--------|------|------|--------|-------|------|-----|--------|-----|-----|-----|-----|-----|-----|
| GRADE | 0   | -1  | 1   | -2  | 2    | -3   | 3    | -4     | 4    | -5   | 5      | -6    | 6    | -7  | 7      | -8  | 8   | -9  | 9   | -10 | 10  |
|       |     |     |     |     |      |      |      |        |      |      |        |       |      |     |        |     |     |     |     |     |     |
| HV %  |     |     |     |     |      |      |      |        |      |      |        |       |      |     |        |     |     |     |     |     |     |
| 0     | 4.3 | 4.3 | 4.3 | 4.3 | 4.3  | 4.3  | 4.3  | 4.3    | 4.3  | 4.3  | 4.3    | 4.3   | 4.3  | 4.3 | 4.3    | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| 1     | 4.3 | 4.3 | 4.3 | 4.3 | 4.3  | 4.3  | 4.3  | 4.3    | 4.3  | 4.3  | 4.3    | 4.3   | 4.3  | 4.3 | 4.3    | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| 2     | 4.3 | 4.3 | 4.3 | 4.3 | 4.3  | 4.3  | 4.3  | 4.3    | 4.3  | 4.3  | 4.3    | 4.3   | 4.3  | 4.3 | 4.3    | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| 3     | 4.3 | 4.3 | 4.3 | 4.3 | 4.3  | 4.3  | 4.3  | 4.3    | 4.3  | 4.3  | 4.3    | 4.3   | 4.3  | 4.3 | 4.3    | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| 4     | 4.3 | 4.3 | 4.3 | 4.3 | 4.3  | 4.3  | 4.3  | 4.3    | 4.3  | 4.3  | 4.3    | 4.3   | 4.3  | 4.3 | 4.3    | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| 5     | 4.4 | 4.4 | 4.4 | 4.4 | 4.4  | 4.4  | 4.4  | 4.4    | 4.4  | 4.4  | 4.4    | 4.4   | 4.4  | 4.4 | 4.4    | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| 6     | 4.4 | 4.4 | 4.4 | 4.4 | 4.4  | 4.4  | 4.4  | 4.4    | 4.4  | 4.4  | 4.4    | 4.4   | 4.4  | 4.4 | 4.4    | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| 7     | 4.4 | 4.4 | 4.4 | 4.4 | 4.4  | 4.4  | 4.4  | 4.4    | 4.4  | 4.4  | 4.4    | 4.4   | 4.4  | 4.4 | 4.4    | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| 8     | 4.4 | 4.4 | 4.4 | 4.4 | 4.4  | 4.4  | 4.4  | 4.4    | 4.4  | 4.4  | 4.4    | 4.4   | 4.4  | 4.4 | 4.4    | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| 9     | 4.4 | 4.4 | 4.4 | 4.4 | 4.4  | 4.4  | 4.4  | 4.4    | 4.4  | 4.4  | 4.4    | 4.4   | 4.4  | 4.4 | 4.4    | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| 10    | 4.4 | 4.4 | 4.4 | 4.4 | 4.4  | 4.4  | 4.4  | 4.4    | 4.4  | 4.4  | 4.4    | 4.4   | 4.4  | 4.4 | 4.4    | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |

|       |     |     | LEFT | TURN | N FRO | M MIN | OR RO | DADW | AY - T | WO LA | NES - | 4-LEG | INTE | RSEC <sup>°</sup> | TION ( | t <sub>c, base</sub> | = 7.1) |     |     |     |     |
|-------|-----|-----|------|------|-------|-------|-------|------|--------|-------|-------|-------|------|-------------------|--------|----------------------|--------|-----|-----|-----|-----|
| GRADE | 0   | -1  | 1    | -2   | 2     | -3    | 3     | -4   | 4      | -5    | 5     | -6    | 6    | -7                | 7      | -8                   | 8      | -9  | 9   | -10 | 10  |
|       |     |     |      |      |       |       |       |      |        |       |       |       |      |                   |        |                      |        |     |     |     |     |
| HV %  |     |     |      |      |       |       |       |      |        |       |       |       |      |                   |        |                      |        |     |     |     |     |
| 0     | 7.1 | 6.9 | 7.3  | 6.7  | 7.5   | 6.5   | 7.7   | 6.3  | 7.9    | 6.1   | 8.1   | 5.9   | 8.3  | 5.7               | 8.5    | 5.5                  | 8.7    | 5.3 | 8.9 | 5.1 | 9.1 |
| 1     | 7.1 | 6.9 | 7.3  | 6.7  | 7.5   | 6.5   | 7.7   | 6.3  | 7.9    | 6.1   | 8.1   | 5.9   | 8.3  | 5.7               | 8.5    | 5.5                  | 8.7    | 5.3 | 8.9 | 5.1 | 9.1 |
| 2     | 7.1 | 6.9 | 7.3  | 6.7  | 7.5   | 6.5   | 7.7   | 6.3  | 7.9    | 6.1   | 8.1   | 5.9   | 8.3  | 5.7               | 8.5    | 5.5                  | 8.7    | 5.3 | 8.9 | 5.1 | 9.1 |
| 3     | 7.1 | 6.9 | 7.3  | 6.7  | 7.5   | 6.5   | 7.7   | 6.3  | 7.9    | 6.1   | 8.1   | 5.9   | 8.3  | 5.7               | 8.5    | 5.5                  | 8.7    | 5.3 | 8.9 | 5.1 | 9.1 |
| 4     | 7.1 | 6.9 | 7.3  | 6.7  | 7.5   | 6.5   | 7.7   | 6.3  | 7.9    | 6.1   | 8.1   | 5.9   | 8.3  | 5.7               | 8.5    | 5.5                  | 8.7    | 5.3 | 8.9 | 5.1 | 9.1 |
| 5     | 7.2 | 7.0 | 7.4  | 6.8  | 7.6   | 6.6   | 7.8   | 6.4  | 8.0    | 6.2   | 8.2   | 6.0   | 8.4  | 5.8               | 8.6    | 5.6                  | 8.8    | 5.4 | 9.0 | 5.2 | 9.2 |
| 6     | 7.2 | 7.0 | 7.4  | 6.8  | 7.6   | 6.6   | 7.8   | 6.4  | 8.0    | 6.2   | 8.2   | 6.0   | 8.4  | 5.8               | 8.6    | 5.6                  | 8.8    | 5.4 | 9.0 | 5.2 | 9.2 |
| 7     | 7.2 | 7.0 | 7.4  | 6.8  | 7.6   | 6.6   | 7.8   | 6.4  | 8.0    | 6.2   | 8.2   | 6.0   | 8.4  | 5.8               | 8.6    | 5.6                  | 8.8    | 5.4 | 9.0 | 5.2 | 9.2 |
| 8     | 7.2 | 7.0 | 7.4  | 6.8  | 7.6   | 6.6   | 7.8   | 6.4  | 8.0    | 6.2   | 8.2   | 6.0   | 8.4  | 5.8               | 8.6    | 5.6                  | 8.8    | 5.4 | 9.0 | 5.2 | 9.2 |
| 9     | 7.2 | 7.0 | 7.4  | 6.8  | 7.6   | 6.6   | 7.8   | 6.4  | 8.0    | 6.2   | 8.2   | 6.0   | 8.4  | 5.8               | 8.6    | 5.6                  | 8.8    | 5.4 | 9.0 | 5.2 | 9.2 |
| 10    | 7.2 | 7.0 | 7.4  | 6.8  | 7.6   | 6.6   | 7.8   | 6.4  | 8.0    | 6.2   | 8.2   | 6.0   | 8.4  | 5.8               | 8.6    | 5.6                  | 8.8    | 5.4 | 9.0 | 5.2 | 9.2 |

|       |     |     |     | Т   | HROU | GH TR | AFFIC | ON N | IINOR | ROAL | WAY . | - TWO | LANE | S (t <sub>c, b</sub> | <sub>ase</sub> = 6 | .5) |     |     |     |     |     |
|-------|-----|-----|-----|-----|------|-------|-------|------|-------|------|-------|-------|------|----------------------|--------------------|-----|-----|-----|-----|-----|-----|
| GRADE | 0   | -1  | 1   | -2  | 2    | -3    | 3     | -4   | 4     | -5   | 5     | -6    | 6    | -7                   | 7                  | -8  | 8   | -9  | 9   | -10 | 10  |
|       |     |     |     |     |      |       |       |      |       |      |       |       |      |                      |                    |     |     |     |     |     |     |
| HV %  |     |     |     |     |      |       |       |      |       |      |       |       |      |                      |                    |     |     |     |     |     |     |
| 0     | 6.5 | 6.3 | 6.7 | 6.1 | 6.9  | 5.9   | 7.1   | 5.7  | 7.3   | 5.5  | 7.5   | 5.3   | 7.7  | 5.1                  | 7.9                | 4.9 | 8.1 | 4.7 | 8.3 | 4.5 | 8.5 |
| 1     | 6.5 | 6.3 | 6.7 | 6.1 | 6.9  | 5.9   | 7.1   | 5.7  | 7.3   | 5.5  | 7.5   | 5.3   | 7.7  | 5.1                  | 7.9                | 4.9 | 8.1 | 4.7 | 8.3 | 4.5 | 8.5 |
| 2     | 6.5 | 6.3 | 6.7 | 6.1 | 6.9  | 5.9   | 7.1   | 5.7  | 7.3   | 5.5  | 7.5   | 5.3   | 7.7  | 5.1                  | 7.9                | 4.9 | 8.1 | 4.7 | 8.3 | 4.5 | 8.5 |
| 3     | 6.5 | 6.3 | 6.7 | 6.1 | 6.9  | 5.9   | 7.1   | 5.7  | 7.3   | 5.5  | 7.5   | 5.3   | 7.7  | 5.1                  | 7.9                | 4.9 | 8.1 | 4.7 | 8.3 | 4.5 | 8.5 |
| 4     | 6.5 | 6.3 | 6.7 | 6.1 | 6.9  | 5.9   | 7.1   | 5.7  | 7.3   | 5.5  | 7.5   | 5.3   | 7.7  | 5.1                  | 7.9                | 4.9 | 8.1 | 4.7 | 8.3 | 4.5 | 8.5 |
| 5     | 6.6 | 6.4 | 6.8 | 6.2 | 7.0  | 6.0   | 7.2   | 5.8  | 7.4   | 5.6  | 7.6   | 5.4   | 7.8  | 5.2                  | 8.0                | 5.0 | 8.2 | 4.8 | 8.4 | 4.6 | 8.6 |
| 6     | 6.6 | 6.4 | 6.8 | 6.2 | 7.0  | 6.0   | 7.2   | 5.8  | 7.4   | 5.6  | 7.6   | 5.4   | 7.8  | 5.2                  | 8.0                | 5.0 | 8.2 | 4.8 | 8.4 | 4.6 | 8.6 |
| 7     | 6.6 | 6.4 | 6.8 | 6.2 | 7.0  | 6.0   | 7.2   | 5.8  | 7.4   | 5.6  | 7.6   | 5.4   | 7.8  | 5.2                  | 8.0                | 5.0 | 8.2 | 4.8 | 8.4 | 4.6 | 8.6 |
| 8     | 6.6 | 6.4 | 6.8 | 6.2 | 7.0  | 6.0   | 7.2   | 5.8  | 7.4   | 5.6  | 7.6   | 5.4   | 7.8  | 5.2                  | 8.0                | 5.0 | 8.2 | 4.8 | 8.4 | 4.6 | 8.6 |
| 9     | 6.6 | 6.4 | 6.8 | 6.2 | 7.0  | 6.0   | 7.2   | 5.8  | 7.4   | 5.6  | 7.6   | 5.4   | 7.8  | 5.2                  | 8.0                | 5.0 | 8.2 | 4.8 | 8.4 | 4.6 | 8.6 |
| 10    | 6.6 | 6.4 | 6.8 | 6.2 | 7.0  | 6.0   | 7.2   | 5.8  | 7.4   | 5.6  | 7.6   | 5.4   | 7.8  | 5.2                  | 8.0                | 5.0 | 8.2 | 4.8 | 8.4 | 4.6 | 8.6 |

|       |     |     |     |     | RIGH | T TUR | N FRC | IIM MC | NOR R | OADW | /AY - 1 | WO L | ANES | (t <sub>c, base</sub> | = 6.2) |     |     |     |     |     |     |
|-------|-----|-----|-----|-----|------|-------|-------|--------|-------|------|---------|------|------|-----------------------|--------|-----|-----|-----|-----|-----|-----|
| GRADE | 0   | -1  | 1   | -2  | 2    | -3    | 3     | -4     | 4     | -5   | 5       | -6   | 6    | -7                    | 7      | -8  | 8   | -9  | 9   | -10 | 10  |
|       |     |     |     |     |      |       |       |        |       |      |         |      |      |                       |        |     |     |     |     |     |     |
| HV %  |     |     |     |     |      |       |       |        |       |      |         |      |      |                       |        |     |     |     |     |     |     |
| 0     | 6.2 | 6.1 | 6.3 | 6.0 | 6.4  | 5.9   | 6.5   | 5.8    | 6.6   | 5.7  | 6.7     | 5.6  | 6.8  | 5.5                   | 6.9    | 5.4 | 7.0 | 5.3 | 7.1 | 5.2 | 7.2 |
| 1     | 6.2 | 6.1 | 6.3 | 6.0 | 6.4  | 5.9   | 6.5   | 5.8    | 6.6   | 5.7  | 6.7     | 5.6  | 6.8  | 5.5                   | 6.9    | 5.4 | 7.0 | 5.3 | 7.1 | 5.2 | 7.2 |
| 2     | 6.2 | 6.1 | 6.3 | 6.0 | 6.4  | 5.9   | 6.5   | 5.8    | 6.6   | 5.7  | 6.7     | 5.6  | 6.8  | 5.5                   | 6.9    | 5.4 | 7.0 | 5.3 | 7.1 | 5.2 | 7.2 |
| 3     | 6.2 | 6.1 | 6.3 | 6.0 | 6.4  | 5.9   | 6.5   | 5.8    | 6.6   | 5.7  | 6.7     | 5.6  | 6.8  | 5.5                   | 6.9    | 5.4 | 7.0 | 5.3 | 7.1 | 5.2 | 7.2 |
| 4     | 6.2 | 6.1 | 6.3 | 6.0 | 6.4  | 5.9   | 6.5   | 5.8    | 6.6   | 5.7  | 6.7     | 5.6  | 6.8  | 5.5                   | 6.9    | 5.4 | 7.0 | 5.3 | 7.1 | 5.2 | 7.2 |
| 5     | 6.3 | 6.2 | 6.4 | 6.1 | 6.5  | 6.0   | 6.6   | 5.9    | 6.7   | 5.8  | 6.8     | 5.7  | 6.9  | 5.6                   | 7.0    | 5.5 | 7.1 | 5.4 | 7.2 | 5.3 | 7.3 |
| 6     | 6.3 | 6.2 | 6.4 | 6.1 | 6.5  | 6.0   | 6.6   | 5.9    | 6.7   | 5.8  | 6.8     | 5.7  | 6.9  | 5.6                   | 7.0    | 5.5 | 7.1 | 5.4 | 7.2 | 5.3 | 7.3 |
| 7     | 6.3 | 6.2 | 6.4 | 6.1 | 6.5  | 6.0   | 6.6   | 5.9    | 6.7   | 5.8  | 6.8     | 5.7  | 6.9  | 5.6                   | 7.0    | 5.5 | 7.1 | 5.4 | 7.2 | 5.3 | 7.3 |
| 8     | 6.3 | 6.2 | 6.4 | 6.1 | 6.5  | 6.0   | 6.6   | 5.9    | 6.7   | 5.8  | 6.8     | 5.7  | 6.9  | 5.6                   | 7.0    | 5.5 | 7.1 | 5.4 | 7.2 | 5.3 | 7.3 |
| 9     | 6.3 | 6.2 | 6.4 | 6.1 | 6.5  | 6.0   | 6.6   | 5.9    | 6.7   | 5.8  | 6.8     | 5.7  | 6.9  | 5.6                   | 7.0    | 5.5 | 7.1 | 5.4 | 7.2 | 5.3 | 7.3 |
| 10    | 6.3 | 6.2 | 6.4 | 6.1 | 6.5  | 6.0   | 6.6   | 5.9    | 6.7   | 5.8  | 6.8     | 5.7  | 6.9  | 5.6                   | 7.0    | 5.5 | 7.1 | 5.4 | 7.2 | 5.3 | 7.3 |

## CRITICAL HEADWAY CALCULATIONS FOR TWSC INTERSECTION WITHIN SUBURBAN LAND USE CONTEXT BASED ON PENNSYLVANIA DEFAULT VALUES FROM CHAPTER 10 OF PENNDOT PUBLICATION 46

 $t_{c,x} = t_{c, \text{ base}} + t_{c,HV}^* P_{HV} + t_{c,G}^* G - t_{3,LT}$ 

where:

 $t_{c,x}$  = critical headway for movement x (s)

 $t_{c,base}$  = base crtitcal headway from Chapter 10 of PennDOT Publication 46

 $t_{c,HV}$  = adjustment factor for heavy vehciles (1.0 for major streets with one lane in each direction;

2.0 for major streets with two or three lanes in each direction) (s)

P<sub>HV</sub> = proportion of heavy vehciles for movement (expressed as a decimal; e.g., P<sub>HV</sub>=0.02 for 2% heavy vehciles)

 $t_{c,G}$  = adjustment factor for grade (0.1 for Movement 9 and 12; 0.2 for Movements 7,8,10, and 11) (s)

G = percent grade (expressed as an integer; e.g., G= -2 for a 2% downhill grade)

t<sub>c,base</sub> = adjustment factor for intersction geometry (0.7 for minor street left-turn movement at three-leg intersections; 0.0 otherwise) (s)

|       |     |     |     |     | LEFT | TURN | FROM | /I MAJ | OR RO | DADW | AY - T | WO L | ANES | (t <sub>r hase</sub> | = 4.3) | )   |     |     |     |     |     |
|-------|-----|-----|-----|-----|------|------|------|--------|-------|------|--------|------|------|----------------------|--------|-----|-----|-----|-----|-----|-----|
| GRADE | 0   | -1  | 1   | -2  | 2    | -3   | 3    | -4     | 4     | -5   | 5      | -6   | 6    | -7                   | 7      | -8  | 8   | -9  | 9   | -10 | 10  |
|       |     |     |     |     |      |      |      |        |       |      |        |      |      |                      |        |     |     |     |     |     |     |
| HV %  |     |     |     |     |      |      |      |        |       |      |        |      |      |                      |        |     |     |     |     |     |     |
| 0     | 4.3 | 4.3 | 4.3 | 4.3 | 4.3  | 4.3  | 4.3  | 4.3    | 4.3   | 4.3  | 4.3    | 4.3  | 4.3  | 4.3                  | 4.3    | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| 1     | 4.3 | 4.3 | 4.3 | 4.3 | 4.3  | 4.3  | 4.3  | 4.3    | 4.3   | 4.3  | 4.3    | 4.3  | 4.3  | 4.3                  | 4.3    | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| 2     | 4.3 | 4.3 | 4.3 | 4.3 | 4.3  | 4.3  | 4.3  | 4.3    | 4.3   | 4.3  | 4.3    | 4.3  | 4.3  | 4.3                  | 4.3    | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| 3     | 4.3 | 4.3 | 4.3 | 4.3 | 4.3  | 4.3  | 4.3  | 4.3    | 4.3   | 4.3  | 4.3    | 4.3  | 4.3  | 4.3                  | 4.3    | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| 4     | 4.3 | 4.3 | 4.3 | 4.3 | 4.3  | 4.3  | 4.3  | 4.3    | 4.3   | 4.3  | 4.3    | 4.3  | 4.3  | 4.3                  | 4.3    | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| 5     | 4.4 | 4.4 | 4.4 | 4.4 | 4.4  | 4.4  | 4.4  | 4.4    | 4.4   | 4.4  | 4.4    | 4.4  | 4.4  | 4.4                  | 4.4    | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| 6     | 4.4 | 4.4 | 4.4 | 4.4 | 4.4  | 4.4  | 4.4  | 4.4    | 4.4   | 4.4  | 4.4    | 4.4  | 4.4  | 4.4                  | 4.4    | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| 7     | 4.4 | 4.4 | 4.4 | 4.4 | 4.4  | 4.4  | 4.4  | 4.4    | 4.4   | 4.4  | 4.4    | 4.4  | 4.4  | 4.4                  | 4.4    | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| 8     | 4.4 | 4.4 | 4.4 | 4.4 | 4.4  | 4.4  | 4.4  | 4.4    | 4.4   | 4.4  | 4.4    | 4.4  | 4.4  | 4.4                  | 4.4    | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| 9     | 4.4 | 4.4 | 4.4 | 4.4 | 4.4  | 4.4  | 4.4  | 4.4    | 4.4   | 4.4  | 4.4    | 4.4  | 4.4  | 4.4                  | 4.4    | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| 10    | 4.4 | 4.4 | 4.4 | 4.4 | 4.4  | 4.4  | 4.4  | 4.4    | 4.4   | 4.4  | 4.4    | 4.4  | 4.4  | 4.4                  | 4.4    | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |

|       |     |     | LEFT | TURN | FROM | MIN( | OR RO | ADW | ۲۱ - Y | NO LA | NES - | 3-LEC | 3 INTE | RSEC | TION | (t <sub>c, base</sub> | = 7.1) | )   |     |     |     |
|-------|-----|-----|------|------|------|------|-------|-----|--------|-------|-------|-------|--------|------|------|-----------------------|--------|-----|-----|-----|-----|
| GRADE | 0   | -1  | 1    | -2   | 2    | -3   | 3     | -4  | 4      | -5    | 5     | -6    | 6      | -7   | 7    | -8                    | 8      | -9  | 9   | -10 | 10  |
|       |     |     |      |      |      |      |       |     |        |       |       |       |        |      |      |                       |        |     |     |     |     |
| HV %  |     |     |      |      |      |      |       |     |        |       |       |       |        |      |      |                       |        |     |     |     |     |
| 0     | 6.4 | 6.2 | 6.6  | 6.0  | 6.8  | 5.8  | 7.0   | 5.6 | 7.2    | 5.4   | 7.4   | 5.2   | 7.6    | 5.0  | 7.8  | 4.8                   | 8.0    | 4.6 | 8.2 | 4.4 | 8.4 |
| 1     | 6.4 | 6.2 | 6.6  | 6.0  | 6.8  | 5.8  | 7.0   | 5.6 | 7.2    | 5.4   | 7.4   | 5.2   | 7.6    | 5.0  | 7.8  | 4.8                   | 8.0    | 4.6 | 8.2 | 4.4 | 8.4 |
| 2     | 6.4 | 6.2 | 6.6  | 6.0  | 6.8  | 5.8  | 7.0   | 5.6 | 7.2    | 5.4   | 7.4   | 5.2   | 7.6    | 5.0  | 7.8  | 4.8                   | 8.0    | 4.6 | 8.2 | 4.4 | 8.4 |
| 3     | 6.4 | 6.2 | 6.6  | 6.0  | 6.8  | 5.8  | 7.0   | 5.6 | 7.2    | 5.4   | 7.4   | 5.2   | 7.6    | 5.0  | 7.8  | 4.8                   | 8.0    | 4.6 | 8.2 | 4.4 | 8.4 |
| 4     | 6.4 | 6.2 | 6.6  | 6.0  | 6.8  | 5.8  | 7.0   | 5.6 | 7.2    | 5.4   | 7.4   | 5.2   | 7.6    | 5.0  | 7.8  | 4.8                   | 8.0    | 4.6 | 8.2 | 4.4 | 8.4 |
| 5     | 6.5 | 6.3 | 6.7  | 6.1  | 6.9  | 5.9  | 7.1   | 5.7 | 7.3    | 5.5   | 7.5   | 5.3   | 7.7    | 5.1  | 7.9  | 4.9                   | 8.1    | 4.7 | 8.3 | 4.5 | 8.5 |
| 6     | 6.5 | 6.3 | 6.7  | 6.1  | 6.9  | 5.9  | 7.1   | 5.7 | 7.3    | 5.5   | 7.5   | 5.3   | 7.7    | 5.1  | 7.9  | 4.9                   | 8.1    | 4.7 | 8.3 | 4.5 | 8.5 |
| 7     | 6.5 | 6.3 | 6.7  | 6.1  | 6.9  | 5.9  | 7.1   | 5.7 | 7.3    | 5.5   | 7.5   | 5.3   | 7.7    | 5.1  | 7.9  | 4.9                   | 8.1    | 4.7 | 8.3 | 4.5 | 8.5 |
| 8     | 6.5 | 6.3 | 6.7  | 6.1  | 6.9  | 5.9  | 7.1   | 5.7 | 7.3    | 5.5   | 7.5   | 5.3   | 7.7    | 5.1  | 7.9  | 4.9                   | 8.1    | 4.7 | 8.3 | 4.5 | 8.5 |
| 9     | 6.5 | 6.3 | 6.7  | 6.1  | 6.9  | 5.9  | 7.1   | 5.7 | 7.3    | 5.5   | 7.5   | 5.3   | 7.7    | 5.1  | 7.9  | 4.9                   | 8.1    | 4.7 | 8.3 | 4.5 | 8.5 |
| 10    | 6.5 | 6.3 | 6.7  | 6.1  | 6.9  | 5.9  | 7.1   | 5.7 | 7.3    | 5.5   | 7.5   | 5.3   | 7.7    | 5.1  | 7.9  | 4.9                   | 8.1    | 4.7 | 8.3 | 4.5 | 8.5 |

|       |     |     |     |     | RIGHT | TURI | N FRO | M MIN | OR R | OADW | AY - T | WO L | ANES | (t <sub>c, base</sub> | , = 6.2 | )   |     |     |     |     |     |
|-------|-----|-----|-----|-----|-------|------|-------|-------|------|------|--------|------|------|-----------------------|---------|-----|-----|-----|-----|-----|-----|
| GRADE | 0   | -1  | 1   | -2  | 2     | -3   | 3     | -4    | 4    | -5   | 5      | -6   | 6    | -7                    | 7       | -8  | 8   | -9  | 9   | -10 | 10  |
|       |     |     |     |     |       |      |       |       |      |      |        |      |      |                       |         |     |     |     |     |     |     |
| HV %  |     |     |     |     |       |      |       |       |      |      |        |      |      |                       |         |     |     |     |     |     |     |
| 0     | 6.2 | 6.1 | 6.3 | 6.0 | 6.4   | 5.9  | 6.5   | 5.8   | 6.6  | 5.7  | 6.7    | 5.6  | 6.8  | 5.5                   | 6.9     | 5.4 | 7.0 | 5.3 | 7.1 | 5.2 | 7.2 |
| 1     | 6.2 | 6.1 | 6.3 | 6.0 | 6.4   | 5.9  | 6.5   | 5.8   | 6.6  | 5.7  | 6.7    | 5.6  | 6.8  | 5.5                   | 6.9     | 5.4 | 7.0 | 5.3 | 7.1 | 5.2 | 7.2 |
| 2     | 6.2 | 6.1 | 6.3 | 6.0 | 6.4   | 5.9  | 6.5   | 5.8   | 6.6  | 5.7  | 6.7    | 5.6  | 6.8  | 5.5                   | 6.9     | 5.4 | 7.0 | 5.3 | 7.1 | 5.2 | 7.2 |
| 3     | 6.2 | 6.1 | 6.3 | 6.0 | 6.4   | 5.9  | 6.5   | 5.8   | 6.6  | 5.7  | 6.7    | 5.6  | 6.8  | 5.5                   | 6.9     | 5.4 | 7.0 | 5.3 | 7.1 | 5.2 | 7.2 |
| 4     | 6.2 | 6.1 | 6.3 | 6.0 | 6.4   | 5.9  | 6.5   | 5.8   | 6.6  | 5.7  | 6.7    | 5.6  | 6.8  | 5.5                   | 6.9     | 5.4 | 7.0 | 5.3 | 7.1 | 5.2 | 7.2 |
| 5     | 6.3 | 6.2 | 6.4 | 6.1 | 6.5   | 6.0  | 6.6   | 5.9   | 6.7  | 5.8  | 6.8    | 5.7  | 6.9  | 5.6                   | 7.0     | 5.5 | 7.1 | 5.4 | 7.2 | 5.3 | 7.3 |
| 6     | 6.3 | 6.2 | 6.4 | 6.1 | 6.5   | 6.0  | 6.6   | 5.9   | 6.7  | 5.8  | 6.8    | 5.7  | 6.9  | 5.6                   | 7.0     | 5.5 | 7.1 | 5.4 | 7.2 | 5.3 | 7.3 |
| 7     | 6.3 | 6.2 | 6.4 | 6.1 | 6.5   | 6.0  | 6.6   | 5.9   | 6.7  | 5.8  | 6.8    | 5.7  | 6.9  | 5.6                   | 7.0     | 5.5 | 7.1 | 5.4 | 7.2 | 5.3 | 7.3 |
| 8     | 6.3 | 6.2 | 6.4 | 6.1 | 6.5   | 6.0  | 6.6   | 5.9   | 6.7  | 5.8  | 6.8    | 5.7  | 6.9  | 5.6                   | 7.0     | 5.5 | 7.1 | 5.4 | 7.2 | 5.3 | 7.3 |
| 9     | 6.3 | 6.2 | 6.4 | 6.1 | 6.5   | 6.0  | 6.6   | 5.9   | 6.7  | 5.8  | 6.8    | 5.7  | 6.9  | 5.6                   | 7.0     | 5.5 | 7.1 | 5.4 | 7.2 | 5.3 | 7.3 |
| 10    | 6.3 | 6.2 | 6.4 | 6.1 | 6.5   | 6.0  | 6.6   | 5.9   | 6.7  | 5.8  | 6.8    | 5.7  | 6.9  | 5.6                   | 7.0     | 5.5 | 7.1 | 5.4 | 7.2 | 5.3 | 7.3 |

## FOLLOW-UP HEADWAY CALCULATIONS FOR TWSC INTERSECTION WITHIN SUBURBAN LAND USE CONTEXT BASED ON PENNSYLVANIA DEFAULT VALUES FROM CHAPTER 10 OF PENNDOT PUBLICATION 46

 $t_{f,x}$ =  $t_{f, base} + t_{f,HV}^* P_{HV}$ 

where:

 $t_{\text{f},\text{x}}$ = follow-up headway for movement x (s)

= base follow-up headway from Chapter 10 of PennDOT Publication 46  $t_{\text{f,base}} \\$ 

= adjustment factor for heavy vehciles (0.9 for major streets with one lane in each direction;  $t_{\mathsf{f},\mathsf{HV}}$ 

1.0 for major streets with two or three lanes in each direction) (s) = proportion of heavy vehciles for movement (expressed as a decimal; e.g., P<sub>HV</sub>=0.02 for 2% heavy vehciles)  $\mathsf{P}_{\mathsf{HV}}$ 

|       |     |     |     |     | LEFT | TURN | FRO | M MAJ | OR R | DADW | AY - T | WO L | ANES | (t <sub>f, base</sub> | = 3.0) |     |     |     |     |     |     |
|-------|-----|-----|-----|-----|------|------|-----|-------|------|------|--------|------|------|-----------------------|--------|-----|-----|-----|-----|-----|-----|
| GRADE | 0   | -1  | 1   | -2  | 2    | -3   | 3   | -4    | 4    | -5   | 5      | -6   | 6    | -7                    | 7      | -8  | 8   | -9  | 9   | -10 | 10  |
|       |     |     |     |     |      |      |     |       |      |      |        |      |      |                       |        |     |     |     |     |     |     |
| HV %  |     |     |     |     |      |      |     |       |      |      |        |      |      |                       |        |     |     |     |     |     |     |
| 0     | 3.0 | 3.0 | 3.0 | 3.0 | 3.0  | 3.0  | 3.0 | 3.0   | 3.0  | 3.0  | 3.0    | 3.0  | 3.0  | 3.0                   | 3.0    | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 1     | 3.0 | 3.0 | 3.0 | 3.0 | 3.0  | 3.0  | 3.0 | 3.0   | 3.0  | 3.0  | 3.0    | 3.0  | 3.0  | 3.0                   | 3.0    | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 2     | 3.0 | 3.0 | 3.0 | 3.0 | 3.0  | 3.0  | 3.0 | 3.0   | 3.0  | 3.0  | 3.0    | 3.0  | 3.0  | 3.0                   | 3.0    | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 3     | 3.0 | 3.0 | 3.0 | 3.0 | 3.0  | 3.0  | 3.0 | 3.0   | 3.0  | 3.0  | 3.0    | 3.0  | 3.0  | 3.0                   | 3.0    | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 4     | 3.0 | 3.0 | 3.0 | 3.0 | 3.0  | 3.0  | 3.0 | 3.0   | 3.0  | 3.0  | 3.0    | 3.0  | 3.0  | 3.0                   | 3.0    | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 5     | 3.0 | 3.0 | 3.0 | 3.0 | 3.0  | 3.0  | 3.0 | 3.0   | 3.0  | 3.0  | 3.0    | 3.0  | 3.0  | 3.0                   | 3.0    | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 6     | 3.1 | 3.1 | 3.1 | 3.1 | 3.1  | 3.1  | 3.1 | 3.1   | 3.1  | 3.1  | 3.1    | 3.1  | 3.1  | 3.1                   | 3.1    | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| 7     | 3.1 | 3.1 | 3.1 | 3.1 | 3.1  | 3.1  | 3.1 | 3.1   | 3.1  | 3.1  | 3.1    | 3.1  | 3.1  | 3.1                   | 3.1    | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| 8     | 3.1 | 3.1 | 3.1 | 3.1 | 3.1  | 3.1  | 3.1 | 3.1   | 3.1  | 3.1  | 3.1    | 3.1  | 3.1  | 3.1                   | 3.1    | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| 9     | 3.1 | 3.1 | 3.1 | 3.1 | 3.1  | 3.1  | 3.1 | 3.1   | 3.1  | 3.1  | 3.1    | 3.1  | 3.1  | 3.1                   | 3.1    | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| 10    | 3.1 | 3.1 | 3.1 | 3.1 | 3.1  | 3.1  | 3.1 | 3.1   | 3.1  | 3.1  | 3.1    | 3.1  | 3.1  | 3.1                   | 3.1    | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |

|       |     |     |     |     | LEFT | TURN | FRO | M MIN | OR RO | DADW. | AY - T | WO L | ANES | (t <sub>f, base</sub> | = 3.0) |     |     |     |     |     |     |
|-------|-----|-----|-----|-----|------|------|-----|-------|-------|-------|--------|------|------|-----------------------|--------|-----|-----|-----|-----|-----|-----|
| GRADE | 0   | -1  | 1   | -2  | 2    | -3   | 3   | -4    | 4     | -5    | 5      | -6   | 6    | -7                    | 7      | -8  | 8   | -9  | 9   | -10 | 10  |
|       |     |     |     |     |      |      |     |       |       |       |        |      |      |                       |        |     |     |     |     |     |     |
| HV %  |     |     |     |     |      |      |     |       |       |       |        |      |      |                       |        |     |     |     |     |     |     |
| 0     | 3.0 | 3.0 | 3.0 | 3.0 | 3.0  | 3.0  | 3.0 | 3.0   | 3.0   | 3.0   | 3.0    | 3.0  | 3.0  | 3.0                   | 3.0    | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 1     | 3.0 | 3.0 | 3.0 | 3.0 | 3.0  | 3.0  | 3.0 | 3.0   | 3.0   | 3.0   | 3.0    | 3.0  | 3.0  | 3.0                   | 3.0    | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 2     | 3.0 | 3.0 | 3.0 | 3.0 | 3.0  | 3.0  | 3.0 | 3.0   | 3.0   | 3.0   | 3.0    | 3.0  | 3.0  | 3.0                   | 3.0    | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 3     | 3.0 | 3.0 | 3.0 | 3.0 | 3.0  | 3.0  | 3.0 | 3.0   | 3.0   | 3.0   | 3.0    | 3.0  | 3.0  | 3.0                   | 3.0    | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 4     | 3.0 | 3.0 | 3.0 | 3.0 | 3.0  | 3.0  | 3.0 | 3.0   | 3.0   | 3.0   | 3.0    | 3.0  | 3.0  | 3.0                   | 3.0    | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 5     | 3.0 | 3.0 | 3.0 | 3.0 | 3.0  | 3.0  | 3.0 | 3.0   | 3.0   | 3.0   | 3.0    | 3.0  | 3.0  | 3.0                   | 3.0    | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 6     | 3.1 | 3.1 | 3.1 | 3.1 | 3.1  | 3.1  | 3.1 | 3.1   | 3.1   | 3.1   | 3.1    | 3.1  | 3.1  | 3.1                   | 3.1    | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| 7     | 3.1 | 3.1 | 3.1 | 3.1 | 3.1  | 3.1  | 3.1 | 3.1   | 3.1   | 3.1   | 3.1    | 3.1  | 3.1  | 3.1                   | 3.1    | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| 8     | 3.1 | 3.1 | 3.1 | 3.1 | 3.1  | 3.1  | 3.1 | 3.1   | 3.1   | 3.1   | 3.1    | 3.1  | 3.1  | 3.1                   | 3.1    | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| 9     | 3.1 | 3.1 | 3.1 | 3.1 | 3.1  | 3.1  | 3.1 | 3.1   | 3.1   | 3.1   | 3.1    | 3.1  | 3.1  | 3.1                   | 3.1    | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| 10    | 3.1 | 3.1 | 3.1 | 3.1 | 3.1  | 3.1  | 3.1 | 3.1   | 3.1   | 3.1   | 3.1    | 3.1  | 3.1  | 3.1                   | 3.1    | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |

|       |     |     |     | TI  | HROU | GH TR | AFFIC | ON N | IINOR | ROAD | WAY | - TWO | LANE | S (t <sub>f, b</sub> | <sub>ase</sub> = 4 | .0) |     |     |     |     |     |
|-------|-----|-----|-----|-----|------|-------|-------|------|-------|------|-----|-------|------|----------------------|--------------------|-----|-----|-----|-----|-----|-----|
| GRADE | 0   | -1  | 1   | -2  | 2    | -3    | 3     | -4   | 4     | -5   | 5   | -6    | 6    | -7                   | 7                  | -8  | 8   | -9  | 9   | -10 | 10  |
|       |     |     |     |     |      |       |       |      |       |      |     |       |      |                      |                    |     |     |     |     |     |     |
| HV %  |     |     |     |     |      |       |       |      |       |      |     |       |      |                      |                    |     |     |     |     |     |     |
| 0     | 4.0 | 4.0 | 4.0 | 4.0 | 4.0  | 4.0   | 4.0   | 4.0  | 4.0   | 4.0  | 4.0 | 4.0   | 4.0  | 4.0                  | 4.0                | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| 1     | 4.0 | 4.0 | 4.0 | 4.0 | 4.0  | 4.0   | 4.0   | 4.0  | 4.0   | 4.0  | 4.0 | 4.0   | 4.0  | 4.0                  | 4.0                | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| 2     | 4.0 | 4.0 | 4.0 | 4.0 | 4.0  | 4.0   | 4.0   | 4.0  | 4.0   | 4.0  | 4.0 | 4.0   | 4.0  | 4.0                  | 4.0                | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| 3     | 4.0 | 4.0 | 4.0 | 4.0 | 4.0  | 4.0   | 4.0   | 4.0  | 4.0   | 4.0  | 4.0 | 4.0   | 4.0  | 4.0                  | 4.0                | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| 4     | 4.0 | 4.0 | 4.0 | 4.0 | 4.0  | 4.0   | 4.0   | 4.0  | 4.0   | 4.0  | 4.0 | 4.0   | 4.0  | 4.0                  | 4.0                | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| 5     | 4.0 | 4.0 | 4.0 | 4.0 | 4.0  | 4.0   | 4.0   | 4.0  | 4.0   | 4.0  | 4.0 | 4.0   | 4.0  | 4.0                  | 4.0                | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| 6     | 4.1 | 4.1 | 4.1 | 4.1 | 4.1  | 4.1   | 4.1   | 4.1  | 4.1   | 4.1  | 4.1 | 4.1   | 4.1  | 4.1                  | 4.1                | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| 7     | 4.1 | 4.1 | 4.1 | 4.1 | 4.1  | 4.1   | 4.1   | 4.1  | 4.1   | 4.1  | 4.1 | 4.1   | 4.1  | 4.1                  | 4.1                | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| 8     | 4.1 | 4.1 | 4.1 | 4.1 | 4.1  | 4.1   | 4.1   | 4.1  | 4.1   | 4.1  | 4.1 | 4.1   | 4.1  | 4.1                  | 4.1                | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| 9     | 4.1 | 4.1 | 4.1 | 4.1 | 4.1  | 4.1   | 4.1   | 4.1  | 4.1   | 4.1  | 4.1 | 4.1   | 4.1  | 4.1                  | 4.1                | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| 10    | 4.1 | 4.1 | 4.1 | 4.1 | 4.1  | 4.1   | 4.1   | 4.1  | 4.1   | 4.1  | 4.1 | 4.1   | 4.1  | 4.1                  | 4.1                | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |

|       |     |     |     |     | RIGH | TURI | N FRO | M MIN | IOR R | OADW | /AY - 1 | WO L | ANES | (t <sub>f, base</sub> | = 3.1 | )   |     |     |     |     |     |
|-------|-----|-----|-----|-----|------|------|-------|-------|-------|------|---------|------|------|-----------------------|-------|-----|-----|-----|-----|-----|-----|
| GRADE | 0   | -1  | 1   | -2  | 2    | -3   | 3     | -4    | 4     | -5   | 5       | -6   | 6    | -7                    | 7     | -8  | 8   | -9  | 9   | -10 | 10  |
|       |     |     |     |     |      |      |       |       |       |      |         |      |      |                       |       |     |     |     |     |     |     |
| HV %  |     |     |     |     |      |      |       |       |       |      |         |      |      |                       |       |     |     |     |     |     |     |
| 0     | 3.1 | 3.1 | 3.1 | 3.1 | 3.1  | 3.1  | 3.1   | 3.1   | 3.1   | 3.1  | 3.1     | 3.1  | 3.1  | 3.1                   | 3.1   | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| 1     | 3.1 | 3.1 | 3.1 | 3.1 | 3.1  | 3.1  | 3.1   | 3.1   | 3.1   | 3.1  | 3.1     | 3.1  | 3.1  | 3.1                   | 3.1   | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| 2     | 3.1 | 3.1 | 3.1 | 3.1 | 3.1  | 3.1  | 3.1   | 3.1   | 3.1   | 3.1  | 3.1     | 3.1  | 3.1  | 3.1                   | 3.1   | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| 3     | 3.1 | 3.1 | 3.1 | 3.1 | 3.1  | 3.1  | 3.1   | 3.1   | 3.1   | 3.1  | 3.1     | 3.1  | 3.1  | 3.1                   | 3.1   | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| 4     | 3.1 | 3.1 | 3.1 | 3.1 | 3.1  | 3.1  | 3.1   | 3.1   | 3.1   | 3.1  | 3.1     | 3.1  | 3.1  | 3.1                   | 3.1   | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| 5     | 3.1 | 3.1 | 3.1 | 3.1 | 3.1  | 3.1  | 3.1   | 3.1   | 3.1   | 3.1  | 3.1     | 3.1  | 3.1  | 3.1                   | 3.1   | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| 6     | 3.2 | 3.2 | 3.2 | 3.2 | 3.2  | 3.2  | 3.2   | 3.2   | 3.2   | 3.2  | 3.2     | 3.2  | 3.2  | 3.2                   | 3.2   | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |
| 7     | 3.2 | 3.2 | 3.2 | 3.2 | 3.2  | 3.2  | 3.2   | 3.2   | 3.2   | 3.2  | 3.2     | 3.2  | 3.2  | 3.2                   | 3.2   | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |
| 8     | 3.2 | 3.2 | 3.2 | 3.2 | 3.2  | 3.2  | 3.2   | 3.2   | 3.2   | 3.2  | 3.2     | 3.2  | 3.2  | 3.2                   | 3.2   | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |
| 9     | 3.2 | 3.2 | 3.2 | 3.2 | 3.2  | 3.2  | 3.2   | 3.2   | 3.2   | 3.2  | 3.2     | 3.2  | 3.2  | 3.2                   | 3.2   | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |
| 10    | 3.2 | 3.2 | 3.2 | 3.2 | 3.2  | 3.2  | 3.2   | 3.2   | 3.2   | 3.2  | 3.2     | 3.2  | 3.2  | 3.2                   | 3.2   | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |

# **APPENDIX K**CAPACITY ANALYSES

### **2017 EXISTING CONDITIONS**

#### ← < < √</p> Lane Group EBL Lane Configurations Traffic Volume (vph) 211 213 Future Volume (vph) 280 732 175 101 211 213 Ideal Flow (vphpl) 1800 1800 1800 1800 1800 1800 Lane Width (ft) 14 10 13 12 10 11 Grade (%) -2% Storage Length (ft) 145 0 230 0 Storage Lanes Taper Length (ft) 25 25 Right Turn on Red Yes Yes Link Speed (mph) 45 35 35 Link Distance (ft) 268 1016 359 Travel Time (s) 4.1 19.8 7.0 0.87 0.87 0.87 Peak Hour Factor 0.87 Heavy Vehicles (%) 2% 7% 6% 0% 14% 22% Shared Lane Traffic (%) Turn Type pm+pt NA NA Prot pm+ov Protected Phases Permitted Phases 2 4 Detector Phase Switch Phase Minimum Initial (s) 3.0 11.0 11.0 3.0 3.0 Minimum Split (s) 14.0 18.0 18.0 13.0 14.0 Total Split (s) 42.0 42.0 86.0 44.0 29.0 36.5% 74.8% 38.3% 25.2% 36.5% Total Split (%) Yellow Time (s) 5.0 5.0 4.0 5.0 5.0 All-Red Time (s) 2.0 2.0 2.0 2.0 2.0 Lost Time Adjust (s) -1.0 -1.0 -1.0 -1.0 -1.0 6.0 6.0 Total Lost Time (s) 6.0 6.0 5.0 Lead/Lag Lead Lead Lag Lead-Lag Optimize? Yes Yes Yes Recall Mode None C-Max C-Max None None Intersection Summary Area Type: Other Cycle Length: 115 Actuated Cycle Length: 115 Offset: 112 (97%), Referenced to phase 2:EBTL and 6:WBT, Start of Green Natural Cycle: 60 Control Type: Actuated-Coordinated

| Splits and Phases:   | 1: ROUTE 322 & ROCK RAYMOND ROAD |             |
|----------------------|----------------------------------|-------------|
| △ ø <sub>2 (R)</sub> | •                                | <b>√</b> Ø4 |
| 86 s                 |                                  | 29 s        |
| <b>₹</b> Ø5          | Ø6 (R)                           |             |
| 42 s                 | 44 s                             |             |

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|                              | ۶    | <b>→</b> | <b>←</b> | *    | -            | 4    |
|------------------------------|------|----------|----------|------|--------------|------|
| Movement                     | EBL  | EBT      | WBT      | WBR  | SBL          | SBR  |
| Lane Configurations          | 7    | <b>^</b> | 1>       |      | 7            | 7    |
| Traffic Volume (veh/h)       | 280  | 732      | 175      | 101  | 211          | 213  |
| Future Volume (veh/h)        | 280  | 732      | 175      | 101  | 211          | 213  |
| Number                       | 5    | 2        | 6        | 16   | 7            | 14   |
| Initial Q (Qb), veh          | 0    | 0        | 0        | 0    | 0            | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |          |          | 1.00 | 1.00         | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00     | 1.00     | 1.00 | 1.00         | 1.00 |
| Adj Sat Flow, veh/h/ln       | 1782 | 1767     | 1767     | 1764 | 1571         | 1468 |
| Adj Flow Rate, veh/h         | 322  | 841      | 201      | 103  | 243          | 100  |
| Adj No. of Lanes             | 1    | 1        | 1        | 0    | 1            | 1    |
| Peak Hour Factor             | 0.87 | 0.87     | 0.87     | 0.87 | 0.87         | 0.87 |
| Percent Heavy Veh, %         | 2    | 7        | 6        | 6    | 14           | 22   |
| Cap, veh/h                   | 722  | 1262     | 594      | 304  | 285          | 391  |
| Arrive On Green              | 0.25 | 1.00     | 0.54     | 0.53 | 0.19         | 0.19 |
| Sat Flow, veh/h              | 1697 | 1767     | 1103     | 565  | 1496         | 1248 |
| Grp Volume(v), veh/h         | 322  | 841      | 0        | 304  | 243          | 100  |
| Grp Sat Flow(s), veh/h/ln    | 1697 | 1767     | 0        | 1668 | 1496         | 1248 |
| Q Serve(q s), s              | 9.6  | 0.0      | 0.0      | 11.9 | 18.1         | 6.9  |
| Cycle Q Clear(q c), s        | 9.6  | 0.0      | 0.0      | 11.9 | 18.1         | 6.9  |
| Prop In Lane                 | 1.00 | 0.0      | 0.0      | 0.34 | 1.00         | 1.00 |
| Lane Grp Cap(c), veh/h       | 722  | 1262     | 0        | 899  | 285          | 391  |
| V/C Ratio(X)                 | 0.45 | 0.67     | 0.00     | 0.34 | 0.85         | 0.26 |
| Avail Cap(c_a), veh/h        | 1045 | 1262     | 0.00     | 899  | 312          | 414  |
| HCM Platoon Ratio            | 2.00 | 2.00     | 1.00     | 1.00 | 1.00         | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00     | 0.00     | 1.00 | 1.00         | 1.00 |
|                              | 7.2  | 0.0      | 0.00     | 15.1 | 45.0         | 29.5 |
| Uniform Delay (d), s/veh     |      |          |          |      | 45.0<br>18.7 |      |
| Incr Delay (d2), s/veh       | 0.4  | 2.8      | 0.0      | 1.0  |              | 0.3  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0      | 0.0      | 0.0  | 0.0          | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 7.7  | 1.8      | 0.0      | 9.6  | 13.9         | 9.2  |
| LnGrp Delay(d),s/veh         | 7.7  | 2.8      | 0.0      | 16.1 | 63.7         | 29.8 |
| LnGrp LOS                    | Α    | A        |          | В    | E            | С    |
| Approach Vol, veh/h          |      | 1163     | 304      |      | 343          |      |
| Approach Delay, s/veh        |      | 4.1      | 16.1     |      | 53.8         |      |
| Approach LOS                 |      | Α        | В        |      | D            |      |
| Timer                        | 1    | 2        | 3        | 4    | 5            | 6    |
| Assigned Phs                 |      | 2        |          | 4    | 5            | 6    |
| Phs Duration (G+Y+Rc), s     |      | 88.1     |          | 26.9 | 20.1         | 68.0 |
| Change Period (Y+Rc), s      |      | 7.0      |          | 6.0  | 7.0          | 7.0  |
| Max Green Setting (Gmax), s  |      | 79.0     |          | 23.0 | 35.0         | 37.0 |
| Max Q Clear Time (g_c+l1), s |      | 2.5      |          | 20.6 | 12.1         | 13.9 |
| Green Ext Time (p_c), s      |      | 3.9      |          | 0.3  | 1.1          | 1.1  |
|                              |      | 0.0      |          | 0.0  | 1.1          | 1.1  |
| Intersection Summary         |      |          |          |      |              |      |
| HCM 2010 Ctrl Delay          |      |          | 15.6     |      |              |      |
| HCM 2010 LOS                 |      |          | В        |      |              |      |
|                              |      |          |          |      |              |      |

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1: ROUTE 322 & ROCK RAYMOND ROAD

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Timing Plan: AM Peak

|                         | •     | <b>→</b> | •     | •     | <b>←</b> | •     | 4     | <b>†</b> | /     | <b>&gt;</b> | <b>↓</b> | 4    |
|-------------------------|-------|----------|-------|-------|----------|-------|-------|----------|-------|-------------|----------|------|
| Lane Group              | EBL   | EBT      | EBR   | WBL   | WBT      | WBR   | NBL   | NBT      | NBR   | SBL         | SBT      | SBR  |
| Lane Configurations     | *     | <b>^</b> | 7     | *     | <b>^</b> | 7     |       | ની       | 7     |             | 4        |      |
| Traffic Volume (vph)    | 48    | 709      | 95    | 79    | 315      | 25    | 182   | 32       | 244   | 18          | 5        | 63   |
| Future Volume (vph)     | 48    | 709      | 95    | 79    | 315      | 25    | 182   | 32       | 244   | 18          | 5        | 63   |
| Ideal Flow (vphpl)      | 1800  | 1800     | 1800  | 1800  | 1800     | 1800  | 1800  | 1800     | 1800  | 1800        | 1800     | 1800 |
| Lane Width (ft)         | 10    | 12       | 12    | 10    | 11       | 12    | 12    | 11       | 11    | 12          | 15       | 12   |
| Grade (%)               |       | 0%       |       |       | -1%      |       |       | -1%      |       |             | 2%       |      |
| Storage Length (ft)     | 190   |          | 0     | 150   |          | 150   | 0     |          | 150   | 0           |          | 0    |
| Storage Lanes           | 1     |          | 1     | 1     |          | 1     | 0     |          | 1     | 0           |          | 0    |
| Taper Length (ft)       | 25    |          |       | 25    |          |       | 25    |          |       | 25          |          |      |
| Right Turn on Red       |       |          | Yes   |       |          | Yes   |       |          | Yes   |             |          | Yes  |
| Link Speed (mph)        |       | 45       |       |       | 45       |       |       | 35       |       |             | 25       |      |
| Link Distance (ft)      |       | 551      |       |       | 329      |       |       | 298      |       |             | 194      |      |
| Travel Time (s)         |       | 8.3      |       |       | 5.0      |       |       | 5.8      |       |             | 5.3      |      |
| Confl. Peds. (#/hr)     | 2     |          | 2     |       |          |       |       |          |       | 2           |          | 2    |
| Confl. Bikes (#/hr)     |       |          | 1     |       |          |       |       |          |       |             |          |      |
| Peak Hour Factor        | 0.87  | 0.87     | 0.87  | 0.87  | 0.87     | 0.87  | 0.87  | 0.87     | 0.87  | 0.87        | 0.87     | 0.87 |
| Heavy Vehicles (%)      | 2%    | 5%       | 5%    | 19%   | 15%      | 0%    | 1%    | 3%       | 5%    | 0%          | 0%       | 3%   |
| Shared Lane Traffic (%) |       |          |       |       |          |       |       |          |       |             |          |      |
| Turn Type               | Perm  | NA       | Perm  | pm+pt | NA       | Perm  | Perm  | NA       | pm+ov | Perm        | NA       |      |
| Protected Phases        |       | 2        |       | 1     | 6        |       |       | 8        | 1     |             | 4        |      |
| Permitted Phases        | 2     |          | 2     | 6     |          | 6     | 8     |          | 8     | 4           |          |      |
| Detector Phase          | 2     | 2        | 2     | 1     | 6        | 6     | 8     | 8        | 1     | 4           | 4        |      |
| Switch Phase            |       |          |       |       |          |       |       |          |       |             |          |      |
| Minimum Initial (s)     | 13.0  | 13.0     | 13.0  | 3.0   | 13.0     | 13.0  | 3.0   | 3.0      | 3.0   | 3.0         | 3.0      |      |
| Minimum Split (s)       | 40.0  | 40.0     | 40.0  | 10.0  | 40.0     | 40.0  | 13.0  | 13.0     | 10.0  | 13.0        | 13.0     |      |
| Total Split (s)         | 67.0  | 67.0     | 67.0  | 12.0  | 79.0     | 79.0  | 36.0  | 36.0     | 12.0  | 36.0        | 36.0     |      |
| Total Split (%)         | 58.3% | 58.3%    | 58.3% | 10.4% | 68.7%    | 68.7% | 31.3% | 31.3%    | 10.4% | 31.3%       | 31.3%    |      |
| Yellow Time (s)         | 5.0   | 5.0      | 5.0   | 5.0   | 5.0      | 5.0   | 3.0   | 3.0      | 5.0   | 3.0         | 3.0      |      |
| All-Red Time (s)        | 2.0   | 2.0      | 2.0   | 2.0   | 2.0      | 2.0   | 3.0   | 3.0      | 2.0   | 3.0         | 3.0      |      |
| Lost Time Adjust (s)    | -1.0  | -1.0     | -1.0  | -1.0  | -1.0     | -1.0  |       | -1.0     | -1.0  |             | -1.0     |      |
| Total Lost Time (s)     | 6.0   | 6.0      | 6.0   | 6.0   | 6.0      | 6.0   |       | 5.0      | 6.0   |             | 5.0      |      |
| Lead/Lag                | Lag   | Lag      | Lag   | Lead  |          |       |       |          | Lead  |             |          |      |
| Lead-Lag Optimize?      | Yes   | Yes      | Yes   | Yes   |          |       |       |          | Yes   |             |          |      |
| Recall Mode             | C-Max | C-Max    | C-Max | None  | C-Max    | C-Max | None  | None     | None  | None        | None     |      |
| Intersection Summary    |       |          |       |       |          |       |       |          |       |             |          |      |

Intersection Summary

Area Type: Other
Cycle Length: 115

Actuated Cycle Length: 115

Offset: 113 (98%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Splits and Phases: 2: LLOYD AVENUE/ROYAL FARMS DRIVEWAY & ROUTE 322



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#### 2: LLOYD AVENUE/ROYAL FARMS DRIVEWAY & ROUTE 322 2017 EXISTING CONDITIONS

|  | Timing | Plan: | AM | Peak |
|--|--------|-------|----|------|
|--|--------|-------|----|------|

|   | ۶           | <b>→</b>     | •           | •           | <b>←</b>   | 4          | 1            | 1           | <b>/</b>    | /    | <b>↓</b> | 1    |
|---|-------------|--------------|-------------|-------------|------------|------------|--------------|-------------|-------------|------|----------|------|
| Movement  | EBL         | EBT          | EBR         | WBL         | WBT        | WBR        | NBL          | NBT         | NBR         | SBL  | SBT      | SBR  |
| Lane Configurations                                     | ሻ           | <b>^</b>     | 7           | ሻ           | <b>^</b>   | 7          |              | ની          | 7           |      | 4        |      |
| Traffic Volume (veh/h)                                  | 48          | 709          | 95          | 79          | 315        | 25         | 182          | 32          | 244         | 18   | 5        | 63   |
| Future Volume (veh/h)                                   | 48          | 709          | 95          | 79          | 315        | 25         | 182          | 32          | 244         | 18   | 5        | 63   |
| Number  | 5           | 2            | 12          | 1           | 6          | 16         | 3            | 8           | 18          | 7    | 4        | 14   |
| Initial Q (Qb), veh                                     | 0           | 0            | 0           | 2           | 0          | 0          | 6            | 0           | 0           | 0    | 0        | 0    |
| Ped-Bike Adj(A_pbT)                                     | 1.00        |              | 0.98        | 1.00        |            | 1.00       | 1.00         |             | 1.00        | 1.00 |          | 0.99 |
| Parking Bus, Adj  | 1.00        | 1.00         | 1.00        | 1.00        | 1.00       | 1.00       | 1.00         | 1.00        | 1.00        | 1.00 | 1.00     | 1.00 |
| Adj Sat Flow, veh/h/ln                                  | 1765        | 1714         | 1714        | 1520        | 1573       | 1809       | 1809         | 1786        | 1723        | 1782 | 1814     | 1782 |
| Adj Flow Rate, veh/h                                    | 55          | 815          | 95          | 91          | 362        | 22         | 209          | 37          | 149         | 21   | 6        | 35   |
| Adj No. of Lanes  | 1           | 1            | 1           | 1           | 1          | 1          | 0            | 1           | 1           | 0    | 1        | 0    |
| Peak Hour Factor  | 0.87        | 0.87         | 0.87        | 0.87        | 0.87       | 0.87       | 0.87         | 0.87        | 0.87        | 0.87 | 0.87     | 0.87 |
| Percent Heavy Veh, %                                    | 2           | 5            | 5           | 19          | 15         | 0          | 3            | 3           | 5           | 0    | 0        | 0    |
| Cap, veh/h  | 619         | 1012         | 841         | 245         | 1090       | 1065       | 313          | 41          | 384         | 143  | 54       | 201  |
| Arrive On Green   | 0.60        | 0.60         | 0.60        | 0.07        | 0.93       | 0.93       | 0.21         | 0.21        | 0.21        | 0.20 | 0.21     | 0.20 |
| Sat Flow, veh/h   | 943         | 1714         | 1425        | 1448        | 1573       | 1538       | 1190         | 211         | 1464        | 471  | 256      | 942  |
| Grp Volume(v), veh/h                                    | 55          | 815          | 95          | 91          | 362        | 22         | 246          | 0           | 149         | 62   | 0        | 0    |
| Grp Sat Flow(s),veh/h/ln                                | 943         | 1714         | 1425        | 1448        | 1573       | 1538       | 1400         | 0           | 1464        | 1670 | 0        | 0    |
| Q Serve(g_s), s   | 2.9         | 42.2         | 3.3         | 2.6         | 2.7        | 0.1        | 16.2         | 0.0         | 9.7         | 0.0  | 0.0      | 0.0  |
| Cycle Q Clear(g_c), s                                   | 2.9         | 42.2         | 3.3         | 2.6         | 2.7        | 0.1        | 19.3         | 0.0         | 9.7         | 3.6  | 0.0      | 0.0  |
| Prop In Lane  | 1.00        |              | 1.00        | 1.00        |            | 1.00       | 0.85         |             | 1.00        | 0.34 |          | 0.56 |
| Lane Grp Cap(c), veh/h                                  | 619         | 1012         | 841         | 245         | 1090       | 1065       | 353          | 0           | 384         | 383  | 0        | 0    |
| V/C Ratio(X)  | 0.09        | 0.81         | 0.11        | 0.37        | 0.33       | 0.02       | 0.70         | 0.00        | 0.39        | 0.16 | 0.00     | 0.00 |
| Avail Cap(c_a), veh/h                                   | 624         | 1021         | 848         | 252         | 1098       | 1073       | 432          | 0           | 469         | 465  | 0        | 0    |
| HCM Platoon Ratio                                       | 1.00        | 1.00         | 1.00        | 1.33        | 1.33       | 1.33       | 1.00         | 1.00        | 1.00        | 1.00 | 1.00     | 1.00 |
| Upstream Filter(I)                                      | 1.00        | 1.00         | 1.00        | 1.00        | 1.00       | 1.00       | 1.00         | 0.00        | 1.00        | 1.00 | 0.00     | 0.00 |
| Uniform Delay (d), s/veh                                | 10.3        | 18.5         | 10.4        | 18.1        | 1.5        | 1.4        | 43.6         | 0.0         | 34.9        | 37.6 | 0.0      | 0.0  |
| Incr Delay (d2), s/veh                                  | 0.3         | 6.8          | 0.3         | 0.9         | 8.0        | 0.0        | 3.7          | 0.0         | 0.6         | 0.2  | 0.0      | 0.0  |
| Initial Q Delay(d3),s/veh                               | 0.0         | 0.0          | 0.0         | 0.8         | 0.0        | 0.0        | 0.0          | 0.0         | 0.0         | 0.0  | 0.0      | 0.0  |
| %ile BackOfQ(95%),veh/ln                                | 1.5<br>10.6 | 29.6<br>25.3 | 2.5<br>10.6 | 2.9<br>19.8 | 2.7<br>2.4 | 0.1<br>1.5 | 13.1<br>47.3 | 0.0         | 7.1<br>35.5 | 3.0  | 0.0      | 0.0  |
| LnGrp Delay(d),s/veh                                    |             |              |             |             |            |            |              | 0.0         |             | 37.7 | 0.0      | 0.0  |
| LnGrp LOS   | В           | C            | В           | В           | A 475      | A          | D            | 205         | D           | D    | 00       |      |
| Approach Vol, veh/h                                     |             | 965          |             |             | 475        |            |              | 395         |             |      | 62       |      |
| Approach Delay, s/veh                                   |             | 23.0         |             |             | 5.7        |            |              | 42.8        |             |      | 37.7     |      |
| Approach LOS  |             | С            |             |             | Α          |            |              | D           |             |      | D        |      |
| Timer   | 1           | 2            | 3           | 4           | 5          | 6          | 7            | 8           |             |      |          |      |
| Assigned Phs  |             | 2            |             |             |            |            |              | 8           |             |      |          |      |
| Phs Duration (G+Y+Rc), s                                | 11.8        | 74.5         |             | 28.7        |            | 86.3       |              | 28.7        |             |      |          |      |
| Change Period (Y+Rc), s                                 | 7.0         | 7.0          |             | 6.0         |            | 7.0        |              | 6.0         |             |      |          |      |
| Max Green Setting (Gmax), s                             | 5.0         | 60.0         |             | 30.0        |            | 72.0       |              | 30.0        |             |      |          |      |
| Max Q Clear Time (g_c+11), s<br>Green Ext Time (p_c), s | 5.1<br>0.0  | 44.7<br>3.8  |             | 5.6<br>0.2  |            | 5.2<br>1.4 |              | 21.8<br>1.0 |             |      |          |      |
| Intersection Summary                                    |             |              |             |             |            |            |              |             |             |      |          |      |
| HCM 2010 Ctrl Delay                                     |             |              | 23.3        |             |            |            |              |             |             |      |          |      |
| HCM 2010 LOS  |             |              | С           |             |            |            |              |             |             |      |          |      |

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Ø6 (R)

#### ← < < √</p> Lane Group EBL Lane Configurations Traffic Volume (vph) Future Volume (vph) 9 1104 206 109 183 260 Ideal Flow (vphpl) 1800 1800 1800 1800 1800 1800 Lane Width (ft) 16 12 12 12 15 15 Grade (%) -3% Storage Length (ft) 75 0 0 0 Storage Lanes 25 25 Taper Length (ft) Right Turn on Red Yes 45 45 25 Link Speed (mph) Link Distance (ft) 830 280 317 Travel Time (s) 12.6 4.2 8.6 Confl. Peds. (#/hr) 0.96 0.96 0.96 0.96 0.96 0.96 Peak Hour Factor 33% 4% 12% Heavy Vehicles (%) 15% 15% 7% Shared Lane Traffic (%) Prot Turn Type Free Protected Phases 2 6 4 Permitted Phases 2 Detector Phase 2 6 4 Switch Phase 15.0 15.0 15.0 3.0 Minimum Initial (s) Minimum Split (s) 22.0 22.0 22.0 13.0 94.0 Total Split (s) 94.0 94.0 21.0 Total Split (%) 81.7% 81.7% 81.7% 18.3% Yellow Time (s) 5.0 5.0 5.0 4.0 All-Red Time (s) 2.0 2.0 2.0 2.0 -1.0 -1.0 Lost Time Adjust (s) -1.0 -1.0 Total Lost Time (s) 6.0 6.0 6.0 5.0 Lead/Lag Lead-Lag Optimize? C-Max C-Max C-Max Recall Mode None Intersection Summary Area Type: Cycle Length: 115 Actuated Cycle Length: 115 Offset: 76 (66%), Referenced to phase 2:EBTL and 6:WBT, Start of Green Natural Cycle: 75 Control Type: Actuated-Coordinated Splits and Phases: 4: ROUTE 322 & WB ROUTE 30 RAMPS -4 Ø2 (R)

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|                              | ۶    | -        | •        | •    | /    | 4    |
|------------------------------|------|----------|----------|------|------|------|
| Movement                     | EBL  | EBT      | WBT      | WBR  | SBL  | SBR  |
| Lane Configurations          | 7    | <b>*</b> | <b>1</b> |      | ች    | 7    |
| Traffic Volume (veh/h)       | 9    | 1104     | 206      | 109  | 183  | 260  |
| Future Volume (veh/h)        | 9    | 1104     | 206      | 109  | 183  | 260  |
| Number                       | 5    | 2        | 6        | 16   | 7    | 14   |
| Initial Q (Qb), veh          | 0    | 0        | 0        | 0    | 1    | 1    |
| Ped-Bike Adj(A pbT)          | 1.00 |          |          | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00     | 1.00     | 1.00 | 1.00 | 1.00 |
| Adj Sat Flow, veh/h/ln       | 1429 | 1757     | 1550     | 1782 | 1750 | 1671 |
| Adj Flow Rate, veh/h         | 9    | 1150     | 215      | 0    | 191  | 0    |
| Adi No. of Lanes             | 1    | 1        | 1        | 0    | 1    | 1    |
| Peak Hour Factor             | 0.96 | 0.96     | 0.96     | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh. %         | 33   | 4        | 15       | 15   | 7    | 12   |
|                              | 711  | 1344     | 1186     | 0    | 232  | 198  |
| Cap, veh/h                   | 0.77 |          |          | 0.00 |      |      |
| Arrive On Green              |      | 0.77     | 0.77     |      | 0.14 | 0.00 |
| Sat Flow, veh/h              | 891  | 1757     | 1550     | 0    | 1666 | 1421 |
| Grp Volume(v), veh/h         | 9    | 1150     | 215      | 0    | 191  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 891  | 1757     | 1550     | 0    | 1666 | 1421 |
| Q Serve(g_s), s              | 0.3  | 51.2     | 4.3      | 0.0  | 12.8 | 0.0  |
| Cycle Q Clear(g_c), s        | 4.7  | 51.2     | 4.3      | 0.0  | 12.8 | 0.0  |
| Prop In Lane                 | 1.00 |          |          | 0.00 | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h       | 711  | 1344     | 1186     | 0    | 232  | 198  |
| V/C Ratio(X)                 | 0.01 | 0.86     | 0.18     | 0.00 | 0.82 | 0.00 |
| Avail Cap(c_a), veh/h        | 711  | 1344     | 1186     | 0    | 232  | 198  |
| HCM Platoon Ratio            | 1.00 | 1.00     | 1.00     | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00     | 1.00     | 0.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 4.3  | 9.2      | 3.7      | 0.0  | 48.3 | 0.0  |
| Incr Delay (d2), s/veh       | 0.0  | 7.1      | 0.3      | 0.0  | 21.6 | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0      | 0.0      | 0.0  | 0.8  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 0.0  | 35.5     | 3.5      | 0.0  | 11.9 | 0.0  |
|                              | 4.3  | 16.3     | 4.0      | 0.0  | 70.6 | 0.0  |
| LnGrp Delay(d),s/veh         |      |          |          | 0.0  |      | 0.0  |
| LnGrp LOS                    | A    | В        | A        |      | E    |      |
| Approach Vol, veh/h          |      | 1159     | 215      |      | 191  |      |
| Approach Delay, s/veh        |      | 16.2     | 4.0      |      | 70.6 |      |
| Approach LOS                 |      | В        | Α        |      | Е    |      |
| Timer                        | 1    | 2        | 3        | 4    | 5    | 6    |
| Assigned Phs                 |      | 2        |          | 4    |      | 6    |
| Phs Duration (G+Y+Rc), s     |      | 94.0     |          | 21.0 |      | 94.0 |
| Change Period (Y+Rc), s      |      | 7.0      |          | 6.0  |      | 7.0  |
|                              |      |          |          |      |      |      |
| Max Green Setting (Gmax), s  |      | 87.0     |          | 15.0 |      | 87.0 |
| Max Q Clear Time (g_c+l1), s |      | 53.7     |          | 15.3 |      | 6.8  |
| Green Ext Time (p_c), s      |      | 7.0      |          | 0.0  |      | 0.7  |
| Intersection Summary         |      |          |          |      |      |      |
| HCM 2010 Ctrl Delay          |      |          | 21.2     |      |      |      |
| HCM 2010 LOS                 |      |          | С        |      |      |      |
|                              |      |          |          |      |      |      |

4: ROUTE 322 & WB ROUTE 30 RAMPS

2017 EXISTING CONDITIONS

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#### 3: EB ROUTE 30 RAMPS & ROUTE 322 2017 EXISTING CONDITIONS

Timing Plan: AM Peak

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|                         | -        | •    | •    | •        | 1    | ~    |
|-------------------------|----------|------|------|----------|------|------|
| Lane Group              | EBT      | EBR  | WBL  | WBT      | NBL  | NBR  |
| Lane Configurations     | <b>↑</b> | 7    | ሻ    | <b>↑</b> | 7    | 7    |
| Traffic Volume (vph)    | 703      | 592  | 262  | 299      | 11   | 166  |
| Future Volume (vph)     | 703      | 592  | 262  | 299      | 11   | 166  |
| Ideal Flow (vphpl)      | 1800     | 1800 | 1800 | 1800     | 1800 | 1800 |
| Lane Width (ft)         | 13       | 12   | 12   | 13       | 13   | 14   |
| Grade (%)               | -6%      |      |      | 7%       | -5%  |      |
| Storage Length (ft)     |          | 0    | 250  |          | 0    | 0    |
| Storage Lanes           |          | 1    | 1    |          | 1    | 1    |
| Taper Length (ft)       |          |      | 25   |          | 25   |      |
| Link Speed (mph)        | 45       |      |      | 45       | 25   |      |
| Link Distance (ft)      | 353      |      |      | 551      | 313  |      |
| Travel Time (s)         | 5.3      |      |      | 8.3      | 8.5  |      |
| Peak Hour Factor        | 0.93     | 0.93 | 0.93 | 0.93     | 0.93 | 0.93 |
| Heavy Vehicles (%)      | 5%       | 4%   | 2%   | 15%      | 0%   | 2%   |
| Shared Lane Traffic (%) |          |      |      |          |      |      |

Area Type:

Other

#### 3: EB ROUTE 30 RAMPS & ROUTE 322 2017 EXISTING CONDITIONS

Timing Plan: AM Peak

| 1-4                    |        |         |        |          |        |       |   |
|------------------------|--------|---------|--------|----------|--------|-------|---|
| Intersection           | 2.0    |         |        |          |        |       | ĺ |
| Int Delay, s/veh       | 3.6    |         |        |          |        |       |   |
| Movement               | EBT    | EBR     | WBL    | WBT      | NBL    | NBR   |   |
| Lane Configurations    |        | 7       | ٦      | <b>^</b> | ሻ      | 7     |   |
| Traffic Vol, veh/h     | 703    | 592     | 262    | 299      | 11     | 166   |   |
| Future Vol, veh/h      | 703    | 592     | 262    | 299      | 11     | 166   |   |
| Conflicting Peds, #/hr | 0      | 0       | 0      | 0        | 0      | 0     |   |
| Sign Control           | Free   | Free    | Free   | Free     | Stop   | Stop  |   |
| RT Channelized         | -      | Yield   | -      | None     | -      | Stop  |   |
| Storage Length         | -      | 0       | 250    | -        | 0      | 0     |   |
| Veh in Median Storage  | ,# 0   | -       | -      | 0        | 0      | -     |   |
| Grade, %               | -6     | -       | -      | 7        | -5     | -     |   |
| Peak Hour Factor       | 93     | 93      | 93     | 93       | 93     | 93    |   |
| Heavy Vehicles, %      | 5      | 4       | 2      | 15       | 0      | 2     |   |
| Mymt Flow              | 756    | 637     | 282    | 322      | 12     | 178   |   |
|                        |        |         |        |          |        |       |   |
| Maine/Minne            | Major1 |         | M-:0   |          | A:4    |       | ľ |
|                        |        |         | Major2 |          | Minor1 | 750   |   |
| Conflicting Flow All   | 0      | 0       | 756    | 0        | 1642   | 756   |   |
| Stage 1                | -      | -       | -      | -        | 756    | -     |   |
| Stage 2                | -      | -       | -      | -        | 886    | -     |   |
| Critical Hdwy          | -      | -       | 4.3    | -        | 5.4    | 5.72  |   |
| Critical Hdwy Stg 1    | -      | -       | -      | -        | 4.4    | -     |   |
| Critical Hdwy Stg 2    | -      | -       | -      | -        | 4.4    | -     |   |
| Follow-up Hdwy         | -      | -       | 3      | -        | 3      | 3.1   |   |
| Pot Cap-1 Maneuver     | -      | -       | 656    | -        | 139    | 475   |   |
| Stage 1                | -      | -       | -      | -        | 642    | -     |   |
| Stage 2                | -      | -       | -      | -        | 518    | -     |   |
| Platoon blocked, %     | -      | -       |        | -        | 1      |       |   |
| Mov Cap-1 Maneuver     | -      | -       | 656    | -        | 79     | 475   |   |
| Mov Cap-2 Maneuver     | -      | -       | -      | -        | 79     | -     |   |
| Stage 1                | -      | -       | -      | -        | 366    | -     |   |
| Stage 2                | -      | -       | -      | -        | 518    | -     |   |
| ·                      |        |         |        |          |        |       |   |
| Annroach               | EB     |         | WB     |          | NB     |       |   |
| Approach               | 0      |         | 6.8    |          | 19.7   |       |   |
| HCM Control Delay, s   | U      |         | 0.8    |          |        |       |   |
| HCM LOS                |        |         |        |          | С      |       |   |
|                        |        |         |        |          |        |       |   |
| Minor Lane/Major Mvm   | t 1    | NBLn1 I | NBLn2  | EBT      | EBR    | WBL   |   |
| Capacity (veh/h)       |        | 79      | 475    | -        | -      | 656   |   |
| HCM Lane V/C Ratio     |        | 0.15    | 0.376  | -        |        | 0.429 |   |
| HCM Control Delay (s)  |        | 58.4    | 17.1   | -        | _      | 14.6  |   |
| HCM Lane LOS           |        | F       | С      |          | -      | В     |   |
| HCM 95th %tile Q(veh)  |        | 0.5     | 1.7    | -        | -      | 2.2   |   |
| 70000 4(1000)          |        |         |        |          |        |       |   |

#### 8: LLOYD AVENUE & PARK AND RIDE 2017 EXISTING CONDITIONS

Timing Plan: AM Peak

|                         | •    | -    | -          | •    | -    | 4    |
|-------------------------|------|------|------------|------|------|------|
| Lane Group              | EBL  | EBT  | WBT        | WBR  | SBL  | SBR  |
| Lane Configurations     |      | 4    | <b>1</b> > |      | Y    |      |
| Traffic Volume (vph)    | 2    | 439  | 173        | 18   | 11   | 1    |
| Future Volume (vph)     | 2    | 439  | 173        | 18   | 11   | 1    |
| Ideal Flow (vphpl)      | 1800 | 1800 | 1800       | 1800 | 1800 | 1800 |
| Lane Width (ft)         | 12   | 10   | 10         | 12   | 16   | 12   |
| Grade (%)               |      | -2%  | 1%         |      | 4%   |      |
| Link Speed (mph)        |      | 35   | 35         |      | 25   |      |
| Link Distance (ft)      |      | 301  | 298        |      | 184  |      |
| Travel Time (s)         |      | 5.9  | 5.8        |      | 5.0  |      |
| Confl. Peds. (#/hr)     |      |      |            |      | 2    | 2    |
| Peak Hour Factor        | 0.81 | 0.81 | 0.81       | 0.81 | 0.81 | 0.81 |
| Heavy Vehicles (%)      | 0%   | 3%   | 11%        | 22%  | 9%   | 0%   |
| Shared Lane Traffic (%) |      |      |            |      |      |      |

Intersection Summary
Area Type:

8: LLOYD AVENUE & PARK AND RIDE 2017 EXISTING CONDITIONS

| Interception           |        |       |        |      |             |       |
|------------------------|--------|-------|--------|------|-------------|-------|
| Intersection           | 0.0    |       |        |      |             |       |
| Int Delay, s/veh       | 0.3    |       |        |      |             |       |
| Movement               | EBL    | EBT   | WBT    | WBR  | SBL         | SBR   |
| Lane Configurations    |        | ની    | ĵ.     |      | Y           |       |
| Traffic Vol, veh/h     | 2      | 439   | 173    | 18   | 11          | 1     |
| Future Vol, veh/h      | 2      | 439   | 173    | 18   | 11          | 1     |
| Conflicting Peds, #/hr | 0      | 0     | 0      | 0    | 2           | 2     |
| Sign Control           | Free   | Free  | Free   | Free | Stop        | Stop  |
| RT Channelized         | -      | None  | -      | None | -           | None  |
| Storage Length         | -      | -     | -      | -    | 0           | -     |
| Veh in Median Storage  | ,# -   | 0     | 0      | -    | 0           | -     |
| Grade, %               | -      | -2    | 1      |      | 4           |       |
| Peak Hour Factor       | 81     | 81    | 81     | 81   | 81          | 81    |
| Heavy Vehicles, %      | 0      | 3     | 11     | 22   | 9           | 0     |
| Mvmt Flow              | 2      | 542   | 214    | 22   | 14          | 1     |
|                        |        |       |        |      |             |       |
| Maine/Minne            | M-:4   |       | 4-:0   |      | A:0         |       |
|                        | Major1 |       | Major2 |      | Minor2      | 007   |
| Conflicting Flow All   | 236    | 0     | -      | 0    | 773         | 227   |
| Stage 1                | -      | -     | -      | -    | 225         | -     |
| Stage 2                | 4.3    | -     | -      | -    | 548<br>7.29 | -     |
| Critical Hdwy          |        | -     | -      | -    | 6.29        | 6.6   |
| Critical Hdwy Stg 1    | -      | -     | -      | -    |             | -     |
| Critical Hdwy Stg 2    | -      | -     | -      | -    | 6.29        | -     |
| Follow-up Hdwy         | 3      | -     | -      | -    | 3.1         | 3.1   |
| Pot Cap-1 Maneuver     | 997    | -     | -      | -    | 332         | 843   |
| Stage 1                | -      | -     | -      | -    | 862         | -     |
| Stage 2                | -      | -     | -      | -    | 559         | -     |
| Platoon blocked, %     | 007    | -     | -      | -    | 004         | 212   |
| Mov Cap-1 Maneuver     | 997    | -     | -      | -    | 331         | 842   |
| Mov Cap-2 Maneuver     | -      | -     | -      | -    | 331         | -     |
| Stage 1                | -      | -     | -      | -    | 859         | -     |
| Stage 2                | -      | -     | -      | -    | 559         | -     |
|                        |        |       |        |      |             |       |
| Approach               | EB     |       | WB     |      | SB          |       |
| HCM Control Delay, s   | 0      |       | 0      |      | 15.8        |       |
| HCM LOS                |        |       |        |      | C           |       |
| TIOM EGG               |        |       |        |      | U           |       |
|                        |        |       |        |      |             |       |
| Minor Lane/Major Mvm   | nt     | EBL   | EBT    | WBT  | WBR:        | SBLn1 |
| Capacity (veh/h)       |        | 997   | -      | -    | -           | 349   |
| HCM Lane V/C Ratio     |        | 0.002 | -      | -    | -           | 0.042 |
| HCM Control Doloy (c)  |        | 0.6   | Λ      |      |             | 150   |

| vacity (veh/h)     997     - |
|--|
| M Control Delay (s) 8.6 0 1 M Lane LOS A A   |
| M Lane LOS A A   |
|  |
| A OEth (/tile O/yeh)   |
| vi 95th %tile Q(ven)   |

# 9: LLOYD AVENUE & GO CARLSON BLVD 2017 EXISTING CONDITIONS

Timing Plan: AM Peak

|                         | •     | `    | •    | <b>†</b> | Ţ    | 4    |
|-------------------------|-------|------|------|----------|------|------|
|                         |       | •    | ,    | •        | •    |      |
| Lane Group              | EBL   | EBR  | NBL  | NBT      | SBT  | SBR  |
| Lane Configurations     | W     |      |      | ની       | ĵ»   |      |
| Traffic Volume (vph)    | 136   | 46   | 13   | 295      | 155  | 19   |
| Future Volume (vph)     | 136   | 46   | 13   | 295      | 155  | 19   |
| Ideal Flow (vphpl)      | 1800  | 1800 | 1800 | 1800     | 1800 | 1000 |
| Lane Width (ft)         | 12    | 12   | 12   | 10       | 10   | 12   |
| Grade (%)               | 2%    |      |      | 1%       | -2%  |      |
| Link Speed (mph)        | 35    |      |      | 35       | 35   |      |
| Link Distance (ft)      | 1310  |      |      | 446      | 202  |      |
| Travel Time (s)         | 25.5  |      |      | 8.7      | 3.9  |      |
| Peak Hour Factor        | 0.90  | 0.90 | 0.90 | 0.90     | 0.90 | 0.90 |
| Heavy Vehicles (%)      | 2%    | 2%   | 31%  | 5%       | 12%  | 0%   |
| Shared Lane Traffic (%) |       |      |      |          |      |      |
| Intersection Summary    |       |      |      |          |      |      |
|                         | Other |      |      |          |      |      |
| Area Type:              | Other |      |      |          |      |      |

# 9: LLOYD AVENUE & GO CARLSON BLVD 2017 EXISTING CONDITIONS

Timing Plan: AM Peak

| Intersection             |        |       |        |       |        |      |
|--------------------------|--------|-------|--------|-------|--------|------|
| Int Delay, s/veh         | 4.1    |       |        |       |        |      |
|                          |        | EDE   | ND:    | NDT   | 007    | 000  |
| Movement                 | EBL    | EBR   | NBL    | NBT   | SBT    | SBR  |
| Lane Configurations      | Y      |       |        | ની    | ٦      |      |
| Traffic Vol, veh/h       | 136    | 46    | 13     | 295   | 155    | 19   |
| Future Vol, veh/h        | 136    | 46    | 13     | 295   | 155    | 19   |
| 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      | -    |
| Grade, %                 | 2      | -     | -      | 1     | -2     | -    |
| Peak Hour Factor         | 90     | 90    | 90     | 90    | 90     | 90   |
| Heavy Vehicles, %        | 2      | 2     | 31     | 5     | 12     | 0    |
| Mvmt Flow                | 151    | 51    | 14     | 328   | 172    | 21   |
|                          |        |       |        |       |        |      |
|                          | ^      |       |        |       |        |      |
|                          | Minor2 |       | Major1 |       | Major2 |      |
| Conflicting Flow All     | 539    | 183   | 193    | 0     | -      | 0    |
| Stage 1                  | 183    | -     | -      | -     | -      | -    |
| Stage 2                  | 356    | -     | -      | -     | -      | -    |
| Critical Hdwy            | 6.82   | 6.42  | 4.41   | -     | -      | -    |
| Critical Hdwy Stg 1      | 5.82   | -     | -      | -     | -      | -    |
| Critical Hdwy Stg 2      | 5.82   | -     | -      | -     | -      | -    |
| Follow-up Hdwy           | 3      | 3.1   | 3.1    | -     | -      | -    |
| Pot Cap-1 Maneuver       | 537    | 906   | 995    | -     | -      | -    |
| Stage 1                  | 962    | -     | -      | -     | -      | -    |
| Stage 2                  | 780    | -     | -      | -     | -      | -    |
| Platoon blocked, %       |        |       |        | -     | -      | -    |
| Mov Cap-1 Maneuver       | 528    | 906   | 995    | -     | -      | -    |
| Mov Cap-2 Maneuver       | 528    | -     | -      | -     | -      | -    |
| Stage 1                  | 946    | -     | -      | -     | -      | -    |
| Stage 2                  | 780    | -     | -      |       | -      |      |
|                          |        |       |        |       |        |      |
| Annroach                 | EB     |       | NB     |       | SB     |      |
| Approach                 |        |       |        |       |        |      |
| HCM Control Delay, s     | 14.3   |       | 0.4    |       | 0      |      |
| HCM LOS                  | В      |       |        |       |        |      |
|                          |        |       |        |       |        |      |
| Minor Lane/Major Mvm     | nt     | NBL   | NBT    | EBLn1 | SBT    | SBR  |
| Capacity (veh/h)         |        | 995   | -      | 590   | -      | -    |
| HCM Lane V/C Ratio       |        | 0.015 |        | 0.343 |        | -    |
| HCM Control Delay (s)    |        | 8.7   | 0      | 14.3  | -      | _    |
| HCM Lane LOS             |        | Α.    | A      | В     | -      |      |
| HCM 95th %tile Q(veh     | )      | 0     | -      | 1.5   |        |      |
| TICINI SOUT /OUIE Q(VEIT | )      | 0     |        | 1.0   |        | -    |
|                          |        |       |        |       |        |      |

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# 10: LLOYD AVENUE & BEAVER RUN ROAD 2017 EXISTING CONDITIONS

Timing Plan: AM Peak

|                         | •     | •    | 4    | Ť    | Į.         | 4    |
|-------------------------|-------|------|------|------|------------|------|
| Lane Group              | EBL   | EBR  | NBL  | NBT  | SBT        | SBR  |
| Lane Configurations     | ¥     |      |      | 4    | <b>1</b> > |      |
| Traffic Volume (vph)    | 16    | 5    | 0    | 317  | 189        | 1    |
| Future Volume (vph)     | 16    | 5    | 0    | 317  | 189        | 1    |
| Ideal Flow (vphpl)      | 1800  | 1800 | 1800 | 1800 | 1800       | 1800 |
| Lane Width (ft)         | 13    | 12   | 12   | 10   | 10         | 12   |
| Grade (%)               | 1%    |      |      | 1%   | -1%        |      |
| Link Speed (mph)        | 25    |      |      | 35   | 35         |      |
| Link Distance (ft)      | 1282  |      |      | 488  | 446        |      |
| Travel Time (s)         | 35.0  |      |      | 9.5  | 8.7        |      |
| Peak Hour Factor        | 0.91  | 0.91 | 0.91 | 0.91 | 0.91       | 0.91 |
| Heavy Vehicles (%)      | 0%    | 20%  | 0%   | 5%   | 11%        | 0%   |
| Shared Lane Traffic (%) |       |      |      |      |            |      |
| Intersection Summary    |       |      |      |      |            |      |
| Area Type:              | Other |      |      |      |            |      |

10: LLOYD AVENUE & BEAVER RUN ROAD 2017 EXISTING CONDITIONS

| Intersection           |        |      |        |       |         |      |
|------------------------|--------|------|--------|-------|---------|------|
| Int Delay, s/veh       | 0.5    |      |        |       |         |      |
| Movement               | EBL    | EBR  | NBL    | NBT   | SBT     | SBR  |
| Lane Configurations    | ¥      | LUIN | HUL    | 4     | 1€      | ODIN |
| Traffic Vol., veh/h    | 16     | 5    | 0      | 317   | 189     | 1    |
| Future Vol. veh/h      | 16     | 5    | 0      | 317   | 189     | 1    |
| Conflicting Peds, #/hr |        | 0    | 0      | 0.17  | 0       | 0    |
| Sign Control           | Stop   | Stop | Free   | Free  | Free    | Free |
| RT Channelized         | -      | None | - 100  | None  | -       | None |
| Storage Length         | 0      | -    |        | -     |         | -    |
| Veh in Median Storag   | _      | -    | -      | 0     | 0       | -    |
| Grade, %               | 1      |      |        | 1     | -1      |      |
| Peak Hour Factor       | 91     | 91   | 91     | 91    | 91      | 91   |
| Heavy Vehicles, %      | 0      | 20   | 0      | 5     | 11      | 0    |
| Mymt Flow              | 18     | 5    | 0      | 348   | 208     | 1    |
|                        |        |      |        | 0.0   |         |      |
| M = i = =/M di== = =   | Minor2 |      | 4-:4   |       | 4-:0    |      |
| Major/Minor            |        |      | Major1 |       | /lajor2 |      |
| Conflicting Flow All   | 557    | 209  | 209    | 0     | -       | 0    |
| Stage 1                | 209    | -    | -      | -     | -       | -    |
| Stage 2                | 348    | -    | -      | -     | -       | -    |
| Critical Hdwy          | 6.6    | 6.5  | 4.3    | -     | -       | -    |
| Critical Hdwy Stg 1    | 5.6    | -    | -      | -     | -       | -    |
| Critical Hdwy Stg 2    | 5.6    | -    | -      | -     | -       | -    |
| Follow-up Hdwy         | 3      | 3.48 | 3      | -     | -       | -    |
| Pot Cap-1 Maneuver     |        | 783  | 1019   | -     | -       | -    |
| Stage 1                | 945    | -    | -      | -     | -       | -    |
| Stage 2                | 805    | -    | -      | -     | -       | -    |
| Platoon blocked, %     |        |      |        | -     | -       | -    |
| Mov Cap-1 Maneuve      |        | 783  | 1019   | -     | -       | -    |
| Mov Cap-2 Maneuve      |        | -    | -      | -     | -       | -    |
| Stage 1                | 945    | -    | -      | -     | -       | -    |
| Stage 2                | 805    | -    | -      | -     | -       | -    |
|                        |        |      |        |       |         |      |
| Approach               | EB     |      | NB     |       | SB      |      |
| HCM Control Delay,     | s 11.4 |      | 0      |       | 0       |      |
| HCM LOS                | В      |      |        |       |         |      |
|                        |        |      |        |       |         |      |
| Minor Lane/Major Mv    | ımt    | NBL  | NDT    | EBLn1 | SBT     | SBR  |
|                        | IIIC   |      | NUT    |       | _       | JUIN |
| Capacity (veh/h)       |        | 1019 | -      | 583   | -       | -    |

#### ← < < √</p> Lane Group EBL Lane Configurations Traffic Volume (vph) Future Volume (vph) 83 519 680 77 62 119 Ideal Flow (vphpl) 1800 1800 1800 1800 1800 1800 Lane Width (ft) 10 14 13 12 10 11 Grade (%) -2% Storage Length (ft) 145 0 230 0 Storage Lanes 25 25 Taper Length (ft) Right Turn on Red Yes 45 35 35 Link Speed (mph) Link Distance (ft) 268 1016 359 Travel Time (s) 4.1 19.8 7.0 Confl. Peds. (#/hr) Peak Hour Factor 0.95 0.95 0.95 0.95 0.95 0.95 21% Heavy Vehicles (%) 2% 1% 0% Shared Lane Traffic (%) Prot pm+ov Turn Type Protected Phases 2 6 4 5 5 Permitted Phases Detector Phase 5 2 6 4 5 Switch Phase 3.0 11.0 11.0 3.0 Minimum Initial (s) 3.0 Minimum Split (s) 18.0 18.0 14.0 16.0 Total Split (s) 16.0 79.0 63.0 21.0 Total Split (%) 16.0% 79.0% 63.0% 21.0% 16.0% Yellow Time (s) 5.0 5.0 5.0 4.0 5.0 All-Red Time (s) 2.0 2.0 2.0 2.0 2.0 -1.0 -1.0 -1.0 -1.0 Lost Time Adjust (s) -1.0 Total Lost Time (s) 6.0 6.0 6.0 5.0 6.0 Lead/Lag Lead Lag Lead Lead-Lag Optimize? Yes Yes Yes Recall Mode None C-Max C-Max None None Intersection Summary Area Type: Cycle Length: 100 Actuated Cycle Length: 100 Offset: 13 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green Natural Cycle: 65 Control Type: Actuated-Coordinated

| Contact Type: Actual |                                  |      |  |
|----------------------|----------------------------------|------|--|
| Splits and Phases:   | 1: ROUTE 322 & ROCK RAYMOND ROAD |      |  |
| ≠ <sub>Ø2 (R)</sub>  | •                                | Ø4   |  |
| 79 s                 |                                  | 21 s |  |
| <b>₹</b> Ø5          | <b>←</b><br>Ø6 (R)               |      |  |
| 16 s                 | 63 s                             |      |  |

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|   | ᄼ    | -        | •         | •    | -         | 4    |
|---|------|----------|-----------|------|-----------|------|
| Movement                                  | EBL  | EBT      | WBT       | WBR  | SBL       | SBR  |
| Lane Configurations                       | ň    | <u> </u> | 1         | TTDI | 7         | 7    |
| Traffic Volume (veh/h)                    | 83   | 519      | 680       | 77   | 62        | 119  |
| Future Volume (veh/h)                     | 83   | 519      | 680       | 77   | 62        | 119  |
| Number                                    | 5    | 2        | 6         | 16   | 7         | 14   |
| Initial Q (Qb), veh                       | 1    | 0        | 1         | 0    | 0         | 0    |
| Ped-Bike Adi(A pbT)                       | 1.00 |          |           | 1.00 | 1.00      | 1.00 |
| Parking Bus, Adj                          | 1.00 | 1.00     | 1.00      | 1.00 | 1.00      | 1.00 |
| Adj Sat Flow, veh/h/ln                    | 1502 | 1854     | 1809      | 1764 | 1791      | 1706 |
| Adj Flow Rate, veh/h                      | 87   | 546      | 716       | 79   | 65        | 61   |
| Adj No. of Lanes                          | 1    | 1        | 1         | 0    | 1         | 1    |
| Peak Hour Factor                          | 0.95 | 0.95     | 0.95      | 0.95 | 0.95      | 0.95 |
|   |      | 0.95     | 0.95      | 0.95 | 0.95      | 0.95 |
| Percent Heavy Veh, %                      | 21   |          |           | -    | -         |      |
| Cap, veh/h                                | 396  | 1513     | 1136      | 125  | 126       | 176  |
| Arrive On Green                           | 0.09 | 1.00     | 0.71      | 0.70 | 0.07      | 0.07 |
| Sat Flow, veh/h                           | 1431 | 1854     | 1601      | 177  | 1706      | 1450 |
| Grp Volume(v), veh/h                      | 87   | 546      | 0         | 795  | 65        | 61   |
| Grp Sat Flow(s),veh/h/ln                  | 1431 | 1854     | 0         | 1778 | 1706      | 1450 |
| Q Serve(g_s), s                           | 1.4  | 0.0      | 0.0       | 23.6 | 3.7       | 3.9  |
| Cycle Q Clear(g_c), s                     | 1.4  | 0.0      | 0.0       | 23.6 | 3.7       | 3.9  |
| Prop In Lane                              | 1.00 |          |           | 0.10 | 1.00      | 1.00 |
| Lane Grp Cap(c), veh/h                    | 396  | 1513     | 0         | 1261 | 126       | 176  |
| V/C Ratio(X)                              | 0.22 | 0.36     | 0.00      | 0.63 | 0.52      | 0.35 |
| Avail Cap(c_a), veh/h                     | 478  | 1513     | 0         | 1261 | 273       | 300  |
| HCM Platoon Ratio                         | 2.00 | 2.00     | 1.00      | 1.00 | 1.00      | 1.00 |
| Upstream Filter(I)                        | 1.00 | 1.00     | 0.00      | 1.00 | 1.00      | 1.00 |
| Uniform Delay (d), s/veh                  | 6.9  | 0.0      | 0.0       | 7.8  | 44.6      | 40.3 |
| Incr Delay (d2), s/veh                    | 0.3  | 0.7      | 0.0       | 2.4  | 3.2       | 1.2  |
| Initial Q Delay(d3),s/veh                 | 0.1  | 0.0      | 0.0       | 0.0  | 0.0       | 0.0  |
| %ile BackOfQ(95%),veh/ln                  | 1.6  | 0.5      | 0.0       | 18.1 | 3.3       | 5.8  |
| LnGrp Delay(d),s/veh                      | 7.2  | 0.7      | 0.0       | 10.1 | 47.8      | 41.4 |
| LnGrp LOS                                 | Α.Δ  | Α        | 0.0       | В    | T7.0      | D    |
| Approach Vol. veh/h                       |      | 633      | 795       |      | 126       |      |
| Approach Voi, ven/n Approach Delay, s/veh |      | 1.6      | 10.2      |      | 44.7      |      |
| Approach LOS                              |      | 1.0<br>A | 10.2<br>B |      | 44.7<br>D |      |
|   |      |          | _         |      |           |      |
| Timer                                     | 1    | 2        | 3         | 4    | 5         | 6    |
| Assigned Phs                              |      | 2        |           | 4    | 5         | 6    |
| Phs Duration (G+Y+Rc), s                  |      | 87.6     |           | 12.4 | 10.7      | 77.0 |
| Change Period (Y+Rc), s                   |      | 7.0      |           | 6.0  | 7.0       | 7.0  |
| Max Green Setting (Gmax), s               |      | 72.0     |           | 15.0 | 9.0       | 56.0 |
| Max Q Clear Time (g_c+l1), s              |      | 2.5      |           | 6.4  | 3.9       | 25.6 |
| Green Ext Time (p_c), s                   |      | 2.1      |           | 0.2  | 0.1       | 3.7  |
| Intersection Summary                      |      |          |           |      |           |      |
| HCM 2010 Ctrl Delay                       |      |          | 9.5       |      |           |      |
| HCM 2010 LOS                              |      |          | A         |      |           |      |
|   |      |          |           |      |           |      |

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1: ROUTE 322 & ROCK RAYMOND ROAD

2017 EXISTING CONDITIONS

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Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 2: LLOYD AVENUE/ROYAL FARMS DRIVEWAY & ROUTE 322



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#### 2: LLOYD AVENUE/ROYAL FARMS DRIVEWAY & ROUTE 322 2017 EXISTING CONDITIONS

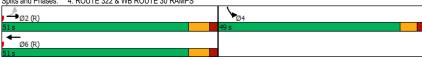
Timing Plan: PM Peak

|                              | ۶    | <b>→</b> | •         | •    | <b>←</b> | •    | 1    | †    | <i>&gt;</i> | <b>/</b> | <b>↓</b> | 4    |
|------------------------------|------|----------|-----------|------|----------|------|------|------|-------------|----------|----------|------|
| Movement                     | EBL  | EBT      | EBR       | WBL  | WBT      | WBR  | NBL  | NBT  | NBR         | SBL      | SBT      | SBR  |
| Lane Configurations          | 7    | <b>*</b> | 7         | ሻ    | <b>↑</b> | 7    |      | ર્ન  | 7           |          | 4        |      |
| Traffic Volume (veh/h)       | 57   | 496      | 235       | 112  | 644      | 51   | 160  | 20   | 102         | 9        | 22       | 81   |
| Future Volume (veh/h)        | 57   | 496      | 235       | 112  | 644      | 51   | 160  | 20   | 102         | 9        | 22       | 81   |
| Number                       | 5    | 2        | 12        | 1    | 6        | 16   | 3    | 8    | 18          | 7        | 4        | 14   |
| Initial Q (Qb), veh          | 1    | 0        | 0         | 0    | 1        | 0    | 6    | 0    | 0           | 0        | 0        | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |          | 0.98      | 1.00 |          | 1.00 | 1.00 |      | 1.00        | 1.00     |          | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00     | 1.00      | 1.00 | 1.00     | 1.00 | 1.00 | 1.00 | 1.00        | 1.00     | 1.00     | 1.00 |
| Adj Sat Flow, veh/h/ln       | 1765 | 1731     | 1731      | 1791 | 1791     | 1756 | 1809 | 1783 | 1707        | 1782     | 1801     | 1782 |
| Adj Flow Rate, veh/h         | 59   | 517      | 216       | 117  | 671      | 30   | 167  | 21   | 53          | 9        | 23       | 56   |
| Adj No. of Lanes             | 1    | 1        | 1         | 1    | 1        | 1    | 0    | 1    | 1           | 0        | 1        | 0    |
| Peak Hour Factor             | 0.96 | 0.96     | 0.96      | 0.96 | 0.96     | 0.96 | 0.96 | 0.96 | 0.96        | 0.96     | 0.96     | 0.96 |
| Percent Heavy Veh, %         | 2    | 4        | 4         | 1    | 1        | 3    | 5    | 5    | 6           | 0        | 0        | 0    |
| Cap, veh/h                   | 486  | 1037     | 863       | 467  | 1285     | 1070 | 278  | 26   | 335         | 53       | 92       | 183  |
| Arrive On Green              | 0.60 | 0.60     | 0.60      | 0.11 | 1.00     | 1.00 | 0.17 | 0.17 | 0.17        | 0.16     | 0.17     | 0.16 |
| Sat Flow, veh/h              | 703  | 1731     | 1441      | 1706 | 1791     | 1493 | 1207 | 152  | 1451        | 74       | 528      | 1055 |
| Grp Volume(v), veh/h         | 59   | 517      | 216       | 117  | 671      | 30   | 188  | 0    | 53          | 88       | 0        | 0    |
| Grp Sat Flow(s),veh/h/ln     | 703  | 1731     | 1441      | 1706 | 1791     | 1493 | 1359 | 0    | 1451        | 1657     | 0        | 0    |
| Q Serve(q s), s              | 3.7  | 17.0     | 7.0       | 2.4  | 0.0      | 0.0  | 8.8  | 0.0  | 2.9         | 0.0      | 0.0      | 0.0  |
| Cycle Q Clear(q c), s        | 3.7  | 17.0     | 7.0       | 2.4  | 0.0      | 0.0  | 13.1 | 0.0  | 2.9         | 4.8      | 0.0      | 0.0  |
| Prop In Lane                 | 1.00 |          | 1.00      | 1.00 |          | 1.00 | 0.89 |      | 1.00        | 0.10     |          | 0.64 |
| Lane Grp Cap(c), veh/h       | 486  | 1037     | 863       | 467  | 1285     | 1070 | 304  | 0    | 335         | 311      | 0        | 0    |
| V/C Ratio(X)                 | 0.12 | 0.50     | 0.25      | 0.25 | 0.52     | 0.03 | 0.62 | 0.00 | 0.16        | 0.28     | 0.00     | 0.00 |
| Avail Cap(c_a), veh/h        | 495  | 1040     | 866       | 507  | 1287     | 1072 | 416  | 0    | 460         | 446      | 0        | 0    |
| HCM Platoon Ratio            | 1.00 | 1.00     | 1.00      | 2.00 | 2.00     | 2.00 | 1.00 | 1.00 | 1.00        | 1.00     | 1.00     | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00     | 1.00      | 1.00 | 1.00     | 1.00 | 1.00 | 0.00 | 1.00        | 1.00     | 0.00     | 0.00 |
| Uniform Delay (d), s/veh     | 9.4  | 11.5     | 9.5       | 7.3  | 0.0      | 0.0  | 39.5 | 0.0  | 30.7        | 36.5     | 0.0      | 0.0  |
| Incr Delay (d2), s/veh       | 0.5  | 1.7      | 0.7       | 0.3  | 1.5      | 0.0  | 2.1  | 0.0  | 0.2         | 0.5      | 0.0      | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0      | 0.0       | 0.0  | 0.0      | 0.0  | 0.0  | 0.0  | 0.0         | 0.0      | 0.0      | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 1.6  | 13.4     | 5.3       | 2.0  | 1.0      | 0.0  | 9.0  | 0.0  | 2.1         | 4.0      | 0.0      | 0.0  |
| LnGrp Delay(d),s/veh         | 10.0 | 13.2     | 10.2      | 7.5  | 1.5      | 0.0  | 41.5 | 0.0  | 30.9        | 37.0     | 0.0      | 0.0  |
| LnGrp LOS                    | Α    | В        | В         | A    | A        | Α    | D    |      | С           | D        |          |      |
| Approach Vol, veh/h          |      | 792      |           |      | 818      |      |      | 241  |             |          | 88       |      |
| Approach Delay, s/veh        |      | 12.1     |           |      | 2.3      |      |      | 39.2 |             |          | 37.0     |      |
| Approach LOS                 |      | В        |           |      | Α.       |      |      | D    |             |          | D        |      |
| Timer                        | 1    | 2        | 3         | 4    | 5        | 6    | 7    | 8    |             |          |          |      |
| Assigned Phs                 | 1    | 2        |           | 4    |          | 6    |      | 8    |             |          |          |      |
| Phs Duration (G+Y+Rc), s     | 11.7 | 66.1     |           | 22.2 |          | 77.8 |      | 22.2 |             |          |          |      |
| Change Period (Y+Rc), s      | 7.0  | 7.0      |           | 6.0  |          | 7.0  |      | 6.0  |             |          |          |      |
| Max Green Setting (Gmax), s  | 7.0  | 48.0     |           | 25.0 |          | 62.0 |      | 25.0 |             |          |          |      |
| Max Q Clear Time (q c+l1), s | 4.9  | 19.5     |           | 6.8  |          | 2.5  |      | 15.6 |             |          |          |      |
| Green Ext Time (p c), s      | 0.1  | 3.4      |           | 0.0  |          | 2.9  |      | 0.6  |             |          |          |      |
| Intersection Summary         |      |          |           |      |          |      |      |      |             |          |          |      |
| HCM 2010 Ctrl Delay          |      |          | 12.5      |      |          |      |      |      |             |          |          |      |
| HCM 2010 Ctrl Delay          |      |          | 12.5<br>B |      |          |      |      |      |             |          |          |      |
| HOW 2010 LOS                 |      |          | Б         |      |          |      |      |      |             |          |          |      |

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|                           | <u> </u>     |          | <b>←</b>    | 4          | _       | 1    |
|---------------------------|--------------|----------|-------------|------------|---------|------|
|                           |              |          | WOT         |            | 201     | -    |
| Lane Group                | EBL          | EBT      | WBT         | WBR        | SBL     | SBR  |
| Lane Configurations       | 7            | <b>^</b> | ĵ.          |            | 7       | 7    |
| Traffic Volume (vph)      | 11           | 731      | 492         | 199        | 249     | 584  |
| Future Volume (vph)       | 11           | 731      | 492         | 199        | 249     | 584  |
| Ideal Flow (vphpl)        | 1800         | 1800     | 1800        | 1800       | 1800    | 1800 |
| Lane Width (ft)           | 16           | 12       | 12          | 12         | 15      | 15   |
| Grade (%)                 |              | -3%      | 2%          |            | 0%      |      |
| Storage Length (ft)       | 75           |          |             | 0          | 0       | 0    |
| Storage Lanes             | 1            |          |             | 0          | 1       | 1    |
| Taper Length (ft)         | 25           |          |             |            | 25      |      |
| Right Turn on Red         |              |          |             | Yes        |         | Yes  |
| Link Speed (mph)          |              | 45       | 45          |            | 25      |      |
| Link Distance (ft)        |              | 830      | 280         |            | 317     |      |
| Travel Time (s)           |              | 12.6     | 4.2         |            | 8.6     |      |
| Confl. Bikes (#/hr)       |              |          |             |            |         | 1    |
| Peak Hour Factor          | 0.90         | 0.90     | 0.90        | 0.90       | 0.90    | 0.90 |
| Heavy Vehicles (%)        | 0%           | 3%       | 1%          | 2%         | 2%      | 3%   |
| Shared Lane Traffic (%)   |              |          |             |            |         |      |
| Turn Type                 | Perm         | NA       | NA          |            | Prot    | Free |
| Protected Phases          |              | 2        | 6           |            | 4       |      |
| Permitted Phases          | 2            |          |             |            |         | Free |
| Detector Phase            | 2            | 2        | 6           |            | 4       |      |
| Switch Phase              |              |          |             |            |         |      |
| Minimum Initial (s)       | 15.0         | 15.0     | 15.0        |            | 3.0     |      |
| Minimum Split (s)         | 22.0         | 22.0     | 22.0        |            | 13.0    |      |
| Total Split (s)           | 51.0         | 51.0     | 51.0        |            | 49.0    |      |
| Total Split (%)           | 51.0%        | 51.0%    | 51.0%       |            | 49.0%   |      |
| Yellow Time (s)           | 5.0          | 5.0      | 5.0         |            | 4.0     |      |
| All-Red Time (s)          | 2.0          | 2.0      | 2.0         |            | 2.0     |      |
| Lost Time Adjust (s)      | -1.0         | -1.0     | -1.0        |            | -1.0    |      |
| Total Lost Time (s)       | 6.0          | 6.0      | 6.0         |            | 5.0     |      |
| Lead/Lag                  |              |          |             |            |         |      |
| Lead-Lag Optimize?        |              |          |             |            |         |      |
| Recall Mode               | C-Max        | C-Max    | C-Max       |            | None    |      |
| Intersection Summary      |              |          |             |            |         |      |
| Area Type:                | Other        |          |             |            |         |      |
| Cycle Length: 100         |              |          |             |            |         |      |
| Actuated Cycle Length: 10 |              |          |             |            |         |      |
| Offset: 97 (97%), Referen | ced to phase | 2:EBTL   | and 6:WB    | T, Start o | f Green |      |
| Natural Cycle: 55         |              |          |             |            |         |      |
| Control Type: Actuated-Co | oordinated   |          |             |            |         |      |
| Splits and Phases: 4: R   | OUTE 322 &   | . WR R∩I | ITE 30 D    | AMPS       |         |      |
| ορικο απα τ παοσο. 4. Ν   | OU I L 322 0 | WD NO    | J I L JU IV | TIVII O    | - 1 3   |      |



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#### 4: ROUTE 322 & WB ROUTE 30 RAMPS 2017 EXISTING CONDITIONS

Timing Plan: PM Peak

Synchro 10 Report

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|                              |      |           |          | _    |           | -,   |
|------------------------------|------|-----------|----------|------|-----------|------|
|                              | •    | -         | •        | •    | -         | 4    |
| Movement                     | EBL  | EBT       | WBT      | WBR  | SBL       | SBR  |
| Lane Configurations          | *    | <b>^</b>  | 1>       |      | ሻ         | 7    |
| Traffic Volume (veh/h)       | 11   | 731       | 492      | 199  | 249       | 584  |
| Future Volume (veh/h)        | 11   | 731       | 492      | 199  | 249       | 584  |
| Number                       | 5    | 2         | 6        | 16   | 7         | 14   |
| Initial Q (Qb), veh          | 1    | 4         | 1        | 0    | 0         | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |           |          | 1.00 | 1.00      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00      | 1.00     | 1.00 | 1.00      | 1.00 |
| Adj Sat Flow, veh/h/ln       | 1900 | 1774      | 1759     | 1782 | 1835      | 1817 |
| Adj Flow Rate, veh/h         | 12   | 812       | 547      | 0    | 277       | 0    |
| Adj No. of Lanes             | 1    | 1         | 1        | 0    | 1         | 1    |
| Peak Hour Factor             | 0.90 | 0.90      | 0.90     | 0.90 | 0.90      | 0.90 |
| Percent Heavy Veh, %         | 0    | 3         | 1        | 1    | 2         | 3    |
| Cap, veh/h                   | 518  | 1221      | 1211     | 0    | 353       | 312  |
| Arrive On Green              | 0.69 | 0.69      | 0.69     | 0.00 | 0.20      | 0.00 |
| Sat Flow, veh/h              | 874  | 1774      | 1759     | 0    | 1748      | 1545 |
| Grp Volume(v), veh/h         | 12   | 812       | 547      | 0    | 277       | 0    |
| Grp Sat Flow(s), veh/h/ln    | 874  | 1774      | 1759     | 0    | 1748      | 1545 |
| Q Serve(q s), s              | 0.6  | 26.3      | 14.1     | 0.0  | 15.0      | 0.0  |
| Cycle Q Clear(q c), s        | 14.7 | 26.3      | 14.1     | 0.0  | 15.0      | 0.0  |
| Prop In Lane                 | 1.00 | 20.0      | 14.1     | 0.00 | 1.00      | 1.00 |
| Lane Grp Cap(c), veh/h       | 518  | 1221      | 1211     | 0.00 | 353       | 312  |
| V/C Ratio(X)                 | 0.02 | 0.67      | 0.45     | 0.00 | 0.79      | 0.00 |
| Avail Cap(c_a), veh/h        | 550  | 1221      | 1211     | 0.00 | 769       | 680  |
| HCM Platoon Ratio            | 1.00 | 1.00      | 1.00     | 1.00 | 1.00      | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00      | 1.00     | 0.00 | 1.00      | 0.00 |
| Uniform Delay (d), s/veh     | 13.0 | 9.2       | 7.1      | 0.0  | 37.9      | 0.0  |
| Incr Delay (d2), s/veh       | 0.1  | 2.9       | 1.2      | 0.0  | 5.4       | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.2       | 0.0      | 0.0  | 0.0       | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 0.5  | 20.7      | 11.7     | 0.0  | 12.3      | 0.0  |
| LnGrp Delay(d),s/veh         | 13.1 | 12.3      | 8.3      | 0.0  | 43.3      | 0.0  |
| LnGrp LOS                    | В    | 12.3<br>B | Α.5      | 0.0  | 43.3<br>D | 0.0  |
| Approach Vol, veh/h          | ט    | 824       | 547      |      | 277       |      |
|                              |      | 12.3      | 8.3      |      | 43.3      |      |
| Approach LOS                 |      | 12.3<br>B | 8.3<br>A |      | 43.3<br>D |      |
| Approach LOS                 |      | В         | А        |      | U         |      |
| Timer                        | 1    | 2         | 3        | 4    | 5         | 6    |
| Assigned Phs                 |      | 2         |          | 4    |           | 6    |
| Phs Duration (G+Y+Rc), s     |      | 74.8      |          | 25.2 |           | 74.8 |
| Change Period (Y+Rc), s      |      | 7.0       |          | 6.0  |           | 7.0  |
| Max Green Setting (Gmax), s  |      | 44.0      |          | 43.0 |           | 44.0 |
| Max Q Clear Time (g_c+l1), s |      | 28.8      |          | 17.5 |           | 16.6 |
| Green Ext Time (p_c), s      |      | 3.1       |          | 1.7  |           | 2.0  |
| Intersection Summary         |      |           |          |      |           |      |
|                              |      |           | 40.0     |      |           |      |
| HCM 2010 Ctrl Delay          |      |           | 16.2     |      |           |      |
| HCM 2010 LOS                 |      |           | В        |      |           |      |

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#### 3: EB ROUTE 30 RAMPS & ROUTE 322 2017 EXISTING CONDITIONS

Timing Plan: PM Peak

|                         | -        | *    | •    | •        | 1    | ~    |
|-------------------------|----------|------|------|----------|------|------|
| Lane Group              | EBT      | EBR  | WBL  | WBT      | NBL  | NBR  |
| Lane Configurations     | <b>†</b> | 7    | ٦    | <b>^</b> | 7    | 7    |
| Traffic Volume (vph)    | 571      | 390  | 188  | 704      | 8    | 200  |
| Future Volume (vph)     | 571      | 390  | 188  | 704      | 8    | 200  |
| Ideal Flow (vphpl)      | 1800     | 1800 | 1800 | 1800     | 1800 | 1800 |
| Lane Width (ft)         | 13       | 12   | 12   | 13       | 13   | 14   |
| Grade (%)               | -6%      |      |      | 7%       | -5%  |      |
| Storage Length (ft)     |          | 0    | 250  |          | 0    | 0    |
| Storage Lanes           |          | 1    | 1    |          | 1    | 1    |
| Taper Length (ft)       |          |      | 25   |          | 25   |      |
| Link Speed (mph)        | 45       |      |      | 45       | 25   |      |
| Link Distance (ft)      | 353      |      |      | 551      | 313  |      |
| Travel Time (s)         | 5.3      |      |      | 8.3      | 8.5  |      |
| Peak Hour Factor        | 0.90     | 0.90 | 0.90 | 0.90     | 0.90 | 0.90 |
| Heavy Vehicles (%)      | 4%       | 2%   | 1%   | 1%       | 25%  | 3%   |
| Shared Lane Traffic (%) |          |      |      |          |      |      |

Area Type: Other

3: EB ROUTE 30 RAMPS & ROUTE 322 2017 EXISTING CONDITIONS

| Intersection           |          |        |        |          |         |       |  |
|------------------------|----------|--------|--------|----------|---------|-------|--|
| Int Delay, s/veh       | 3.4      |        |        |          |         |       |  |
| Movement               | EBT      | EBR    | WBL    | WBT      | NBL     | NBR   |  |
| Lane Configurations    | <b>*</b> | 7      |        | <b>*</b> | *       | 7     |  |
| Traffic Vol, veh/h     | 571      | 390    | 188    | 704      | 8       | 200   |  |
| Future Vol. veh/h      | 571      | 390    | 188    | 704      | 8       | 200   |  |
| Conflicting Peds, #/hr | 0        | 0      | 0      | 0        | 0       | 0     |  |
| Sign Control           | Free     | Free   | Free   | Free     | Stop    | Stop  |  |
| RT Channelized         | -        | Yield  | -      | None     | -       | Stop  |  |
| Storage Length         |          | 0      | 250    | -        | 0       | 0     |  |
| Veh in Median Storage  |          | -      | 200    | 0        | 0       | -     |  |
| Grade. %               | -6       |        |        | 7        | -5      | -     |  |
| Peak Hour Factor       | 90       | 90     | 90     | 90       | 90      | 90    |  |
|                        | 4        | 2      | 1      | 90       | 25      | 3     |  |
| Heavy Vehicles, %      | 634      | 433    | 209    | 782      | 25<br>9 | 222   |  |
| Mvmt Flow              | 034      | 433    | 209    | 782      | 9       | 222   |  |
|                        |          |        |        |          |         |       |  |
| Major/Minor            | Major1   | - 1    | Major2 | ı        | Minor1  |       |  |
| Conflicting Flow All   | 0        | 0      | 634    | 0        | 1834    | 634   |  |
| Stage 1                | -        | -      | -      | -        | 634     | -     |  |
| Stage 2                | -        | -      | -      | -        | 1200    | -     |  |
| Critical Hdwy          | -        | -      | 4.3    | -        | 5.65    | 5.73  |  |
| Critical Hdwy Stg 1    | -        | -      | -      | -        | 4.65    | -     |  |
| Critical Hdwy Stg 2    | -        | -      | -      | -        | 4.65    | -     |  |
| Follow-up Hdwy         |          |        | 3      | -        | 3       | 3.1   |  |
| Pot Cap-1 Maneuver     | -        | -      | 724    | _        | 37      | 549   |  |
| Stage 1                |          | -      |        | -        | 681     | -     |  |
| Stage 2                |          | _      |        | _        | 257     | _     |  |
| Platoon blocked, %     |          |        | _      |          | 1       | _     |  |
| Mov Cap-1 Maneuver     | -        |        | 724    | -        | 26      | 549   |  |
|                        |          |        |        |          |         |       |  |
| Mov Cap-2 Maneuver     | -        | -      | -      | -        | 26      | -     |  |
| Stage 1                | -        | -      | -      | -        | 484     | -     |  |
| Stage 2                | -        | -      | -      | -        | 257     | -     |  |
|                        |          |        |        |          |         |       |  |
| Approach               | EB       |        | WB     |          | NB      |       |  |
| HCM Control Delay, s   | 0        |        | 2.5    |          | 23.1    |       |  |
| HCM LOS                | •        |        | 2.0    |          | C       |       |  |
| TIOW LOO               |          |        |        |          | U       |       |  |
|                        |          |        |        |          |         | 14/51 |  |
| Minor Lane/Major Mvm   | it I     | NBLn11 |        | EBT      | EBR     | WBL   |  |
| Capacity (veh/h)       |          | 26     | 549    | -        | -       | 724   |  |
| HCM Lane V/C Ratio     |          | 0.342  |        | -        | -       | 0.289 |  |
| HCM Control Delay (s)  |          | 203.3  | 15.9   | -        | -       | 12    |  |
| HCM Lane LOS           |          | F      | С      | -        | -       | В     |  |
| HCM 95th %tile Q(veh)  | )        | 1      | 1.9    | -        | -       | 1.2   |  |
|                        |          |        |        |          |         |       |  |

| Synchro 10 Report |  |
|-------------------|--|

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# 8: LLOYD AVENUE & PARK AND RIDE 2017 EXISTING CONDITIONS

Timing Plan: PM Peak

|                         | •    | -    | ←    | •    | <b>&gt;</b> | 4    |
|-------------------------|------|------|------|------|-------------|------|
|                         |      |      |      |      |             |      |
| Lane Group              | EBL  | EBT  | WBT  | WBR  | SBL         | SBR  |
| Lane Configurations     |      | ર્ન  | ĵ.   |      | Y           |      |
| Traffic Volume (vph)    | 1    | 279  | 378  | 7    | 7           | 3    |
| Future Volume (vph)     | 1    | 279  | 378  | 7    | 7           | 3    |
| Ideal Flow (vphpl)      | 1800 | 1800 | 1800 | 1800 | 1800        | 1800 |
| Lane Width (ft)         | 12   | 10   | 10   | 12   | 16          | 12   |
| Grade (%)               |      | -2%  | 1%   |      | 4%          |      |
| Link Speed (mph)        |      | 35   | 35   |      | 25          |      |
| Link Distance (ft)      |      | 292  | 307  |      | 174         |      |
| Travel Time (s)         |      | 5.7  | 6.0  |      | 4.7         |      |
| Confl. Peds. (#/hr)     |      |      |      | 1    | 2           | 2    |
| Peak Hour Factor        | 0.94 | 0.94 | 0.94 | 0.94 | 0.94        | 0.94 |
| Heavy Vehicles (%)      | 0%   | 2%   | 2%   | 0%   | 0%          | 0%   |
| Shared Lane Traffic (%) |      |      |      |      |             |      |

Intersection Summary
Area Type:

Other

# 8: LLOYD AVENUE & PARK AND RIDE 2017 EXISTING CONDITIONS

| Intersection           |        |      |        |      |        |      |
|------------------------|--------|------|--------|------|--------|------|
| Int Delay, s/veh       | 0.2    |      |        |      |        |      |
| **                     |        |      |        |      |        |      |
| Movement               | EBL    | EBT  | WBT    | WBR  | SBL    | SBR  |
| Lane Configurations    |        | ની   | ĵ»     |      | Y      |      |
| Traffic Vol, veh/h     | 1      | 279  | 378    | 7    | 7      | 3    |
| Future Vol, veh/h      | 1      | 279  | 378    | 7    | 7      | 3    |
| Conflicting Peds, #/hr | . 0    | 0    | 0      | 1    | 2      | 2    |
| Sign Control           | Free   | Free | Free   | Free | Stop   | Stop |
| RT Channelized         | -      | None | -      | None | -      | None |
| Storage Length         | -      | -    | -      | -    | 0      | -    |
| Veh in Median Storag   | je,# - | 0    | 0      | -    | 0      | -    |
| Grade, %               | -      | -2   | 1      | -    | 4      | -    |
| Peak Hour Factor       | 94     | 94   | 94     | 94   | 94     | 94   |
| Heavy Vehicles, %      | 0      | 2    | 2      | 0    | 0      | 0    |
| Mvmt Flow              | 1      | 297  | 402    | 7    | 7      | 3    |
|                        |        |      |        |      |        |      |
| Major/Minor            | Major1 | ľ    | Major2 | N    | Minor2 |      |
| Conflicting Flow All   | 410    | 0    | -      | 0    | 708    | 409  |
| Stage 1                | -      | -    | -      | -    | 407    | -    |

| iviajor/iviinor      | iviajori | IVIa | IJOTZ | IV | IINOTZ |     |  |
|----------------------|----------|------|-------|----|--------|-----|--|
| Conflicting Flow All | 410      | 0    | -     | 0  | 708    | 409 |  |
| Stage 1              | -        | -    | -     | -  | 407    | -   |  |
| Stage 2              | -        | -    | -     | -  | 301    | -   |  |
| Critical Hdwy        | 4.3      | -    | -     | -  | 7.2    | 6.6 |  |
| Critical Hdwy Stg 1  | -        | -    | -     | -  | 6.2    | -   |  |
| Critical Hdwy Stg 2  | -        | -    | -     | -  | 6.2    | -   |  |
| Follow-up Hdwy       | 3        | -    | -     | -  | 3      | 3.1 |  |
| Pot Cap-1 Maneuver   | 868      | -    | -     | -  | 386    | 651 |  |
| Stage 1              | -        | -    | -     | -  | 702    | -   |  |
| Stage 2              | -        | -    | -     | -  | 808    | -   |  |
| Platoon blocked, %   |          | -    | -     | -  |        |     |  |
| Mov Cap-1 Maneuver   | r 867    | -    | -     | -  | 385    | 649 |  |
| Mov Cap-2 Maneuver   | r -      | -    | -     | -  | 385    | -   |  |
| Stage 1              | -        | -    | -     | -  | 701    | -   |  |
| Stage 2              | -        | -    | -     | -  | 807    | -   |  |
|                      |          |      |       |    |        |     |  |

| Approach             | EB | WB | SB   |
|----------------------|----|----|------|
| HCM Control Delay, s | 0  | 0  | 13.4 |
| HCM LOS              |    |    | В    |

| Minor Lane/Maior Mymt | EBL   | EBT | WBT | WBR SBLn1 |
|-----------------------|-------|-----|-----|-----------|
|                       |       |     |     |           |
| Capacity (veh/h)      | 867   | -   | -   | - 439     |
| HCM Lane V/C Ratio    | 0.001 | -   | -   | - 0.024   |
| 11011 0 1 1 1 1 1 1   |       | •   |     | 10.1      |
| HCM Control Delay (s) | 9.2   | 0   | -   | - 13.4    |
| HCM Lane LOS          | Α     | Α   | -   | - B       |
|                       |       |     |     |           |
| HCM 95th %tile Q(veh) | 0     | -   | -   | - 0.1     |
|                       |       |     |     |           |

# 9: LLOYD AVENUE & GO CARLSON BLVD 2017 EXISTING CONDITIONS

Timing Plan: PM Peak

|                         | •     | `    | 4    | <b>†</b> | Ţ    | 4    |
|-------------------------|-------|------|------|----------|------|------|
|                         |       | •    | ٠,   | '        | *    |      |
| Lane Group              | EBL   | EBR  | NBL  | NBT      | SBT  | SBR  |
| Lane Configurations     | W     |      |      | ર્ન      | ĵ»   |      |
| Traffic Volume (vph)    | 66    | 24   | 36   | 208      | 257  | 124  |
| Future Volume (vph)     | 66    | 24   | 36   | 208      | 257  | 124  |
| Ideal Flow (vphpl)      | 1800  | 1800 | 1800 | 1800     | 1800 | 1000 |
| Lane Width (ft)         | 12    | 12   | 12   | 10       | 10   | 12   |
| Grade (%)               | 2%    |      |      | 1%       | -2%  |      |
| Link Speed (mph)        | 35    |      |      | 35       | 35   |      |
| Link Distance (ft)      | 1323  |      |      | 450      | 217  |      |
| Travel Time (s)         | 25.8  |      |      | 8.8      | 4.2  |      |
| Peak Hour Factor        | 0.94  | 0.94 | 0.94 | 0.94     | 0.94 | 0.94 |
| Heavy Vehicles (%)      | 2%    | 13%  | 0%   | 2%       | 1%   | 2%   |
| Shared Lane Traffic (%) |       |      |      |          |      |      |
| Intersection Summary    |       |      |      |          |      |      |
| Area Type:              | Other |      |      |          |      |      |

# 9: LLOYD AVENUE & GO CARLSON BLVD 2017 EXISTING CONDITIONS

Timing Plan: PM Peak

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| Interception           |           |       |        |       |              | _    |
|------------------------|-----------|-------|--------|-------|--------------|------|
| Intersection           | 2.3       |       |        |       |              |      |
| Int Delay, s/veh       | 2.3       |       |        |       |              |      |
| Movement               | EBL       | EBR   | NBL    | NBT   | SBT          | SBR  |
| Lane Configurations    | ¥         |       |        | ની    | <del>(</del> |      |
| Traffic Vol, veh/h     | 66        | 24    | 36     | 208   | 257          | 124  |
| Future Vol, veh/h      | 66        | 24    | 36     | 208   | 257          | 124  |
| 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. %               | 2         |       | -      | 1     | -2           | -    |
| Peak Hour Factor       | 94        | 94    | 94     | 94    | 94           | 94   |
| Heavy Vehicles, %      | 2         | 13    | 0      | 2     | 1            | 2    |
| Mymt Flow              | 70        | 26    | 38     | 221   | 273          | 132  |
| WWITETIOW              | 10        | 20    | 30     | 221   | 210          | 102  |
|                        |           |       |        |       |              |      |
| Major/Minor N          | Minor2    | ı     | Major1 | ı     | Major2       |      |
| Conflicting Flow All   | 636       | 339   | 405    | 0     | -            | 0    |
| Stage 1                | 339       | -     | -      | -     | -            | -    |
| Stage 2                | 297       | -     | -      | -     | -            | -    |
| Critical Hdwy          | 6.82      | 6.53  | 4.3    | -     | -            | -    |
| Critical Hdwy Stg 1    | 5.82      | -     | -      | -     | -            | -    |
| Critical Hdwy Stg 2    | 5.82      | -     | _      | -     | _            | -    |
| Follow-up Hdwy         |           | 3.417 | 3      |       |              | -    |
| Pot Cap-1 Maneuver     | 463       | 666   | 872    | _     | _            | _    |
| Stage 1                | 796       | -     | - 012  |       |              |      |
| Stage 2                | 838       | _     |        | _     |              |      |
| Platoon blocked, %     | 000       | _     | _      |       | -            |      |
| Mov Cap-1 Maneuver     | 440       | 666   | 872    | -     |              |      |
|                        | 440       | - 000 | 012    |       |              |      |
| Mov Cap-2 Maneuver     |           | -     | -      | -     | -            | -    |
| Stage 1                | 756       | -     | -      | -     | -            | -    |
| Stage 2                | 838       | -     | -      | -     | -            | -    |
|                        |           |       |        |       |              |      |
| Approach               | EB        |       | NB     |       | SB           |      |
| HCM Control Delay, s   | 14.3      |       | 1.4    |       | 0            |      |
| HCM LOS                | 14.3<br>B |       | 1.4    |       | U            |      |
| HCIVI LOS              | ь         |       |        |       |              |      |
|                        |           |       |        |       |              |      |
| Minor Lane/Major Mvm   | t         | NBL   | NBT    | EBLn1 | SBT          | SBR  |
| Capacity (veh/h)       |           | 872   | -      | 484   | -            | -    |
| HCM Lane V/C Ratio     |           | 0.044 | -      | 0.198 | -            | -    |
| HCM Control Delay (s)  |           | 9.3   | 0      | 14.3  | -            | -    |
| HCM Lane LOS           |           | A     | A      | В     |              | -    |
| HCM 95th %tile Q(veh)  |           | 0.1   | -      | 0.7   | -            | -    |
| John John Q(Von)       |           | 0.1   |        | 0.1   |              |      |

#### 10: LLOYD AVENUE & BEAVER RUN ROAD 2017 EXISTING CONDITIONS

Timing Plan: PM Peak

|                         | •     | •    | 4    | <b>†</b> | ļ    | 4    |
|-------------------------|-------|------|------|----------|------|------|
| Lane Group              | EBL   | EBR  | NBL  | NBT      | SBT  | SBR  |
| Lane Configurations     | Y     |      |      | 4        | ĵ»   |      |
| Traffic Volume (vph)    | 3     | 2    | 1    | 247      | 266  | 14   |
| Future Volume (vph)     | 3     | 2    | 1    | 247      | 266  | 14   |
| Ideal Flow (vphpl)      | 1800  | 1800 | 1800 | 1800     | 1800 | 1800 |
| Lane Width (ft)         | 13    | 12   | 12   | 10       | 10   | 12   |
| Grade (%)               | 1%    |      |      | 1%       | -1%  |      |
| Link Speed (mph)        | 25    |      |      | 35       | 35   |      |
| Link Distance (ft)      | 1337  |      |      | 161      | 450  |      |
| Travel Time (s)         | 36.5  |      |      | 3.1      | 8.8  |      |
| Peak Hour Factor        | 0.93  | 0.93 | 0.93 | 0.93     | 0.93 | 0.93 |
| Heavy Vehicles (%)      | 0%    | 0%   | 0%   | 2%       | 3%   | 0%   |
| Shared Lane Traffic (%) |       |      |      |          |      |      |
| Intersection Summary    |       |      |      |          |      |      |
| Area Type:              | Other |      |      |          |      |      |

10: LLOYD AVENUE & BEAVER RUN ROAD 2017 EXISTING CONDITIONS

Timing Plan: PM Peak

| Intersection Int Delay, s/veh Movement Lane Configurations Traffic Vol, veh/h Future Vol, veh/h Conflicting Peds, #// Sign Control RT Channelized Storage Length Veh in Median Stora Grade, % Peak Hour Factor Heavy Vehicles, % Mymt Flow  Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Stg 1 Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay, HCM LOS |
|--|
| Int Delay, s/veh  Movement  Lane Configurations Traffic Vol, veh/h Future Vol, veh/h Conflicting Peds, #// Sign Control RT Channelized Storage Length Veh in Median Stora Grade, % Peak Hour Factor Heavy Vehicles, % Mymt Flow  Major/Minor  Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuve Stage 1 Stage 2 Approach HCM Control Delay,  |
| Movement Lane Configurations Traffic Vol, veh/h Future Vol, veh/h Sign Control RT Channelized Storage Length Veh in Median Stora Grade, % Peak Hour Factor Heavy Vehicles, % Mymt Flow  Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Stg 1 Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,  |
| Lane Configurations Traffic Vol, veh/h Future Vol, veh/h Future Vol, veh/h Future Vol, veh/h Sign Control RT Channelized Storage Length Veh in Median Stora Grade, % Peak Hour Factor Heavy Vehicles, % Mymt Flow  Major/Minor  Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,  |
| Traffic Vol, veh/h Future Vol, veh/h Future Vol, veh/h Future Vol, veh/h Conflicting Peds, #// Sign Control RT Channelized Storage Length Veh in Median Stora Grade, % Peak Hour Factor Heavy Vehicles, % Mvmt Flow  Major/Minor  Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,   |
| Future Vol, veh/h Conflicting Peds, #/l Sign Control RT Channelized Storage Length Veh in Median Stora Grade, % Peak Hour Factor Heavy Vehicles, % Mwmt Flow  Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Stg 2 Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuve Stage 1 Stage 2 Approach HCM Control Delay,   |
| Conflicting Peds, #// Sign Control RT Channelized Storage Length Veh in Median Stora Grade, % Peak Hour Factor Heavy Vehicles, % Mvmt Flow  Major/Minor  Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platon blocked, % Mov Cap-1 Maneuve Stage 1 Stage 2 Platon blocked, % Mov Cap-2 Maneuv Mov Cap-2 Maneuv Mov Cap-2 Maneuv Mov Cap-2 Maneuv Stage 1 Stage 2  Approach HCM Control Delay,  |
| Sign Control RT Channelized Storage Length Veh in Median Stora Grade, % Peak Hour Factor Heavy Vehicles, % Mvmt Flow  Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,  |
| RT Channelized Storage Length Veh in Median Stora Grade, % Peak Hour Factor Heavy Vehicles, % Mvmt Flow  Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,   |
| Storage Length Veh in Median Stora Grade, % Peak Hour Factor Heavy Vehicles, % Mvmt Flow  Major/Minor  Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Stg 2 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Platoap blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,   |
| Veh in Median Stora Grade, % Peak Hour Factor Heavy Vehicles, % Mvmt Flow  Major/Minor Conflicting Flow All Stage 1 Stage 1 Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,   |
| Grade, % Peak Hour Factor Heavy Vehicles, % Mvmt Flow  Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuv Hov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,  |
| Peak Hour Factor Heavy Vehicles, % Mvmt Flow  Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,  |
| Heavy Vehicles, % Mvmt Flow  Major/Minor  Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Stg 2 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platon blocked, % Mov Cap-1 Maneuve Stage 1 Stage 2 Platon blocked, % Mov Cap-1 Maneuve Stage 1 Stage 2 Approach HCM Control Delay,  |
| Mvmt Flow  Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuv Mov Cap-2 Maneuv Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuv Hov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,   |
| Major/Minor Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuv Stage 1 Stage 2 Platoon blocked, % Approach HCM Control Delay,   |
| Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 2 Platoon blocked, % Mov Cap-1 Maneuv Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,  |
| Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 1 Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuv Mov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,   |
| Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Platoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,  |
| Stage 1 Stage 2 Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuv Stage 1 Stage 2 Patoon blocked, % Mov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,  |
| Stage 2 Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuv Mov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,  |
| Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuv Mov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,  |
| Critical Hdwy Stg 1 Critical Hdwy Stg 2 Critical Hdwy Stg 2 Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuv Mov Cap-2 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,   |
| Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuv Stage 1 Stage 2 Approach HCM Control Delay,   |
| Follow-up Hdwy Pot Cap-1 Maneuve Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuv Mov Cap-2 Maneuv Stage 1 Stage 2  Approach HCM Control Delay,   |
| Pot Cap-1 Maneuve<br>Stage 1<br>Stage 2<br>Platoon blocked, %<br>Mov Cap-1 Maneuv<br>Mov Cap-2 Maneuv<br>Stage 1<br>Stage 2  |
| Stage 1<br>Stage 2<br>Platoon blocked, %<br>Mov Cap-1 Maneuv<br>Mov Cap-2 Maneuv<br>Stage 1<br>Stage 2<br>Approach<br>HCM Control Delay,   |
| Stage 2 Platoon blocked, % Mov Cap-1 Maneuv Mov Cap-2 Maneuv Stage 1 Stage 2  Approach HCM Control Delay,  |
| Platoon blocked, % Mov Cap-1 Maneuv Mov Cap-2 Maneuv Stage 1 Stage 2  Approach HCM Control Delay,  |
| Mov Cap-1 Maneuv<br>Mov Cap-2 Maneuv<br>Stage 1<br>Stage 2<br>Approach<br>HCM Control Delay,   |
| Mov Cap-2 Maneuv<br>Stage 1<br>Stage 2<br>Approach<br>HCM Control Delay,   |
| Mov Cap-2 Maneuv<br>Stage 1<br>Stage 2<br>Approach<br>HCM Control Delay,   |
| Stage 1<br>Stage 2<br>Approach<br>HCM Control Delay,   |
| Stage 2  Approach HCM Control Delay,   |
| Approach HCM Control Delay,  |
| HCM Control Delay,   |
| HCM Control Delay,   |
|  |
| HCM LOS  |
|  |
|  |
| Minor Lane/Major M   |
| Capacity (veh/h)   |
| HCM Lane V/C Rati  |
| HCM Control Delay  |
|  |
| HCM Lane LOS<br>HCM 95th %tile Q(v   |
|  |

|                         | ၨ     | -        | <b>←</b> | •    | -     | 1     |
|-------------------------|-------|----------|----------|------|-------|-------|
| Lane Group              | EBL   | EBT      | WBT      | WBR  | SBL   | SBR   |
| Lane Configurations     | ሻ     | <b>1</b> | f)       |      | ሻ     | 7     |
| Traffic Volume (vph)    | 65    | 453      | 419      | 42   | 39    | 79    |
| Future Volume (vph)     | 65    | 453      | 419      | 42   | 39    | 79    |
| Ideal Flow (vphpl)      | 1800  | 1800     | 1800     | 1800 | 1800  | 1800  |
| Lane Width (ft)         | 10    | 14       | 13       | 12   | 10    | 11    |
| Grade (%)               |       | -2%      | 4%       |      | 1%    |       |
| Storage Length (ft)     | 145   |          |          | 0    | 230   | 0     |
| Storage Lanes           | 1     |          |          | 0    | 1     | 1     |
| Taper Length (ft)       | 25    |          |          |      | 25    |       |
| Right Turn on Red       |       |          |          | Yes  |       | Yes   |
| Link Speed (mph)        |       | 45       | 35       |      | 35    |       |
| Link Distance (ft)      |       | 268      | 1016     |      | 359   |       |
| Travel Time (s)         |       | 4.1      | 19.8     |      | 7.0   |       |
| Peak Hour Factor        | 0.95  | 0.95     | 0.95     | 0.95 | 0.95  | 0.95  |
| Heavy Vehicles (%)      | 5%    | 1%       | 1%       | 5%   | 0%    | 3%    |
| Shared Lane Traffic (%) |       |          |          |      |       |       |
| Turn Type               | pm+pt | NA       | NA       |      | Prot  | pm+ov |
| Protected Phases        | 5     | 2        | 6        |      | 4     | 5     |
| Permitted Phases        | 2     |          |          |      |       | 4     |
| Detector Phase          | 5     | 2        | 6        |      | 4     | 5     |
| Switch Phase            |       |          |          |      |       |       |
| Minimum Initial (s)     | 3.0   | 11.0     | 11.0     |      | 3.0   | 3.0   |
| Minimum Split (s)       | 14.0  | 18.0     | 18.0     |      | 13.0  | 14.0  |
| Total Split (s)         | 14.0  | 53.0     | 39.0     |      | 22.0  | 14.0  |
| Total Split (%)         | 18.7% | 70.7%    | 52.0%    |      | 29.3% | 18.7% |
| Yellow Time (s)         | 5.0   | 5.0      | 5.0      |      | 4.0   | 5.0   |
| All-Red Time (s)        | 2.0   | 2.0      | 2.0      |      | 2.0   | 2.0   |
| Lost Time Adjust (s)    | -1.0  | -1.0     | -1.0     |      | -1.0  | -1.0  |
| Total Lost Time (s)     | 6.0   | 6.0      | 6.0      |      | 5.0   | 6.0   |
| Lead/Lag                | Lead  |          | Lag      |      |       | Lead  |
| Lead-Lag Optimize?      | Yes   |          | Yes      |      |       | Yes   |
| Recall Mode             | None  | C-Max    | C-Max    |      | None  | None  |
|                         |       |          | 2        |      |       |       |

#### Intersection Summary

Area Type: Other

Cycle Length: 75

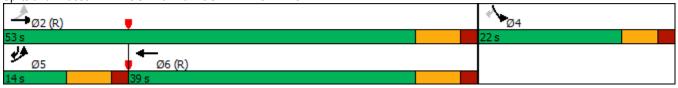
Actuated Cycle Length: 75

Offset: 8 (11%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 1: ROUTE 322 & ROCK RAYMOND ROAD



|  |                | _               | <b>←</b>        | •           | <u> </u>       | 1          |
|--|----------------|-----------------|-----------------|-------------|----------------|------------|
| Movement                                   | EBL            | EBT             | WBT             | WBR         | SBL            | SBR        |
|  | CDL            |                 |                 | VVDR        | SBL            | SBR<br>7   |
| Lane Configurations Traffic Volume (veh/h) | <b>1</b><br>65 | <b>↑</b><br>453 | <b>♣</b><br>419 | 42          | <b>1</b><br>39 | <b>7</b> 9 |
| Future Volume (veh/h)                      | 65             | 453             | 419             | 42          | 39             | 79<br>79   |
| Number                                     | 5              | 433             | 6               | 16          | 7              | 14         |
| Initial Q (Qb), veh                        | 0              | 0               | 0               | 0           | 0              | 0          |
| Ped-Bike Adj(A_pbT)                        | 1.00           | U               | U               | 1.00        | 1.00           | 1.00       |
| Parking Bus, Adj                           | 1.00           | 1.00            | 1.00            | 1.00        | 1.00           | 1.00       |
| Adj Sat Flow, veh/h/ln                     | 1731           | 1872            | 1810            | 1764        | 1791           | 1739       |
| Adj Flow Rate, veh/h                       | 68             | 477             | 441             | 42          | 41             | 39         |
| Adj No. of Lanes                           | 1              | 1               | 1               | 0           | 1              | 1          |
| Peak Hour Factor                           | 0.95           | 0.95            | 0.95            | 0.95        | 0.95           | 0.95       |
| Percent Heavy Veh, %                       | 5              | 1               | 1               | 1           | 0.33           | 3          |
| Cap, veh/h                                 | 635            | 1482            | 1082            | 103         | 105            | 161        |
| Arrive On Green                            | 0.03           | 0.53            | 0.66            | 0.65        | 0.06           | 0.06       |
| Sat Flow, veh/h                            | 1649           | 1872            | 1628            | 155         | 1706           | 1478       |
|  | 68             | 477             |                 | 483         | 41             | 39         |
| Grp Volume(v), veh/h                       | 1649           | 1872            | 0               | 483<br>1783 | 1706           | 39<br>1478 |
| Grp Sat Flow(s),veh/h/ln                   | 0.8            | 10.8            | 0.0             | 9.4         | 1.7            | 1478       |
| Q Serve(g_s), s<br>Cycle Q Clear(g_c), s   | 0.8            | 10.8            | 0.0             | 9.4         | 1.7            | 1.8        |
| Prop In Lane                               | 1.00           | 10.0            | 0.0             | 0.09        | 1.00           | 1.00       |
| •  | 635            | 1482            | 0               | 1185        | 105            | 161        |
| Lane Grp Cap(c), veh/h<br>V/C Ratio(X)     | 0.11           | 0.32            | 0.00            | 0.41        | 0.39           | 0.24       |
| ` '  | 733            | 1482            | 0.00            | 1185        | 387            | 405        |
| Avail Cap(c_a), veh/h HCM Platoon Ratio    | 0.67           | 0.67            | 1.00            | 1.00        | 1.00           | 1.00       |
| Upstream Filter(I)                         | 1.00           | 1.00            | 0.00            | 1.00        | 1.00           | 1.00       |
|  | 3.5            | 6.2             | 0.00            | 5.8         | 33.8           | 30.6       |
| Uniform Delay (d), s/veh                   | 0.1            | 0.2             | 0.0             | 1.0         | 2.4            | 0.8        |
| Incr Delay (d2), s/veh                     | 0.1            | 0.0             | 0.0             | 0.0         | 0.0            | 0.0        |
| Initial Q Delay(d3),s/veh                  | 0.0            |                 | 0.0             | 8.5         | 1.6            | 2.8        |
| %ile BackOfQ(95%),veh/ln                   |                | 9.8             |                 |             | 36.2           |            |
| LnGrp Delay(d),s/veh                       | 3.6            | 6.8             | 0.0             | 6.9         |                | 31.4       |
| LnGrp LOS                                  | A              | A               | 400             | A           | D              | С          |
| Approach Vol, veh/h                        |                | 545             | 483             |             | 80             |            |
| Approach Delay, s/veh                      |                | 6.4             | 6.9             |             | 33.8           |            |
| Approach LOS                               |                | Α               | Α               |             | С              |            |
| Timer                                      | 1              | 2               | 3               | 4           | 5              | 6          |
| Assigned Phs                               |                | 2               |                 | 4           | 5              | 6          |
| Phs Duration (G+Y+Rc), s                   |                | 65.4            |                 | 9.6         | 9.5            | 55.8       |
| Change Period (Y+Rc), s                    |                | 7.0             |                 | 6.0         | 7.0            | 7.0        |
| Max Green Setting (Gmax), s                |                | 46.0            |                 | 16.0        | 7.0            | 32.0       |
| Max Q Clear Time (g_c+l1), s               |                | 13.3            |                 | 4.3         | 3.3            | 11.4       |
| Green Ext Time (p_c), s                    |                | 1.7             |                 | 0.1         | 0.0            | 1.8        |
| Intersection Summary                       |                |                 |                 |             |                |            |
| HCM 2010 Ctrl Delay                        |                |                 | 8.6             |             |                |            |
| HCM 2010 LOS                               |                |                 | Α               |             |                |            |

|                         | ٠     | <b>→</b> | •     | •     | +       | 4     | •     | <u>†</u> | <u> </u> | <u> </u> | Ţ     | 4    |
|-------------------------|-------|----------|-------|-------|---------|-------|-------|----------|----------|----------|-------|------|
| Lane Group              | EBL   | EBT      | EBR   | WBL   | WBT     | WBR   | NBL   | NBT      | NBR      | SBL      | SBT   | SBR  |
| Lane Configurations     | *     | <b></b>  | 7     | *     | <b></b> | 7     |       | स        | 7        |          | 4     |      |
| Traffic Volume (vph)    | 54    | 433      | 205   | 61    | 406     | 46    | 179   | 21       | 50       | 19       | 15    | 78   |
| Future Volume (vph)     | 54    | 433      | 205   | 61    | 406     | 46    | 179   | 21       | 50       | 19       | 15    | 78   |
| Ideal Flow (vphpl)      | 1800  | 1800     | 1800  | 1800  | 1800    | 1800  | 1800  | 1800     | 1800     | 1800     | 1800  | 1800 |
| Lane Width (ft)         | 10    | 12       | 12    | 10    | 11      | 12    | 12    | 11       | 11       | 12       | 15    | 12   |
| Grade (%)               |       | 0%       |       |       | -1%     |       |       | -1%      |          |          | 2%    |      |
| Storage Length (ft)     | 190   |          | 0     | 150   |         | 150   | 0     |          | 150      | 0        |       | 0    |
| Storage Lanes           | 1     |          | 1     | 1     |         | 1     | 0     |          | 1        | 0        |       | 0    |
| Taper Length (ft)       | 25    |          |       | 25    |         |       | 25    |          |          | 25       |       |      |
| Right Turn on Red       |       |          | Yes   |       |         | Yes   |       |          | Yes      |          |       | Yes  |
| Link Speed (mph)        |       | 45       |       |       | 45      |       |       | 35       |          |          | 25    |      |
| Link Distance (ft)      |       | 551      |       |       | 297     |       |       | 312      |          |          | 194   |      |
| Travel Time (s)         |       | 8.3      |       |       | 4.5     |       |       | 6.1      |          |          | 5.3   |      |
| Confl. Peds. (#/hr)     | 2     |          | 2     |       |         |       |       |          |          |          |       |      |
| Peak Hour Factor        | 0.95  | 0.95     | 0.95  | 0.95  | 0.95    | 0.95  | 0.95  | 0.95     | 0.95     | 0.95     | 0.95  | 0.95 |
| Heavy Vehicles (%)      | 2%    | 1%       | 1%    | 0%    | 1%      | 0%    | 1%    | 0%       | 3%       | 0%       | 0%    | 5%   |
| Shared Lane Traffic (%) |       |          |       |       |         |       |       |          |          |          |       |      |
| Turn Type               | Perm  | NA       | Perm  | pm+pt | NA      | Perm  | Perm  | NA       | pm+ov    | Perm     | NA    |      |
| Protected Phases        |       | 2        |       | 1     | 6       |       |       | 8        | 1        |          | 4     |      |
| Permitted Phases        | 2     |          | 2     | 6     |         | 6     | 8     |          | 8        | 4        |       |      |
| Detector Phase          | 2     | 2        | 2     | 1     | 6       | 6     | 8     | 8        | 1        | 4        | 4     |      |
| Switch Phase            |       |          |       |       |         |       |       |          |          |          |       |      |
| Minimum Initial (s)     | 13.0  | 13.0     | 13.0  | 3.0   | 13.0    | 13.0  | 3.0   | 3.0      | 3.0      | 3.0      | 3.0   |      |
| Minimum Split (s)       | 40.0  | 40.0     | 40.0  | 10.0  | 40.0    | 40.0  | 13.0  | 13.0     | 10.0     | 13.0     | 13.0  |      |
| Total Split (s)         | 40.0  | 40.0     | 40.0  | 13.0  | 53.0    | 53.0  | 22.0  | 22.0     | 13.0     | 22.0     | 22.0  |      |
| Total Split (%)         | 53.3% | 53.3%    | 53.3% | 17.3% | 70.7%   | 70.7% | 29.3% | 29.3%    | 17.3%    | 29.3%    | 29.3% |      |
| Yellow Time (s)         | 5.0   | 5.0      | 5.0   | 5.0   | 5.0     | 5.0   | 3.0   | 3.0      | 5.0      | 3.0      | 3.0   |      |
| All-Red Time (s)        | 2.0   | 2.0      | 2.0   | 2.0   | 2.0     | 2.0   | 3.0   | 3.0      | 2.0      | 3.0      | 3.0   |      |
| Lost Time Adjust (s)    | -1.0  | -1.0     | -1.0  | -1.0  | -1.0    | -1.0  |       | -1.0     | -1.0     |          | -1.0  |      |
| Total Lost Time (s)     | 6.0   | 6.0      | 6.0   | 6.0   | 6.0     | 6.0   |       | 5.0      | 6.0      |          | 5.0   |      |
| Lead/Lag                | Lag   | Lag      | Lag   | Lead  |         |       |       |          | Lead     |          |       |      |
| Lead-Lag Optimize?      | Yes   | Yes      | Yes   | Yes   |         |       |       |          | Yes      |          |       |      |
| Recall Mode             | C-Max | C-Max    | C-Max | None  | C-Max   | C-Max | None  | None     | None     | None     | None  |      |

#### Intersection Summary

Area Type: Other

Cycle Length: 75

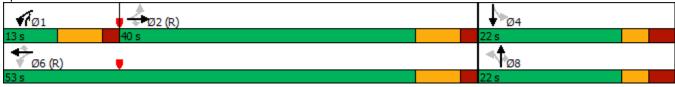
Actuated Cycle Length: 75

Offset: 48 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated





Notes

|                         | ۶     | -        | ←     | •    | -     | 4    |
|-------------------------|-------|----------|-------|------|-------|------|
| Lane Group              | EBL   | EBT      | WBT   | WBR  | SBL   | SBR  |
| Lane Configurations     | ሻ     | <b>†</b> | f)    |      | ሻ     | 7    |
| Traffic Volume (vph)    | 15    | 829      | 332   | 138  | 219   | 486  |
| Future Volume (vph)     | 15    | 829      | 332   | 138  | 219   | 486  |
| Ideal Flow (vphpl)      | 1800  | 1800     | 1800  | 1800 | 1800  | 1800 |
| Lane Width (ft)         | 16    | 12       | 12    | 12   | 15    | 15   |
| Grade (%)               |       | -3%      | 2%    |      | 0%    |      |
| Storage Length (ft)     | 75    |          |       | 0    | 0     | 0    |
| Storage Lanes           | 1     |          |       | 0    | 1     | 1    |
| Taper Length (ft)       | 25    |          |       |      | 25    |      |
| Right Turn on Red       |       |          |       | Yes  |       | Yes  |
| Link Speed (mph)        |       | 45       | 45    |      | 25    |      |
| Link Distance (ft)      |       | 830      | 280   |      | 317   |      |
| Travel Time (s)         |       | 12.6     | 4.2   |      | 8.6   |      |
| Peak Hour Factor        | 0.94  | 0.94     | 0.94  | 0.94 | 0.94  | 0.94 |
| Heavy Vehicles (%)      | 0%    | 1%       | 1%    | 0%   | 1%    | 2%   |
| Shared Lane Traffic (%) |       |          |       |      |       |      |
| Turn Type               | Perm  | NA       | NA    |      | Prot  | Free |
| Protected Phases        |       | 2        | 6     |      | 4     |      |
| Permitted Phases        | 2     |          |       |      |       | Free |
| Detector Phase          | 2     | 2        | 6     |      | 4     |      |
| Switch Phase            |       |          |       |      |       |      |
| Minimum Initial (s)     | 15.0  | 15.0     | 15.0  |      | 3.0   |      |
| Minimum Split (s)       | 22.0  | 22.0     | 22.0  |      | 13.0  |      |
| Total Split (s)         | 54.0  | 54.0     | 54.0  |      | 21.0  |      |
| Total Split (%)         | 72.0% | 72.0%    | 72.0% |      | 28.0% |      |
| Yellow Time (s)         | 5.0   | 5.0      | 5.0   |      | 4.0   |      |
| All-Red Time (s)        | 2.0   | 2.0      | 2.0   |      | 2.0   |      |
| Lost Time Adjust (s)    | -1.0  | -1.0     | -1.0  |      | -1.0  |      |
| Total Lost Time (s)     | 6.0   | 6.0      | 6.0   |      | 5.0   |      |
| Lead/Lag                |       |          |       |      |       |      |
| Lead-Lag Optimize?      |       |          |       |      |       |      |
| Recall Mode             | C-Max | C-Max    | C-Max |      | None  |      |
| Intersection Summary    |       |          |       |      |       |      |

Area Type: Other

Cycle Length: 75

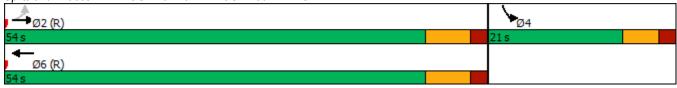
Actuated Cycle Length: 75

Offset: 17 (23%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 4: ROUTE 322 & WB ROUTE 30 RAMPS



|                              | •    |          | <b>←</b> | 4    |      | 1    |
|------------------------------|------|----------|----------|------|------|------|
|                              |      | <b>→</b> | _        |      | *    | ₹    |
| Movement                     | EBL  | EBT      | WBT      | WBR  | SBL  | SBR  |
| Lane Configurations          |      | <b></b>  | f)       |      | ሻ    | 7    |
| Traffic Volume (veh/h)       | 15   | 829      | 332      | 138  | 219  | 486  |
| Future Volume (veh/h)        | 15   | 829      | 332      | 138  | 219  | 486  |
| Number                       | 5    | 2        | 6        | 16   | 7    | 14   |
| Initial Q (Qb), veh          | 0    | 0        | 0        | 0    | 1    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |          |          | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00     | 1.00     | 1.00 | 1.00 | 1.00 |
| Adj Sat Flow, veh/h/ln       | 1900 | 1809     | 1770     | 1782 | 1853 | 1835 |
| Adj Flow Rate, veh/h         | 16   | 882      | 353      | 0    | 233  | 0    |
| Adj No. of Lanes             | 1    | 1        | 1        | 0    | 1    | 1    |
| Peak Hour Factor             | 0.94 | 0.94     | 0.94     | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, %         | 0    | 1        | 1        | 1    | 1    | 2    |
| Cap, veh/h                   | 719  | 1224     | 1198     | 0    | 312  | 275  |
| Arrive On Green              | 0.68 | 0.68     | 0.68     | 0.00 | 0.18 | 0.00 |
| Sat Flow, veh/h              | 1044 | 1809     | 1770     | 0    | 1765 | 1560 |
| Grp Volume(v), veh/h         | 16   | 882      | 353      | 0    | 233  | 0    |
| Grp Sat Flow(s), veh/h/ln    | 1044 | 1809     | 1770     | 0    | 1765 | 1560 |
| Q Serve(g_s), s              | 0.5  | 23.0     | 6.0      | 0.0  | 9.4  | 0.0  |
| Cycle Q Clear(g_c), s        | 6.5  | 23.0     | 6.0      | 0.0  | 9.4  | 0.0  |
| Prop In Lane                 | 1.00 | 20.0     | 0.0      | 0.00 | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h       | 719  | 1224     | 1198     | 0.00 | 312  | 275  |
| V/C Ratio(X)                 | 0.02 | 0.72     | 0.29     | 0.00 | 0.75 | 0.00 |
| Avail Cap(c_a), veh/h        | 720  | 1226     | 1199     | 0.00 | 377  | 333  |
| HCM Platoon Ratio            | 1.00 | 1.00     | 1.00     | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00     | 1.00     | 0.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 6.2  | 7.6      | 4.9      | 0.00 | 29.4 | 0.00 |
| Incr Delay (d2), s/veh       | 0.2  | 3.7      | 0.6      | 0.0  | 7.6  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0      | 0.0      | 0.0  | 0.3  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 0.0  | 18.4     | 5.5      | 0.0  | 9.2  | 0.0  |
| , ,                          | 6.3  | 11.3     | 5.5      | 0.0  | 37.2 | 0.0  |
| LnGrp Delay(d),s/veh         |      |          |          | 0.0  |      | 0.0  |
| LnGrp LOS                    | A    | B        | A 252    |      | D    |      |
| Approach Vol, veh/h          |      | 898      | 353      |      | 233  |      |
| Approach Delay, s/veh        |      | 11.2     | 5.5      |      | 37.2 |      |
| Approach LOS                 |      | В        | Α        |      | D    |      |
| Timer                        | 1    | 2        | 3        | 4    | 5    | 6    |
| Assigned Phs                 |      | 2        |          | 4    |      | 6    |
| Phs Duration (G+Y+Rc), s     |      | 56.8     |          | 18.2 |      | 56.8 |
| Change Period (Y+Rc), s      |      | 7.0      |          | 6.0  |      | 7.0  |
| Max Green Setting (Gmax), s  |      | 47.0     |          | 15.0 |      | 47.0 |
| Max Q Clear Time (g_c+l1), s |      | 25.5     |          | 11.9 |      | 8.5  |
| Green Ext Time (p_c), s      |      | 3.9      |          | 0.4  |      | 1.2  |
| Intersection Summary         |      |          |          |      |      |      |
| HCM 2010 Ctrl Delay          |      |          | 14.0     |      |      |      |
| HCM 2010 LOS                 |      |          | В        |      |      |      |
|                              |      |          | _        |      |      |      |

# 3: EB ROUTE 30 RAMPS & ROUTE 322 2017 EXISTING CONDITIONS

Timing Plan: SAT Peak

|                         | -        | *    | •    | •        | 1    |      |
|-------------------------|----------|------|------|----------|------|------|
| Lane Group              | EBT      | EBR  | WBL  | WBT      | NBL  | NBR  |
| Lane Configurations     | <b>†</b> | 7    | 7    | <b>^</b> | 7    | 7    |
| Traffic Volume (vph)    | 520      | 543  | 223  | 427      | 20   | 173  |
| Future Volume (vph)     | 520      | 543  | 223  | 427      | 20   | 173  |
| Ideal Flow (vphpl)      | 1800     | 1800 | 1800 | 1800     | 1800 | 1800 |
| Lane Width (ft)         | 13       | 12   | 12   | 13       | 13   | 14   |
| Grade (%)               | -6%      |      |      | 7%       | -5%  |      |
| Storage Length (ft)     |          | 0    | 250  |          | 0    | 0    |
| Storage Lanes           |          | 1    | 1    |          | 1    | 1    |
| Taper Length (ft)       |          |      | 25   |          | 25   |      |
| Link Speed (mph)        | 45       |      |      | 45       | 25   |      |
| Link Distance (ft)      | 353      |      |      | 551      | 313  |      |
| Travel Time (s)         | 5.3      |      |      | 8.3      | 8.5  |      |
| Peak Hour Factor        | 0.96     | 0.96 | 0.96 | 0.96     | 0.96 | 0.96 |
| Heavy Vehicles (%)      | 1%       | 2%   | 2%   | 1%       | 0%   | 1%   |
| Shared Lane Traffic (%) |          |      |      |          |      |      |

Intersection Summary

Area Type:

Other

# 3: EB ROUTE 30 RAMPS & ROUTE 322 2017 EXISTING CONDITIONS

| Intersection           |          |       |      |          |      |      |
|------------------------|----------|-------|------|----------|------|------|
| Int Delay, s/veh       | 3        |       |      |          |      |      |
| **                     |          |       |      |          |      |      |
| Movement               | EBT      | EBR   | WBL  | WBT      | NBL  | NBR  |
| Lane Configurations    | <b>•</b> | 7     | 1    | <b>↑</b> |      | 7    |
| Traffic Vol, veh/h     | 520      | 543   | 223  | 427      | 20   | 173  |
| Future Vol, veh/h      | 520      | 543   | 223  | 427      | 20   | 173  |
| Conflicting Peds, #/hr | 0        | 0     | 0    | 0        | 0    | 0    |
| Sign Control           | Free     | Free  | Free | Free     | Stop | Stop |
| RT Channelized         | -        | Yield | -    | None     | -    | Stop |
| Storage Length         | -        | 0     | 250  | -        | 0    | 0    |
| Veh in Median Storage  | , # 0    | -     | -    | 0        | 0    | -    |
| Grade, %               | -6       | -     | -    | 7        | -5   | -    |
| Peak Hour Factor       | 96       | 96    | 96   | 96       | 96   | 96   |
| Heavy Vehicles, %      | 1        | 2     | 2    | 1        | 0    | 1    |
| Mvmt Flow              | 542      | 566   | 232  | 445      | 21   | 180  |
|                        |          |       |      |          |      |      |

| M = i = =/N Ai== = = | Maland |   | 1-:0   |   | A:4    |      |
|----------------------|--------|---|--------|---|--------|------|
| Major/Minor          | Major1 | M | lajor2 |   | Minor1 |      |
| Conflicting Flow All | 0      | 0 | 542    | 0 | 1451   | 542  |
| Stage 1              | -      | - | -      | - | 542    | -    |
| Stage 2              | -      | - | -      | - | 909    | -    |
| Critical Hdwy        | -      | - | 4.3    | - | 5.4    | 5.71 |
| Critical Hdwy Stg 1  | -      | - | -      | - | 4.4    | -    |
| Critical Hdwy Stg 2  | -      | - | -      | - | 4.4    | -    |
| Follow-up Hdwy       | -      | - | 3      | - | 3      | 3.1  |
| Pot Cap-1 Maneuver   | -      | - | 781    | - | 166    | 615  |
| Stage 1              | -      | - | -      | - | 769    | -    |
| Stage 2              | -      | - | -      | - | 487    | -    |
| Platoon blocked, %   | -      | - |        | - | 1      |      |
| Mov Cap-1 Maneuve    | r -    | - | 781    | - | 117    | 615  |
| Mov Cap-2 Maneuve    | r -    | - | -      | - | 117    | -    |
| Stage 1              | -      | - | -      | - | 541    | -    |
| Stage 2              | -      | - | -      | - | 487    | -    |
| ·                    |        |   |        |   |        |      |
|                      |        |   |        |   |        |      |

| Approach             | EB | WB | NB   |  |
|----------------------|----|----|------|--|
| HCM Control Delay, s | 0  | 4  | 16.3 |  |
| HCM LOS              |    |    | С    |  |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 117   | 615   | -   | -   | 781   | -   |
| HCM Lane V/C Ratio    | 0.178 | 0.293 | -   | -   | 0.297 | -   |
| HCM Control Delay (s) | 42.3  | 13.3  | -   | -   | 11.5  | -   |
| HCM Lane LOS          | Е     | В     | -   | -   | В     | -   |
| HCM 95th %tile Q(veh) | 0.6   | 1.2   | -   | -   | 1.2   | -   |

# 8: LLOYD AVENUE & PARK AND RIDE 2017 EXISTING CONDITIONS

Timing Plan: SAT Peak

|                         | •     | _    | ←    | •    | <b>\</b> | 4    |
|-------------------------|-------|------|------|------|----------|------|
|                         |       |      |      |      |          |      |
| Lane Group              | EBL   | EBT  | WBT  | WBR  | SBL      | SBR  |
| Lane Configurations     |       | ન    | 1•   |      | ¥        |      |
| Traffic Volume (vph)    | 2     | 248  | 290  | 4    | 4        | 1    |
| Future Volume (vph)     | 2     | 248  | 290  | 4    | 4        | 1    |
| Ideal Flow (vphpl)      | 1800  | 1800 | 1800 | 1800 | 1800     | 1800 |
| Lane Width (ft)         | 12    | 10   | 10   | 12   | 16       | 12   |
| Grade (%)               |       | -2%  | 1%   |      | 4%       |      |
| Link Speed (mph)        |       | 35   | 35   |      | 25       |      |
| Link Distance (ft)      |       | 287  | 312  |      | 177      |      |
| Travel Time (s)         |       | 5.6  | 6.1  |      | 4.8      |      |
| Peak Hour Factor        | 0.97  | 0.97 | 0.97 | 0.97 | 0.97     | 0.97 |
| Heavy Vehicles (%)      | 0%    | 1%   | 1%   | 25%  | 0%       | 0%   |
| Shared Lane Traffic (%) |       |      |      |      |          |      |
| Intersection Summary    |       |      |      |      |          |      |
| Area Type:              | Other |      |      |      |          |      |

8: LLOYD AVENUE & PARK AND RIDE 2017 EXISTING CONDITIONS

| latara atian  |                                       |             |  |             |  |                                  |
|---|---------------------------------------|-------------|--|-------------|--|----------------------------------|
| Intersection  | 0.0                                   |             |  |             |  |                                  |
| Int Delay, s/veh  | 0.2                                   |             |  |             |  |                                  |
| Movement  | EBL                                   | EBT         | WBT  | WBR         | SBL  | SBR                              |
| Lane Configurations   |                                       | ર્ન         | Þ  |             | Y  |                                  |
| Traffic Vol, veh/h  | 2                                     | 248         | 290  | 4           | 4  | 1                                |
| Future Vol, veh/h   | 2                                     | 248         | 290  | 4           | 4  | 1                                |
| 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   | e,# -                                 | 0           | 0  | -           | 0  | -                                |
| Grade, %  | -                                     | -2          | 1  | -           | 4  | -                                |
| Peak Hour Factor  | 97                                    | 97          | 97   | 97          | 97   | 97                               |
| Heavy Vehicles, %   | 0                                     | 1           | 1  | 25          | 0  | 0                                |
| Mvmt Flow   | 2                                     | 256         | 299  | 4           | 4  | 1                                |
|   |                                       |             |  |             |  |                                  |
| Major/Minor   | Major1                                | 1           | Major2   | N           | /linor2  |                                  |
| Conflicting Flow All  | 303                                   | 0           | -,-  | 0           | 561  | 301                              |
| Stage 1   | -                                     | -           | _  | -           | 301  | -                                |
| Stage 2   |                                       | -           | -  | -           | 260  | -                                |
| Critical Hdwy   | 4.3                                   | -           | _  | _           | 7.2  | 6.6                              |
| Critical Hdwy Stg 1   |                                       |             |  |             |  |                                  |
|   | -                                     | -           | -  | -           |  | -                                |
|   | -                                     | -           | -  | -           | 6.2  | -                                |
| Critical Hdwy Stg 2   | -                                     |             |  |             | 6.2  |                                  |
| Critical Hdwy Stg 2<br>Follow-up Hdwy   | 3                                     | -           | -  | -           | 6.2<br>6.2<br>3  | 3.1                              |
| Critical Hdwy Stg 2<br>Follow-up Hdwy<br>Pot Cap-1 Maneuver   | -                                     | -           | -  | -           | 6.2<br>6.2<br>3<br>489   |                                  |
| Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1   | 3                                     | -           | -<br>-   | -<br>-      | 6.2<br>6.2<br>3<br>489<br>808                                    | 3.1<br>759                       |
| Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2   | 3                                     | -           | -<br>-<br>-  | -<br>-<br>- | 6.2<br>6.2<br>3<br>489   | 3.1<br>759                       |
| Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2 Platoon blocked, %  | -<br>3<br>946<br>-<br>-               | -<br>-<br>- | -<br>-<br>-<br>-   | -           | 6.2<br>6.2<br>3<br>489<br>808<br>853                             | 3.1<br>759<br>-                  |
| Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuver   | 946<br>-<br>946                       | -           | -<br>-<br>-<br>-<br>-  | -           | 6.2<br>6.2<br>3<br>489<br>808<br>853                             | 3.1<br>759                       |
| Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuver Mov Cap-2 Maneuver                          | 946<br>-<br>946                       | -           | -<br>-<br>-<br>-   | -           | 6.2<br>6.2<br>3<br>489<br>808<br>853<br>488                      | 3.1<br>759<br>-<br>-<br>759      |
| Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuver Mov Cap-2 Maneuver Stage 1                  | 946<br>-<br>946                       | -           | -<br>-<br>-<br>-<br>-  | -           | 6.2<br>6.2<br>3<br>489<br>808<br>853<br>488<br>488<br>806        | 3.1<br>759<br>-<br>-<br>759<br>- |
| Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuver Mov Cap-2 Maneuver                          | 946<br>-<br>946<br>-<br>-             |             | -  |             | 6.2<br>6.2<br>3<br>489<br>808<br>853<br>488                      | 3.1<br>759<br>-<br>-<br>759      |
| Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuver Mov Cap-2 Maneuver Stage 1 Stage 2          | 946<br>-<br>946<br>-<br>-             |             | -  |             | 6.2<br>6.2<br>3<br>489<br>808<br>853<br>488<br>488<br>806<br>853 | 3.1<br>759<br>-<br>-<br>759<br>- |
| Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuver Mov Cap-2 Maneuver Stage 1 Stage 2 Approach | 946<br>-<br>946<br>-<br>-<br>946<br>- |             | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- |             | 6.2<br>6.2<br>3<br>489<br>808<br>853<br>488<br>488<br>806<br>853 | 3.1<br>759<br>-<br>-<br>759<br>- |
| Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuver Mov Cap-2 Maneuver Stage 1 Stage 2          | 946<br>-<br>946<br>-<br>-<br>946<br>- |             | -  |             | 6.2<br>6.2<br>3<br>489<br>808<br>853<br>488<br>488<br>806<br>853 | 3.1<br>759<br>-<br>-<br>759<br>- |

|                       |       |     |     | _     |       |
|-----------------------|-------|-----|-----|-------|-------|
|                       |       |     |     |       |       |
| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR : | SBLn1 |
| Capacity (veh/h)      | 946   | -   | -   | -     | 526   |
| HCM Lane V/C Ratio    | 0.002 | -   | -   | -     | 0.01  |
| HCM Control Delay (s) | 8.8   | 0   | -   | -     | 11.9  |
| HCM Lane LOS          | Α     | Α   | -   | -     | В     |
| HCM 95th %tile Q(veh) | 0     | -   | -   | -     | 0     |
|                       |       |     |     |       |       |

# 9: LLOYD AVENUE & GO CARLSON BLVD 2017 EXISTING CONDITIONS

Timing Plan: SAT Peak

|                         | •     | •    | 4    | <b>†</b> | ļ    | 4    |
|-------------------------|-------|------|------|----------|------|------|
| Lane Group              | EBL   | EBR  | NBL  | NBT      | SBT  | SBR  |
| Lane Configurations     | W     |      |      | ર્ન      | ĵ.   |      |
| Traffic Volume (vph)    | 62    | 22   | 19   | 188      | 225  | 68   |
| Future Volume (vph)     | 62    | 22   | 19   | 188      | 225  | 68   |
| Ideal Flow (vphpl)      | 1800  | 1800 | 1800 | 1800     | 1800 | 1000 |
| Lane Width (ft)         | 12    | 12   | 12   | 10       | 10   | 12   |
| Grade (%)               | 2%    |      |      | 1%       | -2%  |      |
| Link Speed (mph)        | 35    |      |      | 35       | 35   |      |
| Link Distance (ft)      | 1394  |      |      | 471      | 183  |      |
| Travel Time (s)         | 27.2  |      |      | 9.2      | 3.6  |      |
| Peak Hour Factor        | 0.96  | 0.96 | 0.96 | 0.96     | 0.96 | 0.96 |
| Heavy Vehicles (%)      | 2%    | 0%   | 0%   | 0%       | 1%   | 2%   |
| Shared Lane Traffic (%) |       |      |      |          |      |      |
| Intersection Summary    |       |      |      |          |      |      |
| Area Type:              | Other |      |      |          |      |      |

# 9: LLOYD AVENUE & GO CARLSON BLVD 2017 EXISTING CONDITIONS

| Intersection           |        |       |        |       |           |      |
|------------------------|--------|-------|--------|-------|-----------|------|
| Int Delay, s/veh       | 2      |       |        |       |           |      |
|                        |        | EDD   | NDI    | NDT   | CDT       | CDD  |
| Movement               | EBL    | EBR   | NBL    | NBT   | SBT       | SBR  |
| Lane Configurations    | Y      |       | 40     | 4     | <b>^}</b> | 00   |
| Traffic Vol, veh/h     | 62     | 22    | 19     | 188   | 225       | 68   |
| Future Vol, veh/h      | 62     | 22    | 19     | 188   | 225       | 68   |
| 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         | -    |
| Grade, %               | 2      | -     | -      | 1     | -2        | -    |
| Peak Hour Factor       | 96     | 96    | 96     | 96    | 96        | 96   |
| Heavy Vehicles, %      | 2      | 0     | 0      | 0     | 1         | 2    |
| Mvmt Flow              | 65     | 23    | 20     | 196   | 234       | 71   |
|                        |        |       |        |       |           |      |
| Major/Minor I          | Minor2 | ľ     | Major1 | ľ     | Major2    |      |
| Conflicting Flow All   | 506    | 270   | 305    | 0     | -         | 0    |
| Stage 1                | 270    | -     | -      | -     | -         | -    |
| Stage 2                | 236    | -     | -      | -     | -         | -    |
| Critical Hdwy          | 6.82   | 6.4   | 4.3    | -     | -         | -    |
| Critical Hdwy Stg 1    | 5.82   | -     | -      | -     | -         | -    |
| Critical Hdwy Stg 2    | 5.82   | -     | -      | -     | -         | -    |
| Follow-up Hdwy         | 3      | 3.1   | 3      |       |           |      |
| Pot Cap-1 Maneuver     | 564    | 805   | 944    | -     | _         | -    |
| Stage 1                | 866    | -     | -      | -     |           | -    |
| Stage 2                | 903    | -     | -      | _     | -         | -    |
| Platoon blocked, %     |        |       |        | -     |           | -    |
| Mov Cap-1 Maneuver     | 550    | 805   | 944    | _     | -         | -    |
| Mov Cap-2 Maneuver     | 550    | -     | -      | -     |           | -    |
| Stage 1                | 845    | -     | _      | _     | _         | -    |
| Stage 2                | 903    |       |        |       |           |      |
| olugo 2                | 000    |       |        |       |           |      |
|                        |        |       |        |       |           |      |
| Approach               | EB     |       | NB     |       | SB        |      |
| HCM Control Delay, s   | 12     |       | 8.0    |       | 0         |      |
| HCM LOS                | В      |       |        |       |           |      |
|                        |        |       |        |       |           |      |
| Minor Lane/Major Mvm   | nt     | NBL   | NBT I  | EBLn1 | SBT       | SBR  |
| Capacity (veh/h)       |        | 944   | -      | 600   |           | -    |
| HCM Lane V/C Ratio     |        | 0.021 |        | 0 146 |           |      |

| Minor Lane/Major Mvmt | NBL   | NBT | EBLn1 | SBT | SBR |
|-----------------------|-------|-----|-------|-----|-----|
| Capacity (veh/h)      | 944   | -   | 600   | -   | -   |
| HCM Lane V/C Ratio    | 0.021 | -   | 0.146 | -   | -   |
| HCM Control Delay (s) | 8.9   | 0   | 12    | -   | -   |
| HCM Lane LOS          | Α     | Α   | В     | -   | -   |
| HCM 95th %tile Q(veh) | 0.1   | -   | 0.5   | -   | -   |

# 10: LLOYD AVENUE & BEAVER RUN ROAD 2017 EXISTING CONDITIONS

Timing Plan: SAT Peak

|                         | •     | •    | 4    | <b>†</b> | <b>↓</b> | 4    |
|-------------------------|-------|------|------|----------|----------|------|
| Lane Group              | EBL   | EBR  | NBL  | NBT      | SBT      | SBR  |
| Lane Configurations     | W     |      |      | 4        | ĵ.       |      |
| Traffic Volume (vph)    | 5     | 10   | 3    | 204      | 238      | 9    |
| Future Volume (vph)     | 5     | 10   | 3    | 204      | 238      | 9    |
| Ideal Flow (vphpl)      | 1800  | 1800 | 1800 | 1800     | 1800     | 1800 |
| Lane Width (ft)         | 13    | 12   | 12   | 10       | 10       | 12   |
| Grade (%)               | 1%    |      |      | 1%       | -1%      |      |
| Link Speed (mph)        | 25    |      |      | 35       | 35       |      |
| Link Distance (ft)      | 1436  |      |      | 307      | 471      |      |
| Travel Time (s)         | 39.2  |      |      | 6.0      | 9.2      |      |
| Peak Hour Factor        | 0.90  | 0.90 | 0.90 | 0.90     | 0.90     | 0.90 |
| Heavy Vehicles (%)      | 0%    | 0%   | 0%   | 0%       | 0%       | 0%   |
| Shared Lane Traffic (%) |       |      |      |          |          |      |
| Intersection Summary    |       |      |      |          |          |      |
| Area Type:              | Other |      |      |          |          |      |

# 10: LLOYD AVENUE & BEAVER RUN ROAD 2017 EXISTING CONDITIONS

| Intersection           |        |      |        |      |        |      |
|------------------------|--------|------|--------|------|--------|------|
| Int Delay, s/veh       | 0.4    |      |        |      |        |      |
| Movement               | EBL    | EBR  | NBL    | NBT  | SBT    | SBR  |
| Lane Configurations    | ¥      |      |        | ની   | ĵ.     |      |
| Traffic Vol, veh/h     | 5      | 10   | 3      | 204  | 238    | 9    |
| Future Vol., veh/h     | 5      | 10   | 3      | 204  | 238    | 9    |
| 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  | e,# 0  | -    | -      | 0    | 0      | -    |
| Grade, %               | 1      | -    | -      | 1    | -1     | -    |
| Peak Hour Factor       | 90     | 90   | 90     | 90   | 90     | 90   |
| Heavy Vehicles, %      | 0      | 0    | 0      | 0    | 0      | 0    |
| Mvmt Flow              | 6      | 11   | 3      | 227  | 264    | 10   |
|                        |        |      |        |      |        |      |
| Major/Minor            | Minor2 | ı    | Major1 | ı    | Major2 |      |
| Conflicting Flow All   | 502    | 269  | 274    | 0    | -      | 0    |
| Stage 1                | 269    | -    | -      | -    | -      | -    |
| Stage 2                | 233    | -    | -      | -    | -      | -    |
| Critical Hdwy          | 6.6    | 6.3  | 4.3    | -    | -      | -    |
| Critical Hdwy Stg 1    | 5.6    | -    | -      | -    | -      | -    |
| Critical Hdwy Stg 2    | 5.6    | -    | -      | -    | -      | -    |
| Follow-up Hdwy         | 3      | 3.1  | 3      | -    | -      | -    |
| Pot Cap-1 Maneuver     | 585    | 813  | 968    | -    | -      | -    |
| Stage 1                | 881    | -    | -      | -    | -      | -    |
| Stage 2                | 919    | -    | -      | -    | -      | -    |
| Platoon blocked, %     |        |      |        | -    | -      | -    |
| Mov Cap-1 Maneuver     | 583    | 813  | 968    | -    | -      | -    |
| Mov Cap-2 Maneuver     | 583    | -    | -      | -    | -      | -    |
| Stage 1                | 877    | -    | -      | -    | -      | -    |
| Stage 2                | 919    | -    | -      | -    | -      | -    |
|                        |        |      |        |      |        |      |
|                        |        |      |        |      |        |      |
| Approach               | EB     |      | NB     |      | SB     |      |

| Approacri             | ED    | IND   |       | 9D  |     |
|-----------------------|-------|-------|-------|-----|-----|
| HCM Control Delay, s  | 10.1  | 0.1   |       | 0   |     |
| HCM LOS               | В     |       |       |     |     |
|                       |       |       |       |     |     |
| Minor Lane/Major Mvmt | NBL   | NBT I | EBLn1 | SBT | SBR |
| Capacity (veh/h)      | 968   | -     | 719   | -   | -   |
| HCM Lane V/C Ratio    | 0.003 | -     | 0.023 | -   | -   |
| HCM Control Delay (s) | 8.7   | 0     | 10.1  | -   | -   |
| HCM Lane LOS          | Α     | Α     | В     | -   | -   |
| HCM 95th %tile Q(veh) | 0     | _     | 0.1   | _   | -   |

#### **2023 BASE CONDITIONS**

EBL

305

1800

10

145

25

2%

2

3.0 11.0

14.0

28.0

5.0

2.0

-1.0

6.0

Lead

Yes

Offset: 106 (92%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Ø6 (R)

Other

Splits and Phases: 1: ROUTE 322 & ROCK RAYMOND ROAD

24.3% 67.8%

pm+pt

789

1800

14

-2%

45

268 1016

4.1 19.8

0.87

7%

NA

18.0

78.0

5.0

2.0

-1.0

6.0

None C-Max C-Max

Lane Group

Lane Configurations Traffic Volume (vph)

Future Volume (vph)

Ideal Flow (vphpl)

Storage Length (ft)

Lane Width (ft)

Storage Lanes

Taper Length (ft) Right Turn on Red

Link Speed (mph)

Link Distance (ft)

Peak Hour Factor

Protected Phases Permitted Phases

Detector Phase Switch Phase

Minimum Initial (s)

Minimum Split (s)

Total Split (s)

Total Split (%) Yellow Time (s)

All-Red Time (s)

Lost Time Adjust (s)

Total Lost Time (s) Lead/Lag

Lead-Lag Optimize?

Intersection Summary Area Type:

Cycle Length: 115 Actuated Cycle Length: 115

Natural Cycle: 55

Ø2 (R) 炒

Ø5

Control Type: Actuated-Coordinated

Recall Mode

Heavy Vehicles (%)

Shared Lane Traffic (%) Turn Type

Travel Time (s)

Grade (%)

← < < √ </p>

106

1800 1800

12 10

0 230

Yes

0.87

0% 14%

235

235

25

35

359

7.0

0.87

3.0

13.0 14.0

37.0 28.0

4.0

2.0

-1.0

5.0

32.2% 24.3%

None None

227

227

1800

11

Yes

22%

4

3.0

5.0

2.0

-1.0

6.0

Lead

Yes

Ø4

Prot pm+ov

0

193

193

1800

13

35

0.87

6%

NA

11.0

18.0

50.0

5.0

2.0

-1.0

6.0

Lag

Yes

43.5%

|                              | ၨ    | <b>→</b> | <b>—</b>  | •         | /         | 4    |   |   |  |   |
|------------------------------|------|----------|-----------|-----------|-----------|------|---|---|--|---|
| Movement                     | EBL  | EBT      | WBT       | WBR       | SBL       | SBR  |   |   |  |   |
| Lane Configurations          | Ţ    | <b>†</b> | ĵ»        |           | ሻ         | 7    |   |   |  | Τ |
| Traffic Volume (veh/h)       | 305  | 789      | 193       | 106       | 235       | 227  |   |   |  |   |
| Future Volume (veh/h)        | 305  | 789      | 193       | 106       | 235       | 227  |   |   |  |   |
| Number                       | 5    | 2        | 6         | 16        | 7         | 14   |   |   |  |   |
| Initial Q (Qb), veh          | 0    | 0        | 0         | 0         | 0         | 0    |   |   |  |   |
| Ped-Bike Adj(A pbT)          | 1.00 |          |           | 1.00      | 1.00      | 1.00 |   |   |  |   |
| Parking Bus, Adj             | 1.00 | 1.00     | 1.00      | 1.00      | 1.00      | 1.00 |   |   |  |   |
| Adj Sat Flow, veh/h/ln       | 1782 | 1767     | 1766      | 1764      | 1571      | 1468 |   |   |  |   |
| Adj Flow Rate, veh/h         | 351  | 907      | 222       | 109       | 270       | 116  |   |   |  |   |
| Adj No. of Lanes             | 1    | 1        | 1         | 0         | 1         | 1    |   |   |  |   |
| Peak Hour Factor             | 0.87 | 0.87     | 0.87      | 0.87      | 0.87      | 0.87 |   |   |  |   |
| Percent Heavy Veh, %         | 2    | 7        | 6         | 6         | 14        | 22   |   |   |  |   |
| Cap, veh/h                   | 679  | 1223     | 563       | 276       | 318       | 436  |   |   |  |   |
| Arrive On Green              | 0.27 | 1.00     | 0.50      | 0.49      | 0.21      | 0.21 |   |   |  |   |
| Sat Flow, veh/h              | 1697 | 1767     | 1120      | 550       | 1496      | 1248 |   |   |  |   |
| Grp Volume(v), veh/h         | 351  | 907      | 0         | 331       | 270       | 116  |   |   |  | Ī |
| Grp Sat Flow(s), veh/h/ln    | 1697 | 1767     | 0         | 1669      | 1496      | 1248 |   |   |  |   |
| Q Serve(a s), s              | 11.5 | 0.0      | 0.0       | 14.2      | 19.9      | 7.7  |   |   |  |   |
| Cycle Q Clear(g_c), s        | 11.5 | 0.0      | 0.0       | 14.2      | 19.9      | 7.7  |   |   |  |   |
| Prop In Lane                 | 1.00 | 0.0      | 0.0       | 0.33      | 1.00      | 1.00 |   |   |  |   |
| Lane Grp Cap(c), veh/h       | 679  | 1223     | 0         | 839       | 318       | 436  |   |   |  |   |
| V/C Ratio(X)                 | 0.52 | 0.74     | 0.00      | 0.39      | 0.85      | 0.27 |   |   |  |   |
| Avail Cap(c_a), veh/h        | 771  | 1223     | 0         | 839       | 416       | 518  |   |   |  |   |
| HCM Platoon Ratio            | 2.00 | 2.00     | 1.00      | 1.00      | 1.00      | 1.00 |   |   |  |   |
| Upstream Filter(I)           | 1.00 | 1.00     | 0.00      | 1.00      | 1.00      | 1.00 |   |   |  |   |
| Uniform Delay (d), s/veh     | 8.5  | 0.0      | 0.0       | 17.9      | 43.5      | 26.8 |   |   |  |   |
| Incr Delay (d2), s/veh       | 0.6  | 4.1      | 0.0       | 1.4       | 12.2      | 0.3  |   |   |  |   |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0      | 0.0       | 0.0       | 0.0       | 0.0  |   |   |  |   |
| %ile BackOfQ(95%),veh/ln     | 9.1  | 2.5      | 0.0       | 11.2      | 14.3      | 10.2 |   |   |  |   |
| LnGrp Delay(d),s/veh         | 9.2  | 4.1      | 0.0       | 19.2      | 55.7      | 27.1 |   |   |  |   |
| LnGrp LOS                    | A.Z  | A        | 0.0       | 13.2<br>B | 55.7<br>E | C C  |   |   |  |   |
| Approach Vol. veh/h          | м    | 1258     | 331       |           | 386       |      |   |   |  |   |
| Approach Delay, s/veh        |      | 5.5      | 19.2      |           | 47.1      |      |   |   |  |   |
| Approach LOS                 |      | 3.5<br>A | 19.2<br>B |           | 47.1<br>D |      |   |   |  |   |
| PF                           |      |          |           |           |           |      |   |   |  |   |
| Timer                        | 1    | 2        | 3         | 4         | 5         | 6    | 7 | 8 |  |   |
| Assigned Phs                 |      | 2        |           | 4         | 5         | 6    |   |   |  |   |
| Phs Duration (G+Y+Rc), s     |      | 85.6     |           | 29.4      | 21.8      | 63.8 |   |   |  |   |
| Change Period (Y+Rc), s      |      | 7.0      |           | 6.0       | 7.0       | 7.0  |   |   |  |   |
| Max Green Setting (Gmax), s  |      | 71.0     |           | 31.0      | 21.0      | 43.0 |   |   |  |   |
| Max Q Clear Time (g_c+I1), s |      | 2.5      |           | 22.4      | 14.0      | 16.2 |   |   |  |   |
| Green Ext Time (p_c), s      |      | 4.5      |           | 1.0       | 0.7       | 1.2  |   |   |  |   |
| Intersection Summary         |      |          |           |           |           |      |   |   |  |   |
| HCM 2010 Ctrl Delay          |      |          | 15.9      |           |           |      |   |   |  |   |
| HCM 2010 LOS                 |      |          | В         |           |           |      |   |   |  |   |

|                              | ۶    | -       | •    | •    | -    | 4    |   |   |  |   |
|------------------------------|------|---------|------|------|------|------|---|---|--|---|
| Movement                     | EBL  | EBT     | WBT  | WBR  | SBL  | SBR  |   |   |  |   |
| Lane Configurations          | *    | <b></b> | 1>   |      | *    | 7    |   |   |  | _ |
| Traffic Volume (veh/h)       | 305  | 789     | 193  | 106  | 235  | 227  |   |   |  |   |
| Future Volume (veh/h)        | 305  | 789     | 193  | 106  | 235  | 227  |   |   |  |   |
| Number                       | 5    | 2       | 6    | 16   | 7    | 14   |   |   |  |   |
| Initial Q (Qb), veh          | 0    | 0       | 0    | 0    | 0    | 0    |   |   |  |   |
| Ped-Bike Adj(A pbT)          | 1.00 |         |      | 1.00 | 1.00 | 1.00 |   |   |  |   |
| Parking Bus, Adj             | 1.00 | 1.00    | 1.00 | 1.00 | 1.00 | 1.00 |   |   |  |   |
| Adj Sat Flow, veh/h/ln       | 1782 | 1767    | 1766 | 1764 | 1571 | 1468 |   |   |  |   |
| Adj Flow Rate, veh/h         | 351  | 907     | 222  | 109  | 270  | 116  |   |   |  |   |
| Adj No. of Lanes             | 1    | 1       | 1    | 0    | 1    | 1    |   |   |  |   |
| Peak Hour Factor             | 0.87 | 0.87    | 0.87 | 0.87 | 0.87 | 0.87 |   |   |  |   |
| Percent Heavy Veh, %         | 2    | 7       | 6    | 6    | 14   | 22   |   |   |  |   |
| Cap, veh/h                   | 679  | 1223    | 563  | 276  | 318  | 436  |   |   |  |   |
| Arrive On Green              | 0.27 | 1.00    | 0.50 | 0.49 | 0.21 | 0.21 |   |   |  |   |
| Sat Flow, veh/h              | 1697 | 1767    | 1120 | 550  | 1496 | 1248 |   |   |  |   |
| Grp Volume(v), veh/h         | 351  | 907     | 0    | 331  | 270  | 116  |   |   |  |   |
| Grp Sat Flow(s), veh/h/ln    | 1697 | 1767    | 0    | 1669 | 1496 | 1248 |   |   |  |   |
| Q Serve(q s), s              | 11.5 | 0.0     | 0.0  | 14.2 | 19.9 | 7.7  |   |   |  |   |
| Cycle Q Clear(g_c), s        | 11.5 | 0.0     | 0.0  | 14.2 | 19.9 | 7.7  |   |   |  |   |
| Prop In Lane                 | 1.00 | 0.0     | 0.0  | 0.33 | 1.00 | 1.00 |   |   |  |   |
| Lane Grp Cap(c), veh/h       | 679  | 1223    | 0    | 839  | 318  | 436  |   |   |  |   |
| V/C Ratio(X)                 | 0.52 | 0.74    | 0.00 | 0.39 | 0.85 | 0.27 |   |   |  |   |
| Avail Cap(c_a), veh/h        | 771  | 1223    | 0    | 839  | 416  | 518  |   |   |  |   |
| HCM Platoon Ratio            | 2.00 | 2.00    | 1.00 | 1.00 | 1.00 | 1.00 |   |   |  |   |
| Upstream Filter(I)           | 1.00 | 1.00    | 0.00 | 1.00 | 1.00 | 1.00 |   |   |  |   |
| Uniform Delay (d), s/veh     | 8.5  | 0.0     | 0.0  | 17.9 | 43.5 | 26.8 |   |   |  |   |
| Incr Delay (d2), s/veh       | 0.6  | 4.1     | 0.0  | 1.4  | 12.2 | 0.3  |   |   |  |   |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0     | 0.0  | 0.0  | 0.0  | 0.0  |   |   |  |   |
| %ile BackOfQ(95%),veh/ln     | 9.1  | 2.5     | 0.0  | 11.2 | 14.3 | 10.2 |   |   |  |   |
| LnGrp Delay(d),s/veh         | 9.2  | 4.1     | 0.0  | 19.2 | 55.7 | 27.1 |   |   |  |   |
| LnGrp LOS                    | Α    | Α       |      | В    | Е    | С    |   |   |  |   |
| Approach Vol, veh/h          |      | 1258    | 331  |      | 386  |      |   |   |  |   |
| Approach Delay, s/veh        |      | 5.5     | 19.2 |      | 47.1 |      |   |   |  |   |
| Approach LOS                 |      | A       | В    |      | D    |      |   |   |  |   |
| Timer                        | 1    | 2       | 3    | 4    | 5    | 6    | 7 | 8 |  |   |
| Assigned Phs                 |      | 2       |      | 4    | 5    | 6    |   | 0 |  |   |
| Phs Duration (G+Y+Rc), s     |      | 85.6    |      | 29.4 | 21.8 | 63.8 |   |   |  |   |
| Change Period (Y+Rc), s      |      | 7.0     |      | 6.0  | 7.0  | 7.0  |   |   |  |   |
| Max Green Setting (Gmax), s  |      | 71.0    |      | 31.0 | 21.0 | 43.0 |   |   |  |   |
| Max Q Clear Time (g_c+I1), s |      | 2.5     |      | 22.4 | 14.0 | 16.2 |   |   |  |   |
| Green Ext Time (p_c), s      |      | 4.5     |      | 1.0  | 0.7  | 1.2  |   |   |  |   |
| Intersection Summary         |      |         |      |      |      |      |   |   |  |   |
| HCM 2010 Ctrl Delay          |      |         | 15.9 |      |      |      |   |   |  |   |
| HCM 2010 LOS                 |      |         | В    |      |      |      |   |   |  |   |

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Synchro 10 Report Page 2

2: LLOYD AVENUE/ROYAL FARMS DRIVEWAY & ROUTE 322

| 2023 BASE CONDITIONS |  |
|----------------------|--|
|----------------------|--|

MB

Timing Plan: AM Peak

Timing Plan: AM Peak

Synchro 10 Report

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|                         | •     | <b>→</b> | *     | •     | +        | 4     | 4     | 1     | ~     | <b>/</b> | <del> </del> | 1    |
|-------------------------|-------|----------|-------|-------|----------|-------|-------|-------|-------|----------|--------------|------|
| Lane Group              | EBL   | EBT      | EBR   | WBL   | WBT      | WBR   | NBL   | NBT   | NBR   | SBL      | SBT          | SBR  |
| Lane Configurations     | 7     | <b>^</b> | 7     | 7     | <b>↑</b> | 7     |       | ની    | 7     |          | 4            |      |
| Traffic Volume (vph)    | 48    | 813      | 107   | 84    | 363      | 25    | 191   | 32    | 256   | 18       | 5            | 63   |
| Future Volume (vph)     | 48    | 813      | 107   | 84    | 363      | 25    | 191   | 32    | 256   | 18       | 5            | 63   |
| Ideal Flow (vphpl)      | 1800  | 1800     | 1800  | 1800  | 1800     | 1800  | 1800  | 1800  | 1800  | 1800     | 1800         | 1800 |
| Lane Width (ft)         | 10    | 12       | 12    | 10    | 11       | 12    | 12    | 11    | 11    | 12       | 15           | 12   |
| Grade (%)               |       | 0%       |       |       | -1%      |       |       | -1%   |       |          | 2%           |      |
| Storage Length (ft)     | 190   |          | 0     | 150   |          | 150   | 0     |       | 150   | 0        |              | 0    |
| Storage Lanes           | 1     |          | 1     | 1     |          | 1     | 0     |       | 1     | 0        |              | 0    |
| Taper Length (ft)       | 25    |          |       | 25    |          |       | 25    |       |       | 25       |              |      |
| Right Turn on Red       |       |          | Yes   |       |          | Yes   |       |       | Yes   |          |              | Yes  |
| Link Speed (mph)        |       | 45       |       |       | 45       |       |       | 35    |       |          | 25           |      |
| Link Distance (ft)      |       | 551      |       |       | 329      |       |       | 298   |       |          | 194          |      |
| Travel Time (s)         |       | 8.3      |       |       | 5.0      |       |       | 5.8   |       |          | 5.3          |      |
| Confl. Peds. (#/hr)     | 2     |          | 2     |       |          |       |       |       |       | 2        |              | 2    |
| Confl. Bikes (#/hr)     |       |          | 1     |       |          |       |       |       |       |          |              |      |
| Peak Hour Factor        | 0.87  | 0.87     | 0.87  | 0.87  | 0.87     | 0.87  | 0.87  | 0.87  | 0.87  | 0.87     | 0.87         | 0.87 |
| Heavy Vehicles (%)      | 2%    | 5%       | 5%    | 19%   | 15%      | 0%    | 1%    | 3%    | 5%    | 0%       | 0%           | 3%   |
| Shared Lane Traffic (%) |       |          |       |       |          |       |       |       |       |          |              |      |
| Turn Type               | Perm  | NA       | Perm  | pm+pt | NA       | Perm  | Perm  | NA    | pm+ov | Perm     | NA           |      |
| Protected Phases        |       | 2        |       | 1     | 6        |       |       | 8     | 1     |          | 4            |      |
| Permitted Phases        | 2     |          | 2     | 6     |          | 6     | 8     |       | 8     | 4        |              |      |
| Detector Phase          | 2     | 2        | 2     | 1     | 6        | 6     | 8     | 8     | 1     | 4        | 4            |      |
| Switch Phase            |       |          |       |       |          |       |       |       |       |          |              |      |
| Minimum Initial (s)     | 13.0  | 13.0     | 13.0  | 3.0   | 13.0     | 13.0  | 3.0   | 3.0   | 3.0   | 3.0      | 3.0          |      |
| Minimum Split (s)       | 40.0  | 40.0     | 40.0  | 10.0  | 40.0     | 40.0  | 13.0  | 13.0  | 10.0  | 13.0     | 13.0         |      |
| Total Split (s)         | 71.0  | 71.0     | 71.0  | 13.0  | 84.0     | 84.0  | 31.0  | 31.0  | 13.0  | 31.0     | 31.0         |      |
| Total Split (%)         | 61.7% | 61.7%    | 61.7% | 11.3% | 73.0%    | 73.0% | 27.0% | 27.0% | 11.3% | 27.0%    | 27.0%        |      |
| Yellow Time (s)         | 5.0   | 5.0      | 5.0   | 5.0   | 5.0      | 5.0   | 3.0   | 3.0   | 5.0   | 3.0      | 3.0          |      |
| All-Red Time (s)        | 2.0   | 2.0      | 2.0   | 2.0   | 2.0      | 2.0   | 3.0   | 3.0   | 2.0   | 3.0      | 3.0          |      |
| Lost Time Adjust (s)    | -1.0  | -1.0     | -1.0  | -1.0  | -1.0     | -1.0  |       | -1.0  | -1.0  |          | -1.0         |      |
| Total Lost Time (s)     | 6.0   | 6.0      | 6.0   | 6.0   | 6.0      | 6.0   |       | 5.0   | 6.0   |          | 5.0          |      |
| Lead/Lag                | Lag   | Lag      | Lag   | Lead  |          |       |       |       | Lead  |          |              |      |
| Lead-Lag Optimize?      | Yes   | Yes      | Yes   | Yes   |          |       |       |       | Yes   |          |              |      |
| Recall Mode             | C-Max | C-Max    | C-Max | None  | C-Max    | C-Max | None  | None  | None  | None     | None         |      |
| Intersection Summary    |       |          |       |       |          |       |       |       |       |          |              |      |
| Area Type:              | Other |          |       |       |          |       |       |       |       |          |              |      |
| Cycle Length: 115       |       |          |       |       |          |       |       |       |       |          |              |      |

Cycle Length: 115
Actuated Cycle Length: 115 Offset: 74 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green Natural Cycle: 90 Control Type: Actuated-Coordinated

Splits and Phases: 2: LLOYD AVENUE/ROYAL FARMS DRIVEWAY & ROUTE 322



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|                              | ۶    | <b>→</b> | •    | •    | <b>←</b> | 4    | 1    | <b>†</b> | <b>/</b> | /    | <b>+</b> | 4    |
|------------------------------|------|----------|------|------|----------|------|------|----------|----------|------|----------|------|
| Movement                     | EBL  | EBT      | EBR  | WBL  | WBT      | WBR  | NBL  | NBT      | NBR      | SBL  | SBT      | SBR  |
| Lane Configurations          | Ť    | <b>↑</b> | 7    | ሻ    | <b>↑</b> | 7    |      | ર્ન      | 7        |      | 4        |      |
| Traffic Volume (veh/h)       | 48   | 813      | 107  | 84   | 363      | 25   | 191  | 32       | 256      | 18   | 5        | 63   |
| Future Volume (veh/h)        | 48   | 813      | 107  | 84   | 363      | 25   | 191  | 32       | 256      | 18   | 5        | 63   |
| Number                       | 5    | 2        | 12   | 1    | 6        | 16   | 3    | 8        | 18       | 7    | 4        | 14   |
| Initial Q (Qb), veh          | 0    | 0        | 0    | 1    | 0        | 0    | 6    | 0        | 0        | 0    | 0        | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |          | 0.98 | 1.00 |          | 1.00 | 1.00 |          | 1.00     | 1.00 |          | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00     | 1.00 | 1.00 | 1.00     | 1.00 | 1.00 | 1.00     | 1.00     | 1.00 | 1.00     | 1.00 |
| Adj Sat Flow, veh/h/ln       | 1765 | 1714     | 1714 | 1520 | 1573     | 1809 | 1809 | 1786     | 1723     | 1782 | 1814     | 1782 |
| Adj Flow Rate, veh/h         | 55   | 934      | 109  | 97   | 417      | 22   | 220  | 37       | 163      | 21   | 6        | 35   |
| Adj No. of Lanes             | 1    | 1        | 1    | 1    | 1        | 1    | 0    | 1        | 1        | 0    | 1        | 0    |
| Peak Hour Factor             | 0.87 | 0.87     | 0.87 | 0.87 | 0.87     | 0.87 | 0.87 | 0.87     | 0.87     | 0.87 | 0.87     | 0.87 |
| Percent Heavy Veh, %         | 2    | 5        | 5    | 19   | 15       | 0    | 3    | 3        | 5        | 0    | 0        | 0    |
| Cap, veh/h                   | 589  | 1007     | 837  | 181  | 1090     | 1066 | 313  | 40       | 388      | 143  | 54       | 201  |
| Arrive On Green              | 0.59 | 0.59     | 0.59 | 0.11 | 1.00     | 1.00 | 0.21 | 0.21     | 0.21     | 0.20 | 0.21     | 0.20 |
| Sat Flow, veh/h              | 896  | 1714     | 1425 | 1448 | 1573     | 1538 | 1196 | 201      | 1464     | 476  | 256      | 948  |
| Grp Volume(v), veh/h         | 55   | 934      | 109  | 97   | 417      | 22   | 257  | 0        | 163      | 62   | 0        | 0    |
| Grp Sat Flow(s),veh/h/ln     | 896  | 1714     | 1425 | 1448 | 1573     | 1538 | 1397 | 0        | 1464     | 1680 | 0        | 0    |
| Q Serve(q s), s              | 3.1  | 56.6     | 3.9  | 2.8  | 0.0      | 0.0  | 17.2 | 0.0      | 10.6     | 0.0  | 0.0      | 0.0  |
| Cycle Q Clear(q c), s        | 3.1  | 56.6     | 3.9  | 2.8  | 0.0      | 0.0  | 20.3 | 0.0      | 10.6     | 3.6  | 0.0      | 0.0  |
| Prop In Lane                 | 1.00 |          | 1.00 | 1.00 |          | 1.00 | 0.86 |          | 1.00     | 0.34 |          | 0.56 |
| Lane Grp Cap(c), veh/h       | 589  | 1007     | 837  | 181  | 1090     | 1066 | 353  | 0        | 388      | 383  | 0        | 0    |
| V/C Ratio(X)                 | 0.09 | 0.93     | 0.13 | 0.54 | 0.38     | 0.02 | 0.73 | 0.00     | 0.42     | 0.16 | 0.00     | 0.00 |
| Avail Cap(c_a), veh/h        | 590  | 1009     | 839  | 193  | 1092     | 1067 | 373  | 0        | 409      | 404  | 0        | 0    |
| HCM Platoon Ratio            | 1.00 | 1.00     | 1.00 | 2.00 | 2.00     | 2.00 | 1.00 | 1.00     | 1.00     | 1.00 | 1.00     | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00     | 1.00 | 1.00 | 1.00     | 1.00 | 1.00 | 0.00     | 1.00     | 1.00 | 0.00     | 0.00 |
| Uniform Delay (d), s/veh     | 10.4 | 21.5     | 10.6 | 24.6 | 0.0      | 0.0  | 43.7 | 0.0      | 35.0     | 37.6 | 0.0      | 0.0  |
| Incr Delay (d2), s/veh       | 0.3  | 15.5     | 0.3  | 2.5  | 1.0      | 0.0  | 6.6  | 0.0      | 0.7      | 0.2  | 0.0      | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0      | 0.0  | 0.5  | 0.0      | 0.0  | 0.0  | 0.0      | 0.0      | 0.0  | 0.0      | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 1.5  | 40.0     | 2.9  | 3.8  | 0.6      | 0.0  | 13.6 | 0.0      | 7.8      | 3.0  | 0.0      | 0.0  |
| LnGrp Delay(d),s/veh         | 10.7 | 37.0     | 10.9 | 27.6 | 1.0      | 0.0  | 50.3 | 0.0      | 35.7     | 37.8 | 0.0      | 0.0  |
| LnGrp LOS                    | В    | D        | В    | С    | Α        | Α    | D    |          | D        | D    |          |      |
| Approach Vol, veh/h          |      | 1098     |      |      | 536      |      |      | 420      |          |      | 62       |      |
| Approach Delay, s/veh        |      | 33.1     |      |      | 5.8      |      |      | 44.7     |          |      | 37.8     |      |
| Approach LOS                 |      | С        |      |      | Α        |      |      | D        |          |      | D        |      |
| Timer                        | 1    | 2        | 3    | 4    | 5        | 6    | 7    | 8        |          |      |          |      |
| Assigned Phs                 | 1    | 2        |      | 4    |          | 6    |      | 8        |          |      |          |      |
| Phs Duration (G+Y+Rc), s     | 12.1 | 73.7     |      | 29.2 |          | 85.8 |      | 29.2     |          |      |          |      |
| Change Period (Y+Rc), s      | 7.0  | 7.0      |      | 6.0  |          | 7.0  |      | 6.0      |          |      |          |      |
| Max Green Setting (Gmax), s  | 6.0  | 64.0     |      | 25.0 |          | 77.0 |      | 25.0     |          |      |          |      |
| Max Q Clear Time (q c+l1), s | 5.3  | 59.1     |      | 5.6  |          | 2.5  |      | 22.8     |          |      |          |      |
| Green Ext Time (p_c), s      | 0.0  | 2.3      |      | 0.2  |          | 1.6  |      | 0.4      |          |      |          |      |
| Intersection Summary         |      |          |      |      |          |      |      |          |          |      |          |      |
| HCM 2010 Ctrl Delay          |      |          | 28.6 |      |          |      |      |          |          |      |          |      |
| HCM 2010 LOS                 |      |          | С    |      |          |      |      |          |          |      |          |      |
|                              |      |          |      |      |          |      |      |          |          |      |          |      |

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#### **← ₹ ↓ √** EBL Lane Group Lane Configurations Traffic Volume (vph) 202 Future Volume (vph) 23 1269 238 119 202 280 Ideal Flow (vphpl) 1800 1800 1800 1800 1800 1800 Lane Width (ft) 16 12 12 12 15 15 Grade (%) -3% 2% Storage Length (ft) 75 0 0 0 Storage Lanes 25 25 Taper Length (ft) Right Turn on Red Yes 45 45 25 Link Speed (mph) Link Distance (ft) 830 280 317 Travel Time (s) 12.6 4.2 8.6 Confl. Peds. (#/hr) 0.96 0.96 0.96 0.96 0.96 0.96 Peak Hour Factor 33% 4% 15% 12% Heavy Vehicles (%) 15% 7% Shared Lane Traffic (%) Prot Turn Type Free Protected Phases 2 6 4 Permitted Phases 2 6 Detector Phase 2 4 Switch Phase 15.0 15.0 15.0 3.0 Minimum Initial (s) Minimum Split (s) 22.0 22.0 22.0 13.0 93.0 93.0 22.0 Total Split (s) 93.0 Total Split (%) 80.9% 80.9% 80.9% 19.1% Yellow Time (s) 5.0 5.0 5.0 4.0 All-Red Time (s) 2.0 2.0 2.0 2.0 -1.0 -1.0 -1.0 -1.0 Lost Time Adjust (s) Total Lost Time (s) 6.0 6.0 6.0 5.0 Lead/Lag Lead-Lag Optimize? C-Max C-Max C-Max Recall Mode None Intersection Summary Area Type: Cycle Length: 115 Actuated Cycle Length: 115 Offset: 72 (63%), Referenced to phase 2:EBTL and 6:WBT, Start of Green Natural Cycle: 90

| plits and Phases: 4: ROUTE 322 & WB ROUTE 30 RAMPS |             |
|--|-------------|
| △ ø <sub>2</sub> (R)                               | <b>№</b> 04 |
| 3s   | 22 s        |
| Ø6 (R)   |             |
| 3 s  |             |
|  |             |

|                              | •    | -        | •         | •    | -    | 4    |
|------------------------------|------|----------|-----------|------|------|------|
| Movement                     | EBL  | EBT      | WBT       | WBR  | SBL  | SBR  |
| Lane Configurations          | ሻ    | <b>^</b> | 1>        |      | ሻ    | 7    |
| Traffic Volume (veh/h)       | 23   | 1269     | 238       | 119  | 202  | 280  |
| Future Volume (veh/h)        | 23   | 1269     | 238       | 119  | 202  | 280  |
| Number                       | 5    | 2        | 6         | 16   | 7    | 14   |
| Initial Q (Qb), veh          | 0    | 0        | 0         | 0    | 1    | 1    |
| Ped-Bike Adj(A pbT)          | 1.00 |          |           | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00     | 1.00      | 1.00 | 1.00 | 1.00 |
| Adj Sat Flow, veh/h/ln       | 1429 | 1757     | 1550      | 1782 | 1750 | 1671 |
| Adj Flow Rate, veh/h         | 24   | 1322     | 248       | 0    | 210  | 0    |
| Adj No. of Lanes             | 1    | 1        | 1         | 0    | 1    | 1    |
| Peak Hour Factor             | 0.96 | 0.96     | 0.96      | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, %         | 33   | 4        | 15        | 15   | 7    | 12   |
| Cap, veh/h                   | 677  | 1329     | 1172      | 0    | 246  | 210  |
| Arrive On Green              | 0.76 | 0.76     | 0.76      | 0.00 | 0.15 | 0.00 |
| Sat Flow, veh/h              | 864  | 1757     | 1550      | 0.00 | 1666 | 1421 |
| Grp Volume(v), veh/h         | 24   | 1322     | 248       | 0    | 210  | 0    |
| Grp Sat Flow(s), veh/h/ln    |      | 1757     |           |      | 1666 |      |
|                              | 864  |          | 1550      | 0.0  |      | 1421 |
| Q Serve(g_s), s              | 1.0  | 85.1     | 5.3       |      | 14.1 | 0.0  |
| Cycle Q Clear(g_c), s        | 6.3  | 85.1     | 5.3       | 0.0  | 14.1 | 0.0  |
| Prop In Lane                 | 1.00 | 4000     | 4470      | 0.00 | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h       | 677  | 1329     | 1172      | 0    | 246  | 210  |
| V/C Ratio(X)                 | 0.04 | 0.99     | 0.21      | 0.00 | 0.85 | 0.00 |
| Avail Cap(c_a), veh/h        | 677  | 1329     | 1172      | 0    | 246  | 210  |
| HCM Platoon Ratio            | 1.00 | 1.00     | 1.00      | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00     | 1.00      | 0.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 5.0  | 13.8     | 4.1       | 0.0  | 47.9 | 0.0  |
| Incr Delay (d2), s/veh       | 0.1  | 23.5     | 0.4       | 0.0  | 24.6 | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0      | 0.0       | 0.0  | 0.8  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 0.4  | 60.5     | 4.3       | 0.0  | 13.1 | 0.0  |
| LnGrp Delay(d),s/veh         | 5.1  | 37.2     | 4.5       | 0.0  | 73.3 | 0.0  |
| LnGrp LOS                    | Α    | D        | Α         |      | Е    |      |
| Approach Vol, veh/h          |      | 1346     | 248       |      | 210  |      |
| Approach Delay, s/veh        |      | 36.7     | 4.5       |      | 73.3 |      |
| Approach LOS                 |      | D        | A         |      | E    |      |
|                              | 4    | _        |           | ,    |      | •    |
| Timer                        | 1    | 2        | 3         | 4    | 5    | 6    |
| Assigned Phs                 |      | 2        |           | 4    |      | 6    |
| Phs Duration (G+Y+Rc), s     |      | 93.0     |           | 22.0 |      | 93.0 |
| Change Period (Y+Rc), s      |      | 7.0      |           | 6.0  |      | 7.0  |
| Max Green Setting (Gmax), s  |      | 86.0     |           | 16.0 |      | 86.0 |
| Max Q Clear Time (g_c+l1), s |      | 87.6     |           | 16.6 |      | 7.8  |
| Green Ext Time (p_c), s      |      | 0.0      |           | 0.0  |      | 8.0  |
| Intersection Summary         |      |          |           |      |      |      |
| HCM 2010 Ctrl Delay          |      |          | 36.5      |      |      |      |
| HCM 2010 LOS                 |      |          | 50.5<br>D |      |      |      |
| 110W 2010 LOG                |      |          | U         |      |      |      |

4: ROUTE 322 & WB ROUTE 30 RAMPS

2023 BASE CONDITIONS

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#### 3: EB ROUTE 30 RAMPS & ROUTE 322 2023 BASE CONDITIONS

Timing Plan: AM Peak

|                         | -        | •    | •    | •        | 1    |      |
|-------------------------|----------|------|------|----------|------|------|
| Lane Group              | EBT      | EBR  | WBL  | WBT      | NBL  | NBR  |
| Lane Configurations     | <b>†</b> | 7    | ሻ    | <b>^</b> | 7    | 7    |
| Traffic Volume (vph)    | 809      | 670  | 284  | 338      | 15   | 179  |
| Future Volume (vph)     | 809      | 670  | 284  | 338      | 15   | 179  |
| Ideal Flow (vphpl)      | 1800     | 1800 | 1800 | 1800     | 1800 | 1800 |
| Lane Width (ft)         | 13       | 12   | 12   | 13       | 13   | 14   |
| Grade (%)               | -6%      |      |      | 7%       | -5%  |      |
| Storage Length (ft)     |          | 0    | 250  |          | 0    | 0    |
| Storage Lanes           |          | 1    | 1    |          | 1    | 1    |
| Taper Length (ft)       |          |      | 25   |          | 25   |      |
| Link Speed (mph)        | 45       |      |      | 45       | 25   |      |
| Link Distance (ft)      | 353      |      |      | 551      | 313  |      |
| Travel Time (s)         | 5.3      |      |      | 8.3      | 8.5  |      |
| Peak Hour Factor        | 0.93     | 0.93 | 0.93 | 0.93     | 0.93 | 0.93 |
| Heavy Vehicles (%)      | 5%       | 4%   | 2%   | 15%      | 0%   | 2%   |
| Shared Lane Traffic (%) |          |      |      |          |      |      |

Area Type: Other

#### 3: EB ROUTE 30 RAMPS & ROUTE 322 2023 BASE CONDITIONS

Approach EB
HCM Control Delay, s 0
HCM LOS

Timing Plan: AM Peak

| Intersection           |          |       |        |          |        |      |
|------------------------|----------|-------|--------|----------|--------|------|
| Int Delay, s/veh       | 4.5      |       |        |          |        |      |
| Movement               | EBT      | EBR   | WBL    | WBT      | NBL    | NBR  |
| Lane Configurations    | <b>^</b> | 7     |        | <b>↑</b> | 7      | 7    |
| Traffic Vol, veh/h     | 809      | 670   | 284    | 338      | 15     | 179  |
| Future Vol, veh/h      | 809      | 670   | 284    | 338      | 15     | 179  |
| Conflicting Peds, #/hr | 0        | 0     | 0      | 0        | 0      | 0    |
| Sign Control           | Free     | Free  | Free   | Free     | Stop   | Stop |
| RT Channelized         | -        | Yield | -      | None     | -      | Stop |
| Storage Length         | -        | 0     | 250    | -        | 0      | 0    |
| Veh in Median Storag   | e,# 0    | -     | -      | 0        | 0      | -    |
| Grade, %               | -6       | -     | -      | 7        | -5     | -    |
| Peak Hour Factor       | 93       | 93    | 93     | 93       | 93     | 93   |
| Heavy Vehicles, %      | 5        | 4     | 2      | 15       | 0      | 2    |
| Mvmt Flow              | 870      | 720   | 305    | 363      | 16     | 192  |
|                        |          |       |        |          |        |      |
| Major/Minor            | Major1   | -     | Major2 | ı        | Minor1 |      |
| Conflicting Flow All   | 0        | 0     | 870    | 0        | 1843   | 870  |
| Stage 1                | -        | -     | -      | -        | 870    | -    |
| Stage 2                | -        | -     | -      | -        | 973    | -    |
| Critical Hdwy          | _        | -     | 4.3    | -        | 5.4    | 5.72 |
| Critical Hdwy Stg 1    | -        | -     | -      | -        | 4.4    | -    |
| Critical Hdwy Stg 2    | -        | -     | -      | -        | 4.4    | -    |
| Follow-up Hdwy         | -        | -     | 3      | -        | 3      | 3.1  |
| Pot Cap-1 Maneuver     | -        | -     | 597    | -        | 97     | 414  |
| Stage 1                | -        | -     | -      | -        | 583    | -    |
| Stage 2                | -        | _     | _      | -        | 464    | _    |
| Platoon blocked. %     | -        | -     |        | -        | 1      |      |
| Mov Cap-1 Maneuver     | -        | -     | 597    | -        | 47     | 414  |
| Mov Cap-2 Maneuver     |          | -     | -      | -        | 47     |      |
| Stage 1                | -        | _     | -      | -        | 285    | -    |
| Stage 2                | -        | -     |        | -        | 464    |      |
| olago 2                |          |       |        |          |        |      |
|                        |          |       |        |          |        |      |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 47    | 414   | -   | -   | 597   | -   |
| HCM Lane V/C Ratio    | 0.343 | 0.465 | -   | -   | 0.512 | -   |
| HCM Control Delay (s) | 117.3 | 21    | -   | -   | 17.2  | -   |
| HCM Lane LOS          | F     | С     | -   | -   | С     | -   |
| HCM 95th %tile Q(veh) | 1.2   | 2.4   | -   | -   | 2.9   | -   |

NB 28.4

# 8: LLOYD AVENUE & PARK AND RIDE 2023 BASE CONDITIONS

Timing Plan: AM Peak

|                         | •    | -    | ←    | •    | -    | 4    |
|-------------------------|------|------|------|------|------|------|
| Lane Group              | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
| Lane Configurations     |      | 4    | 1    |      | ¥    |      |
| Traffic Volume (vph)    | 2    | 460  | 190  | 18   | 11   | 1    |
| Future Volume (vph)     | 2    | 460  | 190  | 18   | 11   | 1    |
| Ideal Flow (vphpl)      | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (ft)         | 12   | 10   | 10   | 12   | 16   | 12   |
| Grade (%)               |      | -2%  | 1%   |      | 4%   |      |
| Link Speed (mph)        |      | 35   | 35   |      | 25   |      |
| Link Distance (ft)      |      | 301  | 298  |      | 184  |      |
| Travel Time (s)         |      | 5.9  | 5.8  |      | 5.0  |      |
| Confl. Peds. (#/hr)     |      |      |      |      | 2    | 2    |
| Peak Hour Factor        | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 | 0.81 |
| Heavy Vehicles (%)      | 0%   | 3%   | 11%  | 22%  | 9%   | 0%   |
| Shared Lane Traffic (%) |      |      |      |      |      |      |

Intersection Summary

Area Type: O

# 8: LLOYD AVENUE & PARK AND RIDE 2023 BASE CONDITIONS

| Intersection   |                           |                  |                  |             |   |                                       |
|--|---------------------------|------------------|------------------|-------------|---|---------------------------------------|
| Int Delay, s/veh   | 0.3                       |                  |                  |             |   |                                       |
| Movement   | EBL                       | EBT              | WBT              | WBR         | SBL   | SBR                                   |
| Lane Configurations  |                           | 4                | ĵ,               |             | Y   |                                       |
| Traffic Vol, veh/h   | 2                         | 460              | 190              | 18          | 11  | 1                                     |
| Future Vol, veh/h  | 2                         | 460              | 190              | 18          | 11  | 1                                     |
| Conflicting Peds, #/hr   | 0                         | 0                | 0                | 0           | 2   | 2                                     |
| Sign Control   | Free                      | Free             | Free             | Free        | Stop  | Stop                                  |
| RT Channelized   | -                         | None             | -                | None        | -   | None                                  |
| Storage Length   | -                         | -                | -                | -           | 0   | -                                     |
| Veh in Median Storag   | e,# -                     | 0                | 0                | -           | 0   | -                                     |
| Grade, %   | -                         | -2               | 1                | -           | 4   | -                                     |
| Peak Hour Factor   | 81                        | 81               | 81               | 81          | 81  | 81                                    |
| Heavy Vehicles, %  | 0                         | 3                | 11               | 22          | 9   | 0                                     |
| Mvmt Flow  | 2                         | 568              | 235              | 22          | 14  | 1                                     |
|  |                           |                  |                  |             |   |                                       |
| Major/Minor  | Major1                    | ı                | Major2           | N           | /linor2   |                                       |
| Conflicting Flow All   | 257                       | 0                | -                | 0           | 820   | 248                                   |
| Stage 1  | -                         | -                | -                | _           | 246   |                                       |
| Stage 2  | -                         |                  |                  |             | 240   | -                                     |
| Critical Hdwy  |                           | -                | -                | -           | 574   | -                                     |
|  | 4.3                       | -                | -                |             | 574<br>7.29   | 6.6                                   |
| Critical Hdwy Stg 1  | 4.3                       |                  |                  | -           | 574<br>7.29<br>6.29   | -                                     |
|  |                           | -                | -                | -           | 574<br>7.29   | -                                     |
| Critical Hdwy Stg 1  | -                         | -                | -                | -           | 574<br>7.29<br>6.29   | -                                     |
| Critical Hdwy Stg 1<br>Critical Hdwy Stg 2   | -                         | -                | -                | -<br>-<br>- | 574<br>7.29<br>6.29<br>6.29   | 6.6                                   |
| Critical Hdwy Stg 1<br>Critical Hdwy Stg 2<br>Follow-up Hdwy   | - 3                       | -<br>-<br>-      | -<br>-<br>-      | -           | 574<br>7.29<br>6.29<br>6.29<br>3.1                                    | 6.6                                   |
| Critical Hdwy Stg 1<br>Critical Hdwy Stg 2<br>Follow-up Hdwy<br>Pot Cap-1 Maneuver<br>Stage 1<br>Stage 2   | -<br>3<br>981             | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -           | 574<br>7.29<br>6.29<br>6.29<br>3.1<br>308                             | 6.6                                   |
| Critical Hdwy Stg 1<br>Critical Hdwy Stg 2<br>Follow-up Hdwy<br>Pot Cap-1 Maneuver<br>Stage 1  | -<br>3<br>981<br>-        | -                | -                | -           | 574<br>7.29<br>6.29<br>6.29<br>3.1<br>308<br>838                      | 6.6<br>-<br>-<br>3.1<br>819           |
| Critical Hdwy Stg 1<br>Critical Hdwy Stg 2<br>Follow-up Hdwy<br>Pot Cap-1 Maneuver<br>Stage 1<br>Stage 2   | -<br>3<br>981<br>-        | -                | -                | -           | 574<br>7.29<br>6.29<br>6.29<br>3.1<br>308<br>838                      | 6.6<br>-<br>-<br>3.1<br>819           |
| Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2 Platoon blocked, %   | 3<br>981<br>-<br>-<br>981 | -                | -                | -           | 574<br>7.29<br>6.29<br>6.29<br>3.1<br>308<br>838<br>540               | -<br>6.6<br>-<br>-<br>3.1<br>819<br>- |
| Critical Hdwy Stg 1<br>Critical Hdwy Stg 2<br>Follow-up Hdwy<br>Pot Cap-1 Maneuver<br>Stage 1<br>Stage 2<br>Platoon blocked, %<br>Mov Cap-1 Maneuver | 3<br>981<br>-<br>-<br>981 | -                | -                | -           | 574<br>7.29<br>6.29<br>6.29<br>3.1<br>308<br>838<br>540               | 6.6<br>-<br>-<br>3.1<br>819<br>-<br>- |
| Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuver Mov Cap-2 Maneuver   | 981<br>-<br>-<br>-<br>981 | -                | -                |             | 574<br>7.29<br>6.29<br>6.29<br>3.1<br>308<br>838<br>540<br>307<br>307 | 6.6<br>-<br>-<br>3.1<br>819<br>-<br>- |

|                      |    | 14/5 |      |
|----------------------|----|------|------|
| Approach             | EB | WB   | SB   |
| HCM Control Delay, s | 0  | 0    | 16.6 |
| HCM LOS              |    |      | С    |
|                      |    |      |      |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 |
|-----------------------|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 981   | -   | -   | -   | 324   |
| HCM Lane V/C Ratio    | 0.003 | -   | -   | -   | 0.046 |
| HCM Control Delay (s) | 8.7   | 0   | -   | -   | 16.6  |
| HCM Lane LOS          | Α     | Α   | -   | -   | С     |
| HCM 95th %tile Q(veh) | 0     | -   | -   | -   | 0.1   |

# 9: LLOYD AVENUE & GO CARLSON BLVD 2023 BASE CONDITIONS

Timing Plan: AM Peak

|                         | •     | •    | 4    | <b>†</b> | ļ    | 4    |
|-------------------------|-------|------|------|----------|------|------|
| Lane Group              | EBL   | EBR  | NBL  | NBT      | SBT  | SBR  |
| Lane Configurations     | W     |      |      | ની       | ĵ»   |      |
| Traffic Volume (vph)    | 136   | 46   | 13   | 311      | 171  | 19   |
| Future Volume (vph)     | 136   | 46   | 13   | 311      | 171  | 19   |
| Ideal Flow (vphpl)      | 1800  | 1800 | 1800 | 1800     | 1800 | 1000 |
| Lane Width (ft)         | 12    | 12   | 12   | 10       | 10   | 12   |
| Grade (%)               | 2%    |      |      | 1%       | -2%  |      |
| Link Speed (mph)        | 35    |      |      | 35       | 35   |      |
| Link Distance (ft)      | 1310  |      |      | 446      | 202  |      |
| Travel Time (s)         | 25.5  |      |      | 8.7      | 3.9  |      |
| Peak Hour Factor        | 0.90  | 0.90 | 0.90 | 0.90     | 0.90 | 0.90 |
| Heavy Vehicles (%)      | 2%    | 2%   | 31%  | 5%       | 12%  | 0%   |
| Shared Lane Traffic (%) |       |      |      |          |      |      |
| Intersection Summary    |       |      |      |          |      |      |
| Area Type:              | Other |      |      |          |      |      |

# 9: LLOYD AVENUE & GO CARLSON BLVD 2023 BASE CONDITIONS

| Intersection             |       |       |        |       |        |       |
|--------------------------|-------|-------|--------|-------|--------|-------|
| Int Delay, s/veh         | 4.1   |       |        |       |        |       |
| Movement                 | EBL   | EBR   | NBL    | NBT   | SBT    | SBR   |
| Lane Configurations      | W     |       |        | 4     | 1>     |       |
| Traffic Vol, veh/h       | 136   | 46    | 13     | 311   | 171    | 19    |
| Future Vol, veh/h        | 136   | 46    | 13     | 311   | 171    | 19    |
| 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, %                 | 2     | -     | -      | 1     | -2     | -     |
| Peak Hour Factor         | 90    | 90    | 90     | 90    | 90     | 90    |
| Heavy Vehicles, %        | 2     | 2     | 31     | 5     | 12     | 0     |
| Mymt Flow                | 151   | 51    | 14     | 346   | 190    | 21    |
| WWW.CT IOW               | 101   | 01    |        | 040   | 100    |       |
|                          |       |       |        |       |        |       |
|                          | inor2 |       | Major1 |       | Major2 |       |
| Conflicting Flow All     | 575   | 201   | 211    | 0     | -      | 0     |
| Stage 1                  | 201   | -     | -      | -     | -      | -     |
| Stage 2                  | 374   | -     | -      | -     | -      | -     |
|                          | 6.82  | 6.42  | 4.41   | -     | -      | -     |
| Critical Hdwy Stg 1      | 5.82  | -     | -      | -     | -      | -     |
| Critical Hdwy Stg 2      | 5.82  | -     | -      | -     | -      | -     |
| Follow-up Hdwy           | 3     | 3.1   | 3.1    | -     | -      | -     |
| Pot Cap-1 Maneuver       | 508   | 884   | 981    | -     | -      | -     |
| Stage 1                  | 942   | -     | -      | -     | -      | -     |
| Stage 2                  | 763   | -     | -      | -     | -      | -     |
| Platoon blocked, %       |       |       |        | -     | -      | -     |
| Mov Cap-1 Maneuver       | 499   | 884   | 981    | -     | -      | _     |
| Mov Cap-2 Maneuver       | 499   | -     | -      | -     |        |       |
| Stage 1                  | 925   |       |        | _     |        |       |
| Stage 2                  | 763   | -     |        |       |        |       |
| Stage 2                  | 103   |       |        |       |        |       |
|                          |       |       |        |       |        |       |
| Approach                 | EB    |       | NB     |       | SB     |       |
| HCM Control Delay, s     | 15    |       | 0.4    |       | 0      |       |
| HCM LOS                  | С     |       |        |       |        |       |
|                          |       |       |        |       |        |       |
| Minor Lane/Major Mvmt    |       | NBL   | NRT    | EBLn1 | SBT    | SBR   |
|                          |       | 981   | IND I  | 561   | - 301  | ODK - |
| Capacity (veh/h)         |       |       |        |       |        |       |
| HCM Cartes Delay (a)     |       | 0.015 | -      |       | -      | -     |
| HCM Control Delay (s)    |       | 8.7   | 0      | 15    | -      | -     |
| HCM Lane LOS             |       | A     | Α      | C     | -      | -     |
| HCM 95th %tile Q(veh)    |       | 0     | -      | 1.6   | -      | -     |

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# 10: LLOYD AVENUE & BEAVER RUN ROAD 2023 BASE CONDITIONS

Timing Plan: AM Peak

|                         | •     | •    | 4    | <b>†</b> | ļ    | 4    |
|-------------------------|-------|------|------|----------|------|------|
| Lane Group              | EBL   | EBR  | NBL  | NBT      | SBT  | SBR  |
| Lane Configurations     | W     |      |      | ની       | ĵ»   |      |
| Traffic Volume (vph)    | 16    | 5    | 0    | 334      | 206  | 1    |
| Future Volume (vph)     | 16    | 5    | 0    | 334      | 206  | 1    |
| Ideal Flow (vphpl)      | 1800  | 1800 | 1800 | 1800     | 1800 | 1800 |
| Lane Width (ft)         | 13    | 12   | 12   | 10       | 10   | 12   |
| Grade (%)               | 1%    |      |      | 1%       | -1%  |      |
| Link Speed (mph)        | 25    |      |      | 35       | 35   |      |
| Link Distance (ft)      | 1282  |      |      | 488      | 446  |      |
| Travel Time (s)         | 35.0  |      |      | 9.5      | 8.7  |      |
| Peak Hour Factor        | 0.91  | 0.91 | 0.91 | 0.91     | 0.91 | 0.91 |
| Heavy Vehicles (%)      | 0%    | 20%  | 0%   | 5%       | 11%  | 0%   |
| Shared Lane Traffic (%) |       |      |      |          |      |      |
| Intersection Summary    |       |      |      |          |      |      |
| Area Type:              | Other |      |      |          |      |      |

# 10: LLOYD AVENUE & BEAVER RUN ROAD 2023 BASE CONDITIONS

| Intersection           |           |      |        |       |               |      |
|------------------------|-----------|------|--------|-------|---------------|------|
| Int Delay, s/veh       | 0.4       |      |        |       |               |      |
|                        |           | EDE  | ND     | NDT   | 007           | 000  |
| Movement               | EBL       | EBR  | NBL    | NBT   | SBT           | SBR  |
| Lane Configurations    | ¥         |      |        | ની    | ₽             |      |
| Traffic Vol, veh/h     | 16        | 5    | 0      | 334   | 206           | 1    |
| Future Vol, veh/h      | 16        | 5    | 0      | 334   | 206           | 1    |
| 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, %               | 1         | -    | -      | 1     | -1            | -    |
| Peak Hour Factor       | 91        | 91   | 91     | 91    | 91            | 91   |
| Heavy Vehicles, %      | 0         | 20   | 0      | 5     | 11            | 0    |
| Mvmt Flow              | 18        | 5    | 0      | 367   | 226           | 1    |
|                        |           |      |        |       |               |      |
| Major/Minor N          | Minor2    |      | Major1 | ı     | Major2        |      |
|                        | 594       | 227  | 227    | 0     | viajui 2<br>- | 0    |
| Conflicting Flow All   | 227       |      |        | -     |               |      |
| Stage 1                |           | -    | -      |       | -             | -    |
| Stage 2                | 367       | -    | -      | -     | -             | -    |
| Critical Hdwy          | 6.6       | 6.5  | 4.3    | -     | -             | -    |
| Critical Hdwy Stg 1    | 5.6       | -    | -      | -     | -             | -    |
| Critical Hdwy Stg 2    | 5.6       | -    | -      | -     | -             | -    |
| Follow-up Hdwy         | 3         | 3.48 | 3      | -     | -             | -    |
| Pot Cap-1 Maneuver     | 512       | 765  | 1004   | -     | -             | -    |
| Stage 1                | 925       | -    | -      | -     | -             | -    |
| Stage 2                | 787       | -    | -      | -     | -             | -    |
| Platoon blocked, %     |           |      |        | -     | -             | -    |
| Mov Cap-1 Maneuver     | 512       | 765  | 1004   | -     | -             | -    |
| Mov Cap-2 Maneuver     | 512       | -    | -      | -     | -             | -    |
| Stage 1                | 925       | -    | -      | -     | -             | -    |
| Stage 2                | 787       | -    | -      | -     | -             | -    |
| , in the second        |           |      |        |       |               |      |
| Approach               | EB        |      | NB     |       | SB            |      |
| HCM Control Delay, s   | 11.8      |      | 0      |       | 0.0           |      |
| HCM LOS                | 11.0<br>B |      | U      |       | U             |      |
| LICINI FOS             | В         |      |        |       |               |      |
|                        |           |      |        |       |               |      |
|                        |           |      |        |       |               |      |
| Minor Lane/Major Mvm   | t         | NBL  | NBT    | EBLn1 | SBT           | SBR  |

| Minor Lane/Major Mvmt | NBL  | NBT E | BLn1  | SBT | SBR |
|-----------------------|------|-------|-------|-----|-----|
| Capacity (veh/h)      | 1004 | -     | 556   | -   | -   |
| HCM Lane V/C Ratio    | -    | - (   | 0.042 | -   | -   |
| HCM Control Delay (s) | 0    | -     | 11.8  | -   | -   |
| HCM Lane LOS          | Α    | -     | В     | -   | -   |
| HCM 95th %tile Q(veh) | 0    | -     | 0.1   | -   | -   |

2023 BASE CONDITIONS

|                           | •            | <b>→</b> | ←        | •          | <b>\</b> | 1     |  |
|---------------------------|--------------|----------|----------|------------|----------|-------|--|
| Lane Group                | EBL          | EBT      | WBT      | WBR        | SBL      | SBR   |  |
| ane Configurations        | 7            | <b>^</b> | ĵ.       |            | 7        | 7     |  |
| raffic Volume (vph)       | 94           | 554      | 750      | 81         | 73       | 134   |  |
| uture Volume (vph)        | 94           | 554      | 750      | 81         | 73       | 134   |  |
| deal Flow (vphpl)         | 1800         | 1800     | 1800     | 1800       | 1800     | 1800  |  |
| ane Width (ft)            | 10           | 14       | 13       | 12         | 10       | 11    |  |
| Grade (%)                 |              | -2%      | 4%       |            | 1%       |       |  |
| torage Length (ft)        | 145          | 270      | 170      | 0          | 230      | 0     |  |
| torage Lanes              | 1            |          |          | 0          | 1        | 1     |  |
| Taper Length (ft)         | 25           |          |          | U          | 25       | - 1   |  |
| Right Turn on Red         | 23           |          |          | Yes        | 20       | Yes   |  |
|                           |              | 45       | 35       | res        | 35       | res   |  |
| ink Speed (mph)           |              |          |          |            |          |       |  |
| ink Distance (ft)         |              | 268      | 1016     |            | 359      |       |  |
| Fravel Time (s)           |              | 4.1      | 19.8     |            | 7.0      |       |  |
| Confl. Peds. (#/hr)       |              |          |          | 1          |          |       |  |
| Peak Hour Factor          | 0.95         | 0.95     | 0.95     | 0.95       | 0.95     | 0.95  |  |
| Heavy Vehicles (%)        | 21%          | 2%       | 1%       | 5%         | 0%       | 5%    |  |
| Shared Lane Traffic (%)   |              |          |          |            |          |       |  |
| Turn Type                 | pm+pt        | NA       | NA       |            | Prot     | pm+ov |  |
| Protected Phases          | 5            | 2        | 6        |            | 4        | 5     |  |
| Permitted Phases          | 2            |          |          |            |          | 4     |  |
| Detector Phase            | 5            | 2        | 6        |            | 4        | 5     |  |
| Switch Phase              |              |          |          |            |          |       |  |
| Minimum Initial (s)       | 3.0          | 11.0     | 11.0     |            | 3.0      | 3.0   |  |
| Minimum Split (s)         | 14.0         | 18.0     | 18.0     |            | 13.0     | 14.0  |  |
| Total Split (s)           | 14.0         | 84.0     | 70.0     |            | 16.0     | 14.0  |  |
| Total Split (%)           | 14.0%        | 84.0%    | 70.0%    |            | 16.0%    | 14.0% |  |
|                           |              |          |          |            |          |       |  |
| Yellow Time (s)           | 5.0          | 5.0      | 5.0      |            | 4.0      | 5.0   |  |
| All-Red Time (s)          | 2.0          | 2.0      | 2.0      |            | 2.0      | 2.0   |  |
| ost Time Adjust (s)       | -1.0         | -1.0     | -1.0     |            | -1.0     | -1.0  |  |
| Total Lost Time (s)       | 6.0          | 6.0      | 6.0      |            | 5.0      | 6.0   |  |
| _ead/Lag                  | Lead         |          | Lag      |            |          | Lead  |  |
| Lead-Lag Optimize?        | Yes          |          | Yes      |            |          | Yes   |  |
| Recall Mode               | None         | C-Max    | C-Max    |            | None     | None  |  |
| ntersection Summary       |              |          |          |            |          |       |  |
| Area Type:                | Other        |          |          |            |          |       |  |
| Cycle Length: 100         |              |          |          |            |          |       |  |
| Actuated Cycle Length: 10 |              |          |          |            |          |       |  |
| Offset: 94 (94%), Referen | ced to phase | 2:EBTL   | and 6:WB | T, Start o | f Green  |       |  |
| latural Cycle: 70         |              |          |          |            |          |       |  |
| Control Type: Actuated-Co | oordinated   |          |          |            |          |       |  |
| ,,                        |              |          |          |            |          |       |  |
| plits and Phases: 1: R    | OUTE 322 8   | ROCK F   | RAYMONE  | ROAD       |          |       |  |
| A                         |              |          |          |            |          |       |  |

| ø <sub>2 (R)</sub> | ,                  | <b>√</b> Ø4 |
|--------------------|--------------------|-------------|
| 84 s               |                    | 16 s        |
| <b>₹</b> Ø5        | <b>←</b><br>Ø6 (R) |             |
| 14 s               | 70 s               |             |

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|                              | •    | <b>→</b> | +    | 4    | <b>\</b> | 4    |
|------------------------------|------|----------|------|------|----------|------|
| Movement                     | EBL  | EBT      | WBT  | WBR  | SBL      | SBR  |
| Lane Configurations          | *    | 4        | 1    |      | ች        | 7    |
| Traffic Volume (veh/h)       | 94   | 554      | 750  | 81   | 73       | 134  |
| Future Volume (veh/h)        | 94   | 554      | 750  | 81   | 73       | 134  |
| Number                       | 5    | 2        | 6    | 16   | 7        | 14   |
| Initial Q (Qb), veh          | 1    | 0        | 1    | 0    | 0        | 0    |
| Ped-Bike Adj(A pbT)          | 1.00 |          |      | 1.00 | 1.00     | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00     | 1.00 | 1.00 | 1.00     | 1.00 |
| Adj Sat Flow, veh/h/ln       | 1502 | 1854     | 1809 | 1764 | 1791     | 1706 |
| Adj Flow Rate, veh/h         | 99   | 583      | 789  | 83   | 77       | 77   |
| Adj No. of Lanes             | 1    | 1        | 109  | 0    | 1        | 1    |
| Peak Hour Factor             | 0.95 | 0.95     | 0.95 | 0.95 | 0.95     | 0.95 |
|                              | 21   | 0.95     | 0.95 | 0.95 | 0.95     | 0.95 |
| Percent Heavy Veh, %         |      |          |      |      |          |      |
| Cap, veh/h                   | 345  | 1495     | 1121 | 117  | 143      | 195  |
| Arrive On Green              | 0.10 | 1.00     | 0.70 | 0.69 | 0.08     | 0.08 |
| Sat Flow, veh/h              | 1431 | 1854     | 1610 | 169  | 1706     | 1450 |
| Grp Volume(v), veh/h         | 99   | 583      | 0    | 872  | 77       | 77   |
| Grp Sat Flow(s),veh/h/ln     | 1431 | 1854     | 0    | 1779 | 1706     | 1450 |
| Q Serve(g_s), s              | 1.7  | 0.0      | 0.0  | 29.3 | 4.3      | 4.9  |
| Cycle Q Clear(g_c), s        | 1.7  | 0.0      | 0.0  | 29.3 | 4.3      | 4.9  |
| Prop In Lane                 | 1.00 |          |      | 0.10 | 1.00     | 1.00 |
| Lane Grp Cap(c), veh/h       | 345  | 1495     | 0    | 1238 | 143      | 195  |
| V/C Ratio(X)                 | 0.29 | 0.39     | 0.00 | 0.70 | 0.54     | 0.39 |
| Avail Cap(c a), veh/h        | 395  | 1495     | 0    | 1239 | 188      | 232  |
| HCM Platoon Ratio            | 2.00 | 2.00     | 1.00 | 1.00 | 1.00     | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00     | 0.00 | 1.00 | 1.00     | 1.00 |
| Uniform Delay (d), s/veh     | 9.4  | 0.0      | 0.00 | 9.2  | 44.0     | 39.5 |
| Incr Delay (d2), s/veh       | 0.5  | 0.0      | 0.0  | 3.4  | 3.1      | 1.3  |
|                              | 0.5  | 0.0      | 0.0  | 0.0  |          | 0.0  |
| Initial Q Delay(d3),s/veh    |      |          |      |      | 0.0      |      |
| %ile BackOfQ(95%),veh/ln     | 2.2  | 0.6      | 0.0  | 21.9 | 3.9      | 7.3  |
| LnGrp Delay(d),s/veh         | 9.9  | 0.8      | 0.0  | 12.6 | 47.1     | 40.8 |
| LnGrp LOS                    | A    | A        |      | В    | D        | D    |
| Approach Vol, veh/h          |      | 682      | 872  |      | 154      |      |
| Approach Delay, s/veh        |      | 2.1      | 12.6 |      | 44.0     |      |
| Approach LOS                 |      | Α        | В    |      | D        |      |
| Timer                        | 1    | 2        | 3    | 4    | 5        | 6    |
| Assigned Phs                 |      | 2        |      | 4    | 5        | 6    |
| Phs Duration (G+Y+Rc), s     |      | 86.6     |      | 13.4 | 11.0     | 75.6 |
| Change Period (Y+Rc), s      |      | 7.0      |      | 6.0  | 7.0      | 7.0  |
| Max Green Setting (Gmax), s  |      | 77.0     |      | 10.0 | 7.0      | 63.0 |
| Max Q Clear Time (g_c+l1), s |      | 2.5      |      | 7.4  | 4.2      | 31.3 |
|                              |      | 2.3      |      | 0.1  | 0.1      | 4.4  |
| Green Ext Time (p_c), s      |      | 2.3      |      | U. I | U. I     | 4.4  |
| Intersection Summary         |      |          |      |      |          |      |
| HCM 2010 Ctrl Delay          |      |          | 11.2 |      |          |      |
| HCM 2010 LOS                 |      |          | В    |      |          |      |
|                              |      |          |      |      |          |      |

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| ZUZU DAUL OUND             | THON        |          |          |             |          |       |       |          |       |       | 3        | oan  |
|----------------------------|-------------|----------|----------|-------------|----------|-------|-------|----------|-------|-------|----------|------|
|                            | •           | <b>→</b> | •        | •           | <b>←</b> | •     | 4     | <b>†</b> | /     | -     | <b>↓</b> | 4    |
| Lane Group                 | EBL         | EBT      | EBR      | WBL         | WBT      | WBR   | NBL   | NBT      | NBR   | SBL   | SBT      | SBR  |
| Lane Configurations        | *           | <b>†</b> | 7        | *           | <b>*</b> | 1     |       | 4        | 1     |       | 4        |      |
| Traffic Volume (vph)       | 57          | 560      | 248      | 117         | 736      | 51    | 174   | 20       | 107   | 9     | 22       | 81   |
| Future Volume (vph)        | 57          | 560      | 248      | 117         | 736      | 51    | 174   | 20       | 107   | 9     | 22       | 81   |
| Ideal Flow (vphpl)         | 1800        | 1800     | 1800     | 1800        | 1800     | 1800  | 1800  | 1800     | 1800  | 1800  | 1800     | 1800 |
| Lane Width (ft)            | 10          | 12       | 12       | 10          | 11       | 12    | 12    | 11       | 11    | 12    | 15       | 12   |
| Grade (%)                  |             | 0%       |          |             | -1%      |       |       | -1%      |       |       | 2%       |      |
| Storage Length (ft)        | 190         |          | 0        | 150         |          | 150   | 0     |          | 150   | 0     |          | 0    |
| Storage Lanes              | 1           |          | 1        | 1           |          | 1     | 0     |          | 1     | 0     |          | 0    |
| Taper Length (ft)          | 25          |          |          | 25          |          |       | 25    |          |       | 25    |          |      |
| Right Turn on Red          |             |          | Yes      |             |          | Yes   |       |          | Yes   |       |          | Yes  |
| Link Speed (mph)           |             | 45       |          |             | 45       |       |       | 35       |       |       | 25       |      |
| Link Distance (ft)         |             | 551      |          |             | 315      |       |       | 307      |       |       | 194      |      |
| Travel Time (s)            |             | 8.3      |          |             | 4.8      |       |       | 6.0      |       |       | 5.3      |      |
| Confl. Bikes (#/hr)        |             |          | 1        |             |          |       |       |          |       |       |          |      |
| Peak Hour Factor           | 0.96        | 0.96     | 0.96     | 0.96        | 0.96     | 0.96  | 0.96  | 0.96     | 0.96  | 0.96  | 0.96     | 0.96 |
| Heavy Vehicles (%)         | 2%          | 4%       | 4%       | 1%          | 1%       | 3%    | 1%    | 5%       | 6%    | 0%    | 0%       | 4%   |
| Shared Lane Traffic (%)    |             |          |          |             |          |       |       |          |       |       |          |      |
| Turn Type                  | Perm        | NA       | Perm     | pm+pt       | NA       | Perm  | Perm  | NA       | pm+ov | Perm  | NA       |      |
| Protected Phases           |             | 2        |          | 1           | 6        |       |       | 8        | 1     |       | 4        |      |
| Permitted Phases           | 2           |          | 2        | 6           |          | 6     | 8     |          | 8     | 4     |          |      |
| Detector Phase             | 2           | 2        | 2        | 1           | 6        | 6     | 8     | 8        | 1     | 4     | 4        |      |
| Switch Phase               |             |          |          |             |          |       |       |          |       |       |          |      |
| Minimum Initial (s)        | 13.0        | 13.0     | 13.0     | 3.0         | 13.0     | 13.0  | 3.0   | 3.0      | 3.0   | 3.0   | 3.0      |      |
| Minimum Split (s)          | 40.0        | 40.0     | 40.0     | 10.0        | 40.0     | 40.0  | 13.0  | 13.0     | 10.0  | 13.0  | 13.0     |      |
| Total Split (s)            | 53.0        | 53.0     | 53.0     | 13.0        | 66.0     | 66.0  | 34.0  | 34.0     | 13.0  | 34.0  | 34.0     |      |
| Total Split (%)            | 53.0%       | 53.0%    | 53.0%    | 13.0%       | 66.0%    | 66.0% | 34.0% | 34.0%    | 13.0% | 34.0% | 34.0%    |      |
| Yellow Time (s)            | 5.0         | 5.0      | 5.0      | 5.0         | 5.0      | 5.0   | 3.0   | 3.0      | 5.0   | 3.0   | 3.0      |      |
| All-Red Time (s)           | 2.0         | 2.0      | 2.0      | 2.0         | 2.0      | 2.0   | 3.0   | 3.0      | 2.0   | 3.0   | 3.0      |      |
| Lost Time Adjust (s)       | -1.0        | -1.0     | -1.0     | -1.0        | -1.0     | -1.0  |       | -1.0     | -1.0  |       | -1.0     |      |
| Total Lost Time (s)        | 6.0         | 6.0      | 6.0      | 6.0         | 6.0      | 6.0   |       | 5.0      | 6.0   |       | 5.0      |      |
| Lead/Lag                   | Lag         | Lag      | Lag      | Lead        |          |       |       |          | Lead  |       |          |      |
| Lead-Lag Optimize?         | Yes         | Yes      | Yes      | Yes         |          |       |       |          | Yes   |       |          |      |
| Recall Mode                | C-Max       | C-Max    | C-Max    | None        | C-Max    | C-Max | None  | None     | None  | None  | None     |      |
| Intersection Summary       |             |          |          |             |          |       |       |          |       |       |          |      |
| Area Type:                 | Other       |          |          |             |          |       |       |          |       |       |          |      |
| Cycle Length: 100          |             |          |          |             |          |       |       |          |       |       |          |      |
| Actuated Cycle Length: 100 |             |          |          |             |          |       |       |          |       |       |          |      |
| Offset: 2 (2%), Referenced | to phase 2: | EBTL and | d 6:WBTL | ., Start of | Green    |       |       |          |       |       |          |      |
| Natural Cycle: 65          |             |          |          |             |          |       |       |          |       |       |          |      |
| Control Type: Actuated-Coo | ordinated   |          |          |             |          |       |       |          |       |       |          |      |

| Lane Configurations 7 5 60 248 117 736 51 174 20 107 9 22 Future Volume (veh/h) 57 560 248 117 736 51 174 20 107 9 22 Future Volume (veh/h) 57 560 248 117 736 51 174 20 107 9 22 Future Volume (veh/h) 57 560 248 117 736 51 174 20 107 9 22 Future Volume (veh/h) 57 560 248 117 736 51 174 20 107 9 22 Future Volume (veh/h) 57 560 248 117 736 51 174 20 107 9 22 Future Volume (veh/h) 57 560 248 117 736 51 174 20 107 9 22 Future Volume (veh/h) 57 560 248 117 736 51 174 20 107 9 22 Future Volume (veh/h) 10 100 10 0 0 0 1 0 0 1 0 10 100 1.00 1.00 1.00 1.00 1.00 1.00 Ped-Bike AdjiA pbT) 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0   | SBR  | SBT | SBL | NBR | NBT  | NBL | WBR  | WBT | WBL  | EBR | EBT  | EBL  | Movement                     |
|---|------|-----|-----|-----|------|-----|------|-----|------|-----|------|------|------------------------------|
| Future Volume (veh/h)   |      |     |     |     |      |     |      |     |      |     |      |      |                              |
| Number  |      |     |     |     |      |     |      |     |      |     |      |      |                              |
| Initial Q (Qb), veh   |      |     |     |     |      |     |      |     |      |     |      |      |                              |
| Ped-Bike Adj(A_pbT)         1.00         0.98         1.00 </td <td></td>   |      |     |     |     |      |     |      |     |      |     |      |      |                              |
| Parking Bus, Adj  | 0    | 0   |     |     | 0    |     |      | 1   |      |     | 0    |      |                              |
| Adj Sat Flow, veh/h/ln  | 1.00 |     |     |     |      |     |      |     |      |     |      |      |                              |
| Adj Flow Rate, veh/h  | 1.00 |     |     |     |      |     |      |     |      |     |      |      |                              |
| Adj No. of Lanes         1         1         1         1         1         1         1         1         1         0         1         1         0  | 1782 |     |     |     |      |     |      |     |      |     |      |      |                              |
| Peak Hour Factor         0.96         0.26         88           Arrive On Green         0.59         0.59         0.12         1.00         1.00         0.18         0.18         0.18         0.18         0.17         0.18           Sat Flow, veh/h         643         1731         1441         1706         1791         1493         1216         141         1451         73         529           Grp Vollume(v), veh/h         59         583         229         122         767         30         202         0         58         88         0           Grp Sat Flow(s), veh/hn/ln         643         1731         1441         1706         1791         1493         1357         0         1451   | 56   |     |     |     |      |     |      |     |      |     |      |      |                              |
| Percent Heavy Veh, %   2  | 0    |     |     |     |      |     |      |     |      |     |      |      |                              |
| Cap, veh/h         334         986         821         401         1264         1030         316         22         378         55         106           Arrive On Green         0.59         0.59         0.59         0.12         1.00         1.00         0.18         0.18         0.18         0.17         0.18           Sat Flow, veh/h         643         1731         1441         1706         1791         1493         1216         141         1451         73         529           Gry Volume(v), veh/h         59         583         229         122         767         30         202         0         58         88         0           Gry Sat Flow(s), veh/h/ln         643         1731         1441         1706         1791         1493         1357         0         1451         1657         0           Q Serve(g. s), s         4.2         20.9         7.8         2.6         0.0         0.0         1.41         0.0         3.2         0.0         0.0           Cycle Q Clear(g.c), s         4.2         20.9         7.8         2.6         0.0         0.0         14.1         0.0         0.0         0.0           ViC Ratio(X) <td< td=""><td>0.96</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>   | 0.96 |     |     |     |      |     |      |     |      |     |      |      |                              |
| Arrive On Green         0.59         0.59         0.59         0.12         1.00         1.00         0.18         0.18         0.18         0.17         0.18           Sat Flow, veh/h         643         1731         1441         1706         1791         1493         1216         141         1451         73         529           Grp Volume(v), veh/h         59         583         229         122         767         30         202         0         58         88         0           Grp Sat Flow(s), veh/h/ln         643         1731         1441         1706         1791         1493         1357         0         1451         1657         0           Q Serve(g_s), s         4.2         20.9         7.8         2.6         0.0         0.0         9.8         0.0         3.2         0.0         0.0           Cycle Q Clear(g_c), s         4.2         20.9         7.8         2.6         0.0         0.0         14.1         0.0         3.2         4.7         0.0           Prop In Lane         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00   | 0    |     |     |     |      |     | -    |     |      |     |      |      |                              |
| Sat Flow, veh/h         643         1731         1441         1706         1791         1493         1216         141         1451         73         529           Grp Volume(v), veh/h         59         583         229         122         767         30         202         0         58         88         0           Grp Sat Flow(s), veh/h/h         643         1731         1441         1706         1791         1493         1357         0         1451         1657         0           Q Serve(g, s), s         4.2         20.9         7.8         2.6         0.0         0.0         9.8         0.0         3.2         0.0         0.0           Cycle Q Clear(g_c), s         4.2         20.9         7.8         2.6         0.0         0.0         9.8         0.0         3.2         4.7         0.0           Prop In Lane         1.00         1.0  | 212  |     |     |     |      |     |      |     |      |     |      |      |                              |
| Grp Volume(v), veh/h         59         583         229         122         767         30         202         0         58         88         0           Grp Sat Flow(s), veh/h/ln         643         1731         1441         1706         1791         1493         1357         0         1451         1657         0           Q Serve(g_s), s         4.2         20.9         7.8         2.6         0.0         0.0         9.8         0.0         3.2         0.0         0.0           Cycle Q Clear(g_c), s         4.2         20.9         7.8         2.6         0.0         0.0         1.1         0.0         3.2         4.7         0.0           Prop In Lane         1.00         1.00         1.00         1.00         0.0         1.1         0.0         0.0           Lane Gr Cap(c), veh/h         334         986         821         401         1264         1030         338         0         378         357         0           V/C Ratio(X)         0.18         0.59         0.28         0.30         0.61         0.03         0.60         0.0         0.1         0.0         0.0           Avail Cap(c_a), veh/h         450         1018  | 0.17 |     |     |     |      |     |      |     |      |     |      |      |                              |
| Grp Sat Flow(s),veh/h/ln         643         1731         1441         1706         1791         1493         1357         0         1451         1657         0           Q Serve(g, s), s         4.2         20.9         7.8         2.6         0.0         0.0         9.8         0.0         3.2         0.0         0.0           Cycle Q Clear(g, c), s         4.2         20.9         7.8         2.6         0.0         0.0         14.1         0.0         3.2         4.7         0.0           Prop In Lane         1.00         1.00         1.00         0.00         1.00         0.0         1.00         0.0           V/C Ratio(X)         0.18         0.59         0.28         0.30         0.61         0.03         338         0         378         357         0           V/C Ratio(X)         0.18         847         435         1267         1056         456         0         507         494         0           HCM Platoon Ratio         1.00         1.00         1.00         2.00         2.00         2.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00   | 1054 |     |     |     |      |     |      |     |      |     |      |      |                              |
| Q Serve(g_s), s   |      |     |     |     |      |     |      |     |      |     |      |      |                              |
| Cycle Q Člear(g_c), s         4.2         20.9         7.8         2.6         0.0         0.0         14.1         0.0         3.2         4.7         0.0           Prop In Lane         1.00         1.00         1.00         1.00         0.09         1.00         0.10           Lane Grp Cap(c), veh/h         334         986         821         401         1264         1030         338         0         378         357         0           V/C Ratio(X)         0.18         0.59         0.28         0.30         0.61         0.03         0.60         0.00         0.15         0.25         0.00           Avail Cap(c_a), veh/h         450         1018         847         435         1267         1056         456         0         507         494         0           HCM Platoon Ratio         1.00  | 0    |     |     |     |      |     |      |     |      |     |      |      |                              |
| Prop In Lane         1.00         1.00         1.00         1.00         0.90         1.00         0.10           Lane Grp Cap(c), veh/h         334         986         821         401         1264         1030         338         0         378         357         0           V/C Ratio(X)         0.18         0.59         0.28         0.30         0.61         0.03         308         0         378         357         0           Avail Cap(c_a), veh/h         450         1018         847         435         1267         1056         456         0         507         494         0           HCM Platoon Ratio         1.00         1.00         1.00         2.00         2.00         2.00         1.0  | 0.0  |     |     |     |      |     |      |     |      |     |      |      |                              |
| Lane Grp Cap(c), veh/h  334  986  821  401  1264  1030  338  0  378  377  0  V/C Ratio(X)  0.18  0.59  0.28  0.30  0.61  0.03  0.60  0.00  0.15  0.25  0.00  Avail Cap(c_a), veh/h  450  1018  847  435  1267  1056  456  0  507  494  0  1.00  0.00  | 0.0  | 0.0 |     |     | 0.0  |     |      | 0.0 |      |     | 20.9 |      |                              |
| \( \begin{array}{cccccccccccccccccccccccccccccccccccc   | 0.64 |     |     |     |      |     |      |     |      |     |      |      |                              |
| Avail Cap(c_a), veh/h HCM Platoon Ratio 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0  |      |     |     |     |      |     |      |     |      |     |      |      |                              |
| HCM Platoon Ratio  1.00 | 0.00 |     |     |     |      |     |      |     |      |     |      |      |                              |
| Upstream Filter(I)  | 0    |     |     |     | -    |     |      |     |      |     |      |      |                              |
| Uniform Delay (d), s/veh         21.9         14.1         11.1         9.5         0.0         0.0         38.6         0.0         28.6         34.3         0.0           Incr Delay (d2), s/veh         1.2         2.6         0.8         0.4         2.2         0.1         1.7         0.0         0.2         0.4         0.0           Initial Q Delay(d3), s/veh         0.1         0.0 </td <td>1.00</td> <td></td>   | 1.00 |     |     |     |      |     |      |     |      |     |      |      |                              |
| Incr Delay (d2), s/veh         1.2         2.6         0.8         0.4         2.2         0.1         1.7         0.0         0.2         0.4         0.0           Initial Q Delay(d3),s/veh         0.1         0.0  | 0.00 |     |     |     |      |     |      |     |      |     |      |      |                              |
| Initial Q Delay(d3),s/veh   | 0.0  |     |     |     |      |     |      |     |      |     |      |      |                              |
| %ile BackOfQ(95%),veh/ln         2.2         16.5         6.1         2.3         1.4         0.0         10.9         0.0         2.3         3.8         0.0           LnGrp Delay(d),s/veh         23.1         16.7         12.0         9.9         2.2         0.1         40.3         0.0         28.8         34.6         0.0           LnGrp LOS         C         B         B         A         A         A         D         C         C           Approach Vol, veh/h         871         919         260         88           Approach LOS         B         A         A         D         C           Timer         1         2         3         4         5         6         7         8           Assigned Phs         1         2         4         6         8         8           Phs Duration (G+Y+Rc), s         11.9         64.8         23.3         76.7         23.3           Change Period (Y+Rc), s         7.0         7.0         6.0         7.0         6.0  | 0.0  |     |     |     |      |     |      |     |      |     |      |      |                              |
| LnGrp Delay(d), s/véh         23.1         16.7         12.0         9.9         2.2         0.1         40.3         0.0         28.8         34.6         0.0           LnGrp LOS         C         B         B         A         A         A         D         C         C         C           Approach Vol, veh/h         871         919         260         88           Approach LOS         B         A         D         C         C           Timer         1         2         3         4         5         6         7         8           Assigned Phs         1         2         4         6         8         8           Phs Duration (G+Y+Rc), s         11.9         64.8         23.3         76.7         23.3           Change Period (Y+Rc), s         7.0         7.0         6.0         7.0         6.0  | 0.0  |     |     |     |      |     |      |     |      |     |      |      |                              |
| LnGrp LOS         C         B         B         A         A         A         D         C         C           Approach Vol, veh/h         871         919         260         88           Approach Delay, s/veh         15.9         3.1         37.7         34.6           Approach LOS         B         A         D         C           Timer         1         2         3         4         5         6         7         8           Assigned Phs         1         2         4         6         8         8           Phs Duration (G+Y+Rc), s         11.9         64.8         23.3         76.7         23.3           Change Period (Y+Rc), s         7.0         7.0         6.0         7.0         6.0   | 0.0  |     |     |     |      |     |      |     |      |     |      |      |                              |
| Approach Vol, veh/h         871         919         260         88           Approach Delay, s/veh         15.9         3.1         37.7         34.6           Approach LOS         B         A         D         C           Timer         1         2         3         4         5         6         7         8           Assigned Phs         1         2         4         6         8         8           Phs Duration (G+Y+Rc), s         11.9         64.8         23.3         76.7         23.3           Change Period (Y+Rc), s         7.0         7.0         6.0         7.0         6.0   | 0.0  | 0.0 |     |     | 0.0  |     |      |     |      |     |      |      |                              |
| Approach Delay, s/veh         15.9         3.1         37.7         34.6           Approach LOS         B         A         D         C           Timer         1         2         3         4         5         6         7         8           Assigned Phs         1         2         4         6         8         8           Phs Duration (G+Y+Rc), s         11.9         64.8         23.3         76.7         23.3           Change Period (Y+Rc), s         7.0         7.0         6.0         7.0         6.0  |      |     | С   | С   |      | D   | Α    |     | Α    | В   |      | С    | LnGrp LOS                    |
| Approach LOS         B         A         D         C           Timer         1         2         3         4         5         6         7         8           Assigned Phs         1         2         4         6         8           Phs Duration (G+Y+Rc), s         11.9         64.8         23.3         76.7         23.3           Change Period (Y+Rc), s         7.0         7.0         6.0         7.0         6.0   |      |     |     |     |      |     |      |     |      |     |      |      | Approach Vol, veh/h          |
| Timer 1 2 3 4 5 6 7 8  Assigned Phs 1 2 4 6 8  Phs Duration (G+Y+Rc), s 11.9 648 23.3 76.7 23.3  Change Period (Y+Rc), s 7.0 7.0 6.0 7.0 6.0  |      |     |     |     |      |     |      |     |      |     |      |      |                              |
| Assigned Phs 1 2 4 6 8 Phs Duration (G+Y+Rc), s 11.9 64.8 23.3 76.7 23.3 Change Period (Y+Rc), s 7.0 7.0 6.0 7.0 6.0  |      | С   |     |     | D    |     |      | Α   |      |     | В    |      | Approach LOS                 |
| Phs Duration (G+Y+Rc), s 11.9 64.8 23.3 76.7 23.3 Change Period (Y+Rc), s 7.0 7.0 6.0 7.0 6.0   |      |     |     |     | 8    | 7   | 6    | 5   | 4    | 3   | 2    | 1    | Timer                        |
| Change Period (Y+Rc), s 7.0 7.0 6.0 7.0 6.0   |      |     |     |     | 8    |     | 6    |     | 4    |     | 2    | 1    | Assigned Phs                 |
|   |      |     |     |     | 23.3 |     | 76.7 |     | 23.3 |     | 64.8 | 11.9 | Phs Duration (G+Y+Rc), s     |
| Max Green Setting (Gmax), s 6.0 46.0 28.0 59.0 28.0   |      |     |     |     | 6.0  |     | 7.0  |     | 6.0  |     | 7.0  | 7.0  | Change Period (Y+Rc), s      |
|   |      |     |     |     | 28.0 |     | 59.0 |     | 28.0 |     | 46.0 | 6.0  | Max Green Setting (Gmax), s  |
| Max Q Clear Time (g_c+l1), s 5.1 23.4 6.7 2.5 16.6  |      |     |     |     |      |     |      |     |      |     |      | 5.1  | Max Q Clear Time (g_c+l1), s |
| Green Ext Time (p_c), s 0.0 3.7 0.3 3.5 0.7   |      |     |     |     | 0.7  |     | 3.5  |     | 0.3  |     | 3.7  | 0.0  | Green Ext Time (p_c), s      |
| Intersection Summary  |      |     |     |     |      |     |      |     |      |     |      |      | Intersection Summary         |
| HCM 2010 Ctrl Delay 13.8  |      |     |     |     |      |     |      |     |      |     |      |      | HCM 2010 Ctrl Delay          |
| HCM 2010 LOS B  |      |     |     |     |      |     |      |     |      | В   |      |      | HCM 2010 LOS                 |

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Timing Plan: PM Peak

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Splits and Phases: 2: LLOYD AVENUE/ROYAL FARMS DRIVEWAY & ROUTE 322

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#### Lane Group EBL Lane Configurations Traffic Volume (vph) 824 267 Future Volume (vph) 18 824 586 211 267 662 Ideal Flow (vphpl) 1800 1800 1800 1800 1800 1800 Lane Width (ft) 16 12 12 12 15 15 Grade (%) -3% 2% Storage Length (ft) 75 0 0 0 Storage Lanes 25 25 Taper Length (ft) Right Turn on Red Yes Yes 45 45 25 Link Speed (mph) Link Distance (ft) 830 280 317 Travel Time (s) 12.6 4.2 8.6 Confl. Bikes (#/hr) 0.90 Peak Hour Factor 0.90 0.90 0.90 0.90 0.90 2% Heavy Vehicles (%) 0% 3% 1% 2% 3% Shared Lane Traffic (%) Prot Turn Type Free Protected Phases 2 6 4 Permitted Phases 2 Detector Phase 2 6 4 Switch Phase 15.0 15.0 15.0 3.0 Minimum Initial (s) Minimum Split (s) 22.0 22.0 22.0 13.0 72.0 28.0 Total Split (s) 72.0 72.0 Total Split (%) 72.0% 72.0% 72.0% 28.0% Yellow Time (s) 5.0 5.0 5.0 4.0 All-Red Time (s) 2.0 2.0 2.0 2.0 -1.0 -1.0 -1.0 -1.0 Lost Time Adjust (s) Total Lost Time (s) 6.0 6.0 6.0 5.0 Lead/Lag Lead-Lag Optimize? C-Max C-Max C-Max Recall Mode None Intersection Summary Area Type: Cycle Length: 100 Actuated Cycle Length: 100 Offset: 13 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green Natural Cycle: 60 Control Type: Actuated-Coordinated

| Splits and Phases:  | 4: ROUTE 322 & WB ROUTE 30 RAMPS |      |
|---------------------|----------------------------------|------|
| ≠ <sub>Ø2 (R)</sub> |                                  | Ø4   |
| 72 s                |                                  | 28 s |
| Ø6 (R)              |                                  |      |
| 72 s                |                                  |      |

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|                              | •          | _         | -         | •    | <u> </u>  | 4        |
|------------------------------|------------|-----------|-----------|------|-----------|----------|
| Movement                     | EBL        | EBT       | WBT       | WBR  | SBL       | SBR      |
| Lane Configurations          | T T        | <u></u>   | <u>₩Ы</u> | WOR  | SDL<br>1  | JDK<br>7 |
| Traffic Volume (veh/h)       | <b>1</b> 8 | 824       | 586       | 211  | 267       | 662      |
| Future Volume (veh/h)        | 18         | 824       | 586       | 211  | 267       | 662      |
| Number                       | 5          | 2         | 6         | 16   | 7         | 14       |
| Initial Q (Qb), veh          | 1          | 4         | 1         | 0    | 0         | 0        |
| Ped-Bike Adj(A_pbT)          | 1.00       | 4         |           | 1.00 | 1.00      | 1.00     |
|                              |            | 1.00      | 1.00      | 1.00 | 1.00      | 1.00     |
| Parking Bus, Adj             | 1.00       |           |           | 1782 | 1835      | 1817     |
| Adj Sat Flow, veh/h/ln       | 1900       | 1774      | 1760      |      |           |          |
| Adj Flow Rate, veh/h         | 20         | 916       | 651       | 0    | 297       | 0        |
| Adj No. of Lanes             | 1          | 1         | 1         | 0    | 1         | 1        |
| Peak Hour Factor             | 0.90       | 0.90      | 0.90      | 0.90 | 0.90      | 0.90     |
| Percent Heavy Veh, %         | 0          | 3         | 1         | 1    | 2         | 3        |
| Cap, veh/h                   | 440        | 1218      | 1209      | 0    | 355       | 314      |
| Arrive On Green              | 0.69       | 0.69      | 0.69      | 0.00 | 0.20      | 0.00     |
| Sat Flow, veh/h              | 793        | 1774      | 1760      | 0    | 1748      | 1545     |
| Grp Volume(v), veh/h         | 20         | 916       | 651       | 0    | 297       | 0        |
| Grp Sat Flow(s),veh/h/ln     | 793        | 1774      | 1760      | 0    | 1748      | 1545     |
| Q Serve(g_s), s              | 1.3        | 33.4      | 18.4      | 0.0  | 16.3      | 0.0      |
| Cycle Q Clear(g_c), s        | 19.7       | 33.4      | 18.4      | 0.0  | 16.3      | 0.0      |
| Prop In Lane                 | 1.00       |           |           | 0.00 | 1.00      | 1.00     |
| Lane Grp Cap(c), veh/h       | 440        | 1218      | 1209      | 0    | 355       | 314      |
| V/C Ratio(X)                 | 0.05       | 0.75      | 0.54      | 0.00 | 0.84      | 0.00     |
| Avail Cap(c_a), veh/h        | 471        | 1218      | 1209      | 0    | 402       | 355      |
| HCM Platoon Ratio            | 1.00       | 1.00      | 1.00      | 1.00 | 1.00      | 1.00     |
| Upstream Filter(I)           | 1.00       | 1.00      | 1.00      | 0.00 | 1.00      | 0.00     |
| Uniform Delay (d), s/veh     | 15.5       | 10.4      | 7.8       | 0.0  | 38.3      | 0.0      |
| Incr Delay (d2), s/veh       | 0.2        | 4.3       | 1.7       | 0.0  | 13.9      | 0.0      |
| Initial Q Delay(d3),s/veh    | 0.0        | 0.3       | 0.0       | 0.0  | 0.0       | 0.0      |
| %ile BackOfQ(95%),veh/ln     | 0.8        | 25.5      | 14.7      | 0.0  | 14.2      | 0.0      |
| LnGrp Delay(d),s/veh         | 15.8       | 15.0      | 9.6       | 0.0  | 52.2      | 0.0      |
| LnGrp LOS                    | В          | В         | Α.        | 3.0  | D D       | 3.0      |
| Approach Vol, veh/h          | U          | 936       | 651       |      | 297       |          |
|                              |            |           | 9.6       |      | 52.2      |          |
| Approach Delay, s/veh        |            | 15.1<br>B | 9.6<br>A  |      | 52.2<br>D |          |
| Approach LOS                 |            | В         | А         |      | U         |          |
| Timer                        | 1          | 2         | 3         | 4    | 5         | 6        |
| Assigned Phs                 |            | 2         |           | 4    |           | 6        |
| Phs Duration (G+Y+Rc), s     |            | 74.7      |           | 25.3 |           | 74.7     |
| Change Period (Y+Rc), s      |            | 7.0       |           | 6.0  |           | 7.0      |
| Max Green Setting (Gmax), s  |            | 65.0      |           | 22.0 |           | 65.0     |
| Max Q Clear Time (g_c+l1), s |            | 35.9      |           | 18.8 |           | 20.9     |
| Green Ext Time (p_c), s      |            | 4.5       |           | 0.5  |           | 2.6      |
| Intersection Summary         |            |           |           |      |           |          |
| HCM 2010 Ctrl Delay          |            |           | 19.0      |      |           |          |
| HCM 2010 LOS                 |            |           | В         |      |           |          |
| 2010 200                     |            |           | -         |      |           |          |

4: ROUTE 322 & WB ROUTE 30 RAMPS

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# 3: EB ROUTE 30 RAMPS & ROUTE 322 2023 BASE CONDITIONS

Timing Plan: PM Peak

|                         | -        | •    | •    | •        | 1    |      |
|-------------------------|----------|------|------|----------|------|------|
| Lane Group              | EBT      | EBR  | WBL  | WBT      | NBL  | NBR  |
| Lane Configurations     | <b>↑</b> | 7    | ሻ    | <b>^</b> | 7    | 7    |
| Traffic Volume (vph)    | 638      | 433  | 203  | 798      | 21   | 212  |
| Future Volume (vph)     | 638      | 433  | 203  | 798      | 21   | 212  |
| Ideal Flow (vphpl)      | 1800     | 1800 | 1800 | 1800     | 1800 | 1800 |
| Lane Width (ft)         | 13       | 12   | 12   | 13       | 13   | 14   |
| Grade (%)               | -6%      |      |      | 7%       | -5%  |      |
| Storage Length (ft)     |          | 0    | 250  |          | 0    | 0    |
| Storage Lanes           |          | 1    | 1    |          | 1    | 1    |
| Taper Length (ft)       |          |      | 25   |          | 25   |      |
| Link Speed (mph)        | 45       |      |      | 45       | 25   |      |
| Link Distance (ft)      | 353      |      |      | 551      | 313  |      |
| Travel Time (s)         | 5.3      |      |      | 8.3      | 8.5  |      |
| Peak Hour Factor        | 0.90     | 0.90 | 0.90 | 0.90     | 0.90 | 0.90 |
| Heavy Vehicles (%)      | 4%       | 2%   | 1%   | 1%       | 25%  | 3%   |
| Shared Lane Traffic (%) |          |      |      |          |      |      |

Area Type: Other

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#### 3: EB ROUTE 30 RAMPS & ROUTE 322 2023 BASE CONDITIONS

Timing Plan: PM Peak

| t Delay, s/veh                    | 16.8   |             |           |      |        |           |     |  |
|-----------------------------------|--------|-------------|-----------|------|--------|-----------|-----|--|
|                                   |        |             |           |      |        |           |     |  |
| ovement                           | EBT    | EBR         | WBL       | WBT  | NBL    | NBR       |     |  |
| ane Configurations                |        | 7           | - ሻ       |      | - 7    | 7         |     |  |
| affic Vol, veh/h                  | 638    | 433         | 203       | 798  | 21     | 212       |     |  |
| iture Vol, veh/h                  | 638    | 433         | 203       | 798  | 21     | 212       |     |  |
| onflicting Peds, #/hr             | 0      | 0           | 0         | 0    | 0      | 0         |     |  |
| gn Control                        | Free   | Free        | Free      | Free | Stop   | Stop      |     |  |
| Γ Channelized                     | -      | Yield       | -         | None | -      | Stop      |     |  |
| orage Length                      | -      | 0           | 250       | -    | 0      | 0         |     |  |
| h in Median Storage,              |        | -           | -         | 0    | 0      | -         |     |  |
| ade, %                            | -6     | -           | -         | 7    | -5     | -         |     |  |
| ak Hour Factor                    | 90     | 90          | 90        | 90   | 90     | 90        |     |  |
| avy Vehicles, %                   | 4      | 2           | 1         | 1    | 25     | 3         |     |  |
| mt Flow                           | 709    | 481         | 226       | 887  | 23     | 236       |     |  |
|                                   |        |             |           |      |        |           |     |  |
| ijor/Minor N                      | lajor1 |             | Major2    | I    | Minor1 |           |     |  |
| onflicting Flow All               | 0      | 0           | 709       | 0    | 2048   | 709       |     |  |
| Stage 1                           | -      | -           | -         | -    | 709    | -         |     |  |
| Stage 2                           | -      | -           | -         | -    | 1339   | -         |     |  |
| itical Hdwy                       | -      | -           | 4.3       | -    | 5.65   | 5.73      |     |  |
| tical Hdwy Stg 1                  | -      | -           | -         | -    | 4.65   | -         |     |  |
| itical Hdwy Stg 2                 | -      | -           | -         | -    | 4.65   | -         |     |  |
| llow-up Hdwy                      | -      | -           | 3         | -    | 3      | 3.1       |     |  |
| ot Cap-1 Maneuver                 | -      | -           | 681       | -    | ~ 14   | 502       |     |  |
| Stage 1                           | -      | -           | -         | -    | 636    | -         |     |  |
| Stage 2                           | -      | -           | -         | -    | 178    | -         |     |  |
| atoon blocked, %                  | -      | -           |           | -    | 1      |           |     |  |
| ov Cap-1 Maneuver                 | -      | -           | 681       | -    | ~ 9    | 502       |     |  |
| v Cap-2 Maneuver                  | -      | -           | -         | -    | ~ 9    | -         |     |  |
| Stage 1                           | -      | -           | -         | -    | 425    | -         |     |  |
| Stage 2                           | -      | -           | -         | -    | 178    | -         |     |  |
|                                   |        |             |           |      |        |           |     |  |
| proach                            | EB     |             | WB        |      | NB     |           |     |  |
| CM Control Delay, s               | 0      |             | 2.6       |      | 155.1  |           |     |  |
| CM LOS                            |        |             |           |      | F      |           |     |  |
| 50                                |        |             |           |      |        |           |     |  |
| inor Lane/Major Mvmt              |        | NBLn1       | NIDI 50   | EBT  | EBR    | WBL       | WBT |  |
| nor Lane/Major MVIIII             |        | 9           | 502       | EDI  | EDR    | 681       | WDI |  |
| CM Lane V/C Ratio                 |        | 2.593       |           | -    | -      | 0.331     | -   |  |
| M Control Delay (s)               | ٠.     | 1534.7      | 18.4      | -    | -      | 12.9      | -   |  |
| , ( )                             | Þ      | 1534.7<br>F | 18.4<br>C | -    | -      | 12.9<br>B | -   |  |
| MIanalOC                          |        |             | U         | -    | -      | B         | -   |  |
| M Lane LOS<br>M 95th %tile Q(veh) |        | 4           | 2.5       |      |        | 1.4       |     |  |

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# 8: LLOYD AVENUE & PARK AND RIDE 2023 BASE CONDITIONS

Timing Plan: PM Peak

|                         | •    | -    | ←    | •     | -    | 4    |
|-------------------------|------|------|------|-------|------|------|
|                         |      |      | WOT  | 14/00 | 001  | 000  |
| Lane Group              | EBL  | EBT  | WBT  | WBR   | SBL  | SBR  |
| Lane Configurations     |      | र्स  | î.   |       | ¥    |      |
| Traffic Volume (vph)    | 1    | 299  | 398  | 7     | 7    | 3    |
| Future Volume (vph)     | 1    | 299  | 398  | 7     | 7    | 3    |
| Ideal Flow (vphpl)      | 1800 | 1800 | 1800 | 1800  | 1800 | 1800 |
| Lane Width (ft)         | 12   | 10   | 10   | 12    | 16   | 12   |
| Grade (%)               |      | -2%  | 1%   |       | 4%   |      |
| Link Speed (mph)        |      | 35   | 35   |       | 25   |      |
| Link Distance (ft)      |      | 292  | 307  |       | 174  |      |
| Travel Time (s)         |      | 5.7  | 6.0  |       | 4.7  |      |
| Confl. Peds. (#/hr)     |      |      |      | 1     | 2    | 2    |
| Peak Hour Factor        | 0.94 | 0.94 | 0.94 | 0.94  | 0.94 | 0.94 |
| Heavy Vehicles (%)      | 0%   | 2%   | 2%   | 0%    | 0%   | 0%   |
| Shared Lane Traffic (%) |      |      |      |       |      |      |

Intersection Summary

Area Type:

8: LLOYD AVENUE & PARK AND RIDE 2023 BASE CONDITIONS

| Intersection                  |        |      |        |       |         |      |
|-------------------------------|--------|------|--------|-------|---------|------|
| Intersection Int Delay, s/veh | 0.2    |      |        |       |         |      |
|                               |        |      | WET    | 14/00 | 0.01    | 000  |
| Movement                      | EBL    | EBT  | WBT    | WBR   | SBL     | SBR  |
| Lane Configurations           |        | 4    | ₽      |       | Y       |      |
| Traffic Vol, veh/h            | 1      | 299  | 398    | 7     | 7       | 3    |
| Future Vol, veh/h             | 1      | 299  | 398    | 7     | 7       | 3    |
| Conflicting Peds, #/hr        |        | 0    | 0      | 1     | 2       | 2    |
| Sign Control                  | Free   | Free | Free   | Free  | Stop    | Stop |
| RT Channelized                | -      | None | -      | None  | -       | None |
| Storage Length                | -      | -    | -      | -     | 0       | -    |
| Veh in Median Storag          | e,# -  | 0    | 0      | -     | 0       | -    |
| Grade, %                      | -      | -2   | 1      | -     | 4       | -    |
| Peak Hour Factor              | 94     | 94   | 94     | 94    | 94      | 94   |
| Heavy Vehicles, %             | 0      | 2    | 2      | 0     | 0       | 0    |
| Mvmt Flow                     | 1      | 318  | 423    | 7     | 7       | 3    |
|                               |        |      |        |       |         |      |
| Major/Minor                   | Major1 |      | Major2 | ı     | /linor2 |      |
| Conflicting Flow All          | 431    | 0    |        | 0     | 750     | 430  |
| Stage 1                       | -      | -    | -      | -     | 428     | -    |
| Stage 2                       | -      | -    | -      | -     | 322     | -    |
| Critical Hdwy                 | 4.3    | -    | -      | -     | 7.2     | 6.6  |
| Critical Hdwy Stg 1           | -      |      |        |       | 6.2     | -    |
| Critical Hdwy Stg 2           | -      | -    | -      | -     | 6.2     | _    |
| Follow-up Hdwy                | 3      | -    |        | -     | 3       | 3.1  |
| Pot Cap-1 Maneuver            | 854    | -    | _      | _     | 360     | 632  |
| Stage 1                       | -      | -    |        | -     | 683     | -    |
| Stage 2                       | -      | -    | -      | -     | 786     | _    |
| Platoon blocked. %            |        | -    | -      | -     |         |      |
| Mov Cap-1 Maneuver            | 853    | -    | -      | -     | 359     | 630  |
| Mov Cap-2 Maneuver            |        | -    | -      | -     | 359     | -    |
| Stage 1                       | _      | _    | -      | -     | 682     | -    |
| Stage 2                       | -      | -    | -      | -     | 785     | -    |
|                               |        |      |        |       |         |      |

| HCM Control Delay, s  | 0     | 0   |     | 14  |       |
|-----------------------|-------|-----|-----|-----|-------|
| HCM LOS               |       |     |     | В   |       |
|                       |       |     |     |     |       |
| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 |
| Capacity (veh/h)      | 853   | -   | -   | -   | 412   |
| HCM Lane V/C Ratio    | 0.001 | -   | -   | -   | 0.026 |
| HCM Control Delay (s) | 9.2   | 0   | -   | -   | 14    |
| HCM Lane LOS          | Α     | Α   | -   | -   | В     |
| HCM 05th %tile O(yeh) | Λ     |     |     |     | 0.1   |

# 9: LLOYD AVENUE & GO CARLSON BLVD 2023 BASE CONDITIONS

Timing Plan: PM Peak

|                         | •     | •    | 4    | <b>†</b> | ļ    | 4    |
|-------------------------|-------|------|------|----------|------|------|
| Lane Group              | EBL   | EBR  | NBL  | NBT      | SBT  | SBR  |
| Lane Configurations     | W     |      |      | ની       | ĵ»   |      |
| Traffic Volume (vph)    | 66    | 24   | 36   | 225      | 272  | 124  |
| Future Volume (vph)     | 66    | 24   | 36   | 225      | 272  | 124  |
| Ideal Flow (vphpl)      | 1800  | 1800 | 1800 | 1800     | 1800 | 1000 |
| Lane Width (ft)         | 12    | 12   | 12   | 10       | 10   | 12   |
| Grade (%)               | 2%    |      |      | 1%       | -2%  |      |
| Link Speed (mph)        | 35    |      |      | 35       | 35   |      |
| Link Distance (ft)      | 1323  |      |      | 450      | 217  |      |
| Travel Time (s)         | 25.8  |      |      | 8.8      | 4.2  |      |
| Peak Hour Factor        | 0.94  | 0.94 | 0.94 | 0.94     | 0.94 | 0.94 |
| Heavy Vehicles (%)      | 2%    | 13%  | 0%   | 2%       | 1%   | 2%   |
| Shared Lane Traffic (%) |       |      |      |          |      |      |
| Intersection Summary    |       |      |      |          |      |      |
| Area Type:              | Other |      |      |          |      |      |

# 9: LLOYD AVENUE & GO CARLSON BLVD 2023 BASE CONDITIONS

| Intersection           |        |       |        |          |        |      |
|------------------------|--------|-------|--------|----------|--------|------|
| Int Delay, s/veh       | 2.2    |       |        |          |        |      |
| Movement               | EBL    | EBR   | NBL    | NBT      | SBT    | SBR  |
| Lane Configurations    | ¥.     | LDI/  | INDL   | ₩<br>A   | 3B1    | ODI  |
| Traffic Vol. veh/h     | 66     | 24    | 36     | 225      | 272    | 124  |
| Future Vol. veh/h      | 66     | 24    | 36     | 225      | 272    | 124  |
|                        | 00     | 0     | 30     | 225      | 0      | 124  |
| Conflicting Peds, #/hr |        |       | -      |          | -      | _    |
| Sign Control           | Stop   | Stop  | Free   | Free     | Free   | Free |
| RT Channelized         | -      | None  | -      | None     | -      | None |
| Storage Length         | 0      | -     | -      | -        | -      | -    |
| Veh in Median Storage  |        | -     | -      | 0        | 0      | -    |
| Grade, %               | 2      | -     | -      | 1        | -2     | -    |
| Peak Hour Factor       | 94     | 94    | 94     | 94       | 94     | 94   |
| Heavy Vehicles, %      | 2      | 13    | 0      | 2        | 1      | 2    |
| Mvmt Flow              | 70     | 26    | 38     | 239      | 289    | 132  |
|                        |        |       |        |          |        |      |
| Major/Minor            | Minor  | _     | Majort |          | Aniaro |      |
|                        | Minor2 |       | Major1 |          | Major2 | _    |
| Conflicting Flow All   | 670    | 355   | 421    | 0        | -      | 0    |
| Stage 1                | 355    | -     | -      | -        | -      | -    |
| Stage 2                | 315    | -     | -      | -        | -      | -    |
| Critical Hdwy          | 6.82   | 6.53  | 4.3    | -        | -      | -    |
| Critical Hdwy Stg 1    | 5.82   | -     | -      | -        | -      | -    |
| Critical Hdwy Stg 2    | 5.82   | -     | -      | -        | -      | -    |
| Follow-up Hdwy         | 3      | 3.417 | 3      | -        | -      | -    |
| Pot Cap-1 Maneuver     | 440    | 652   | 860    | -        | -      | -    |
| Stage 1                | 781    | -     | -      | -        | -      | -    |
| Stage 2                | 820    | -     | -      | -        | -      | -    |
| Platoon blocked, %     |        |       |        | -        | -      | -    |
| Mov Cap-1 Maneuver     | 418    | 652   | 860    | -        | -      | -    |
| Mov Cap-2 Maneuver     | 418    | -     | -      | _        |        |      |
| Stage 1                | 741    | _     |        |          |        |      |
| Stage 2                | 820    |       |        |          |        |      |
| Staye 2                | 020    |       |        |          | -      |      |
|                        |        |       |        |          |        |      |
| Approach               | EB     |       | NB     |          | SB     |      |
| HCM Control Delay, s   | 14.8   |       | 1.3    |          | 0      |      |
| HCM LOS                | В      |       |        |          |        |      |
|                        |        |       |        |          |        |      |
|                        |        |       |        | <i>(</i> |        | 000  |
| Minor Lane/Major Mvm   | ıt     | NBL   |        | EBLn1    | SBT    | SBR  |
| Capacity (veh/h)       |        | 860   | -      | 462      | -      | -    |
| HCM Lane V/C Ratio     |        | 0.045 | -      | 0.207    | -      | -    |
| HCM Control Delay (s)  |        | 9.4   | 0      | 14.8     | -      | -    |
| HCM Lane LOS           |        | Α     | Α      | В        | -      | -    |
| HCM 95th %tile Q(veh)  | )      | 0.1   | -      | 0.8      | -      | -    |
| ,                      |        |       |        |          |        |      |

# 10: LLOYD AVENUE & BEAVER RUN ROAD 2023 BASE CONDITIONS

Timing Plan: PM Peak

|                         | •     | •    | •    | Ť    | .↓   | 1    |
|-------------------------|-------|------|------|------|------|------|
| Lane Group              | EBL   | EBR  | NBL  | NBT  | SBT  | SBR  |
| Lane Configurations     | W     |      |      | 4    | 1    |      |
| Traffic Volume (vph)    | 3     | 2    | 1    | 266  | 282  | 14   |
| Future Volume (vph)     | 3     | 2    | 1    | 266  | 282  | 14   |
| Ideal Flow (vphpl)      | 1800  | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (ft)         | 13    | 12   | 12   | 10   | 10   | 12   |
| Grade (%)               | 1%    |      |      | 1%   | -1%  |      |
| Link Speed (mph)        | 25    |      |      | 35   | 35   |      |
| Link Distance (ft)      | 1337  |      |      | 161  | 450  |      |
| Travel Time (s)         | 36.5  |      |      | 3.1  | 8.8  |      |
| Peak Hour Factor        | 0.93  | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Heavy Vehicles (%)      | 0%    | 0%   | 0%   | 2%   | 3%   | 0%   |
| Shared Lane Traffic (%) |       |      |      |      |      |      |
| Intersection Summary    |       |      |      |      |      |      |
| Area Type:              | Other |      |      |      |      |      |

10: LLOYD AVENUE & BEAVER RUN ROAD 2023 BASE CONDITIONS

| Intersection                             |        | _     |        | _      |        |      |
|--|--------|-------|--------|--------|--------|------|
| Int Delay, s/veh                         | 0.1    |       |        |        |        |      |
|  |        |       |        |        |        |      |
| Movement                                 | EBL    | EBR   | NBL    | NBT    | SBT    | SBR  |
| Lane Configurations                      | W      |       |        | ની     | f)     |      |
| Traffic Vol, veh/h                       | 3      | 2     | 1      | 266    | 282    | 14   |
| Future Vol, veh/h                        | 3      | 2     | 1      | 266    | 282    | 14   |
| 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                    | e, # 0 | -     | -      | 0      | 0      | -    |
| Grade. %                                 | 1      | -     |        | 1      | -1     |      |
| Peak Hour Factor                         | 93     | 93    | 93     | 93     | 93     | 93   |
| Heavy Vehicles, %                        | 0      | 0     | 0      | 2      | 3      | 0    |
| Mymt Flow                                | 3      | 2     | 1      | 286    | 303    | 15   |
| WWITCHIOW                                | J      |       |        | 200    | 000    | 10   |
|  |        |       |        |        |        |      |
|  | Minor2 |       | Major1 |        | Major2 |      |
| Conflicting Flow All                     | 599    | 311   | 318    | 0      | -      | 0    |
| Stage 1                                  | 311    | -     | -      | -      | -      | -    |
| Stage 2                                  | 288    | -     | -      | -      | -      | -    |
| Critical Hdwy                            | 6.6    | 6.3   | 4.3    | -      | -      | -    |
| Critical Hdwy Stg 1                      | 5.6    | -     | -      | -      | -      | -    |
| Critical Hdwy Stg 2                      | 5.6    | -     | -      | -      | -      | -    |
| Follow-up Hdwy                           | 3      | 3.1   | 3      | -      | -      | -    |
| Pot Cap-1 Maneuver                       | 508    | 768   | 934    | -      | -      | -    |
| Stage 1                                  | 840    | -     | -      | -      | -      | -    |
| Stage 2                                  | 862    | -     | -      | -      | -      | -    |
| Platoon blocked, %                       | 002    |       |        |        |        |      |
| Mov Cap-1 Maneuver                       | 507    | 768   | 934    | _      | _      | _    |
| Mov Cap-2 Maneuver                       | 507    | - 100 | - 504  |        | -      |      |
| Stage 1                                  | 839    | -     |        |        |        |      |
| Stage 2                                  | 862    |       |        | -      |        |      |
| Stage 2                                  | 002    | -     | -      | -      | -      | -    |
|  |        |       |        |        |        |      |
| Approach                                 | EB     |       | NB     |        | SB     |      |
| HCM Control Delay, s                     | 11.2   |       | 0      |        | 0      |      |
| HCM LOS                                  | В      |       |        |        |        |      |
|  |        |       |        |        |        |      |
| Minor Long/Major Major                   |        | MDI   | NDT    | EDI n4 | CDT    | CDD  |
| Minor Lane/Major Mvm<br>Capacity (veh/h) | ıt     | NBL   | MBI    | EBLn1  | SBT    | SBR  |
|  |        | 934   | _      | 587    | -      | _    |

|                         | ۶     | -        | •     | •    | <b>&gt;</b> | 4     |
|-------------------------|-------|----------|-------|------|-------------|-------|
| Lane Group              | EBL   | EBT      | WBT   | WBR  | SBL         | SBR   |
| Lane Configurations     | *     | <b>1</b> | ĵ.    |      | ሻ           | 7     |
| Traffic Volume (vph)    | 81    | 489      | 467   | 46   | 62          | 92    |
| Future Volume (vph)     | 81    | 489      | 467   | 46   | 62          | 92    |
| Ideal Flow (vphpl)      | 1800  | 1800     | 1800  | 1800 | 1800        | 1800  |
| Lane Width (ft)         | 10    | 14       | 13    | 12   | 10          | 11    |
| Grade (%)               |       | -2%      | 4%    |      | 1%          |       |
| Storage Length (ft)     | 145   |          |       | 0    | 230         | 0     |
| Storage Lanes           | 1     |          |       | 0    | 1           | 1     |
| Taper Length (ft)       | 25    |          |       |      | 25          |       |
| Right Turn on Red       |       |          |       | Yes  |             | Yes   |
| Link Speed (mph)        |       | 45       | 35    |      | 35          |       |
| Link Distance (ft)      |       | 268      | 1016  |      | 359         |       |
| Travel Time (s)         |       | 4.1      | 19.8  |      | 7.0         |       |
| Peak Hour Factor        | 0.95  | 0.95     | 0.95  | 0.95 | 0.95        | 0.95  |
| Heavy Vehicles (%)      | 5%    | 1%       | 1%    | 5%   | 0%          | 3%    |
| Shared Lane Traffic (%) |       |          |       |      |             |       |
| Turn Type               | pm+pt | NA       | NA    |      | Prot        | pm+ov |
| Protected Phases        | 5     | 2        | 6     |      | 4           | 5     |
| Permitted Phases        | 2     |          |       |      |             | 4     |
| Detector Phase          | 5     | 2        | 6     |      | 4           | 5     |
| Switch Phase            |       |          |       |      |             |       |
| Minimum Initial (s)     | 3.0   | 11.0     | 11.0  |      | 3.0         | 3.0   |
| Minimum Split (s)       | 14.0  | 18.0     | 18.0  |      | 13.0        | 14.0  |
| Total Split (s)         | 14.0  | 62.0     | 48.0  |      | 13.0        | 14.0  |
| Total Split (%)         | 18.7% | 82.7%    | 64.0% |      | 17.3%       | 18.7% |
| Yellow Time (s)         | 5.0   | 5.0      | 5.0   |      | 4.0         | 5.0   |
| All-Red Time (s)        | 2.0   | 2.0      | 2.0   |      | 2.0         | 2.0   |
| Lost Time Adjust (s)    | -1.0  | -1.0     | -1.0  |      | -1.0        | -1.0  |
| Total Lost Time (s)     | 6.0   | 6.0      | 6.0   |      | 5.0         | 6.0   |
| Lead/Lag                | Lead  |          | Lag   |      |             | Lead  |
| Lead-Lag Optimize?      | Yes   |          | Yes   |      |             | Yes   |
| Recall Mode             | None  | C-Max    | C-Max |      | None        | None  |

#### Intersection Summary

Area Type: Other

Cycle Length: 75

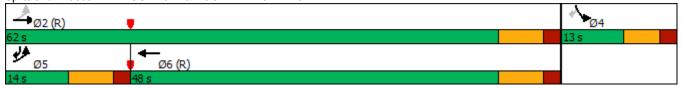
Actuated Cycle Length: 75

Offset: 48 (64%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 1: ROUTE 322 & ROCK RAYMOND ROAD



|   |      |               | _        |              |      |      |
|---|------|---------------|----------|--------------|------|------|
|   | •    | $\rightarrow$ | ←        | •            | -    | 4    |
| Movement                                      | EBL  | EBT           | WBT      | WBR          | SBL  | SBR  |
| Lane Configurations                           | ሻ    | <b>†</b>      | <b>^</b> |              | ች    | 7    |
| Traffic Volume (veh/h)                        | 81   | 489           | 467      | 46           | 62   | 92   |
| Future Volume (veh/h)                         | 81   | 489           | 467      | 46           | 62   | 92   |
| Number  | 5    | 2             | 6        | 16           | 7    | 14   |
| Initial Q (Qb), veh                           | 0    | 0             | 0        | 0            | 0    | 0    |
| Ped-Bike Adj(A_pbT)                           | 1.00 |               |          | 1.00         | 1.00 | 1.00 |
| Parking Bus, Adj                              | 1.00 | 1.00          | 1.00     | 1.00         | 1.00 | 1.00 |
| Adj Sat Flow, veh/h/ln                        | 1731 | 1872          | 1810     | 1764         | 1791 | 1739 |
| Adj Flow Rate, veh/h                          | 85   | 515           | 492      | 46           | 65   | 53   |
| Adj No. of Lanes                              | 1    | 1             | 1        | 0            | 1    | 1    |
| Peak Hour Factor                              | 0.95 | 0.95          | 0.95     | 0.95         | 0.95 | 0.95 |
| Percent Heavy Veh, %                          | 5    | 1             | 1        | 1            | 0.00 | 3    |
| Cap, veh/h                                    | 581  | 1452          | 1046     | 98           | 133  | 195  |
| Arrive On Green                               | 0.11 | 1.00          | 0.64     | 0.63         | 0.08 | 0.08 |
| Sat Flow, veh/h                               | 1649 | 1872          | 1631     | 152          | 1706 | 1478 |
|   | 85   | 515           | 0        | 538          | 65   | 53   |
| Grp Volume(v), veh/h Grp Sat Flow(s),veh/h/ln | 1649 | 1872          | 0        | 1783         | 1706 | 1478 |
|   | 1.1  | 0.0           | 0.0      | 11.6         | 2.7  | 2.4  |
| Q Serve(g_s), s                               | 1.1  | 0.0           | 0.0      | 11.6         | 2.7  | 2.4  |
| Cycle Q Clear(g_c), s                         | 1.00 | 0.0           | 0.0      | 0.09         | 1.00 | 1.00 |
| Prop In Lane                                  |      | 1450          | 0        |              | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h                        | 581  | 1452          | 0.00     | 1144<br>0.47 |      | 0.27 |
| V/C Ratio(X)                                  | 0.15 | 0.35          | 0.00     |              | 0.49 | 237  |
| Avail Cap(c_a), veh/h                         | 668  | 1452          | 1.00     | 1144         | 182  |      |
| HCM Platoon Ratio                             | 2.00 | 2.00          | 1.00     | 1.00         | 1.00 | 1.00 |
| Upstream Filter(I)                            | 1.00 | 1.00          | 0.00     | 1.00         | 1.00 | 1.00 |
| Uniform Delay (d), s/veh                      | 4.0  | 0.0           | 0.0      | 6.9          | 33.2 | 29.3 |
| Incr Delay (d2), s/veh                        | 0.1  | 0.7           | 0.0      | 1.4          | 2.8  | 0.7  |
| Initial Q Delay(d3),s/veh                     | 0.0  | 0.0           | 0.0      | 0.0          | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln                      | 0.8  | 0.5           | 0.0      | 10.2         | 2.5  | 3.8  |
| LnGrp Delay(d),s/veh                          | 4.2  | 0.7           | 0.0      | 8.3          | 35.9 | 30.1 |
| LnGrp LOS                                     | Α    | Α             |          | Α            | D    | С    |
| Approach Vol, veh/h                           |      | 600           | 538      |              | 118  |      |
| Approach Delay, s/veh                         |      | 1.2           | 8.3      |              | 33.3 |      |
| Approach LOS                                  |      | Α             | Α        |              | С    |      |
| Timer   | 1    | 2             | 3        | 4            | 5    | 6    |
| Assigned Phs                                  |      | 2             |          | 4            | 5    | 6    |
| Phs Duration (G+Y+Rc), s                      |      | 64.2          |          | 10.8         | 10.0 | 54.1 |
| Change Period (Y+Rc), s                       |      | 7.0           |          | 6.0          | 7.0  | 7.0  |
| Max Green Setting (Gmax), s                   |      | 55.0          |          | 7.0          | 7.0  | 41.0 |
| Max Q Clear Time (g_c+l1), s                  |      | 2.5           |          | 5.2          | 3.6  | 13.6 |
| Green Ext Time (p_c), s                       |      | 1.9           |          | 0.1          | 0.1  | 2.1  |
| Intersection Summary                          |      |               |          |              |      |      |
| HCM 2010 Ctrl Delay                           |      |               | 7.2      |              |      |      |
| HCM 2010 LOS                                  |      |               | Α.Δ      |              |      |      |
| TION ZUTU LOG                                 |      |               |          |              |      |      |

|                         | ۶     | <b>→</b> | •     | •     | +        | •     | •     | <b>†</b> | ~     | <b>/</b> | ţ     | 4    |
|-------------------------|-------|----------|-------|-------|----------|-------|-------|----------|-------|----------|-------|------|
| Lane Group              | EBL   | EBT      | EBR   | WBL   | WBT      | WBR   | NBL   | NBT      | NBR   | SBL      | SBT   | SBR  |
| Lane Configurations     | 7     | <b>†</b> | 7     | 7     | <b>†</b> | 7     |       | ર્ન      | 7     |          | 4     |      |
| Traffic Volume (vph)    | 54    | 521      | 219   | 67    | 484      | 46    | 191   | 21       | 56    | 19       | 15    | 78   |
| Future Volume (vph)     | 54    | 521      | 219   | 67    | 484      | 46    | 191   | 21       | 56    | 19       | 15    | 78   |
| Ideal Flow (vphpl)      | 1800  | 1800     | 1800  | 1800  | 1800     | 1800  | 1800  | 1800     | 1800  | 1800     | 1800  | 1800 |
| Lane Width (ft)         | 10    | 12       | 12    | 10    | 11       | 12    | 12    | 11       | 11    | 12       | 15    | 12   |
| Grade (%)               |       | 0%       |       |       | -1%      |       |       | -1%      |       |          | 2%    |      |
| Storage Length (ft)     | 190   |          | 0     | 150   |          | 150   | 0     |          | 150   | 0        |       | 0    |
| Storage Lanes           | 1     |          | 1     | 1     |          | 1     | 0     |          | 1     | 0        |       | 0    |
| Taper Length (ft)       | 25    |          |       | 25    |          |       | 25    |          |       | 25       |       |      |
| Right Turn on Red       |       |          | Yes   |       |          | Yes   |       |          | Yes   |          |       | Yes  |
| Link Speed (mph)        |       | 45       |       |       | 45       |       |       | 35       |       |          | 25    |      |
| Link Distance (ft)      |       | 551      |       |       | 297      |       |       | 312      |       |          | 194   |      |
| Travel Time (s)         |       | 8.3      |       |       | 4.5      |       |       | 6.1      |       |          | 5.3   |      |
| Confl. Peds. (#/hr)     | 2     |          | 2     |       |          |       |       |          |       |          |       |      |
| Peak Hour Factor        | 0.95  | 0.95     | 0.95  | 0.95  | 0.95     | 0.95  | 0.95  | 0.95     | 0.95  | 0.95     | 0.95  | 0.95 |
| Heavy Vehicles (%)      | 2%    | 1%       | 1%    | 0%    | 1%       | 0%    | 1%    | 0%       | 3%    | 0%       | 0%    | 5%   |
| Shared Lane Traffic (%) |       |          |       |       |          |       |       |          |       |          |       |      |
| Turn Type               | Perm  | NA       | Perm  | pm+pt | NA       | Perm  | Perm  | NA       | pm+ov | Perm     | NA    |      |
| Protected Phases        |       | 2        |       | 1     | 6        |       |       | 8        | 1     |          | 4     |      |
| Permitted Phases        | 2     |          | 2     | 6     |          | 6     | 8     |          | 8     | 4        |       |      |
| Detector Phase          | 2     | 2        | 2     | 1     | 6        | 6     | 8     | 8        | 1     | 4        | 4     |      |
| Switch Phase            |       |          |       |       |          |       |       |          |       |          |       |      |
| Minimum Initial (s)     | 13.0  | 13.0     | 13.0  | 3.0   | 13.0     | 13.0  | 3.0   | 3.0      | 3.0   | 3.0      | 3.0   |      |
| Minimum Split (s)       | 40.0  | 40.0     | 40.0  | 10.0  | 40.0     | 40.0  | 13.0  | 13.0     | 10.0  | 13.0     | 13.0  |      |
| Total Split (s)         | 37.0  | 37.0     | 37.0  | 13.0  | 50.0     | 50.0  | 25.0  | 25.0     | 13.0  | 25.0     | 25.0  |      |
| Total Split (%)         | 49.3% | 49.3%    | 49.3% | 17.3% | 66.7%    | 66.7% | 33.3% | 33.3%    | 17.3% | 33.3%    | 33.3% |      |
| Yellow Time (s)         | 5.0   | 5.0      | 5.0   | 5.0   | 5.0      | 5.0   | 3.0   | 3.0      | 5.0   | 3.0      | 3.0   |      |
| All-Red Time (s)        | 2.0   | 2.0      | 2.0   | 2.0   | 2.0      | 2.0   | 3.0   | 3.0      | 2.0   | 3.0      | 3.0   |      |
| Lost Time Adjust (s)    | -1.0  | -1.0     | -1.0  | -1.0  | -1.0     | -1.0  |       | -1.0     | -1.0  |          | -1.0  |      |
| Total Lost Time (s)     | 6.0   | 6.0      | 6.0   | 6.0   | 6.0      | 6.0   |       | 5.0      | 6.0   |          | 5.0   |      |
| Lead/Lag                | Lag   | Lag      | Lag   | Lead  |          |       |       |          | Lead  |          |       |      |
| Lead-Lag Optimize?      | Yes   | Yes      | Yes   | Yes   |          |       |       |          | Yes   |          |       |      |
| Recall Mode             | C-Max | C-Max    | C-Max | None  | C-Max    | C-Max | None  | None     | None  | None     | None  |      |

### Intersection Summary

Area Type: Other

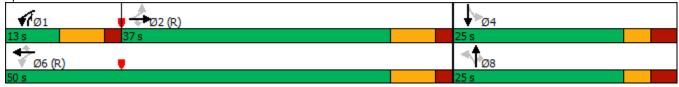
Cycle Length: 75
Actuated Cycle Length: 75

Offset: 50 (67%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated





|                              | •    | -        | *    | •    | •        | •    | 1    | Ť    |      | -    | ¥    | 4    |
|------------------------------|------|----------|------|------|----------|------|------|------|------|------|------|------|
| Movement                     | EBL  | EBT      | EBR  | WBL  | WBT      | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations          | 7    | <b>↑</b> | 7    | ሻ    | <b>↑</b> | 7    |      | 4    | 7    |      | 4    |      |
| Traffic Volume (veh/h)       | 54   | 521      | 219  | 67   | 484      | 46   | 191  | 21   | 56   | 19   | 15   | 78   |
| Future Volume (veh/h)        | 54   | 521      | 219  | 67   | 484      | 46   | 191  | 21   | 56   | 19   | 15   | 78   |
| Number                       | 5    | 2        | 12   | 1    | 6        | 16   | 3    | 8    | 18   | 7    | 4    | 14   |
| Initial Q (Qb), veh          | 0    | 0        | 0    | 1    | 0        | 0    | 6    | 1    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |          | 1.00 | 1.00 |          | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00     | 1.00 | 1.00 | 1.00     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj Sat Flow, veh/h/ln       | 1765 | 1782     | 1782 | 1809 | 1791     | 1809 | 1809 | 1793 | 1756 | 1782 | 1791 | 1782 |
| Adj Flow Rate, veh/h         | 57   | 548      | 169  | 71   | 509      | 42   | 201  | 22   | 27   | 20   | 16   | 44   |
| Adj No. of Lanes             | 1    | 1        | 1    | 1    | 1        | 1    | 0    | 1    | 1    | 0    | 1    | 0    |
| Peak Hour Factor             | 0.95 | 0.95     | 0.95 | 0.95 | 0.95     | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %         | 2    | 1        | 1    | 0    | 1        | 0    | 0    | 0    | 3    | 0    | 0    | 0    |
| Cap, veh/h                   | 515  | 924      | 784  | 403  | 1166     | 1001 | 342  | 30   | 381  | 114  | 98   | 185  |
| Arrive On Green              | 0.52 | 0.52     | 0.52 | 0.10 | 1.00     | 1.00 | 0.20 | 0.20 | 0.20 | 0.19 | 0.20 | 0.19 |
| Sat Flow, veh/h              | 808  | 1782     | 1512 | 1723 | 1791     | 1538 | 1255 | 137  | 1493 | 266  | 484  | 917  |
| Grp Volume(v), veh/h         | 57   | 548      | 169  | 71   | 509      | 42   | 223  | 0    | 27   | 80   | 0    | 0    |
| Grp Sat Flow(s),veh/h/ln     | 808  | 1782     | 1512 | 1723 | 1791     | 1538 | 1392 | 0    | 1493 | 1667 | 0    | 0    |
| Q Serve(g_s), s              | 2.7  | 16.0     | 4.5  | 1.3  | 0.0      | 0.0  | 8.6  | 0.0  | 1.0  | 0.0  | 0.0  | 0.0  |
| Cycle Q Clear(g_c), s        | 2.7  | 16.0     | 4.5  | 1.3  | 0.0      | 0.0  | 11.2 | 0.0  | 1.0  | 3.1  | 0.0  | 0.0  |
| Prop In Lane                 | 1.00 |          | 1.00 | 1.00 |          | 1.00 | 0.90 |      | 1.00 | 0.25 |      | 0.55 |
| Lane Grp Cap(c), veh/h       | 515  | 924      | 784  | 403  | 1166     | 1001 | 373  | 0    | 381  | 374  | 0    | 0    |
| V/C Ratio(X)                 | 0.11 | 0.59     | 0.22 | 0.18 | 0.44     | 0.04 | 0.60 | 0.00 | 0.07 | 0.21 | 0.00 | 0.00 |
| Avail Cap(c_a), veh/h        | 516  | 927      | 786  | 475  | 1168     | 1003 | 458  | 0    | 476  | 472  | 0    | 0    |
| HCM Platoon Ratio            | 1.00 | 1.00     | 1.00 | 2.00 | 2.00     | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00     | 1.00 | 1.00 | 1.00     | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Uniform Delay (d), s/veh     | 9.4  | 12.6     | 9.8  | 8.3  | 0.0      | 0.0  | 28.2 | 0.0  | 21.2 | 25.5 | 0.0  | 0.0  |
| Incr Delay (d2), s/veh       | 0.4  | 2.8      | 0.6  | 0.2  | 1.2      | 0.1  | 1.5  | 0.0  | 0.1  | 0.3  | 0.0  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0      | 0.0  | 0.1  | 0.0      | 0.0  | 0.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 1.2  | 13.3     | 3.6  | 1.2  | 0.7      | 0.0  | 8.2  | 0.0  | 0.8  | 2.6  | 0.0  | 0.0  |
| LnGrp Delay(d),s/veh         | 9.8  | 15.4     | 10.4 | 8.5  | 1.2      | 0.1  | 29.8 | 0.0  | 21.3 | 25.7 | 0.0  | 0.0  |
| LnGrp LOS                    | A    | В        | В    | Α    | Α        | Α    | С    |      | С    | С    |      |      |
| Approach Vol, veh/h          |      | 774      |      |      | 622      |      |      | 250  |      |      | 80   |      |
| Approach Delay, s/veh        |      | 13.9     |      |      | 2.0      |      |      | 28.9 |      |      | 25.7 |      |
| Approach LOS                 |      | В        |      |      | А        |      |      | С    |      |      | С    |      |
| Timer                        | 1    | 2        | 3    | 4    | 5        | 6    | 7    | 8    |      |      |      |      |
| Assigned Phs                 | 1    | 2        |      | 4    |          | 6    |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 9.9  | 45.0     |      | 20.1 |          | 54.9 |      | 20.1 |      |      |      |      |
| Change Period (Y+Rc), s      | 7.0  | 7.0      |      | 6.0  |          | 7.0  |      | 6.0  |      |      |      |      |
| Max Green Setting (Gmax), s  | 6.0  | 30.0     |      | 19.0 |          | 43.0 |      | 19.0 |      |      |      |      |
| Max Q Clear Time (g_c+l1), s | 3.8  | 18.5     |      | 5.1  |          | 2.5  |      | 13.7 |      |      |      |      |
| Green Ext Time (p_c), s      | 0.0  | 2.5      |      | 0.2  |          | 2.0  |      | 0.4  |      |      |      |      |
| Intersection Summary         |      |          |      |      |          |      |      |      |      |      |      |      |
| HCM 2010 Ctrl Delay          |      |          | 12.3 |      |          |      |      |      |      |      |      |      |
| HCM 2010 LOS                 |      |          | В    |      |          |      |      |      |      |      |      |      |
| Notes                        |      |          |      |      |          |      |      |      |      |      |      |      |
|                              |      |          |      |      |          |      |      |      |      |      |      |      |

|                         | ٠     | <b>→</b> | ←     | •    | <b>\</b> | 4    |
|-------------------------|-------|----------|-------|------|----------|------|
| Lane Group              | EBL   | EBT      | WBT   | WBR  | SBL      | SBR  |
| Lane Configurations     | ሻ     | <b>†</b> | f)    | _    | ሻ        | 7    |
| Traffic Volume (vph)    | 26    | 961      | 401   | 148  | 242      | 538  |
| Future Volume (vph)     | 26    | 961      | 401   | 148  | 242      | 538  |
| Ideal Flow (vphpl)      | 1800  | 1800     | 1800  | 1800 | 1800     | 1800 |
| Lane Width (ft)         | 16    | 12       | 12    | 12   | 15       | 15   |
| Grade (%)               |       | -3%      | 2%    |      | 0%       |      |
| Storage Length (ft)     | 75    |          |       | 0    | 0        | 0    |
| Storage Lanes           | 1     |          |       | 0    | 1        | 1    |
| Taper Length (ft)       | 25    |          |       |      | 25       |      |
| Right Turn on Red       |       |          |       | Yes  |          | Yes  |
| Link Speed (mph)        |       | 45       | 45    |      | 25       |      |
| Link Distance (ft)      |       | 830      | 280   |      | 317      |      |
| Travel Time (s)         |       | 12.6     | 4.2   |      | 8.6      |      |
| Peak Hour Factor        | 0.94  | 0.94     | 0.94  | 0.94 | 0.94     | 0.94 |
| Heavy Vehicles (%)      | 0%    | 1%       | 1%    | 0%   | 1%       | 2%   |
| Shared Lane Traffic (%) |       |          |       |      |          |      |
| Turn Type               | Perm  | NA       | NA    |      | Prot     | Free |
| Protected Phases        |       | 2        | 6     |      | 4        |      |
| Permitted Phases        | 2     |          |       |      |          | Free |
| Detector Phase          | 2     | 2        | 6     |      | 4        |      |
| Switch Phase            |       |          |       |      |          |      |
| Minimum Initial (s)     | 15.0  | 15.0     | 15.0  |      | 3.0      |      |
| Minimum Split (s)       | 22.0  | 22.0     | 22.0  |      | 13.0     |      |
| Total Split (s)         | 56.0  | 56.0     | 56.0  |      | 19.0     |      |
| Total Split (%)         | 74.7% | 74.7%    | 74.7% |      | 25.3%    |      |
| Yellow Time (s)         | 5.0   | 5.0      | 5.0   |      | 4.0      |      |
| All-Red Time (s)        | 2.0   | 2.0      | 2.0   |      | 2.0      |      |
| Lost Time Adjust (s)    | -1.0  | -1.0     | -1.0  |      | -1.0     |      |
| Total Lost Time (s)     | 6.0   | 6.0      | 6.0   |      | 5.0      |      |
| Lead/Lag                |       |          |       |      |          |      |
| Lead-Lag Optimize?      |       |          |       |      |          |      |
| Recall Mode             | C-Max | C-Max    | C-Max |      | None     |      |
| Intersection Summary    |       |          |       |      |          |      |
| A see Trans             | Othor |          |       |      |          |      |

Area Type: Other

Cycle Length: 75

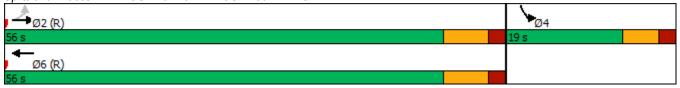
Actuated Cycle Length: 75

Offset: 17 (23%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 4: ROUTE 322 & WB ROUTE 30 RAMPS



|                              | •    |          | _    | 4    |      |      |
|------------------------------|------|----------|------|------|------|------|
|                              |      | -        | -    | -    | -    | *    |
| Movement                     | EBL  | EBT      | WBT  | WBR  | SBL  | SBR  |
| Lane Configurations          | ሻ    | <b>†</b> | f)   |      | J.   | 7    |
| Traffic Volume (veh/h)       | 26   | 961      | 401  | 148  | 242  | 538  |
| Future Volume (veh/h)        | 26   | 961      | 401  | 148  | 242  | 538  |
| Number                       | 5    | 2        | 6    | 16   | 7    | 14   |
| Initial Q (Qb), veh          | 0    | 0        | 0    | 0    | 1    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |          |      | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00     | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj Sat Flow, veh/h/ln       | 1900 | 1809     | 1769 | 1782 | 1853 | 1835 |
| Adj Flow Rate, veh/h         | 28   | 1022     | 427  | 0    | 257  | 0    |
| Adj No. of Lanes             | 1    | 1        | 1    | 0    | 1    | 1    |
| Peak Hour Factor             | 0.94 | 0.94     | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, %         | 0    | 1        | 1    | 1    | 1    | 2    |
| Cap, veh/h                   | 645  | 1209     | 1182 | 0    | 327  | 289  |
| Arrive On Green              | 0.67 | 0.67     | 0.67 | 0.00 | 0.18 | 0.00 |
| Sat Flow, veh/h              | 976  | 1809     | 1769 | 0    | 1765 | 1560 |
| Grp Volume(v), veh/h         | 28   | 1022     | 427  | 0    | 257  | 0    |
| Grp Sat Flow(s), veh/h/ln    | 976  | 1809     | 1769 | 0    | 1765 | 1560 |
| Q Serve(g_s), s              | 1.0  | 32.3     | 7.9  | 0.0  | 10.4 | 0.0  |
| Cycle Q Clear(g_c), s        | 8.9  | 32.3     | 7.9  | 0.0  | 10.4 | 0.0  |
| Prop In Lane                 | 1.00 | JZ.J     | 1.3  | 0.00 | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h       | 645  | 1209     | 1182 | 0.00 | 327  | 289  |
| V/C Ratio(X)                 | 0.04 | 0.85     | 0.36 | 0.00 | 0.79 | 0.00 |
| Avail Cap(c_a), veh/h        | 645  | 1209     | 1182 | 0.00 | 330  | 291  |
| HCM Platoon Ratio            | 1.00 | 1.00     | 1.00 | 1.00 | 1.00 | 1.00 |
|                              | 1.00 | 1.00     | 1.00 | 0.00 | 1.00 | 0.00 |
| Upstream Filter(I)           | 7.4  |          | 5.4  |      | 29.2 | 0.00 |
| Uniform Delay (d), s/veh     |      | 9.5      |      | 0.0  |      |      |
| Incr Delay (d2), s/veh       | 0.1  | 7.4      | 0.9  | 0.0  | 12.5 | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0      | 0.0  | 0.0  | 0.3  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 0.5  | 25.1     | 7.3  | 0.0  | 10.4 | 0.0  |
| LnGrp Delay(d),s/veh         | 7.5  | 16.8     | 6.3  | 0.0  | 42.1 | 0.0  |
| LnGrp LOS                    | A    | В        | A    |      | D    |      |
| Approach Vol, veh/h          |      | 1050     | 427  |      | 257  |      |
| Approach Delay, s/veh        |      | 16.6     | 6.3  |      | 42.1 |      |
| Approach LOS                 |      | В        | Α    |      | D    |      |
| Timer                        | 1    | 2        | 3    | 4    | 5    | 6    |
| Assigned Phs                 |      | 2        |      | 4    |      | 6    |
| Phs Duration (G+Y+Rc), s     |      | 56.1     |      | 18.9 |      | 56.1 |
| Change Period (Y+Rc), s      |      | 7.0      |      | 6.0  |      | 7.0  |
| Max Green Setting (Gmax), s  |      | 49.0     |      | 13.0 |      | 49.0 |
| Max Q Clear Time (g_c+l1), s |      | 34.8     |      | 12.9 |      | 10.4 |
| Green Ext Time (p_c), s      |      | 4.4      |      | 0.0  |      | 1.5  |
| ,                            |      | 4.4      |      | 0.0  |      | 1.0  |
| Intersection Summary         |      |          |      |      |      |      |
| HCM 2010 Ctrl Delay          |      |          | 17.8 |      |      |      |
| HCM 2010 LOS                 |      |          | В    |      |      |      |
|                              |      |          |      |      |      |      |

### 3: EB ROUTE 30 RAMPS & ROUTE 322 2023 BASE CONDITIONS

Timing Plan: SAT Peak

|                         | -        | •    | •    | •        | 1    | ~    |
|-------------------------|----------|------|------|----------|------|------|
| Lane Group              | EBT      | EBR  | WBL  | WBT      | NBL  | NBR  |
| Lane Configurations     | <b>↑</b> | 7    | ሻ    | <b>^</b> | 7    | 7    |
| Traffic Volume (vph)    | 613      | 607  | 246  | 497      | 29   | 185  |
| Future Volume (vph)     | 613      | 607  | 246  | 497      | 29   | 185  |
| Ideal Flow (vphpl)      | 1800     | 1800 | 1800 | 1800     | 1800 | 1800 |
| Lane Width (ft)         | 13       | 12   | 12   | 13       | 13   | 14   |
| Grade (%)               | -6%      |      |      | 7%       | -5%  |      |
| Storage Length (ft)     |          | 0    | 250  |          | 0    | 0    |
| Storage Lanes           |          | 1    | 1    |          | 1    | 1    |
| Taper Length (ft)       |          |      | 25   |          | 25   |      |
| Link Speed (mph)        | 45       |      |      | 45       | 25   |      |
| Link Distance (ft)      | 353      |      |      | 551      | 313  |      |
| Travel Time (s)         | 5.3      |      |      | 8.3      | 8.5  |      |
| Peak Hour Factor        | 0.96     | 0.96 | 0.96 | 0.96     | 0.96 | 0.96 |
| Heavy Vehicles (%)      | 1%       | 2%   | 2%   | 1%       | 0%   | 1%   |
| Shared Lane Traffic (%) |          |      |      |          |      |      |

Area Type:

Other

### 3: EB ROUTE 30 RAMPS & ROUTE 322 2023 BASE CONDITIONS

Timing Plan: SAT Peak

| Intersection  |                       |             |                                |             |   |                                   |
|---|-----------------------|-------------|--------------------------------|-------------|---|-----------------------------------|
| Int Delay, s/veh  | 3.9                   |             |                                |             |   |                                   |
| Movement  | EBT                   | EBR         | WBL                            | WBT         | NBL   | NBR                               |
| Lane Configurations   | <b>^</b>              | 7           | ች                              | <b>†</b>    | *   | 7                                 |
| Traffic Vol., veh/h   | 613                   | 607         | 246                            | 497         | 29  | 185                               |
| Future Vol., veh/h  | 613                   | 607         | 246                            | 497         | 29  | 185                               |
| Conflicting Peds, #/hr  | 0                     | 0           | 0                              | 0           | 0   | 0                                 |
| Sign Control  | Free                  | Free        | Free                           | Free        | Stop  | Stop                              |
| RT Channelized  | -                     | Yield       | -                              | None        | -   | Stop                              |
| Storage Length  | -                     | 0           | 250                            | -           | 0   | 0                                 |
| Veh in Median Storage   | e, # 0                | -           | -                              | 0           | 0   | -                                 |
| Grade, %  | -6                    | -           | -                              | 7           | -5  | -                                 |
| Peak Hour Factor  | 96                    | 96          | 96                             | 96          | 96  | 96                                |
| Heavy Vehicles, %   | 1                     | 2           | 2                              | 1           | 0   | 1                                 |
| Mvmt Flow   | 639                   | 632         | 256                            | 518         | 30  | 193                               |
|   |                       |             |                                |             |   |                                   |
| Major/Minor   | Major1                | ı           | Major2                         | ı           | Minor1  |                                   |
| Conflicting Flow All  | 0                     | 0           | 639                            | 0           | 1669  | 639                               |
| Stage 1   | -                     | -           | _                              |             |   |                                   |
|   |                       |             | _                              | -           | 639   | -                                 |
| Stage 2   | -                     | -           | -                              | -           |   |                                   |
| Stage 2<br>Critical Hdwy  | -                     | -           |                                |             | 639   |                                   |
|   |                       |             | -                              |             | 639<br>1030<br>5.4<br>4.4   | -                                 |
| Critical Hdwy   | -                     | -           | -                              |             | 639<br>1030<br>5.4  | -                                 |
| Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy  | -                     | -           | 4.3                            | -           | 639<br>1030<br>5.4<br>4.4<br>4.4<br>3                                 | 5.71                              |
| Critical Hdwy<br>Critical Hdwy Stg 1<br>Critical Hdwy Stg 2   |                       | -           | 4.3                            | -<br>-<br>- | 639<br>1030<br>5.4<br>4.4<br>4.4<br>3<br>106                          | 5.71                              |
| Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1   | -                     | -<br>-<br>- | 4.3                            | -           | 639<br>1030<br>5.4<br>4.4<br>4.4<br>3<br>106<br>709                   | 5.71                              |
| Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2                                       | -<br>-<br>-<br>-      | -           | 4.3                            | -           | 639<br>1030<br>5.4<br>4.4<br>4.4<br>3<br>106<br>709<br>411            | 5.71                              |
| Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2 Platoon blocked, %                    | -<br>-<br>-<br>-<br>- | -           | 4.3<br>-<br>-<br>3<br>721<br>- | -           | 639<br>1030<br>5.4<br>4.4<br>4.4<br>3<br>106<br>709<br>411            | 5.71<br>-<br>-<br>3.1<br>548<br>- |
| Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2 Platoon blocked, % Mov Cap-1 Maneuver | -                     | -           | 4.3                            | -           | 639<br>1030<br>5.4<br>4.4<br>4.4<br>3<br>106<br>709<br>411<br>1<br>69 | 5.71<br>-<br>-<br>3.1<br>548      |
| Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2 Platoon blocked, %                    | -                     | -           | 4.3<br>-<br>-<br>3<br>721<br>- | -           | 639<br>1030<br>5.4<br>4.4<br>4.4<br>3<br>106<br>709<br>411            | 5.71<br>-<br>-<br>3.1<br>548<br>- |

- - - - 411 -

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 69    | 548   | -   | -   | 721   | -   |
| HCM Lane V/C Ratio    | 0.438 | 0.352 | -   | -   | 0.355 | -   |
| HCM Control Delay (s) | 92.8  | 15.1  | -   | -   | 12.7  | -   |
| HCM Lane LOS          | F     | С     | -   | -   | В     | -   |
| HCM 95th %tile Q(veh) | 1.7   | 1.6   | -   | -   | 1.6   | -   |

Stage 2

### 8: LLOYD AVENUE & PARK AND RIDE 2023 BASE CONDITIONS

Timing Plan: SAT Peak

|                         | •     | <b>→</b> | ←    | •    | <b>\</b> | 4    |
|-------------------------|-------|----------|------|------|----------|------|
|                         |       |          |      |      |          |      |
| Lane Group              | EBL   | EBT      | WBT  | WBR  | SBL      | SBR  |
| Lane Configurations     |       | 4        | ĵ.   |      | W        |      |
| Traffic Volume (vph)    | 2     | 267      | 311  | 4    | 4        | 1    |
| Future Volume (vph)     | 2     | 267      | 311  | 4    | 4        | 1    |
| Ideal Flow (vphpl)      | 1800  | 1800     | 1800 | 1800 | 1800     | 1800 |
| Lane Width (ft)         | 12    | 10       | 10   | 12   | 16       | 12   |
| Grade (%)               |       | -2%      | 1%   |      | 4%       |      |
| Link Speed (mph)        |       | 35       | 35   |      | 25       |      |
| Link Distance (ft)      |       | 287      | 312  |      | 177      |      |
| Travel Time (s)         |       | 5.6      | 6.1  |      | 4.8      |      |
| Peak Hour Factor        | 0.97  | 0.97     | 0.97 | 0.97 | 0.97     | 0.97 |
| Heavy Vehicles (%)      | 0%    | 1%       | 1%   | 25%  | 0%       | 0%   |
| Shared Lane Traffic (%) |       |          |      |      |          |      |
| Intersection Summary    |       |          |      |      |          |      |
| Area Type:              | Other |          |      |      |          |      |
| Area Type.              | Other |          |      |      |          |      |

8: LLOYD AVENUE & PARK AND RIDE 2023 BASE CONDITIONS

| Intersection           |        |      |        |      |         |      |
|------------------------|--------|------|--------|------|---------|------|
| Int Delay, s/veh       | 0.2    |      |        |      |         |      |
| Movement               | EBL    | EBT  | WBT    | WBR  | SBL     | SBR  |
| Lane Configurations    |        | 4    | ĥ      |      | Y       |      |
| Traffic Vol, veh/h     | 2      | 267  | 311    | 4    | 4       | 1    |
| Future Vol, veh/h      | 2      | 267  | 311    | 4    | 4       | 1    |
| 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  | e,# -  | 0    | 0      | -    | 0       | -    |
| Grade, %               | -      | -2   | 1      | -    | 4       | -    |
| Peak Hour Factor       | 97     | 97   | 97     | 97   | 97      | 97   |
| Heavy Vehicles, %      | 0      | 1    | 1      | 25   | 0       | 0    |
| Mvmt Flow              | 2      | 275  | 321    | 4    | 4       | 1    |
|                        |        |      |        |      |         |      |
| Major/Minor            | Major1 | ı    | Major2 | N    | /linor2 |      |
| Conflicting Flow All   | 325    | 0    | -      | 0    | 602     | 323  |
| Stage 1                | -      | -    | -      | -    | 323     | -    |
| Stage 2                | -      | -    | -      | -    | 279     | -    |
| Critical Hdwy          | 4.3    | -    | -      | -    | 7.2     | 6.6  |

| Conflicting Flow All | 325 | 0 | - | 0 | 602 | 323 |  |
|----------------------|-----|---|---|---|-----|-----|--|
| Stage 1              | -   | - | - | - | 323 | -   |  |
| Stage 2              | -   | - | - | - | 279 | -   |  |
| Critical Hdwy        | 4.3 | - | - | - | 7.2 | 6.6 |  |
| Critical Hdwy Stg 1  | -   | - | - | - | 6.2 | -   |  |
| Critical Hdwy Stg 2  | -   | - | - | - | 6.2 | -   |  |
| Follow-up Hdwy       | 3   | - | - | - | 3   | 3.1 |  |
| Pot Cap-1 Maneuver   | 929 | - | - | - | 458 | 736 |  |
| Stage 1              | -   | - | - | - | 785 | -   |  |
| Stage 2              | -   | - | - | - | 832 | -   |  |
| Platoon blocked, %   |     | - | - | - |     |     |  |
| Mov Cap-1 Maneuver   | 929 | - | - | - | 457 | 736 |  |
| Mov Cap-2 Maneuver   | -   | - | - | - | 457 | -   |  |
| Stage 1              | -   | - | - | - | 783 | -   |  |
| Stage 2              | -   | - | - | - | 832 | -   |  |
|                      |     |   |   |   |     |     |  |
|                      |     |   |   |   |     |     |  |

| Approach              | EB  | WB      |     | SB        |
|-----------------------|-----|---------|-----|-----------|
| HCM Control Delay, s  | 0.1 | 0       |     | 12.4      |
| HCM LOS               |     |         |     | В         |
|                       |     |         |     |           |
|                       |     |         |     |           |
| Minor Lane/Major Mvmt | i   | EBL EBT | WBT | WBR SBLn1 |
| 0 " ( 1 ")            |     |         |     |           |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | W | BR S | BLn1 |
|-----------------------|-------|-----|-----|---|------|------|
| Capacity (veh/h)      | 929   | -   | -   |   | -    | 494  |
| HCM Lane V/C Ratio    | 0.002 | -   | -   |   | -    | 0.01 |
| HCM Control Delay (s) | 8.9   | 0   | -   |   | -    | 12.4 |
| HCM Lane LOS          | Α     | Α   | -   |   | -    | В    |
| HCM 95th %tile Q(veh) | 0     | -   | -   |   | -    | 0    |

### 9: LLOYD AVENUE & GO CARLSON BLVD 2023 BASE CONDITIONS

Timing Plan: SAT Peak

|                         | •     | •    | 4    | <b>†</b> | ļ    | 4    |
|-------------------------|-------|------|------|----------|------|------|
| Lane Group              | EBL   | EBR  | NBL  | NBT      | SBT  | SBR  |
| Lane Configurations     | W     |      |      | ની       | ĵ»   |      |
| Traffic Volume (vph)    | 62    | 22   | 19   | 204      | 244  | 68   |
| Future Volume (vph)     | 62    | 22   | 19   | 204      | 244  | 68   |
| Ideal Flow (vphpl)      | 1800  | 1800 | 1800 | 1800     | 1800 | 1000 |
| Lane Width (ft)         | 12    | 12   | 12   | 10       | 10   | 12   |
| Grade (%)               | 2%    |      |      | 1%       | -2%  |      |
| Link Speed (mph)        | 35    |      |      | 35       | 35   |      |
| Link Distance (ft)      | 1394  |      |      | 471      | 183  |      |
| Travel Time (s)         | 27.2  |      |      | 9.2      | 3.6  |      |
| Peak Hour Factor        | 0.96  | 0.96 | 0.96 | 0.96     | 0.96 | 0.96 |
| Heavy Vehicles (%)      | 2%    | 0%   | 0%   | 0%       | 1%   | 2%   |
| Shared Lane Traffic (%) |       |      |      |          |      |      |
| Intersection Summary    |       |      |      |          |      |      |
| Area Type:              | Other |      |      |          |      |      |

### 9: LLOYD AVENUE & GO CARLSON BLVD 2023 BASE CONDITIONS

| Intersection           |        |      |        |      |        |      |
|------------------------|--------|------|--------|------|--------|------|
| Int Delay, s/veh       | 2      |      |        |      |        |      |
| <u> </u>               |        |      | ND     | NDT  | 007    | 000  |
| Movement               | EBL    | EBR  | NBL    | NBT  | SBT    | SBR  |
| Lane Configurations    | Y      |      |        | ની   | ٦      |      |
| Traffic Vol, veh/h     | 62     | 22   | 19     | 204  | 244    | 68   |
| Future Vol, veh/h      | 62     | 22   | 19     | 204  | 244    | 68   |
| 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, %               | 2      | -    | -      | 1    | -2     | -    |
| Peak Hour Factor       | 96     | 96   | 96     | 96   | 96     | 96   |
| Heavy Vehicles, %      | 2      | 0    | 0      | 0    | 1      | 2    |
| Mvmt Flow              | 65     | 23   | 20     | 213  | 254    | 71   |
|                        |        |      |        |      |        |      |
| NA = i = =/NAi== = =   | M:0    |      | 4-14   |      | 4-:0   |      |
| -,                     | Minor2 |      | Major1 |      | Major2 |      |
| Conflicting Flow All   | 543    | 290  | 325    | 0    | -      | 0    |
| Stage 1                | 290    | -    | -      | -    | -      | -    |
| Stage 2                | 253    | -    | -      | -    | -      | -    |
| Critical Hdwy          | 6.82   | 6.4  | 4.3    | -    | -      | -    |
| Critical Hdwy Stg 1    | 5.82   | -    | -      | -    | -      | -    |
| Critical Hdwy Stg 2    | 5.82   | -    | -      | -    | -      | -    |
| Follow-up Hdwy         | 3      | 3.1  | 3      | -    | -      | -    |
| Pot Cap-1 Maneuver     | 533    | 784  | 929    | -    | -      | -    |
| Stage 1                | 845    | -    | -      | -    | -      | -    |
| Stage 2                | 884    | -    | -      | -    | -      | -    |
| Platoon blocked, %     |        |      |        | -    | -      | -    |
| Mov Cap-1 Maneuver     | 520    | 784  | 929    | -    | -      | -    |
| Mov Cap-2 Maneuver     | 520    | -    | -      | -    |        | -    |
| Stage 1                | 825    | _    | _      | -    | _      | _    |
| Stage 2                | 884    | -    |        | -    |        |      |
| Olugo 2                | 001    |      |        |      |        |      |
|                        |        |      |        |      |        |      |
| Approach               | EB     |      | NB     |      | SB     |      |
| HCM Control Delay, s   | 12.5   |      | 8.0    |      | 0      |      |
| HCM LOS                | В      |      |        |      |        |      |
|                        |        |      |        |      |        |      |
|                        |        |      |        |      |        |      |

| pacity (veh/h) 929 - 570      |
|-------------------------------|
| M Control Delay (s) 9 0 12.5  |
| M Lane LOS A A B              |
|                               |
| M 95th %tile Q(veh) 0.1 - 0.5 |
|                               |

### 10: LLOYD AVENUE & BEAVER RUN ROAD 2023 BASE CONDITIONS

Timing Plan: SAT Peak

|                         | •     | `    | 4    | <b>†</b> | Ţ    | 4    |
|-------------------------|-------|------|------|----------|------|------|
|                         |       | •    | ٠,   | '        | *    |      |
| Lane Group              | EBL   | EBR  | NBL  | NBT      | SBT  | SBR  |
| Lane Configurations     | W     |      |      | ર્ન      | ĵ»   |      |
| Traffic Volume (vph)    | 5     | 10   | 3    | 221      | 257  | 9    |
| Future Volume (vph)     | 5     | 10   | 3    | 221      | 257  | 9    |
| Ideal Flow (vphpl)      | 1800  | 1800 | 1800 | 1800     | 1800 | 1800 |
| Lane Width (ft)         | 13    | 12   | 12   | 10       | 10   | 12   |
| Grade (%)               | 1%    |      |      | 1%       | -1%  |      |
| Link Speed (mph)        | 25    |      |      | 35       | 35   |      |
| Link Distance (ft)      | 1436  |      |      | 307      | 471  |      |
| Travel Time (s)         | 39.2  |      |      | 6.0      | 9.2  |      |
| Peak Hour Factor        | 0.90  | 0.90 | 0.90 | 0.90     | 0.90 | 0.90 |
| Heavy Vehicles (%)      | 0%    | 0%   | 0%   | 0%       | 0%   | 0%   |
| Shared Lane Traffic (%) |       |      |      |          |      |      |
| Intersection Summary    |       |      |      |          |      |      |
| Area Type:              | Other |      |      |          |      |      |

### 10: LLOYD AVENUE & BEAVER RUN ROAD 2023 BASE CONDITIONS

| Intersection           |       |          | _      |           |           |      |
|------------------------|-------|----------|--------|-----------|-----------|------|
| Int Delay, s/veh       | 0.4   |          |        |           |           |      |
|                        | •••   | EDD      | NDI    | NDT       | CDT       | CDD  |
| Movement               | EBL   | EBR      | NBL    | NBT       | SBT       | SBR  |
| Lane Configurations    | Y     | 40       | ^      | 4         | <b>^}</b> | ^    |
| Traffic Vol, veh/h     | 5     | 10       | 3      | 221       | 257       | 9    |
| Future Vol, veh/h      | 5     | 10       | 3      | 221       | 257       | 9    |
| 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         | -    |
| Grade, %               | 1     | -        | -      | 1         | -1        | -    |
| Peak Hour Factor       | 90    | 90       | 90     | 90        | 90        | 90   |
| Heavy Vehicles, %      | 0     | 0        | 0      | 0         | 0         | 0    |
| Mvmt Flow              | 6     | 11       | 3      | 246       | 286       | 10   |
|                        |       |          |        |           |           |      |
| Major/Minor M          | inor2 |          | Major1 |           | Major2    |      |
|                        |       |          |        |           |           | _    |
| Conflicting Flow All   | 543   | 291      | 296    | 0         | -         | 0    |
| Stage 1                | 291   | -        | -      | -         | -         | -    |
| Stage 2                | 252   | -        | -      | -         | -         | -    |
| Critical Hdwy          | 6.6   | 6.3      | 4.3    | -         | -         | -    |
| Critical Hdwy Stg 1    | 5.6   | -        | -      | -         | -         | -    |
| Critical Hdwy Stg 2    | 5.6   | -        | -      | -         | -         | -    |
| Follow-up Hdwy         | 3     | 3.1      | 3      | -         | -         | -    |
| Pot Cap-1 Maneuver     | 551   | 789      | 951    | -         | -         | -    |
| Stage 1                | 859   | -        | -      | -         | -         | -    |
| Stage 2                | 899   | -        | -      | -         | -         | -    |
| Platoon blocked, %     |       |          |        | -         | -         | -    |
| Mov Cap-1 Maneuver     | 549   | 789      | 951    | -         | -         | -    |
| Mov Cap-2 Maneuver     | 549   | -        | -      | -         | -         | -    |
| Stage 1                | 856   | -        | -      | -         | -         | -    |
| Stage 2                | 899   | -        |        | -         | -         | -    |
| olago 2                | 000   |          |        |           |           |      |
|                        |       |          |        |           |           |      |
| Approach               | EB    |          | NB     |           | SB        |      |
| HCM Control Delay, s   | 10.4  |          | 0.1    |           | 0         |      |
| HCM LOS                | В     |          |        |           |           |      |
|                        |       |          |        |           |           |      |
| Minor Lane/Major Mvmt  |       | NBL      | NRT    | EBLn1     | SBT       | SBR  |
| Capacity (veh/h)       |       | 951      | -      | 689       | -         | -    |
| HCM Lane V/C Ratio     |       | 0.004    |        | 0.024     |           |      |
| HCM Control Delay (s)  |       | 8.8      | 0      | 10.4      |           | -    |
| HCM Lane LOS           |       | 0.0<br>A | A      | 10.4<br>B |           | -    |
|                        |       | A<br>0   | A      | 0.1       | -         | -    |
| HCM 95th %tile Q(veh)  |       | U        | -      | U. I      | -         | -    |

### **2023 PROJECTED CONDITIONS**

### 1: PROPOSED DRIVEWAY/ROCK RAYMOND ROAD & ROUTE 322 2023 PROJECTED CONDITIONS

Timing Plan: AM Peak

|                         | ۶     | -     | $\rightarrow$ | •     | •     | •    | 4     | <b>†</b> | <b>*</b> | -     | ţ     | 4    |
|-------------------------|-------|-------|---------------|-------|-------|------|-------|----------|----------|-------|-------|------|
| Lane Group              | EBL   | EBT   | EBR           | WBL   | WBT   | WBR  | NBL   | NBT      | NBR      | SBL   | SBT   | SBR  |
| Lane Configurations     | ሻ     | ĵ.    |               | Ţ     | ĵ.    |      |       | 4        |          | Ţ     | ĵ.    |      |
| Traffic Volume (vph)    | 305   | 792   | 16            | 7     | 194   | 106  | 26    | 6        | 11       | 235   | 4     | 227  |
| Future Volume (vph)     | 305   | 792   | 16            | 7     | 194   | 106  | 26    | 6        | 11       | 235   | 4     | 227  |
| Ideal Flow (vphpl)      | 1800  | 1800  | 1800          | 1800  | 1800  | 1800 | 1800  | 1800     | 1800     | 1800  | 1800  | 1800 |
| Lane Width (ft)         | 10    | 14    | 12            | 12    | 13    | 12   | 12    | 12       | 12       | 10    | 12    | 11   |
| Grade (%)               |       | -2%   |               |       | 4%    |      |       | 0%       |          |       | 1%    |      |
| Storage Length (ft)     | 145   |       | 0             | 75    |       | 0    | 0     |          | 0        | 230   |       | 0    |
| Storage Lanes           | 1     |       | 0             | 1     |       | 0    | 0     |          | 0        | 1     |       | 0    |
| Taper Length (ft)       | 25    |       |               | 25    |       |      | 25    |          |          | 25    |       |      |
| Right Turn on Red       |       |       | Yes           |       |       | Yes  |       |          | Yes      |       |       | Yes  |
| Link Speed (mph)        |       | 45    |               |       | 35    |      |       | 25       |          |       | 35    |      |
| Link Distance (ft)      |       | 268   |               |       | 1016  |      |       | 224      |          |       | 359   |      |
| Travel Time (s)         |       | 4.1   |               |       | 19.8  |      |       | 6.1      |          |       | 7.0   |      |
| Peak Hour Factor        | 0.87  | 0.87  | 0.87          | 0.87  | 0.87  | 0.87 | 0.87  | 0.87     | 0.87     | 0.87  | 0.87  | 0.87 |
| Heavy Vehicles (%)      | 2%    | 7%    | 2%            | 2%    | 6%    | 0%   | 2%    | 2%       | 2%       | 14%   | 2%    | 22%  |
| Shared Lane Traffic (%) |       |       |               |       |       |      |       |          |          |       |       |      |
| Turn Type               | pm+pt | NA    |               | Perm  | NA    |      | Perm  | NA       |          | Perm  | NA    |      |
| Protected Phases        | 5     | 2     |               |       | 6     |      |       | 8        |          |       | 4     |      |
| Permitted Phases        | 2     |       |               | 6     |       |      | 8     |          |          | 4     |       |      |
| Detector Phase          | 5     | 2     |               | 6     | 6     |      | 8     | 8        |          | 4     | 4     |      |
| Switch Phase            |       |       |               |       |       |      |       |          |          |       |       |      |
| Minimum Initial (s)     | 3.0   | 11.0  |               | 11.0  | 11.0  |      | 3.0   | 3.0      |          | 3.0   | 3.0   |      |
| Minimum Split (s)       | 14.0  | 18.0  |               | 18.0  | 18.0  |      | 13.0  | 13.0     |          | 13.0  | 13.0  |      |
| Total Split (s)         | 34.0  | 75.0  |               | 41.0  | 41.0  |      | 40.0  | 40.0     |          | 40.0  | 40.0  |      |
| Total Split (%)         | 29.6% | 65.2% |               | 35.7% | 35.7% |      | 34.8% | 34.8%    |          | 34.8% | 34.8% |      |
| Yellow Time (s)         | 5.0   | 5.0   |               | 5.0   | 5.0   |      | 4.0   | 4.0      |          | 4.0   | 4.0   |      |
| All-Red Time (s)        | 2.0   | 2.0   |               | 2.0   | 2.0   |      | 2.0   | 2.0      |          | 2.0   | 2.0   |      |
| Lost Time Adjust (s)    | -1.0  | -1.0  |               | -1.0  | -1.0  |      |       | -1.0     |          | -1.0  | -1.0  |      |
| Total Lost Time (s)     | 6.0   | 6.0   |               | 6.0   | 6.0   |      |       | 5.0      |          | 5.0   | 5.0   |      |
| Lead/Lag                | Lead  |       |               | Lag   | Lag   |      |       |          |          |       |       |      |
| Lead-Lag Optimize?      | Yes   |       |               | Yes   | Yes   |      |       |          |          |       |       |      |
| Recall Mode             | None  | C-Max |               | C-Max | C-Max |      | None  | None     |          | None  | None  |      |
| Intersection Summary    |       |       |               |       |       |      |       |          |          |       |       |      |

### Intersection Summary Area Type: Other

Cycle Length: 115
Actuated Cycle Length: 115

Offset: 106 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated





2023 PROJECTED CONDITIONS 11/21/2017 MB Synchro 10 Report

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### 1: PROPOSED DRIVEWAY/ROCK RAYMOND ROAD & ROUTE 322 2023 PROJECTED CONDITIONS

Timing Plan: AM Peak

|                                   | ۶            | -        | •          | •         | <b>—</b>  | •            | 1           | 1         | ~    | <b>/</b>     | <b>+</b>  | 4           |
|-----------------------------------|--------------|----------|------------|-----------|-----------|--------------|-------------|-----------|------|--------------|-----------|-------------|
| Movement                          | EBL          | EBT      | EBR        | WBL       | WBT       | WBR          | NBL         | NBT       | NBR  | SBL          | SBT       | SBR         |
| Lane Configurations               | Ť            | ĵ.       |            | ሻ         | ĵ»        |              |             | 4         |      | 7            | î»        |             |
| Traffic Volume (veh/h)            | 305          | 792      | 16         | 7         | 194       | 106          | 26          | 6         | 11   | 235          | 4         | 227         |
| Future Volume (veh/h)             | 305          | 792      | 16         | 7         | 194       | 106          | 26          | 6         | 11   | 235          | 4         | 227         |
| Number                            | 5            | 2        | 12         | 1         | 6         | 16           | 3           | 8         | 18   | 7            | 4         | 14          |
| Initial Q (Qb), veh               | 0            | 0        | 0          | 0         | 0         | 0            | 0           | 0         | 0    | 0            | 0         | 0           |
| Ped-Bike Adj(A_pbT)               | 1.00         |          | 1.00       | 1.00      |           | 1.00         | 1.00        |           | 1.00 | 1.00         |           | 1.00        |
| Parking Bus, Adj                  | 1.00         | 1.00     | 1.00       | 1.00      | 1.00      | 1.00         | 1.00        | 1.00      | 1.00 | 1.00         | 1.00      | 1.00        |
| Adj Sat Flow, veh/h/ln            | 1782         | 1769     | 1818       | 1729      | 1766      | 1764         | 1800        | 1765      | 1800 | 1571         | 1473      | 1791        |
| Adj Flow Rate, veh/h              | 351          | 910      | 18         | 8         | 223       | 109          | 30          | 7         | 13   | 270          | 5         | 116         |
| Adj No. of Lanes                  | 1            | 1        | 0          | 1         | 1         | 0            | 0           | 1         | 0    | 1            | 1         | 0           |
| Peak Hour Factor                  | 0.87         | 0.87     | 0.87       | 0.87      | 0.87      | 0.87         | 0.87        | 0.87      | 0.87 | 0.87         | 0.87      | 0.87        |
| Percent Heavy Veh, %              | 2            | 7        | 7          | 2         | 6         | 6            | 2           | 2         | 2    | 14           | 2         | 2           |
| Cap, veh/h                        | 610          | 1092     | 22         | 300       | 477       | 233          | 200         | 50        | 70   | 366          | 14        | 329         |
| Arrive On Green                   | 0.31         | 1.00     | 1.00       | 0.43      | 0.43      | 0.42         | 0.26        | 0.27      | 0.26 | 0.27         | 0.27      | 0.27        |
| Sat Flow, veh/h                   | 1697         | 1728     | 34         | 557       | 1121      | 548          | 550         | 183       | 258  | 1169         | 52        | 1207        |
| Grp Volume(v), veh/h              | 351          | 0        | 928        | 8         | 0         | 332          | 50          | 0         | 0    | 270          | 0         | 121         |
| Grp Sat Flow(s),veh/h/ln          | 1697         | 0        | 1763       | 557       | 0         | 1669         | 991         | 0         | 0    | 1169         | 0         | 1259        |
| Q Serve(g_s), s                   | 13.2         | 0.0      | 0.0        | 1.0       | 0.0       | 16.5         | 1.9         | 0.0       | 0.0  | 16.3         | 0.0       | 8.9         |
| Cycle Q Clear(g_c), s             | 13.2         | 0.0      | 0.0        | 1.0       | 0.0       | 16.5         | 11.3        | 0.0       | 0.0  | 27.1         | 0.0       | 8.9         |
| Prop In Lane                      | 1.00         |          | 0.02       | 1.00      |           | 0.33         | 0.60        | •         | 0.26 | 1.00         | •         | 0.96        |
| Lane Grp Cap(c), veh/h            | 610          | 0        | 1113       | 300       | 0         | 711          | 312         | 0         | 0    | 366          | 0         | 344         |
| V/C Ratio(X)                      | 0.58         | 0.00     | 0.83       | 0.03      | 0.00      | 0.47         | 0.16        | 0.00      | 0.00 | 0.74         | 0.00      | 0.35        |
| Avail Cap(c_a), veh/h             | 763          | 0        | 1113       | 300       | 0         | 711          | 354         | 0         | 0    | 403          | 0         | 383         |
| HCM Platoon Ratio                 | 2.00         | 2.00     | 2.00       | 1.00      | 1.00      | 1.00         | 1.00        | 1.00      | 1.00 | 1.00         | 1.00      | 1.00        |
| Upstream Filter(I)                | 1.00         | 0.00     | 1.00       | 1.00      | 0.00      | 1.00         | 1.00        | 0.00      | 0.00 | 1.00         | 0.00      | 1.00        |
| Uniform Delay (d), s/veh          | 11.3         | 0.0      | 0.0        | 19.2      | 0.0       | 23.8         | 35.0        | 0.0       | 0.0  | 40.7         | 0.0       | 33.6        |
| Incr Delay (d2), s/veh            | 0.9          | 0.0      | 7.4<br>0.0 | 0.2       | 0.0       | 2.2          | 0.2         | 0.0       | 0.0  | 6.3          | 0.0       | 0.6         |
| Initial Q Delay(d3),s/veh         | 0.0          | 0.0      | 4.1        | 0.0       | 0.0       | 0.0          |             | 0.0       | 0.0  |              | 0.0       | 0.0         |
| %ile BackOfQ(95%),veh/ln          | 10.1<br>12.2 | 0.0      | 7.4        | 19.4      | 0.0       | 12.7<br>26.0 | 2.5<br>35.2 | 0.0       | 0.0  | 13.8<br>47.0 | 0.0       | 5.7<br>34.3 |
| LnGrp Delay(d),s/veh<br>LnGrp LOS | 12.2<br>B    | 0.0      | 7.4<br>A   | 19.4<br>B | 0.0       | 20.0<br>C    | 35.2<br>D   | 0.0       | 0.0  | 47.0<br>D    | 0.0       | 34.3<br>C   |
|                                   | В            | 1279     | A          | В         | 340       | U            | U           | 50        |      | U            | 391       | U           |
| Approach Vol, veh/h               |              |          |            |           | 25.9      |              |             | 35.2      |      |              |           |             |
| Approach Delay, s/veh             |              | 8.7<br>A |            |           | 25.9<br>C |              |             | 35.2<br>D |      |              | 43.1<br>D |             |
| Approach LOS                      |              |          |            |           |           |              |             |           |      |              | U         |             |
| Timer                             | 1            | 2        | 3          | 4         | 5         | 6            | 7           | 8         |      |              |           |             |
| Assigned Phs                      |              | 2        |            | 4         | 5         | 6            |             | 8         |      |              |           |             |
| Phs Duration (G+Y+Rc), s          |              | 78.6     |            | 36.4      | 23.7      | 55.0         |             | 36.4      |      |              |           |             |
| Change Period (Y+Rc), s           |              | 7.0      |            | 6.0       | 7.0       | 7.0          |             | 6.0       |      |              |           |             |
| Max Green Setting (Gmax), s       |              | 68.0     |            | 34.0      | 27.0      | 34.0         |             | 34.0      |      |              |           |             |
| Max Q Clear Time (g_c+l1), s      |              | 2.5      |            | 29.6      | 15.7      | 18.5         |             | 13.3      |      |              |           |             |
| Green Ext Time (p_c), s           |              | 4.7      |            | 0.8       | 0.9       | 1.2          |             | 0.2       |      |              |           |             |
| Intersection Summary              |              |          |            |           |           |              |             |           |      |              |           |             |
| HCM 2010 Ctrl Delay               |              |          | 18.7       |           |           |              |             |           |      |              |           |             |
| HCM 2010 LOS                      |              |          | В          |           |           |              |             |           |      |              |           |             |

2023 PROJECTED CONDITIONS 11/21/2017 MB

|                         | ۶     | <b>→</b> | •     | •     | <b>←</b> | •     | 1     | <b>†</b> | /     | <b>&gt;</b> | ţ     | 4    |
|-------------------------|-------|----------|-------|-------|----------|-------|-------|----------|-------|-------------|-------|------|
| Lane Group              | EBL   | EBT      | EBR   | WBL   | WBT      | WBR   | NBL   | NBT      | NBR   | SBL         | SBT   | SBR  |
| Lane Configurations     | Ţ     | <b>†</b> | 7     | *     | <u></u>  | 7     |       | 4        | 7     |             | 4     |      |
| Traffic Volume (vph)    | 48    | 832      | 113   | 86    | 389      | 25    | 206   | 32       | 259   | 18          | 5     | 63   |
| Future Volume (vph)     | 48    | 832      | 113   | 86    | 389      | 25    | 206   | 32       | 259   | 18          | 5     | 63   |
| Ideal Flow (vphpl)      | 1800  | 1800     | 1800  | 1800  | 1800     | 1800  | 1800  | 1800     | 1800  | 1800        | 1800  | 1800 |
| Lane Width (ft)         | 10    | 12       | 12    | 10    | 11       | 12    | 12    | 11       | 11    | 12          | 15    | 12   |
| Grade (%)               |       | 0%       |       |       | -1%      |       |       | -1%      |       |             | 2%    |      |
| Storage Length (ft)     | 190   |          | 0     | 150   |          | 150   | 0     |          | 150   | 0           |       | 0    |
| Storage Lanes           | 1     |          | 1     | 1     |          | 1     | 0     |          | 1     | 0           |       | 0    |
| Taper Length (ft)       | 25    |          |       | 25    |          |       | 25    |          |       | 25          |       |      |
| Right Turn on Red       |       |          | Yes   |       |          | Yes   |       |          | Yes   |             |       | Yes  |
| Link Speed (mph)        |       | 45       |       |       | 45       |       |       | 35       |       |             | 25    |      |
| Link Distance (ft)      |       | 551      |       |       | 329      |       |       | 298      |       |             | 194   |      |
| Travel Time (s)         |       | 8.3      |       |       | 5.0      |       |       | 5.8      |       |             | 5.3   |      |
| Confl. Peds. (#/hr)     | 2     |          | 2     |       |          |       |       |          |       | 2           |       | 2    |
| Confl. Bikes (#/hr)     |       |          | 1     |       |          |       |       |          |       |             |       |      |
| Peak Hour Factor        | 0.87  | 0.87     | 0.87  | 0.87  | 0.87     | 0.87  | 0.87  | 0.87     | 0.87  | 0.87        | 0.87  | 0.87 |
| Heavy Vehicles (%)      | 2%    | 5%       | 5%    | 19%   | 15%      | 0%    | 1%    | 3%       | 5%    | 0%          | 0%    | 3%   |
| Shared Lane Traffic (%) |       |          |       |       |          |       |       |          |       |             |       |      |
| Turn Type               | Perm  | NA       | Perm  | pm+pt | NA       | Perm  | Perm  | NA       | pm+ov | Perm        | NA    |      |
| Protected Phases        |       | 2        |       | 1     | 6        |       |       | 8        | 1     |             | 4     |      |
| Permitted Phases        | 2     |          | 2     | 6     |          | 6     | 8     |          | 8     | 4           |       |      |
| Detector Phase          | 2     | 2        | 2     | 1     | 6        | 6     | 8     | 8        | 1     | 4           | 4     |      |
| Switch Phase            |       |          |       |       |          |       |       |          |       |             |       |      |
| Minimum Initial (s)     | 13.0  | 13.0     | 13.0  | 3.0   | 13.0     | 13.0  | 3.0   | 3.0      | 3.0   | 3.0         | 3.0   |      |
| Minimum Split (s)       | 40.0  | 40.0     | 40.0  | 10.0  | 40.0     | 40.0  | 13.0  | 13.0     | 10.0  | 13.0        | 13.0  |      |
| Total Split (s)         | 71.0  | 71.0     | 71.0  | 13.0  | 84.0     | 84.0  | 31.0  | 31.0     | 13.0  | 31.0        | 31.0  |      |
| Total Split (%)         | 61.7% | 61.7%    | 61.7% | 11.3% | 73.0%    | 73.0% | 27.0% | 27.0%    | 11.3% | 27.0%       | 27.0% |      |
| Yellow Time (s)         | 5.0   | 5.0      | 5.0   | 5.0   | 5.0      | 5.0   | 3.0   | 3.0      | 5.0   | 3.0         | 3.0   |      |
| All-Red Time (s)        | 2.0   | 2.0      | 2.0   | 2.0   | 2.0      | 2.0   | 3.0   | 3.0      | 2.0   | 3.0         | 3.0   |      |
| Lost Time Adjust (s)    | -1.0  | -1.0     | -1.0  | -1.0  | -1.0     | -1.0  |       | -1.0     | -1.0  |             | -1.0  |      |
| Total Lost Time (s)     | 6.0   | 6.0      | 6.0   | 6.0   | 6.0      | 6.0   |       | 5.0      | 6.0   |             | 5.0   |      |
| Lead/Lag                | Lag   | Lag      | Lag   | Lead  |          |       |       |          | Lead  |             |       |      |
| Lead-Lag Optimize?      | Yes   | Yes      | Yes   | Yes   |          |       |       |          | Yes   |             |       |      |
| Recall Mode             | C-Max | C-Max    | C-Max | None  | C-Max    | C-Max | None  | None     | None  | None        | None  |      |

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 115

Offset: 74 (64%). Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Splits and Phases: 2: LLOYD AVENUE/ROYAL FARMS DRIVEWAY & ROUTE 322



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#### 2: LLOYD AVENUE/ROYAL FARMS DRIVEWAY & ROUTE 322 2023 PROJECTED CONDITIONS

Timing Plan: AM Peak

| Lane Configurations   |                          | ۶    | <b>→</b> | •    | •    | <b>←</b> | •    | 1    | †    | ~    | /    | ţ    | 4    |
|---|--------------------------|------|----------|------|------|----------|------|------|------|------|------|------|------|
| Traffic Volume (veh/h)  |                          |      |          |      |      |          |      | NBL  |      |      | SBL  |      | SBR  |
| Future Volume (veh/h)  48 832 113 86 389 25 206 32 259 18 5  Number  5 2 12 1 6 6 6 3 8 18 7 4  Initial Q(Db), veh  0 0 0 0 1 0 0 6 0 0 0  Ped-Blike Adj(A_pbT)  1.00 0.98 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0   |                          |      |          |      |      |          |      |      |      |      |      |      |      |
| Number 5 2 12 1 1 6 16 3 8 18 7 4 Initial Q (Qb), veh 0 0 0 0 1 0 0 0 1 0 0 6 0 0 0 0 0 0 Ped-Bike Adj(A_pbT) 1.00 0.98 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0  |                          |      |          |      |      |          |      |      |      |      |      |      | 63   |
| Initial Q (Ob), veh Q 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0   |                          |      |          |      |      |          |      |      |      |      |      |      | 63   |
| Ped-Bike Adj(A_pbT)   |                          | _    |          |      |      | _        |      |      | _    |      |      |      | 14   |
| Parking Bus, Adj  | Initial Q (Qb), veh      | -    | 0        |      |      | 0        |      | -    | 0    |      |      | 0    | 0    |
| Adj Sat Flow, veh/h/ln 1765 1714 1714 1714 1714 1715 1716 99 1717 1716 1716 1716 99 1717 1717   | Ped-Bike Adj(A_pbT)      |      |          |      |      |          |      |      |      |      |      |      | 1.00 |
| Adj Flow Rate, veh/h  Adj No. of Lanes  1 1 1 1 1 1 1 0 1 1 1 0 0 1  Percent Heavy Veh, % 2 5 5 19 15 0 3 3 3 5 0 0  Percent Heavy Veh, % 2 5 5 19 15 0 3 3 3 5 0 0  Cap, veh/h 565 987 820 159 1074 1050 327 39 405 150 56 2  Arrive On Green 0.58 0.58 0.58 0.11 100 1.00 0.22 0.22 0.21 0.22 0  Sat Flow, veh/h 872 1714 1425 1448 1573 1538 1204 188 1464 484 252 9  Grp Volume(v), veh/h 575 956 116 99 447 22 274 0 167 62 0  Grp Sat Flow(s), veh/h/ln 872 1714 1425 1448 1573 1538 1204 188 1464 484 252 9  Grp Volume(v), veh/h/n 872 1714 1425 1448 1573 1538 1204 188 1464 1689 0  Q Serve(g.s.), s 3.3 61.4 4.3 3.0 0.0 0.0 18.8 0.0 10.7 0.0 0.0 0.0 0  Cycle Clear(g.c.), s 3.3 61.4 4.3 3.0 0.0 0.0 18.8 0.0 10.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0  |                          |      |          |      |      |          |      |      |      |      |      |      | 1.00 |
| Adj No. of Lanes 1 1 1 1 1 1 1 0 1 0 1 1 0 0 1 1 Peak Hour Factor 0.87 0.87 0.87 0.87 0.87 0.87 0.87 0.87   | Adj Sat Flow, veh/h/ln   | 1765 | 1714     | 1714 | 1520 | 1573     |      | 1809 | 1786 | 1723 | 1782 | 1814 | 1782 |
| Peak Hour Factor 0.87 0.87 0.87 0.87 0.87 0.87 0.87 0.87  | Adj Flow Rate, veh/h     |      | 956      | 116  |      | 447      | 22   | 237  |      | 167  | 21   | 6    | 35   |
| Percent Heavy Veh, % 2 5 5 5 19 15 0 3 3 3 5 0 0 0 Cap, veh/h 565 987 820 159 1074 1050 327 39 405 150 56 62 20 Arrive On Green 0.58 0.58 0.58 0.11 1.00 1.00 0.22 0.22 0.22 0.22 0.22  |                          |      |          |      |      |          |      |      |      |      | -    |      | 0    |
| Cap, veh/h On Green On Ses On |                          |      |          |      |      |          |      |      |      |      |      |      | 0.87 |
| Arrive On Green   | Percent Heavy Veh, %     | 2    |          |      | 19   | 15       | 0    | 3    | 3    | 5    | 0    | 0    | 0    |
| Sat Flow, veh/h         872         1714         1425         1448         1573         1538         1204         188         1464         484         252         9           Grp Vollume(v), veh/h         55         956         116         99         447         22         274         0         167         62         0           Grp Sat Flow(s), veh/h/ln         872         1714         1425         1448         1573         1538         1392         0         1464         1689         0           QServe(g.s), s         3.3         61.4         4.3         3.0         0.0         0.0         18.8         0.0         10.7         0.0         0.0           Cycle Q Clear(g.c), s         3.3         61.4         4.3         3.0         0.0         0.0         18.8         0.0         10.7         0.0         0.0           Lane Grp Cap(c), veh/h         565         987         820         159         1074         1050         367         0         403         0           ViC Ratio(X)         0.10         0.97         0.14         0.62         0.42         0.02         0.75         0.00         0.41         0.15         0.00         0         4  |                          |      |          |      |      |          |      |      |      |      |      |      | 212  |
| Grp Volume(v), veh/h  | Arrive On Green          | 0.58 | 0.58     | 0.58 | 0.11 | 1.00     | 1.00 | 0.22 | 0.22 | 0.22 | 0.21 | 0.22 | 0.21 |
| GP Sat Flow(s), veh/h/ln  | Sat Flow, veh/h          | 872  | 1714     | 1425 | 1448 | 1573     | 1538 | 1204 | 188  | 1464 | 484  | 252  | 953  |
| Q Serve(g_s), s 3.3 61.4 4.3 3.0 0.0 0.0 18.8 0.0 10.7 0.0 0.0 Cycle Q Clear(g_c), s 3.3 61.4 4.3 3.0 0.0 0.0 12.8 0.0 10.7 3.5 0.0 0.0 Cycle Q Clear(g_c), s 3.3 61.4 4.3 3.0 0.0 0.0 21.8 0.0 10.7 3.5 0.0 0.0 0.0 10.0 0.0 0.0 0.0 0.0 0.0 0.  | Grp Volume(v), veh/h     | 55   | 956      | 116  | 99   | 447      | 22   | 274  | 0    | 167  | 62   | 0    | 0    |
| Cycle Q Clear(g_c), s 3.3 61.4 4.3 3.0 0.0 0.0 21.8 0.0 10.7 3.5 0.0 Prop In Lane 1.00 1.00 1.00 1.00 0.86 1.00 0.34 0 1.00 1.00 0.86 1.00 0.34 0 1.00 0.86 1.00 0.34 0 1.00 0.86 1.00 0.34 0 0.00 0.86 1.00 0.34 0 0.00 0.86 1.00 0.34 0 0.00 0.86 1.00 0.34 0 0.00 0.00 0.00 0.00 0.00 0.00   | Grp Sat Flow(s),veh/h/ln | 872  | 1714     | 1425 | 1448 | 1573     | 1538 | 1392 | 0    | 1464 | 1689 | 0    | 0    |
| Prop In Lane  | Q Serve(q s), s          | 3.3  | 61.4     | 4.3  | 3.0  | 0.0      | 0.0  | 18.8 | 0.0  | 10.7 | 0.0  | 0.0  | 0.0  |
| Lane Grp Cap(c), veh/h 565 987 820 159 1074 1050 367 0 405 403 0 V/C Ratio(X) 0.10 0.97 0.14 0.62 0.42 0.02 0.75 0.00 0.41 0.15 0.00 0 Avail Cap(c_a), veh/h 565 988 821 169 1074 1050 373 0 411 408 0 HCM Platoon Ratio 1.00 1.00 1.00 1.00 2.00 2.00 2.00 1.00 1  | Cycle Q Clear(q c), s    | 3.3  | 61.4     | 4.3  | 3.0  | 0.0      | 0.0  | 21.8 | 0.0  | 10.7 | 3.5  | 0.0  | 0.0  |
| V/C Ratio(X)  | Prop In Lane             | 1.00 |          | 1.00 | 1.00 |          | 1.00 | 0.86 |      | 1.00 | 0.34 |      | 0.56 |
| Avail Cap(c_a), veh/h 565 988 821 169 1074 1050 373 0 411 408 0 HCM Platoon Ratio 1.00 1.00 1.00 1.00 2.00 2.00 1.00 1.00   | Lane Grp Cap(c), veh/h   | 565  | 987      | 820  | 159  | 1074     | 1050 | 367  | 0    | 405  | 403  | 0    | 0    |
| HCM Platoon Ratio   | V/C Ratio(X)             | 0.10 | 0.97     | 0.14 | 0.62 | 0.42     | 0.02 | 0.75 | 0.00 | 0.41 | 0.15 | 0.00 | 0.00 |
| Upstream Filter(I)         1.00         1.00         1.00         1.00         1.00         1.00         1.00         0.00 <td>Avail Cap(c_a), veh/h</td> <td>565</td> <td>988</td> <td>821</td> <td>169</td> <td>1074</td> <td>1050</td> <td>373</td> <td>0</td> <td>411</td> <td>408</td> <td>0</td> <td>0</td>  | Avail Cap(c_a), veh/h    | 565  | 988      | 821  | 169  | 1074     | 1050 | 373  | 0    | 411  | 408  | 0    | 0    |
| Uniform Delay (d), s/veh  | HCM Platoon Ratio        | 1.00 | 1.00     | 1.00 | 2.00 | 2.00     | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incr Delay (d2), s/veh  | Upstream Filter(I)       | 1.00 | 1.00     | 1.00 | 1.00 | 1.00     | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 |
| Initial Q Delay(d3),s/veh         0.0         0.0         0.0         0.7         0.0 <td>Uniform Delay (d), s/veh</td> <td>11.1</td> <td>23.4</td> <td>11.3</td> <td>26.3</td> <td>0.0</td> <td>0.0</td> <td>43.3</td> <td>0.0</td> <td>34.0</td> <td>36.6</td> <td>0.0</td> <td>0.0</td>  | Uniform Delay (d), s/veh | 11.1 | 23.4     | 11.3 | 26.3 | 0.0      | 0.0  | 43.3 | 0.0  | 34.0 | 36.6 | 0.0  | 0.0  |
| %ile BackOfQ(95%),veh/ln 1.5 44.7 3.2 4.1 0.6 0.0 14.5 0.0 7.8 3.0 0.0 LnGrp Delay(d),s/veh 11.4 45.4 11.6 33.3 1.2 0.0 51.2 0.0 34.6 36.8 0.0 LnGrp LOS B D B C A A D C D Approach Vol, veh/h 1127 568 44.9 36.8 Approach LOS D A D D D  Timer 1 2 3 4 5 6 7 8 Assigned Phs 1 2 4 6 8 Assigned Phs Dr.   | Incr Delay (d2), s/veh   | 0.3  | 22.0     | 0.4  | 6.3  | 1.2      | 0.0  | 7.9  | 0.0  | 0.7  | 0.2  | 0.0  | 0.0  |
| LnGrp Delay(d),s/veh 11.4 45.4 11.6 33.3 1.2 0.0 51.2 0.0 34.6 36.8 0.0 LnGrp LOS B D B C A A D C D Approach Vol, veh/h 1127 568 44.1 62 Approach Delay, s/veh 40.3 6.7 44.9 36.8 Approach LOS D A D D D  Timer 1 2 3 4 5 6 7 8 Assigned Phs 1 2 4 6 8 Phs Duration (G+Y+Rc), s 12.3 72.3 30.5 84.5 30.5 Change Period (Y+Rc), s 7.0 7.0 6.0 7.0 6.0 Max Green Setting (Gmax), s 6.0 64.0 25.0 77.0 25.0 Max Q Clear Time (g_C+I1), s 5.5 63.9 5.5 2.5 24.3 Green Ext Time (p_C), s 0.0 0.1 0.2 1.7 0.1  Intersection Summary HCM 2010 Ctrl Delay 32.5  |                          | 0.0  | 0.0      | 0.0  | 0.7  | 0.0      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| LnGrp LOS         B         D         B         C         A         A         D         C         D           Approach Vol, veh/h         1127         568         441         62           Approach Delay, sIveh         40.3         6.7         44.9         36.8           Approach LOS         D         A         D         D           Timer         1         2         3         4         5         6         7         8           Assigned Phs         1         2         4         6         8         8         Phs Duration (G+Y+Rc), s         12.3         72.3         30.5         84.5         30.5         Change Period (Y+Rc), s         7.0         7.0         6.0         7.0         6.0         Amount of the common of the comm   | %ile BackOfQ(95%),veh/ln | 1.5  | 44.7     | 3.2  | 4.1  | 0.6      | 0.0  | 14.5 | 0.0  | 7.8  | 3.0  | 0.0  | 0.0  |
| Approach Vol, veh/h 1127 568 441 62 Approach Delay, s/veh 40.3 6.7 44.9 36.8 Approach LOS D A D D  Timer 1 2 3 4 5 6 7 8  Assigned Phs 1 2 4 6 8 Phs Duration (G+Y+Rc), s 12.3 72.3 30.5 84.5 30.5 Change Period (Y+Rc), s 7.0 7.0 6.0 7.0 6.0 Max Green Setting (Gmax), s 6.0 64.0 25.0 77.0 25.0 Max Q Clear Time (g_c+I1), s 5.5 63.9 5.5 2.5 24.3 Green Ext Time (p_c), s 0.0 0.1 0.2 1.7 0.1  Intersection Summary HCM 2010 Ctrl Delay 32.5  | LnGrp Delay(d),s/veh     | 11.4 | 45.4     | 11.6 | 33.3 | 1.2      | 0.0  | 51.2 | 0.0  | 34.6 | 36.8 | 0.0  | 0.0  |
| Approach Delay, s/veh         40.3         6.7         44.9         36.8           Approach LOS         D         A         D         D           Timer         1         2         3         4         5         6         7         8           Assigned Phs         1         2         4         6         8         8           Phs Duration (G+Y+Rc), s         12.3         72.3         30.5         84.5         30.5           Change Period (Y+Rc), s         7.0         7.0         6.0         7.0         6.0           Max Green Setting (Gmax), s         6.0         64.0         25.0         77.0         25.0           Max Q Clear Time (p_c+in), s         5.5         63.9         5.5         2.5         24.3           Green Ext Time (p_c), s         0.0         0.1         0.2         1.7         0.1           Intersection Summary         HCM 2010 Ctrl Delay         32.5   | LnGrp LOS                | В    | D        | В    | С    | Α        | Α    | D    |      | С    | D    |      |      |
| Approach Delay, s/veh         40.3         6.7         44.9         36.8           Approach LOS         D         A         D         D           Timer         1         2         3         4         5         6         7         8           Assigned Phs         1         2         4         6         8         8           Phs Duration (G+Y+Rc), s         12.3         72.3         30.5         84.5         30.5           Change Period (Y+Rc), s         7.0         7.0         6.0         7.0         6.0           Max Green Setting (Gmax), s         6.0         64.0         25.0         77.0         25.0           Max Q Clear Time (p_c+in), s         5.5         63.9         5.5         2.5         24.3           Green Ext Time (p_c), s         0.0         0.1         0.2         1.7         0.1           Intersection Summary         HCM 2010 Ctrl Delay         32.5   | Approach Vol. veh/h      |      | 1127     |      |      | 568      |      |      | 441  |      |      | 62   |      |
| Approach LOS D A D  Timer 1 2 3 4 5 6 7 8  Assigned Phs 1 2 4 6 8  Phs Duration (G+Y+Rc), s 12.3 72.3 30.5 84.5 30.5  Change Period (Y+Rc), s 7.0 7.0 6.0 7.0 6.0  Max Green Setting (Gmax), s 6.0 64.0 25.0 77.0 25.0  Max Q Clear Time (g_c+11), s 5.5 63.9 5.5 2.5 24.3  Green Ext Time (p_c), s 0.0 0.1 0.2 1.7 0.1  Intersection Summary  HCM 2010 Ctrl Delay 32.5   | bb                       |      |          |      |      |          |      |      |      |      |      |      |      |
| Assigned Phs 1 2 4 6 8 Phs Duration (G+Y+Rc), s 12.3 72.3 30.5 84.5 30.5 Change Period (Y+Rc), s 7.0 7.0 6.0 7.0 6.0 Max Green Setting (Gmax), s 6.0 64.0 25.0 77.0 25.0 Max Q Clear Time (g_c+I1), s 5.5 63.9 5.5 2.5 24.3 Green Ext Time (p_c), s 0.0 0.1 0.2 1.7 0.1  Intersection Summary HCM 2010 Ctrl Delay 32.5  |                          |      |          |      |      |          |      |      |      |      |      |      |      |
| Phs Duration (G+Y+Rc), s 12.3 72.3 30.5 84.5 30.5 Change Period (Y+Rc), s 7.0 7.0 6.0 7.0 6.0 Max Green Setting (Gmax), s 6.0 64.0 25.0 77.0 25.0 Max Q Clear Time (g_c+I1), s 5.5 63.9 5.5 2.5 24.3 Green Ext Time (p_c), s 0.0 0.1 0.2 1.7 0.1 Intersection Summary  HCM 2010 Ctrl Delay 32.5   | Timer                    | 1    | 2        | 3    | 4    | 5        | 6    | 7    | 8    |      |      |      |      |
| Change Period (Y+Rc), s     7.0     7.0     6.0     7.0     6.0       Max Green Setting (Gmax), s     6.0     64.0     25.0     77.0     25.0       Max Q Clear Time (g_c+II), s     5.5     63.9     5.5     2.5     24.3       Green Ext Time (p_c), s     0.0     0.1     0.2     1.7     0.1       Intersection Summary       HCM 2010 Ctrl Delay     32.5  | Assigned Phs             | 1    | 2        |      | 4    |          | 6    |      | 8    |      |      |      |      |
| Max Green Setting (Gmax), s     6.0     64.0     25.0     77.0     25.0       Max Q Clear Time (g_c+l1), s     5.5     63.9     5.5     2.5     24.3       Green Ext Time (p_c), s     0.0     0.1     0.2     1.7     0.1       Intersection Summary       HCM 2010 Ctrl Delay     32.5  | Phs Duration (G+Y+Rc), s | 12.3 | 72.3     |      | 30.5 |          | 84.5 |      | 30.5 |      |      |      |      |
| Max Green Setting (Gmax), s     6.0     64.0     25.0     77.0     25.0       Max Q Clear Time (g_c+l1), s     5.5     63.9     5.5     2.5     24.3       Green Ext Time (p_c), s     0.0     0.1     0.2     1.7     0.1       Intersection Summary       HCM 2010 Ctrl Delay     32.5  |                          | 7.0  | 7.0      |      | 6.0  |          | 7.0  |      | 6.0  |      |      |      |      |
| Max Q Clear Time (g_c+11), s     5.5     63.9     5.5     2.5     24.3       Green Ext Time (p_c), s     0.0     0.1     0.2     1.7     0.1       Intersection Summary       HCM 2010 Ctrl Delay     32.5  |                          | 6.0  |          |      | 25.0 |          | 77.0 |      | 25.0 |      |      |      |      |
| Green Ext Time (p_e), s 0.0 0.1 0.2 1.7 0.1  Intersection Summary  HCM 2010 Ctrl Delay 32.5   |                          |      |          |      |      |          |      |      |      |      |      |      |      |
| HCM 2010 Ctrl Delay 32.5  |                          |      |          |      |      |          |      |      |      |      |      |      |      |
|   | Intersection Summary     |      |          |      |      |          |      |      |      |      |      |      |      |
|   | HCM 2010 Ctrl Delay      |      |          | 32.5 |      |          |      |      |      |      |      |      |      |
|   |                          |      |          |      |      |          |      |      |      |      |      |      |      |

2023 PROJECTED CONDITIONS 11/21/2017 MB

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#### ← < < √</p> Lane Group EBL Lane Configurations Traffic Volume (vph) 211 Future Volume (vph) 23 1280 256 122 211 280 Ideal Flow (vphpl) 1800 1800 1800 1800 1800 1800 Lane Width (ft) 16 12 12 12 15 15 Grade (%) -3% Storage Length (ft) 75 0 0 0 Storage Lanes Taper Length (ft) 25 25 Right Turn on Red Yes Yes Link Speed (mph) 45 45 25 Link Distance (ft) 830 280 317 Travel Time (s) 12.6 4.2 8.6 Confl. Peds. (#/hr) Peak Hour Factor 0.96 0.96 0.96 0.96 0.96 0.96 33% 4% 15% 12% Heavy Vehicles (%) 15% 7% Shared Lane Traffic (%) Turn Type Prot Free Protected Phases 2 6 4 Permitted Phases 2 6 Detector Phase 2 4 Switch Phase Minimum Initial (s) 15.0 15.0 15.0 3.0 Minimum Split (s) 22.0 22.0 22.0 13.0 Total Split (s) 93.0 93.0 93.0 22.0 Total Split (%) 80.9% 80.9% 80.9% 19.1% Yellow Time (s) 5.0 5.0 5.0 4.0 All-Red Time (s) 2.0 2.0 2.0 2.0 Lost Time Adjust (s) -1.0 -1.0 -1.0 -1.0 Total Lost Time (s) 6.0 6.0 6.0 5.0 Lead/Lag Lead-Lag Optimize? Recall Mode C-Max C-Max C-Max None Intersection Summary Area Type: Cycle Length: 115 Actuated Cycle Length: 115 Offset: 72 (63%), Referenced to phase 2:EBTL and 6:WBT, Start of Green Natural Cycle: 90 Control Type: Actuated-Coordinated

| Splits and Phases:  | 4: ROUTE 322 & WB ROUTE 30 RAMPS |      |
|---------------------|----------------------------------|------|
| ≠ <sub>Ø2 (R)</sub> |                                  | Ø4   |
| 93 s                |                                  | 22 s |
| Ø6 (R)              |                                  |      |
| 93 s                |                                  |      |

2023 PROJECTED CONDITIONS 11/21/2017 Synchro 10 Report

|                              | •    | $\rightarrow$ | •       | •    | -    | 4    |
|------------------------------|------|---------------|---------|------|------|------|
| Movement                     | EBL  | EBT           | WBT     | WBR  | SBL  | SBR  |
| Lane Configurations          | ሻ    | <u> </u>      | <u></u> | ,    | ኘ    | 7    |
| Traffic Volume (veh/h)       | 23   | 1280          | 256     | 122  | 211  | 280  |
| Future Volume (veh/h)        | 23   | 1280          | 256     | 122  | 211  | 280  |
| Number                       | 5    | 2             | 6       | 16   | 7    | 14   |
| Initial Q (Qb), veh          | 0    | 0             | 0       | 0    | 1    | 1    |
| Ped-Bike Adj(A pbT)          | 1.00 |               | Ť       | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00          | 1.00    | 1.00 | 1.00 | 1.00 |
| Adj Sat Flow, veh/h/ln       | 1429 | 1757          | 1550    | 1782 | 1750 | 1671 |
| Adj Flow Rate, veh/h         | 24   | 1333          | 267     | 0    | 220  | 0    |
| Adj No. of Lanes             | 1    | 1             | 1       | 0    | 1    | 1    |
| Peak Hour Factor             | 0.96 | 0.96          | 0.96    | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, %         | 33   | 4             | 15      | 15   | 7    | 12   |
| Cap, veh/h                   | 662  | 1329          | 1172    | 0    | 246  | 210  |
| Arrive On Green              | 0.76 | 0.76          | 0.76    | 0.00 | 0.15 | 0.00 |
| Sat Flow, veh/h              | 850  | 1757          | 1550    | 0.00 | 1666 | 1421 |
| Grp Volume(v), veh/h         | 24   | 1333          | 267     | 0    | 220  | 0    |
|                              |      |               |         | 0    |      | 1421 |
| Grp Sat Flow(s),veh/h/ln     | 850  | 1757          | 1550    |      | 1666 |      |
| Q Serve(g_s), s              | 1.0  | 87.0          | 5.8     | 0.0  | 14.9 | 0.0  |
| Cycle Q Clear(g_c), s        | 6.8  | 87.0          | 5.8     | 0.0  | 14.9 | 0.0  |
| Prop In Lane                 | 1.00 | 4000          | 4470    | 0.00 | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h       | 662  | 1329          | 1172    | 0    | 246  | 210  |
| V/C Ratio(X)                 | 0.04 | 1.00          | 0.23    | 0.00 | 0.89 | 0.00 |
| Avail Cap(c_a), veh/h        | 662  | 1329          | 1172    | 0    | 246  | 210  |
| HCM Platoon Ratio            | 1.00 | 1.00          | 1.00    | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00          | 1.00    | 0.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 5.1  | 14.0          | 4.1     | 0.0  | 48.2 | 0.0  |
| Incr Delay (d2), s/veh       | 0.1  | 25.4          | 0.5     | 0.0  | 31.5 | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0           | 0.0     | 0.0  | 1.1  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 0.4  | 90.6          | 4.7     | 0.0  | 14.2 | 0.0  |
| LnGrp Delay(d),s/veh         | 5.2  | 39.4          | 4.6     | 0.0  | 80.8 | 0.0  |
| LnGrp LOS                    | A    | F             | A       |      | F    |      |
| Approach Vol, veh/h          |      | 1357          | 267     |      | 220  |      |
| Approach Delay, s/veh        |      | 38.8          | 4.6     |      | 80.8 |      |
| Approach LOS                 |      | D             | Α       |      | F    |      |
| Timer                        | 1    | 2             | 3       | 4    | 5    | 6    |
| Assigned Phs                 |      | 2             |         | 4    |      | 6    |
| Phs Duration (G+Y+Rc), s     |      | 93.0          |         | 22.0 |      | 93.0 |
| Change Period (Y+Rc), s      |      | 7.0           |         | 6.0  |      | 7.0  |
| Max Green Setting (Gmax), s  |      | 86.0          |         | 16.0 |      | 86.0 |
| Max Q Clear Time (g_c+l1), s |      | 89.5          |         | 17.4 |      | 8.3  |
| Green Ext Time (p c), s      |      | 0.0           |         | 0.0  |      | 0.9  |
| 4 - 7                        |      | 0.0           |         | 0.0  |      | 0.0  |
| Intersection Summary         |      |               |         |      |      |      |
| HCM 2010 Ctrl Delay          |      |               | 38.9    |      |      |      |
| HCM 2010 LOS                 |      |               | D       |      |      |      |

2023 PROJECTED CONDITIONS 11/21/2017 MB

4: ROUTE 322 & WB ROUTE 30 RAMPS

2023 PROJECTED CONDITIONS

## 3: EB ROUTE 30 RAMPS & ROUTE 322 2023 PROJECTED CONDITIONS

Timing Plan: AM Peak

|                         | -        | •    | •    | -        | 1    |      |
|-------------------------|----------|------|------|----------|------|------|
| Lane Group              | EBT      | EBR  | WBL  | WBT      | NBL  | NBR  |
| Lane Configurations     | <b>^</b> | 7    | ሻ    | <b>^</b> | 7    | 7    |
| Traffic Volume (vph)    | 831      | 670  | 301  | 362      | 15   | 181  |
| Future Volume (vph)     | 831      | 670  | 301  | 362      | 15   | 181  |
| Ideal Flow (vphpl)      | 1800     | 1800 | 1800 | 1800     | 1800 | 1800 |
| Lane Width (ft)         | 13       | 12   | 12   | 13       | 13   | 14   |
| Grade (%)               | -6%      |      |      | 7%       | -5%  |      |
| Storage Length (ft)     |          | 0    | 250  |          | 0    | 0    |
| Storage Lanes           |          | 1    | 1    |          | 1    | 1    |
| Taper Length (ft)       |          |      | 25   |          | 25   |      |
| Link Speed (mph)        | 45       |      |      | 45       | 25   |      |
| Link Distance (ft)      | 353      |      |      | 551      | 313  |      |
| Travel Time (s)         | 5.3      |      |      | 8.3      | 8.5  |      |
| Peak Hour Factor        | 0.93     | 0.93 | 0.93 | 0.93     | 0.93 | 0.93 |
| Heavy Vehicles (%)      | 5%       | 4%   | 2%   | 15%      | 0%   | 2%   |
| Shared Lane Traffic (%) |          |      |      |          |      |      |
| Sign Control            | Free     |      |      | Free     | Stop |      |
| Intersection Summary    |          |      |      |          |      |      |
| Area Type:              | Other    |      |      |          |      |      |

Control Type: Unsignalized

3: EB ROUTE 30 RAMPS & ROUTE 322 2023 PROJECTED CONDITIONS

| Intersection           |                 |            |        |            |          |            |  |
|------------------------|-----------------|------------|--------|------------|----------|------------|--|
| Int Delay, s/veh       | 5.1             |            |        |            |          |            |  |
| Movement               | EBT             | EBR        | WBL    | WBT        | NBL      | NBR        |  |
|                        |                 |            |        |            | INDL     |            |  |
| Lane Configurations    | <b>↑</b><br>831 | 670        | 201    | 262        | _        | 101        |  |
| Traffic Vol, veh/h     | 831             | 670<br>670 | 301    | 362<br>362 | 15<br>15 | 181<br>181 |  |
| Future Vol, veh/h      |                 | 0/0        | 0      | 302        | 0        | 181        |  |
| Conflicting Peds, #/hi |                 | -          |        | -          |          | -          |  |
| Sign Control           | Free            | Free       | Free   | Free       | Stop     | Stop       |  |
| RT Channelized         | -               |            | -      | None       | -        | Stop       |  |
| Storage Length         | - 4 0           | 0          | 250    | -          | 0        | 0          |  |
| Veh in Median Storag   |                 |            | -      | 0          | 0        | -          |  |
| Grade, %               | -6              | -          | -      | 7          | -5       | -          |  |
| Peak Hour Factor       | 93              |            | 93     | 93         | 93       | 93         |  |
| Heavy Vehicles, %      | 5               | 4          | 2      | 15         | 0        | 2          |  |
| Mvmt Flow              | 894             | 720        | 324    | 389        | 16       | 195        |  |
|                        |                 |            |        |            |          |            |  |
| Major/Minor            | Major1          |            | Major2 | ı          | Minor1   |            |  |
| Conflicting Flow All   | 0               |            | 894    | 0          | 1931     | 894        |  |
| Stage 1                | -               | -          | -      | -          | 894      | -          |  |
| Stage 2                |                 |            |        |            | 1037     |            |  |
| Critical Hdwy          | -               | -          | 4.3    | _          | 5.4      | 5.72       |  |
| Critical Hdwy Stg 1    | -               |            | -1.0   |            | 4.4      | 0.72       |  |
| Critical Hdwy Stg 2    | _               |            | _      | _          | 4.4      | _          |  |
| Follow-up Hdwy         | _               |            | 3      |            | 3        | 3.1        |  |
| Pot Cap-1 Maneuver     |                 |            | 585    | -          | 80       | 402        |  |
| Stage 1                |                 |            | -      | -          | 571      | - 402      |  |
| Stage 2                | -               |            |        | -          | 425      |            |  |
| Platoon blocked, %     | -               |            | -      |            | 425      | -          |  |
| Mov Cap-1 Maneuve      |                 | -          | 585    | -          | 36       | 402        |  |
| Mov Cap-1 Maneuve      |                 |            | 505    | -          | 36       | 402        |  |
|                        |                 |            | -      | -          | 571      | -          |  |
| Stage 1                | -               | -          |        |            |          | -          |  |
| Stage 2                | -               | -          | -      | -          | 190      | -          |  |
|                        |                 |            |        |            |          |            |  |
| Approach               | EB              |            | WB     |            | NB       |            |  |
| HCM Control Delay,     | s 0             |            | 8.4    |            | 33.4     |            |  |
| HCM LOS                |                 |            |        |            | D        |            |  |
|                        |                 |            |        |            |          |            |  |
| N. 1 (N. 1 N.          |                 | NDI 4      | NDI O  | EDT        | EDD.     | MIDI       |  |
| Minor Lane/Major My    | vmt             | NBLn1      |        | EBT        | EBR      | WBL        |  |
| Capacity (veh/h)       |                 | 36         | 402    | -          | -        | 585        |  |
| HCM Lane V/C Ratio     |                 |            | 0.484  | -          |          | 0.553      |  |
| HCM Control Delay (    | (S)             | 169.4      | 22.1   | -          | -        | 18.5       |  |
| HCM Lane LOS           |                 | F          | С      | -          | -        | С          |  |
| HCM 95th %tile Q(ve    | eh)             | 1.5        | 2.6    | -          | -        | 3.4        |  |

### 8: PROPOSED DRIVEWAY/PARK AND RIDE & LLOYD AVENUE 2023 PROJECTED CONDITIONS

Timing Plan: AM Peak

|                         | •    | -    | $\rightarrow$ | •    | •    | •    | 4    | <b>†</b> | ~    | -    | ţ    | 4    |
|-------------------------|------|------|---------------|------|------|------|------|----------|------|------|------|------|
| Lane Group              | EBL  | EBT  | EBR           | WBL  | WBT  | WBR  | NBL  | NBT      | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations     |      | 4    |               |      | 4    |      |      | 4        |      |      | 4    |      |
| Traffic Volume (vph)    | 2    | 475  | 2             | 1    | 196  | 18   | 1    | 0        | 2    | 11   | 0    | 1    |
| Future Volume (vph)     | 2    | 475  | 2             | 1    | 196  | 18   | 1    | 0        | 2    | 11   | 0    | 1    |
| Ideal Flow (vphpl)      | 1800 | 1800 | 1800          | 1800 | 1800 | 1800 | 1800 | 1800     | 1800 | 1800 | 1800 | 1800 |
| Lane Width (ft)         | 12   | 10   | 12            | 12   | 10   | 12   | 12   | 12       | 12   | 16   | 12   | 12   |
| Grade (%)               |      | -2%  |               |      | 1%   |      |      | 0%       |      |      | 4%   |      |
| Link Speed (mph)        |      | 35   |               |      | 35   |      |      | 25       |      |      | 25   |      |
| Link Distance (ft)      |      | 301  |               |      | 298  |      |      | 205      |      |      | 184  |      |
| Travel Time (s)         |      | 5.9  |               |      | 5.8  |      |      | 5.6      |      |      | 5.0  |      |
| Confl. Peds. (#/hr)     |      |      |               |      |      |      |      |          |      | 2    |      | 2    |
| Peak Hour Factor        | 0.81 | 0.81 | 0.81          | 0.81 | 0.81 | 0.81 | 0.81 | 0.81     | 0.81 | 0.81 | 0.81 | 0.81 |
| Heavy Vehicles (%)      | 0%   | 3%   | 2%            | 2%   | 11%  | 22%  | 2%   | 2%       | 2%   | 9%   | 2%   | 0%   |
| Shared Lane Traffic (%) |      |      |               |      |      |      |      |          |      |      |      |      |
| Sign Control            |      | Free |               |      | Free |      |      | Stop     |      |      | Stop |      |
| Intersection Summary    |      |      |               |      |      |      |      |          |      |      |      |      |

Area Type: (Control Type: Unsignalized

### 8: PROPOSED DRIVEWAY/PARK AND RIDE & LLOYD AVENUE 2023 PROJECTED CONDITIONS

Timing Plan: AM Peak

| Intersection           |        |      |      |        |      |      |        |       |      |        |       |      |
|------------------------|--------|------|------|--------|------|------|--------|-------|------|--------|-------|------|
| Int Delay, s/veh       | 0.4    |      |      |        |      |      |        |       |      |        |       |      |
| Movement               | EBL    | EBT  | EBR  | WBL    | WBT  | WBR  | NBL    | NBT   | NBR  | SBL    | SBT   | SBR  |
| Lane Configurations    |        | 4    |      |        | 4    |      |        | 4     |      |        | 4     |      |
| Traffic Vol, veh/h     | 2      | 475  | 2    | 1      | 196  | 18   | 1      | 0     | 2    | 11     | 0     | 1    |
| Future Vol, veh/h      | 2      | 475  | 2    | 1      | 196  | 18   | 1      | 0     | 2    | 11     | 0     | 1    |
| Conflicting Peds, #/hr | 0      | 0    | 0    | 0      | 0    | 0    | 0      | 0     | 0    | 2      | 0     | 2    |
| Sign Control           | Free   | Free | Free | Free   | Free | Free | Stop   | Stop  | Stop | Stop   | Stop  | Stop |
| RT Channelized         | -      | -    | None | -      | -    | None | -      | -     | None | -      | -     | None |
| Storage Length         | -      | -    | -    | -      | -    | -    | -      | -     | -    | -      | -     | -    |
| Veh in Median Storage  | e,# -  | 0    | -    | -      | 0    | -    | -      | 0     | -    | -      | 0     | -    |
| Grade, %               | -      | -2   | -    | -      | 1    | -    | -      | 0     | -    | -      | 4     | -    |
| Peak Hour Factor       | 81     | 81   | 81   | 81     | 81   | 81   | 81     | 81    | 81   | 81     | 81    | 81   |
| Heavy Vehicles, %      | 0      | 3    | 2    | 2      | 11   | 22   | 2      | 2     | 2    | 9      | 2     | 0    |
| Mvmt Flow              | 2      | 586  | 2    | 1      | 242  | 22   | 1      | 0     | 2    | 14     | 0     | 1    |
|                        |        |      |      |        |      |      |        |       |      |        |       |      |
| Major/Minor            | Major1 |      |      | Major2 |      | N    | Minor1 |       | ľ    | Minor2 |       |      |
| Conflicting Flow All   | 264    | 0    | 0    | 588    | 0    | 0    | 849    | 857   | 589  | 849    | 847   | 255  |
| Stage 1                | -      | -    | _    | _      | -    | _    | 591    | 591   | -    | 255    | 255   |      |
| Stage 2                | -      | -    | -    | -      |      | -    | 258    | 266   | -    | 594    | 592   | -    |
| Critical Hdwy          | 4.3    | -    | _    | 4.3    | -    | _    | 7.12   | 6.52  | 6.22 | 7.99   | 7.32  | 6.6  |
| Critical Hdwy Stg 1    | -      | -    | -    | -      |      | -    | 6.12   | 5.52  | -    | 6.99   | 6.32  | -    |
| Critical Hdwy Stg 2    | -      | -    | _    | _      | -    | _    | 6.12   | 5.52  | _    | 6.99   | 6.32  | _    |
| Follow-up Hdwy         | 3      | -    |      | 3      |      |      |        | 4.018 | 3.1  | 3.1    | 4.018 | 3.1  |
| Pot Cap-1 Maneuver     | 975    | -    | -    | 752    | -    | -    | 312    | 295   | 535  | 249    | 247   | 810  |
| Stage 1                | -      | -    | -    | -      | -    |      | 556    | 494   | -    | 788    | 658   | -    |
| Stage 2                | -      | -    | _    | _      | -    | -    | 860    | 689   | _    | 468    | 433   | -    |
| Platoon blocked, %     |        | -    |      |        |      |      |        |       |      |        |       |      |
| Mov Cap-1 Maneuver     | 975    | -    | _    | 752    | _    | -    | 310    | 294   | 534  | 247    | 246   | 809  |
| Mov Cap-2 Maneuver     |        | -    |      | -      |      |      | 310    | 294   |      | 247    | 246   | -    |
| Stage 1                | _      | -    | _    | -      | _    | _    | 554    | 493   | -    | 786    | 657   | -    |
| Stage 2                | -      |      |      |        | -    | -    | 856    | 688   | -    | 464    | 432   |      |
| 0.030 2                |        |      |      |        |      |      | 550    | 555   |      |        | .02   |      |
| Approach               | EB     |      |      | WB     |      |      | NB     |       |      | SB     |       |      |
|                        |        |      |      | 0      |      |      | 13.4   |       |      |        |       |      |
| HCM Control Delay, s   | Ü      |      |      | 0      |      |      |        |       |      | 19.6   |       |      |
| HCM LOS                |        |      |      |        |      |      | В      |       |      | С      |       |      |

| Minor Lane/Major Mvmt | NBLn1 | EBL   | EBT | EBR | WBL   | WBT | WBR S | BLn1  |
|-----------------------|-------|-------|-----|-----|-------|-----|-------|-------|
| Capacity (veh/h)      | 430   | 975   | -   | -   | 752   | -   | -     | 262   |
| HCM Lane V/C Ratio    | 0.009 | 0.003 | -   | -   | 0.002 | -   | - (   | 0.057 |
| HCM Control Delay (s) | 13.4  | 8.7   | 0   | -   | 9.8   | 0   | -     | 19.6  |
| HCM Lane LOS          | В     | Α     | Α   | -   | Α     | Α   | -     | С     |
| HCM 95th %tile Q(veh) | 0     | 0     | -   | -   | 0     | -   | -     | 0.2   |

### 9: LLOYD AVENUE & GO CARLSON BLVD 2023 PROJECTED CONDITIONS

Timing Plan: AM Peak

|                         | •    | •    | 1    | 1    | ţ    | 4    |
|-------------------------|------|------|------|------|------|------|
| Lane Group              | EBL  | EBR  | NBL  | NBT  | SBT  | SBR  |
| Lane Configurations     | W    |      |      | ર્ન  | ĵ»   |      |
| Traffic Volume (vph)    | 136  | 46   | 13   | 328  | 177  | 19   |
| Future Volume (vph)     | 136  | 46   | 13   | 328  | 177  | 19   |
| Ideal Flow (vphpl)      | 1800 | 1800 | 1800 | 1800 | 1800 | 1000 |
| Lane Width (ft)         | 12   | 12   | 12   | 10   | 10   | 12   |
| Grade (%)               | 2%   |      |      | 1%   | -2%  |      |
| Link Speed (mph)        | 35   |      |      | 35   | 35   |      |
| Link Distance (ft)      | 1310 |      |      | 446  | 202  |      |
| Travel Time (s)         | 25.5 |      |      | 8.7  | 3.9  |      |
| Peak Hour Factor        | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Heavy Vehicles (%)      | 2%   | 2%   | 31%  | 5%   | 12%  | 0%   |
| Shared Lane Traffic (%) |      |      |      |      |      |      |
| Sign Control            | Stop |      |      | Free | Free |      |

Intersection Summary
Area Type:
Control Type: Unsignalized

### 9: LLOYD AVENUE & GO CARLSON BLVD 2023 PROJECTED CONDITIONS

| Interception           |         |       |        |       |         |      |
|------------------------|---------|-------|--------|-------|---------|------|
| Intersection           | 4.1     |       |        |       |         |      |
| Int Delay, s/veh       | 4.1     |       |        |       |         |      |
| Movement               | EBL     | EBR   | NBL    | NBT   | SBT     | SBR  |
| Lane Configurations    | ¥       |       |        | 4     | ĥ       |      |
| Traffic Vol, veh/h     | 136     | 46    | 13     | 328   | 177     | 19   |
| Future Vol, veh/h      | 136     | 46    | 13     | 328   | 177     | 19   |
| 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. %               | 2       |       | -      | 1     | -2      |      |
| Peak Hour Factor       | 90      | 90    | 90     | 90    | 90      | 90   |
| Heavy Vehicles, %      | 2       | 2     | 31     | 5     | 12      | 0    |
| Mymt Flow              | 151     | 51    | 14     | 364   | 197     | 21   |
| WWITTIOW               | 101     | 01    | 17     | 304   | 101     | 21   |
|                        |         |       |        |       |         |      |
| Major/Minor N          | /linor2 | 1     | Major1 | N     | /lajor2 |      |
| Conflicting Flow All   | 600     | 208   | 218    | 0     | -       | 0    |
| Stage 1                | 208     | -     | -      | -     | -       | -    |
| Stage 2                | 392     | -     | -      | -     | -       | -    |
| Critical Hdwy          | 6.82    | 6.42  | 4.41   | -     | -       | -    |
| Critical Hdwy Stg 1    | 5.82    | -     | -      | -     | -       | -    |
| Critical Hdwy Stg 2    | 5.82    | -     | -      | -     | -       | -    |
| Follow-up Hdwy         | 3       | 3.1   | 3.1    | -     |         | -    |
| Pot Cap-1 Maneuver     | 489     | 875   | 975    | _     | -       | -    |
| Stage 1                | 934     | -     | -      | -     | -       | -    |
| Stage 2                | 746     | -     | _      | _     | -       | -    |
| Platoon blocked, %     | 1-10    |       |        |       |         |      |
| Mov Cap-1 Maneuver     | 480     | 875   | 975    | _     | _       | -    |
| Mov Cap-2 Maneuver     | 480     | - 013 | 313    | -     | -       |      |
| Stage 1                | 917     | -     | -      |       | -       |      |
|                        |         |       | -      | -     | -       | -    |
| Stage 2                | 746     | -     | -      | -     | -       | -    |
|                        |         |       |        |       |         |      |
| Approach               | EB      |       | NB     |       | SB      |      |
| HCM Control Delay, s   | 15.5    |       | 0.3    |       | 0       |      |
| HCM LOS                | C       |       | 0.0    |       | U       |      |
| TIOW LOS               | U       |       |        |       |         |      |
|                        |         |       |        |       |         |      |
| Minor Lane/Major Mvm   |         | NBL   | NBT    | EBLn1 | SBT     | SBR  |
| Capacity (veh/h)       |         | 975   | -      | 542   | -       | -    |
| HCM Lane V/C Ratio     |         | 0.015 | -      | 0.373 | -       | -    |
| HCM Control Delay (s)  |         | 8.7   | 0      | 15.5  | -       | -    |
| HCM Lane LOS           |         | A     | A      | C     | -       | -    |
| HCM 95th %tile Q(veh)  |         | 0     | -      | 1.7   | _       | _    |
| TION JOHN JUNE Q(VEII) |         | U     |        | 1.7   |         |      |

### 10: LLOYD AVENUE & BEAVER RUN ROAD/PROPOSED DRIVEWAY 2023 PROJECTED CONDITIONS

Timing Plan: AM Peak

|                         | •    | <b>→</b> | $\rightarrow$ | •    | <b>←</b> | •    | <b>1</b> | <b>†</b> | /    | -    | ļ    | 4    |
|-------------------------|------|----------|---------------|------|----------|------|----------|----------|------|------|------|------|
| Lane Group              | EBL  | EBT      | EBR           | WBL  | WBT      | WBR  | NBL      | NBT      | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations     |      | 4        |               |      | 4        |      |          | 4        |      |      | 4    |      |
| Traffic Volume (vph)    | 16   | 0        | 5             | 6    | 0        | 16   | 0        | 335      | 3    | 6    | 206  | 1    |
| Future Volume (vph)     | 16   | 0        | 5             | 6    | 0        | 16   | 0        | 335      | 3    | 6    | 206  | 1    |
| Ideal Flow (vphpl)      | 1800 | 1800     | 1800          | 1800 | 1800     | 1800 | 1800     | 1800     | 1800 | 1800 | 1800 | 1800 |
| Lane Width (ft)         | 13   | 12       | 12            | 12   | 12       | 12   | 12       | 10       | 12   | 12   | 10   | 12   |
| Grade (%)               |      | 1%       |               |      | 0%       |      |          | 1%       |      |      | -1%  |      |
| Link Speed (mph)        |      | 25       |               |      | 25       |      |          | 35       |      |      | 35   |      |
| Link Distance (ft)      |      | 1282     |               |      | 461      |      |          | 488      |      |      | 446  |      |
| Travel Time (s)         |      | 35.0     |               |      | 12.6     |      |          | 9.5      |      |      | 8.7  |      |
| Peak Hour Factor        | 0.91 | 0.91     | 0.91          | 0.91 | 0.91     | 0.91 | 0.91     | 0.91     | 0.91 | 0.91 | 0.91 | 0.91 |
| Heavy Vehicles (%)      | 0%   | 2%       | 20%           | 2%   | 2%       | 2%   | 0%       | 5%       | 2%   | 2%   | 11%  | 0%   |
| Shared Lane Traffic (%) |      |          |               |      |          |      |          |          |      |      |      |      |
| Sign Control            |      | Stop     |               |      | Stop     |      |          | Free     |      |      | Free |      |

Intersection Summary

Other

Area Type: Control Type: Unsignalized

### 10: LLOYD AVENUE & BEAVER RUN ROAD/PROPOSED DRIVEWAY 2023 PROJECTED CONDITIONS

| Intersection           |        |      |      |        |      |      |         |      |      |        |      |      |
|------------------------|--------|------|------|--------|------|------|---------|------|------|--------|------|------|
| Int Delay, s/veh       | 1      |      |      |        |      |      |         |      |      |        |      |      |
| Movement               | EBL    | EBT  | EBR  | WBL    | WBT  | WBR  | NBL     | NBT  | NBR  | SBL    | SBT  | SBR  |
| Lane Configurations    |        | 4    |      |        | 4    |      |         | 4    |      |        | 4    |      |
| Traffic Vol, veh/h     | 16     | 0    | 5    | 6      | 0    | 16   | 0       | 335  | 3    | 6      | 206  | 1    |
| Future Vol, veh/h      | 16     | 0    | 5    | 6      | 0    | 16   | 0       | 335  | 3    | 6      | 206  | 1    |
| 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  | e,# -  | 0    | -    | -      | 0    | -    | -       | 0    | -    | -      | 0    | -    |
| Grade, %               | -      | 1    | -    | -      | 0    | -    | -       | 1    | -    | -      | -1   | -    |
| Peak Hour Factor       | 91     | 91   | 91   | 91     | 91   | 91   | 91      | 91   | 91   | 91     | 91   | 91   |
| Heavy Vehicles, %      | 0      | 2    | 20   | 2      | 2    | 2    | 0       | 5    | 2    | 2      | 11   | 0    |
| Mvmt Flow              | 18     | 0    | 5    | 7      | 0    | 18   | 0       | 368  | 3    | 7      | 226  | 1    |
|                        |        |      |      |        |      |      |         |      |      |        |      |      |
| Major/Minor            | Minor2 |      | N    | Minor1 |      | N    | //ajor1 |      | ı    | Major2 |      |      |
| Conflicting Flow All   | ຣາດ    | 612  | 227  | 612    | 611  | 270  | 227     | ۸    | ۸    | 371    | ۸    | ۸    |

| Major/Minor          | Minor2 |       | N    | /linor1 |       | 1    | Major1 |   | N | lajor2 |   |   |  |
|----------------------|--------|-------|------|---------|-------|------|--------|---|---|--------|---|---|--|
| Conflicting Flow All | 620    | 612   | 227  | 613     | 611   | 370  | 227    | 0 | 0 | 371    | 0 | 0 |  |
| Stage 1              | 241    | 241   | -    | 370     | 370   | -    | -      | - | - | -      | - | - |  |
| Stage 2              | 379    | 371   | -    | 243     | 241   | -    | -      | - | - | -      | - | - |  |
| Critical Hdwy        | 7.3    | 6.72  | 6.5  | 7.12    | 6.52  | 6.22 | 4.3    | - | - | 4.3    | - | - |  |
| Critical Hdwy Stg 1  | 6.3    | 5.72  | -    | 6.12    | 5.52  | -    | -      | - | - | -      | - | - |  |
| Critical Hdwy Stg 2  | 6.3    | 5.72  | -    | 6.12    | 5.52  | -    | -      | - | - | -      | - | - |  |
| Follow-up Hdwy       | 3      | 4.018 | 3.48 | 3       | 4.018 | 3.1  | 3      | - | - | 3      | - | - |  |
| Pot Cap-1 Maneuver   | 437    | 395   | 765  | 456     | 409   | 716  | 1004   | - | - | 896    | - | - |  |
| Stage 1              | 869    | 697   | -    | 743     | 620   | -    | -      | - | - | -      | - | - |  |
| Stage 2              | 721    | 607   | -    | 877     | 706   | -    | -      | - | - | -      | - | - |  |
| Platoon blocked, %   |        |       |      |         |       |      |        | - | - |        | - | - |  |
| Mov Cap-1 Maneuver   | 423    | 391   | 765  | 450     | 405   | 716  | 1004   | - | - | 896    | - | - |  |
| Mov Cap-2 Maneuver   | 423    | 391   | -    | 450     | 405   | -    | -      | - | - | -      | - | - |  |
| Stage 1              | 869    | 691   | -    | 743     | 620   | -    | -      | - | - | -      | - | - |  |
| Stage 2              | 703    | 607   | -    | 863     | 700   | -    | -      | - | - | -      | - | - |  |
|                      |        |       |      |         |       |      |        |   |   |        |   |   |  |
| Approach             | EB     |       |      | WB      |       |      | NB     |   |   | SB     |   |   |  |

| pproach         EB         WB         NB         SB           CM Control Delay, s         13         11.1         0         0.3 |                      |    |      |    |     |
|---|----------------------|----|------|----|-----|
| CM Control Delay, s 13 11.1 0 0.3   | Approach             | EB | WB   | NB | SB  |
|   | HCM Control Delay, s | 13 | 11.1 | 0  | 0.3 |
| CM LOS B B  | HCM LOS              | В  | В    |    |     |

| Minor Lane/Major Mvmt | NBL  | NBT | NBR | EBLn1\ | WBLn1 | SBL   | SBT | SBR |
|-----------------------|------|-----|-----|--------|-------|-------|-----|-----|
| Capacity (veh/h)      | 1004 | -   | -   | 473    | 617   | 896   | -   | -   |
| HCM Lane V/C Ratio    | -    | -   | -   | 0.049  | 0.039 | 0.007 | -   | -   |
| HCM Control Delay (s) | 0    | -   | -   | 13     | 11.1  | 9     | 0   | -   |
| HCM Lane LOS          | Α    | -   | -   | В      | В     | Α     | Α   | -   |
| HCM 95th %tile Q(veh) | 0    | -   | -   | 0.2    | 0.1   | 0     | -   | -   |

### 11: PROPOSED RIRO DRIVEWAY & ROUTE 322 2023 PROJECTED CONDITIONS

Timing Plan: AM Peak

Synchro 10 Report Page 9

|                         | -     | •    | 1    | •        | 1    | ~    |
|-------------------------|-------|------|------|----------|------|------|
| Lane Group              | EBT   | EBR  | WBL  | WBT      | NBL  | NBR  |
| Lane Configurations     | 1₃    |      |      | <b>*</b> |      | 7    |
| Traffic Volume (vph)    | 1105  | 4    | 0    | 502      | 0    | 0    |
| Future Volume (vph)     | 1105  | 4    | 0    | 502      | 0    | 0    |
| Ideal Flow (vphpl)      | 1800  | 1800 | 1800 | 1800     | 1800 | 1800 |
| Grade (%)               | -2%   |      |      | -1%      | 0%   |      |
| Link Speed (mph)        | 45    |      |      | 35       | 25   |      |
| Link Distance (ft)      | 329   |      |      | 134      | 155  |      |
| Travel Time (s)         | 5.0   |      |      | 2.6      | 4.2  |      |
| Peak Hour Factor        | 0.87  | 0.87 | 0.87 | 0.87     | 0.87 | 0.87 |
| Heavy Vehicles (%)      | 7%    | 2%   | 2%   | 6%       | 2%   | 2%   |
| Shared Lane Traffic (%) |       |      |      |          |      |      |
| Sign Control            | Free  |      |      | Free     | Stop |      |
| Intersection Summary    |       |      |      |          |      |      |
| Area Type:              | Other |      |      |          |      |      |

Control Type: Unsignalized

11: PROPOSED RIRO DRIVEWAY & ROUTE 322 2023 PROJECTED CONDITIONS

| Intersection           |        |      |        |          |         |      |
|------------------------|--------|------|--------|----------|---------|------|
| Int Delay, s/veh       | 0      |      |        |          |         |      |
| Movement               | EBT    | EBR  | WBL    | WBT      | NBL     | NBR  |
| Lane Configurations    | ĵ.     |      |        | <b>^</b> |         | 7    |
| Traffic Vol, veh/h     | 1105   | 4    | 0      | 502      | 0       | 0    |
| Future Vol, veh/h      | 1105   | 4    | 0      | 502      | 0       | 0    |
| Conflicting Peds, #/hr | 0      | 0    | 0      | 0        | 0       | 0    |
| Sign Control           | Free   | Free | Free   | Free     | Stop    | Stop |
| RT Channelized         | -      | None | -      | None     | -       | None |
| Storage Length         | -      | -    | -      | -        | -       | 0    |
| Veh in Median Storage  | e,# 0  | -    | -      | 0        | 0       | -    |
| Grade, %               | -2     | -    | -      | -1       | 0       | -    |
| Peak Hour Factor       | 87     | 87   | 87     | 87       | 87      | 87   |
| Heavy Vehicles, %      | 7      | 2    | 2      | 6        | 2       | 2    |
| Mvmt Flow              | 1270   | 5    | 0      | 577      | 0       | 0    |
|                        |        |      |        |          |         |      |
| Major/Minor            | Major1 | ľ    | Major2 | ľ        | /linor1 |      |
| Conflicting Flow All   | 0      | 0    | -      | -        | -       | 1273 |
| Stage 1                | -      | -    | -      | -        | -       | -    |
| Stage 2                | -      | -    | -      | -        | -       | -    |
| Critical Hdwy          | -      | -    | -      | -        | -       | 6.22 |
| Critical Hdwy Stg 1    | -      | -    | -      | -        | -       | -    |
| Critical Hdwy Stg 2    | -      | -    | -      | -        | -       | -    |
| Follow-up Hdwy         | -      | -    | -      | -        | -       | 3.1  |
| Pot Cap-1 Maneuver     | -      | -    | 0      | -        | 0       | *156 |
| Stage 1                | -      | -    | 0      | -        | 0       | -    |
| Stage 2                | -      | -    | 0      | -        | 0       | -    |
| Platoon blocked. %     | -      | -    |        | -        |         | 1    |

| Stage 1             | - | - | - | - | - | -    |
|---------------------|---|---|---|---|---|------|
| Stage 2             | - | - | - | - | - | -    |
| Critical Hdwy       | - | - | - | - | - | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | -    |
| Critical Hdwy Stg 2 | - | - | - | - | - | -    |
| Follow-up Hdwy      | - | - | - | - | - | 3.1  |
| Pot Cap-1 Maneuver  | - | - | 0 | - | 0 | *156 |
| Stage 1             | - | - | 0 | - | 0 | -    |
| Stage 2             | - | - | 0 | - | 0 | -    |
| Platoon blocked, %  | - | - |   | - |   | 1    |
| Mov Cap-1 Maneuver  | - | - | - | - | - | *156 |
| Mov Cap-2 Maneuver  | - | - | - | - | - | -    |
| Stage 1             | - | - | - | - | - | -    |
| Stage 2             | - | - | - | - | - | -    |
| · ·                 |   |   |   |   |   |      |
|                     |   |   |   |   |   |      |

| Approach             | EB | WB | NB |
|----------------------|----|----|----|
| HCM Control Delay, s | 0  | 0  | 0  |
| HCM LOS              |    |    | Α  |
|                      |    |    |    |
|                      |    |    |    |

| Minar Lana/Majar Mumt      | NBLn1   | EBT     | EDD     | WBT   |                           |                                |
|----------------------------|---------|---------|---------|-------|---------------------------|--------------------------------|
| Minor Lane/Major Mvmt      | INDLIII | EDI     | EDK     | VVDI  |                           |                                |
| Capacity (veh/h)           | -       | -       | -       | -     |                           |                                |
| HCM Lane V/C Ratio         | -       | -       | -       | -     |                           |                                |
| HCM Control Delay (s)      | 0       | -       | -       | -     |                           |                                |
| HCM Lane LOS               | Α       | -       | -       | -     |                           |                                |
| HCM 95th %tile Q(veh)      | -       | -       | -       | -     |                           |                                |
|                            |         |         |         |       |                           |                                |
| Notes                      |         |         |         |       |                           |                                |
| ~: Volume exceeds canacity | \$- Da  | lav evo | aade 31 | າ∩c ₄ | · Computation Not Defined | *· All major volume in platoon |

### 1: PROPOSED DRIVEWAY/ROCK RAYMOND ROAD & ROUTE 322 2023 PROJECTED CONDITIONS

Timing Plan: PM Peak

|                         | ٠     | <b>→</b> | $\rightarrow$ | •     | <b>←</b> | •    | 4     | <b>†</b> | <b>/</b> | -     | ļ     | 4    |
|-------------------------|-------|----------|---------------|-------|----------|------|-------|----------|----------|-------|-------|------|
| Lane Group              | EBL   | EBT      | EBR           | WBL   | WBT      | WBR  | NBL   | NBT      | NBR      | SBL   | SBT   | SBR  |
| Lane Configurations     | ሻ     | 1→       |               | . ነ   | 1→       |      |       | 4        |          | "     | ĵ.    |      |
| Traffic Volume (vph)    | 94    | 556      | 27            | 15    | 750      | 81   | 25    | 6        | 10       | 73    | 7     | 134  |
| Future Volume (vph)     | 94    | 556      | 27            | 15    | 750      | 81   | 25    | 6        | 10       | 73    | 7     | 134  |
| Ideal Flow (vphpl)      | 1800  | 1800     | 1800          | 1800  | 1800     | 1800 | 1800  | 1800     | 1800     | 1800  | 1800  | 1800 |
| Lane Width (ft)         | 10    | 14       | 12            | 12    | 13       | 12   | 12    | 12       | 12       | 10    | 12    | 11   |
| Grade (%)               |       | -2%      |               |       | 4%       |      |       | 0%       |          |       | 1%    |      |
| Storage Length (ft)     | 145   |          | 0             | 75    |          | 0    | 0     |          | 0        | 230   |       | 0    |
| Storage Lanes           | 1     |          | 0             | 1     |          | 0    | 0     |          | 0        | 1     |       | 0    |
| Taper Length (ft)       | 25    |          |               | 25    |          |      | 25    |          |          | 25    |       |      |
| Right Turn on Red       |       |          | Yes           |       |          | Yes  |       |          | Yes      |       |       | Yes  |
| Link Speed (mph)        |       | 45       |               |       | 35       |      |       | 25       |          |       | 35    |      |
| Link Distance (ft)      |       | 268      |               |       | 1016     |      |       | 212      |          |       | 359   |      |
| Travel Time (s)         |       | 4.1      |               |       | 19.8     |      |       | 5.8      |          |       | 7.0   |      |
| Confl. Peds. (#/hr)     |       |          |               |       |          | 1    |       |          |          |       |       |      |
| Peak Hour Factor        | 0.95  | 0.95     | 0.95          | 0.95  | 0.95     | 0.95 | 0.95  | 0.95     | 0.95     | 0.95  | 0.95  | 0.95 |
| Heavy Vehicles (%)      | 21%   | 2%       | 2%            | 2%    | 1%       | 5%   | 2%    | 2%       | 2%       | 0%    | 2%    | 5%   |
| Shared Lane Traffic (%) |       |          |               |       |          |      |       |          |          |       |       |      |
| Turn Type               | pm+pt | NA       |               | Perm  | NA       |      | Perm  | NA       |          | Perm  | NA    |      |
| Protected Phases        | 5     | 2        |               |       | 6        |      |       | 8        |          |       | 4     |      |
| Permitted Phases        | 2     |          |               | 6     |          |      | 8     |          |          | 4     |       |      |
| Detector Phase          | 5     | 2        |               | 6     | 6        |      | 8     | 8        |          | 4     | 4     |      |
| Switch Phase            |       |          |               |       |          |      |       |          |          |       |       |      |
| Minimum Initial (s)     | 3.0   | 11.0     |               | 11.0  | 11.0     |      | 3.0   | 3.0      |          | 3.0   | 3.0   |      |
| Minimum Split (s)       | 14.0  | 18.0     |               | 18.0  | 18.0     |      | 22.0  | 22.0     |          | 13.0  | 13.0  |      |
| Total Split (s)         | 14.0  | 73.0     |               | 59.0  | 59.0     |      | 27.0  | 27.0     |          | 27.0  | 27.0  |      |
| Total Split (%)         | 14.0% | 73.0%    |               | 59.0% | 59.0%    |      | 27.0% | 27.0%    |          | 27.0% | 27.0% |      |
| Yellow Time (s)         | 5.0   | 5.0      |               | 5.0   | 5.0      |      | 4.0   | 4.0      |          | 4.0   | 4.0   |      |
| All-Red Time (s)        | 2.0   | 2.0      |               | 2.0   | 2.0      |      | 2.0   | 2.0      |          | 2.0   | 2.0   |      |
| Lost Time Adjust (s)    | -1.0  | -1.0     |               | -1.0  | -1.0     |      |       | -1.0     |          | -1.0  | -1.0  |      |
| Total Lost Time (s)     | 6.0   | 6.0      |               | 6.0   | 6.0      |      |       | 5.0      |          | 5.0   | 5.0   |      |
| Lead/Lag                | Lead  |          |               | Lag   | Lag      |      |       |          |          |       |       |      |
| Lead-Lag Optimize?      | Yes   |          |               | Yes   | Yes      |      |       |          |          |       |       |      |
| Recall Mode             | None  | C-Max    |               | C-Max | C-Max    |      | None  | None     |          | None  | None  |      |
| Intersection Summary    |       |          |               |       |          |      |       |          |          |       |       |      |

Intersection Summary

Area Type: Other
Cycle Length: 100

Actuated Cycle Length: 100

Offset: 94 (94%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated



2023 PROJECTED CONDITIONS 11/21/2017

Synchro 10 Report Page 1

### 1: PROPOSED DRIVEWAY/ROCK RAYMOND ROAD & ROUTE 322 2023 PROJECTED CONDITIONS

Timing Plan: PM Peak

|                                   | ۶          | <b>→</b> | •        | •        | -         | •           | 1          | 1         | ~    | <b>/</b>  | <b>+</b>  | 4          |
|-----------------------------------|------------|----------|----------|----------|-----------|-------------|------------|-----------|------|-----------|-----------|------------|
| Movement                          | EBL        | EBT      | EBR      | WBL      | WBT       | WBR         | NBL        | NBT       | NBR  | SBL       | SBT       | SBR        |
| Lane Configurations               | ٦          | ĵ.       |          | ሻ        | ĵ»        |             |            | 4         |      | 7         | î»        |            |
| Traffic Volume (veh/h)            | 94         | 556      | 27       | 15       | 750       | 81          | 25         | 6         | 10   | 73        | 7         | 134        |
| Future Volume (veh/h)             | 94         | 556      | 27       | 15       | 750       | 81          | 25         | 6         | 10   | 73        | 7         | 134        |
| Number                            | 5          | 2        | 12       | 1        | 6         | 16          | 3          | 8         | 18   | 7         | 4         | 14         |
| Initial Q (Qb), veh               | 1          | 0        | 0        | 0        | 1         | 0           | 0          | 0         | 0    | 0         | 0         | 0          |
| Ped-Bike Adj(A_pbT)               | 1.00       |          | 1.00     | 1.00     |           | 1.00        | 1.00       |           | 1.00 | 1.00      |           | 1.00       |
| Parking Bus, Adj                  | 1.00       | 1.00     | 1.00     | 1.00     | 1.00      | 1.00        | 1.00       | 1.00      | 1.00 | 1.00      | 1.00      | 1.00       |
| Adj Sat Flow, veh/h/ln            | 1502       | 1854     | 1818     | 1729     | 1809      | 1764        | 1800       | 1765      | 1800 | 1791      | 1708      | 1791       |
| Adj Flow Rate, veh/h              | 99         | 585      | 28       | 16       | 789       | 83          | 26         | 6         | 11   | 77        | 7         | 77         |
| Adj No. of Lanes                  | 1          | 1        | 0        | 1        | 1         | 0           | 0          | 1         | 0    | 1         | 1         | 0          |
| Peak Hour Factor                  | 0.95       | 0.95     | 0.95     | 0.95     | 0.95      | 0.95        | 0.95       | 0.95      | 0.95 | 0.95      | 0.95      | 0.95       |
| Percent Heavy Veh, %              | 21         | 2        | 2        | 2        | 1         | . 1         | 2          | 2         | 2    | 0         | 2         | 2          |
| Cap, veh/h                        | 325        | 1378     | 66       | 575      | 1085      | 113         | 90         | 25        | 20   | 210       | 13        | 141        |
| Arrive On Green                   | 0.10       | 1.00     | 1.00     | 0.67     | 0.67      | 0.66        | 0.09       | 0.10      | 0.09 | 0.10      | 0.10      | 0.10       |
| Sat Flow, veh/h                   | 1431       | 1755     | 84       | 748      | 1610      | 169         | 308        | 242       | 189  | 1337      | 123       | 1348       |
| Grp Volume(v), veh/h              | 99         | 0        | 613      | 16       | 0         | 872         | 43         | 0         | 0    | 77        | 0         | 84         |
| Grp Sat Flow(s),veh/h/ln          | 1431       | 0        | 1839     | 748      | 0         | 1779        | 739        | 0         | 0    | 1337      | 0         | 1470       |
| Q Serve(g_s), s                   | 1.9        | 0.0      | 0.0      | 0.7      | 0.0       | 31.4        | 1.5        | 0.0       | 0.0  | 0.0       | 0.0       | 5.4        |
| Cycle Q Clear(g_c), s             | 1.9        | 0.0      | 0.0      | 0.7      | 0.0       | 31.4        | 7.4        | 0.0       | 0.0  | 5.6       | 0.0       | 5.4        |
| Prop In Lane                      | 1.00       |          | 0.05     | 1.00     |           | 0.10        | 0.60       | •         | 0.26 | 1.00      | •         | 0.92       |
| Lane Grp Cap(c), veh/h            | 325        | 0        | 1444     | 575      | 0         | 1198        | 128        | 0         | 0    | 210       | 0         | 154        |
| V/C Ratio(X)                      | 0.30       | 0.00     | 0.42     | 0.03     | 0.00      | 0.73        | 0.34       | 0.00      | 0.00 | 0.37      | 0.00      | 0.54       |
| Avail Cap(c_a), veh/h             | 372        | 0        | 1444     | 576      | 0         | 1198        | 284        | 0         | 0    | 364       | 0         | 323        |
| HCM Platoon Ratio                 | 2.00       | 2.00     | 2.00     | 1.00     | 1.00      | 1.00        | 1.00       | 1.00      | 1.00 | 1.00      | 1.00      | 1.00       |
| Upstream Filter(I)                | 1.00       | 0.00     | 1.00     | 1.00     | 0.00      | 1.00        | 1.00       | 0.00      | 0.00 | 1.00      | 0.00      | 1.00       |
| Uniform Delay (d), s/veh          | 10.6       | 0.0      | 0.0      | 5.5      | 0.0       | 10.6        | 43.6       | 0.0       | 0.0  | 42.6      | 0.0       | 42.5       |
| Incr Delay (d2), s/veh            | 0.5        | 0.0      | 0.9      | 0.1      | 0.0       | 3.9         | 1.5        | 0.0       | 0.0  | 1.1       | 0.0       | 3.0        |
| Initial Q Delay(d3),s/veh         | 0.1<br>2.3 | 0.0      | 0.0      | 0.0      | 0.0       | 0.0<br>23.5 | 0.0<br>2.2 | 0.0       | 0.0  | 3.8       | 0.0       | 0.0<br>4.2 |
| %ile BackOfQ(95%),veh/ln          | 11.2       | 0.0      | 0.7      | 5.6      | 0.0       | 14.5        | 45.2       | 0.0       | 0.0  | 43.7      | 0.0       | 4.2        |
| LnGrp Delay(d),s/veh<br>LnGrp LOS | 11.2<br>B  | 0.0      | 0.9<br>A | 5.6<br>A | 0.0       | 14.5<br>B   | 45.2<br>D  | 0.0       | 0.0  | 43.7<br>D | 0.0       |            |
|                                   | В          | 712      | A        | A        | 888       | В           | U          | 43        |      | U         | 161       | D          |
| Approach Vol, veh/h               |            | 2.3      |          |          |           |             |            | 45.2      |      |           | 44.6      |            |
| Approach Delay, s/veh             |            | 2.3<br>A |          |          | 14.3<br>B |             |            | 45.2<br>D |      |           | 44.6<br>D |            |
| Approach LOS                      |            |          |          |          |           |             |            |           |      |           | U         |            |
| Timer                             | 1          | 2        | 3        | 4        | 5         | 6           | 7          | 8         |      |           |           |            |
| Assigned Phs                      |            | 2        |          | 4        | 5         | 6           |            | 8         |      |           |           |            |
| Phs Duration (G+Y+Rc), s          |            | 84.5     |          | 15.5     | 11.2      | 73.3        |            | 15.5      |      |           |           |            |
| Change Period (Y+Rc), s           |            | 7.0      |          | 6.0      | 7.0       | 7.0         |            | 6.0       |      |           |           |            |
| Max Green Setting (Gmax), s       |            | 66.0     |          | 21.0     | 7.0       | 52.0        |            | 21.0      |      |           |           |            |
| Max Q Clear Time (g_c+l1), s      |            | 2.5      |          | 8.1      | 4.4       | 33.4        |            | 9.4       |      |           |           |            |
| Green Ext Time (p_c), s           |            | 2.4      |          | 0.5      | 0.1       | 4.0         |            | 0.1       |      |           |           |            |
| Intersection Summary              |            |          |          |          |           |             |            |           |      |           |           |            |
| HCM 2010 Ctrl Delay               |            |          | 13.0     |          |           |             |            |           |      |           |           |            |
| HCM 2010 LOS                      |            |          | В        |          |           |             |            |           |      |           |           |            |

2023 PROJECTED CONDITIONS 11/21/2017 MB

Area Type: Cycle Length: 100 Actuated Cycle Length: 100 Offset: 2 (2%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green Natural Cycle: 70 Control Type: Actuated-Coordinated



2023 PROJECTED CONDITIONS 11/21/2017 MB

Synchro 10 Report Page 3

#### 2: LLOYD AVENUE/ROYAL FARMS DRIVEWAY & ROUTE 322 2023 PROJECTED CONDITIONS

Timing Plan: PM Peak

|                              | ۶    | <b>→</b>  | •    | •    | <b>←</b> | •    | 1    | †    | /    | /    | <b>+</b>  | 4    |
|------------------------------|------|-----------|------|------|----------|------|------|------|------|------|-----------|------|
| Movement                     | EBL  | EBT       | EBR  | WBL  | WBT      | WBR  | NBL  | NBT  | NBR  | SBL  | SBT       | SBR  |
| Lane Configurations          | 7    | <b>^</b>  | 7    | ሻ    | <b>^</b> | 7    |      | ની   | 7    |      | 4         |      |
| Traffic Volume (veh/h)       | 57   | 594       | 258  | 121  | 757      | 51   | 190  | 20   | 109  | 9    | 22        | 81   |
| Future Volume (veh/h)        | 57   | 594       | 258  | 121  | 757      | 51   | 190  | 20   | 109  | 9    | 22        | 81   |
| Number                       | 5    | 2         | 12   | 1    | 6        | 16   | 3    | 8    | 18   | 7    | 4         | 14   |
| Initial Q (Qb), veh          | 1    | 0         | 0    | 0    | 1        | 0    | 6    | 0    | 0    | 0    | 0         | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |           | 0.98 | 1.00 |          | 1.00 | 1.00 |      | 1.00 | 1.00 |           | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00      | 1.00 | 1.00 | 1.00     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00      | 1.00 |
| Adj Sat Flow, veh/h/ln       | 1765 | 1731      | 1731 | 1791 | 1791     | 1756 | 1809 | 1784 | 1707 | 1782 | 1801      | 1782 |
| Adj Flow Rate, veh/h         | 59   | 619       | 240  | 126  | 789      | 30   | 198  | 21   | 61   | 9    | 23        | 56   |
| Adj No. of Lanes             | 1    | 1         | 1    | 1    | 1        | 1    | 0    | 1    | 1    | 0    | 1         | 0    |
| Peak Hour Factor             | 0.96 | 0.96      | 0.96 | 0.96 | 0.96     | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96      | 0.96 |
| Percent Heavy Veh, %         | 2    | 4         | 4    | 1    | 1        | 3    | 5    | 5    | 6    | 0    | 0         | 0    |
| Cap, veh/h                   | 322  | 964       | 803  | 370  | 1242     | 1014 | 330  | 22   | 396  | 56   | 112       | 223  |
| Arrive On Green              | 0.57 | 0.57      | 0.57 | 0.12 | 1.00     | 1.00 | 0.20 | 0.20 | 0.20 | 0.19 | 0.20      | 0.19 |
| Sat Flow, veh/h              | 630  | 1731      | 1441 | 1706 | 1791     | 1493 | 1225 | 130  | 1451 | 72   | 531       | 1054 |
| Grp Volume(v), veh/h         | 59   | 619       | 240  | 126  | 789      | 30   | 219  | 0    | 61   | 88   | 0         | 0    |
| Grp Sat Flow(s), veh/h/ln    | 630  | 1731      | 1441 | 1706 | 1791     | 1493 | 1355 | 0    | 1451 | 1657 | 0         | 0    |
| Q Serve(q s), s              | 4.4  | 23.7      | 8.5  | 2.8  | 0.0      | 0.0  | 11.1 | 0.0  | 3.3  | 0.0  | 0.0       | 0.0  |
| Cycle Q Clear(g_c), s        | 4.4  | 23.7      | 8.5  | 2.8  | 0.0      | 0.0  | 15.3 | 0.0  | 3.3  | 4.7  | 0.0       | 0.0  |
| Prop In Lane                 | 1.00 |           | 1.00 | 1.00 |          | 1.00 | 0.90 |      | 1.00 | 0.10 |           | 0.64 |
| Lane Grp Cap(c), veh/h       | 322  | 964       | 803  | 370  | 1242     | 1014 | 353  | 0    | 396  | 374  | 0         | 0    |
| V/C Ratio(X)                 | 0.18 | 0.64      | 0.30 | 0.34 | 0.64     | 0.03 | 0.62 | 0.00 | 0.15 | 0.24 | 0.00      | 0.00 |
| Avail Cap(c_a), veh/h        | 433  | 993       | 826  | 398  | 1244     | 1037 | 456  | 0    | 509  | 495  | 0         | 0    |
| HCM Platoon Ratio            | 1.00 | 1.00      | 1.00 | 2.00 | 2.00     | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00      | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00      | 1.00 | 1.00 | 1.00     | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00      | 0.00 |
| Uniform Delay (d), s/veh     | 22.3 | 15.4      | 11.8 | 10.7 | 0.0      | 0.0  | 38.1 | 0.0  | 27.7 | 33.3 | 0.0       | 0.0  |
| Incr Delay (d2), s/veh       | 1.2  | 3.3       | 1.0  | 0.5  | 2.5      | 0.1  | 1.8  | 0.0  | 0.2  | 0.3  | 0.0       | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.1  | 0.0       | 0.0  | 0.0  | 0.0      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0       | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 2.3  | 18.3      | 6.7  | 2.5  | 1.5      | 0.0  | 11.4 | 0.0  | 2.3  | 3.8  | 0.0       | 0.0  |
| LnGrp Delay(d),s/veh         | 23.7 | 18.7      | 12.8 | 11.3 | 2.5      | 0.1  | 39.9 | 0.0  | 27.9 | 33.7 | 0.0       | 0.0  |
| LnGrp LOS                    | C    | В         | В    | В    | A        | A    | D    | 0.0  | C    | C    | 0.0       | 0.0  |
| Approach Vol, veh/h          |      | 918       |      |      | 945      |      |      | 280  |      |      | 88        |      |
| Approach Delay, s/veh        |      | 17.4      |      |      | 3.6      |      |      | 37.3 |      |      | 33.7      |      |
| Approach LOS                 |      | 17.4<br>B |      |      | J.0      |      |      | 57.5 |      |      | 33.7<br>C |      |
| ••                           |      | _         |      |      |          |      |      | _    |      |      | U         |      |
| Timer                        | 1    | 2         | 3    | 4    | 5        | 6    | 7    | 8    |      |      |           |      |
| Assigned Phs                 | 1    | 2         |      | 4    |          | 6    |      | 8    |      |      |           |      |
| Phs Duration (G+Y+Rc), s     | 12.1 | 63.4      |      | 24.5 |          | 75.5 |      | 24.5 |      |      |           |      |
| Change Period (Y+Rc), s      | 7.0  | 7.0       |      | 6.0  |          | 7.0  |      | 6.0  |      |      |           |      |
| Max Green Setting (Gmax), s  | 6.0  | 46.0      |      | 28.0 |          | 59.0 |      | 28.0 |      |      |           |      |
| Max Q Clear Time (g_c+l1), s | 5.3  | 26.2      |      | 6.7  |          | 2.5  |      | 17.8 |      |      |           |      |
| Green Ext Time (p_c), s      | 0.0  | 3.9       |      | 0.3  |          | 3.6  |      | 0.7  |      |      |           |      |
| Intersection Summary         |      |           |      |      |          |      |      |      |      |      |           |      |
| HCM 2010 Ctrl Delay          |      |           | 14.7 |      |          |      |      |      |      |      |           |      |
| HCM 2010 LOS                 |      |           | В    |      |          |      |      |      |      |      |           |      |

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| 2023 PROJECTE             | D CONL       | ITION    | 3         |            |          |      | Tilling Flatt. Fivi Feak |
|---------------------------|--------------|----------|-----------|------------|----------|------|--------------------------|
|                           | •            | <b>→</b> | •         | •          | -        | 4    |                          |
| Lane Group                | EBL          | EBT      | WBT       | WBR        | SBL      | SBR  |                          |
| Lane Configurations       | 7            | <b>†</b> | ĵ.        |            | 7        | 7    |                          |
| Traffic Volume (vph)      | 18           | 844      | 602       | 214        | 284      | 662  |                          |
| Future Volume (vph)       | 18           | 844      | 602       | 214        | 284      | 662  |                          |
| Ideal Flow (vphpl)        | 1800         | 1800     | 1800      | 1800       | 1800     | 1800 |                          |
| Lane Width (ft)           | 16           | 12       | 12        | 12         | 15       | 15   |                          |
| Grade (%)                 |              | -3%      | 2%        |            | 0%       |      |                          |
| Storage Length (ft)       | 75           |          |           | 0          | 0        | 0    |                          |
| Storage Lanes             | 1            |          |           | 0          | 1        | 1    |                          |
| Taper Length (ft)         | 25           |          |           |            | 25       |      |                          |
| Right Turn on Red         |              |          |           | Yes        |          | Yes  |                          |
| Link Speed (mph)          |              | 45       | 45        |            | 25       |      |                          |
| Link Distance (ft)        |              | 830      | 280       |            | 317      |      |                          |
| Travel Time (s)           |              | 12.6     | 4.2       |            | 8.6      |      |                          |
| Confl. Bikes (#/hr)       |              |          |           |            |          | 1    |                          |
| Peak Hour Factor          | 0.90         | 0.90     | 0.90      | 0.90       | 0.90     | 0.90 |                          |
| Heavy Vehicles (%)        | 0%           | 3%       | 1%        | 2%         | 2%       | 3%   |                          |
| Shared Lane Traffic (%)   |              |          |           |            |          |      |                          |
| Turn Type                 | Perm         | NA       | NA        |            | Prot     | Free |                          |
| Protected Phases          |              | 2        | 6         |            | 4        |      |                          |
| Permitted Phases          | 2            |          |           |            |          | Free |                          |
| Detector Phase            | 2            | 2        | 6         |            | 4        |      |                          |
| Switch Phase              |              |          |           |            |          |      |                          |
| Minimum Initial (s)       | 15.0         | 15.0     | 15.0      |            | 3.0      |      |                          |
| Minimum Split (s)         | 22.0         | 22.0     | 22.0      |            | 13.0     |      |                          |
| Total Split (s)           | 72.0         | 72.0     | 72.0      |            | 28.0     |      |                          |
| Total Split (%)           | 72.0%        | 72.0%    | 72.0%     |            | 28.0%    |      |                          |
| Yellow Time (s)           | 5.0          | 5.0      | 5.0       |            | 4.0      |      |                          |
| All-Red Time (s)          | 2.0          | 2.0      | 2.0       |            | 2.0      |      |                          |
| Lost Time Adjust (s)      | -1.0         | -1.0     | -1.0      |            | -1.0     |      |                          |
| Total Lost Time (s)       | 6.0          | 6.0      | 6.0       |            | 5.0      |      |                          |
| Lead/Lag                  |              |          |           |            |          |      |                          |
| Lead-Lag Optimize?        |              |          |           |            |          |      |                          |
| Recall Mode               | C-Max        | C-Max    | C-Max     |            | None     |      |                          |
| Intersection Summary      |              |          |           |            |          |      |                          |
| Area Type:                | Other        |          |           |            |          |      |                          |
| Cycle Length: 100         |              |          |           |            |          |      |                          |
| Actuated Cycle Length: 1  |              |          |           |            |          |      |                          |
| Offset: 13 (13%), Referen | ced to phase | 2:EBTL   | and 6:WB  | T, Start o | of Green |      |                          |
| Natural Cycle: 60         |              |          |           |            |          |      |                          |
| Control Type: Actuated-C  | oordinated   |          |           |            |          |      |                          |
| Splits and Phases: 4: R   | OUTE 322 8   | WB ROL   | JTE 30 R. | AMPS       |          |      |                          |
| Ø2 (R)                    |              |          |           |            |          |      | Ø4                       |
| 72 s                      |              |          |           |            |          |      | 28 s                     |

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|   |   | Adj    |
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|   |   | Сар    |
|   |   | Arriv  |
|   |   | Sat    |
|   |   | Grp    |
|   |   | Grp    |
|   |   | QS     |
|   |   | Сус    |
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|   |   | HCN    |
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| Movement                     | EBL  | EBI      | WBI  | WBR  | SBL  | SBR  |   |   |  |
|------------------------------|------|----------|------|------|------|------|---|---|--|
| Lane Configurations          | Ť    | <b>†</b> | ĵ»   |      | Ť    | 7    | · |   |  |
| Traffic Volume (veh/h)       | 18   | 844      | 602  | 214  | 284  | 662  |   |   |  |
| Future Volume (veh/h)        | 18   | 844      | 602  | 214  | 284  | 662  |   |   |  |
| Number                       | 5    | 2        | 6    | 16   | 7    | 14   |   |   |  |
| Initial Q (Qb), veh          | 1    | 4        | 1    | 0    | 0    | 0    |   |   |  |
| Ped-Bike Adj(A_pbT)          | 1.00 |          |      | 1.00 | 1.00 | 1.00 |   |   |  |
| Parking Bus, Adj             | 1.00 | 1.00     | 1.00 | 1.00 | 1.00 | 1.00 |   |   |  |
| Adj Sat Flow, veh/h/ln       | 1900 | 1774     | 1760 | 1782 | 1835 | 1817 |   |   |  |
| Adj Flow Rate, veh/h         | 20   | 938      | 669  | 0    | 316  | 0    |   |   |  |
| Adj No. of Lanes             | 1    | 1        | 1    | 0    | 1    | 1    |   |   |  |
| Peak Hour Factor             | 0.90 | 0.90     | 0.90 | 0.90 | 0.90 | 0.90 |   |   |  |
| Percent Heavy Veh, %         | 0    | 3        | 1    | 1    | 2    | 3    |   |   |  |
| Cap, veh/h                   | 417  | 1202     | 1192 | 0    | 372  | 328  |   |   |  |
| Arrive On Green              | 0.68 | 0.68     | 0.68 | 0.00 | 0.21 | 0.00 |   |   |  |
| Sat Flow, veh/h              | 780  | 1774     | 1760 | 0    | 1748 | 1545 |   |   |  |
| Grp Volume(v), veh/h         | 20   | 938      | 669  | 0    | 316  | 0    |   |   |  |
| Grp Sat Flow(s),veh/h/ln     | 780  | 1774     | 1760 | 0    | 1748 | 1545 |   |   |  |
| Q Serve(g_s), s              | 1.4  | 36.2     | 19.8 | 0.0  | 17.4 | 0.0  |   |   |  |
| Cycle Q Clear(g_c), s        | 21.2 | 36.2     | 19.8 | 0.0  | 17.4 | 0.0  |   |   |  |
| Prop In Lane                 | 1.00 |          |      | 0.00 | 1.00 | 1.00 |   |   |  |
| Lane Grp Cap(c), veh/h       | 417  | 1202     | 1192 | 0    | 372  | 328  |   |   |  |
| V/C Ratio(X)                 | 0.05 | 0.78     | 0.56 | 0.00 | 0.85 | 0.00 |   |   |  |
| Avail Cap(c_a), veh/h        | 446  | 1202     | 1192 | 0    | 402  | 355  |   |   |  |
| HCM Platoon Ratio            | 1.00 | 1.00     | 1.00 | 1.00 | 1.00 | 1.00 |   |   |  |
| Upstream Filter(I)           | 1.00 | 1.00     | 1.00 | 0.00 | 1.00 | 0.00 |   |   |  |
| Uniform Delay (d), s/veh     | 16.7 | 11.3     | 8.5  | 0.0  | 37.8 | 0.0  |   |   |  |
| Incr Delay (d2), s/veh       | 0.2  | 5.1      | 1.9  | 0.0  | 15.7 | 0.0  |   |   |  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.4      | 0.0  | 0.0  | 0.0  | 0.0  |   |   |  |
| %ile BackOfQ(95%),veh/ln     | 0.8  | 27.5     | 15.6 | 0.0  | 15.1 | 0.0  |   |   |  |
| LnGrp Delay(d),s/veh         | 16.9 | 16.8     | 10.4 | 0.0  | 53.6 | 0.0  |   |   |  |
| LnGrp LOS                    | В    | В        | В    |      | D    |      |   |   |  |
| Approach Vol, veh/h          |      | 958      | 669  |      | 316  |      |   |   |  |
| Approach Delay, s/veh        |      | 16.8     | 10.4 |      | 53.6 |      |   |   |  |
| Approach LOS                 |      | В        | В    |      | D    |      |   |   |  |
| Timer                        | 1    | 2        | 3    | 4    | 5    | 6    | 7 | 8 |  |
| Assigned Phs                 |      | 2        |      | 4    |      | 6    |   |   |  |
| Phs Duration (G+Y+Rc), s     |      | 73.7     |      | 26.3 |      | 73.7 |   |   |  |
| Change Period (Y+Rc), s      |      | 7.0      |      | 6.0  |      | 7.0  |   |   |  |
| Max Green Setting (Gmax), s  |      | 65.0     |      | 22.0 |      | 65.0 |   |   |  |
| Max Q Clear Time (g_c+l1), s |      | 38.7     |      | 19.9 |      | 22.3 |   |   |  |
| Green Ext Time (p_c), s      |      | 4.6      |      | 0.4  |      | 2.7  |   |   |  |
| Intersection Summary         |      |          |      |      |      |      |   |   |  |
| HCM 2010 Ctrl Delay          |      |          | 20.6 |      |      |      |   |   |  |
| HCM 2010 LOS                 |      |          | С    |      |      |      |   |   |  |

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4: ROUTE 322 & WB ROUTE 30 RAMPS

2023 PROJECTED CONDITIONS

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|                            | -        | •    | •    | •        | 1    |      |
|----------------------------|----------|------|------|----------|------|------|
| Lane Group                 | EBT      | EBR  | WBL  | WBT      | NBL  | NBR  |
| Lane Configurations        | <b>^</b> | 7    | ሻ    | <b>^</b> | 7    | 7    |
| Traffic Volume (vph)       | 678      | 433  | 219  | 820      | 21   | 216  |
| Future Volume (vph)        | 678      | 433  | 219  | 820      | 21   | 216  |
| Ideal Flow (vphpl)         | 1800     | 1800 | 1800 | 1800     | 1800 | 1800 |
| Lane Width (ft)            | 13       | 12   | 12   | 13       | 13   | 14   |
| Grade (%)                  | -6%      |      |      | 7%       | -5%  |      |
| Storage Length (ft)        |          | 0    | 250  |          | 0    | 0    |
| Storage Lanes              |          | 1    | 1    |          | 1    | 1    |
| Taper Length (ft)          |          |      | 25   |          | 25   |      |
| Link Speed (mph)           | 45       |      |      | 45       | 25   |      |
| Link Distance (ft)         | 353      |      |      | 551      | 313  |      |
| Travel Time (s)            | 5.3      |      |      | 8.3      | 8.5  |      |
| Peak Hour Factor           | 0.90     | 0.90 | 0.90 | 0.90     | 0.90 | 0.90 |
| Heavy Vehicles (%)         | 4%       | 2%   | 1%   | 1%       | 25%  | 3%   |
| Shared Lane Traffic (%)    |          |      |      |          |      |      |
| Sign Control               | Free     |      |      | Free     | Stop |      |
| Intersection Summary       |          |      |      |          |      |      |
| Area Type:                 | Other    |      |      |          |      |      |
| Control Type: Unsignalized | d        |      |      |          |      |      |

| ntersection           |          |        |          |          |        |         |                      |                                |
|-----------------------|----------|--------|----------|----------|--------|---------|----------------------|--------------------------------|
| nt Delay, s/veh       | 29.7     |        |          |          |        |         |                      |                                |
| Movement              | EBT      | EBR    | WBL      | WBT      | NBL    | NBR     |                      |                                |
| ane Configurations    | <b>†</b> | 7      | ሻ        | <b>†</b> | ሻ      | 7       |                      |                                |
| raffic Vol, veh/h     | 678      | 433    | 219      | 820      | 21     | 216     |                      |                                |
| uture Vol, veh/h      | 678      | 433    | 219      | 820      | 21     | 216     |                      |                                |
| onflicting Peds, #/hr | 0        | 0      | 0        | 0        | 0      | 0       |                      |                                |
| ign Control           | Free     | Free   | Free     | Free     | Stop   | Stop    |                      |                                |
| T Channelized         | -        | Yield  | -        | None     | -      | Stop    |                      |                                |
| torage Length         | -        | 0      | 250      | -        | 0      | 0       |                      |                                |
| eh in Median Storage  | , # 0    | -      | -        | 0        | 0      | -       |                      |                                |
| Grade, %              | -6       | -      | -        | 7        | -5     | -       |                      |                                |
| eak Hour Factor       | 90       | 90     | 90       | 90       | 90     | 90      |                      |                                |
| leavy Vehicles, %     | 4        | 2      | 1        | 1        | 25     | 3       |                      |                                |
| Numt Flow             | 753      | 481    | 243      | 911      | 23     | 240     |                      |                                |
|                       |          |        |          |          |        |         |                      |                                |
| lajor/Minor I         | Major1   |        | Major2   | I        | Minor1 |         |                      |                                |
| Conflicting Flow All  | 0        | 0      | 753      | 0        | 2150   | 753     |                      |                                |
| Stage 1               | -        | -      | -        | -        | 753    | -       |                      |                                |
| Stage 2               | -        | -      | -        | -        | 1397   | -       |                      |                                |
| Critical Hdwy         | -        | -      | 4.3      | -        | 5.65   | 5.73    |                      |                                |
| ritical Hdwy Stg 1    | -        | -      | -        | -        | 4.65   | -       |                      |                                |
| ritical Hdwy Stg 2    | -        | -      | -        | -        | 4.65   | -       |                      |                                |
| ollow-up Hdwy         | -        | -      | 3        | -        | 3      | 3.1     |                      |                                |
| ot Cap-1 Maneuver     | -        | -      | 657      | -        | ~ 8    | 476     |                      |                                |
| Stage 1               | -        | -      | -        | -        | 611    | -       |                      |                                |
| Stage 2               | -        | -      | -        | -        | 147    | -       |                      |                                |
| latoon blocked, %     | -        | -      |          | -        | 1      |         |                      |                                |
| Nov Cap-1 Maneuver    | -        | -      | 657      | -        | ~ 5    | 476     |                      |                                |
| Nov Cap-2 Maneuver    | -        | -      | -        | -        | ~ 5    | -       |                      |                                |
| Stage 1               | -        | -      | -        | -        | 611    | -       |                      |                                |
| Stage 2               | -        | -      | -        | -        | 92     | -       |                      |                                |
|                       |          |        |          |          |        |         |                      |                                |
| pproach               | EB       |        | WB       |          | NB     |         |                      |                                |
| ICM Control Delay, s  | 0        |        | 2.9      |          | 286.8  |         |                      |                                |
| HCM LOS               |          |        |          |          | F      |         |                      |                                |
|                       |          |        |          |          |        |         |                      |                                |
| /linor Lane/Major Mvm | it I     | NBLn1  | NBLn2    | EBT      | EBR    | WBL     | WBT                  |                                |
| Capacity (veh/h)      |          | 5      | 476      | -        | -      | 657     | -                    |                                |
| ICM Lane V/C Ratio    |          | 4.667  | 0.504    | -        | -      | 0.37    | -                    |                                |
| ICM Control Delay (s) | \$ 3     | 3030.8 | 20       | -        | -      | 13.7    | -                    |                                |
| ICM Lane LOS          |          | F      | С        | -        | -      | В       | -                    |                                |
| ICM 95th %tile Q(veh) | )        | 4.3    | 2.8      | -        | -      | 1.7     | -                    |                                |
| otes                  |          |        |          |          |        |         |                      |                                |
| Volume exceeds car    | pacity   | \$: De | elav exc | eeds 30  | 00s -  | : Comr  | outation Not Defined | *: All major volume in platoon |
|                       |          | ų. J   | , 0,00   | - 500 00 |        | . 00.11 | 2                    | major rotattio iii piatoon     |

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3: EB ROUTE 30 RAMPS & ROUTE 322

2023 PROJECTED CONDITIONS

### 8: PROPOSED DRIVEWAY/PARK AND RIDE & LLOYD AVENUE 2023 PROJECTED CONDITIONS

Timing Plan: PM Peak

|                         | •    | -    | $\rightarrow$ | •    | •    | •    | 4    | <b>†</b> | ~    | -    | ţ    | 4    |
|-------------------------|------|------|---------------|------|------|------|------|----------|------|------|------|------|
| Lane Group              | EBL  | EBT  | EBR           | WBL  | WBT  | WBR  | NBL  | NBT      | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations     |      | 4    |               |      | 4    |      |      | 4        |      |      | 4    |      |
| Traffic Volume (vph)    | 1    | 308  | 5             | 5    | 406  | 7    | 4    | 0        | 8    | 7    | 0    | 3    |
| Future Volume (vph)     | 1    | 308  | 5             | 5    | 406  | 7    | 4    | 0        | 8    | 7    | 0    | 3    |
| Ideal Flow (vphpl)      | 1800 | 1800 | 1800          | 1800 | 1800 | 1800 | 1800 | 1800     | 1800 | 1800 | 1800 | 1800 |
| Lane Width (ft)         | 12   | 10   | 12            | 12   | 10   | 12   | 12   | 12       | 12   | 16   | 12   | 12   |
| Grade (%)               |      | -2%  |               |      | 1%   |      |      | 0%       |      |      | 4%   |      |
| Link Speed (mph)        |      | 35   |               |      | 35   |      |      | 25       |      |      | 25   |      |
| Link Distance (ft)      |      | 292  |               |      | 307  |      |      | 162      |      |      | 174  |      |
| Travel Time (s)         |      | 5.7  |               |      | 6.0  |      |      | 4.4      |      |      | 4.7  |      |
| Confl. Peds. (#/hr)     |      |      |               |      |      | 1    |      |          |      | 2    |      | 2    |
| Peak Hour Factor        | 0.94 | 0.94 | 0.94          | 0.94 | 0.94 | 0.94 | 0.94 | 0.94     | 0.94 | 0.94 | 0.94 | 0.94 |
| Heavy Vehicles (%)      | 0%   | 2%   | 2%            | 2%   | 2%   | 0%   | 2%   | 2%       | 2%   | 0%   | 2%   | 0%   |
| Shared Lane Traffic (%) |      |      |               |      |      |      |      |          |      |      |      |      |
| Sign Control            |      | Free |               |      | Free |      |      | Stop     |      |      | Stop |      |
| Intersection Summary    |      |      |               |      |      |      |      |          |      |      |      |      |

Area Type: (Control Type: Unsignalized

### 8: PROPOSED DRIVEWAY/PARK AND RIDE & LLOYD AVENUE 2023 PROJECTED CONDITIONS

Timing Plan: PM Peak

| Intersection           |        |      |      |        |      |      |        |       |      |        |       |      |
|------------------------|--------|------|------|--------|------|------|--------|-------|------|--------|-------|------|
| Int Delay, s/veh       | 0.5    |      |      |        |      |      |        |       |      |        |       |      |
| Movement               | EBL    | EBT  | EBR  | WBL    | WBT  | WBR  | NBL    | NBT   | NBR  | SBL    | SBT   | SBR  |
| Lane Configurations    |        | 4    |      |        | 4    |      |        | 4     |      |        | 4     |      |
| Traffic Vol, veh/h     | 1      | 308  | 5    | 5      | 406  | 7    | 4      | 0     | 8    | 7      | 0     | 3    |
| Future Vol, veh/h      | 1      | 308  | 5    | 5      | 406  | 7    | 4      | 0     | 8    | 7      | 0     | 3    |
| Conflicting Peds, #/hr | 0      | 0    | 0    | 0      | 0    | 1    | 0      | 0     | 0    | 2      | 0     | 2    |
| Sign Control           | Free   | Free | Free | Free   | Free | Free | Stop   | Stop  | Stop | Stop   | Stop  | Stop |
| RT Channelized         | -      | -    | None | -      | -    | None | -      | -     | None | -      | -     | None |
| Storage Length         | -      | -    | -    | -      | -    | -    | -      | -     | -    | -      | -     | -    |
| Veh in Median Storage  | e,# -  | 0    | -    | -      | 0    | -    | -      | 0     | -    | -      | 0     | -    |
| Grade, %               | -      | -2   | -    | -      | 1    | -    | -      | 0     | -    | -      | 4     | -    |
| Peak Hour Factor       | 94     | 94   | 94   | 94     | 94   | 94   | 94     | 94    | 94   | 94     | 94    | 94   |
| Heavy Vehicles, %      | 0      | 2    | 2    | 2      | 2    | 0    | 2      | 2     | 2    | 0      | 2     | 0    |
| Mvmt Flow              | 1      | 328  | 5    | 5      | 432  | 7    | 4      | 0     | 9    | 7      | 0     | 3    |
|                        |        |      |      |        |      |      |        |       |      |        |       |      |
| Major/Minor            | Major1 |      | ı    | Major2 |      | 1    | Minor1 |       | ı    | Minor2 |       |      |
| Conflicting Flow All   | 440    | 0    | 0    | 333    | 0    | 0    | 782    | 783   | 333  | 786    | 782   | 439  |
| Stage 1                | -      | -    | -    | -      | -    | -    | 333    | 333   | -    | 447    | 447   | -    |
| Stage 2                | -      | -    | -    | -      | -    | -    | 449    | 450   | -    | 339    | 335   | -    |
| Critical Hdwy          | 4.3    | -    | -    | 4.3    | -    | -    | 7.12   | 6.52  | 6.22 | 7.9    | 7.32  | 6.6  |
| Critical Hdwy Stg 1    | -      | -    | -    | -      | -    | -    | 6.12   | 5.52  | -    | 6.9    | 6.32  | -    |
| Critical Hdwy Stg 2    | -      | -    | -    | -      | -    | -    | 6.12   | 5.52  | -    | 6.9    | 6.32  | -    |
| Follow-up Hdwy         | 3      | -    | -    | 3      | -    | -    | 3      | 4.018 | 3.1  | 3      | 4.018 | 3.1  |
| Pot Cap-1 Maneuver     | 847    | -    | -    | 923    | -    | -    | 348    | 325   | 751  | 291    | 274   | 624  |
| Stage 1                | -      | -    | -    | -      | -    | -    | 780    | 644   | -    | 610    | 519   | -    |
| Stage 2                | -      | -    | -    | -      | -    | -    | 671    | 572   | -    | 719    | 596   | -    |
| Platoon blocked, %     |        | -    | -    |        | -    | -    |        |       |      |        |       |      |
| Mov Cap-1 Maneuver     | 846    | -    | -    | 923    | -    | -    | 343    | 322   | 750  | 285    | 272   | 623  |
| Mov Cap-2 Maneuver     | -      | -    | -    | -      | -    | -    | 343    | 322   | -    | 285    | 272   | -    |
| Stage 1                | -      | -    | -    | -      | -    | -    | 779    | 643   | -    | 609    | 515   | -    |

| Approach             | EB | WB  | NB   | SB   |  |
|----------------------|----|-----|------|------|--|
| HCM Control Delay, s | 0  | 0.1 | 11.9 | 15.9 |  |
| HCM LOS              |    |     | В    | С    |  |
|                      |    |     |      |      |  |

- - - - - 662 567 - 709 595

|                       | NDI 4 | EDI   | CDT | EDD | MIDI  | MOT | MDD   | DI 4  |
|-----------------------|-------|-------|-----|-----|-------|-----|-------|-------|
| Minor Lane/Major Mvmt | NBLn1 | EBL   | EBT | EBR | WBL   | WBT | WBR S | BLn1  |
| Capacity (veh/h)      | 537   | 846   | -   | -   | 923   | -   | -     | 340   |
| HCM Lane V/C Ratio    | 0.024 | 0.001 | -   | -   | 0.006 | -   | -     | 0.031 |
| HCM Control Delay (s) | 11.9  | 9.3   | 0   | -   | 8.9   | 0   | -     | 15.9  |
| HCM Lane LOS          | В     | Α     | Α   | -   | Α     | Α   | -     | С     |
| HCM 95th %tile Q(veh) | 0.1   | 0     | -   | -   | 0     | -   | -     | 0.1   |
|                       |       |       |     |     |       |     |       |       |

Stage 2

### 9: LLOYD AVENUE & GO CARLSON BLVD 2023 PROJECTED CONDITIONS

Timing Plan: PM Peak

|                         | •    | •    | 1    | 1    | ţ    | 4    |
|-------------------------|------|------|------|------|------|------|
| Lane Group              | EBL  | EBR  | NBL  | NBT  | SBT  | SBR  |
| Lane Configurations     | ¥    |      |      | 4    | ĵ»   |      |
| Traffic Volume (vph)    | 67   | 24   | 36   | 238  | 284  | 125  |
| Future Volume (vph)     | 67   | 24   | 36   | 238  | 284  | 125  |
| Ideal Flow (vphpl)      | 1800 | 1800 | 1800 | 1800 | 1800 | 1000 |
| Lane Width (ft)         | 12   | 12   | 12   | 10   | 10   | 12   |
| Grade (%)               | 2%   |      |      | 1%   | -2%  |      |
| Link Speed (mph)        | 35   |      |      | 35   | 35   |      |
| Link Distance (ft)      | 1323 |      |      | 450  | 217  |      |
| Travel Time (s)         | 25.8 |      |      | 8.8  | 4.2  |      |
| Peak Hour Factor        | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Heavy Vehicles (%)      | 2%   | 13%  | 0%   | 2%   | 1%   | 2%   |
| Shared Lane Traffic (%) |      |      |      |      |      |      |
| Sign Control            | Stop |      |      | Free | Free |      |

Intersection Summary
Area Type:
Control Type: Unsignalized

### 9: LLOYD AVENUE & GO CARLSON BLVD 2023 PROJECTED CONDITIONS

Timing Plan: PM Peak

| Intersection                |        |       |        |       |                |      |
|-----------------------------|--------|-------|--------|-------|----------------|------|
| Int Delay, s/veh            | 2.2    |       |        |       |                |      |
| Movement                    | EBL    | EBR   | NBL    | NBT   | SBT            | SBR  |
| Lane Configurations         | ¥      | LDIN  | INDL   | 4     | 1 <del>3</del> | JUIN |
| Traffic Vol. veh/h          | 67     | 24    | 36     | 238   | 284            | 125  |
|                             | 67     | 24    | 36     |       | 284            | 125  |
| Future Vol, veh/h           | 0/     | 0     | 30     | 238   | 284            | 125  |
| Conflicting Peds, #/hr      | -      |       | -      |       | -              | _    |
| Sign Control                | Stop   | Stop  | Free   | Free  | Free           | Free |
| RT Channelized              | -      | None  | -      | None  | -              | None |
| Storage Length              | 0      | -     | -      | -     | -              | -    |
| Veh in Median Storage       |        | -     | -      | 0     | 0              | -    |
| Grade, %                    | 2      | -     | -      | 1     | -2             | -    |
| Peak Hour Factor            | 94     | 94    | 94     | 94    | 94             | 94   |
| Heavy Vehicles, %           | 2      | 13    | 0      | 2     | 1              | 2    |
| Mvmt Flow                   | 71     | 26    | 38     | 253   | 302            | 133  |
|                             |        |       |        |       |                |      |
| M=:==/M:===                 | A:     |       | A-:4   |       | 4-:0           |      |
|                             | Minor2 |       | Major1 |       | /lajor2        |      |
| Conflicting Flow All        | 698    | 369   | 435    | 0     | -              | 0    |
| Stage 1                     | 369    | -     | -      | -     | -              | -    |
| Stage 2                     | 329    | -     | -      | -     | -              | -    |
| Critical Hdwy               | 6.82   | 6.53  | 4.3    | -     | -              | -    |
| Critical Hdwy Stg 1         | 5.82   | -     | -      | -     | -              | -    |
| Critical Hdwy Stg 2         | 5.82   | -     | -      | -     | -              | -    |
| Follow-up Hdwy              | 3      | 3.417 | 3      | -     | -              | -    |
| Pot Cap-1 Maneuver          | 422    | 639   | 851    | -     | -              | -    |
| Stage 1                     | 768    | -     | -      | -     | -              | -    |
| Stage 2                     | 806    | -     |        | _     | _              | -    |
| Platoon blocked, %          | 000    |       |        | -     |                | _    |
| Mov Cap-1 Maneuver          | 400    | 639   | 851    |       |                |      |
|                             | 400    | - 009 | -      | -     |                | -    |
| Mov Cap-2 Maneuver          |        |       | -      | -     | -              | -    |
| Stage 1                     | 728    | -     | -      | -     | -              | -    |
| Stage 2                     | 806    | -     | -      | -     | -              | -    |
|                             |        |       |        |       |                |      |
| Approach                    | EB     |       | NB     |       | SB             |      |
| HCM Control Delay, s        | 15.4   |       | 1.2    |       | 0              |      |
| HCM LOS                     | C      |       | 1.2    |       | U              |      |
| HCIVI LOS                   | U      |       |        |       |                |      |
|                             |        |       |        |       |                |      |
| Minor Lane/Major Mvm        | t      | NBL   | NBT    | EBLn1 | SBT            | SBR  |
| Capacity (veh/h)            |        | 851   | -      | 444   | -              | -    |
| HCM Lane V/C Ratio          |        | 0.045 | -      | 0.218 | -              | -    |
| HCM Control Delay (s)       |        | 9.4   | 0      | 15.4  | _              | _    |
| HCM Lane LOS                |        | A     | A      | C     |                |      |
| HCM 95th %tile Q(veh)       |        | 0.1   |        | 0.8   |                |      |
| TICIVI 95(II /6(IIE Q(VEII) |        | 0.1   | _      | 0.0   | _              | -    |

Synchro 10 Report

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### 10: LLOYD AVENUE & BEAVER RUN ROAD/PROPOSED DRIVEWAY 2023 PROJECTED CONDITIONS

Timing Plan: PM Peak

|                         | ۶    | <b>→</b> | $\rightarrow$ | •    | •    | •    | 4    | <b>†</b> | 1    | <b>&gt;</b> | ļ    | 4    |
|-------------------------|------|----------|---------------|------|------|------|------|----------|------|-------------|------|------|
| Lane Group              | EBL  | EBT      | EBR           | WBL  | WBT  | WBR  | NBL  | NBT      | NBR  | SBL         | SBT  | SBR  |
| Lane Configurations     |      | 4        |               |      | 4    |      |      | 4        |      |             | 4    |      |
| Traffic Volume (vph)    | 3    | 0        | 2             | 4    | 0    | 11   | 1    | 268      | 5    | 10          | 284  | 14   |
| Future Volume (vph)     | 3    | 0        | 2             | 4    | 0    | 11   | 1    | 268      | 5    | 10          | 284  | 14   |
| Ideal Flow (vphpl)      | 1800 | 1800     | 1800          | 1800 | 1800 | 1800 | 1800 | 1800     | 1800 | 1800        | 1800 | 1800 |
| Lane Width (ft)         | 13   | 12       | 12            | 12   | 12   | 12   | 12   | 10       | 12   | 12          | 10   | 12   |
| Grade (%)               |      | 1%       |               |      | 0%   |      |      | 1%       |      |             | -1%  |      |
| Link Speed (mph)        |      | 25       |               |      | 25   |      |      | 35       |      |             | 35   |      |
| Link Distance (ft)      |      | 1337     |               |      | 430  |      |      | 161      |      |             | 450  |      |
| Travel Time (s)         |      | 36.5     |               |      | 11.7 |      |      | 3.1      |      |             | 8.8  |      |
| Peak Hour Factor        | 0.93 | 0.93     | 0.93          | 0.93 | 0.93 | 0.93 | 0.93 | 0.93     | 0.93 | 0.93        | 0.93 | 0.93 |
| Heavy Vehicles (%)      | 0%   | 2%       | 0%            | 2%   | 2%   | 2%   | 0%   | 2%       | 2%   | 2%          | 3%   | 0%   |
| Shared Lane Traffic (%) |      |          |               |      |      |      |      |          |      |             |      |      |
| Sign Control            |      | Stop     |               |      | Stop |      |      | Free     |      |             | Free |      |

Intersection Summary Area Type: Control Type: Unsignalized Other

### 10: LLOYD AVENUE & BEAVER RUN ROAD/PROPOSED DRIVEWAY 2023 PROJECTED CONDITIONS

| Intersection           |        |      |      |         |      |      |         |      |      |         |      |      |
|------------------------|--------|------|------|---------|------|------|---------|------|------|---------|------|------|
| Int Delay, s/veh       | 0.5    |      |      |         |      |      |         |      |      |         |      |      |
| Movement               | EBL    | EBT  | EBR  | WBL     | WBT  | WBR  | NBL     | NBT  | NBR  | SBL     | SBT  | SBR  |
| Lane Configurations    |        | 4    |      |         | 4    |      |         | 4    |      |         | 4    |      |
| Traffic Vol, veh/h     | 3      | 0    | 2    | 4       | 0    | 11   | 1       | 268  | 5    | 10      | 284  | 14   |
| Future Vol, veh/h      | 3      | 0    | 2    | 4       | 0    | 11   | 1       | 268  | 5    | 10      | 284  | 14   |
| 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  | e,# -  | 0    | -    | -       | 0    | -    | -       | 0    | -    | -       | 0    | -    |
| Grade, %               | -      | 1    | -    | -       | 0    | -    | -       | 1    | -    | -       | -1   | -    |
| Peak Hour Factor       | 93     | 93   | 93   | 93      | 93   | 93   | 93      | 93   | 93   | 93      | 93   | 93   |
| Heavy Vehicles, %      | 0      | 2    | 0    | 2       | 2    | 2    | 0       | 2    | 2    | 2       | 3    | 0    |
| Mvmt Flow              | 3      | 0    | 2    | 4       | 0    | 12   | 1       | 288  | 5    | 11      | 305  | 15   |
|                        |        |      |      |         |      |      |         |      |      |         |      |      |
| Major/Minor            | Minor2 |      | ı    | /linor1 |      | N    | //ajor1 |      | N    | /lajor2 |      |      |
| Conflicting Flow All   | 634    | 630  | 313  | 629     | 635  | 291  | 320     | 0    | 0    | 293     | 0    | 0    |
| Stage 1                | 335    | 335  | -    | 293     | 293  | -    | -       | -    | -    | -       | -    | -    |
| Stage 2                | 299    | 295  | -    | 336     | 342  | -    | -       | -    | -    | -       | -    | -    |
| Critical Hdwy          | 7.3    | 6.72 | 6.3  | 7.12    | 6.52 | 6.22 | 4.3     | -    | -    | 4.3     | -    | -    |
| Critical Hdwy Stg 1    | 6.3    | 5.72 | -    | 6.12    | 5.52 | -    | -       | -    | -    | -       | -    | -    |

| Conflicting Flow All | 634 | 630   | 313 | 629  | 635   | 291  | 320 | 0 | 0 | 293 | 0 | 0 |  |
|----------------------|-----|-------|-----|------|-------|------|-----|---|---|-----|---|---|--|
| Stage 1              | 335 | 335   | -   | 293  | 293   | -    | -   | - | - | -   | - | - |  |
| Stage 2              | 299 | 295   | -   | 336  | 342   | -    | -   | - | - | -   | - | - |  |
| Critical Hdwy        | 7.3 | 6.72  | 6.3 | 7.12 | 6.52  | 6.22 | 4.3 | - | - | 4.3 | - | - |  |
| Critical Hdwy Stg 1  | 6.3 | 5.72  | -   | 6.12 | 5.52  | -    | -   | - | - | -   | - | - |  |
| Critical Hdwy Stg 2  | 6.3 | 5.72  | -   | 6.12 | 5.52  | -    | -   | - | - | -   | - | - |  |
| Follow-up Hdwy       | 3   | 4.018 | 3.1 | 3    | 4.018 | 3.1  | 3   | - | - | 3   | - | - |  |
| Pot Cap-1 Maneuver   | 427 | 385   | 766 | 444  | 396   | 794  | 933 | - | - | 953 | - | - |  |
| Stage 1              | 765 | 631   | -   | 822  | 670   | -    | -   | - | - | -   | - | - |  |
| Stage 2              | 803 | 658   | -   | 777  | 638   | -    | -   | - | - | -   | - | - |  |
| Platoon blocked, %   |     |       |     |      |       |      |     | - | - |     | - | - |  |
| Mov Cap-1 Maneuver   | 416 | 379   | 766 | 438  | 390   | 794  | 933 | - | - | 953 | - | - |  |
| Mov Cap-2 Maneuver   | 416 | 379   | -   | 438  | 390   | -    | -   | - | - | -   | - | - |  |
| Stage 1              | 764 | 622   | -   | 821  | 669   | -    | -   | - | - | -   | - | - |  |
| Stage 2              | 790 | 657   | -   | 764  | 629   | -    | -   | - | - | -   | - | - |  |
|                      |     |       |     |      |       |      |     |   |   |     |   |   |  |

| Approach             | EB   | WB   | NB | SB  |
|----------------------|------|------|----|-----|
| HCM Control Delay, s | 12.1 | 10.7 | 0  | 0.3 |
| HCM LOS              | В    | В    |    |     |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR E | BLn1\ | WBLn1 | SBL   | SBT | SBR |
|-----------------------|-------|-----|-------|-------|-------|-------|-----|-----|
| Capacity (veh/h)      | 933   | -   | -     | 509   | 653   | 953   | -   | -   |
| HCM Lane V/C Ratio    | 0.001 | -   | -     | 0.011 | 0.025 | 0.011 | -   | -   |
| HCM Control Delay (s) | 8.9   | 0   | -     | 12.1  | 10.7  | 8.8   | 0   | -   |
| HCM Lane LOS          | Α     | Α   | -     | В     | В     | Α     | Α   | -   |
| HCM 95th %tile Q(veh) | 0     | -   | -     | 0     | 0.1   | 0     | -   | -   |

### 11: PROPOSED RIRO DRIVEWAY & ROUTE 322 2023 PROJECTED CONDITIONS

Timing Plan: PM Peak

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|                         | -     | •    | •    | •        | 1    | ~    |
|-------------------------|-------|------|------|----------|------|------|
| Lane Group              | EBT   | EBR  | WBL  | WBT      | NBL  | NBR  |
| Lane Configurations     | ĵ»    |      |      | <b>†</b> |      | 7    |
| Traffic Volume (vph)    | 701   | 11   | 0    | 931      | 0    | 2    |
| Future Volume (vph)     | 701   | 11   | 0    | 931      | 0    | 2    |
| Ideal Flow (vphpl)      | 1800  | 1800 | 1800 | 1800     | 1800 | 1800 |
| Grade (%)               | -2%   |      |      | -1%      | 0%   |      |
| Link Speed (mph)        | 45    |      |      | 35       | 25   |      |
| Link Distance (ft)      | 315   |      |      | 148      | 219  |      |
| Travel Time (s)         | 4.8   |      |      | 2.9      | 6.0  |      |
| Peak Hour Factor        | 0.95  | 0.95 | 0.95 | 0.95     | 0.95 | 0.95 |
| Heavy Vehicles (%)      | 2%    | 2%   | 2%   | 1%       | 2%   | 2%   |
| Shared Lane Traffic (%) |       |      |      |          |      |      |
| Sign Control            | Free  |      |      | Free     | Stop |      |
| Intersection Summary    |       |      |      |          |      |      |
| Area Type:              | Other |      |      |          |      |      |

Control Type: Unsignalized

11: PROPOSED RIRO DRIVEWAY & ROUTE 322 2023 PROJECTED CONDITIONS

| Intersection           |        |      |        |          |        |      |
|------------------------|--------|------|--------|----------|--------|------|
| Int Delay, s/veh       | 0      |      |        |          |        |      |
| Movement               | EBT    | EBR  | WBL    | WBT      | NBL    | NBR  |
| Lane Configurations    | f)     |      |        | <b>↑</b> |        | 7    |
| Traffic Vol, veh/h     | 701    | 11   | 0      | 931      | 0      | 2    |
| Future Vol, veh/h      | 701    | 11   | 0      | 931      | 0      | 2    |
| 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 Storag   | ge,# 0 | -    | -      | 0        | 0      | -    |
| Grade, %               | -2     | -    | -      | -1       | 0      | -    |
| Peak Hour Factor       | 95     | 95   | 95     | 95       | 95     | 95   |
| Heavy Vehicles, %      | 2      | 2    | 2      | 1        | 2      | 2    |
| Mvmt Flow              | 738    | 12   | 0      | 980      | 0      | 2    |
|                        |        |      |        |          |        |      |
| Major/Minor            | Major1 | N    | Major2 | P        | Minor1 |      |
| Conflicting Flow All   | 0      | 0    | -      | -        | -      | 744  |
| Stage 1                | -      | -    | -      | -        | -      | -    |
| Stage 2                | -      | -    | -      | -        | -      | -    |
| Critical Hdwy          | -      | -    | -      | -        | -      | 6.22 |
| Critical Hdwy Stg 1    | -      | -    | -      | -        | -      | -    |
| Critical Hdwy Stg 2    | _      | _    | _      | _        | _      | _    |

| iviajoi/iviii ioi    | iviajui i | IVIA | JUIZ | IVIII | IIUI I |      |
|----------------------|-----------|------|------|-------|--------|------|
| Conflicting Flow All | 0         | 0    | -    | -     | -      | 744  |
| Stage 1              | -         | -    | -    | -     | -      | -    |
| Stage 2              | -         | -    | -    | -     | -      | -    |
| Critical Hdwy        | -         | -    | -    | -     | -      | 6.22 |
| Critical Hdwy Stg 1  | -         | -    | -    | -     | -      | -    |
| Critical Hdwy Stg 2  | -         | -    | -    | -     | -      | -    |
| Follow-up Hdwy       | -         | -    | -    | -     | -      | 3.1  |
| Pot Cap-1 Maneuver   | -         | -    | 0    | -     | 0      | *563 |
| Stage 1              | -         | -    | 0    | -     | 0      | -    |
| Stage 2              | -         | -    | 0    | -     | 0      | -    |
| Platoon blocked, %   | -         | -    |      | -     |        | 1    |
| Mov Cap-1 Maneuver   | -         | -    | -    | -     | -      | *563 |
| Mov Cap-2 Maneuver   | -         | -    | -    | -     | -      | -    |
| Stage 1              | -         | -    | -    | -     | -      | -    |
| Stage 2              | -         | -    | -    | -     | -      | -    |
|                      |           |      |      |       |        |      |

| Minor Lane/Major Mvmt      | NBLn1  | EBT     | EBR     | WBT | •                          |                              |
|----------------------------|--------|---------|---------|-----|----------------------------|------------------------------|
| Capacity (veh/h)           | 563    | -       | -       | -   |                            |                              |
| HCM Lane V/C Ratio         | 0.004  | -       | -       | -   |                            |                              |
| HCM Control Delay (s)      | 11.4   | -       | -       | -   |                            |                              |
| HCM Lane LOS               | В      | -       | -       | -   |                            |                              |
| HCM 95th %tile Q(veh)      | 0      | -       | -       | -   |                            |                              |
| Notes                      |        |         |         |     |                            |                              |
| ~: Volume exceeds canacity | \$∙ De | lav exc | eeds 30 | າດຣ | +: Computation Not Defined | *· All major volume in plate |

# 1: PROPOSED DRIVEWAYS/ROCK RAYMOND ROAD & ROUTE 322 2023 PROJECTED CONDITIONS

|                         | ۶     | <b>→</b> | •    | •     | +     | •    | 4     | †     | ~    | <b>/</b> | ļ     | 4    |
|-------------------------|-------|----------|------|-------|-------|------|-------|-------|------|----------|-------|------|
| Lane Group              | EBL   | EBT      | EBR  | WBL   | WBT   | WBR  | NBL   | NBT   | NBR  | SBL      | SBT   | SBR  |
| Lane Configurations     | ħ     | ĵ.       |      | 7     | f)    |      |       | 4     |      | 7        | ĵ.    |      |
| Traffic Volume (vph)    | 81    | 492      | 22   | 15    | 467   | 46   | 23    | 5     | 11   | 62       | 7     | 92   |
| Future Volume (vph)     | 81    | 492      | 22   | 15    | 467   | 46   | 23    | 5     | 11   | 62       | 7     | 92   |
| Ideal Flow (vphpl)      | 1800  | 1800     | 1800 | 1800  | 1800  | 1800 | 1800  | 1800  | 1800 | 1800     | 1800  | 1800 |
| Lane Width (ft)         | 10    | 14       | 12   | 12    | 13    | 12   | 12    | 12    | 12   | 10       | 12    | 11   |
| Grade (%)               |       | -2%      |      |       | 4%    |      |       | 0%    |      |          | 1%    |      |
| Storage Length (ft)     | 145   |          | 0    | 75    |       | 0    | 0     |       | 0    | 230      |       | 0    |
| Storage Lanes           | 1     |          | 0    | 1     |       | 0    | 0     |       | 0    | 1        |       | 0    |
| Taper Length (ft)       | 25    |          |      | 25    |       |      | 25    |       |      | 25       |       |      |
| Right Turn on Red       |       |          | Yes  |       |       | Yes  |       |       | Yes  |          |       | Yes  |
| Link Speed (mph)        |       | 45       |      |       | 35    |      |       | 25    |      |          | 35    |      |
| Link Distance (ft)      |       | 268      |      |       | 1016  |      |       | 301   |      |          | 359   |      |
| Travel Time (s)         |       | 4.1      |      |       | 19.8  |      |       | 8.2   |      |          | 7.0   |      |
| Peak Hour Factor        | 0.95  | 0.95     | 0.95 | 0.95  | 0.95  | 0.95 | 0.95  | 0.95  | 0.95 | 0.95     | 0.95  | 0.95 |
| Heavy Vehicles (%)      | 5%    | 1%       | 2%   | 2%    | 1%    | 5%   | 2%    | 2%    | 2%   | 0%       | 2%    | 3%   |
| Shared Lane Traffic (%) |       |          |      |       |       |      |       |       |      |          |       |      |
| Turn Type               | pm+pt | NA       |      | Perm  | NA    |      | Perm  | NA    |      | Perm     | NA    |      |
| Protected Phases        | 5     | 2        |      |       | 6     |      |       | 8     |      |          | 4     |      |
| Permitted Phases        | 2     |          |      | 6     |       |      | 8     |       |      | 4        |       |      |
| Detector Phase          | 5     | 2        |      | 6     | 6     |      | 8     | 8     |      | 4        | 4     |      |
| Switch Phase            |       |          |      |       |       |      |       |       |      |          |       |      |
| Minimum Initial (s)     | 3.0   | 11.0     |      | 11.0  | 11.0  |      | 3.0   | 3.0   |      | 3.0      | 3.0   |      |
| Minimum Split (s)       | 14.0  | 18.0     |      | 18.0  | 18.0  |      | 13.0  | 13.0  |      | 13.0     | 13.0  |      |
| Total Split (s)         | 14.0  | 60.0     |      | 46.0  | 46.0  |      | 15.0  | 15.0  |      | 15.0     | 15.0  |      |
| Total Split (%)         | 18.7% | 80.0%    |      | 61.3% | 61.3% |      | 20.0% | 20.0% |      | 20.0%    | 20.0% |      |
| Yellow Time (s)         | 5.0   | 5.0      |      | 5.0   | 5.0   |      | 4.0   | 4.0   |      | 4.0      | 4.0   |      |
| All-Red Time (s)        | 2.0   | 2.0      |      | 2.0   | 2.0   |      | 2.0   | 2.0   |      | 2.0      | 2.0   |      |
| Lost Time Adjust (s)    | -1.0  | -1.0     |      | -1.0  | -1.0  |      |       | -1.0  |      | -1.0     | -1.0  |      |
| Total Lost Time (s)     | 6.0   | 6.0      |      | 6.0   | 6.0   |      |       | 5.0   |      | 5.0      | 5.0   |      |
| Lead/Lag                | Lead  |          |      | Lag   | Lag   |      |       |       |      |          |       |      |
| Lead-Lag Optimize?      | Yes   |          |      | Yes   | Yes   |      |       |       |      |          |       |      |
| Recall Mode             | None  | C-Max    |      | C-Max | C-Max |      | None  | None  |      | None     | None  |      |

### Intersection Summary

Area Type: Other

Cycle Length: 75

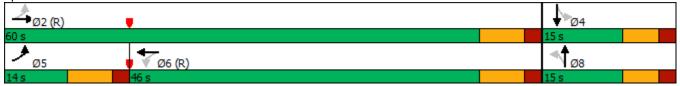
Actuated Cycle Length: 75

Offset: 48 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated





|                              | ۶    | <b>→</b> | •    | <b>√</b> | <b>←</b> | •    | •    | †    | ~    | <b>/</b> | <b></b>  | ✓        |
|------------------------------|------|----------|------|----------|----------|------|------|------|------|----------|----------|----------|
| Movement                     | EBL  | EBT      | EBR  | WBL      | WBT      | WBR  | NBL  | NBT  | NBR  | SBL      | SBT      | SBR      |
| Lane Configurations          | 7    | ĵ.       |      | 7        | f)       |      |      | ₽    |      | ሻ        | <b>₽</b> |          |
| Traffic Volume (veh/h)       | 81   | 492      | 22   | 15       | 467      | 46   | 23   | 5    | 11   | 62       | 7        | 92       |
| Future Volume (veh/h)        | 81   | 492      | 22   | 15       | 467      | 46   | 23   | 5    | 11   | 62       | 7        | 92       |
| Number                       | 5    | 2        | 12   | 1        | 6        | 16   | 3    | 8    | 18   | 7        | 4        | 14       |
| Initial Q (Qb), veh          | 0    | 0        | 0    | 0        | 0        | 0    | 0    | 0    | 0    | 0        | 0        | 0        |
| Ped-Bike Adj(A_pbT)          | 1.00 |          | 1.00 | 1.00     |          | 1.00 | 1.00 |      | 1.00 | 1.00     |          | 1.00     |
| Parking Bus, Adj             | 1.00 | 1.00     | 1.00 | 1.00     | 1.00     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00     | 1.00     | 1.00     |
| Adj Sat Flow, veh/h/ln       | 1731 | 1871     | 1818 | 1729     | 1810     | 1764 | 1800 | 1765 | 1800 | 1791     | 1740     | 1791     |
| Adj Flow Rate, veh/h         | 85   | 518      | 23   | 16       | 492      | 46   | 24   | 5    | 12   | 65       | 7        | 53       |
| Adj No. of Lanes             | 1    | 1        | 0    | 1        | 1        | 0    | 0    | 1    | 0    | 1        | 1        | 0        |
| Peak Hour Factor             | 0.95 | 0.95     | 0.95 | 0.95     | 0.95     | 0.95 | 0.95 | 0.95 | 0.95 | 0.95     | 0.95     | 0.95     |
| Percent Heavy Veh, %         | 5    | 1        | 1    | 2        | 1        | 1    | 2    | 2    | 2    | 0        | 2        | 2        |
| Cap, veh/h                   | 567  | 1357     | 60   | 599      | 1026     | 96   | 107  | 31   | 25   | 233      | 16       | 120      |
| Arrive On Green              | 0.11 | 1.00     | 1.00 | 0.63     | 0.63     | 0.62 | 0.08 | 0.09 | 0.08 | 0.09     | 0.09     | 0.09     |
| Sat Flow, veh/h              | 1649 | 1778     | 79   | 800      | 1631     | 152  | 339  | 339  | 281  | 1337     | 176      | 1330     |
| Grp Volume(v), veh/h         | 85   | 0        | 541  | 16       | 0        | 538  | 41   | 0    | 0    | 65       | 0        | 60       |
| Grp Sat Flow(s),veh/h/ln     | 1649 | 0        | 1857 | 800      | 0        | 1783 | 959  | 0    | 0    | 1337     | 0        | 1505     |
| Q Serve(g_s), s              | 1.2  | 0.0      | 0.0  | 0.6      | 0.0      | 12.1 | 0.6  | 0.0  | 0.0  | 0.0      | 0.0      | 2.8      |
| Cycle Q Clear(g_c), s        | 1.2  | 0.0      | 0.0  | 0.6      | 0.0      | 12.1 | 3.9  | 0.0  | 0.0  | 2.7      | 0.0      | 2.8      |
| Prop In Lane                 | 1.00 |          | 0.04 | 1.00     |          | 0.09 | 0.59 |      | 0.29 | 1.00     |          | 0.88     |
| Lane Grp Cap(c), veh/h       | 567  | 0        | 1418 | 599      | 0        | 1121 | 150  | 0    | 0    | 233      | 0        | 136      |
| V/C Ratio(X)                 | 0.15 | 0.00     | 0.38 | 0.03     | 0.00     | 0.48 | 0.27 | 0.00 | 0.00 | 0.28     | 0.00     | 0.44     |
| Avail Cap(c_a), veh/h        | 653  | 0        | 1418 | 599      | 0        | 1121 | 209  | 0    | 0    | 291      | 0        | 201      |
| HCM Platoon Ratio            | 2.00 | 2.00     | 2.00 | 1.00     | 1.00     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00     | 1.00     | 1.00     |
| Upstream Filter(I)           | 1.00 | 0.00     | 1.00 | 1.00     | 0.00     | 1.00 | 1.00 | 0.00 | 0.00 | 1.00     | 0.00     | 1.00     |
| Uniform Delay (d), s/veh     | 4.4  | 0.0      | 0.0  | 5.3      | 0.0      | 7.4  | 32.8 | 0.0  | 0.0  | 32.3     | 0.0      | 32.3     |
| Incr Delay (d2), s/veh       | 0.1  | 0.0      | 8.0  | 0.1      | 0.0      | 1.5  | 1.0  | 0.0  | 0.0  | 0.6      | 0.0      | 2.3      |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0      | 0.0  | 0.0      | 0.0      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0      | 0.0      | 0.0      |
| %ile BackOfQ(95%),veh/ln     | 1.0  | 0.0      | 0.6  | 0.2      | 0.0      | 10.4 | 1.6  | 0.0  | 0.0  | 2.3      | 0.0      | 2.3      |
| LnGrp Delay(d),s/veh         | 4.5  | 0.0      | 0.8  | 5.4      | 0.0      | 8.9  | 33.7 | 0.0  | 0.0  | 32.9     | 0.0      | 34.6     |
| LnGrp LOS                    | Α    |          | Α    | Α        |          | Α    | С    |      |      | С        |          | <u>C</u> |
| Approach Vol, veh/h          |      | 626      |      |          | 554      |      |      | 41   |      |          | 125      |          |
| Approach Delay, s/veh        |      | 1.3      |      |          | 8.8      |      |      | 33.7 |      |          | 33.7     |          |
| Approach LOS                 |      | Α        |      |          | Α        |      |      | С    |      |          | С        |          |
| Timer                        | 1    | 2        | 3    | 4        | 5        | 6    | 7    | 8    |      |          |          |          |
| Assigned Phs                 |      | 2        |      | 4        | 5        | 6    |      | 8    |      |          |          |          |
| Phs Duration (G+Y+Rc), s     |      | 63.2     |      | 11.8     | 10.1     | 53.2 |      | 11.8 |      |          |          |          |
| Change Period (Y+Rc), s      |      | 7.0      |      | 6.0      | 7.0      | 7.0  |      | 6.0  |      |          |          |          |
| Max Green Setting (Gmax), s  |      | 53.0     |      | 9.0      | 7.0      | 39.0 |      | 9.0  |      |          |          |          |
| Max Q Clear Time (g_c+l1), s |      | 2.5      |      | 5.3      | 3.7      | 14.1 |      | 5.9  |      |          |          |          |
| Green Ext Time (p_c), s      |      | 2.1      |      | 0.1      | 0.1      | 2.2  |      | 0.0  |      |          |          |          |
| Intersection Summary         |      |          |      |          |          |      |      |      |      |          |          |          |
| HCM 2010 Ctrl Delay          |      |          | 8.4  |          |          |      |      |      |      |          |          |          |
| HCM 2010 LOS                 |      |          | Α    |          |          |      |      |      |      |          |          |          |

|                         | ۶     | <b>→</b> | •     | •     | +        | •     | •     | <b>†</b> | ~     | <b>/</b> | ţ     | 4    |
|-------------------------|-------|----------|-------|-------|----------|-------|-------|----------|-------|----------|-------|------|
| Lane Group              | EBL   | EBT      | EBR   | WBL   | WBT      | WBR   | NBL   | NBT      | NBR   | SBL      | SBT   | SBR  |
| Lane Configurations     | *     | <b>†</b> | 7     | *     | <b>†</b> | 7     |       | ર્ન      | 7     |          | 4     |      |
| Traffic Volume (vph)    | 54    | 556      | 228   | 71    | 503      | 46    | 210   | 21       | 58    | 19       | 15    | 78   |
| Future Volume (vph)     | 54    | 556      | 228   | 71    | 503      | 46    | 210   | 21       | 58    | 19       | 15    | 78   |
| Ideal Flow (vphpl)      | 1800  | 1800     | 1800  | 1800  | 1800     | 1800  | 1800  | 1800     | 1800  | 1800     | 1800  | 1800 |
| Lane Width (ft)         | 10    | 12       | 12    | 10    | 11       | 12    | 12    | 11       | 11    | 12       | 15    | 12   |
| Grade (%)               |       | 0%       |       |       | -1%      |       |       | -1%      |       |          | 2%    |      |
| Storage Length (ft)     | 190   |          | 0     | 150   |          | 150   | 0     |          | 150   | 0        |       | 0    |
| Storage Lanes           | 1     |          | 1     | 1     |          | 1     | 0     |          | 1     | 0        |       | 0    |
| Taper Length (ft)       | 25    |          |       | 25    |          |       | 25    |          |       | 25       |       |      |
| Right Turn on Red       |       |          | Yes   |       |          | Yes   |       |          | Yes   |          |       | Yes  |
| Link Speed (mph)        |       | 45       |       |       | 45       |       |       | 35       |       |          | 25    |      |
| Link Distance (ft)      |       | 551      |       |       | 297      |       |       | 312      |       |          | 194   |      |
| Travel Time (s)         |       | 8.3      |       |       | 4.5      |       |       | 6.1      |       |          | 5.3   |      |
| Confl. Peds. (#/hr)     | 2     |          | 2     |       |          |       |       |          |       |          |       |      |
| Peak Hour Factor        | 0.95  | 0.95     | 0.95  | 0.95  | 0.95     | 0.95  | 0.95  | 0.95     | 0.95  | 0.95     | 0.95  | 0.95 |
| Heavy Vehicles (%)      | 2%    | 1%       | 1%    | 0%    | 1%       | 0%    | 1%    | 0%       | 3%    | 0%       | 0%    | 5%   |
| Shared Lane Traffic (%) |       |          |       |       |          |       |       |          |       |          |       |      |
| Turn Type               | Perm  | NA       | Perm  | pm+pt | NA       | Perm  | Perm  | NA       | pm+ov | Perm     | NA    |      |
| Protected Phases        |       | 2        |       | 1     | 6        |       |       | 8        | 1     |          | 4     |      |
| Permitted Phases        | 2     |          | 2     | 6     |          | 6     | 8     |          | 8     | 4        |       |      |
| Detector Phase          | 2     | 2        | 2     | 1     | 6        | 6     | 8     | 8        | 1     | 4        | 4     |      |
| Switch Phase            |       |          |       |       |          |       |       |          |       |          |       |      |
| Minimum Initial (s)     | 13.0  | 13.0     | 13.0  | 3.0   | 13.0     | 13.0  | 3.0   | 3.0      | 3.0   | 3.0      | 3.0   |      |
| Minimum Split (s)       | 40.0  | 40.0     | 40.0  | 10.0  | 40.0     | 40.0  | 13.0  | 13.0     | 10.0  | 13.0     | 13.0  |      |
| Total Split (s)         | 37.0  | 37.0     | 37.0  | 13.0  | 50.0     | 50.0  | 25.0  | 25.0     | 13.0  | 25.0     | 25.0  |      |
| Total Split (%)         | 49.3% | 49.3%    | 49.3% | 17.3% | 66.7%    | 66.7% | 33.3% | 33.3%    | 17.3% | 33.3%    | 33.3% |      |
| Yellow Time (s)         | 5.0   | 5.0      | 5.0   | 5.0   | 5.0      | 5.0   | 3.0   | 3.0      | 5.0   | 3.0      | 3.0   |      |
| All-Red Time (s)        | 2.0   | 2.0      | 2.0   | 2.0   | 2.0      | 2.0   | 3.0   | 3.0      | 2.0   | 3.0      | 3.0   |      |
| Lost Time Adjust (s)    | -1.0  | -1.0     | -1.0  | -1.0  | -1.0     | -1.0  |       | -1.0     | -1.0  |          | -1.0  |      |
| Total Lost Time (s)     | 6.0   | 6.0      | 6.0   | 6.0   | 6.0      | 6.0   |       | 5.0      | 6.0   |          | 5.0   |      |
| Lead/Lag                | Lag   | Lag      | Lag   | Lead  |          |       |       |          | Lead  |          |       |      |
| Lead-Lag Optimize?      | Yes   | Yes      | Yes   | Yes   |          |       |       |          | Yes   |          |       |      |
| Recall Mode             | C-Max | C-Max    | C-Max | None  | C-Max    | C-Max | None  | None     | None  | None     | None  |      |

### Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 75

Offset: 50 (67%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated





|                         | ٠     | <b>→</b> | <b>←</b> | •    | <b>/</b> | 4    |
|-------------------------|-------|----------|----------|------|----------|------|
| Lane Group              | EBL   | EBT      | WBT      | WBR  | SBL      | SBR  |
| Lane Configurations     | *     | <b>†</b> | f)       |      | ሻ        | 7    |
| Traffic Volume (vph)    | 26    | 983      | 420      | 152  | 260      | 538  |
| Future Volume (vph)     | 26    | 983      | 420      | 152  | 260      | 538  |
| Ideal Flow (vphpl)      | 1800  | 1800     | 1800     | 1800 | 1800     | 1800 |
| Lane Width (ft)         | 16    | 12       | 12       | 12   | 15       | 15   |
| Grade (%)               |       | -3%      | 2%       |      | 0%       |      |
| Storage Length (ft)     | 75    |          |          | 0    | 0        | 0    |
| Storage Lanes           | 1     |          |          | 0    | 1        | 1    |
| Taper Length (ft)       | 25    |          |          |      | 25       |      |
| Right Turn on Red       |       |          |          | Yes  |          | Yes  |
| Link Speed (mph)        |       | 45       | 45       |      | 25       |      |
| Link Distance (ft)      |       | 830      | 280      |      | 317      |      |
| Travel Time (s)         |       | 12.6     | 4.2      |      | 8.6      |      |
| Peak Hour Factor        | 0.94  | 0.94     | 0.94     | 0.94 | 0.94     | 0.94 |
| Heavy Vehicles (%)      | 0%    | 1%       | 1%       | 0%   | 1%       | 2%   |
| Shared Lane Traffic (%) |       |          |          |      |          |      |
| Turn Type               | Perm  | NA       | NA       |      | Prot     | Free |
| Protected Phases        |       | 2        | 6        |      | 4        |      |
| Permitted Phases        | 2     |          |          |      |          | Free |
| Detector Phase          | 2     | 2        | 6        |      | 4        |      |
| Switch Phase            |       |          |          |      |          |      |
| Minimum Initial (s)     | 15.0  | 15.0     | 15.0     |      | 3.0      |      |
| Minimum Split (s)       | 22.0  | 22.0     | 22.0     |      | 13.0     |      |
| Total Split (s)         | 56.0  | 56.0     | 56.0     |      | 19.0     |      |
| Total Split (%)         | 74.7% | 74.7%    | 74.7%    |      | 25.3%    |      |
| Yellow Time (s)         | 5.0   | 5.0      | 5.0      |      | 4.0      |      |
| All-Red Time (s)        | 2.0   | 2.0      | 2.0      |      | 2.0      |      |
| Lost Time Adjust (s)    | -1.0  | -1.0     | -1.0     |      | -1.0     |      |
| Total Lost Time (s)     | 6.0   | 6.0      | 6.0      |      | 5.0      |      |
| Lead/Lag                |       |          |          |      |          |      |
| Lead-Lag Optimize?      |       |          |          |      |          |      |
| Recall Mode             | C-Max | C-Max    | C-Max    |      | None     |      |
| Intersection Summary    |       |          |          |      |          |      |
| Area Type:              | Other |          |          |      |          |      |

Area Type: Other

Cycle Length: 75

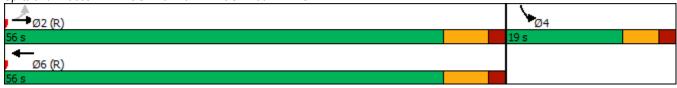
Actuated Cycle Length: 75

Offset: 17 (23%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 4: ROUTE 322 & WB ROUTE 30 RAMPS



|                              | •    |          | <b>—</b> | 4    |      | 1    |
|------------------------------|------|----------|----------|------|------|------|
|                              | _    | <b>→</b> |          |      | _    | 7    |
| Movement                     | EBL  | EBT      | WBT      | WBR  | SBL  | SBR  |
| Lane Configurations          | ሻ    | <u></u>  | f)       |      | ሻ    | 7    |
| Traffic Volume (veh/h)       | 26   | 983      | 420      | 152  | 260  | 538  |
| Future Volume (veh/h)        | 26   | 983      | 420      | 152  | 260  | 538  |
| Number                       | 5    | 2        | 6        | 16   | 7    | 14   |
| Initial Q (Qb), veh          | 0    | 0        | 0        | 0    | 1    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00 |          |          | 1.00 | 1.00 | 1.00 |
| Parking Bus, Adj             | 1.00 | 1.00     | 1.00     | 1.00 | 1.00 | 1.00 |
| Adj Sat Flow, veh/h/ln       | 1900 | 1809     | 1769     | 1782 | 1853 | 1835 |
| Adj Flow Rate, veh/h         | 28   | 1046     | 447      | 0    | 277  | 0    |
| Adj No. of Lanes             | 1    | 1        | 1        | 0    | 1    | 1    |
| Peak Hour Factor             | 0.94 | 0.94     | 0.94     | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, %         | 0    | 1        | 1        | 1    | 1    | 2    |
| Cap, veh/h                   | 627  | 1206     | 1179     | 0    | 330  | 291  |
| Arrive On Green              | 0.67 | 0.67     | 0.67     | 0.00 | 0.19 | 0.00 |
| Sat Flow, veh/h              | 958  | 1809     | 1769     | 0.00 | 1765 | 1560 |
| Grp Volume(v), veh/h         | 28   | 1046     | 447      | 0    | 277  | 0    |
|                              | 958  | 1809     | 1769     | 0    | 1765 | 1560 |
| Grp Sat Flow(s),veh/h/ln     | 1.0  | 34.3     |          |      | 11.4 |      |
| Q Serve(g_s), s              |      |          | 8.5      | 0.0  |      | 0.0  |
| Cycle Q Clear(g_c), s        | 9.5  | 34.3     | 8.5      | 0.0  | 11.4 | 0.0  |
| Prop In Lane                 | 1.00 | 4000     | 4470     | 0.00 | 1.00 | 1.00 |
| Lane Grp Cap(c), veh/h       | 627  | 1206     | 1179     | 0    | 330  | 291  |
| V/C Ratio(X)                 | 0.04 | 0.87     | 0.38     | 0.00 | 0.84 | 0.00 |
| Avail Cap(c_a), veh/h        | 627  | 1206     | 1179     | 0    | 330  | 291  |
| HCM Platoon Ratio            | 1.00 | 1.00     | 1.00     | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00 | 1.00     | 1.00     | 0.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 7.7  | 9.9      | 5.6      | 0.0  | 29.5 | 0.0  |
| Incr Delay (d2), s/veh       | 0.1  | 8.5      | 0.9      | 0.0  | 18.0 | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0  | 0.0      | 0.0      | 0.0  | 0.4  | 0.0  |
| %ile BackOfQ(95%),veh/ln     | 0.5  | 26.6     | 7.8      | 0.0  | 11.7 | 0.0  |
| LnGrp Delay(d),s/veh         | 7.8  | 18.4     | 6.5      | 0.0  | 47.9 | 0.0  |
| LnGrp LOS                    | Α.   | В        | A        |      | D    | J.0  |
| Approach Vol, veh/h          | ,,   | 1074     | 447      |      | 277  |      |
| Approach Delay, s/veh        |      | 18.1     | 6.5      |      | 47.9 |      |
|                              |      |          |          |      |      |      |
| Approach LOS                 |      | В        | Α        |      | D    |      |
| Timer                        | 1    | 2        | 3        | 4    | 5    | 6    |
| Assigned Phs                 |      | 2        |          | 4    |      | 6    |
| Phs Duration (G+Y+Rc), s     |      | 56.0     |          | 19.0 |      | 56.0 |
| Change Period (Y+Rc), s      |      | 7.0      |          | 6.0  |      | 7.0  |
| Max Green Setting (Gmax), s  |      | 49.0     |          | 13.0 |      | 49.0 |
| Max Q Clear Time (g_c+I1), s |      | 36.8     |          | 13.9 |      | 11.0 |
| Green Ext Time (p_c), s      |      | 4.3      |          | 0.0  |      | 1.6  |
|                              |      | 7.0      |          | 0.0  |      | 1.0  |
| Intersection Summary         |      |          |          |      |      |      |
| HCM 2010 Ctrl Delay          |      |          | 19.8     |      |      |      |
| HCM 2010 LOS                 |      |          | В        |      |      |      |
|                              |      |          |          |      |      |      |

|                         | -        | •    | •    | -        | 1    |      |
|-------------------------|----------|------|------|----------|------|------|
| Lane Group              | EBT      | EBR  | WBL  | WBT      | NBL  | NBR  |
| Lane Configurations     | <b>↑</b> | 7    | ሻ    | <b>†</b> | 7    | 7    |
| Traffic Volume (vph)    | 652      | 607  | 261  | 520      | 29   | 189  |
| Future Volume (vph)     | 652      | 607  | 261  | 520      | 29   | 189  |
| Ideal Flow (vphpl)      | 1800     | 1800 | 1800 | 1800     | 1800 | 1800 |
| Lane Width (ft)         | 13       | 12   | 12   | 13       | 13   | 14   |
| Grade (%)               | -6%      |      |      | 7%       | -5%  |      |
| Storage Length (ft)     |          | 0    | 250  |          | 0    | 0    |
| Storage Lanes           |          | 1    | 1    |          | 1    | 1    |
| Taper Length (ft)       |          |      | 25   |          | 25   |      |
| Link Speed (mph)        | 45       |      |      | 45       | 25   |      |
| Link Distance (ft)      | 353      |      |      | 551      | 313  |      |
| Travel Time (s)         | 5.3      |      |      | 8.3      | 8.5  |      |
| Peak Hour Factor        | 0.96     | 0.96 | 0.96 | 0.96     | 0.96 | 0.96 |
| Heavy Vehicles (%)      | 1%       | 2%   | 2%   | 1%       | 0%   | 1%   |
| Shared Lane Traffic (%) |          |      |      |          |      |      |
| Sign Control            | Free     |      |      | Free     | Stop |      |
| Intersection Summary    |          |      |      |          |      |      |
| Area Type:              | Other    |      |      |          |      |      |

| Intersection Summa  | ary      |  |  |  |  |
|---------------------|----------|--|--|--|--|
| Area Type:          | Other    |  |  |  |  |
| Control Type: Unsig | gnalized |  |  |  |  |
|                     |          |  |  |  |  |
|                     |          |  |  |  |  |
|                     |          |  |  |  |  |
|                     |          |  |  |  |  |
|                     |          |  |  |  |  |
|                     |          |  |  |  |  |
|                     |          |  |  |  |  |

| Movement   |                       |        |          |        |     |        |      |  |
|--|-----------------------|--------|----------|--------|-----|--------|------|--|
| Movement   | Intersection          |        |          |        |     |        |      |  |
| Cane Configurations  | Int Delay, s/veh      | 4.9    |          |        |     |        |      |  |
| Cane Configurations  | Movement              | EBT    | EBR      | WBL    | WBT | NBL    | NBR  |  |
| Fraffic Vol, veh/h         652         607         261         520         29         189           ruture Vol, veh/h         652         607         261         520         29         189           conflicting Peds, #hr         0         1         2         1         0   |                       |        |          |        |     |        |      |  |
| Future Vol, veh/h Conflicting Peds, #/hr Conflicting Flow All Conflicting Flow All Conflicting Flow All Conflicting Flow All Conflicting Howy Conflicting Flow All Conflicting Howy Conflicting Flow All Conflicting Howy Conflicting Flow All Confli |                       |        |          |        |     |        |      |  |
| Conflicting Peds, #/hr   0   |                       |        |          |        |     |        |      |  |
| Sign Control         Free Pree         Free Pree Pree         Free Pree Pree Pree Pree Pree Pree Pree  |                       |        |          |        |     |        |      |  |
| None   |                       |        |          |        |     |        | •    |  |
| Storage Length   - 0 250   |                       |        |          |        |     |        |      |  |
| Veh in Median Storage, #         0         -         0         0         -           Grade, %         -6         -         -         7         -5         -           Peak Hour Factor         96   |                       |        |          |        |     |        |      |  |
| Grade, % -6 7 -5 7 -5 7 -6 - 7 -6 - 7 -6 - 7 -6 - 7 -6 - 7 -6 - 7 -6 - 7 -6 - 7 -6 - 96 - 9  |                       |        | -        |        |     |        |      |  |
| Peak Hour Factor 96 96 96 96 96 96 96 96 96 96 96 96 96  |                       |        |          |        |     |        | _    |  |
| Heavy Vehicles, %  |                       | -      |          |        |     | -      |      |  |
| Major/Minor   Major1   Major2   Minor1   |                       |        |          |        |     |        |      |  |
| Major/Minor         Major1         Major2         Minor1           Conflicting Flow All         0         0         679         0         1765         679           Stage 1         -         -         -         679         -         Stage 2         -         -         1086         -         -         -         1086         -         -         -         4.4         -         -         -         4.4         -         -         -         4.4         -         -         -         4.4         -         -         -         4.4         -         -         -         4.4         -         -         -         4.4         -         -         -         4.4         -         -         -         4.4         -         -         -         4.4         -         -         -         -         4.4         -   |                       |        |          |        |     | -      |      |  |
| Conflicting Flow All   | INIVITIL FIOW         | 019    | 032      | 212    | 342 | 30     | 191  |  |
| Conflicting Flow All   |                       |        |          |        |     |        |      |  |
| Stage 1  | Major/Minor I         | Major1 |          | Major2 | 1   | Minor1 |      |  |
| Stage 2  | Conflicting Flow All  | 0      | 0        | 679    | 0   | 1765   | 679  |  |
| Critical Hdwy Critical Hdwy Stg 1 4.3 - 5.4 5.71 Critical Hdwy Stg 1 4.4 Critical Hdwy Stg 2 4.4 Critical Hdwy Stg 2 4.4 Critical Hdwy Stg 2 3 3 3.1 Critical Hdwy Stg 2 3 3 3.3 Critical Hdwy Stg 2 698 - 82 522 Stage 1 698 - 82 522 Critical Hdwy Stg 2 372 1 Mov Cap-1 Maneuver 698 - 50 522 Mov Cap-2 Maneuver 50 - 522 Mov Cap-2 Maneuver 698 - 50 522 Mov Cap-2 Maneuver 685 685 685 Stage 2 685  | Stage 1               | -      | -        | -      | -   | 679    | -    |  |
| Critical Hdwy Stg 1 4.4 - Critical Hdwy Stg 2 3 3 3.1    Crollow-up Hdwy 698 - 82 522    Stage 1 698 - 522    Stage 2 372 - 372 - Critical Maneuver - 698 - 50 522    Mov Cap-1 Maneuver - 698 - 50 522    Mov Cap-2 Maneuver 50 - 50    Stage 1 685 - 522    Stage 2 227 685 - 522    Approach EB WB NB    HCM Control Delay, s 0 4.5 34.3    HCM LOS D D   Minor Lane/Major Mvmt NBLn1 NBLn2 EBT EBR WBL    Capacity (veh/h) 50 522 - 698    HCM Lone V/C Ratio 0.604 0.377 - 0.39    HCM Lone V/C Ratio 153.8 16 - 13.4    HCM Lane LOS F C - B   | Stage 2               | -      | -        | -      | -   | 1086   | -    |  |
| Critical Hdwy Stg 2 4.4 Critical Hdwy Stg 2 4.4 Critical Hdwy Pdwy - 3 3 - 3 3.1 3.1 Por CC Cap-1 Maneuver - 698 - 82 522 Stage 1 685 - 522 Polation blocked, % 1 1 Mov Cap-1 Maneuver - 698 - 50 522 Mov Cap-2 Maneuver 698 - 50 522 Mov Cap-2 Maneuver 698 - 50 522 Mov Cap-2 Maneuver 685 - 51age 2 685 - 522 Maneuver 685 - 51age 2 50 - 522 Maneuver 685 - 51age 2 50 D D Mov Cap-2 Maneuver 685 - 51age 2 50 D D Mov Cap-2 Maneuver 685 - 51age 2 685 - 51age 2 685 - 51age 2 50 D D Mov Cap-2 Maneuver 685 - 51age 2 685 - 685  | Critical Hdwy         | -      | -        | 4.3    | -   | 5.4    | 5.71 |  |
| Follow-up Hdwy 3 - 3 3.1 Pot Cap-1 Maneuver - 698 - 82 522 Stage 1 685 - 372 Platoon blocked, % 1 1 Mov Cap-1 Maneuver - 698 - 50 522 Mov Cap-2 Maneuver 698 - 50 522 Mov Cap-2 Maneuver 50 - 685 Stage 2 227 -   Approach EB WB NB HCM Control Delay, s 0 4.5 34.3 HCM LOS D  Minor Lane/Major Mvmt NBLn1 NBLn2 EBT EBR WBL Capacity (veh/h) 50 522 - 698 HCM Los D  Minor Lane/Major Movet NBLn1 NBLn2 EBT EBR WBL Capacity (veh/h) 50 522 - 698 HCM Los D  Minor Lane/Major Movet NBLn1 NBLn2 EBT EBR WBL Capacity (veh/h) 50 522 - 698 HCM Lontrol Delay (s) 153.8 16 - 13.4 HCM Control Delay (s) 153.8 16 - 13.4   | Critical Hdwy Stg 1   | -      | -        | -      | -   | 4.4    | -    |  |
| Follow-up Hdwy - 3 - 3 3.1 Pot Cap-1 Maneuver - 698 - 82 522 Stage 1 685 - Stage 2 3772 - Platoon blocked, % 1 Mov Cap-1 Maneuver - 698 - 50 522 Mov Cap-2 Maneuver 50 - Stage 2 227 - Mov Cap-2 Maneuver 50 - Stage 1 685 - Stage 2 3227 -  Approach EB WB NB HCM Control Delay, s 0 4.5 34.3 HCM LOS D  Minor Lane/Major Mvmt NBLn1 NBLn2 EBT EBR WBL  Capacity (veh/h) 50 522 - 698 HCM Lane V/C Ratio 0.604 0.377 - 0.39 HCM Lane V/C Ratio 153.8 16 - 13.4 HCM Control Delay (s) 153.8 16 - 13.4  | Critical Hdwy Stg 2   | -      | -        | _      | -   | 4.4    | -    |  |
| Stage 1  |                       | -      | -        | 3      | -   |        | 3,1  |  |
| Stage 1  |                       |        |          |        |     |        |      |  |
| Stage 2  |                       |        |          |        | -   |        |      |  |
| Platoon blocked, %         -         -         1           Mov Cap-1 Maneuver         -         698         -         50         522           Mov Cap-2 Maneuver         -         -         -         50         -         -         50         -         -         685         -         -         685         -         -         -         685         -         -         -         685         -         -         -         227         -           Approach         EB         WB         NB         -         -         -         227         -         -         -         227         -         -         -         -         227         -         -         -         -         227         -         -         -         -         227         -         -         -         -         227         -         -         -         -         227         -  |                       | _      | _        | _      | -   |        | _    |  |
| Mov Cap-1 Maneuver         -         698         -         50         522           Mov Cap-2 Maneuver         -         -         -         50         -           Stage 1         -         -         -         685         -           Stage 2         -         -         -         227         -           Approach         EB         WB         NB         NB           4CM Control Delay, s         0         4.5         34.3         -           4CM LOS         D         D         D         -         -         698         -         -         698         -         -         -         698         -         -         -         0.39         -         -         -         0.39         -         -         -         0.39         -         -         -         0.39         -         -         -         3.4         -         -         -         3.4         -         -         -         3.4         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -<  |                       |        |          |        |     |        |      |  |
| Mov Cap-2 Maneuver   |                       |        |          | 698    |     |        | 522  |  |
| Stage 1  |                       |        |          |        |     |        |      |  |
| Stage 2  |                       |        | -        | -      |     |        |      |  |
| Approach   EB   WB   NB  |                       |        | -        | -      |     |        |      |  |
| CM Control Delay, s   0   4.5   34.3   CM LOS   D  | Stage 2               | -      | -        | -      | -   | 221    | -    |  |
| CM Control Delay, s   0   4.5   34.3   CM LOS   D  |                       |        |          |        |     |        |      |  |
| Minor Lane/Major Mvmt   NBLn1 NBLn2   EBT   EBR   WBL  | Approach              | EB     |          | WB     |     | NB     |      |  |
| Minor Lane/Major Mvmt         NBLn1 NBLn2         EBT         EBR         WBL           Capacity (veh/h)         50         522         -         -         698           ICM Lane V/C Ratio         0.604         0.377         -         -         0.39           ICM Control Delay (s)         153.8         16         -         -         13.4           ICM Lane LOS         F         C         -         B   | HCM Control Delay, s  | 0      |          | 4.5    |     | 34.3   |      |  |
| Capacity (veh/h)         50         522         -         698           HCM Lane V/C Ratio         0.604         0.377         -         -         0.39           HCM Control Delay (s)         153.8         16         -         -         13.4           HCM Lane LOS         F         C         -         B   | HCM LOS               |        |          |        |     | D      |      |  |
| Capacity (veh/h)         50         522         -         698           HCM Lane V/C Ratio         0.604         0.377         -         -         0.39           HCM Control Delay (s)         153.8         16         -         -         13.4           HCM Lane LOS         F         C         -         B   |                       |        |          |        |     |        |      |  |
| Capacity (veh/h)         50         522         -         698           HCM Lane V/C Ratio         0.604         0.377         -         -         0.39           HCM Control Delay (s)         153.8         16         -         -         13.4           HCM Lane LOS         F         C         -         B   | Min I /M-i M          |        | NIDL 4 I | NDIO   | EDT | EDD    | MDI  |  |
| HCM Lane V/C Ratio     0.604     0.377     -     -     0.39       HCM Control Delay (s)     153.8     16     -     -     13.4       HCM Lane LOS     F     C     -     B   |                       | l I    |          |        | FRI | EBK    |      |  |
| HCM Control Delay (s) 153.8 16 - 13.4 HCM Lane LOS F C - B   |                       |        |          |        | -   | -      |      |  |
| HCM Lane LOS F C B   |                       |        |          |        | -   | -      |      |  |
|  | , , ,                 |        |          |        | -   | -      |      |  |
| HCM 95th %tile Q(veh) 2.3 1.7 1.9  | HCM Lane LOS          |        |          |        | -   | -      |      |  |
|  | HCM 95th %tile Q(veh) |        | 2.3      | 1.7    | -   | -      | 1.9  |  |

3: EB ROUTE 30 RAMPS & ROUTE 322

2023 PROJECTED CONDITIONS

### 8: PROPOSED DRIVEWAY/PARK AND RIDE & LLOYD AVENUE 2023 PROJECTED CONDITIONS

Timing Plan: SAT Peak

|                         | ۶    | <b>→</b> | $\rightarrow$ | •    | <b>←</b> | •    | 1    | <b>†</b> | <b>/</b> | -    | ļ    | 4    |
|-------------------------|------|----------|---------------|------|----------|------|------|----------|----------|------|------|------|
| Lane Group              | EBL  | EBT      | EBR           | WBL  | WBT      | WBR  | NBL  | NBT      | NBR      | SBL  | SBT  | SBR  |
| Lane Configurations     |      | 4        |               |      | 4        |      |      | 4        |          |      | 4    |      |
| Traffic Volume (vph)    | 2    | 274      | 6             | 7    | 317      | 4    | 6    | 0        | 14       | 4    | 0    | 1    |
| Future Volume (vph)     | 2    | 274      | 6             | 7    | 317      | 4    | 6    | 0        | 14       | 4    | 0    | 1    |
| Ideal Flow (vphpl)      | 1800 | 1800     | 1800          | 1800 | 1800     | 1800 | 1800 | 1800     | 1800     | 1800 | 1800 | 1800 |
| Lane Width (ft)         | 12   | 10       | 12            | 12   | 10       | 12   | 12   | 12       | 12       | 16   | 12   | 12   |
| Grade (%)               |      | -2%      |               |      | 1%       |      |      | 0%       |          |      | 4%   |      |
| Link Speed (mph)        |      | 35       |               |      | 35       |      |      | 25       |          |      | 25   |      |
| Link Distance (ft)      |      | 287      |               |      | 312      |      |      | 263      |          |      | 177  |      |
| Travel Time (s)         |      | 5.6      |               |      | 6.1      |      |      | 7.2      |          |      | 4.8  |      |
| Peak Hour Factor        | 0.97 | 0.97     | 0.97          | 0.97 | 0.97     | 0.97 | 0.97 | 0.97     | 0.97     | 0.97 | 0.97 | 0.97 |
| Heavy Vehicles (%)      | 0%   | 1%       | 2%            | 2%   | 1%       | 25%  | 2%   | 2%       | 2%       | 0%   | 2%   | 0%   |
| Shared Lane Traffic (%) |      |          |               |      |          |      |      |          |          |      |      |      |
| Sign Control            |      | Free     |               |      | Free     |      |      | Stop     |          |      | Stop |      |

Intersection Summary

Other

Area Type: Control Type: Unsignalized

#### 8: PROPOSED DRIVEWAY/PARK AND RIDE & LLOYD AVENUE 2023 PROJECTED CONDITIONS

| Intersection           |      |      |      |      |      |      |      |      |      |      |      |      |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh       | 0.6  |      |      |      |      |      |      |      |      |      |      |      |
| Movement               | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations    |      | 4    |      |      | 4    |      |      | 4    |      |      | 4    |      |
| Traffic Vol, veh/h     | 2    | 274  | 6    | 7    | 317  | 4    | 6    | 0    | 14   | 4    | 0    | 1    |
| Future Vol, veh/h      | 2    | 274  | 6    | 7    | 317  | 4    | 6    | 0    | 14   | 4    | 0    | 1    |
| Conflicting Peds, #/hr | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control           | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized         | -    | -    | None |
| Storage Length         | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| Veh in Median Storage  | ,# - | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %               | -    | -2   | -    | -    | 1    | -    | -    | 0    | -    | -    | 4    | -    |
| Peak Hour Factor       | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   |
| Heavy Vehicles, %      | 0    | 1    | 2    | 2    | 1    | 25   | 2    | 2    | 2    | 0    | 2    | 0    |
| Mvmt Flow              | 2    | 282  | 6    | 7    | 327  | 4    | 6    | 0    | 14   | 4    | 0    | 1    |

| Major/Minor          | Major1 |   | IV. | lajor2 |   | N. | 1inor1 |       | N.   | 1inor2 |       |     |
|----------------------|--------|---|-----|--------|---|----|--------|-------|------|--------|-------|-----|
|                      |        |   |     |        |   |    |        |       |      |        |       |     |
| Conflicting Flow All | 331    | 0 | 0   | 288    | 0 | 0  | 633    | 634   | 285  | 639    | 635   | 329 |
| Stage 1              | -      | - | -   | -      | - | -  | 289    | 289   | -    | 343    | 343   | -   |
| Stage 2              | -      | - | -   | -      | - | -  | 344    | 345   | -    | 296    | 292   | -   |
| Critical Hdwy        | 4.3    | - | -   | 4.3    | - | -  | 7.12   | 6.52  | 6.22 | 7.9    | 7.32  | 6.6 |
| Critical Hdwy Stg 1  | -      | - | -   | -      | - | -  | 6.12   | 5.52  | -    | 6.9    | 6.32  | -   |
| Critical Hdwy Stg 2  | -      | - | -   | -      | - | -  | 6.12   | 5.52  | -    | 6.9    | 6.32  | -   |
| Follow-up Hdwy       | 3      | - | -   | 3      | - | -  | 3      | 4.018 | 3.1  | 3      | 4.018 | 3.1 |
| Pot Cap-1 Maneuver   | 925    | - | -   | 957    | - | -  | 442    | 397   | 800  | 381    | 344   | 730 |
| Stage 1              | -      | - | -   | -      | - | -  | 826    | 673   | -    | 715    | 591   | -   |
| Stage 2              | -      | - | -   | -      | - | -  | 769    | 636   | -    | 768    | 629   | -   |
| Platoon blocked, %   |        | - | -   |        | - | -  |        |       |      |        |       |     |
| Mov Cap-1 Maneuver   | 925    | - | -   | 957    | - | -  | 437    | 392   | 800  | 371    | 340   | 730 |
| Mov Cap-2 Maneuver   | -      | - | -   | -      | - | -  | 437    | 392   | -    | 371    | 340   | -   |
| Stage 1              | -      | - | -   | -      | - | -  | 824    | 671   | -    | 713    | 586   | -   |
| Stage 2              | -      | - | -   | -      | - | -  | 761    | 630   | -    | 752    | 627   | -   |
|                      |        |   |     |        |   |    |        |       |      |        |       |     |
| Annroach             | FB     |   |     | WR     |   |    | NR     |       |      | SB     |       |     |

| Approach             | EB  | WB  | NB   | SB   |  |
|----------------------|-----|-----|------|------|--|
| HCM Control Delay, s | 0.1 | 0.2 | 10.8 | 13.9 |  |
| HCM LOS              |     |     | В    | В    |  |
|                      |     |     |      |      |  |

| Minor Lane/Major Mvmt | NBLn1 | EBL   | EBT | EBR | WBL   | WBT | WBR S | SBLn1 |
|-----------------------|-------|-------|-----|-----|-------|-----|-------|-------|
| Capacity (veh/h)      | 640   | 925   | -   | -   | 957   | -   | -     | 411   |
| HCM Lane V/C Ratio    | 0.032 | 0.002 | -   | -   | 0.008 | -   | -     | 0.013 |
| HCM Control Delay (s) | 10.8  | 8.9   | 0   | -   | 8.8   | 0   | -     | 13.9  |
| HCM Lane LOS          | В     | Α     | Α   | -   | Α     | Α   | -     | В     |
| HCM 95th %tile Q(veh) | 0.1   | 0     | -   | -   | 0     | -   | -     | 0     |

### 9: LLOYD AVENUE & GO CARLSON BLVD 2023 PROJECTED CONDITIONS

Timing Plan: SAT Peak

|                         | •    | •    | 1    | 1    | ţ    | 4    |
|-------------------------|------|------|------|------|------|------|
| Lane Group              | EBL  | EBR  | NBL  | NBT  | SBT  | SBR  |
| Lane Configurations     | W    |      |      | ની   | ĵ»   |      |
| Traffic Volume (vph)    | 63   | 22   | 19   | 216  | 255  | 69   |
| Future Volume (vph)     | 63   | 22   | 19   | 216  | 255  | 69   |
| Ideal Flow (vphpl)      | 1800 | 1800 | 1800 | 1800 | 1800 | 1000 |
| Lane Width (ft)         | 12   | 12   | 12   | 10   | 10   | 12   |
| Grade (%)               | 2%   |      |      | 1%   | -2%  |      |
| Link Speed (mph)        | 35   |      |      | 35   | 35   |      |
| Link Distance (ft)      | 1394 |      |      | 471  | 183  |      |
| Travel Time (s)         | 27.2 |      |      | 9.2  | 3.6  |      |
| Peak Hour Factor        | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Heavy Vehicles (%)      | 2%   | 0%   | 0%   | 0%   | 1%   | 2%   |
| Shared Lane Traffic (%) |      |      |      |      |      |      |
| Sign Control            | Stop |      |      | Free | Free |      |

Intersection Summary

Area Type: Control Type: Unsignalized

### 9: LLOYD AVENUE & GO CARLSON BLVD 2023 PROJECTED CONDITIONS

| Intersection           |            |      |        |        |              |      |
|------------------------|------------|------|--------|--------|--------------|------|
| Int Delay, s/veh       | 1.9        |      |        |        |              |      |
| Movement               | EBL        | EBR  | NBL    | NBT    | SBT          | SBR  |
| Lane Configurations    | W          |      |        | ર્ન    | ĵ.           |      |
| Traffic Vol, veh/h     | 63         | 22   | 19     | 216    | 255          | 69   |
| Future Vol, veh/h      | 63         | 22   | 19     | 216    | 255          | 69   |
| 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 Storag   | e,# 0      | -    | -      | 0      | 0            | -    |
| Grade, %               | 2          | -    | -      | 1      | -2           | -    |
| Peak Hour Factor       | 96         | 96   | 96     | 96     | 96           | 96   |
| Heavy Vehicles, %      | 2          | 0    | 0      | 0      | 1            | 2    |
| Mvmt Flow              | 66         | 23   | 20     | 225    | 266          | 72   |
|                        |            |      |        |        |              |      |
| Major/Minor            | Minor2     |      | Major1 |        | Major2       |      |
| Conflicting Flow All   | 567        | 302  | 338    | 0      | viajoi2<br>- | 0    |
| Stage 1                | 302        | 302  | 330    | -      |              | -    |
| Stage 2                | 265        |      |        |        |              |      |
| Critical Hdwy          | 6.82       | 6.4  | 4.3    | -      | -            | -    |
| Critical Hdwy Stg 1    | 5.82       | 0.4  | 4.5    |        |              |      |
| Critical Hdwy Stg 2    | 5.82       | -    | -      |        | -            |      |
| Follow-up Hdwy         | 3.02       | 3.1  | 3      | -      |              |      |
|                        | 514        | 771  | 920    | -      | -            |      |
| Pot Cap-1 Maneuver     |            |      |        | -      | -            | -    |
| Stage 1                | 833<br>871 | -    | -      | -      | -            | -    |
| Stage 2                | 8/1        | -    | -      | -      | -            | -    |
| Platoon blocked, %     | E04        | 774  | 020    | -      | -            | -    |
| Mov Cap-1 Maneuver     |            | 771  | 920    | -      | -            | -    |
| Mov Cap-2 Maneuver     |            | -    | -      | -      | -            | -    |
| Stage 1                | 812        | -    | -      | -      | -            | -    |
| Stage 2                | 871        | -    | -      | -      | -            | -    |
|                        |            |      |        |        |              |      |
| Approach               | EB         |      | NB     |        | SB           |      |
| HCM Control Delay, s   | 12.8       |      | 0.7    |        | 0            |      |
| HCM LOS                | В          |      |        |        |              |      |
|                        |            |      |        |        |              |      |
| Minor Long/Mais - Mr.  |            | MDI  | NDT    | EDI 54 | SBT          | SBR  |
| Minor Lane/Major Mvr   | ш          | NBL  | INBI   | EBLn1  | SBI          | SBR  |
| Canacity (yeh/h)       |            | 920  | -      | 551    | -            | -    |

| Minor Lane/Major Mymt | NBL   | NBT | EBLn1 | SBT | SBR |  |
|-----------------------|-------|-----|-------|-----|-----|--|
| Capacity (veh/h)      | 920   | -   | 551   | -   | -   |  |
| HCM Lane V/C Ratio    | 0.022 | -   | 0.161 | -   | -   |  |
| HCM Control Delay (s) | 9     | 0   | 12.8  | -   | -   |  |
| HCM Lane LOS          | Α     | Α   | В     | -   | -   |  |
| HCM 95th %tile Q(veh) | 0.1   | -   | 0.6   | -   | -   |  |

### 10: LLOYD AVENUE & BEAVER RUN ROAD/PROPOSED DRIVEWAY 2023 PROJECTED CONDITIONS

Timing Plan: SAT Peak

|                         | •    | <b>→</b> | •    | •    | <b>←</b> | •    | 4    | <b>†</b> | ~    | <b>\</b> | ţ    | 4    |
|-------------------------|------|----------|------|------|----------|------|------|----------|------|----------|------|------|
| Lane Group              | EBL  | EBT      | EBR  | WBL  | WBT      | WBR  | NBL  | NBT      | NBR  | SBL      | SBT  | SBR  |
| Lane Configurations     |      | 4        |      |      | 4        |      |      | 4        |      |          | 4    |      |
| Traffic Volume (vph)    | 5    | 0        | 10   | 3    | 0        | 9    | 3    | 224      | 4    | 8        | 260  | 9    |
| Future Volume (vph)     | 5    | 0        | 10   | 3    | 0        | 9    | 3    | 224      | 4    | 8        | 260  | 9    |
| Ideal Flow (vphpl)      | 1800 | 1800     | 1800 | 1800 | 1800     | 1800 | 1800 | 1800     | 1800 | 1800     | 1800 | 1800 |
| Lane Width (ft)         | 13   | 12       | 12   | 12   | 12       | 12   | 12   | 10       | 12   | 12       | 10   | 12   |
| Grade (%)               |      | 1%       |      |      | 0%       |      |      | 1%       |      |          | -1%  |      |
| Link Speed (mph)        |      | 25       |      |      | 25       |      |      | 35       |      |          | 35   |      |
| Link Distance (ft)      |      | 1436     |      |      | 296      |      |      | 307      |      |          | 471  |      |
| Travel Time (s)         |      | 39.2     |      |      | 8.1      |      |      | 6.0      |      |          | 9.2  |      |
| Peak Hour Factor        | 0.90 | 0.90     | 0.90 | 0.90 | 0.90     | 0.90 | 0.90 | 0.90     | 0.90 | 0.90     | 0.90 | 0.90 |
| Heavy Vehicles (%)      | 0%   | 2%       | 0%   | 2%   | 2%       | 2%   | 0%   | 0%       | 2%   | 2%       | 0%   | 0%   |
| Shared Lane Traffic (%) |      |          |      |      |          |      |      |          |      |          |      |      |
| Sign Control            |      | Stop     |      |      | Stop     |      |      | Free     |      |          | Free |      |

Intersection Summary

Other

Area Type: Control Type: Unsignalized

### 10: LLOYD AVENUE & BEAVER RUN ROAD/PROPOSED DRIVEWAY 2023 PROJECTED CONDITIONS

|                        | ^ =  |      |      |      |      |      |      |      |      |      |      |      |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh       | 0.7  |      |      |      |      |      |      |      |      |      |      |      |
| Movement               | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations    |      | 4    |      |      | 4    |      |      | 4    |      |      | 4    |      |
| Traffic Vol, veh/h     | 5    | 0    | 10   | 3    | 0    | 9    | 3    | 224  | 4    | 8    | 260  | 9    |
| Future Vol, veh/h      | 5    | 0    | 10   | 3    | 0    | 9    | 3    | 224  | 4    | 8    | 260  | 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 |
| Storage Length         | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| Veh in Median Storage, | # -  | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %               | -    | 1    | -    | -    | 0    | -    | -    | 1    | -    | -    | -1   | -    |
| Peak Hour Factor       | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %      | 0    | 2    | 0    | 2    | 2    | 2    | 0    | 0    | 2    | 2    | 0    | 0    |
| Mvmt Flow              | 6    | 0    | 11   | 3    | 0    | 10   | 3    | 249  | 4    | 9    | 289  | 10   |

| Major/Minor          | Minor2 | inor2 Minor1 |     | Major1 |       |      | Major2 |   |   |     |   |   |  |
|----------------------|--------|--------------|-----|--------|-------|------|--------|---|---|-----|---|---|--|
| Conflicting Flow All | 574    | 571          | 294 | 575    | 574   | 251  | 299    | 0 | 0 | 253 | 0 | 0 |  |
| Stage 1              | 312    | 312          | -   | 257    | 257   | -    | -      | - | - | -   | - | - |  |
| Stage 2              | 262    | 259          | -   | 318    | 317   | -    | -      | - | - | -   | - | - |  |
| Critical Hdwy        | 7.3    | 6.72         | 6.3 | 7.12   | 6.52  | 6.22 | 4.3    | - | - | 4.3 | - | - |  |
| Critical Hdwy Stg 1  | 6.3    | 5.72         | -   | 6.12   | 5.52  | -    | -      | - | - | -   | - | - |  |
| Critical Hdwy Stg 2  | 6.3    | 5.72         | -   | 6.12   | 5.52  | -    | -      | - | - | -   | - | - |  |
| Follow-up Hdwy       | 3      | 4.018        | 3.1 | 3      | 4.018 | 3.1  | 3      | - | - | 3   | - | - |  |
| Pot Cap-1 Maneuver   | 471    | 417          | 786 | 484    | 429   | 837  | 949    | - | - | 984 | - | - |  |
| Stage 1              | 789    | 646          | -   | 861    | 695   | -    | -      | - | - | -   | - | - |  |
| Stage 2              | 845    | 684          | -   | 796    | 654   | -    | -      | - | - | -   | - | - |  |
| Platoon blocked, %   |        |              |     |        |       |      |        | - | - |     | - | - |  |
| Mov Cap-1 Maneuver   | r 460  | 411          | 786 | 472    | 423   | 837  | 949    | - | - | 984 | - | - |  |
| Mov Cap-2 Maneuver   | 460    | 411          | -   | 472    | 423   | -    | -      | - | - | -   | - | - |  |
| Stage 1              | 786    | 639          | -   | 858    | 692   | -    | -      | - | - | -   | - | - |  |
| Stage 2              | 832    | 681          | -   | 776    | 647   | -    | -      | - | - | -   | - | - |  |
|                      |        |              |     |        |       |      |        |   |   |     |   |   |  |
| Annroach             | FR     |              |     | WR     |       |      | NR     |   |   | SB  |   |   |  |

| Approach             | EB   | WB   | NB  | SB  |  |
|----------------------|------|------|-----|-----|--|
| HCM Control Delay, s | 10.8 | 10.2 | 0.1 | 0.3 |  |
| HCM LOS              | В    | В    |     |     |  |
|                      |      |      |     |     |  |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1\ | WBLn1 | SBL   | SBT | SBR |
|-----------------------|-------|-----|-----|--------|-------|-------|-----|-----|
| Capacity (veh/h)      | 949   | -   | -   | 636    | 701   | 984   | -   | -   |
| HCM Lane V/C Ratio    | 0.004 | -   | -   | 0.026  | 0.019 | 0.009 | -   | -   |
| HCM Control Delay (s) | 8.8   | 0   | -   | 10.8   | 10.2  | 8.7   | 0   | -   |
| HCM Lane LOS          | Α     | Α   | -   | В      | В     | Α     | Α   | -   |
| HCM 95th %tile Q(veh) | 0     | -   | -   | 0.1    | 0.1   | 0     | -   | -   |

#### 11: PROPOSED RIRO DRIVEWAY & ROUTE 322 2023 PROJECTED CONDITIONS

Timing Plan: SAT Peak

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|                         | -     | •    | €    | ←        | 1    | ~    |
|-------------------------|-------|------|------|----------|------|------|
| Lane Group              | EBT   | EBR  | WBL  | WBT      | NBL  | NBR  |
| Lane Configurations     | ĵ.    |      |      | <b>†</b> |      | 7    |
| Traffic Volume (vph)    | 617   | 16   | 0    | 622      | 0    | 3    |
| Future Volume (vph)     | 617   | 16   | 0    | 622      | 0    | 3    |
| Ideal Flow (vphpl)      | 1800  | 1800 | 1800 | 1800     | 1800 | 1800 |
| Grade (%)               | -2%   |      |      | -1%      | 0%   |      |
| Link Speed (mph)        | 45    |      |      | 35       | 25   |      |
| Link Distance (ft)      | 297   |      |      | 166      | 205  |      |
| Travel Time (s)         | 4.5   |      |      | 3.2      | 5.6  |      |
| Peak Hour Factor        | 0.95  | 0.95 | 0.95 | 0.95     | 0.95 | 0.95 |
| Heavy Vehicles (%)      | 1%    | 2%   | 2%   | 1%       | 2%   | 2%   |
| Shared Lane Traffic (%) |       |      |      |          |      |      |
| Sign Control            | Free  |      |      | Free     | Stop |      |
| Intersection Summary    |       |      |      |          |      |      |
| Area Type:              | Other |      |      |          |      |      |

Control Type: Unsignalized

11: PROPOSED RIRO DRIVEWAY & ROUTE 322 2023 PROJECTED CONDITIONS

Timing Plan: SAT Peak

| Intersection  |   |   |                                 |                            |                                      |  |
|---|---|---|---------------------------------|----------------------------|--------------------------------------|--|
| Int Delay, s/veh  | 0   |   |                                 |                            |                                      |  |
|   | EDT                                       | EDD.  | WDI                             | MOT                        | NDI                                  | NDD  |
| Movement  | EBT                                       | EBR   | WBL                             | WBT                        | NBL                                  | NBR  |
| Lane Configurations   | Þ   |   |                                 | <b>^</b>                   |                                      | 7  |
| Traffic Vol, veh/h  | 617                                       | 16  | 0                               | 622                        | 0                                    | 3  |
| Future Vol, veh/h   | 617                                       | 16  | 0                               | 622                        | 0                                    | 3  |
| 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   | e, # 0                                    | -   | -                               | 0                          | 0                                    | -  |
| Grade, %  | -2  | -   | -                               | -1                         | 0                                    | -  |
| Peak Hour Factor  | 95  | 95  | 95                              | 95                         | 95                                   | 95   |
| Heavy Vehicles, %   | 1   | 2   | 2                               | 1                          | 2                                    | 2  |
| Mymt Flow   | 649                                       | 17  | 0                               | 655                        | 0                                    | 3  |
|   |   |   |                                 |                            |                                      |  |
|   |   |   |                                 |                            |                                      |  |
|   |   |   |                                 |                            |                                      |  |
|   | Major1                                    |   | Major2                          | ı                          | Minor1                               |  |
| Conflicting Flow All  | Major1<br>0                               | 0   | Major2<br>-                     | _ N                        | Minor1                               | 658  |
| Conflicting Flow All<br>Stage 1   |   |   |                                 |                            |                                      | 658  |
| Conflicting Flow All Stage 1 Stage 2  | 0   | 0   | -                               | -                          | -                                    | -  |
| Conflicting Flow All Stage 1 Stage 2 Critical Hdwy  | 0   | 0   | -                               | -                          | -                                    | 658<br>-<br>-<br>6.22                      |
| Conflicting Flow All Stage 1 Stage 2  | 0<br>-<br>-                               | 0<br>-<br>-   | -<br>-<br>-                     | -                          | -                                    | -  |
| Conflicting Flow All Stage 1 Stage 2 Critical Hdwy  | 0<br>-<br>-<br>-                          | 0<br>-<br>-<br>-                                    | -<br>-<br>-                     | -<br>-<br>-                | -<br>-<br>-                          | -  |
| Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1  | 0<br>-<br>-<br>-                          | 0<br>-<br>-<br>-                                    | -<br>-<br>-<br>-                | -                          | -<br>-<br>-<br>-                     | 6.22                                       |
| Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2  | 0<br>-<br>-<br>-<br>-                     | -<br>-<br>-<br>-                                    | -<br>-<br>-<br>-                |                            | -<br>-<br>-<br>-<br>-                | 6.22                                       |
| Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver  | 0<br>-<br>-<br>-<br>-<br>-                | 0<br>-<br>-<br>-<br>-<br>-                          | -<br>-<br>-<br>-<br>-           | -<br>-<br>-<br>-<br>-      | -<br>-<br>-<br>-<br>-                | 6.22                                       |
| Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy   | 0<br>-<br>-<br>-<br>-<br>-                | 0<br>-<br>-<br>-<br>-<br>-                          | -<br>-<br>-<br>-<br>-<br>-<br>0 | -<br>-<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>-<br>0      | 6.22<br>-<br>-<br>3.1<br>*626              |
| Conflicting Flow All<br>Stage 1<br>Stage 2<br>Critical Hdwy<br>Critical Hdwy Stg 1<br>Critical Hdwy Stg 2<br>Follow-up Hdwy<br>Pot Cap-1 Maneuver<br>Stage 1  | 0<br>-<br>-<br>-<br>-<br>-<br>-           | 0<br>-<br>-<br>-<br>-<br>-<br>-                     | -<br>-<br>-<br>-<br>-<br>0<br>0 | -                          | -<br>-<br>-<br>-<br>-<br>0<br>0      | 6.22<br>-<br>-<br>3.1<br>*626              |
| Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2 Platoon blocked, %   | 0<br>-<br>-<br>-<br>-<br>-<br>-           | 0<br>-<br>-<br>-<br>-<br>-<br>-<br>-                | -<br>-<br>-<br>-<br>-<br>0<br>0 | -                          | -<br>-<br>-<br>-<br>-<br>0<br>0      | 6.22<br>-<br>-<br>3.1<br>*626<br>-         |
| Conflicting Flow All<br>Stage 1<br>Stage 2<br>Critical Hdwy<br>Critical Hdwy Stg 1<br>Critical Hdwy Stg 2<br>Follow-up Hdwy<br>Pot Cap-1 Maneuver<br>Stage 1<br>Stage 2<br>Platoon blocked, %<br>Mov Cap-1 Maneuver | 0<br>-<br>-<br>-<br>-<br>-<br>-<br>-      | 0<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-           | -<br>-<br>-<br>-<br>-<br>0<br>0 | -                          | -<br>-<br>-<br>-<br>-<br>-<br>0<br>0 | 6.22<br>-<br>3.1<br>*626<br>-              |
| Conflicting Flow All Stage 1 Stage 2 Critical Hdwy Critical Hdwy Stg 1 Critical Hdwy Stg 2 Follow-up Hdwy Pot Cap-1 Maneuver Stage 1 Stage 2 Stage 2 Hatoon blocked, % Mov Cap-1 Maneuver Mov Cap-2 Maneuver        | 0<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | 0<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-      | -<br>-<br>-<br>-<br>-<br>0<br>0 |                            | -<br>-<br>-<br>-<br>-<br>0<br>0      | 6.22<br>-<br>3.1<br>*626<br>-              |
| Conflicting Flow All<br>Stage 1<br>Stage 2<br>Critical Hdwy<br>Critical Hdwy Stg 1<br>Critical Hdwy Stg 2<br>Follow-up Hdwy<br>Pot Cap-1 Maneuver<br>Stage 1<br>Stage 2<br>Platoon blocked, %<br>Mov Cap-1 Maneuver | 0<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | 0<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>0<br>0 | -                          | -<br>-<br>-<br>-<br>-<br>0<br>0      | 6.22<br>-<br>3.1<br>*626<br>-<br>1<br>*626 |

| HCM Control Delay, s  | 0     | 0   |     | 10.8 |  |
|-----------------------|-------|-----|-----|------|--|
| HCM LOS               |       |     |     | В    |  |
|                       |       |     |     |      |  |
| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBT  |  |
| Capacity (veh/h)      | 626   | -   | -   | -    |  |
| HCM Lane V/C Ratio    | 0.005 | -   | -   | -    |  |
| HCM Control Delay (s) | 10.8  | -   | -   | -    |  |
| HCM Lane LOS          | В     | -   | -   | -    |  |
| HCM 95th %tile Q(veh) | 0     | _   | _   | _    |  |

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

## 2023 PROJECTED CONDITIONS WITH SIGNALIZATION

|                                | -                | •        | •         | -          | 7       |      |
|--------------------------------|------------------|----------|-----------|------------|---------|------|
| ane Group                      | EBT              | EBR      | WBL       | WBT        | NBL     | NBR  |
| Configurations                 | <b>*</b>         | 7        | ሻ         | <b>†</b>   | 7       | 7    |
| ume (vph)                      | 831              | 670      | 301       | 362        | 15      | 181  |
| Volume (vph)                   | 831              | 670      | 301       | 362        | 15      | 181  |
| ow (vphpl)                     | 1800             | 1800     | 1800      | 1800       | 1800    | 1800 |
| Ith (ft)                       | 13               | 12       | 12        | 13         | 13      | 14   |
| 5)                             | -6%              |          |           | 7%         | -5%     |      |
| ength (ft)                     |                  | 0        | 250       |            | 0       | 0    |
| Lanes                          |                  | 1        | 1         |            | 1       | 1    |
| ngth (ft)                      |                  |          | 25        |            | 25      |      |
| rn on Red                      |                  | Yes      |           |            |         | Yes  |
| eed (mph)                      | 45               |          |           | 45         | 25      |      |
| ance (ft)                      | 353              |          |           | 551        | 313     |      |
| ime (s)                        | 5.3              |          |           | 8.3        | 8.5     |      |
| our Factor                     | 0.93             | 0.93     | 0.93      | 0.93       | 0.93    | 0.93 |
| Vehicles (%)                   | 5%               | 4%       | 2%        | 15%        | 0%      | 2%   |
| Lane Traffic (%)               |                  |          |           |            |         |      |
| е                              | NA               | Free     | pm+pt     | NA         | Prot    | Free |
| ted Phases                     | 2                |          | 1         | 6          | 8       |      |
| ed Phases                      |                  | Free     | 6         |            |         | Free |
| Phase                          | 2                |          | 1         | 6          | 8       |      |
| ase                            |                  |          |           |            |         |      |
| Initial (s)                    | 15.0             |          | 3.0       | 15.0       | 3.0     |      |
| Split (s)                      | 22.0             |          | 13.0      | 22.0       | 13.0    |      |
| (s)                            | 77.0             |          | 25.0      | 102.0      | 13.0    |      |
| (%)                            | 67.0%            |          | 21.7%     | 88.7%      | 11.3%   |      |
| ime (s)                        | 5.0              |          | 5.0       | 5.0        | 3.0     |      |
| ne (s)                         | 2.0              |          | 2.0       | 2.0        | 3.0     |      |
| Adjust (s)                     | -1.0             |          | -1.0      | -1.0       | -1.0    |      |
| t Time (s)                     | 6.0              |          | 6.0       | 6.0        | 5.0     |      |
| (.)                            | Lag              |          | Lead      |            |         |      |
| Optimize?                      | Yes              |          | Yes       |            |         |      |
| ode                            | C-Max            |          | None      | C-Max      | None    |      |
| ion Cummor:                    |                  |          |           |            |         |      |
| tion Summary                   | 0#               |          |           |            |         |      |
| )e:                            | Other            |          |           |            |         |      |
| ength: 115                     | 45               |          |           |            |         |      |
| Cycle Length: '3 (63%), Refere |                  | 2.EDT ~  | nd G-M/DT | 1 Ctort o  | f Croon |      |
| Cycle: 90                      | iced to pridse a | ∠.⊏D i ∂ | IIU O.WBI | L, Start 0 | Green   |      |
| ycie: 90<br>Type: Actuated-0   | `oordinated      |          |           |            |         |      |
| pe. Actuated-C                 | oordinated       |          |           |            |         |      |
| Dhacec 2.                      | EB ROUTE 30      | DVMDG    | & DOLLTE  | = 322      |         |      |
| u Priases. 5.                  | _D 1/O0 1E 30    | IVAIVIPO | a ROUTE   | _ 322      |         |      |
|                                | <b>→</b> Ø2      | (R)      |           |            |         |      |
|                                | 77 s             |          |           |            |         |      |
| ₹)                             |                  |          |           |            |         |      |
|                                |                  |          |           |            |         |      |

2023 PROJECTED CONDITIONS - WITH SIGNALIZATION 11/21/2017

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| : EB ROUTE 30 RAMPS & ROUTE 322               |  |
|---|--|
| 023 PROJECTED CONDITIONS - WITH SIGNALIZATION |  |

|                              | -        | •    | •    | •        | <b>~</b>  | <b>/</b> |   |     |      |  |
|------------------------------|----------|------|------|----------|-----------|----------|---|-----|------|--|
| Movement                     | EBT      | EBR  | WBL  | WBT      | NBL       | NBR      |   |     |      |  |
| Lane Configurations          | <b>†</b> | 7    |      | <b>†</b> | ች         | 7        |   |     |      |  |
| Traffic Volume (veh/h)       | 678      | 433  | 219  | 820      | 21        | 216      |   |     |      |  |
| Future Volume (veh/h)        | 678      | 433  | 219  | 820      | 21        | 216      |   |     |      |  |
| Number                       | 2        | 12   | 1    | 6        | 3         | 18       |   |     |      |  |
| Initial Q (Qb), veh          | 0        | 0    | 0    | 0        | 0         | 0        |   |     |      |  |
| Ped-Bike Adj(A pbT)          |          | 1.00 | 1.00 |          | 1.00      | 1.00     |   |     |      |  |
| Parking Bus, Adj             | 1.00     | 1.00 | 1.00 | 1.00     | 1.00      | 1.00     |   |     |      |  |
| Adj Sat Flow, veh/h/ln       | 1854     | 1818 | 1720 | 1789     | 1535      | 1863     |   |     |      |  |
| Adj Flow Rate, veh/h         | 753      | 0    | 243  | 911      | 23        | 0        |   |     |      |  |
| Adj No. of Lanes             | 1        | 1    | 1    | 1        | 1         | 1        |   |     |      |  |
| Peak Hour Factor             | 0.90     | 0.90 | 0.90 | 0.90     | 0.90      | 0.90     |   |     |      |  |
| Percent Heavy Veh, %         | 4        | 2    | 1    | 1        | 25        | 3        |   |     |      |  |
| Cap, veh/h                   | 1349     | 1124 | 545  | 1540     | 43        | 46       |   |     |      |  |
| Arrive On Green              | 0.73     | 0.00 | 0.15 | 1.00     | 0.03      | 0.00     |   |     |      |  |
| Sat Flow, veh/h              | 1854     | 1545 | 1638 | 1789     | 1462      | 1583     |   |     |      |  |
| Grp Volume(v), veh/h         | 753      | 0    | 243  | 911      | 23        | 0        |   |     |      |  |
| Grp Sat Flow(s), veh/h/ln    | 1854     | 1545 | 1638 | 1789     | 1462      | 1583     |   |     |      |  |
| Q Serve(q s), s              | 18.6     | 0.0  | 3.4  | 0.0      | 1.6       | 0.0      |   |     |      |  |
| Cycle Q Clear(g_c), s        | 18.6     | 0.0  | 3.4  | 0.0      | 1.6       | 0.0      |   |     |      |  |
| Prop In Lane                 | 10.0     | 1.00 | 1.00 | 0.0      | 1.00      | 1.00     |   |     |      |  |
| Lane Grp Cap(c), veh/h       | 1349     | 1124 | 545  | 1540     | 43        | 46       |   |     |      |  |
| V/C Ratio(X)                 | 0.56     | 0.00 | 0.45 | 0.59     | 0.54      | 0.00     |   |     |      |  |
| Avail Cap(c a), veh/h        | 1349     | 1124 | 655  | 1540     | 117       | 127      |   |     |      |  |
| HCM Platoon Ratio            | 1.00     | 1.00 | 2.00 | 2.00     | 1.00      | 1.00     |   |     |      |  |
| Upstream Filter(I)           | 1.00     | 0.00 | 0.65 | 0.65     | 1.00      | 0.00     |   |     |      |  |
| Uniform Delay (d), s/veh     | 6.2      | 0.0  | 4.8  | 0.0      | 47.9      | 0.0      |   |     |      |  |
| Incr Delay (d2), s/veh       | 1.7      | 0.0  | 0.4  | 1.1      | 10.2      | 0.0      |   |     |      |  |
| Initial Q Delay(d3),s/veh    | 0.0      | 0.0  | 0.0  | 0.0      | 0.0       | 0.0      |   |     |      |  |
| %ile BackOfQ(95%),veh/ln     | 15.2     | 0.0  | 3.6  | 0.8      | 1.3       | 0.0      |   |     |      |  |
| LnGrp Delay(d),s/veh         | 7.9      | 0.0  | 5.2  | 1.1      | 58.1      | 0.0      |   |     |      |  |
| LnGrp LOS                    | Α        | 0.0  | A    | A        | E         | 0.0      |   |     |      |  |
| Approach Vol, veh/h          | 753      |      | - ^  | 1154     | 23        |          |   |     |      |  |
| Approach Delay, s/veh        | 7.9      |      |      | 1.9      | 58.1      |          |   |     |      |  |
| Approach LOS                 | 7.9<br>A |      |      | 1.9<br>A | 50.1<br>E |          |   |     |      |  |
| ••                           |          |      |      |          |           |          |   |     |      |  |
| Timer                        | 1        | 2    | 3    | 4        | 5         | 6        | 7 | 8   |      |  |
| Assigned Phs                 | 1        | 2    |      |          |           | 6        |   | 8   |      |  |
| Phs Duration (G+Y+Rc), s     | 13.3     | 78.8 |      |          |           | 92.1     |   | 7.9 |      |  |
| Change Period (Y+Rc), s      | 7.0      | 7.0  |      |          |           | 7.0      |   | 6.0 |      |  |
| Max Green Setting (Gmax), s  | 13.0     | 60.0 |      |          |           | 80.0     |   | 7.0 |      |  |
| Max Q Clear Time (g_c+l1), s | 5.9      | 21.1 |      |          |           | 2.5      |   | 4.1 |      |  |
| Green Ext Time (p_c), s      | 0.4      | 3.2  |      |          |           | 4.4      |   | 0.0 |      |  |
| Intersection Summary         |          |      |      |          |           |          |   |     |      |  |
| HCM 2010 Ctrl Delay          |          |      | 4.9  |          |           |          |   |     | <br> |  |
| HCM 2010 LOS                 |          |      | Α    |          |           |          |   |     |      |  |

|  | -               | •        | •        | •          | 7         |      |
|--|-----------------|----------|----------|------------|-----------|------|
| Lane Group                                     | EBT             | EBR      | WBL      | WBT        | NBL       | NBR  |
| Lane Configurations                            | <b>*</b>        | 1        | ሻ        | <b></b>    | ሻ         | 7    |
| Traffic Volume (vph)                           | 678             | 433      | 219      | 820        | 21        | 216  |
| Future Volume (vph)                            | 678             | 433      | 219      | 820        | 21        | 216  |
| Ideal Flow (vphpl)                             | 1800            | 1800     | 1800     | 1800       | 1800      | 1800 |
| Lane Width (ft)                                | 13              | 12       | 12       | 13         | 13        | 14   |
| Grade (%)                                      | -6%             |          |          | 7%         | -5%       |      |
| Storage Length (ft)                            |                 | 0        | 250      |            | 0         | 0    |
| Storage Lanes                                  |                 | 1        | 1        |            | 1         | 1    |
| Taper Length (ft)                              |                 |          | 25       |            | 25        |      |
| Right Turn on Red                              |                 | Yes      |          |            |           | Yes  |
| Link Speed (mph)                               | 45              |          |          | 45         | 25        |      |
| Link Distance (ft)                             | 353             |          |          | 551        | 313       |      |
| Travel Time (s)                                | 5.3             |          |          | 8.3        | 8.5       |      |
| Peak Hour Factor                               | 0.90            | 0.90     | 0.90     | 0.90       | 0.90      | 0.90 |
| Heavy Vehicles (%)                             | 4%              | 2%       | 1%       | 1%         | 25%       | 3%   |
| Shared Lane Traffic (%)                        |                 |          |          |            |           |      |
| Turn Type                                      | NA              | Free     | pm+pt    | NA         | Prot      | Free |
| Protected Phases                               | 2               |          | 1        | 6          | 8         |      |
| Permitted Phases                               |                 | Free     | 6        |            |           | Free |
| Detector Phase                                 | 2               |          | 1        | 6          | 8         |      |
| Switch Phase                                   |                 |          |          |            |           |      |
| Minimum Initial (s)                            | 15.0            |          | 3.0      | 15.0       | 3.0       |      |
| Minimum Split (s)                              | 22.0            |          | 13.0     | 22.0       | 13.0      |      |
| Total Split (s)                                | 67.0            |          | 20.0     | 87.0       | 13.0      |      |
| Total Split (%)                                | 67.0%           |          | 20.0%    | 87.0%      | 13.0%     |      |
| Yellow Time (s)                                | 5.0             |          | 5.0      | 5.0        | 3.0       |      |
| All-Red Time (s)                               | 2.0             |          | 2.0      | 2.0        | 3.0       |      |
| Lost Time Adjust (s)                           | -1.0            |          | -1.0     | -1.0       | -1.0      |      |
| Total Lost Time (s)                            | 6.0             |          | 6.0      | 6.0        | 5.0       |      |
| Lead/Lag                                       | Lag             |          | Lead     |            |           |      |
| Lead-Lag Optimize?                             | Yes             |          | Yes      |            |           |      |
| Recall Mode                                    | C-Max           |          | None     | C-Max      | None      |      |
|  |                 |          |          |            |           |      |
| Intersection Summary                           | Other           |          |          |            |           |      |
| Area Type:                                     | Otner           |          |          |            |           |      |
| Cycle Length: 100 Actuated Cycle Length: 1     | 00              |          |          |            |           |      |
|  |                 | DT and   | CAMDTI   | Chart of C | · · · · · |      |
| Offset: 8 (8%), Reference<br>Natural Cycle: 60 | to phase 2.t    | ED I and | O.VVDIL, | Start or C | oreen     |      |
|  | a a relinate of |          |          |            |           |      |
| Control Type: Actuated-C                       | oordinated      |          |          |            |           |      |
| Splits and Phases: 3: E                        | B ROUTE 30      | RAMPS    | & ROUT   | F 322      |           |      |
|  |                 |          | w 11001  | _ 044      |           |      |
| ÿ1   | → Ø2 (R         | 1)       |          |            |           |      |

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| 2023 PROJECTE               | D CONL    | ITION   | 3 - 111  | 111 31     | SINALI  | ZATIOI | \\ Ilming Plan: SAT Pea |
|-----------------------------|-----------|---------|----------|------------|---------|--------|-------------------------|
|                             | -         | •       | •        | •          | 4       | 1      |                         |
| Lane Group                  | EBT       | EBR     | WBL      | WBT        | NBL     | NBR    |                         |
| Lane Configurations         | <b>†</b>  | 7       | *        | <b>†</b>   | ች       | 7      |                         |
| Traffic Volume (vph)        | 657       | 607     | 263      | 523        | 29      | 190    |                         |
| Future Volume (vph)         | 657       | 607     | 263      | 523        | 29      | 190    |                         |
| Ideal Flow (vphpl)          | 1800      | 1800    | 1800     | 1800       | 1800    | 1800   |                         |
| Lane Width (ft)             | 13        | 12      | 12       | 13         | 13      | 14     |                         |
| Grade (%)                   | -6%       |         |          | 7%         | -5%     |        |                         |
| Storage Length (ft)         |           | 0       | 250      |            | 0       | 0      |                         |
| Storage Lanes               |           | 1       | 1        |            | 1       | 1      |                         |
| Taper Length (ft)           |           |         | 25       |            | 25      |        |                         |
| Right Turn on Red           |           | Yes     |          |            |         | Yes    |                         |
| Link Speed (mph)            | 45        |         |          | 45         | 25      |        |                         |
| Link Distance (ft)          | 353       |         |          | 551        | 313     |        |                         |
| Travel Time (s)             | 5.3       |         |          | 8.3        | 8.5     |        |                         |
| Peak Hour Factor            | 0.96      | 0.96    | 0.96     | 0.96       | 0.96    | 0.96   |                         |
| Heavy Vehicles (%)          | 1%        | 2%      | 2%       | 1%         | 0%      | 1%     |                         |
| Shared Lane Traffic (%)     |           |         |          |            |         |        |                         |
| Turn Type                   | NA        | Perm    | pm+pt    | NA         | Prot    | Perm   |                         |
| Protected Phases            | 2         |         | 1        | 6          | 8       |        |                         |
| Permitted Phases            |           | 2       | 6        |            |         | 8      |                         |
| Detector Phase              | 2         | 2       | 1        | 6          | 8       | 8      |                         |
| Switch Phase                |           |         |          |            |         |        |                         |
| Minimum Initial (s)         | 15.0      | 15.0    | 3.0      | 15.0       | 3.0     | 3.0    |                         |
| Minimum Split (s)           | 22.0      | 22.0    | 13.0     | 22.0       | 13.0    | 13.0   |                         |
| Total Split (s)             | 44.0      | 44.0    | 18.0     | 62.0       | 13.0    | 13.0   |                         |
| Total Split (%)             | 58.7%     | 58.7%   | 24.0%    | 82.7%      | 17.3%   | 17.3%  |                         |
| Yellow Time (s)             | 5.0       | 5.0     | 5.0      | 5.0        | 3.0     | 3.0    |                         |
| All-Red Time (s)            | 2.0       | 2.0     | 2.0      | 2.0        | 3.0     | 3.0    |                         |
| Lost Time Adjust (s)        | -1.0      | -1.0    | -1.0     | -1.0       | -1.0    | -1.0   |                         |
| Total Lost Time (s)         | 6.0       | 6.0     | 6.0      | 6.0        | 5.0     | 5.0    |                         |
| Lead/Lag                    | Lag       | Lag     | Lead     |            |         |        |                         |
| Lead-Lag Optimize?          | Yes       | Yes     | Yes      |            |         |        |                         |
| Recall Mode                 | C-Max     | C-Max   | None     | C-Max      | None    | None   |                         |
| Intersection Summary        |           |         |          |            |         |        |                         |
| Area Type:                  | Other     |         |          |            |         |        |                         |
| Cycle Length: 75            |           |         |          |            |         |        |                         |
| Actuated Cycle Length: 75   | i         |         |          |            |         |        |                         |
| Offset: 33 (44%), Reference |           | 2:EBT a | nd 6:WB1 | L, Start c | f Green |        |                         |
| Natural Cycle: 60           |           |         |          |            |         |        |                         |
| Control Type: Actuated-Co   | ordinated |         |          |            |         |        |                         |

| Splits and Phases: | 3: EB ROUTE 30 RAMPS & ROUTE 322 |             |
|--------------------|----------------------------------|-------------|
| ÿ1                 | <b>▼</b>                         |             |
| 18 s               | 44 s                             |             |
| ₩ Ø6 (R)           | •                                | <b>√</b> Ø8 |
| 62 s               |                                  | 13 s        |

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| Traffic Volume (veh/h)         657         607         263         523         29         190           uture Volume (veh/h)         657         607         263         523         29         190           uture Volume (veh/h)         657         607         263         523         29         190           uture Volume (veh/h)         657         607         263         523         29         190           uture (Veh/h)         0         0         0         0         0         0           veh/h         1         1.00         1.00         1.00         1.00         1.00           veh/g Sat Flow, veh/h         1909         1818         1703         1789         1919         1900           vdj No of Lanes         1         2         2  |
|---|
| Traffic Volume (veh/h)         657         607         263         523         29         190           Future Volume (veh/h)         657         607         263         523         29         190           Number         2         12         1         6         3         18           Initial Q (Qb), veh         0         0         0         0         0         0           Ped-Bike Adj(A_pbT)         1.00         1.00         1.00         1.00         1.00         1.00           Adj Sat Flow, yehh/ln         1909         1818         1703         1789         1919         1900           Adj No. of Lanes         1         2 </th   |
| Traffic Volume (veh/h)         657         607         263         523         29         190           Future Volume (veh/h)         657         607         263         523         29         190           Number         2         12         1         6         3         18           Initial Q (Qb), veh         0         0         0         0         0         0           Ped-Bike Adj(A, pbT)         1.00         1.00         1.00         1.00         1.00         1.00           Adj Sta Flow, veh/h         1909         1818         1703         1789         1919         1900           Adj No. of Lanes         1         2   |
| Number  |
| Initial Q (Qb), veh 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   |
| Ped-Bike Adj(A pbT)         1.00 </td |
| Parking Bus, Adj         1.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.96         |
| Adj Sat Flow, veh/h/ln         1909         1818         1703         1789         1919         1900           Adj Flow Rate, veh/h         684         0         274         545         30         0           Adj No. of Lanes         1   |
| Adj Flow Rate, veh/h         684         0         274         545         30         0           Adj No. of Lanes         1  |
| Adj No. of Lanes         1         Percent Heavy Long         0.96         0.97         0.97         1.20         1.90         1.90         1.90         1.90         1.90         1.90         1.90   |
| Peak Hour Factor         0.96         |
| Percent Heavy Veh, % 1 2 2 1 1 0 1 Cap, veh/h 1211 980 559 1461 66 59 Arrive On Green 0.63 0.00 0.21 1.00 0.04 0.00 Sat Flow, veh/h 1909 1545 1622 1789 1827 1615 Grp Volume(v), veh/h 684 0 274 545 30 0 Grp Sat Flow(s), veh/h/ln 1909 1545 1622 1789 1827 1615 Q Serve(g_s), s 15.3 0.0 3.9 0.0 1.2 0.0 Cycle Q Clear(g_c), s 15.3 0.0 3.9 0.0 1.2 0.0 Prop In Lane 1.00 1.00 1.00 1.00 Lane Grp Cap(c), veh/h 1211 980 559 1461 66 59 V/UC Ratio(X) 0.56 0.00 0.49 0.37 0.45 0.00 Avail Cap(c_a), veh/h 1211 980 652 1461 195 172 HCM Platon Ratio 1.00 1.00 1.00 1.00  |
| Cap, veh/h         1211         980         559         1461         66         59           Arrive On Green         0.63         0.00         0.21         1.00         0.04         0.00           Sat Flow, veh/h         1909         1545         1622         1789         1827         1615           Grp Volume(v), veh/h         684         0         274         545         30         0           Grp Sat Flow(s), veh/h/ln         1909         1545         1622         1789         1827         1615           Q Serve(g. s), s         15.3         0.0         3.9         0.0         1.2         0.0           Cycle Q Clear(g.c), s         15.3         0.0         3.9         0.0         1.2         0.0           Prop In Lane         1.00         1.00         1.00         1.00         1.00           Lane Grp Cap(c), veh/h         1211         980         559         1461         66         59           V/C Ratio(X)         0.56         0.00         0.49         0.37         0.45         0.00           Avail Cap(c_a), veh/h         1211         980         652         1461         195         172           HCM Platoon Ratio <td< td=""></td<>   |
| Arrive On Green         0.63         0.00         0.21         1.00         0.04         0.00           Sat Flow, veh/h         1909         1545         1622         1789         1827         1615           Grp Vollume(v), veh/h/h         684         0         274         545         30         0           Grp Sat Flow(s), veh/h/ln         1909         1545         1622         1789         1827         1615           Q Serve(g_s), s         15.3         0.0         3.9         0.0         1.2         0.0           Cycle Q Clear(g_c), s         15.3         0.0         3.9         0.0         1.2         0.0           Prop In Lane         1.00         1.00         1.00         1.00         1.00           Lane Grp Cap(c), veh/h         1211         980         559         1461         66         59           V/C Ratio(X)         0.56         0.00         0.49         0.37         0.45         0.00           Avail Cap(c_a), veh/h         1211         980         652         1461         195         172           HCM Platoon Ratio         1.00         1.00         2.00         1.00         1.00   |
| Sat Flow, veh/h         1909         1545         1622         1789         1827         1615           Grp Volume(v), veh/h         684         0         274         545         30         0           Grp Sat Flow(s), veh/h/ln         1909         1545         1622         1789         1827         1615           Q Serve(g_s), s         15.3         0.0         3.9         0.0         1.2         0.0           Cycle Q Clear(g_c), s         15.3         0.0         3.9         0.0         1.2         0.0           Prop In Lane         1.00         1.00         1.00         1.00         1.00           Lane Grp Cap(c), veh/h         1211         980         559         1461         66         59           V/C Ratio(X)         0.56         0.00         0.49         0.37         0.45         0.00           Avail Cap(c_a), veh/h         1211         980         652         1461         195         172           HCM Platoon Ratio         1.00         1.00         2.00         1.00         1.00  |
| Grp Volume(v), veh/h         684         0         274         545         30         0           Grp Sat Flow(s), veh/h/ln         1909         1545         1622         1789         1827         1615           Q Serve(g_s), s         15.3         0.0         3.9         0.0         1.2         0.0           Cycle Q Clear(g_c), s         15.3         0.0         3.9         0.0         1.2         0.0           Prop In Lane         1.00         1.00         1.00         1.00         1.00           Lane Grp Cap(c), veh/h         1211         980         559         1461         66         59           V/C Ratio(X)         0.56         0.00         0.49         0.37         0.45         0.00           Avail Cap(c_a), veh/h         1211         980         652         1461         195         172           HCM Platoon Ratio         1.00         1.00         2.00         1.00         1.00  |
| Grp Sal Flow(s), veh/h/ln         1909         1545         1622         1789         1827         1615           Q Serve(g, s), s         15.3         0.0         3.9         0.0         1.2         0.0           Cycle Q Clear(g, c), s         15.3         0.0         3.9         0.0         1.2         0.0           Prop In Lane         1.00         1.00         1.00         1.00         1.00           Lane Grp Cap(c), veh/h         1211         980         559         1461         66         59           V/C Ratio(X)         0.56         0.00         0.49         0.37         0.45         0.00           V/C Ratio(X)         0.56         0.652         1461         195         172           HCM Platoon Ratio         1.00         1.00         2.00         2.00         1.00         1.00  |
| Q Serve(g_s), s     15.3     0.0     3.9     0.0     1.2     0.0       Cycle Q Clear(g_c), s     15.3     0.0     3.9     0.0     1.2     0.0       Prop In Lane     1.00     1.00     1.00     1.00     1.00       Lane Grp Cap(c), veh/h     1211     980     559     1461     66     59       V/C Ratio(X)     0.56     0.00     0.49     0.37     0.45     0.00       Avail Cap(c_a), veh/h     1211     980     652     1461     195     172       HCM Platoon Ratio     1.00     1.00     2.00     2.00     1.00     1.00   |
| Oycle Q Clear(g_c), s         15.3         0.0         3.9         0.0         1.2         0.0           Prop In Lane         1.00         1.00         1.00         1.00         1.00           Lane Grp Cap(c), veh/h         1211         980         559         1461         66         59           V/C Ratio(X)         0.56         0.00         0.49         0.37         0.45         0.00           Avail Cap(c_a), veh/h         1211         980         652         1461         195         172           HCM Platoon Ratio         1.00         1.00         2.00         2.00         1.00         1.00  |
| Prop In Lane         1.00         1.00         1.00         1.00         1.00           Lane Grp Cap(c), veh/h         1211         980         559         1461         66         59           V/C Ratio(X)         0.56         0.00         0.49         0.37         0.45         0.00           Avail Cap(c_a), veh/h         1211         980         652         1461         195         172           HCM Platoon Ratio         1.00         1.00         2.00         2.00         1.00         1.00   |
| Lane Grp Cap(c), veh/h     1211     980     559     1461     66     59       V/C Ratio(X)     0.56     0.00     0.49     0.37     0.45     0.00       Avail Cap(c_a), veh/h     1211     980     652     1461     195     172       HCM Platoon Ratio     1.00     1.00     2.00     2.00     1.00     1.00   |
| V/C Ratio(X) 0.56 0.00 0.49 0.37 0.45 0.00  Avail Cap(c_a), veh/h 1211 980 652 1461 195 172  HCM Platoon Ratio 1.00 1.00 2.00 2.00 1.00 1.00  |
| Avail Cap(c_a), veh/h 1211 980 652 1461 195 172<br>HCM Platoon Ratio 1.00 1.00 2.00 2.00 1.00 1.00  |
| HCM Platoon Ratio 1.00 1.00 2.00 2.00 1.00 1.00   |
|   |
|   |
| Upstream Filter(I) 1.00 0.00 0.85 0.85 1.00 0.00  |
| Uniform Delay (d), s/veh 7.8 0.0 5.0 0.0 35.4 0.0   |
| Incr Delay (d2), s/veh 1.9 0.0 0.6 0.6 4.7 0.0  |
| Initial Q Delay(d3),s/veh 0.0 0.0 0.0 0.0 0.0 0.0   |
| %ile BackOfQ(95%),veh/ln 13.4 0.0 3.4 0.5 1.3 0.0   |
| LnGrp Delay(d),s/veh 9.7 0.0 5.6 0.6 40.1 0.0   |
| LnGrp LOS A A A D   |
| Approach Vol, veh/h 684 819 30  |
| Approach Delay, s/veh 9.7 2.3 40.1  |
| Approach LOS A A D  |
| Timer 1 2 3 4 5 6 7 8   |
| Assigned Phs 1 2 6 8  |
| Phs Duration (G+Y+Rc), s 13.7 53.6 67.3 7.7   |
| Change Period (Y+Rc), s 7.0 7.0 7.0 6.0   |
| Max Green Setting (Gmax), s 11.0 37.0 55.0 7.0  |
| Max Q Clear Time (g_c+l1), s 6.4 17.8 2.5 3.7   |
| Green Ext Time (p_c), s 0.3 4.1 3.5 0.0   |
| Intersection Summary  |
| HCM 2010 Ctrl Delay 6.3   |
| HCM 2010 LOS A  |
| Notes   |

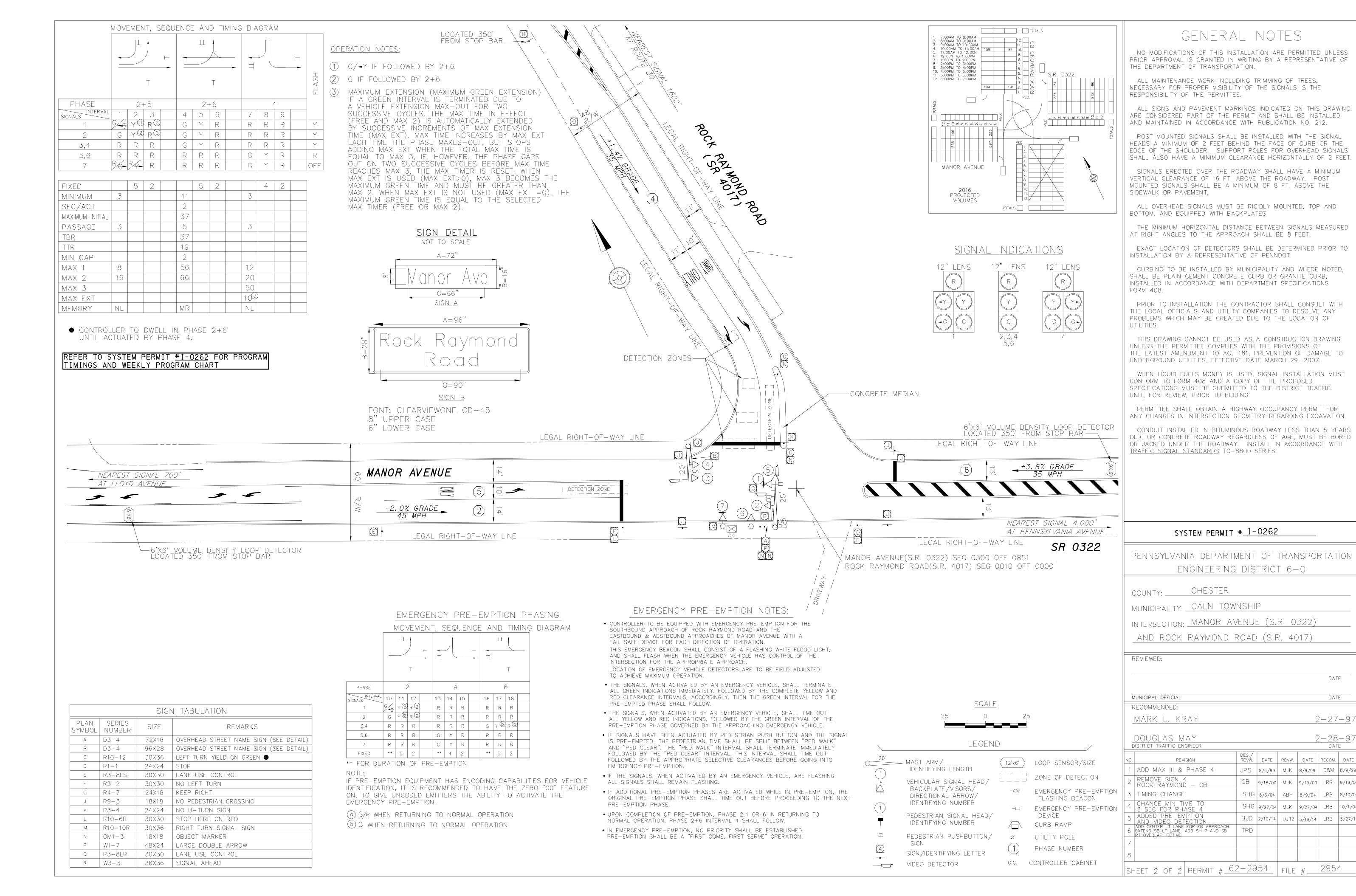
2023 PROJECTED CONDITIONS - WITH SIGNALIZATION 11/21/2017 MB

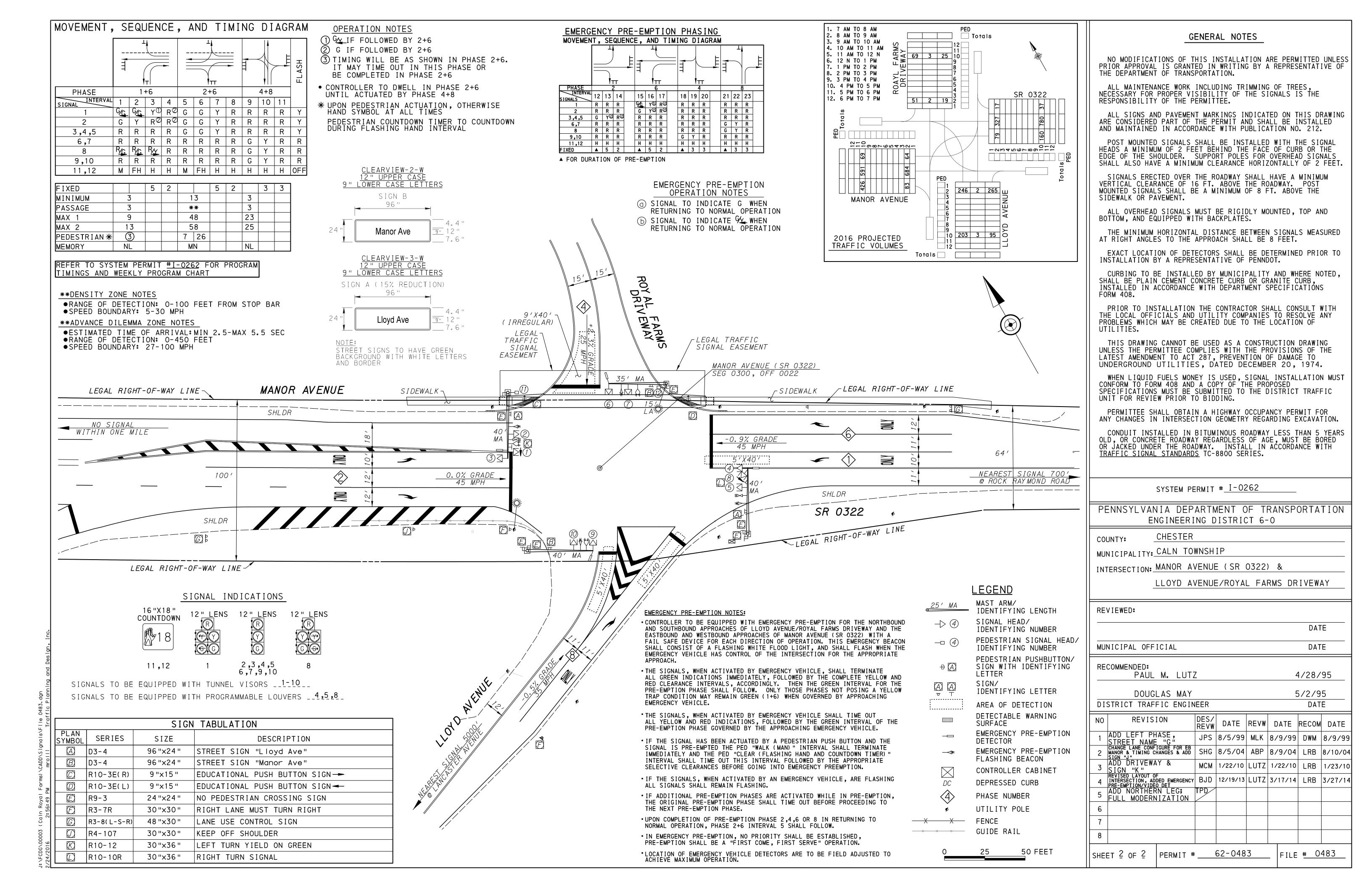
3: EB ROUTE 30 RAMPS & ROUTE 322

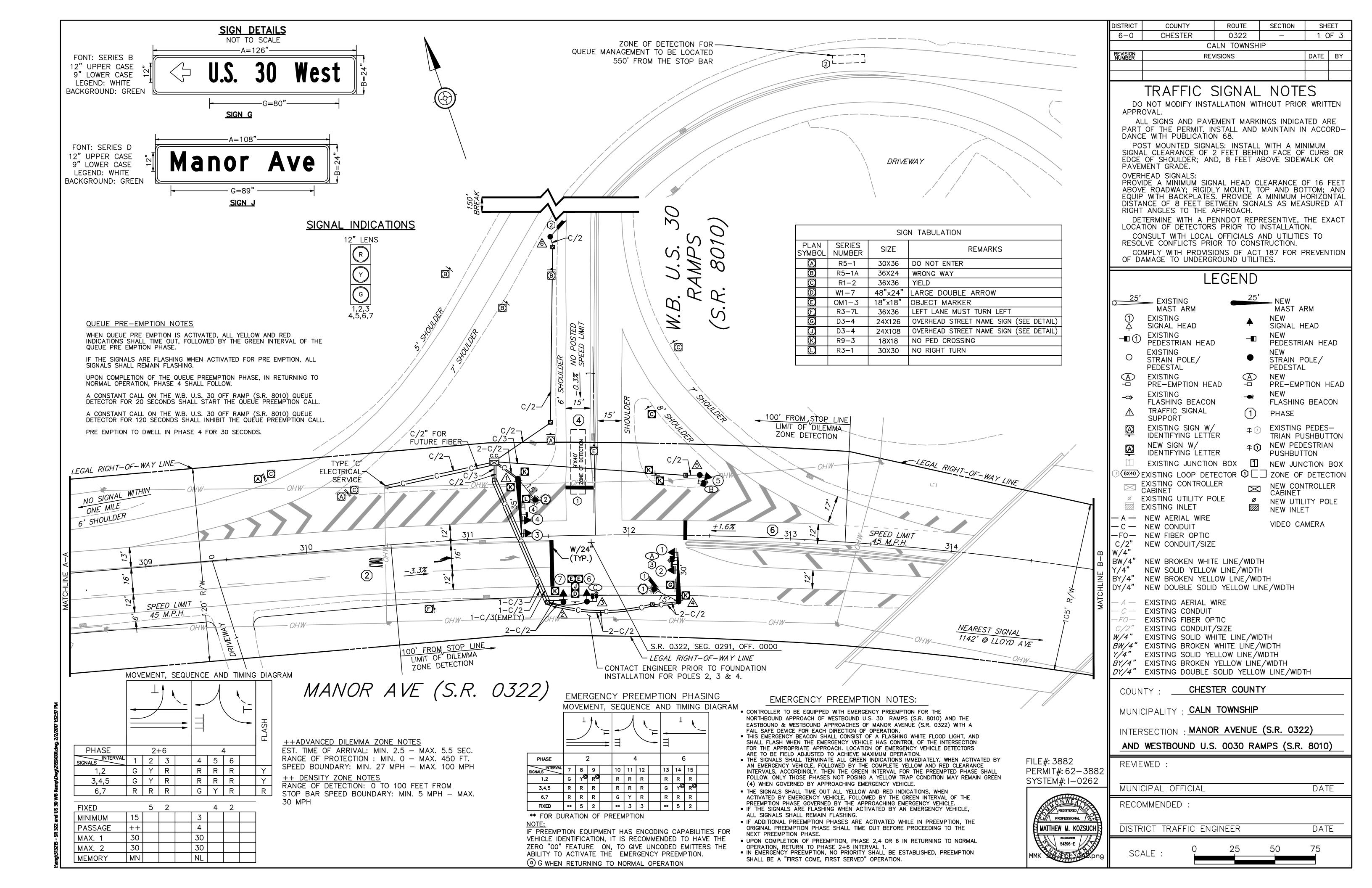
2023 PROJECTED CONDITIONS - WITH SIGNALIZATION

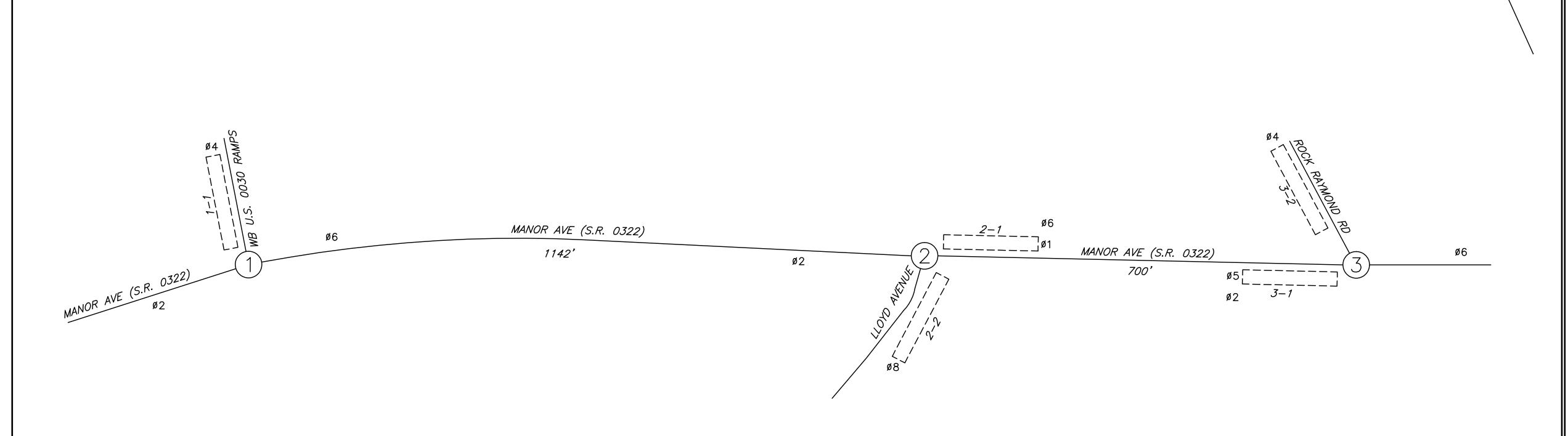
Synchro 10 Report Page 2

# APPENDIX L PENNDOT SIGNAL DIAGRAMS









#### TIME OF DAY SYSTEM CYCLE/SPLIT/OFFSET

| Program 1                            | File # |    |    |   | Pł | nase |    |   |    | Cycle | Offset # 1 |
|--------------------------------------|--------|----|----|---|----|------|----|---|----|-------|------------|
| Intersections                        |        | 1  | 2  | 3 | 4  | 5    | 6  | 7 | 8  |       |            |
| 1 MANOR AVE AND W.B. U.S. 0030 RAMPS | 3882   |    | 94 |   | 21 |      | 94 |   |    | 115   | 76         |
| 2 MANOR AVE AND LLOYD AVE            | 2954   | 12 | 67 |   |    |      | 79 |   | 36 | 115   | 113        |
| 3 MANOR AVE AND ROCK RAYMOND RD      | 0483   |    | 86 |   | 29 | 42   | 44 |   |    | 115   | 112        |
| 4                                    |        |    |    |   |    |      |    |   |    |       |            |
| 5                                    |        |    |    |   |    |      |    |   |    |       |            |
| 6                                    |        |    |    |   |    |      |    |   |    |       |            |
| Program 2                            | File # |    |    |   | Pł | nase |    |   |    | Cycle | Offset # 1 |
| Intersections                        |        | 1  | 2  | 3 | 4  | 5    | 6  | 7 | 8  |       |            |
| 1 MANOR AVE AND W.B. U.S. 0030 RAMPS | 3882   |    | 54 |   | 21 |      | 54 |   |    | 75    | 17         |
| 2 MANOR AVE AND LLOYD AVE            | 2954   | 13 | 39 |   |    |      | 52 |   | 23 | 75    | 48         |
| 3 MANOR AVE AND ROCK RAYMOND RD      | 0483   |    | 53 |   | 22 | 14   | 39 |   |    | 75    | 8          |
| 4                                    |        |    |    |   |    |      |    |   |    |       |            |
| 5                                    |        |    |    |   |    |      |    |   |    |       |            |
| 6                                    |        |    |    |   |    |      |    |   |    |       |            |
| Program 3                            | File # |    |    |   | Pł | nase |    |   |    | Cycle | Offset # 1 |
| Intersections                        |        | 1  | 2  | 3 | 4  | 5    | 6  | 7 | 8  |       |            |
| 1 MANOR AVE AND W.B. U.S. 0030 RAMPS | 3882   |    | 79 |   | 21 |      | 79 |   |    | 100   | 40         |
| 2 MANOR AVE AND LLOYD AVE            | 0483   | 18 | 51 |   |    |      | 69 |   | 31 | 100   | 76         |
| 3 MANOR AVE AND ROCK RAYMOND RD      | 2954   |    | 63 |   | 37 | 16   | 47 |   |    | 100   | 10         |
| 4                                    |        |    |    |   |    |      |    |   |    |       |            |
| 5                                    |        |    |    |   |    |      |    |   |    |       |            |
| 6                                    |        |    |    |   |    |      |    |   |    |       |            |
| Program 4                            | File # |    |    |   | Pł | nase |    |   |    | Cycle | Offset # 1 |
| Intersections                        |        | 1  | 2  | 3 | 4  | 5    | 6  | 7 | 8  |       |            |
| 1 MANOR AVE AND W.B. U.S. 0030 RAMPS | 3882   |    | 51 |   | 49 |      | 51 |   |    | 100   | 97         |
| 2 MANOR AVE AND LLOYD AVE            | 0483   | 14 | 51 |   |    |      | 69 |   | 31 | 100   | 14         |
| 3 MANOR AVE AND ROCK RAYMOND RD      | 2954   |    | 79 |   | 21 | 16   | 63 |   |    | 100   | 13         |
| 4                                    |        |    |    |   |    |      |    |   |    |       |            |
| 5                                    |        |    |    |   |    |      |    |   |    |       |            |
| 6                                    |        |    |    |   |    |      |    |   |    |       |            |

NOTE: DWELL IN CALN TOWNSHIP DEVELOPMENT TO INSTALL FIBER OPTIC INTERCONNECT.

|       | WEEKLY PROGRAM CHART |             |       |         |           |  |  |  |  |  |  |  |
|-------|----------------------|-------------|-------|---------|-----------|--|--|--|--|--|--|--|
| EVENT | DAY                  | TIME        | CYCLE | PROGRAM | REMARKS   |  |  |  |  |  |  |  |
| 1     | 1-5                  | 06:00       | 115   | 1       | AM PEAK   |  |  |  |  |  |  |  |
| 2     | 1-5                  | 09:00       | 75    | 2       | OFF PEAK  |  |  |  |  |  |  |  |
| 3     | 1-5                  | 14:45-15:15 | 100   | 3       | PM SCHOOL |  |  |  |  |  |  |  |
| 4     | 1-5                  | 15:15       | 100   | 4       | PM PEAK   |  |  |  |  |  |  |  |
| 5     | 1-5                  | 19:00       | FREE  | MAX 2   | FREE      |  |  |  |  |  |  |  |
| 6     | 6-7                  | 9:00        | 75    | 2       | WEEKEND   |  |  |  |  |  |  |  |
| 7     | 6-7                  | 18:00       | FREE  | MAX 2   | FREE      |  |  |  |  |  |  |  |

MONDAY = DAY 1OFFSET IN SECONDS OFFSET REFERENCE TO START OF GREEN ON MANOR AVENUE

LEGEND

ø2 PHASE

APPROACH LANES

LOOP SENSOR/IDENTIFYING NUMBER

ZONE OF DETECTION/IDENTIFYING NUMBER

CONTROLLER CABINET

SIGNAL IDENTIFICATION NUMBER

MATTHEW M. KOZSUCH ENGINEER 54396-E

### GENERAL NOTES

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

REFER TO TRAFFIC SIGNAL PERMIT DRAWING FOR INDIVIDUAL INTERSECTION OPERATION, GEOMETRY, PHASING AND CRITICAL TIMES.

FOR CONSTRUCTION AND INSPECTION THE SYSTEM PERMIT SHOULD ALWAYS BE ACCOMPANIED WITH TRAFFIC SIGNAL PERMIT DRAWING.

TEST THE SYSTEM AT LOCAL INTERSECTION LEVEL, SUBSYSTEM LEVEL MASTER CONTROLLER LEVEL AND PERSONAL COMPUTER REMOTE

GATHER THE SYSTEM FAILURE CRITICAL ALARMS REPORT AND ARCHIVE THEM WHERE APPLICABLE.

DIAL UP LEVEL.

SET UP PENNDOT DISTRICT 6-0 COMPUTER WITH THE SYSTEM DATABASE AND GRAPHICS. MODIFY THE DATABASE AND GRAPHICS FOR SYSTEMS REVISIONS.

ASSIGN LOOP DETECTORS AND PROGRAM THE CONTROLLERS TO GATHER TRAFFIC VOLUMES IN 15 MINUTE INTERVAL, WHERE APPLICABLE.

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

OBTAIN POLE ATTACHMENT PERMIT FOR AERIAL FIBER OPTIC

INSTALLATION. MAINTAIN MASTER CONTROLLER COMMUNICATION SUCH AS PHONE

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

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

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

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

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

#### SYSTEM PERMIT PLAN

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION ENGINEERING DISTRICT 6-0

<u>CHESTER</u> COUNTY: \_\_\_ MUNICIPALITY: CALN TOWNSHIP INTERSECTION: MANOR AVENUE (S.R. 0322) TRAFFIC SIGNAL SYSTEM REVIEWED:

DATE MUNICIPAL OFFICIAL DATE RECOMMENDED:

DISTRICT TRAFFIC ENGINEER

DES./ REVW. DATE REVW. DATE RECOM. DATE PERMIT # I-0262 SHEET 1 OF 1

### **APPENDIX M**

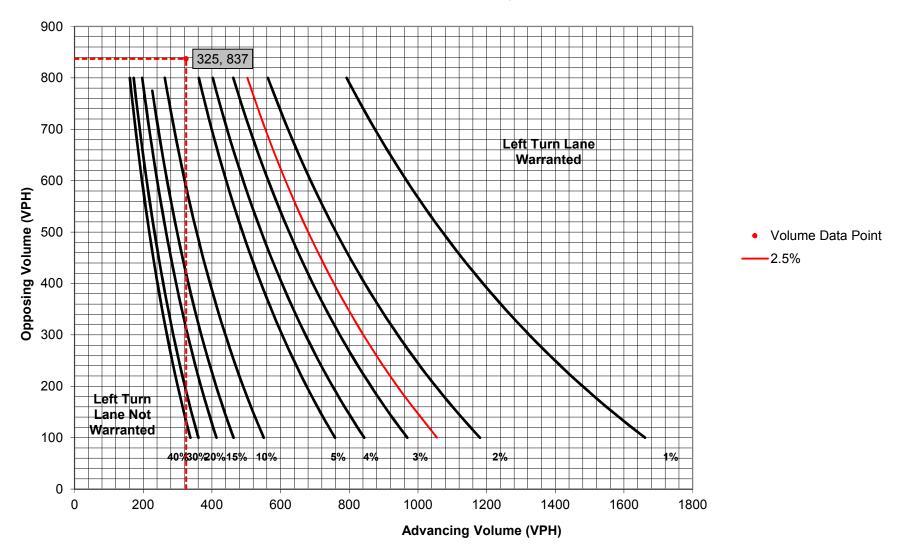
#### **AUXILIARY LANE WARRANT ANALYSIS**

|                            |  | 310                            | JDY LOC             | ATION AN                    | ID ANALT  |   |   |                |                              |
|----------------------------|--|--------------------------------|---------------------|-----------------------------|---|---|---|----------------|------------------------------|
|                            | Ми   | nicipality:                    | Caln To             | ownship                     |   | Analysis Dat  | te:   | 10/30/2        | 018                          |
|                            |  | County:                        |                     | r County                    |   | Conducted E   |   | MB             | 010                          |
| PennDOT                    | Engineering  | -                              |                     | 6                           |   | Checked E   |   |                |                              |
|                            |  |                                |                     |                             | Ag  | gency/Company Nam   | ne:   | TPD            |                              |
| Intersection & A           | pproach De   | scription: Man                 | or Avenue 8         | k Rock Raymo                | nd Road/Prop  | osed Driveway   |   |                |                              |
|                            | Analys   | sis Period: 2                  | 023 Projecto        | ed Conditions               |   | Number of A   | Approach Lane   |                | 1                            |
|                            |  | sign Hour:                     |                     | Peak                        |   | Undivided or Di   | ivided Highwa   | y: l           | Jndivided                    |
|                            | Intersection   |                                |                     | alized                      |   |   |   |                |                              |
| Poste                      | d Speed Lim<br>Type o                                | of Terrain:                    |                     | vel                         |   | Left or Right-Turn  | Lane Analysis   |                | e of Analysis<br>t Turn Lane |
|                            |  |                                |                     | VOLUME                      | CALCULA   | ATIONS  |   |                |                              |
|                            |  |                                | Le                  | eft Turn Lan                | e Volume C  | alculations   |   |                |                              |
| Moveme                     | nt   | Include?                       | Volume              | % Trucks                    | PCEV  |   |   |                |                              |
|                            | Left   | Yes                            | 7                   | 2.0%                        | 8   |   | Advanci   | ing Volum      | e: 325                       |
| Advancing                  | Through  | -                              | 194                 | 6.0%                        | 200   |   | •   | ing Volum      |                              |
|                            | Right  | Yes                            | 106                 | 20.0%                       | 117   |   | Left Tu   | ırn Volum      | e: 8                         |
| Onnesias                   | Left   | No                             | 305                 | 2.0%                        | N/A   |   |   |                |                              |
| Opposing                   | Through<br>Right                                     | Yes                            | 792<br>16           | 7.0%<br>2.0%                | 820<br>17   | % Left Tu   | rns in Advanci  | ing Volum      | e: 2.46%                     |
|                            |  |                                | Ri                  | ght Turn Lar                | ne Volume C   | Calculations  |   |                |                              |
| Moveme                     | nt   | Include?                       | Volume              | % Trucks                    | PCEV  |   |   |                |                              |
|                            | Left   | No                             | 305                 | 2.0%                        | N/A   |   |   |                |                              |
| Advancing                  | Through  | -                              | 792                 | 7.0%                        | N/A   |   |   | ing Volum      |                              |
|                            | Right  | -                              | 16                  | 2.0%                        | N/A   |   | Right Tu  | ırn Volum      | e: N/A                       |
|                            |  |                                | TUF                 | IN LANE V                   | WARRANT   | T FINDINGS  |   |                |                              |
| Le                         | eft Turn La  | ne Warrant F                   | indings             |                             |   | Right T   | urn Lane Wa   | errant Fir     | ndings                       |
| Applicable                 | Warrant F  | igure: Fig                     | ure 1               |                             |   | Applicable War  | rant Figure:  | N/             | Ά                            |
|                            | Warrant I  | Met?:                          | No                  |                             |   | Wa  | rrant Met?:   | N/             | Ά                            |
|                            |  |                                | TURN                | I LANE LE                   | NGTH CA   | LCULATIONS  |   |                |                              |
|                            |  |                                |                     |                             |   |   |   |                |                              |
|                            | Intersection   | 1 Control:                     | Signalized          |                             |   | LCOLATIONS  |   |                |                              |
|                            | Intersection   |                                | Signalized<br>8     |                             |   | LCOLATIONS  |   |                |                              |
| Design Hour Vol            |  | ning Lane:                     |                     |                             |   | ECOLATIONS  |   |                |                              |
| Design Hour Volu<br>Cycles | ume of Turn  | ning Lane:                     | 8                   |                             | Average   | # of Vehicles/Cycle:  | N/A   |                |                              |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A                           | ning Lane:                     | 8<br>Known<br>31.3  | PennDOT Pub                 | olication 46, E                                       | # of Vehicles/Cycle:[<br>xhibit 11-6  | N/A   |                |                              |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If           | ning Lane: Assumed): f Known): | 8<br>Known<br>31.3  | PennDOT Pub                 | olication 46, E                                       | # of Vehicles/Cycle:[<br>xhibit 11-6<br>eed (MPH)   |   |                |                              |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If           | ning Lane:                     | 8<br>Known<br>31.3  |                             | olication 46, E                                       | # of Vehicles/Cycle:[<br>xhibit 11-6  | N/A<br>50-60  |                |                              |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If           | ning Lane: Assumed): f Known): | 8<br>Known<br>31.3  | PennDOT Pub<br>25-35        | Sp<br>Turn Do   | # of Vehicles/Cycle:<br>xhibit 11-6<br>eed (MPH)<br>40-45<br>emand Volume<br>Low  | 50-60<br>High   | Low            |                              |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If<br>Type o | Assumed):  of Traffic Contro   | 8 Known 31.3 High A | PennDOT Pub 25-35  Low A    | Sp Turn Do High B or C                                | # of Vehicles/Cycle:  xhibit 11-6 eed (MPH) 40-45 emand Volume Low B or C   | 50-60  High B or C  | B or C         |                              |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If<br>Type o | ning Lane: Assumed): f Known): | 8<br>Known<br>31.3  | PennDOT Pub  25-35  Low A A | Turn Do High B or C                                   | # of Vehicles/Cycle:  xhibit 11-6  eed (MPH)   40-45   emand Volume   Low   B or C   B  | 50-60  High   B or C   E B or C   E   | B or C         |                              |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If<br>Type o | Assumed):  of Traffic Contro   | 8 Known 31.3 High A | PennDOT Pub  25-35  Low A A | Turn Do High B or C                                   | # of Vehicles/Cycle:    xhibit 11-6   eed (MPH)   40-45   emand Volume   Low     B or C     B     e Length, Condition             | 50-60  High   B or C   E B or C   A: N/A  | B or C B       | Feet                         |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If<br>Type o | Assumed):  of Traffic Contro   | 8 Known 31.3 High A | PennDOT Pub  25-35  Low A A | Turn Do High B or C                                   | # of Vehicles/Cycle:    whibit 11-6   eed (MPH)   40-45   emand Volume   Low     B or C     B     E Length, Condition   Condition | 50-60  High   B or C   E   B or C   B   N / A   N / A   N / A   N / A   B   N / A   N | B or C B A     | Feet                         |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If<br>Type o | Assumed):  of Traffic Contro   | 8 Known 31.3 High A | 25-35  Low A A  Left Turn   | Olication 46, E Sp Turn Di High B or C C Lane Storage | # of Vehicles/Cycle:    xhibit 11-6   eed (MPH)   | 50-60  High   B or C   E   B or C   B or C   B or C   C   N / A   | B or C B A A   | Feet<br>Feet                 |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If<br>Type o | Assumed):  of Traffic Contro   | 8 Known 31.3 High A | 25-35  Low A A  Left Turn   | Olication 46, E Sp Turn Di High B or C C Lane Storage | # of Vehicles/Cycle:    whibit 11-6   eed (MPH)   40-45   emand Volume   Low     B or C     B     E Length, Condition   Condition | 50-60  High   B or C   E   B or C    B or C   C   N / A    C: N / A    th: N / A  | B or C B A A A | Feet                         |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If<br>Type o | Assumed):  of Traffic Contro   | 8 Known 31.3 High A | 25-35  Low A A  Left Turn   | Olication 46, E Sp Turn Di High B or C C Lane Storage | # of Vehicles/Cycle:    xhibit 11-6   eed (MPH)   | 50-60  High   B or C   E   B or C   B or C   B or C   C   N / A   | B or C B A A A | Feet<br>Feet                 |



10/30/2018 322 RRR AM.xlsx

Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)

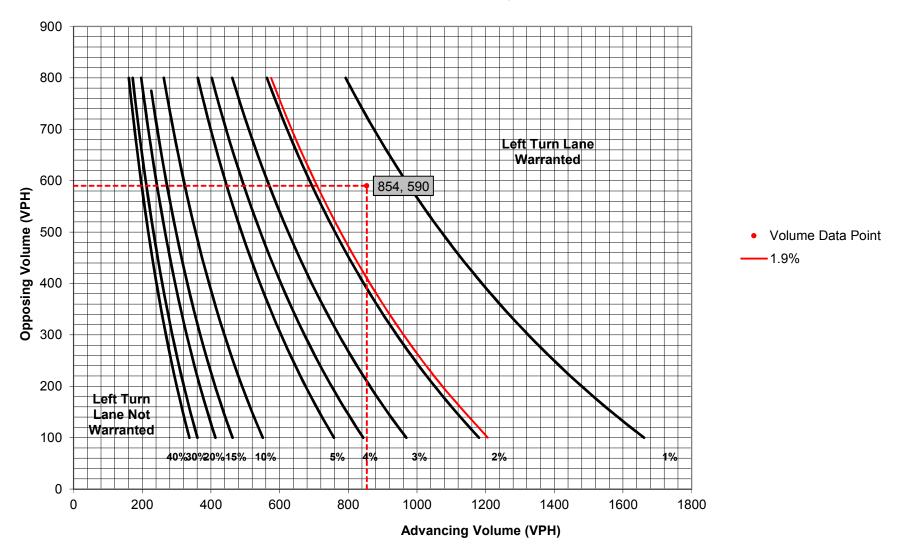


|                   |                     |                            | 001 200      | ATION AN          | ID AIVAL      | 1313 IIVI OIVIV    | .,           |                |                                   |
|-------------------|---------------------|----------------------------|--------------|-------------------|---------------|--------------------|--------------|----------------|-----------------------------------|
|                   | Mu                  | nicipality:                | Caln To      | wnship            |               | Analysis           | Date:        | 10/30          | 0/2018                            |
|                   |                     | County:                    | Chester      | County            |               | Conduct            |              | N              | ИВ                                |
| PennDOT I         | Engineerin          | g District:                | (            | 6                 |               | Check              | ed By:       |                |                                   |
|                   |                     |                            |              |                   | A             | gency/Company N    | Name:        | TI             | PD                                |
| Intersection & Ap | proach De           | scription: Ma              | nor Avenue 8 | k Rock Raymo      | nd Road/Pro   | oosed Driveway     |              |                |                                   |
|                   | Analys              | sis Period:                | 2023 Project | ed Conditions     |               | Number             | of Approac   | th Lanes:      | 1                                 |
|                   |                     | sign Hour:                 | PM           | Peak              |               | Undivided o        | r Divided F  | lighway:       | Undivided                         |
|                   | ntersectio          |                            |              | alized            |               |                    |              | _              |                                   |
| Posted            | Speed Lim<br>Type o | of Terrain:                |              | vel               |               | Left or Right-T    | urn Lane A   |                | ype of Analysis<br>Left Turn Lane |
|                   |                     |                            |              | VOLUME            | CALCUL        | ATIONS             |              |                |                                   |
|                   |                     |                            | Le           | eft Turn Lan      | e Volume C    | alculations        |              |                |                                   |
| Movemen           | ıt                  | Include?                   | Volume       | % Trucks          | PCEV          | <br>T              |              |                |                                   |
|                   | Left                | Yes                        | 15           | 2.0%              | 16            | †                  | А            | dvancing Vol   | ume: 854                          |
| Advancing         | Through             | -                          | 750          | 1.0%              | 754           | 1                  |              | Opposing Vol   |                                   |
|                   | Right               | Yes                        | 81           | 5.0%              | 84            | 1                  |              | Left Turn Vol  |                                   |
|                   | Left                | No                         | 94           | 21.0%             | N/A           | ]                  |              |                |                                   |
| Opposing          | Through             | -                          | 556          | 2.0%              | 562           |                    |              |                |                                   |
|                   | Right               | Yes                        | 27           | 2.0%              | 28            |                    | t Turns in A | dvancing Vol   | ume: 1.87%                        |
|                   |                     |                            | Rig          | ght Turn La       | ne Volume     | Calculations       |              |                |                                   |
| Movemen           | t<br>Left           | Include?                   | Volume<br>94 | % Trucks<br>21.0% | PCEV<br>N/A   | -                  |              |                |                                   |
| Advancing         | Through             | -                          | 556          | 2.0%              | N/A           | -                  | Δ            | dvancing Vol   | ume: N/A                          |
| 7 tavarients      | Right               | -                          | 27           | 2.0%              | N/A           |                    |              | light Turn Vol |                                   |
|                   |                     |                            | TUR          | RN LANE \         | <b>NARRAN</b> | T FINDINGS         |              |                |                                   |
| Le                | ft Turn La          | ne Warrant                 | Findings     |                   |               | Righ               | nt Turn La   | ne Warrant     | Findings                          |
| Applicable \      | Warrant F           | igure: Fi                  | gure 1       | -                 |               | Applicable V       | Varrant Fig  | gure: 1        | N/A                               |
|                   | Warrant             | Met?:                      | Yes          |                   |               | ,                  | Warrant N    | /let?:         | N/A                               |
|                   |                     |                            | TURN         | I LANE LE         | NGTH CA       | LCULATIONS         | 5            |                |                                   |
|                   | ntersectio          | n Control:                 | Signalized   |                   |               |                    |              |                |                                   |
| Design Hour Volu  |                     |                            | 16           |                   |               |                    |              |                |                                   |
|                   | er Hour (A          |                            | Known        |                   |               |                    |              |                |                                   |
|                   | Per Hour (I         |                            | 36           |                   | Average       | # of Vehicles/Cyc  | le:          | 1.0            |                                   |
|                   |                     |                            |              | PennDOT Pub       |               |                    |              |                | _                                 |
|                   |                     |                            |              | 25-35             | Sp            | eed (MPH)<br>40-45 |              | 50-60          |                                   |
|                   | Туре                | of Traffic Contr           | ol           | 23-33             | Turn D        | emand Volume       | •            | 30-60          |                                   |
|                   |                     |                            | High         | Low               | High          | Low                | High         | Low            |                                   |
|                   |                     | Signalized<br>Jnsignalized | A A          | A A               | B or C        | B or C             | B or C       | B or C         |                                   |
|                   |                     | <b>3</b>                   |              |                   | •             |                    |              |                | <b>_</b><br>■                     |
|                   |                     |                            |              | Lett Turn         | Lane Storag   | e Length, Conditi  |              | 0              | Feet                              |
|                   |                     |                            |              |                   |               | Conditi            |              | N/A            | Feet                              |
|                   |                     |                            |              | Dom:              | od Loft Torre | Condit             |              | N/A            | Feet                              |
|                   |                     |                            |              | Keauir            | eu Leit Turn  | Lane Storage Le    | ingth:       | 0              | Feet                              |
|                   |                     |                            |              |                   |               |                    |              |                |                                   |
|                   |                     |                            |              |                   |               |                    | Additi       | ional Finding  |                                   |



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Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)

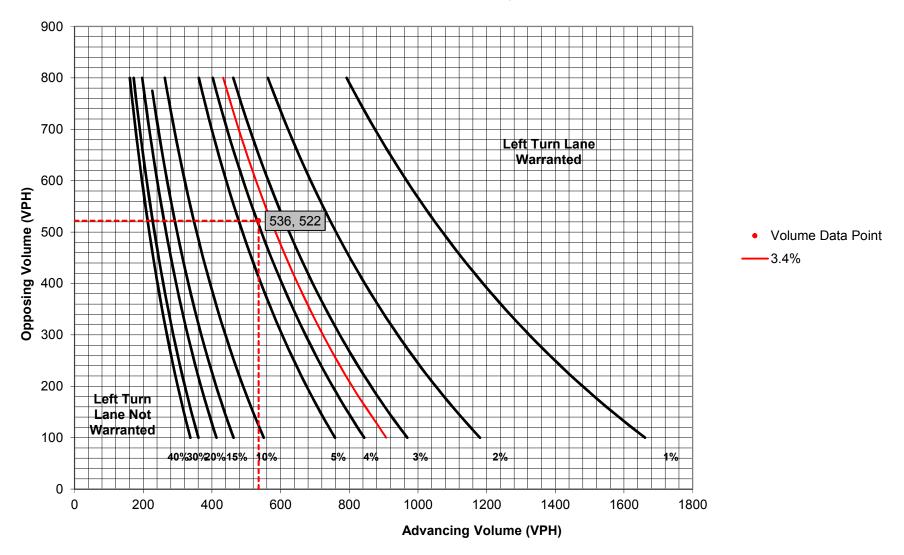


|                                      |  | _   |  | ATION AI                              |  | SIS INFORMAT  |  |                             |
|--------------------------------------|--|---|--|---------------------------------------|--|---|--|-----------------------------|
|                                      | Mur  | nicipality:   |  | ownship                               |  | Analysis Dat  |  |                             |
|                                      |  | County:   |  | County                                |  | Conducted B   |  | В                           |
| PennDOT                              | Engineerin   | g District:   | (  | 6                                     | As   | Checked B<br>ency/Company Nam   | ·  | חי                          |
| lutausatiau 0 A                      |  | and the same Dan  | A G  | Deal Decise                           |  | , ,, , ,  |  |                             |
| Intersection & A                     | pproach De   | scription: Ma   | nor Avenue 8                                       | х коск кауто                          | па коаа/Ргор   | losed Driveway  |  |                             |
|                                      | -  |   |  | ed Conditions                         |  |   | pproach Lanes:   | 1                           |
|                                      | Des<br>Intersection  | sign Hour:  |  | Peak<br>alized                        |  | Undivided or Di   | vided Highway:   | Undivided                   |
|                                      | d Speed Lim  |   |  | 85                                    |  |   | Ty   | pe of Analysis              |
|                                      | -  | of Terrain:   |  | vel                                   |  | Left or Right-Turn  |  | eft Turn Lane               |
|                                      |  |   |  | VOLUME                                | CALCULA  | ATIONS  |  |                             |
|                                      |  |   | Le   | eft Turn Lan                          | e Volume C   | alculations   |  |                             |
| Moveme                               | nt   | Include?  | Volume   | % Trucks                              | PCEV   |   |  |                             |
|                                      | Left   | Yes   | 17   | 2.0%                                  | 18   | •   | Advancing Volu   | ıme: 536                    |
| Advancing                            | Through  | -   | 467  | 1.0%                                  | 470  |   | Opposing Volu  |                             |
|                                      | Right  | Yes   | 46   | 5.0%                                  | 48   |   | Left Turn Volu   | ıme: 18                     |
| Onnosing                             | Left   | No<br>-   | 81<br>492  | 5.0%<br>1.0%                          | N/A<br>495   |   |  |                             |
| Opposing                             | Through<br>Right   | Yes   | 26   | 2.0%                                  | 27   | % Left Tui  | rns in Advancing Volu  | ime: 3.36%                  |
|                                      |  |   | Rig  | ght Turn Lar                          | ne Volume C  | Calculations  |  |                             |
| Moveme                               | nt   | Include?  | Volume   | % Trucks                              | PCEV   |   |  |                             |
|                                      | Left   | No  | 81   | 5.0%                                  | N/A  |   |  |                             |
| Advancing                            | Through  | -   | 492  | 1.0%                                  | N/A<br>N/A   |   | Advancing Volu   |                             |
|                                      | Right  | -   | 26   | 2.0%                                  |  |   | Right Turn Volu  | ıme: N/A                    |
|                                      |  |   |  |                                       | 14/74  |   |  | -                           |
|                                      |  |   | TUR  | RN LANE V                             |  | FINDINGS  |  |                             |
| Le                                   |  | nne Warrant   |  | RN LANE V                             |  |   | urn Lane Warrant F   | Findings                    |
| Le<br>Applicable                     | eft Turn La  |   |  | RN LANE V                             |  |   | urn Lane Warrant F   | Findings                    |
|                                      | eft Turn La  | igure: Fi   | Findings   | RN LANE V                             |  | Right To  | urn Lane Warrant F   |                             |
|                                      | eft Turn La  | igure: Fi   | Findings gure 1 No                                 | I<br>I                                | WARRANT  | Right To  | urn Lane Warrant F   | I/A                         |
| Applicable                           | eft Turn La  | igure: Fi   | Findings gure 1 No                                 | LANE LE                               | WARRANT  | Right Tu<br>Applicable Warı<br>Waı  | urn Lane Warrant F   | I/A                         |
| Applicable<br>Design Hour Volu       | eft Turn La Warrant F Warrant I                                      | Met?:   | Findings gure 1 No TURN Signalized 18              | LANE LE                               | WARRANT  | Right Tu<br>Applicable Warı<br>Waı  | urn Lane Warrant F   | I/A                         |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersection                                     | Met?:  n Control: ning Lane: ussumed):  | Findings gure 1  No  TURN  Signalized 18  Known    | LANE LE                               | WARRANT  | Right To<br>Applicable Wari<br>Wai  | urn Lane Warrant Frant Figure:  Norrant Met?:  N   | I/A                         |
| Applicable  Design Hour Volu  Cycles | eft Turn La Warrant F Warrant I                                      | Met?:  n Control: ning Lane: ussumed):  | Findings gure 1 No TURN Signalized 18              | LANE LE                               | WARRANT  | Right Tu<br>Applicable Warı<br>Waı  | urn Lane Warrant F   | I/A                         |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersection                                     | Met?:  n Control: ning Lane: ussumed):  | Findings gure 1  No  TURN  Signalized 18  Known 48 | LANE LE                               | NARRANT NGTH CA Average  | Right To Applicable Ware Ware LCULATIONS # of Vehicles/Cycle: xhibit 11-6   | urn Lane Warrant Frant Figure:  Norrant Met?:  N   | I/A                         |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersection ume of Turr Per Hour (H             | Met?:  n Control: ning Lane: assumed): f Known):                                | Findings gure 1  No  TURN  Signalized 18  Known 48 | N LANE LE                             | NARRANT NGTH CA Average  | Right To Applicable Warn Warn LCULATIONS  # of Vehicles/Cycle: [ xhibit 11-6 eed (MPH)  | urn Lane Warrant Frant Figure: N   | I/A                         |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersection ume of Turr Per Hour (H             | Met?:  n Control: ning Lane: ussumed):  | Findings gure 1  No  TURN  Signalized 18  Known 48 | LANE LE                               | NARRANT  NGTH CA  Average  Olication 46, E  Sp                       | Right To Applicable Ware Ware LCULATIONS # of Vehicles/Cycle: xhibit 11-6   | urn Lane Warrant Frant Figure:  Norrant Met?:  N   | I/A                         |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersection ume of Turr Per Hour (H             | met?:  n Control: ning Lane: sssumed): f Known):                                | Findings gure 1  No  TURN Signalized 18 Known 48   | PennDOT Pub                           | NGTH CA  Average Dication 46, E Sp  Turn Di High                     | Right To Applicable Warr War  LCULATIONS  # of Vehicles/Cycle:   xhibit 11-6   eed (MPH)  | urn Lane Warrant F rant Figure:  N rrant Met?:  N/A  N/A  50-60  High Low  | I/A                         |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersection ume of Turr Per Hour (A Per Hour (H | Met?:  n Control: ning Lane: assumed): f Known):                                | Findings gure 1  No  TURN  Signalized 18  Known 48 | PennDOT Pub                           | NGTH CA  Average  Olication 46, E  Sp                                | Right To Applicable Warn War  LCULATIONS  # of Vehicles/Cycle:    xhibit 11-6   eed (MPH)   40-45   emand Volume   Low     B or C     | urn Lane Warrant F rant Figure:  N rrant Met?:  N/A  | I/A                         |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersection ume of Turr Per Hour (A Per Hour (H | met?:  n Control: ning Lane: assumed): f Known):  of Traffic Control Signalized | Findings gure 1  No  TURN  Signalized 18  Known 48 | PennDOT Pub  25-35  Low A A           | NGTH CA  Average  Dication 46, E  Sp  Turn Di  High  B or C          | Right To Applicable Warn War  LCULATIONS  # of Vehicles/Cycle: [ xhibit 11-6 eed (MPH) 40-45 emand Volume                             | urn Lane Warrant Frant Figure:  N  N/A  N/A  50-60  High Low B or C B or C B or C B                                      | I/A I/A                     |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersection ume of Turr Per Hour (A Per Hour (H | met?:  n Control: ning Lane: assumed): f Known):  of Traffic Control Signalized | Findings gure 1  No  TURN  Signalized 18  Known 48 | PennDOT Pub  25-35  Low A A           | NGTH CA  Average  Dication 46, E  Sp  Turn Di  High  B or C          | # of Vehicles/Cycle:    Applicable Warr   Warr   Warr   LCULATIONS  # of Vehicles/Cycle:  | urn Lane Warrant F rant Figure: N rrant Met?: N  N/A  N/A  50-60  High Low B or C B or C B or C B                        | I/A I/A Feet                |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersection ume of Turr Per Hour (A Per Hour (H | met?:  n Control: ning Lane: assumed): f Known):  of Traffic Control Signalized | Findings gure 1  No  TURN  Signalized 18  Known 48 | PennDOT Pub  25-35  Low A A           | NGTH CA  Average  Dication 46, E  Sp  Turn Di  High  B or C          | Right To Applicable Warn War  LCULATIONS  # of Vehicles/Cycle: [ xhibit 11-6 eed (MPH) 40-45 Emand Volume Low B or C B B Condition of | urn Lane Warrant F rant Figure:  N rrant Met?:  N/A  50-60  High Low B or C B or C B or C B N/A  R: N/A  B: N/A          | I/A I/A Feet Feet           |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersection ume of Turr Per Hour (A Per Hour (H | met?:  n Control: ning Lane: assumed): f Known):  of Traffic Control Signalized | Findings gure 1  No  TURN  Signalized 18  Known 48 | PennDOT Pub  25-35  Low A A Left Turn | Average  Olication 46, E  Sp  Turn Di  High  B or C  C  Lane Storage | Right To Applicable Warn War  LCULATIONS  # of Vehicles/Cycle: [  xhibit 11-6 eed (MPH) 40-45 Emand Volume                            | nrant Figure:  N  N/A  N/A  S0-60  High Low Bor C Bor C Bor C B Or C Bor C B Or C N/A  N/A  N/A  N/A  N/A  N/A  N/A  N/A | I/A I/A Feet Feet Feet      |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersection ume of Turr Per Hour (A Per Hour (H | met?:  n Control: ning Lane: assumed): f Known):  of Traffic Control Signalized | Findings gure 1  No  TURN  Signalized 18  Known 48 | PennDOT Pub  25-35  Low A A Left Turn | Average  Olication 46, E  Sp  Turn Di  High  B or C  C  Lane Storage | # of Vehicles/Cycle:  whibit 11-6 eed (MPH) 40-45 B or C B B C Condition Condition Lane Storage Lengt                                 | N/A  N/A  SO-60  High Low B or C B or C B or C B or C N/A  B: N/A  C: N/A  th: N/A                                       | I/A I/A Feet Feet Feet Feet |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersection ume of Turr Per Hour (A Per Hour (H | met?:  n Control: ning Lane: assumed): f Known):  of Traffic Control Signalized | Findings gure 1  No  TURN  Signalized 18  Known 48 | PennDOT Pub  25-35  Low A A Left Turn | Average  Olication 46, E  Sp  Turn Di  High  B or C  C  Lane Storage | # of Vehicles/Cycle:  whibit 11-6 eed (MPH) 40-45 B or C B B C Condition Condition Lane Storage Lengt                                 | nrant Figure:  N  N/A  N/A  S0-60  High Low Bor C Bor C Bor C B Or C Bor C B Or C N/A  N/A  N/A  N/A  N/A  N/A  N/A  N/A | I/A I/A Feet Feet Feet Feet |



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Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)

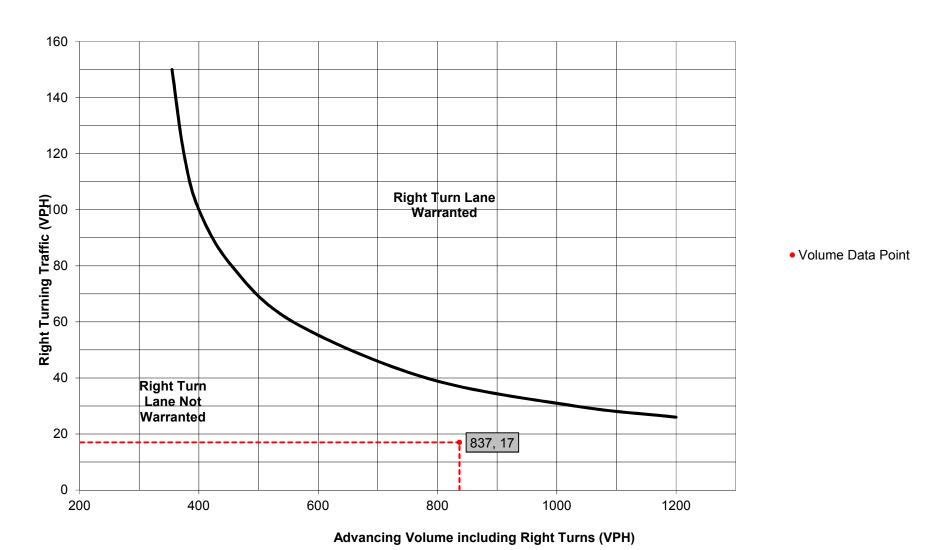


|                                      |   | ST   | LIDY LOC                               | ΔΤΙΩΝ ΔΝ                                | ΝΠ ΔΝΙΔΙΥ   | SIS INFORMAT   | ION  |                      |
|--------------------------------------|---|--|--|---|---|--|--|----------------------|
|                                      |   |  |  |   |   |  |  |                      |
|                                      | Mui   | nicipality:                                      |  | wnship                                  |   | Analysis Date  |  |                      |
| Down DOT                             | · F   | County:  |  | County                                  |   | Conducted B  |  | В                    |
| PennDOI                              | Engineerin  | g District:                                      |  | 6                                       | A   | Checked B<br>gency/Company Name  | •  | 'D                   |
| Intersection & A                     | pproach De  | scription: Ma                                    | nor Avenue 8                           | & Rock Raymo                            |   |  |  |                      |
|                                      |   |  |  |   |   |  |  |                      |
|                                      | -   |  |  | ed Conditions                           | 5   |  | pproach Lanes:   | 1                    |
|                                      | Des   | ign Hour:  |  | Peak<br>alized                          |   | Undivided or Div   | /ided Highway:   | Undivided            |
|                                      | d Speed Lim   |  |  | 15                                      |   |  | Tv   | pe of Analysis       |
|                                      | -   | of Terrain:                                      |  | vel                                     |   | Left or Right-Turn I   |  | ight Turn Lane       |
|                                      |   |  |  | VOLUME                                  | CALCULA   | ATIONS   |  |                      |
|                                      |   |  | Le                                     | eft Turn Lan                            | e Volume C  | alculations  |  |                      |
| Moveme                               | nt  | Include?   | Volume                                 | % Trucks                                | PCEV  | ]  |  |                      |
|                                      | Left  | Yes  | 7                                      | 2.0%                                    | N/A   |  | Advancing Volu   |                      |
| Advancing                            | Through   | -  | 194                                    | 6.0%                                    | N/A   |  | Opposing Volu  |                      |
|                                      | Right   | Yes  | 106                                    | 20.0%                                   | N/A   |  | Left Turn Volu   | ime: N/A             |
| Opposit                              | Left  | No   | 305                                    | 2.0%                                    | N/A   |  |  |                      |
| Opposing                             | Through<br>Right  | -<br>Yes   | 792<br>16                              | 7.0%<br>2.0%                            | N/A<br>N/A  | % Left Tur   | ns in Advancing Volu   | ıme: N/A             |
|                                      | 1 0 -   |  | Rig                                    | I                                       |   | Calculations   |  | ,                    |
| Moveme                               | nt  | Include?   | Volume                                 | % Trucks                                | PCEV  | <br>]  |  |                      |
|                                      | Left  | No   | 305                                    | 2.0%                                    | N/A   |  |  |                      |
| Advancing                            | Through   | -  | 792                                    | 7.0%                                    | 820   |  | Advancing Volu   |                      |
|                                      | Right   | -  | 16                                     | 2.0%                                    | 17  |  | Right Turn Volu  | ıme: 17              |
|                                      |   |  | TUR                                    | RN LANE V                               | WARRAN1   | T FINDINGS   |  |                      |
|                                      | eft Turn I a  | ne Warrant                                       | Findings                               |   |   | Right Tu   | ırn Lane Warrant F   | indings              |
| LE                                   |   |  |  |   |   |  |  | _                    |
| Applicable                           |   |  | N/A                                    | ]                                       |   | Applicable Warr  | ant Figure: Fig  | ure 9                |
|                                      |   | igure:   |  | ]<br>]                                  |   |  |  | vre 9                |
|                                      | Warrant F   | igure:   | N/A<br>N/A                             | ]<br> <br>  LANE LE                     | NGTH CA   |  |  |                      |
| Applicable                           | Warrant F<br>Warrant I                                    | igure: Met?:                                     | N/A<br>N/A<br>TURN                     |   | NGTH CA   | War  |  |                      |
| Applicable                           | Warrant F Warrant I                                       | Met?:  | N/A<br>N/A                             |   | NGTH CA   | War  |  |                      |
| Applicable  Design Hour Volu         | Warrant F Warrant I                                       | Met?:  | N/A N/A TURN Signalized                |   | NGTH CA   | War  |  |                      |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersection                          | Met?:  n Control: ning Lane: ussumed):           | N/A N/A TURN Signalized                |   |   | War  |  |                      |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersection ume of Turn Per Hour (A  | Met?:  n Control: ning Lane: ussumed):           | N/A  TURN  Signalized 17  Known 31.3   |   | Average<br>olication 46, E                                  | War  LCULATIONS  # of Vehicles/Cycle:  xhibit 11-6   | rant Met?:   |                      |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersectior ume of Turn Per Hour (H  | Met?:  n Control: ning Lane: ussumed): f Known): | N/A  TURN  Signalized  17  Known  31.3 | PennDOT Pub                             | Average<br>olication 46, E                                  | War  LCULATIONS  # of Vehicles/Cycle:  xhibit 11-6 eed (MPH)   | rant Met?:   |                      |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersectior ume of Turn Per Hour (H  | Met?:  n Control: ning Lane: ussumed):           | N/A  TURN  Signalized  17  Known  31.3 |   | Average<br>polication 46, E<br>Sp                           | War  LCULATIONS  # of Vehicles/Cycle:  xhibit 11-6   | rant Met?:   |                      |
| Applicable  Design Hour Volu  Cycles | Warrant F Warrant I Intersectior ume of Turn Per Hour (If | met?:  n Control: ning Lane: ussumed): f Known): | N/A  TURN  Signalized  17  Known  31.3 | PennDOT Pub<br>25-35                    | Average plication 46, E Sp Turn D High                      | # of Vehicles/Cycle:    whibit 11-6   eed (MPH)   40-45   emand Volume   Low   | N/A  50-60  High Low   |                      |
| Applicable  Design Hour Volu  Cycles | Intersection ume of Turn Per Hour (H                      | m Control: ining Lane: ussumed): f Known):       | N/A  TURN  Signalized 17  Known 31.3   | PennDOT Pub  25-35  Low A               | Average plication 46, E Sp Turn D High B or C               | # of Vehicles/Cycle:    xhibit 11-6   eed (MPH)   40-45     Low   B or C   E   | N/A  N/A  50-60  High Low B or C B or C  |                      |
| Applicable  Design Hour Volu  Cycles | Intersection ume of Turn Per Hour (H                      | met?:  n Control: ning Lane: ussumed): f Known): | N/A  TURN  Signalized  17  Known  31.3 | PennDOT Pub<br>25-35<br>Low<br>A<br>A   | Average Dication 46, E Sp Turn D High B or C                | # of Vehicles/Cycle:    whibit 11-6   eed (MPH)   40-45   emand Volume   Low     B or C   E     B   E  | N/A  50-60  High Low B or C B or C B or C B  | No                   |
| Applicable  Design Hour Volu  Cycles | Intersection ume of Turn Per Hour (H                      | m Control: ining Lane: ussumed): f Known):       | N/A  TURN  Signalized 17  Known 31.3   | PennDOT Pub<br>25-35<br>Low<br>A<br>A   | Average Dication 46, E Sp Turn D High B or C                | # of Vehicles/Cycle:    xhibit 11-6   eed (MPH)   40-45     Low   B or C   E   | N/A   N/A   S0-60   B or C   B or C   B or C   B or C   A:   N/A   N/A | No                   |
| Applicable  Design Hour Volu  Cycles | Intersection ume of Turn Per Hour (H                      | m Control: ining Lane: ussumed): f Known):       | N/A  TURN  Signalized 17  Known 31.3   | PennDOT Pub<br>25-35<br>Low<br>A<br>A   | Average Dication 46, E Sp Turn D High B or C                | # of Vehicles/Cycle:    whibit 11-6   eed (MPH)   40-45   emand Volume   Low     B or C     B     E Length, Condition &   Condition &  | 50-60  High Low 3 or C B or C 8 or C B A: N/A  N/A   | Feet<br>Feet         |
| Applicable  Design Hour Volu  Cycles | Intersection ume of Turn Per Hour (H                      | m Control: ining Lane: ussumed): f Known):       | N/A  TURN  Signalized 17  Known 31.3   | PennDOT Pub  25-35  Low A A  Right Turn | Average Dication 46, E Sp Turn D High B or C C Lane Storage | # of Vehicles/Cycle:    whibit 11-6   whibit | N/A  50-60  High Low Bor C Bor C Bor C N/A  N/A  N/A  N/A  N/A   | Feet<br>Feet<br>Feet |
| Applicable  Design Hour Volu  Cycles | Intersection ume of Turn Per Hour (H                      | m Control: ining Lane: ussumed): f Known):       | N/A  TURN  Signalized 17  Known 31.3   | PennDOT Pub  25-35  Low A A  Right Turn | Average Dication 46, E Sp Turn D High B or C C Lane Storage | # of Vehicles/Cycle:    xhibit 11-6   eed (MPH)   40-45   emand Volume   Low     B or C     B     Condition A   Condition Cond | N/A   Sor C   B   Sor C   B   N/A   Sor C   B   N/A   Sor C   N/A   N/ | Feet Feet Feet Feet  |
| Applicable  Design Hour Volu  Cycles | Intersection ume of Turn Per Hour (H                      | m Control: ining Lane: ussumed): f Known):       | N/A  TURN  Signalized 17  Known 31.3   | PennDOT Pub  25-35  Low A A  Right Turn | Average Dication 46, E Sp Turn D High B or C C Lane Storage | # of Vehicles/Cycle:    xhibit 11-6   eed (MPH)   40-45   emand Volume   Low     B or C     B     Condition A   Condition Cond | N/A  50-60  High Low Bor C Bor C Bor C N/A  N/A  N/A  N/A  N/A   | Feet Feet Feet Feet  |



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Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)

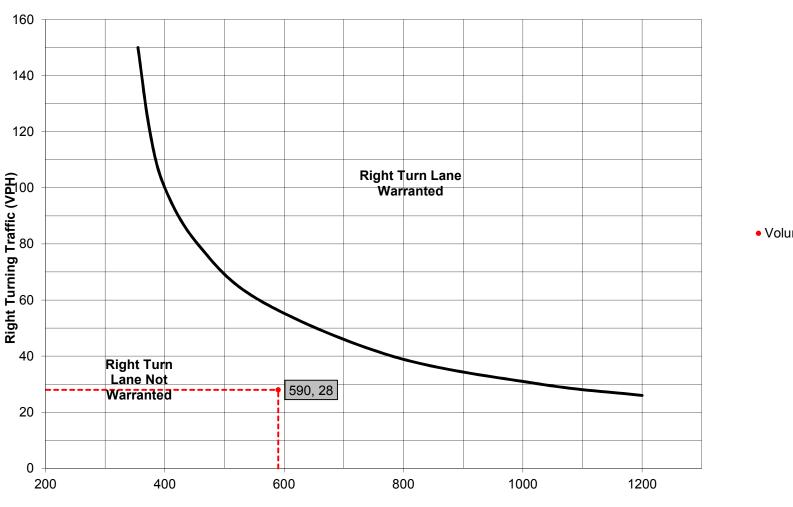


|                            |  | 311   | JDY LOCA     | ATION AN                    | ID ANALT  | 5.5 5   | TION   |                    |                                  |
|----------------------------|--|---|--------------|-----------------------------|---|---|--|--------------------|----------------------------------|
|                            | Mur  | nicipality:   | Caln To      | wnship                      |   | Analysis Da   | ate:   | 10/30,             | /2018                            |
|                            |  | County:   |              | County                      |   | Conducted   |  | M                  |                                  |
| PennDOT                    | Engineering  |   |              | 5                           |   | Checked   |  |                    |                                  |
|                            |  |   |              |                             | Ag  | gency/Company Nai   |  | TP                 | D                                |
| Intersection & A           | pproach De   | scription: Ma                                       | nor Avenue 8 | Rock Raymo                  | nd Road/Prop  | oosed Driveway  |  |                    |                                  |
|                            | Analys   | sis Period:   |              | ed Conditions               |   |   | Approach Lar   |                    | 1                                |
|                            |  | sign Hour:  |              | Peak                        |   | Undivided or D  | Divided Highw  | ay:                | Undivided                        |
|                            | Intersection   |   |              | alized                      |   |   |  | -                  | or and American                  |
| Poste                      | d Speed Lim<br>Type o                                | of Terrain:   |              | vel                         |   | Left or Right-Turi  | n Lane Analys  |                    | pe of Analysis<br>ight Turn Lane |
|                            |  |   |              | VOLUME                      | CALCULA   | ATIONS  |  |                    |                                  |
|                            |  |   |              | eft Turn Lan                |   |   |  |                    |                                  |
| Moveme                     | nt   | Include?  | Volume       | % Trucks                    | PCEV  | ]   |  |                    |                                  |
|                            | Left   | Yes   | 15           | 2.0%                        | N/A   | ]   | Advan  | cing Volu          | me: N/A                          |
| Advancing                  | Through  | -   | 750          | 1.0%                        | N/A   |   | Орро   | sing Volu          | me: N/A                          |
|                            | Right  | Yes   | 81           | 5.0%                        | N/A   |   | Left 1   | Turn Volu          | me: N/A                          |
|                            | Left   | No  | 94           | 21.0%                       | N/A   |   |  |                    |                                  |
| Opposing                   | Through  | -   | 556          | 2.0%                        | N/A   |   |  |                    | -                                |
|                            | Right  | Yes   | 27           | 2.0%                        | N/A   | •   | urns in Advan  | cing Volu          | me: N/A                          |
|                            |  |   | Riç          | ht Turn Larی                | ne Volume (   | Calculations  |  |                    |                                  |
| Moveme                     | nt<br>Left   | Include?  | Volume<br>94 | % Trucks<br>21.0%           | PCEV<br>N/A   |   |  |                    |                                  |
| Advancing                  | Through  | -   | 556          | 2.0%                        | 562   | -   | Advan  | cing Volu          | me: 590                          |
|                            | Right  | -   | 27           | 2.0%                        | 28  | ]   |  | Turn Volu          |                                  |
|                            |  |   | TUR          | N LANE V                    | WARRAN1   | T FINDINGS  |  |                    |                                  |
| Le                         | eft Turn La  | ne Warrant  | Findings     |                             |   | Right <sup>-</sup>  | Turn Lane W  | arrant F           | indings                          |
| Applicable                 | Warrant F  | igure:  | N/A          |                             |   | Applicable Wa   | rrant Figure:  | Fig                | ure 9                            |
|                            | Warrant I  | Met?:   | N/A          |                             |   | Wa  | arrant Met?:   | ı                  | No                               |
|                            |  |   | TURN         | LANE LE                     | NGTH CA   | LCULATIONS  |  |                    |                                  |
|                            | Intersection   | - Cambral   | Signalized   |                             |   |   |  |                    |                                  |
|                            |  |   | Jigitalizeu  |                             |   |   |  |                    |                                  |
| Design Hour Vol            |  |   | 28           |                             |   |   |  |                    |                                  |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A                           | ning Lane:  | Known        |                             |   |   |  |                    | -                                |
| Design Hour Volu<br>Cycles | ume of Turn  | ning Lane:  |              |                             | Average   | # of Vehicles/Cycle:  | N//  | 1                  | 1                                |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A                           | ning Lane:  | Known<br>36  | PennDOT Pub                 | olication 46, E                                     | xhibit 11-6   | N/A  | 1                  | ]                                |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If           | ning Lane: Assumed): f Known):                      | Known<br>36  |                             | olication 46, E                                     | xhibit 11-6<br>eed (MPH)  |  | A                  | ]                                |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If           | ning Lane:  | Known<br>36  | PennDOT Pub                 | olication 46, E                                     | xhibit 11-6   | N//  | 1                  |                                  |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If           | ning Lane:  Assumed):  f Known):  of Traffic Contro | Known<br>36  | 25-35                       | Sp<br>Turn D  | eed (MPH)  40-45 emand Volume  Low  | 50-60<br>High  | Low                |                                  |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If<br>Type o | Assumed):  of Known):  of Traffic Contro            | Known 36     | 25-35<br>Low<br>A           | Sp Turn D High B or C                               | xhibit 11-6 eed (MPH) 40-45 emand Volume Low B or C                         | 50-60 High B or C  | Low<br>B or C      |                                  |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If<br>Type o | ning Lane:  Assumed):  f Known):  of Traffic Contro | Known<br>36  | 25-35  Low A A              | Turn Di<br>High<br>B or C                           | xhibit 11-6 eed (MPH) 40-45 emand Volume Low Bor C B                        | 50-60  High B or C B or C  | Low<br>B or C<br>B |                                  |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If<br>Type o | Assumed):  of Known):  of Traffic Contro            | Known 36     | 25-35  Low A A              | Turn Di<br>High<br>B or C                           | xhibit 11-6 eed (MPH) 40-45 Emand Volume Low B or C B B E Length, Condition | 50-60  High B or C B or C  | Low<br>B or C<br>B | Feet                             |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If<br>Type o | Assumed):  of Known):  of Traffic Contro            | Known 36     | 25-35  Low A A              | Turn Di<br>High<br>B or C                           | ed (MPH)  40-45 emand Volume  Low  Bor C  B  Length, Condition              | 50-60  High BorC BorC  N A: N  | Low<br>B or C<br>B | Feet                             |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If<br>Type o | Assumed):  of Known):  of Traffic Contro            | Known 36     | 25-35  Low A A Right Turn I | Dication 46, E Sp Turn D High B or C C Lane Storage | xhibit 11-6 eed (MPH) 40-45 emand Volume Low B or C B Condition Condition   | 50-60  High B or C B or C  A A: N A B: N A C: N  | Low Bor C B        | Feet<br>Feet                     |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If<br>Type o | Assumed):  of Known):  of Traffic Contro            | Known 36     | 25-35  Low A A Right Turn I | Dication 46, E Sp Turn D High B or C C Lane Storage | ed (MPH)  40-45 emand Volume  Low  Bor C  B  Length, Condition              | 50-60  High BorC BorC  Na A: N | Low<br>BorC<br>B   | Feet<br>Feet                     |
| Design Hour Volu<br>Cycles | ume of Turn<br>Per Hour (A<br>Per Hour (If<br>Type o | Assumed):  of Known):  of Traffic Contro            | Known 36     | 25-35  Low A A Right Turn I | Dication 46, E Sp Turn D High B or C C Lane Storage | xhibit 11-6 eed (MPH) 40-45 emand Volume Low B or C B Condition Condition   | 50-60  High B or C B or C  A A: N A B: N A C: N  | Low<br>BorC<br>B   | Feet<br>Feet<br>Feet             |



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Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



Volume Data Point

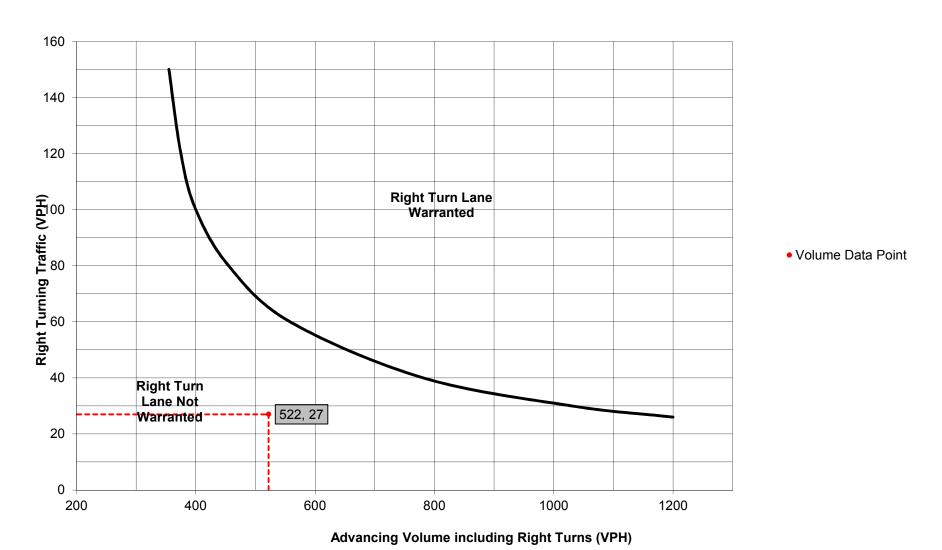
**Advancing Volume including Right Turns (VPH)** 

|                   |  | STL                        | JDY LOC     | ATION AN                                      | ND ANALY     | SIS INFORM          | ATION       |                    |                                    |
|-------------------|--|----------------------------|-------------|---|--------------|---------------------|-------------|--------------------|------------------------------------|
|                   | Mu   | nicipality:                | Caln To     | wnship  |              | Analysis            | Date:       | 10/30              | )/2018                             |
|                   |  | County:                    |             | County  |              | Conducte            |             |                    | ИB                                 |
| PennDOT           | Engineerin                                       | g District:                |             | <u>, , , , , , , , , , , , , , , , , , , </u> |              | Checke              | d By:       |                    |                                    |
|                   |  |                            |             |   | Α            | gency/Company N     | ame:        | TI                 | PD                                 |
| Intersection & Ap | oproach De                                       | scription: Man             | or Avenue 8 | Rock Raymo                                    | nd Road/Prop | oosed Driveway      |             |                    |                                    |
|                   | -  |                            |             | ed Conditions                                 |              |                     | of Approach |                    | 1                                  |
|                   |  | sign Hour:                 |             | Peak  |              | Undivided o         | Divided Hi  | ghway:             | Undivided                          |
|                   | Intersection                                     |                            |             | alized  |              |                     |             | <u> </u>           |                                    |
| Postec            | d Speed Lim<br>Type o                            | of Terrain:                |             | 5<br>vel                                      |              | Left or Right-Tu    | ırn Lane An |                    | ype of Analysis<br>Right Turn Lane |
|                   |  |                            |             | VOLUME  | CALCULA      | ATIONS              |             |                    |                                    |
|                   |  |                            | Le          | eft Turn Lan                                  | e Volume C   | alculations         |             |                    |                                    |
| Moveme            | nt   | Include?                   | Volume      | % Trucks                                      | PCEV         | 1                   |             |                    |                                    |
|                   | Left   | Yes                        | 17          | 2.0%  | N/A          | ]                   | Ac          | lvancing Vol       | ume: N/A                           |
| Advancing         | Through  | -                          | 467         | 1.0%  | N/A          | ]                   |             | pposing Vol        |                                    |
|                   | Right  | Yes                        | 46          | 5.0%  | N/A          |                     | L           | eft Turn Vol       | ume: N/A                           |
| Onnasias          | Left   | No                         | 81          | 5.0%  | N/A          | -                   |             |                    |                                    |
| Opposing          | Through<br>Right                                 | Yes                        | 492<br>26   | 1.0%<br>2.0%                                  | N/A<br>N/A   | % Left              | Turns in Ac | Ivancing Vol       | ume: N/A                           |
|                   | 1 0  |                            |             |   |              | Calculations        |             |                    | ,                                  |
| Moveme            | nt   | Include?                   | Volume      | % Trucks                                      | PCEV         | 1                   |             |                    |                                    |
|                   | Left   | No                         | 81          | 5.0%  | N/A          |                     |             |                    |                                    |
| Advancing         | Through  | -                          | 492         | 1.0%  | 495          |                     | Ac          | lvancing Vol       | ume: 522                           |
|                   | Right  | -                          | 26          | 2.0%  | 27           | ]                   | Ri          | ght Turn Vol       | ume: 27                            |
|                   |  |                            | TUR         | N LANE V                                      | WARRAN'      | T FINDINGS          |             |                    |                                    |
| Le                | ft Turn La                                       | ne Warrant F               | indings     |   |              | Righ                | t Turn Lar  | e Warrant          | Findings                           |
| Applicable        | Warrant F  | igure:                     | N/A         |   |              | Applicable W        | arrant Fig  | ure: Fig           | gure 9                             |
|                   | Warrant  | Met?:                      | N/A         |   |              | V                   | Varrant M   | et?:               | No                                 |
|                   |  |                            | TURN        | I LANE LE                                     | NGTH CA      | LCULATIONS          |             |                    |                                    |
|                   | Intersection                                     | n Control:                 | Signalized  |   |              |                     |             |                    |                                    |
| Design Hour Volu  |  |                            | 27          |   |              |                     |             |                    |                                    |
|                   | Per Hour (A                                      |                            | Known       |   |              |                     |             |                    | _                                  |
| Cycles            | Per Hour (I                                      | f Known):                  | 48          |   | Average      | # of Vehicles/Cycl  | e:          | N/A                |                                    |
|                   |  |                            |             | PennDOT Pub                                   |              |                     |             |                    | _                                  |
|                   |  |                            |             | 25-35   | Sp           | eed (MPH)<br>40-45  | F.          | n_60               |                                    |
|                   | Туре   | of Traffic Contro          | ·           | 23-33   | Turn D       | emand Volume        | 51          | 0-60               |                                    |
|                   |  |                            | High        | Low   | High         | Low                 | High        | Low                |                                    |
|                   | <del>                                     </del> | Signalized<br>Jnsignalized | A<br>A      | A A   | B or C       | B or C              | B or C      | B or C             | 4                                  |
|                   |  | >э.g.i.alizeu              | , A         | <u> </u>                                      |              |                     |             | <u> </u>           | <b>⊣</b><br><b>=</b>               |
|                   |  |                            |             | Right Turn                                    | Lane Storage | e Length, Condition |             | N/A                | Feet                               |
|                   |  |                            |             |   |              | Condition           |             | N/A                | Feet                               |
|                   |  |                            |             |   |              | Condition           | on C:       | N/A                | Feet                               |
|                   |  |                            |             | Require                                       | d Right Turn | Lane Storage Lei    | ngth:       | N/A                | Feet                               |
|                   |  |                            |             |   |              |                     |             |                    |                                    |
|                   |  |                            |             |   |              |                     | Additio     | nal Finding        |                                    |
| dditional Commen  | ts / Justificat                                  | tions:                     |             |   |              |                     | Additio     | onal Finding<br>N/ |                                    |



10/30/2018 322 RRR SAT.xlsx

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)

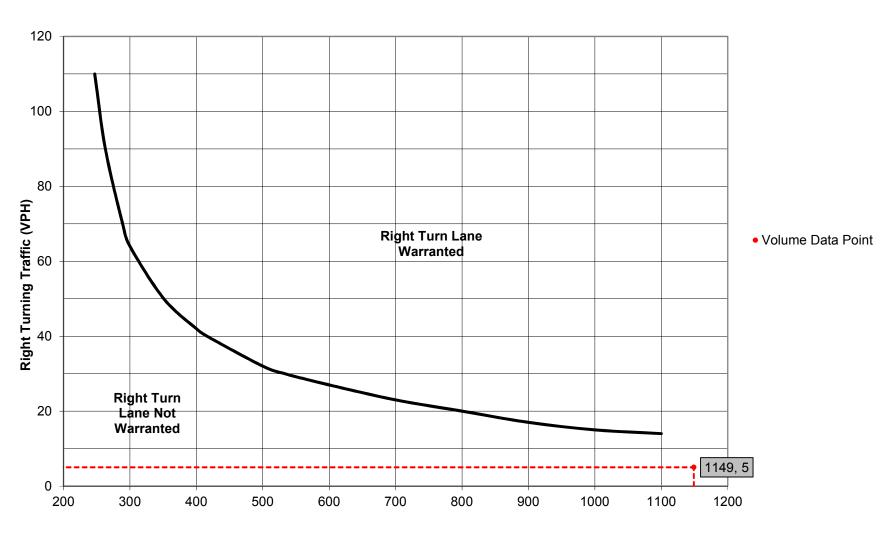


|                     |                          | 9               | TUDYIC     | ЭСАТ            | ION AN      | ΙΟ ΔΝΔΙ Υ      | SIS INFORM            | ΙΔΤΙΩΙ     | V                               |                |
|---------------------|--------------------------|-----------------|------------|-----------------|-------------|----------------|-----------------------|------------|---------------------------------|----------------|
|                     |                          | _               |            |                 |             | - AIVAL        | SIS ANI ONIV          |            |                                 |                |
|                     | Mu                       | nicipality:     | Cal        | n Town          | ship        |                | Analysis              | Date:      | 10/30/                          | /2018          |
|                     |                          | County:         | Che        | ster Co         | unty        |                | Conduct               | –          | M                               | В              |
| PennDOT I           | Engineerin               | g District:     |            | 6               |             |                |                       | ed By:     |                                 |                |
|                     |                          |                 |            |                 |             | А              | gency/Company         | Name:      | ТР                              | D              |
| Intersection & Ap   | proach De                | escription:     | Aanor Aven | ue & Pr         | oposed RIF  | RO Driveway    |                       |            |                                 |                |
|                     | -                        | sis Period:     |            |                 | Conditions  |                |                       |            | oach Lanes:                     | 1              |
|                     |                          | sign Hour:      |            | AM Pea          |             |                | Undivided o           | or Divide  | d Highway:                      | Undivided      |
|                     | ntersection<br>Speed Lim | _               | Ur         | nsignali:<br>45 | zea         |                |                       |            | T-1                             | pe of Analysis |
| Posteu              |                          | of Terrain:     |            | Level           |             |                | Left or Right-T       | urn Lane   |                                 | ight Turn Lane |
|                     | "                        |                 |            | V               | OLUME       | CALCUL         | ATIONS                |            | · <u></u>                       |                |
|                     |                          |                 |            |                 |             |                | alculations           |            |                                 |                |
| BAn                 |                          | Implicate 3     | Value      |                 |             |                | 1                     |            |                                 |                |
| Movemen             | t<br>Left                | Include?<br>Yes | Volum      | e 9             | % Trucks    | PCEV<br>N/A    | -                     |            | Advancing Val-                  | me: N/A        |
| Advancing           | Through                  | Yes<br>-        |            |                 |             | N/A<br>N/A     | 1                     |            | Advancing Volu<br>Opposing Volu |                |
| Auvancing           | Right                    | Yes             |            |                 |             | N/A            | 1                     |            | Left Turn Volu                  |                |
|                     | Left                     | No              |            |                 |             | N/A            | 1                     |            | Leit Turii Volu                 | IIIC. N/A      |
| Opposing            | Through                  | -               |            |                 |             | N/A            | 1                     |            |                                 |                |
| 5,7,7               | Right                    | Yes             |            |                 |             | N/A            | % Lef                 | t Turns ii | n Advancing Volu                | me: N/A        |
|                     |                          |                 |            | Right           | :Turn Lan   | ne Volume      | Calculations          |            |                                 |                |
| Movemen             | t                        | Include?        | Volum      | e 9             | % Trucks    | PCEV           | 7                     |            |                                 |                |
|                     | Left                     | No              |            |                 |             | N/A            |                       |            |                                 |                |
| Advancing           | Through                  | -               | 1105       |                 | 7.0%        | 1144           |                       |            | Advancing Volu                  | me: 1149       |
|                     | Right                    | -               | 4          |                 | 2.0%        | 5              |                       |            | Right Turn Volu                 | me: 5          |
|                     |                          |                 | T          | URN             | LANE V      | VARRAN         | T FINDINGS            |            |                                 |                |
| Lef                 | ft Turn La               | ane Warraı      | nt Finding | S               |             |                | Rigl                  | ht Turn    | Lane Warrant F                  | indings        |
| Applicable \        | Warrant F                | igure:          | N/A        |                 |             |                | Applicable \          | Warrant    | Figure: Figu                    | ire 10         |
|                     | Warrant                  | Met?:           | N/A        |                 |             |                |                       | Warran     | t Met?:                         | No             |
|                     |                          |                 | TU         | RN L            | ANE LEI     | NGTH CA        | LCULATION             | S          |                                 |                |
| 1.                  | ntersectio               | n Control:      | Unsigna    | alizad          |             |                |                       |            |                                 |                |
| Design Hour Volu    |                          | -               | 5          | anzeu           |             |                |                       |            |                                 |                |
| •                   | er Hour (A               | _               | 60         | )               |             |                |                       |            |                                 |                |
|                     | Per Hour (I              |                 | 60         |                 |             | Average        | # of Vehicles/Cyc     | :le:       | N/A                             | 1              |
|                     |                          |                 |            | Pen             | nDOT Pub    | lication 46, E | xhibit 11-6           |            |                                 | _              |
|                     |                          |                 |            |                 | 25          | Sp             | eed (MPH)             |            | F0.66                           | 4              |
|                     | Туре                     | of Traffic Cor  | ntrol      | 25              | -35         | Turn D         | 40-45<br>emand Volume |            | 50-60                           | -              |
|                     |                          |                 | н          | igh             | Low         | High           | Low                   | High       | Low                             | 1              |
|                     |                          | Signalized      |            | A               | А           | B or C         | B or C                | B or 0     | C B or C                        |                |
|                     |                          | Unsignalized    |            | A               | А           | С              | В                     | B or (     | В                               | _              |
|                     |                          |                 |            | Ri              | ight Turn L | Lane Storag    | e Length, Condit      | ion A:     | N/A                             | Feet           |
|                     |                          |                 |            |                 |             |                | Condit                | ion B:     | N/A                             | Feet           |
|                     |                          |                 |            |                 |             |                | Condit                | ion C:     | N/A                             | Feet           |
|                     |                          |                 |            |                 | Require     | d Right Turn   | Lane Storage Le       |            | N/A                             | Feet           |
|                     |                          |                 |            |                 | Require     | u mgm tuff     | Lanc Storage Lt       |            |                                 | _              |
|                     |                          |                 |            |                 |             |                |                       | Add        | litional Findings<br>N/F        |                |
| Additional Comments | s / Justificat           | tions:          |            |                 |             |                |                       |            |                                 |                |
|                     |                          |                 |            |                 |             |                |                       |            |                                 |                |



10/30/2018 322 RIRO AM.xlsx

Figure 10. Warrant for right turn lanes on two-lane roadways (45 mph or greater speeds, unsignalized and signalized intersections)



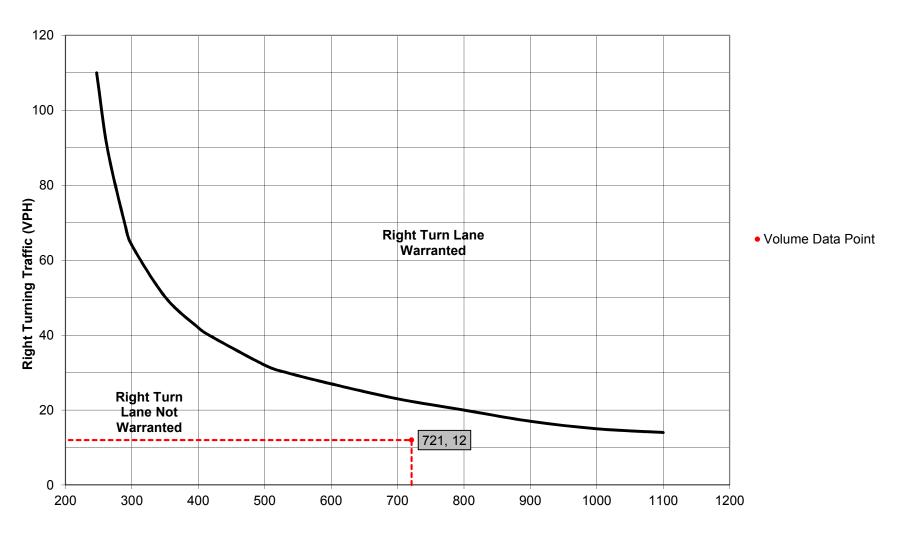
**Advancing Volume including Right Turns (VPH)** 

| Ç   | TUDY LOC   | ΔΤΙΟΝ ΔΝ   | Ο ΔΝΔΙ Υς  | IS INFORMA   | TION   |  |
|---|--|--|--|--|--|--|
| _   |  |  | - AITALIS  | OKIVIA   |  |  |
| unicipality:  | Caln To  | wnship   |  | Analysis Da  | te: 10/30  | /2018  |
| County:   |  |  |  |  |  | В  |
| ng District:  | (  | 5  |  |  |  | 20   |
| _   |  |  |  | ncy/Company Nar  | ne: IF   | טי   |
| escription: N   | Nanor Avenue 8   | k Proposed RIR   | RO Driveway  |  |  |  |
| _   |  |  |  |  |  | 1  |
| _   |  |  |  | Undivided or D   | ivided Highway:  | Undivided  |
|   |  |  |  |  | <del></del>  |  |
| -   |  |  |  | Left or Right-Turn   |  | rpe of Analysis ight Turn Lane   |
|   |  |  |  |  |  |  |
|   |  |  |  |  |  |  |
|   |  |  |  | LuiauUIIS  |  |  |
| Include?  | Volume   | % Trucks   |  |  |  |  |
|   |  |  | -  |  |  |  |
|   |  |  |  |  |  |  |
|   |  |  |  |  | Left Turn Volu   | ıme: N/A   |
|   |  |  |  |  |  |  |
|   |  |  |  | % Left Tu  | ırns in Advancing Volu   | ıme: N/A   |
|   | Ric  | ght Turn Lan   | •  |  |  |  |
| I Indicale 2  |  |  |  |  |  |  |
| _   | volume   | % Irucks   |  |  |  |  |
|   | 701  | 2.0%   | 709  |  | Advancing Volu   | ıme: 721   |
| -   | 11   | 2.0%   | 12   |  | Right Turn Volu  |  |
|   | TUR  | N LANE V   | VARRANT I  | FINDINGS   |  |  |
| .ane Warraı   | nt Findings  |  |  | Right 1  | urn Lane Warrant F   | indings  |
| Figure:   | N/A  | ]  |  | Applicable Wa  | rant Figure: Figu  | ire 10   |
|   |  | ]  |  | Wa   | rrant Met?:  | No   |
| t Met?:   | N/A  |  |  |  |  |  |
| t Met?:   |  | I I ANE I EI   | NGTH CALC  | THE ATIONS   |  |  |
|   | TURN   |  | NGTH CALC  | CULATIONS  |  |  |
| on Control:   | TURN   |  | NGTH CALC  | CULATIONS  |  |  |
| on Control:<br>rning Lane:                              | TURN Unsignalize 12  |  | NGTH CALC  | CULATIONS  |  |  |
| on Control:<br>rning Lane:<br>(Assumed):                | TURN   |  |  |  | N/A  | 1  |
| on Control:<br>rning Lane:                              | TURN Unsignalize 12 60 60  | ed   | Average # o  | of Vehicles/Cycle:   | N/A  |  |
| on Control:<br>rning Lane:<br>(Assumed):                | TURN Unsignalize 12 60 60  | ed   | Average # o  | of Vehicles/Cycle:   | N/A  |  |
| on Control:<br>rning Lane:<br>(Assumed):                | TURN Unsignalize 12 60 60  | ed   | Average # c<br>lication 46, Exh<br>Speed<br>4  | of Vehicles/Cycle:<br>ibit 11-6<br>d (MPH)<br>0-45   | N/A<br>50-60   |  |
| on Control:<br>rning Lane:<br>(Assumed):<br>(If Known): | TURN Unsignalize 12 60 60  | PennDOT Publ   | Average # c<br>lication 46, Exh<br>Spee<br>4<br>Turn Dem   | of Vehicles/Cycle:<br>ibit 11-6<br>d (MPH)<br>0-45<br>land Volume  | 50-60  |  |
| on Control:<br>rning Lane:<br>(Assumed):<br>(If Known): | TURN Unsignalize 12 60 60 High   | PennDOT Publ   | Average # o  | of Vehicles/Cycle:<br>ibit 11-6<br>d (MPH)<br>0-45<br>and Volume<br>Low  | 50-60<br>High Low  |  |
| on Control:<br>rning Lane:<br>(Assumed):<br>(If Known): | TURN Unsignalize 12 60 60  Introl High A   | PennDOT Publ   | Average # c<br>lication 46, Exh<br>Spee<br>4<br>Turn Dem   | of Vehicles/Cycle:<br>ibit 11-6<br>d (MPH)<br>0-45<br>land Volume  | 50-60  |  |
| on Control:<br>rning Lane:<br>(Assumed):<br>(If Known): | TURN Unsignalize 12 60 60  Introl High A   | PennDOT Publ 25-35 Low A A   | Average # c lication 46, Exh Speec 40 Turn Dem High B or C C   | of Vehicles/Cycle: ibit 11-6 d (MPH) 0-45 land Volume Low B or C B   | 50-60  High Low BorC BorC BorC B   | Feet   |
| on Control:<br>rning Lane:<br>(Assumed):<br>(If Known): | TURN Unsignalize 12 60 60  Introl High A   | PennDOT Publ 25-35 Low A A   | Average # c lication 46, Exh Speec 40 Turn Dem High B or C C   | of Vehicles/Cycle: ibit 11-6 d (MPH) 0-45 and Volume Low B or C B ength, Condition   | 50-60  High Low B or C B or C B or C B   |  |
| on Control:<br>rning Lane:<br>(Assumed):<br>(If Known): | TURN Unsignalize 12 60 60  Introl High A   | PennDOT Publ 25-35 Low A A   | Average # c lication 46, Exh Speec 40 Turn Dem High B or C C   | of Vehicles/Cycle: ibit 11-6 d (MPH) 0-45 land Volume Low B or C B ength, Condition  | 50-60  High Low B or C B or C B or C B  A: N/A B: N/A  | Feet   |
| on Control:<br>rning Lane:<br>(Assumed):<br>(If Known): | TURN Unsignalize 12 60 60  Introl High A   | PennDOT Publ 25-35  Low A A Right Turn L   | Average # c lication 46, Exh Speet 40 Turn Dem High B or C Cane Storage Lo   | of Vehicles/Cycle: ibit 11-6 d (MPH) 0-45 and Volume Low Bor C B B ength, Condition Condition  | 50-60  High Low B or C B or C B or C B  A: N/A  B: N/A  C: N/A   | Feet<br>Feet   |
| on Control:<br>rning Lane:<br>(Assumed):<br>(If Known): | TURN Unsignalize 12 60 60  Introl High A   | PennDOT Publ 25-35  Low A A Right Turn L   | Average # c lication 46, Exh Speet 40 Turn Dem High B or C Cane Storage Lo   | of Vehicles/Cycle: ibit 11-6 d (MPH) 0-45 land Volume Low B or C B ength, Condition  | 50-60  High Low B or C B or C B or C B  A: N/A  B: N/A  C: N/A  th: N/A  | Feet<br>Feet<br>Feet   |
| on Control:<br>rning Lane:<br>(Assumed):<br>(If Known): | TURN Unsignalize 12 60 60  Introl High A   | PennDOT Publ 25-35  Low A A Right Turn L   | Average # c lication 46, Exh Speet 40 Turn Dem High B or C Cane Storage Lo   | of Vehicles/Cycle: ibit 11-6 d (MPH) 0-45 and Volume Low Bor C B B ength, Condition Condition  | 50-60  High Low B or C B or C B or C B  A: N/A  B: N/A  C: N/A   | Feet Feet Feet   |
| on Control:<br>rning Lane:<br>(Assumed):<br>(If Known): | TURN Unsignalize 12 60 60  Introl High A   | PennDOT Publ 25-35  Low A A Right Turn L   | Average # c lication 46, Exh Speet 40 Turn Dem High B or C Cane Storage Lo   | of Vehicles/Cycle: ibit 11-6 d (MPH) 0-45 and Volume Low Bor C B B ength, Condition Condition  | High Low Bor C Bor C Bor C B N/A B: N/A C: N/A th: N/A Additional Findings   | Feet Feet Feet   |
| in became   | unicipality: County: ing District:  Description:  Noses Period: esign Hour: on Control: imit (MPH): of Terrain:  Include? Yes No h - Yes  Include? No h - Include? | unicipality: Caln To County: Chester ing District: 6  Description: Manor Avenue 8  ysis Period: 2023 Projecte esign Hour: PM   On Control: Unsign imit (MPH): 4 of Terrain: Le  Include? Volume Yes No | unicipality: County: Chester County ing District: 6  Description: Manor Avenue & Proposed RIF  Unsignalized  Unsignalized  Include?  VOLUME  Left Turn Land  Include?  Volume  Yes  No  No  No  No  Include?  Volume  Right Turn Land  Include?  Volume  Avenue & Proposed RIF  Avenue  Volume  Volume  Trucks  No  No  No  No  Turn Land  Include?  Volume  Trucks  No  Turn Land  Turn Land  Include Nolume  Trucks  No  Turn Land  Tu | unicipality: County: Chester County ing District: 6  Age  Description: Manor Avenue & Proposed RIRO Driveway  ysis Period: esign Hour: On Control: Unsignalized imit (MPH): 45 Level  VOLUME CALCULAT  Left Turn Lane Volume Calculat  Include? Volume % Trucks PCEV Yes N/A NO N/A Turn Lane Volume Calculat  Right Turn Lane Volume Calculat  Right Turn Lane Volume Calculat  Include? Volume % Trucks PCEV NO N/A N/A Yes N/A NO N/A Tes N/A  Right Turn Lane Volume Calculat  Include? Volume % Trucks PCEV NO N/A NO N/A Turn Lane Volume Calculat  TURN LANE WARRANT I  Lene Warrant Findings | unicipality: County: Chester County Checked Agency/Company Nan  Description: Manor Avenue & Proposed RIRO Driveway  Proposed RIRO Driveway  Agency/Company Nan  Description: Manor Avenue & Proposed RIRO Driveway  Proposed RIRO Driveway  Proposed RIRO Driveway  Number of Agency/Company Nan  Number of Agency | County: Chester County ing District: 6  Chesced By: Agency/Company Name: TF  Chescription: Manor Avenue & Proposed RIRO Driveway  Checked By: Agency/Company Name: TF  Chescription: Manor Avenue & Proposed RIRO Driveway  Conducted By: Checked By: Agency/Company Name: TF  Chescription: Manor Avenue & Proposed RIRO Driveway  Conducted By: Checked By: Agency/Company Name: TF  Chescription: Manor Avenue & Proposed RIRO Driveway  Conducted By: Checked By: Agency/Company Name: TF  Chescription: Manor Avenue & Proposed RIRO Driveway  Conducted By: Checked By: Agency/Company Name: TF  Chescription: Manor Avenue & Proposed RIRO Driveway  Number of Approach Lanes: Undivided or Divided Highway: Checked By: Agency/Company Name: TF  Conducted By: Checked By: Agency/Company Name: TF  Chescription: Manor Avenue & Proposed RIRO Driveway  Number of Approach Lanes: Undivided or Divided Highway: Checked By: Agency/Company Name: TF  Conducted By: Checked By: Agency/Company Name: TF  Chescription: Manor Avenue & Proposed RIRO Driveway  Number of Approach Lanes: Undivided or Divided Highway: Checked By: Agency/Company Name: TF  Chescription: Manor Avenue & Proposed RIRO Driveway  Number of Approach Lanes: Undivided or Divided Highway: Checked By: Agency/Company Name: TF  Chescription: Manor Avenue & Proposed RIRO Driveway  Number of Approach Lanes: Checked By: Agency/Company Name: Tr  Chescription: Manor Avenue & Proposed RIRO Driveway  Number of Approach Lanes: Checked By: Agency/Company Name: Tr  Chescription: Agency Checked By: Agency/Company Name: Tr  Checked By: Agency/Company Name: Tr  Checked By: Agency/Company Name: Checked By: Agency/Company Name: Tr  Checked By: Agency/Company Name: Checked By: Agenc |



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Figure 10. Warrant for right turn lanes on two-lane roadways (45 mph or greater speeds, unsignalized and signalized intersections)



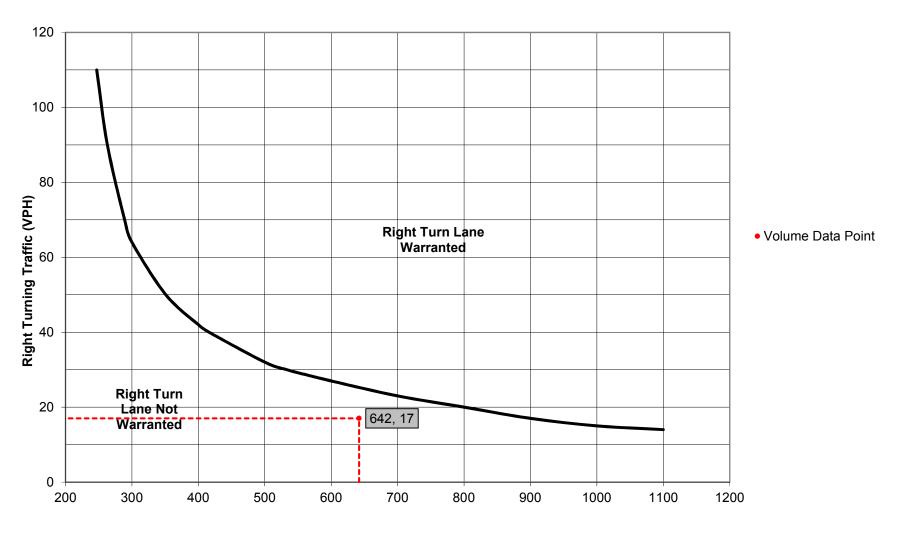
**Advancing Volume including Right Turns (VPH)** 

|                                   |  |   | JDY LOC                             | ATION AN                                | Νη ΔΝΔΙΝ   |   | IC DIM  |                                    |
|-----------------------------------|--|---|-------------------------------------|---|--|---|---|------------------------------------|
| ·                                 |  |   |                                     |   |  | 5.5 51  |   |                                    |
|                                   | Mur  | nicipality:   |                                     | wnship                                  |  | Analysis Date   |   |                                    |
|                                   |  | County:   |                                     | County                                  |  | Conducted B   | •   | В                                  |
| PennDOT                           | Engineering  | g District:   | - 6                                 | 6                                       |  | Checked B   | •   | ND.                                |
|                                   |  |   |                                     | 1.0                                     |  | gency/Company Nam   | e. Ir   | · U                                |
| Intersection & Ap                 | proach De  | scription: Mai  | nor Avenue &                        | i Proposed RII                          | IRO Driveway   |   |   |                                    |
|                                   | Analys   | is Period:  | 2023 Projecte                       | ed Conditions                           | 5  | Number of A   | pproach Lanes:  | 1                                  |
|                                   |  | ign Hour:   |                                     | Peak                                    |  | Undivided or Div  | vided Highway:  | Undivided                          |
|                                   | Intersection   |   |                                     | nalized                                 |  |   |   |                                    |
| Posted                            | d Speed Lim  | of Terrain:   |                                     | ·5<br>vel                               |  | Left or Right-Turn  |   | rpe of Analysis<br>light Turn Lane |
|                                   | Турс о   | T Terrain.  |                                     |   | CALCIU   |   | zane raiarysis :  | ight runn zunc                     |
|                                   |  |   |                                     |   | CALCULA  |   |   |                                    |
|                                   |  |   |                                     |   | ne Volume C  | alculations   |   |                                    |
| Movemer                           | n <b>t</b><br>Left                                       | Include?  | Volume                              | % Trucks                                | PCEV   | -   | A d   | NI/A                               |
| Advancina                         |  | Yes<br>-  |                                     |   | N/A  | -   | Advancing Volu  |                                    |
| Advancing                         | Through<br>Right   | Yes   |                                     |   | N/A<br>N/A   | -   | Opposing Volu   |                                    |
|                                   | Left   | No  |                                     |   | N/A<br>N/A   | 1   | Left Turn Volu  | inie: N/A                          |
| Opposing                          | Through  | -   |                                     |   | N/A  | †   |   |                                    |
| Obbosing                          | Right  | Yes   |                                     |   | N/A  | % Left Tur  | ns in Advancing Volu  | ıme: N/A                           |
|                                   |  |   | Riç                                 | ght Turn Lar                            | ne Volume (  | Calculations  | -   |                                    |
| Movemer                           | nt   | Include?  | Volume                              | % Trucks                                | PCEV   | ]   |   |                                    |
|                                   | Left   | No  |                                     |   | N/A  |   |   |                                    |
| Advancing                         | Through  | -   | 621                                 | 1.0%                                    | 625  |   | Advancing Volu  |                                    |
|                                   | Right  | -   | 16                                  | 2.0%                                    | 17   |   | Right Turn Volu   | ıme: 17                            |
|                                   |  |   | TUR                                 | N LANE V                                | WARRAN   | T FINDINGS  |   |                                    |
| Le                                | ft Turn La   | ine Warrant l   | Findings                            |   |  | Right Tu  | urn Lane Warrant F  | indings                            |
|                                   |  | igure:  | N/A                                 |   |  | Applicable Warr   | ant Figure: Figu  | ure 10                             |
| Applicable '                      | Warrant F  | _   |                                     |   |  |   |   |                                    |
| Applicable                        | Warrant Fi   |   | N/A                                 |   |  | War   | rant Met?:  | No                                 |
| Applicable                        |  |   |                                     | I LANE LE                               | NGTH CA  |   | rant Met?:  | No                                 |
|                                   | Warrant I  | Met?:   | TURN                                |   | NGTH CA  | War<br>LCULATIONS   | rant Met?:  | No                                 |
|                                   | Warrant I  | Met?:   |                                     |   | NGTH CA  |   | rant Met?:  | No                                 |
| I<br>Design Hour Volu             | Warrant I  | Met?:   | TURN                                |   | NGTH CA  |   | rant Met?:  | No                                 |
| I<br>Design Hour Volu<br>Cycles I | Warrant I Intersection                                   | Met?:   | TURN Unsignalize                    |   |  |   | rant Met?:  | No                                 |
| I<br>Design Hour Volu<br>Cycles I | Warrant I Intersection Ime of Turn Per Hour (A           | Met?:   | Unsignalize 17 60 60                | d                                       | Average<br>blication 46, E                                   | # of Vehicles/Cycle:  |   | No                                 |
| I<br>Design Hour Volu<br>Cycles I | Warrant I Intersection Ime of Turn Per Hour (A           | Met?:   | Unsignalize 17 60 60                | d PennDOT Pub                           | Average<br>blication 46, E                                   | # of Vehicles/Cycle:  xhibit 11-6 eed (MPH)   | N/A   | No                                 |
| I<br>Design Hour Volu<br>Cycles I | Marrant I<br>Intersection<br>Ime of Turn<br>Per Hour (If | Met?:   | TURN Unsignalize 17 60 60           | d                                       | Average<br>blication 46, E                                   | # of Vehicles/Cycle:  whibit 11-6 eed (MPH) 40-45   |   | No                                 |
| I<br>Design Hour Volu<br>Cycles I | Marrant I<br>Intersection<br>Ime of Turn<br>Per Hour (If | Met?:  n Control: ning Lane: assumed): f Known):  | TURN Unsignalize 17 60 60           | d PennDOT Pub                           | Average<br>blication 46, E                                   | # of Vehicles/Cycle:  whibit 11-6 eed (MPH) 40-45 emand Volume  | N/A   | No                                 |
| I<br>Design Hour Volu<br>Cycles I | Intersection Ime of Turn Per Hour (If                    | Met?:  n Control: ning Lane: assumed): f Known):  of Traffic Contro                             | TURN Unsignalize 17 60 60 10 High A | PennDOT Pub  25-35  Low A               | Average blication 46, E Sp Turn D High B or C                | # of Vehicles/Cycle:   xhibit 11-6   eed (MPH)   40-45   Low   B or C   I   | N/A  50-60  High Low B or C B or C                              | No                                 |
| I<br>Design Hour Volu<br>Cycles I | Intersection Ime of Turn Per Hour (If                    | Met?:  n Control: ning Lane: ussumed): f Known):  | TURN Unsignalize 17 60 60 High      | PennDOT Pub 25-35                       | Average<br>blication 46, E<br>Sp<br>Turn D<br>High           | # of Vehicles/Cycle:   xhibit 11-6   eed (MPH)   40-45   Low   B or C   I   | N/A 50-60 High Low  | No                                 |
| I<br>Design Hour Volu<br>Cycles I | Intersection Ime of Turn Per Hour (If                    | Met?:  n Control: ning Lane: assumed): f Known):  of Traffic Contro                             | TURN Unsignalize 17 60 60 10 High A | PennDOT Pub  25-35  Low A A             | Average blication 46, E Sp Turn D High B or C                | # of Vehicles/Cycle:   xhibit 11-6   eed (MPH)   40-45   Low   B or C   I   | N/A  50-60  High Low Bor C Bor C Bor C B                        | No                                 |
| I<br>Design Hour Volu<br>Cycles I | Intersection Ime of Turn Per Hour (If                    | Met?:  n Control: ning Lane: assumed): f Known):  of Traffic Contro                             | TURN Unsignalize 17 60 60 10 High A | PennDOT Pub  25-35  Low A A             | Average blication 46, E Sp Turn D High B or C                | # of Vehicles/Cycle:    xhibit 11-6   eed (MPH)   40-45   emand Volume   Low     B or C   B     B   I   | N/A  50-60  High Low B or C B or C B or C B                     |                                    |
| I<br>Design Hour Volu<br>Cycles I | Intersection Ime of Turn Per Hour (If                    | Met?:  n Control: ning Lane: assumed): f Known):  of Traffic Contro                             | TURN Unsignalize 17 60 60 10 High A | PennDOT Pub  25-35  Low A A             | Average blication 46, E Sp Turn D High B or C                | # of Vehicles/Cycle:    xhibit 11-6   eed (MPH)   40-45   Emand Volume   Low   B or C   E     B or C   E     B or C   E     C                               | N/A  50-60  High Low B or C B or C B or C B N/A  N/A B: N/A     | Feet                               |
| I<br>Design Hour Volu<br>Cycles I | Intersection Ime of Turn Per Hour (If                    | Met?:  n Control: ning Lane: assumed): f Known):  of Traffic Contro                             | TURN Unsignalize 17 60 60 10 High A | PennDOT Pub  25-35  Low A A  Right Turn | Average blication 46, E Sp Turn D High B or C C Lane Storage | # of Vehicles/Cycle:    whibit 11-6   eed (MPH)   40-45   emand Volume   Low     B or C   E     B or C   Condition A  | N/A  50-60  High Low BorC BorC BorC B  N/A  N/A  N/A  N/A       | Feet<br>Feet                       |
| I<br>Design Hour Volu<br>Cycles I | Intersection Ime of Turn Per Hour (If                    | Met?:  n Control: ning Lane: assumed): f Known):  of Traffic Contro                             | TURN Unsignalize 17 60 60 10 High A | PennDOT Pub  25-35  Low A A  Right Turn | Average blication 46, E Sp Turn D High B or C C Lane Storage | # of Vehicles/Cycle:    xhibit 11-6   eed (MPH)   40-45   emand Volume   Low   B or C   E     B   E     Condition E     Condition C     Lane Storage Length | 50-60  High Low BorC BorC BorC B  A: N/A  B: N/A  C: N/A        | Feet<br>Feet<br>Feet<br>Feet       |
| I<br>Design Hour Volu<br>Cycles I | Intersection ume of Turn Per Hour (If Type o             | Met?:  In Control: Ining Lane: Issumed): If Known):  Of Traffic Control Signalized Jusignalized | TURN Unsignalize 17 60 60 10 High A | PennDOT Pub  25-35  Low A A  Right Turn | Average blication 46, E Sp Turn D High B or C C Lane Storage | # of Vehicles/Cycle:    xhibit 11-6   eed (MPH)   40-45   emand Volume   Low   B or C   E     B   E     Condition E     Condition C     Lane Storage Length | 50-60  High Low B or C B or C B or C B N/A B: N/A C: N/A h: N/A | Feet<br>Feet<br>Feet<br>Feet       |



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Figure 10. Warrant for right turn lanes on two-lane roadways (45 mph or greater speeds, unsignalized and signalized intersections)



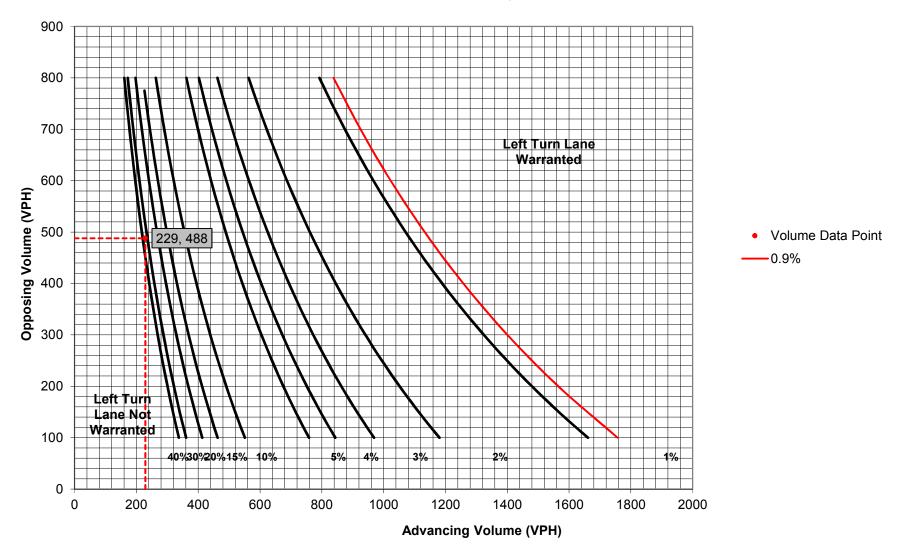
Advancing Volume including Right Turns (VPH)

|  |  |  |  |   |  | ŗ   |                                     |                              |
|--|--|--|--|---|--|---|-------------------------------------|------------------------------|
|  | Mui                                      | nicipality:  |  | ownship                                 |  | Analysis Date:  | 10/30/                              |                              |
| PennD∩T  | Engineerin                               | County:  |  | r County<br>6                           |  | Conducted By:<br>Checked By:  | ME                                  | 3                            |
| remibor  | Liigiileeiiii                            | g District.  |  | 0                                       | Ag   | ency/Company Name:  | TPE                                 | )                            |
| ntersection & A                                  | pproach De                               | escription: LI                                     | oyd Avenue &                           | Park and Ride,                          | /Proposed Dri  | veway   |                                     |                              |
|  | A  |  | 2022 Danis et                          | ad Candikiana                           | _  | Number of Acc   |                                     | 1                            |
|  | -  | sis Period:  |  | ed Conditions<br>Peak                   |  | Number of App<br>Undivided or Divid   |                                     | 1<br>Undivided               |
|  | Intersection                             | _  |  | nalized                                 |  | Ondivided of Divid  | cu mgmway.                          | Ollawaca                     |
| Poste  | d Speed Lim                              | nit (MPH):   |  | 35                                      |  |   | Тур                                 | oe of Analysis               |
|  | Туре о                                   | of Terrain:  | Le                                     | vel                                     |  | Left or Right-Turn Lai  | ne Analysis?: Le                    | eft Turn Lane                |
|  |  |  |  | VOLUME                                  | CALCULA  | TIONS   |                                     |                              |
|  |  |  | L                                      | eft Turn Lan                            | e Volume Ca  | alculations   |                                     |                              |
| Moveme   |  | Include?   | Volume                                 | % Trucks                                | PCEV   |   |                                     |                              |
|  | Left                                     | Yes  | 1                                      | 2.0%                                    | 2  |   | Advancing Volur                     |                              |
| Advancing  | Through                                  | - Voc  | 196<br>18                              | 11.0%                                   | 207  |   | Opposing Volum                      |                              |
|  | Right<br>Left                            | Yes<br>Yes   | 18                                     | 22.0%<br>0.0%                           | 20   |   | Left Turn Volur                     | ne: Z                        |
| Opposing   | Through                                  | -  | 475                                    | 3.0%                                    | 483  |   |                                     |                              |
|  | Right                                    | Yes  | 2                                      | 2.0%                                    | 3  | % Left Turns  | in Advancing Volur                  | ne: 0.87%                    |
|  |  |  | Ri                                     | ght Turn Lar                            | ne Volume C  | alculations   |                                     |                              |
| Moveme   |  | Include?   | Volume                                 | % Trucks                                | PCEV   |   |                                     |                              |
| A al   | Left                                     | No   | 2                                      | 0.0%                                    | N/A  |   | A d                                 | NI/A                         |
| Advancing  | Through<br>Right                         | -  | 475<br>2                               | 3.0%<br>2.0%                            | N/A<br>N/A   |   | Advancing Volur<br>Right Turn Volur |                              |
|  |  |  | TUF                                    | RN LANE V                               | VARRANT  | FINDINGS  |                                     |                              |
| Le   | eft Turn La                              | ne Warran  |  |   |  |   | n Lane Warrant F                    | indings                      |
|  |  |  |  |   |  | Applicable Warran   |                                     | /A                           |
|  | Warrant F                                | igure: F   | JEULGI                                 |   |  |   |                                     |                              |
| Applicable                                       |  |  | No                                     | <u>.</u><br>[                           |  |   | nt Met?: N                          | /A                           |
|  | Warrant F                                |  | No                                     | I I ANE I E                             | NGTH CAI   | Warra   | nt Met?: N                          | /A                           |
| Applicable                                       | Warrant                                  | Met?:  | No<br>TURN                             |   | NGTH CAI   |   | nt Met?: N                          | /A                           |
| Applicable                                       | Warrant                                  | Met?:  | No TURN Unsignalize                    |   | NGTH CAI   | Warra   | nt Met?: N                          | /A                           |
| Applicable  Applicable                           | Warrant                                  | Met?:  | No<br>TURN                             |   | NGTH CAI   | Warra   | nt Met?: N                          | /A                           |
| Applicable  Design Hour Volu  Cycles             | Warrant  <br>Intersection<br>ume of Turn | Met?:  n Control: ning Lane: Assumed):             | No TURN Unsignalize 2                  |   |  | Warra   | nt Met?: N                          | /A                           |
| Applicable  Design Hour Volu  Cycles             | Warrant I                                | Met?:  n Control: ning Lane: Assumed):             | No TURN Unsignalize 2 60 60            |   | Average #  | Warra LCULATIONS  # of Vehicles/Cycle:  |                                     | /A                           |
| Applicable  Design Hour Volu  Cycles             | Intersection ume of Turn Per Hour (H     | n Control:<br>ning Lane:<br>Assumed):<br>f Known): | No TURN Unsignalize 2 60 60            | PennDOT Pub                             | Average #  | Warra LCULATIONS  # of Vehicles/Cycle: chibit 11-6 eed (MPH)  | N/A                                 | /A                           |
| Applicable  Design Hour Volu  Cycles             | Intersection ume of Turn Per Hour (H     | Met?:  n Control: ning Lane: Assumed):             | No TURN Unsignalize 2 60 60            | ed                                      | Average #  | Warra LCULATIONS  # of Vehicles/Cycle:  |                                     | /A                           |
| Applicable  Design Hour Volu  Cycles             | Intersection ume of Turn Per Hour (H     | n Control:<br>ning Lane:<br>Assumed):<br>f Known): | No TURN Unsignalize 2 60 60 ttrol High | PennDOT Pub 25-35                       | Average #  Nication 46, E3  Spe  Turn De  High   | Warra  LCULATIONS  # of Vehicles/Cycle:  chibit 11-6  edd (MPH)  40-45  cmand Volume  Low Hill  | N/A 50-60 Low                       | /A                           |
| Applicable  Design Hour Volu  Cycles             | Intersection ume of Turn Per Hour (H     | n Control:<br>ning Lane:<br>Assumed):<br>f Known): | No TURN Unsignalize 2 60 60            | PennDOT Pub                             | Average folication 46, Expenses  | Warra  LCULATIONS  # of Vehicles/Cycle:  chibit 11-6  eed (MPH)  40-45  emand Volume  | N/A  50-60  gh                      | /A                           |
| Applicable  Design Hour Volu  Cycles             | Intersection ume of Turn Per Hour (H     | n Control: ning Lane: Assumed): f Known):          | No TURN Unsignalize 2 60 60 trol High  | PennDOT Pub  25-35  Low A A             | Average #  ### Specific Specif | # of Vehicles/Cycle:  thibit 11-6  ed (MPH)  40-45  mand Volume  Low Hill  B or C B o  B B B  | 50-60 gh                            |                              |
| Applicable  Applicable  Oesign Hour Volu  Cycles | Intersection ume of Turn Per Hour (H     | n Control: ning Lane: Assumed): f Known):          | No TURN Unsignalize 2 60 60 trol High  | PennDOT Pub  25-35  Low A A             | Average #  ### Specific Specif | Warra  LCULATIONS  # of Vehicles/Cycle:  chibit 11-6  edd (MPH)  40-45  mand Volume  Low Hill  Bor C Bo  B Bo  Length, Condition A:                                 | N/A  50-60  gh                      | Feet                         |
| Applicable  Applicable  Oesign Hour Volu  Cycles | Intersection ume of Turn Per Hour (H     | n Control: ning Lane: Assumed): f Known):          | No TURN Unsignalize 2 60 60 trol High  | PennDOT Pub  25-35  Low A A             | Average #  ### Specific Specif | Warra  LCULATIONS  # of Vehicles/Cycle:  chibit 11-6  end (MPH)  40-45  emand Volume  Low High Bor C Bo B Bo  Length, Condition A:  Condition B:                    | 50-60  gh                           | Feet<br>Feet                 |
| Applicable  Design Hour Volu  Cycles             | Intersection ume of Turn Per Hour (H     | n Control: ning Lane: Assumed): f Known):          | No TURN Unsignalize 2 60 60 trol High  | PennDOT Pub  25-35  Low A A Left Turn I | Average History Special Section 46, Experimental Section 46, Experiment | Warra  LCULATIONS  # of Vehicles/Cycle:  chibit 11-6  ed (MPH)  40-45  mand Volume  Low Hill  B or C B o  B B B o  Length, Condition A:  Condition B:  Condition C: | 50-60 gh                            | Feet<br>Feet<br>Feet         |
| Applicable  Applicable  Oesign Hour Volu  Cycles | Intersection ume of Turn Per Hour (H     | n Control: ning Lane: Assumed): f Known):          | No TURN Unsignalize 2 60 60 trol High  | PennDOT Pub  25-35  Low A A Left Turn I | Average History Special Section 46, Experimental Section 46, Experiment | Warra  LCULATIONS  # of Vehicles/Cycle:    chibit 11-6   end (MPH)   40-45   emand Volume   Low High   B or C B or B or B or C B or B or C B or B or                | 50-60 gh                            | Feet<br>Feet<br>Feet         |
| Applicable  Design Hour Volu  Cycles             | Intersection ume of Turn Per Hour (H     | n Control: ning Lane: Assumed): f Known):          | No TURN Unsignalize 2 60 60 trol High  | PennDOT Pub  25-35  Low A A Left Turn I | Average History Special Section 46, Experimental Section 46, Experiment | Warra  LCULATIONS  # of Vehicles/Cycle:    chibit 11-6   end (MPH)   40-45   emand Volume   Low High   B or C B or B or B or C B or B or C B or B or                | 50-60 gh                            | Feet<br>Feet<br>Feet<br>Feet |



10/30/2018 LLOYD PARK AM.xlsx

Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)

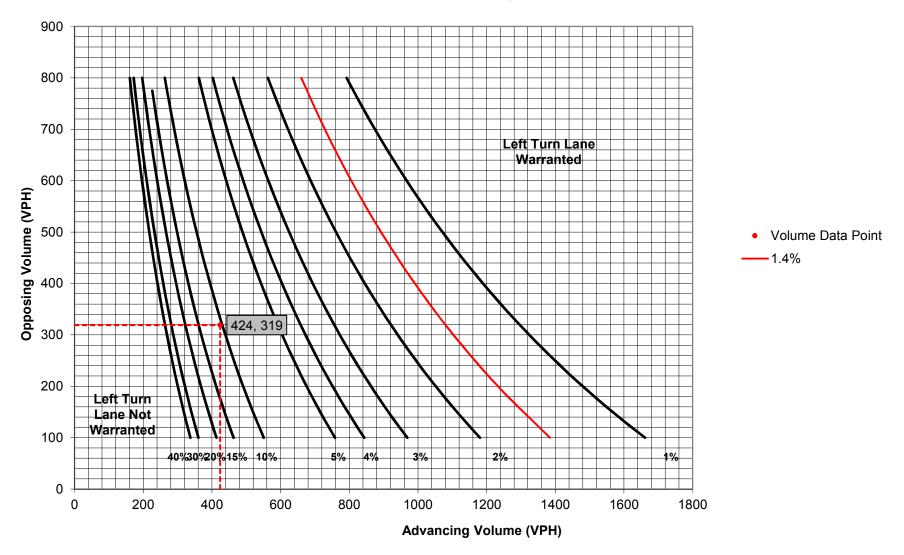


|                  | N.4                                       | nicinality.  | Caln To                                 | wnship                      | _  | Analysis Deta  | 10/30   | /2018                |
|------------------|---|--|---|-----------------------------|--|--|---|----------------------|
|                  | Mui                                       | nicipality: County:                                |   | County                      |  | Analysis Date<br>Conducted By  |   |                      |
| PennDOT          | Engineerin                                |  |   | 6                           |  | Checked By   |   | В                    |
|                  | g   | 8 2 10 11 10 11                                    |   | <u>-</u>                    | Ag   | gency/Company Name   |   | D                    |
| Intersection & A | pproach De                                | scription: Llo                                     | /d Avenue & I                           | Park and Ride,              | /Proposed Dri  | iveway   |   |                      |
|                  | Analys                                    | sis Period:  | 2023 Project                            | ed Conditions               |  | Number of Ap   | proach Lanes:   | 1                    |
|                  | -   | sign Hour:   |   | Peak                        |  | Undivided or Divi  |   | Undivided            |
|                  | Intersection                              | n Control:   | Unsign                                  | nalized                     |  |  |   |                      |
| Poste            | d Speed Lim                               |  |   |                             |  |  |   | pe of Analysis       |
|                  | Туре о                                    | of Terrain:  |   | vel                         |  | Left or Right-Turn La  | ane Analysis?:  | eft Turn Lane        |
|                  |   |  |   |                             | CALCULA  |  |   |                      |
|                  |   |  | Le                                      | eft Turn Lan                | e Volume Ca  | alculations  |   |                      |
| Moveme           |   | Include?   | Volume                                  | % Trucks                    | PCEV   | •  |   | 12.1                 |
| Advancing        | Left                                      | Yes<br>-   | 5<br>406                                | 2.0%                        | 6<br>411   |  | Advancing Volu  |                      |
| Advancing        | Through<br>Right                          | Yes  | 406<br>7                                | 0.0%                        | 7  |  | Opposing Volu<br>Left Turn Volu                       |                      |
|                  | Left                                      | Yes  | 1                                       | 0.0%                        | 1  |  | Lett ruin voit  |                      |
| Opposing         | Through                                   | -  | 308                                     | 2.0%                        | 312  |  |   |                      |
|                  | Right                                     | Yes  | 5                                       | 2.0%                        | 6  | % Left Turn  | s in Advancing Volu                                   | ıme: 1.42%           |
|                  |   |  | Riç                                     | ght Turn Lar                | ne Volume C  | Calculations   |   |                      |
| Moveme           |   | Include?   | Volume                                  | % Trucks                    | PCEV   |  |   |                      |
| Advancing        | Left<br>Through                           | No<br>-  | 308                                     | 0.0%<br>2.0%                | N/A<br>N/A   |  | Advancing Volu  | ıme: N/A             |
| Advancing        | Right                                     | -  | 5                                       | 2.0%                        | N/A  |  | Right Turn Volu                                       |                      |
|                  |   |  | TUP                                     | RN LANE V                   | VARRANT  | T FINDINGS   |   |                      |
| Le               | eft Turn La                               | ne Warrant   | Findings                                |                             |  | Right Tui  | rn Lane Warrant F                                     | indings              |
|                  | Warrant F                                 |  | gure 1                                  |                             |  | Applicable Warra   |   | I/A                  |
|                  | Warrant                                   |  | No                                      | !<br>[                      |  | Warr   | ant Met?:   | I/A                  |
|                  |   |  | THEN                                    | LIANELE                     | NGTH CA  | LCULATIONS   |   |                      |
|                  |   |  | TORK                                    | I LAIVE EEI                 | NOTH CA  | LCOLATIONS   |   |                      |
|                  |   | . Cambuali   | Uncignaliza                             | ٦                           |  |  |   |                      |
|                  | Intersection                              |  | Unsignalize<br>6                        | d                           |  |  |   |                      |
| Design Hour Vol  | ume of Turn                               | ning Lane:   | Unsignalize<br>6<br>60                  | ed                          |  |  |   |                      |
| Design Hour Vol  |   | ning Lane:   | 6                                       | ed                          | Average :  | # of Vehicles/Cycle:   | N/A   | 1                    |
| Design Hour Vol  | ume of Turn<br>Per Hour (A                | ning Lane:   | 6<br>60<br>60                           | PennDOT Pub                 | ŭ  |  | N/A   | ]                    |
| Design Hour Vol  | ume of Turn<br>Per Hour (A                | ning Lane:   | 6<br>60<br>60                           | PennDOT Pub                 | lication 46, E   | xhibit 11-6<br>eed (MPH)   |   | ]                    |
| Design Hour Vol  | ume of Turn<br>Per Hour (A<br>Per Hour (I | ning Lane:   | 6<br>60<br>60                           |                             | olication 46, Ex   | xhibit 11-6<br>eed (MPH)<br>40-45  | N/A<br>50-60  |                      |
| Design Hour Vol  | ume of Turn<br>Per Hour (A<br>Per Hour (I | ning Lane: Assumed): f Known):                     | 6<br>60<br>60                           | PennDOT Pub                 | olication 46, Ex   | xhibit 11-6<br>eed (MPH)<br>40-45<br>emand Volume  |   |                      |
| Design Hour Vol  | ume of Turn Per Hour (A Per Hour (II      | ning Lane: Assumed): f Known):  of Traffic Control | 6 60 60 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIII | PennDOT Pub 25-35  Low A    | Sport Survey Sport Survey Surv | xhibit 11-6 eed (MPH) 40-45 emand Volume Low H B or C B  | 50-60  ligh   |                      |
| Design Hour Vol  | ume of Turn Per Hour (A Per Hour (II      | Assumed): f Known):  of Traffic Contro             | 6<br>60<br>60                           | PennDOT Pub<br>25-35        | Olication 46, Ex   | xhibit 11-6 eed (MPH) 40-45 emand Volume Low H B or C B  | 50-60<br>ligh Low                                     |                      |
| Design Hour Vol  | ume of Turn Per Hour (A Per Hour (II      | ning Lane: Assumed): f Known):  of Traffic Control | 6 60 60 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIII | PennDOT Pub  25-35  Low A A | Special Superior Supe | xhibit 11-6 eed (MPH) 40-45 emand Volume Low H B or C B  | 50-60  ligh   | Feet                 |
| Design Hour Vol  | ume of Turn Per Hour (A Per Hour (II      | ning Lane: Assumed): f Known):  of Traffic Control | 6 60 60 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIII | PennDOT Pub  25-35  Low A A | Special Superior Supe | xhibit 11-6 eed (MPH) 40-45 Emand Volume Low H B or C B B B                                    | 50-60 ligh Low or C B or C or C B                     | Feet<br>Feet         |
| Design Hour Vol  | ume of Turn Per Hour (A Per Hour (II      | ning Lane: Assumed): f Known):  of Traffic Control | 6 60 60 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIII | PennDOT Pub  25-35  Low A A | Special Superior Supe | xhibit 11-6 eed (MPH) 40-45 emand Volume Low H B or C B B B B                                  | 50-60  ligh Low or C B or C or C B  N/A  N/A          | _                    |
| Design Hour Vol  | ume of Turn Per Hour (A Per Hour (II      | ning Lane: Assumed): f Known):  of Traffic Control | 6 60 60 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIII | 25-35  Low A A  Left Turn L | Spilication 46, Ex<br>Spilication 46, Ex<br>Turn De<br>High<br>B or C<br>C   | xhibit 11-6 eed (MPH) 40-45 Emand Volume Low H Bor C B B B E Length, Condition A Condition B   | 50-60  ligh Low or C B or C or C B  N/A  N/A  N/A     | Feet                 |
| Design Hour Vol  | ume of Turn Per Hour (A Per Hour (II      | ning Lane: Assumed): f Known):  of Traffic Control | 6 60 60 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIII | 25-35  Low A A  Left Turn L | Spilication 46, Ex<br>Spilication 46, Ex<br>Turn De<br>High<br>B or C<br>C   | Axhibit 11-6  aced (MPH)  40-45  Bor C B  B B B  Condition A  Condition C  Lane Storage Length | 50-60  ligh Low or C Bor C or C B  N/A  N/A  N/A  N/A | Feet<br>Feet<br>Feet |
| Design Hour Vol  | ume of Turn Per Hour (A Per Hour (II      | ning Lane: Assumed): f Known):  of Traffic Control | 6 60 60 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIII | 25-35  Low A A  Left Turn L | Spilication 46, Ex<br>Spilication 46, Ex<br>Turn De<br>High<br>B or C<br>C   | Axhibit 11-6  aced (MPH)  40-45  Bor C B  B B B  Condition A  Condition C  Lane Storage Length | 50-60  ligh Low or C Bor C or C B  N/A  N/A  N/A      | Feet<br>Feet<br>Feet |



10/30/2018 LLOYD PARK PM.xlsx

Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)

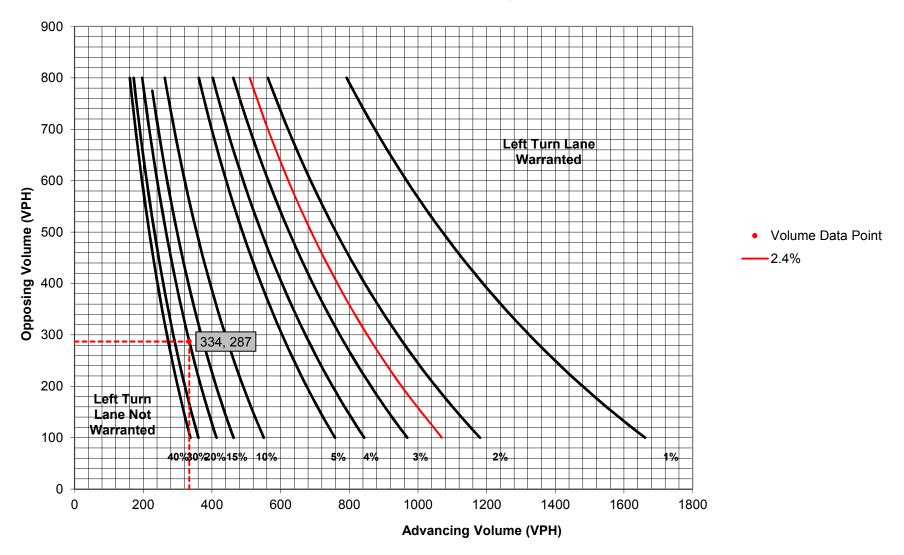


|                  | N.A  | nicipalitu  | Cala Ta                        | wnship   |  | Analysis Data   | 10/30/  | /2018                |
|------------------|--|---|--------------------------------|--|--|---|---|----------------------|
|                  | Mul  | nicipality: County:                               |                                | County   |  | Analysis Date:<br>Conducted By:   |   |                      |
| PennDOT          | Engineerin                                 | -   |                                | 6  |  | Checked By:   |   | ь                    |
| T CHILDOT        | Liigilicciiii                              | 5 District.                                       |                                | <u>,                                      </u> | Ag   | gency/Company Name:   |   | D                    |
| Intersection & A | pproach De                                 | scription: Llo                                    | d Avenue & I                   | Park and Ride,                                 | /Proposed Dri                                    | iveway  |   |                      |
|                  | Analys                                     | sis Period:                                       | 2022 Projecto                  | ed Conditions                                  | _  | Number of App   | reach Lange   | 1                    |
|                  | -  | sign Hour:  |                                | Peak   |  | Undivided or Divided  |   | Undivided            |
|                  | Intersection                               |   |                                | nalized  |  |   |   |                      |
| Poste            | d Speed Lim                                | iit (MPH):  | 3                              | 5  |  |   | Ту  | pe of Analysis       |
|                  | Туре о                                     | of Terrain:                                       | Lev                            | vel  |  | Left or Right-Turn La   | ne Analysis?: L                                       | eft Turn Lane        |
|                  |  |   |                                | VOLUME   | CALCULA  | TIONS   |   |                      |
|                  |  |   | Le                             | eft Turn Land                                  | e Volume Ca                                      | alculations   |   |                      |
| Moveme           |  | Include?  | Volume                         | % Trucks                                       | PCEV   |   |   |                      |
|                  | Left                                       | Yes   | 7                              | 2.0%   | 8  |   | Advancing Volu  |                      |
| Advancing        | Through                                    | - Voc   | 319                            | 1.0%   | 321  |   | Opposing Volu   |                      |
|                  | Right<br>Left                              | Yes<br>Yes  | 2                              | 25.0%<br>0.0%                                  | 5  |   | Left Turn Volu  | me: 8                |
| Opposing         | Through                                    | -   | 276                            | 1.0%   | 278  |   |   |                      |
|                  | Right                                      | Yes   | 6                              | 2.0%   | 7  | % Left Turns  | s in Advancing Volu                                   | me: 2.40%            |
|                  |  |   | Riç                            | ght Turn Lar                                   | ne Volume C                                      | Calculations  |   |                      |
| Moveme           |  | Include?  | Volume                         | % Trucks                                       | PCEV   |   |   |                      |
| A di             | Left                                       | No  | 2                              | 0.0%   | N/A  |   | Advanda Natio   | NI/A                 |
| Advancing        | Through<br>Right                           | -   | 276<br>6                       | 1.0%<br>2.0%                                   | N/A<br>N/A                                       |   | Advancing Volu<br>Right Turn Volu                     |                      |
|                  |  |   | THE                            | NIANEV   | NARRANT  | FINDINGS  |   |                      |
| Le               | eft Turn La                                | ne Warrant  |                                |  |  |   | n Lane Warrant F                                      | indings              |
|                  | Warrant F                                  |   | gure 1                         |  | ' II '   | Applicable Warra  |   | I/A                  |
|                  | Warrant I                                  |   | No                             | ·<br>[   |  |   |   | I/A                  |
|                  | ···  |   | 110                            |  |  |   | ant weet.   |                      |
|                  |  |   | TUDA                           |  |  |   |   |                      |
|                  |  |   |                                |  | NGTH CA  | LCULATIONS  |   |                      |
|                  | Intersection                               |   | Unsignalize                    |  | NGTH CA  | LCULATIONS  |   |                      |
| Design Hour Vol  | ume of Turn                                | ning Lane:  | Unsignalize<br>8               |  | NGTH CA  | LCULATIONS  |   |                      |
| Design Hour Vol  |  | ning Lane:  | Unsignalize                    |  |  | # of Vehicles/Cycle:  | N/A   | ]                    |
| Design Hour Vol  | ume of Turn<br>Per Hour (A                 | ning Lane:  | Unsignalize  8  60  60         | ed   | Average :  | # of Vehicles/Cycle:  | N/A   | ]                    |
| Design Hour Vol  | ume of Turn<br>Per Hour (A                 | ning Lane:  | Unsignalize  8  60  60         |  | Average :  | # of Vehicles/Cycle:  | N/A   | ]                    |
| Design Hour Vol  | ume of Turn<br>Per Hour (A<br>Per Hour (If | ning Lane:  | Unsignalize 8 60 60            | ed   | Average :  | # of Vehicles/Cycle:  | N/A<br>50-60  |                      |
| Design Hour Vol  | ume of Turn<br>Per Hour (A<br>Per Hour (If | ning Lane: Assumed): f Known):                    | Unsignalize  8  60  60         | PennDOT Pub                                    | Average :<br>lication 46, E:<br>Spi<br>Turn De   | # of Vehicles/Cycle:  | 50-60   |                      |
| Design Hour Vol  | ume of Turn<br>Per Hour (A<br>Per Hour (If | ning Lane: sssumed): f Known):  of Traffic Contro | Unsignalize  8 60 60  I High   | PennDOT Pub 25-35 Low A                        | Average : Spi Turn De High B or C                | # of Vehicles/Cycle:    whibit 11-6   eed (MPH)   40-45   emand Volume   Low Hi   B or C B 6  | 50-60  igh  |                      |
| Design Hour Vol  | ume of Turn<br>Per Hour (A<br>Per Hour (If | Assumed):  f Known):                              | Unsignalize  8 60 60 I         | PennDOT Pub 25-35                              | Average : Spo Turn De High                       | # of Vehicles/Cycle:    whibit 11-6   eed (MPH)   40-45   emand Volume   Low Hi   B or C B 6  | 50-60   |                      |
| Design Hour Vol  | ume of Turn<br>Per Hour (A<br>Per Hour (If | ning Lane: sssumed): f Known):  of Traffic Contro | Unsignalize  8 60 60  I High A | PennDOT Pub  25-35  Low A A                    | Average : Spr Turn De High B or C                | # of Vehicles/Cycle:    whibit 11-6   eed (MPH)   40-45   emand Volume   Low Hi   B or C B 6  | 50-60  igh Low or C Bor C or C B                      | Feet                 |
| Design Hour Vol  | ume of Turn<br>Per Hour (A<br>Per Hour (If | ning Lane: sssumed): f Known):  of Traffic Contro | Unsignalize  8 60 60  I High A | PennDOT Pub  25-35  Low A A                    | Average : Spr Turn De High B or C                | # of Vehicles/Cycle:    Xhibit 11-6   | 50-60  igh Low or C Bor C or C B                      | Feet<br>Feet         |
| Design Hour Vol  | ume of Turn<br>Per Hour (A<br>Per Hour (If | ning Lane: sssumed): f Known):  of Traffic Contro | Unsignalize  8 60 60  I High A | PennDOT Pub  25-35  Low A A                    | Average : Spr Turn De High B or C                | # of Vehicles/Cycle:    whibit 11-6     eed (MPH)     40-45     emand Volume     B or C B or | 50-60  igh Low or C B or C or C B                     | Feet                 |
| Design Hour Vol  | ume of Turn<br>Per Hour (A<br>Per Hour (If | ning Lane: sssumed): f Known):  of Traffic Contro | Unsignalize  8 60 60  I High A | PennDOT Pub  25-35  Low A A  Left Turn L       | Average : Spr Turn DE High B or C C Lane Storage | # of Vehicles/Cycle:  | 50-60  igh Low or C Bor C or C B  N/A N/A N/A         | Feet<br>Feet         |
| Design Hour Vol  | ume of Turn<br>Per Hour (A<br>Per Hour (If | ning Lane: sssumed): f Known):  of Traffic Contro | Unsignalize  8 60 60  I High A | PennDOT Pub  25-35  Low A A  Left Turn L       | Average : Spr Turn DE High B or C C Lane Storage | # of Vehicles/Cycle:    whibit 11-6   eed (MPH)   | 50-60  igh Low or C Bor C or C B  N/A N/A N/A N/A N/A | Feet<br>Feet<br>Feet |
| Design Hour Vol  | ume of Turn<br>Per Hour (A<br>Per Hour (If | ning Lane: sssumed): f Known):  of Traffic Contro | Unsignalize  8 60 60  I High A | PennDOT Pub  25-35  Low A A  Left Turn L       | Average : Spr Turn DE High B or C C Lane Storage | # of Vehicles/Cycle:    whibit 11-6   eed (MPH)   | 50-60  igh Low or C Bor C or C B  N/A N/A N/A         | Feet<br>Feet<br>Feet |



10/30/2018 LLOYD PARK SAT.xlsx

Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)

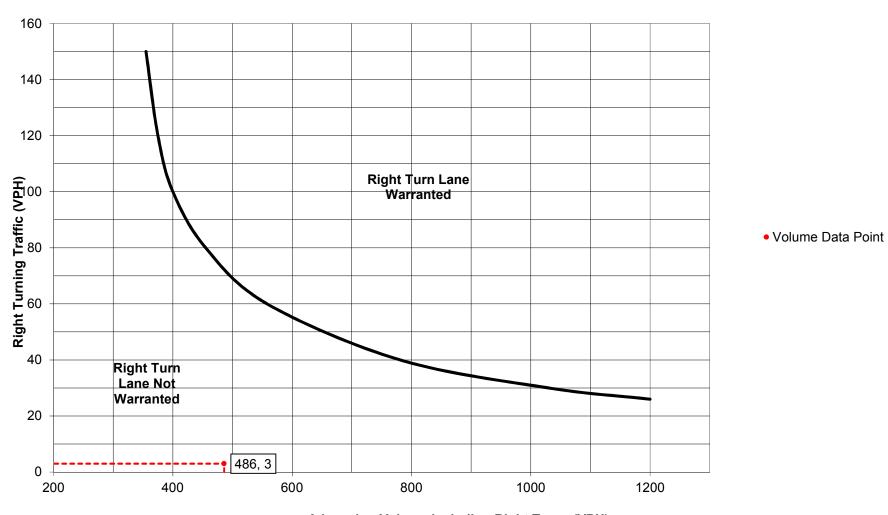


|                                 |                           | STI               | JDY LOC          | ΔΤΙΩΝ ΔΝ                            | ΙΟ ΔΝΔΙ Υ                      | SIS INFORMA  | TION                                   |                          |                      |  |
|---------------------------------|---------------------------|-------------------|------------------|-------------------------------------|--------------------------------|--|--|--------------------------|----------------------|--|
|                                 |                           |                   |                  |                                     | ID AINALI                      |  |  |                          | 1                    |  |
| Municipality:                   |                           |                   | Caln To          |                                     |                                | Analysis Date:   |  |                          | /2018                |  |
|                                 |                           | County:           |                  | Chester County Cond                 |                                |  | -                                      | M                        | В                    |  |
| PennDOT Engineering District:   |                           |                   | (                | ĵ .                                 | Λ.                             | Checked<br>gency/Company Na  |  | TP                       | D                    |  |
| Intersection & App              | nroach De                 | scription: Hov    | rd Avenue &      | Park and Ride                       |                                |  | e.                                     | ''                       | D .                  |  |
| intersection & App              | Ji Oacii Des              | scription. Lloy   | u Avenue &       | r ark ariu Mue                      | угторозей БП                   | iveway   |  |                          |                      |  |
| Design Hour:                    |                           |                   |                  | Projected Conditions  AM Peak       |                                | Number of Approach Lanes: 1  |  |                          |                      |  |
|                                 |                           |                   |                  |                                     |                                | Undivided or   | Divided Hig                            | ghway:                   | Undivided            |  |
|                                 |                           |                   |                  | Unsignalized<br>35<br>Level         |                                | Type of Analysis  Left or Right-Turn Lane Analysis?: Right Turn Lane               |  |                          |                      |  |
|                                 |                           |                   |                  |                                     |                                |  |  |                          |                      |  |
|                                 |                           |                   |                  | VOLUME                              | CALCULA                        | ATIONS   |  |                          |                      |  |
|                                 |                           |                   | Le               | eft Turn Lan                        | e Volume C                     | alculations  |  |                          |                      |  |
| Movement                        | t I                       | Include?          | Volume           | % Trucks                            | PCEV                           |  |  |                          |                      |  |
|                                 | Left                      | Yes               | 1                | 2.0%                                | N/A                            |  |  |                          | me: N/A              |  |
| Advancing                       | Through                   | -                 | 196              | 11.0%                               | N/A                            |  |  |                          |                      |  |
| -                               | Right                     | Yes               | 18               | 22.0%                               | N/A                            |  |  | eft Turn Volu            |                      |  |
|                                 | Left                      | Yes               | 2                | 0.0%                                | N/A                            |  |  |                          |                      |  |
| Opposing                        | Through                   | -                 | 475              | 3.0%                                | N/A                            |  |  |                          |                      |  |
|                                 | Right                     | Yes               | 2                | 2.0%                                | N/A                            | % Left T   | urns in Ad                             | vancing Volu             | me: N/A              |  |
|                                 |                           |                   | Rig              | ght Turn Lar                        | ne Volume C                    | Calculations   |  |                          |                      |  |
| Movement                        |                           | Include?          | Volume           | % Trucks                            | PCEV                           |  |  |                          |                      |  |
|                                 | Left                      | No                | 2                | 0.0%                                | N/A                            |  |  |                          |                      |  |
| Advancing                       | Through                   | -                 | 475<br>2         | 3.0%                                | 483                            |  |  | vancing Volu             |                      |  |
|                                 | Right                     | -                 | 2                | 2.0%                                | 3                              |  | Rig                                    | tht Turn Volu            | me:3                 |  |
|                                 |                           |                   | TUR              | N LANE V                            | VARRAN1                        | T FINDINGS   |  |                          |                      |  |
| Left Turn Lane Warrant Findings |                           |                   |                  |                                     |                                | Right Turn Lane Warrant Findings   |  |                          |                      |  |
| Applicable V                    | <b>Varrant F</b> i        | igure:            | N/A              | Applicable Warrant Figure: Figure 9 |                                |  |  |                          | ure 9                |  |
| ,                               | Met?:                     | N/A               | Warrant Met?: No |                                     |                                |  |  | No                       |                      |  |
|                                 |                           |                   | THEN             | IIANFIF                             | NGTH CA                        | LCULATIONS   |  |                          |                      |  |
|                                 |                           |                   |                  |                                     |                                |  |  |                          |                      |  |
| In Design Hour Volun            | ntersection<br>me of Turn |                   | Unsignalize<br>3 | d                                   |                                |  |  |                          |                      |  |
| -                               | er Hour (A                |                   | 60               |                                     |                                |  |  |                          |                      |  |
|                                 |                           | f Known):         | 60               |                                     | Average                        | # of Vehicles/Cycle  | :                                      | N/A                      |                      |  |
|                                 | er nour (ii               |                   |                  |                                     |                                |  |  |                          |                      |  |
|                                 | er Hour (ii               |                   |                  | PennDOT Pub                         | lication 46, E                 | xhibit 11-6  |  |                          | _                    |  |
|                                 | er Hour (II               |                   | I                | PennDOT Pub                         |                                | xhibit 11-6<br>eed (MPH)   |  |                          |                      |  |
|                                 |                           | of Traffic Contro |                  | PennDOT Pub<br>25-35                | Spe                            | eed (MPH)<br>40-45   | 50                                     | 9-60                     |                      |  |
|                                 |                           | of Traffic Contro | ol               | 25-35                               | Spe<br>Turn De                 | eed (MPH)<br>40-45<br>emand Volume   |  |                          |                      |  |
|                                 | Туре с                    | of Traffic Contro |                  |                                     | Spe                            | eed (MPH)<br>40-45   | 50<br>High<br>B or C                   | 1-60<br>Low<br>B or C    |                      |  |
|                                 | Туре с                    |                   | High             | 25-35<br>Low                        | Turn De                        | 40-45<br>emand Volume<br>Low   | High                                   | Low                      |                      |  |
|                                 | Туре с                    | Signalized        | High             | 25-35  Low A A                      | Turn De High B or C C          | eed (MPH) 40-45 emand Volume Low B or C  | High<br>B or C<br>B or C               | Low<br>B or C            | Feet                 |  |
|                                 | Туре с                    | Signalized        | High             | 25-35  Low A A                      | Turn De High B or C C          | eed (MPH)  40-45 emand Volume  Low  B or C  B                                      | High B or C B or C                     | Low<br>B or C<br>B       | Feet<br>Feet         |  |
|                                 | Туре с                    | Signalized        | High             | 25-35  Low A A                      | Turn De High B or C C          | eed (MPH)  40-45 emand Volume  Low  B or C  B  Length, Condition                   | High B or C B or C                     | B or C B N/A N/A         | -                    |  |
|                                 | Туре с                    | Signalized        | High             | 25-35  Low A A A Right Turn I       | Turn Di<br>High<br>B or C<br>C | eed (MPH)  40-45 emand Volume  Low  B or C  B B  E Length, Condition               | High B or C B or C n A: n B:           | Bor C B N/A N/A N/A      | Feet                 |  |
|                                 | Туре с                    | Signalized        | High             | 25-35  Low A A A Right Turn I       | Turn Di<br>High<br>B or C<br>C | eed (MPH)  40-45  Emand Volume  B or C  B  E Length, Condition  Condition          | High B or C B or C n A: n B: n C: gth: | B or C B N/A N/A N/A N/A | Feet<br>Feet<br>Feet |  |
|                                 | Туре с                    | Signalized        | High             | 25-35  Low A A A Right Turn I       | Turn Di<br>High<br>B or C<br>C | eed (MPH)  40-45  emand Volume  B or C  B  Length, Condition  Condition  Condition | High B or C B or C n A: n B: n C: gth: | Bor C B N/A N/A N/A      | Feet<br>Feet<br>Feet |  |



10/30/2018 LLOYD PARK AM.xlsx

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)

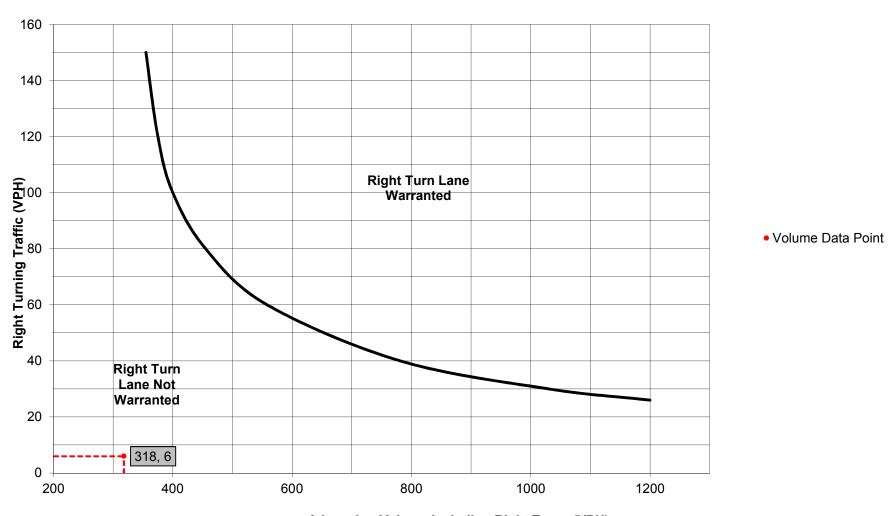


|                  |                       | STL                        | IDY LOC     | ATION AN      | ID ANALY     | SIS INFORM          | ATION       |                     |                                |
|------------------|-----------------------|----------------------------|-------------|---------------|--------------|---------------------|-------------|---------------------|--------------------------------|
|                  | Mu                    | nicipality:                | Caln To     | wnship        |              | Analysis            | Date:       | 10/30               | /2018                          |
|                  |                       | County:                    | Chester     | County        |              | Conducte            |             | N                   | IB                             |
| PennDOT          | Engineerin            | g District:                |             | 6             |              | Checke              | d By:       |                     |                                |
|                  |                       | <u> </u>                   |             |               | A            | gency/Company N     | ame:        | TF                  | D                              |
| ntersection & A  | pproach De            | escription: Lloye          | d Avenue &  | Park and Ride | /Proposed Dr | iveway              |             |                     |                                |
|                  | -                     |                            |             | ed Conditions |              | Number o            | of Approach | Lanes:              | 1                              |
|                  |                       | sign Hour:                 |             | Peak          |              | Undivided or        | Divided Hi  | ghway:              | Undivided                      |
|                  | Intersectio           |                            |             | nalized       |              |                     |             |                     |                                |
| Poster           | d Speed Lin<br>Type o | of Terrain:                |             | vel           |              | Left or Right-Tu    | ırn Lane An |                     | pe of Analysis light Turn Lane |
|                  |                       |                            |             | VOLUME        | CALCULA      | ATIONS              |             |                     |                                |
|                  |                       |                            | Le          | eft Turn Lan  | e Volume C   | alculations         |             |                     |                                |
| Moveme           | nt                    | Include?                   | Volume      | % Trucks      | PCEV         | ]                   |             |                     |                                |
|                  | Left                  | Yes                        | 5           | 2.0%          | N/A          |                     | Ac          | lvancing Volu       |                                |
| Advancing        | Through               | -                          | 406         | 2.0%          | N/A          |                     |             | pposing Volu        |                                |
|                  | Right                 | Yes                        | 7           | 0.0%          | N/A          | -                   | L           | eft Turn Volu       | ıme: N/A                       |
| Onnasira         | Left                  | Yes                        | 200         | 0.0%          | N/A          | -                   |             |                     |                                |
| Opposing         | Through<br>Right      | Yes                        | 308<br>5    | 2.0%          | N/A<br>N/A   | % Left              | Turns in Ac | Ivancing Volu       | ıme: N/A                       |
|                  |                       |                            | Rig         | ght Turn Laı  |              | Calculations        |             |                     | ,                              |
| Moveme           | nt                    | Include?                   | Volume      | % Trucks      | PCEV         | ]                   |             |                     |                                |
|                  | Left                  | No                         | 1           | 0.0%          | N/A          |                     |             |                     |                                |
| Advancing        | Through               | -                          | 308         | 2.0%          | 312          |                     |             | lvancing Volu       |                                |
|                  | Right                 | -                          | 5           | 2.0%          | 6            |                     | Ri          | ght Turn Volu       | ıme: 6                         |
|                  |                       |                            | TUR         | RN LANE V     | WARRAN       | T FINDINGS          |             |                     |                                |
| Le               | eft Turn La           | ane Warrant F              | indings     |               |              | Righ                | t Turn Lar  | e Warrant l         | Findings                       |
| Applicable       | Warrant F             | igure:                     | N/A         |               |              | Applicable W        | arrant Fig  | ure: Fig            | ure 9                          |
|                  | Warrant               | Met?:                      | N/A         |               |              | v                   | Varrant M   | et?:                | No                             |
|                  |                       |                            | TURN        | LANE LE       | NGTH CA      | LCULATIONS          |             |                     |                                |
|                  | Intersectio           | n Control:                 | Unsignalize | d             |              |                     |             |                     |                                |
| Design Hour Volu |                       |                            | 6           |               |              |                     |             |                     |                                |
| -                | Per Hour (A           | _                          | 60          |               |              |                     |             |                     |                                |
| Cycles           | Per Hour (I           | f Known):                  | 60          |               | Average      | # of Vehicles/Cycl  | e:          | N/A                 |                                |
|                  |                       |                            |             | PennDOT Pub   |              |                     |             |                     | _                              |
|                  |                       |                            |             | 25.25         | Sp           | eed (MPH)<br>40-45  | -           | 0.60                |                                |
|                  | Туре                  | of Traffic Contro          |             | 25-35         | Turn D       | emand Volume        | 51          | 0-60                |                                |
|                  |                       |                            | High        | Low           | High         | Low                 | High        | Low                 |                                |
|                  | <u> </u>              | Signalized<br>Unsignalized | A<br>A      | A<br>A        | B or C       | B or C              | B or C      | B or C              | _                              |
|                  |                       | D                          | 1 7         |               |              |                     |             | <u> </u>            | <b>⊣</b><br><b>¬</b>           |
|                  |                       |                            |             | Right Turn    | Lane Storage | e Length, Condition |             | N/A                 | Feet                           |
|                  |                       |                            |             |               |              | Condition           |             | N/A                 | Feet                           |
|                  |                       |                            |             |               |              | Condition           | on C:       | N/A                 | Feet                           |
|                  |                       |                            |             | Require       | d Right Turn | Lane Storage Lei    | ngth:       | N/A                 | Feet                           |
|                  |                       |                            |             |               |              |                     |             |                     |                                |
|                  |                       |                            |             |               |              |                     | Additio     | nal Findings        |                                |
| dditional Commen | ts / Justifica        | tions:                     |             |               |              |                     | Additio     | onal Findings<br>N/ |                                |



10/30/2018 LLOYD PARK PM.xlsx

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)

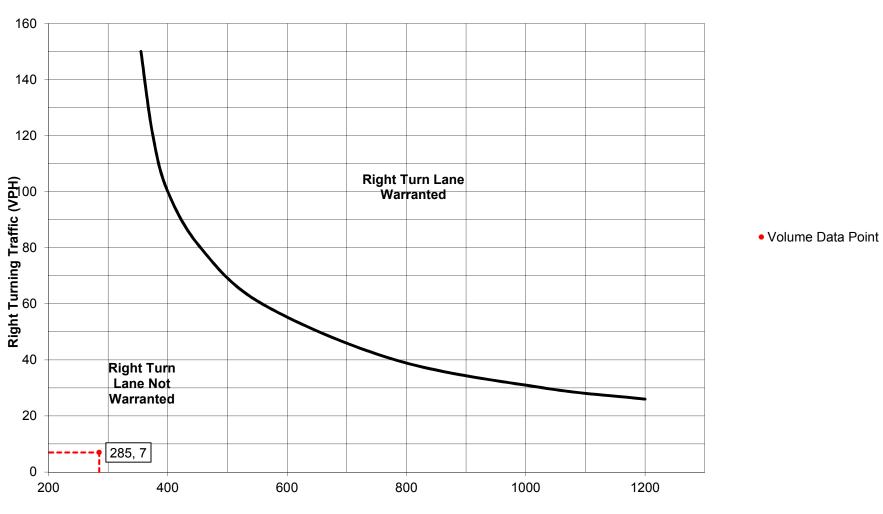


|                  |                       | STL                        | JDY LOC     | ATION AN      | ID ANALY     | SIS INFORM          | ATION       |                     |                                    |
|------------------|-----------------------|----------------------------|-------------|---------------|--------------|---------------------|-------------|---------------------|------------------------------------|
|                  | Mu                    | nicipality:                | Caln To     | wnship        |              | Analysis I          | Date:       | 10/30               | /2018                              |
|                  |                       | County:                    |             | County        |              | Conducte            |             | N                   | -                                  |
| PennDOT          | Engineerin            | g District:                |             | 6             |              | Checke              | d By:       |                     |                                    |
|                  |                       |                            |             |               | A            | gency/Company N     | ame:        | TF                  | D                                  |
| Intersection & A | pproach De            | escription: Lloye          | d Avenue &  | Park and Ride | /Proposed Dr | iveway              |             |                     |                                    |
|                  | Analys                | sis Period: 2              |             | ed Conditions |              | Number o            | f Approach  | Lanes:              | 1                                  |
|                  |                       | sign Hour:                 |             | Peak          |              | Undivided or        | Divided Hi  | ghway:              | Undivided                          |
|                  | Intersectio           |                            |             | nalized       |              |                     |             |                     |                                    |
| Poster           | d Speed Lin<br>Type o | of Terrain:                |             | vel           |              | Left or Right-Tu    | rn Lane An  |                     | ype of Analysis<br>Right Turn Lane |
|                  |                       |                            |             | VOLUME        | CALCULA      | ATIONS              |             |                     |                                    |
|                  |                       |                            | Le          | eft Turn Lan  | e Volume C   | alculations         |             |                     |                                    |
| Moveme           | nt                    | Include?                   | Volume      | % Trucks      | PCEV         | ]                   |             |                     |                                    |
|                  | Left                  | Yes                        | 7           | 2.0%          | N/A          |                     | Ac          | lvancing Volu       | ıme: N/A                           |
| Advancing        | Through               | -                          | 319         | 1.0%          | N/A          | ]                   |             | pposing Volu        |                                    |
|                  | Right                 | Yes                        | 4           | 25.0%         | N/A          |                     | L           | eft Turn Volu       | ıme: N/A                           |
| On               | Left                  | Yes                        | 2           | 0.0%          | N/A          | 4                   |             |                     |                                    |
| Opposing         | Through<br>Right      | Yes                        | 276<br>6    | 1.0%<br>2.0%  | N/A<br>N/A   | % Left              | Turns in Ac | Ivancing Volu       | ıme: N/A                           |
|                  |                       |                            | Rig         | I             |              | Calculations        |             |                     | ,                                  |
| Moveme           | nt                    | Include?                   | Volume      | % Trucks      | PCEV         | 1                   |             |                     |                                    |
|                  | Left                  | No                         | 2           | 0.0%          | N/A          |                     |             |                     |                                    |
| Advancing        | Through               | -                          | 276         | 1.0%          | 278          |                     | Ac          | lvancing Volu       |                                    |
|                  | Right                 | -                          | 6           | 2.0%          | 7            |                     | Ri          | ght Turn Volu       | ume: 7                             |
|                  |                       |                            | TUR         | RN LANE V     | WARRAN       | T FINDINGS          |             |                     |                                    |
| Le               | eft Turn La           | ane Warrant F              | indings     |               |              | Right               | Turn Lar    | e Warrant l         | Findings                           |
| Applicable       | Warrant F             | igure:                     | N/A         |               |              | Applicable W        | arrant Fig  | ure: Fig            | ure 9                              |
|                  | Warrant               | Met?:                      | N/A         |               |              | v                   | Varrant M   | et?:                | No                                 |
|                  |                       |                            | TURN        | I LANE LE     | NGTH CA      | LCULATIONS          |             |                     |                                    |
|                  | Intersectio           | n Control:                 | Unsignalize | ed            |              |                     |             |                     |                                    |
| Design Hour Volu |                       |                            | 7           |               |              |                     |             |                     |                                    |
|                  | Per Hour (A           |                            | 60          |               |              |                     |             |                     | _                                  |
| Cycles           | Per Hour (I           | f Known):                  | 60          |               | Average      | # of Vehicles/Cycle | e:          | N/A                 |                                    |
|                  |                       |                            | l           | PennDOT Pub   |              |                     |             |                     | _                                  |
|                  |                       |                            |             | 25.25         | Sp           | eed (MPH)<br>40-45  | -           | 0.60                |                                    |
|                  | Туре                  | of Traffic Contro          |             | 25-35         | Turn D       | emand Volume        | 51          | 0-60                |                                    |
|                  |                       |                            | High        | Low           | High         | Low                 | High        | Low                 |                                    |
|                  | <u> </u>              | Signalized<br>Unsignalized | A<br>A      | A<br>A        | B or C       | B or C              | B or C      | B or C              | -                                  |
|                  | '                     | onsignanzeu                | , A         |               |              | *                   |             | <u> </u>            | <b>⊣</b><br>■                      |
|                  |                       |                            |             | Right Turn    | Lane Storage | e Length, Condition |             | N/A                 | Feet                               |
|                  |                       |                            |             |               |              | Condition           |             | N/A                 | Feet                               |
|                  |                       |                            |             |               |              | Condition           | on C:       | N/A                 | Feet                               |
|                  |                       |                            |             | Require       | d Right Turn | Lane Storage Ler    | ngth:       | N/A                 | Feet                               |
|                  |                       |                            |             |               |              |                     |             |                     |                                    |
|                  |                       |                            |             |               |              |                     | Additio     | nal Findings        |                                    |
| dditional Commen | ts / Justifica        | tions:                     |             |               |              |                     | Additio     | onal Findings<br>N/ |                                    |



10/30/2018 LLOYD PARK SAT.xlsx

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)

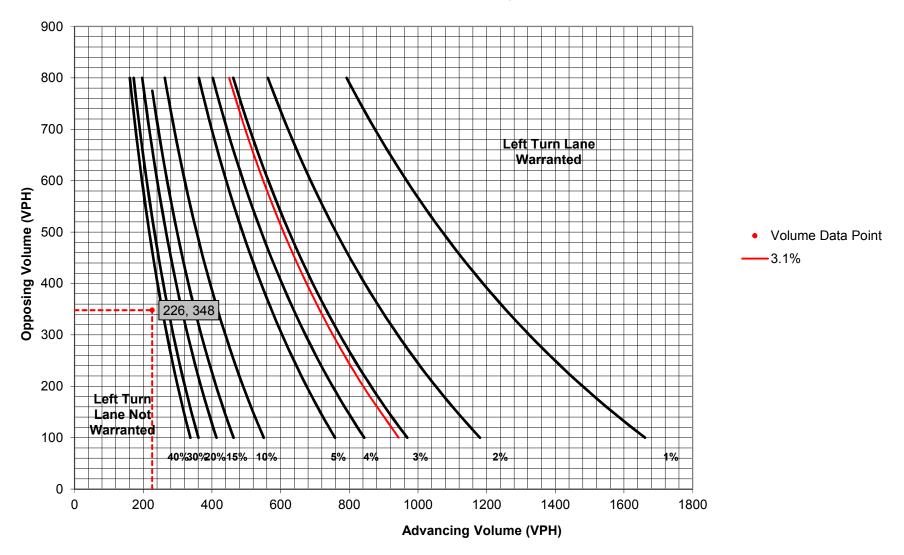


|                           | N.A   | nicipality:   | Cala Ta                    | ownship                                 |  | Analysis Da   | to: 10/20  | 0/2018               |  |  |
|---------------------------|---|---|----------------------------|---|--|---|--|----------------------|--|--|
|                           | Mui   | nicipality: County:   |                            | r County                                |  | Analysis Da<br>Conducted  | · ·  | ЛВ<br>ИВ             |  |  |
| PennDOT                   | Engineerin  |   |                            | 6                                       |  |   |  |                      |  |  |
| Tellibot                  | Liigiiicciiii   | g District.   |                            | ,                                       | A  | gency/Company Nan   |  | PD                   |  |  |
| Intersection & A          | pproach De  | scription: Llo  | /d Avenue &                | Beaver Run/Pr                           | roposed Drive  | eway  |  |                      |  |  |
|                           |   |   |                            |   |  |   |  |                      |  |  |
|                           | -   | sis Period:   |                            | ed Conditions<br>Peak                   |  |   | Approach Lanes:  | 1<br>Undivided       |  |  |
|                           | Intersection  | _   |                            | nalized                                 |  | Offatvided of D   | ivided nigitway.   | Ollaividea           |  |  |
|                           | d Speed Lim   |   |                            | 35                                      |  |   | T  | ype of Analysis      |  |  |
|                           | Туре о  | of Terrain:   | Le                         | vel                                     |  | Left or Right-Turr  | Lane Analysis?:  | Left Turn Lane       |  |  |
|                           |   |   |                            | VOLUME                                  | CALCULA  | ATIONS  |  |                      |  |  |
|                           |   |   | Le                         | eft Turn Lan                            | e Volume C   | alculations   |  |                      |  |  |
| Moveme                    | nt  | Include?  | Volume                     | % Trucks                                | PCEV   | Ī   |  |                      |  |  |
|                           | Left  | Yes   | 6                          | 2.0%                                    | 7  |   | Advancing Vol  | ume: 226             |  |  |
| Advancing                 | Through   | -   | 206                        | 11.0%                                   | 218  |   | Opposing Vol   |                      |  |  |
|                           | Right   | Yes   | 1                          | 0.0%                                    | 1  |   | Left Turn Vol  | ume: 7               |  |  |
| Opposing                  | Left<br>Through   | Yes<br>-  | 0<br>335                   | 0.0%<br>5.0%                            | 344  | -   |  |                      |  |  |
| - 5500119                 | Right   | Yes   | 3                          | 2.0%                                    | 4  | % Left Tu   | ırns in Advancing Vol  | ume: 3.10%           |  |  |
|                           |   |   | Riç                        | ght Turn Lar                            | ne Volume (  | Calculations  |  |                      |  |  |
| Moveme                    |   | Include?  | Volume                     | % Trucks                                | PCEV   | ]   |  |                      |  |  |
|                           | Left  | No  | 0                          | 0.0%                                    | N/A  |   |  | 21/2                 |  |  |
| Advancing                 | Through<br>Right  | -   | 335<br>3                   | 5.0%<br>2.0%                            | N/A<br>N/A   |   | Advancing Vol<br>Right Turn Vol                                      |                      |  |  |
|                           |   |   | THE                        | NI I ANE V                              |  | Γ FINDINGS  | <u> </u>   |                      |  |  |
| 1.4                       | oft Turn I s  | ane Warrant   |                            | IIV LAIVE V                             |  |   | Turn Lane Warrant  | Eindings             |  |  |
|                           |   |   |                            | I                                       |  |   |  |                      |  |  |
|                           | warrant F   |   | gure 1                     | l<br>T                                  |  | Applicable Wai  |  | N/A                  |  |  |
| Applicable                |   | Met?:   | No                         | ĺ                                       |  | Wa  | rrant Met?:  | N/A                  |  |  |
| Аррисавіе                 | Warrant   |   |                            |   |  |   |  |                      |  |  |
| Аррисаоle                 | Warrant   |   | TURN                       | I LANE LE                               | NGTH CA  | LCULATIONS  |  |                      |  |  |
|                           | Intersection  | n Control:  | Unsignalize                |   | NGTH CA  | LCULATIONS  |  |                      |  |  |
| Design Hour Vol           | Intersection  | n Control:  | Unsignalize<br>7           |   | NGTH CA  | LCULATIONS  |  |                      |  |  |
| Design Hour Vol<br>Cycles | Intersection  | n Control:  | Unsignalize                |   |  | # of Vehicles/Cycle:  | N/A  |                      |  |  |
| Design Hour Vol<br>Cycles | Intersection<br>ume of Turn<br>Per Hour (A                | n Control:  | Unsignalize 7 60 60        | ed                                      | Average  | # of Vehicles/Cycle:  | N/A  |                      |  |  |
| Design Hour Vol<br>Cycles | Intersection<br>ume of Turn<br>Per Hour (A                | n Control:  | Unsignalize 7 60 60        |   | Average<br>Dication 46, E                                      | # of Vehicles/Cycle:  | N/A  |                      |  |  |
| Design Hour Vol<br>Cycles | Intersection<br>ume of Turn<br>Per Hour (A<br>Per Hour (H | n Control:<br>ning Lane:<br>Assumed):<br>f Known):          | Unsignalize 7 60 60        | ed                                      | Average<br>Dication 46, E                                      | # of Vehicles/Cycle:<br>xhibit 11-6<br>eed (MPH)<br>40-45   | N/A<br>50-60   |                      |  |  |
| Design Hour Vol<br>Cycles | Intersection<br>ume of Turn<br>Per Hour (A<br>Per Hour (H | n Control:  | Unsignalize 7 60 60        | PennDOT Pub                             | Average<br>Dication 46, E<br>Sp<br>Turn D                      | # of Vehicles/Cycle:<br>xhibit 11-6<br>eed (MPH)<br>40-45<br>emand Volume                                 | 50-60  |                      |  |  |
| Design Hour Vol<br>Cycles | Intersection<br>ume of Turn<br>Per Hour (A<br>Per Hour (H | n Control:<br>ning Lane:<br>Assumed):<br>f Known):          | Unsignalize 7 60 60        | PennDOT Pub                             | Average<br>Dication 46, E                                      | # of Vehicles/Cycle:<br>xhibit 11-6<br>eed (MPH)<br>40-45   |  |                      |  |  |
| Design Hour Vol<br>Cycles | Intersection<br>ume of Turn<br>Per Hour (A<br>Per Hour (H | n Control: ning Lane: Assumed): f Known):                   | Unsignalize 7 60 60 1 High | PennDOT Pub 25-35                       | Average Dication 46, E Sp Turn D High                          | # of Vehicles/Cycle: xhibit 11-6 eed (MPH) 40-45 emand Volume Low   | 50-60<br>High Low  |                      |  |  |
| Design Hour Vol<br>Cycles | Intersection<br>ume of Turn<br>Per Hour (A<br>Per Hour (H | n Control: ning Lane: Assumed): f Known): of Traffic Contro | Unsignalize 7 60 60 1 High | PennDOT Pub  25-35  Low A A             | Average  Sp  Turn D  High B or C                               | # of Vehicles/Cycle: xhibit 11-6 eed (MPH) 40-45 Emand Volume B or C                                      | 50-60  High Low BorC BorC BorC B                                     | Feet                 |  |  |
| Design Hour Vol<br>Cycles | Intersection<br>ume of Turn<br>Per Hour (A<br>Per Hour (H | n Control: ning Lane: Assumed): f Known): of Traffic Contro | Unsignalize 7 60 60 1 High | PennDOT Pub  25-35  Low A A             | Average  Sp  Turn D  High B or C                               | # of Vehicles/Cycle: xhibit 11-6 eed (MPH) 40-45 emand Volume Low B or C B                                | 50-60  High Low B or C B or C B or C B                               | Feet                 |  |  |
| Design Hour Vol<br>Cycles | Intersection<br>ume of Turn<br>Per Hour (A<br>Per Hour (H | n Control: ning Lane: Assumed): f Known): of Traffic Contro | Unsignalize 7 60 60 1 High | PennDOT Pub  25-35  Low A A             | Average  Sp  Turn D  High B or C                               | # of Vehicles/Cycle: xhibit 11-6 eed (MPH) 40-45 emand Volume   | 50-60  High Low Bor C Bor C Bor C B  A: N/A B: N/A                   |                      |  |  |
| Design Hour Vol<br>Cycles | Intersection<br>ume of Turn<br>Per Hour (A<br>Per Hour (H | n Control: ning Lane: Assumed): f Known): of Traffic Contro | Unsignalize 7 60 60 1 High | PennDOT Pub  25-35  Low A A Left Turn I | Average  Olication 46, E Sp  Turn D High Bor C C  Lane Storage | # of Vehicles/Cycle:  xhibit 11-6 eed (MPH)  40-45 emand Volume  Low Bor C B  2 Length, Condition         | 50-60  High Low B or C B or C B or C B  A: N/A  B: N/A  C: N/A       | Feet                 |  |  |
| Design Hour Vol<br>Cycles | Intersection<br>ume of Turn<br>Per Hour (A<br>Per Hour (H | n Control: ning Lane: Assumed): f Known): of Traffic Contro | Unsignalize 7 60 60 1 High | PennDOT Pub  25-35  Low A A Left Turn I | Average  Olication 46, E Sp  Turn D High Bor C C  Lane Storage | # of Vehicles/Cycle: xhibit 11-6 eed (MPH) 40-45 Emand Volume Low Bor C B B E Length, Condition Condition | 50-60  High Low B or C B or C B or C B  A: N/A B: N/A C: N/A th: N/A | Feet<br>Feet<br>Feet |  |  |
| Design Hour Vol<br>Cycles | Intersection<br>ume of Turn<br>Per Hour (A<br>Per Hour (H | n Control: ning Lane: Assumed): f Known): of Traffic Contro | Unsignalize 7 60 60 1 High | PennDOT Pub  25-35  Low A A Left Turn I | Average  Olication 46, E Sp  Turn D High Bor C C  Lane Storage | # of Vehicles/Cycle: xhibit 11-6 eed (MPH) 40-45 Emand Volume Low Bor C B B E Length, Condition Condition | 50-60  High Low B or C B or C B or C B  A: N/A B: N/A C: N/A         | Feet<br>Feet<br>Feet |  |  |



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Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)

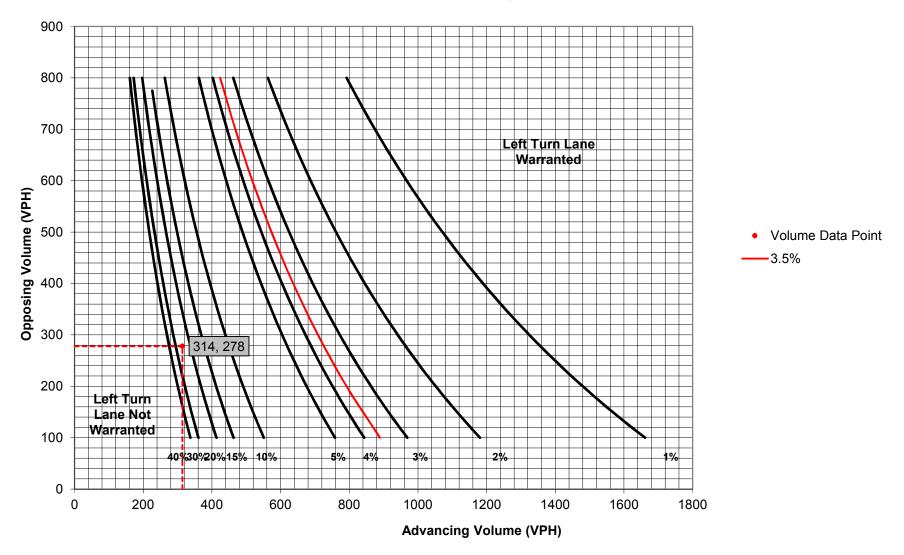


|                        |                           | CTI               | IDV LOC           | ATION AN      | ID VNVI A       | SIS INFORM          | ATION          |               |                                   |
|------------------------|---------------------------|-------------------|-------------------|---------------|-----------------|---------------------|----------------|---------------|-----------------------------------|
|                        |                           | 310               | JUT LOCA          | ATION AN      | ND ANALI        | 313 INFORIVI        | ATION          |               |                                   |
|                        | Mur                       | nicipality:       |                   | ownship       |                 | Analysis            |                | 10/30         | /2018                             |
|                        |                           | County:           |                   | r County      |                 | Conducte            | -              | N             | 1B                                |
| PennDOT E              | ingineerin                | g District:       | (                 | 6             |                 | Checke              |                | T.            | 20                                |
|                        |                           |                   |                   |               |                 | gency/Company N     | ame:           | 11            | PD                                |
| Intersection & Ap      | proach De                 | scription: Lloy   | d Avenue &        | Beaver Run/P  | roposed Drive   | eway                |                |               |                                   |
|                        | Analys                    | sis Period:       |                   | ed Conditions |                 | Number o            | f Approach     | Lanes:        | 1                                 |
|                        |                           | sign Hour:        |                   | Peak          |                 | Undivided or        | Divided Hi     | ghway:        | Undivided                         |
|                        | ntersection               |                   |                   | nalized       |                 |                     |                | _             |                                   |
| Posted                 | Speed Lim                 | of Terrain:       |                   | vel           |                 | Left or Right-Tu    | ırn Lane An    |               | ype of Analysis<br>Left Turn Lane |
|                        | туре о                    | Treffalli.        | Le                |               | CALCULA         |                     | IIII Laile Ail | alysis:       | Left fulli Lalle                  |
|                        |                           |                   |                   |               | CALCULA         |                     |                |               |                                   |
|                        |                           |                   |                   | eft Turn Lan  |                 | alculations         |                |               |                                   |
| Movemen                | <b>t</b><br>Left          | Include?          | Volume            | % Trucks      | PCEV            |                     |                | hansins 14-1  | 314                               |
| Advancina              |                           | Yes -             | 10<br>284         | 2.0%<br>3.0%  | 11<br>289       |                     |                | Ivancing Volu |                                   |
| Advancing              | Through                   | Yes               | 14                | 0.0%          | 289             |                     |                | pposing Volu  |                                   |
|                        | Right<br>Left             | Yes               | 14                | 0.0%          | 14              |                     | L              | eft Turn Volu | ume: 11                           |
| Opposing               | Through                   | -                 | 268               | 2.0%          | 271             |                     |                |               |                                   |
| Оррозии                | Right                     | Yes               | 5                 | 2.0%          | 6               | % Left              | Turns in Ac    | lvancing Volu | ume: 3.50%                        |
|                        |                           |                   | Ri                | ght Turn Laı  | ne Volume C     | Calculations        |                |               |                                   |
| Movemen                | t                         | Include?          | Volume            | % Trucks      | PCEV            |                     |                |               |                                   |
|                        | Left                      | No                | 1                 | 0.0%          | N/A             |                     |                |               |                                   |
| Advancing              | Through                   | -                 | 268               | 2.0%          | N/A             |                     | Ac             | lvancing Volu |                                   |
|                        | Right                     | -                 | 5                 | 2.0%          | N/A             |                     | Ri             | ght Turn Volu | ume: N/A                          |
|                        |                           |                   | TUF               | RN LANE V     | <b>NARRAN</b> 1 | FINDINGS            |                |               |                                   |
| Lef                    | t Turn La                 | ne Warrant I      | Findings          |               |                 | Righ                | t Turn Lar     | ne Warrant I  | Findings                          |
| Applicable V           | Warrant F                 | igure: Fig        | gure 1            | ]             |                 | Applicable W        | arrant Fig     | ure: N        | N/A                               |
|                        | Warrant I                 | Met?:             | No                | ]             |                 | v                   | Varrant M      | et?:          | N/A                               |
|                        |                           |                   | THE               | LIANFIF       | NGTH CA         | LCULATIONS          |                |               |                                   |
|                        |                           |                   |                   |               | ito III CA      | LCOLATIONS          |                |               |                                   |
| Ir<br>Design Hour Volu | ntersectior<br>me of Turn |                   | Unsignalize<br>11 | eu            |                 |                     |                |               |                                   |
| -                      | er Hour (A                |                   | 60                |               |                 |                     |                |               |                                   |
|                        | Per Hour (If              |                   | 60                |               | Average         | # of Vehicles/Cycl  | e:             | N/A           |                                   |
|                        |                           |                   | 1                 | PennDOT Pub   | olication 46, E | xhibit 11-6         | ·              |               |                                   |
|                        |                           |                   |                   |               | Sp              | eed (MPH)           |                |               |                                   |
|                        | Туре                      | of Traffic Contro | ol                | 25-35         |                 | 40-45               | 5              | 0-60          |                                   |
|                        |                           |                   | High              | Low           | High            | emand Volume<br>Low | High           | Low           | -                                 |
|                        |                           | Signalized        | A                 | A             | B or C          | B or C              | B or C         | B or C        |                                   |
|                        | U                         | Jnsignalized      | А                 | А             | С               | В                   | B or C         | В             | _                                 |
|                        |                           |                   |                   | Left Turn     | Lane Storage    | Length, Condition   | on A:          | N/A           | Feet                              |
|                        |                           |                   |                   |               |                 | Condition           | on B:          | N/A           | Feet                              |
|                        |                           |                   |                   |               |                 |                     |                |               |                                   |
|                        |                           |                   |                   |               |                 | Condition           | on C:          | N/A           | Feet                              |
|                        |                           |                   |                   | Requir        | ed Left Turn    |                     |                | N/A<br>N/A    | Feet                              |
|                        |                           |                   |                   | Requir        | ed Left Turn    | Condition           | ngth:          | N/A           | Feet<br>Feet                      |
|                        |                           |                   |                   | Requir        | ed Left Turn    |                     | ngth:          |               | Feet<br>Feet                      |



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Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)

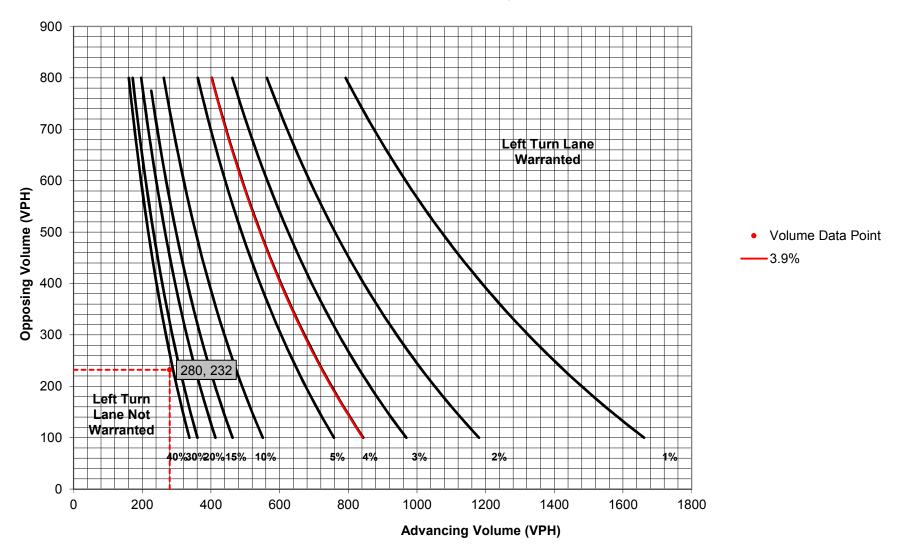


| Analysis Period:  Design Hour: Intersection Control: Posted Speed Limit (MPM): Unsignalized Type of Terain: Level  VOLUME CALCULATIONS  Left Turn Lane Volume Calculations  Wovement Include? Left Yes 10 0.0% 260 0.0% 260 0.0% 270 |                  |            | п             |             |   |             |                |                    |             |               | <b>1</b>      |
|--|------------------|------------|---------------|-------------|---|-------------|----------------|--------------------|-------------|---------------|---------------|
| PennDOT Engineering District:  Agency/Company Name:  TPD  TURN LANE LENGTH Controls  Warrant Met?:  TURN LANE LENGTH CALCULATIONS  Left Turn Lane Warrant Findings  Advancing Volume:  Include?  Number of Approach Lanes:  1 Undivided or Divided Highway:  Undivided or Divided Highw |                  | Mu         |               |             |   |             |                | •                  |             |               |               |
| Agency/Company Name: TPD  TURN LANE WARRANT FINDINGS  TURN LANE WARRANT FINDINGS  TURN LANE WARRANT FINDINGS  Analysis Period: 2023 Projected Conditions Design Hour; Intersection Control: Unsignalized Posted Speed Limit (MPH): 35 Type of Tariffic Control Right - 224 0.0% 234 Advancing Through - 2240 0.0% 224 Right Ves 3 0.0% 33 Right Turn Lane Volume Calculations  **Right Ves 3 0.0% 33 Right Turn Lane Volume Calculations  **Right Ves 3 0.0% 33 Right Turn Lane Volume Calculations  **Right Ves 3 0.0% 33 Right Ves 3 0.0% 33 Right Turn Lane Volume Calculations  **Trough - 2240 0.0% 224 Right Ves 3 0.0% 33 Right Turn Lane Volume Calculations  **Trough - 2240 0.0% 224 Right Ves 3 0.0% 33 Right Turn Volume: 3.93%  **Right Turn Lane Volume Calculations  **Trough - 2240 0.0% 224 Right Ves 3 0.0% N/A Right Turn Volume: 3.93%  **Left Turns in Advancing Volume: 3.93%  **Advancing Through - 224 0.0% N/A Right Turn Volume: 3.93%  **Left Turn Lane Volume Right N/A Right Turn Volume: 3.93%  **Left Turn Lane Volume N/A Right Turn Volume: 3.93%  **Left Turn Lane Volume N/A Right Turn Volume: 3.93%  **Left Turn Lane Warrant Findings  **Applicable Warrant Figure: Figure 1 Warrant Met?: N/A  **Verrage # of Vehicles/Cycle: N/A  **Verrage # of Vehicles/Cycl | PennDOT          | Engineerir | -             | Chi         |   | ounty       |                |                    |             | IVI           | В             |
| Analysis Period:  Design Hour:  Number of Approach Lanes:  Undivided or Divided Highway:  Intersection Control:  Posted Speed Limit (MPH):  Speed Limit (MPH):  Level  VOLUME CALCULATIONS  Left Turn Lane Volume Calculations  Wovement Include? Volume % Trucks PCEV Right Yes 9 0.0% 280 Right Yes 9 0.0% 280 Right Yes 9 0.0% 280 Right Turn Lane Volume Calculations  Right Turn Lane Volume Calculations  Right Turn Volume:  Right Yes 9 0.0% 280 Right Turn Volume:  Right Yes 9 0.0% 224 Right Yes 9 0.0% 280 Right Turn Lane Volume Calculations  Right Turn Lane Volume Calculations  Right Turn Volume:  Right Yes 9 0.0% 280 Right Turn Volume:  Right Yes 9 0.0% 280 Right Turn Volume:  Right Yes 9 0.0% 280 Right Turn Volume:  Right Turn Volume:  Right Yes 9 0.0% 280 Right Turn Volume:  Right Turn Volume:  No Novement Include? Volume % Trucks PCEV Right Yes 4 2.0% N/A  Advancing Volume:  Right Turn Volume:  No Novement Include? Volume % Trucks PCEV Right Volume:  No Novement Include? N/A Right - 4 2.0% N/A  Right Turn Volume:  No N/A Right Turn Lane Warrant Findings  Right Turn Lane Warrant Findings  Applicable Warrant Figure:  Figure 1  Warrant Met?:  No Novement Intersection Control:  Unsignalized  A Novement Intersection Control:  Design Hour Volume (Ir Known):  On N/A  PennDOT Publication 46, Schibit 11-6  Speed (MPH)  Speak Required Left Turn Lane Storage Length, Condition 6:  N/A  Required Left Turn Lane Storage Length, Condition 6:  N/A  Required Left Turn Lane Storage Length; N/A  Additional Findings  Add | Tembot           | Liigilicci | ig District.  |             |   |             | A              |                    |             | TP            | D             |
| Intersection Control: Unsignalized   Undivided or Divided Highway: Undivided   Undivided   Unsignalized   Posted Speed Limit (MPH): 35   Type of Terrain: Level   Unsignalized   Type of Traffic Control: Unsignalized   Unsignalized   A A B of C Required Left Turn Lane Value   Signalized   A A B of C Required Left Turn Lane Storage Length, Condition A: Required Left Turn Lane Warrant Findings   Undivided   Unsignalized   A A A B of C B of C B of C Required Left Turn Lane Value   Include   Include   Volume   X-Trucks   PCEV   Advancing Volume:   280   Opposing Volume:   280   Opposing Volume:   231   Left Ves   3 0.0%   3   Opposing Volume:   232   Left Turn Volume:   133   Left Ves   3 0.0%   3   Keft Turns in Advancing Volume:   3.93%   Right Ves   4 0.0%   5   Keft Turns in Advancing Volume:   3.93%      | ntersection & Ap | proach De  | escription:   | Lloyd Avenu | ie & Be                                       | aver Run/Pi | roposed Drive  | eway               |             |               |               |
| Intersection Control: Unsignalized   Undivided or Divided Highway: Undivided   Unsignalized   A A A B or C   B or C   B or C   B or C   Unsignalized   A A A B or C   B or C   B or C   B or C   Sor C   B or C   Sor C   B or C   Sor    |                  | Amalu      | cic Daviad.   | 2022 Dr     | pioctod                                       | Conditions  |                | Number             | of Annuanch | Longo         | 1             |
| Intersection Control:   Unsignalized   Type of Trarfix   Level   Unsignalized   Type of Trarfix   Unsignalized   Type of Traffix Control   Unsignalized   A A A B of C B ar C B Additional Elimitags:    Movement  |                  | -          | _             |             |   |             |                |                    |             |               |               |
| Left or Right-Turn Lane Analysis?   Left Turn Lane   | 1                |            | _             |             |   |             |                |                    |             |               |               |
| Note   | Posted           | •          | · · ·         |             | 35  |             |                |                    |             |               |               |
| Left   |                  | Туре       | of Terrain:   |             | Level   |             |                | Left or Right-Tu   | ırn Lane An | nalysis?: L   | eft Turn Lane |
| Movement   |                  |            |               |             | V   | OLUME       | CALCULA        | ATIONS             |             |               |               |
| Left   Ves   10   2.0%   11   Advancing Volume:   280   Opposing Volume:   232   Opposing Volume:   11   Opposing Volume:   12   Opposing Volume:   13   Opposing Volume:   14   Opposing Volume:   15   Opposing Volume:   16   Opposing Volume:   16   Opposing Volume:   17   Opposing Volume:   18   Opposite Volume   |                  |            |               |             | Left  | Turn Lan    | e Volume C     | alculations        |             |               |               |
| Advancing  | Movemen          |            |               |             | ne  |             |                |                    |             |               |               |
| Right   Yes   9   0.0%   9   1   1   1   1   1   1   1   1   1   | A disease 1      |            |               |             |   |             |                |                    |             | _             |               |
| Left   Yes   3   0.0%   3     Through   -   224   0.0%   5   % Left Turns in Advancing Volume:   3.93%   | Advancing        |            |               |             |   |             |                |                    |             |               |               |
| Through  |                  |            |               |             |   |             |                |                    |             | eit ium voiu  | me: 11        |
| Right Turn Lane Volume Calculations    Movement  | Opposing         |            |               |             |   |             |                |                    |             |               | _             |
| Movement   Include?   Volume   % Trucks   PCEV   |                  | Right      | Yes           | 4           |   | 2.0%        | 5              | % Left             | Turns in Ad | dvancing Volu | me: 3.93%     |
| Advancing   Left   No   3   0.0%   N/A   N/A   Right   -   224   0.0%   N/A   N/A   Right Turn Volume:   N/A   N/A   Right Turn Volume:   N/A   N/A   N/A   Right Turn Volume:   N/A   N/A   N/A   Right Turn Volume:   N/A    |                  |            |               |             | Righ  | t Turn Lar  | ne Volume C    | Calculations       |             |               |               |
| Advancing Through - 224 0.0% N/A Right Turn Volume: N/A Right Turn Volume: N/A Right Turn Volume: N/A  TURN LANE WARRANT FINDINGS  Left Turn Lane Warrant Findings  Applicable Warrant Figure: Figure 1  Warrant Met?: NO  TURN LANE LENGTH CALCULATIONS  Intersection Control: Unsignalized Cycles Per Hour (Assumed): 60  Cycles Per Hour (Assumed): 60  Cycles Per Hour (If Known): 60  Average # of Vehicles/Cycle: N/A  PennDOT Publication 46, Exhibit 11-6  Speed (MPH)  Type of Traffic Control High Low High Low High Low Signalized A A A Bor C B B B B or C B B C Unsignalized A A A C B B C B or C B B C C B B C C B C C B C C B C   | Movemen          |            |               |             | ne  |             |                | •                  |             |               |               |
| TURN LANE WARRANT FINDINGS  Left Turn Lane Warrant Findings  Applicable Warrant Figure: Figure 1  Warrant Met?: No  TURN LANE LENGTH CALCULATIONS  Intersection Control: Unsignalized Cycles Per Hour (If Known): 60  Cycles Per Hour (If Known): 60  Average # of Vehicles/Cycle: N/A  PennDOT Publication 46, Exhibit 11-6  Speed (MPH)  Type of Traffic Control High Low High Low Borc Borc Borc Borc Borc Borc Borc Borc   | A d              |            |               |             |   |             |                |                    |             | d             | N1/A          |
| TURN LANE WARRANT FINDINGS  Left Turn Lane Warrant Findings  Applicable Warrant Figure: Figure 1  Warrant Met?: No  TURN LANE LENGTH CALCULATIONS  Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 11  Cycles Per Hour (Assumed): 60  Cycles Per Hour (If Known): 60  Average # of Vehicles/Cycle: N/A  PennDOT Publication 46, Exhibit 11-6  Speed (MPH)  Type of Traffic Control  Turn Demand Volume  High Low High Low High Low Signalized A A A Borc Borc Borc Borc Borc Borc Borc Borc   | Advancing        |            |               |             |   |             |                |                    |             |               |               |
| Applicable Warrant Figure: Figure 1  Warrant Met?: No  TURN LANE LENGTH CALCULATIONS  Intersection Control: Ousignalized Design Hour Volume of Turning Lane: Cycles Per Hour (Assumed): 60  Cycles Per Hour (If Known): 60  Type of Traffic Control High Low High Low Signalized A A A B or C B o |                  |            |               | 1           | THEN  | LIANEV      | MARRANI        | T EINDINGS         |             | <b>9</b>      |               |
| Applicable Warrant Figure: Figure 1  Warrant Met?: No  Warrant Met?: N/A  Warrant Met?: N/A  TURN LANE LENGTH CALCULATIONS  Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 11  Cycles Per Hour (Assumed): 60  Cycles Per Hour (If Known): 60  Average # of Vehicles/Cycle: N/A  PennDOT Publication 46, Exhibit 11-6  Speed (MPH)  Type of Traffic Control  Turn Demand Volume High Low High Low High Low Signalized A A B OC B OF C B OF C B OF C B OC C B COndition B: Condition B: Condition C: N/A  Required Left Turn Lane Storage Length: N/A  Feet  Required Left Turn Lane Storage Length: N/A  Additional Findings:   | Lo               | ft Turn L  | ano Warra     |             |   | LAIVE V     | T T            |                    | t Turn I or | o Warrant E   | indings       |
| Warrant Met?: No Warrant Met?: N/A  TURN LANE LENGTH CALCULATIONS  Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 11 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 60  Average # of Vehicles/Cycle: N/A  PennDOT Publication 46, Exhibit 11-6  Speed (MPH) Type of Traffic Control 25-35 40-45 50-60 Turn Demand Volume High Low High Low High Low Signalized A A A B B or C  |                  |            |               |             |   |             |                |                    |             |               |               |
| TURN LANE LENGTH CALCULATIONS  Intersection Control: Unsignalized Design Hour Volume of Turning Lane: 11 Cycles Per Hour (Assumed): 60 Cycles Per Hour (If Known): 60  PennDOT Publication 46, Exhibit 11-6  PennDOT Publication 46, Exhibit 11-6  Speed (MPH) Type of Traffic Control 25-35 40-45 50-60 Turn Demand Volume High Low High Low High Low Signalized A A B or C B | Applicable       |            |               |             | <u>-                                     </u> |             |                |                    | _           |               |               |
| Intersection Control: Unsignalized  Design Hour Volume of Turning Lane: 11  Cycles Per Hour (Assumed): 60  Cycles Per Hour (If Known): 60   PennDOT Publication 46, Exhibit 11-6  PennDOT Publication 46, Exhibit 11-6  Speed (MPH)  Type of Traffic Control 125-35 40-45 50-60  Turn Demand Volume  High Low High Low High Low Signalized A A Bor C B |                  | warrant    | ivietr:       |             |   |             |                |                    |             | et?: IV       | /A            |
| Design Hour Volume of Turning Lane:  Cycles Per Hour (Assumed):  Cycles Per Hour (If Known):  60  Average # of Vehicles/Cycle:  N/A  PennDOT Publication 46, Exhibit 11-6  Speed (MPH)  Type of Traffic Control  Turn Demand Volume  High Low High Low High Low Signalized A A A Bor C Bor |                  |            |               | TU          | JRN L   | ANE LE      | NGTH CA        | LCULATIONS         |             |               |               |
| Cycles Per Hour (Assumed):  Cycles Per Hour (If Known):  BennDOT Publication 46, Exhibit 11-6    Speed (MPH)   |                  |            |               |             |   |             |                |                    |             |               |               |
| Cycles Per Hour (If Known):    FennDOT Publication 46, Exhibit 11-6   Speed (MPH)  | -                |            | -             |             |   |             |                |                    |             |               |               |
| Type of Traffic Control  Type of Type of Type of Control  Type of Type of Type of Control  Type  | -                |            | -             |             |   |             | Average        | # of Vehicles/Cycl | e:          | N/A           |               |
| Type of Traffic Control    25-35   |                  |            |               |             | Pe  | nnDOT Pub   | lication 46, E | xhibit 11-6        |             |               | _             |
| Turn Demand Volume  High Low High Low High Low  Signalized A A Bor C Bor C Bor C Bor C  Unsignalized A A C B Bor C B Bor C B  Left Turn Lane Storage Length, Condition A: N/A Feet  Condition B: N/A Feet  Condition C: N/A Feet  Required Left Turn Lane Storage Length: N/A Feet  Additional Findings:  N/A  |                  |            |               |             |   |             | Sp             |                    |             | 0.60          |               |
| High Low High Low High Low Signalized A A Bor C Bor C Bor C Bor C Unsignalized A A C B B Bor C B  Left Turn Lane Storage Length, Condition A: Condition B: Condition C: Required Left Turn Lane Storage Length: N/A  Additional Findings: N/A  |                  | Туре       | of Traffic Co | ntrol       | 25  | o-35        | Turn De        |                    | 5           | U-6U          | -             |
| Unsignalized A A C B B or C B  Left Turn Lane Storage Length, Condition A:  Condition B:  Condition C:  N/A  Feet  Required Left Turn Lane Storage Length:  N/A  Additional Findings:  N/A   |                  |            |               | ŀ           | ligh  |             |                | Low                |             |               |               |
| Left Turn Lane Storage Length, Condition A:  Condition B:  N/A  Feet  Condition C:  N/A  Feet  Required Left Turn Lane Storage Length:  Additional Findings:  N/A  |                  |            |               |             |   |             |                |                    |             |               | 4             |
| Condition B: N/A Feet Condition C: N/A Feet Required Left Turn Lane Storage Length: N/A Feet  Additional Findings: N/A   |                  | '          | onsignanzed   |             |   | •           |                | - '                |             | •             | <b>」</b><br>■ |
| Condition C: N/A Feet Required Left Turn Lane Storage Length: N/A Feet  Additional Findings: N/A   |                  |            |               |             |   | Left Turn I | Lane Storage   | Length, Condition  | on A:       |               | Feet          |
| Required Left Turn Lane Storage Length: N/A Feet  Additional Findings:  N/A  |                  |            |               |             |   |             |                | Condition          | on B:       |               | Feet          |
| Additional Findings: N/A   |                  |            |               |             |   |             |                |                    |             |               | Feet          |
| N/A  |                  |            |               |             |   | Require     | ed Left Turn   | Lane Storage Lei   | ngth:       | N/A           | Feet          |
|  |                  |            |               |             |   |             |                |                    |             |               | _             |
|  |                  |            |               |             |   |             |                |                    | Additio     | _             |               |



10/30/2018 LLOYD BEAVER SAT.xlsx

Figure 1. Warrant for left turn lanes on two-lane roadways (speeds to 35 mph, unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)

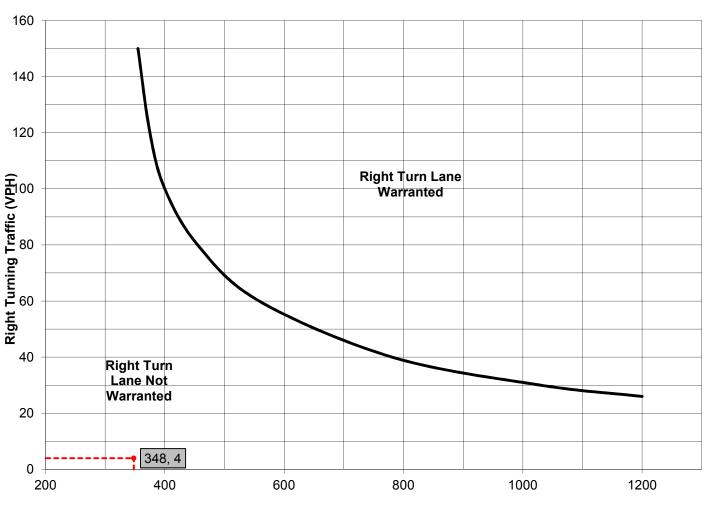


|   |   | S  | TUDY                   | LOC/                          | ATION AN   | ID ANAL   | SIS INFORM   | NOITAN   |   |                                      |
|---|---|--|------------------------|-------------------------------|--|---|--|--|---|--------------------------------------|
|   |   | alalmalit  |                        | Caln To                       | washin   |   | A  | o Doto:  | 10/30/  | 2010                                 |
|   | IVIUI   | nicipality:  |                        |                               |  |   | Analysi  |  | -,,   |                                      |
| Down DOT (  | -<br>-<br>-   | County:  |                        | Chester<br>6                  |  |   | Conduc   | -  | ME  | 3                                    |
| PennDOT E   | engineerin  | g District:  |                        | t t                           | )  |   | cneci<br>gency/Company   | red By:  | TPE   | )                                    |
| Intersection & Ap   | nroach De   | scrintion.   | lovd Ave               | enue & F                      | Beaver Run/P   |   |  | - Tunici   |   |                                      |
| mersection & Ap   | proden be   | scription.   |                        |                               | seave. Hally !   |   |  |  |   |                                      |
|   | -   | is Period:   | 2023                   |                               | ed Conditions  |   |  | of Approa  |   | 1                                    |
|   |   | ign Hour:  |                        | AM F                          |  |   | Undivided  | or Divided   | Highway:  | Undivided                            |
|   | ntersection   |  |                        | Unsign                        |  |   |  |  | _   |                                      |
| Posted  | Speed Lim   | · · · · -  |                        | 3!<br>Lev                     |  |   | Left or Right-   | Turn Lana A  |   | pe of Analysis<br>ght Turn Lane      |
|   | туре о  | of Terrain:  |                        |                               |  |   |  | i ui ii Laile A  | alialysis: . Nig  | giit ruiii Laile                     |
|   |   |  |                        |                               | VOLUME   |   |  |  |   |                                      |
|   |   |  |                        | Le                            | ft Turn Lan  | e Volume C  | alculations  |  |   |                                      |
| Movemen   |   | Include?   |                        | lume                          | % Trucks   | PCEV  |  |  |   |                                      |
|   | Left  | Yes  | _                      | 6                             | 2.0%   | N/A   |  |  | Advancing Volur   |                                      |
| Advancing   | Through   | -  |                        | 206                           | 11.0%  | N/A   |  |  | Opposing Volum  |                                      |
|   | Right   | Yes  |                        | 1                             | 0.0%   | N/A   | 1  |  | Left Turn Volur   | me: N/A                              |
| Onesia  | Left  | Yes  | _                      | 0                             | 0.0%   | N/A   | 4  |  |   |                                      |
| Opposing  | Through<br>Right  | Yes  |                        | 335                           | 5.0%<br>2.0%   | N/A<br>N/A  | 0/1-   | ft Turns in 1  | Advancing Volur   | me: N/A                              |
|   | Nigiit  | 165  |                        |                               |  |   | Calculations   | it rurns in A  | Advancing volui   | me: N/F                              |
| Mayaman   |   | Include?   | Val                    |                               |  |   | 7  |  |   |                                      |
| Movemen   | t<br>Left   | Include?   |                        | lume<br>0                     | % Trucks   | PCEV<br>N/A   |  |  |   |                                      |
|   |   | INU  |                        | U                             | 0.076  | IN/A  |  |  |   | 2.46                                 |
| Advancing   | Through   | -  | 3                      | 335                           | 5.0%   | 344   |  |  | Advancing Volur   | me:1 348                             |
| Advancing   | Through<br>Right  | -  |                        | 3                             | 5.0%<br>2.0%   | 344<br>4  | _  |  | Advancing Volur<br>Right Turn Volur                                     |                                      |
| Advancing   |   |  |                        | 3                             | 2.0%   | 4   | T FINDINGS   |  | _   |                                      |
|   | Right   |  |                        | 3<br>TUR                      | 2.0%   | 4   |  | I  | _   | me: 4                                |
| Lef   | Right  ft Turn La   | ne Warra   | nt Findi               | TUR                           | 2.0%   | 4   | Rig  | ht Turn La   | Right Turn Volur  | me: 4                                |
| Lef<br>Applicable V   | Right  ft Turn La  Warrant F  | igure:   | nt Findi               | TUR                           | 2.0%   | 4   |  | ht Turn La   | ane Warrant Figure:   | indings                              |
| Lef<br>Applicable V   | Right  ft Turn La   | igure:   | nt Findi<br>N/A<br>N/A | TUR ings                      | 2.0% N LANE V  | 4<br>WARRAN   | Rig<br>Applicable  | ht Turn La<br>Warrant Fi<br>Warrant I  | ane Warrant Figure:   | me: 4                                |
| Lef<br>Applicable V   | Right  ft Turn La  Warrant F  | igure:   | nt Findi<br>N/A<br>N/A | TUR ings                      | 2.0% N LANE V  | 4<br>WARRAN   | Rig  | ht Turn La<br>Warrant Fi<br>Warrant I  | ane Warrant Figure:   | indings                              |
| Lef<br>Applicable \u00ed                                      | Right  Turn La  Warrant F  Warrant  | igure:  Met?:  | N/A                    | TUR ings TURN                 | 2.0%  N LANE V   | 4<br>WARRAN   | Rig<br>Applicable  | ht Turn La<br>Warrant Fi<br>Warrant I  | ane Warrant Figure:   | indings                              |
| Lef<br>Applicable \u00ed<br>Ir<br>Design Hour Volui           | Right  ft Turn La  Warrant F  Warrant I  ntersection me of Turn                   | igure:  Met?:  | N/A                    | TUR ings TURN TURN 4          | 2.0%  N LANE V   | 4<br>WARRAN   | Rig<br>Applicable  | ht Turn La<br>Warrant Fi<br>Warrant I  | ane Warrant Figure:   | indings                              |
| Lef Applicable \( \bigve{V} \)  Ir Design Hour Volum Cycles P | Right  ft Turn La  Warrant F  Warrant ontersection me of Turn er Hour (A          | igure:  Met?:  n Control: ning Lane: assumed):                                     | N/A                    | TUR ings TURN tignalized 4 60 | 2.0%  N LANE V   | VARRAN  | Rig<br>Applicable  | ht Turn La<br>Warrant Fi<br>Warrant I  | ane Warrant Figure: Figu  | indings                              |
| Lef Applicable \( \bigve{V} \)  Ir Design Hour Volum Cycles P | Right  ft Turn La  Warrant F  Warrant I  ntersection me of Turn                   | igure:  Met?:  n Control: ning Lane: assumed):                                     | N/A                    | TUR ings TURN TURN 4          | 2.0%  N LANE V   | VARRAN  | Rig<br>Applicable  | ht Turn La<br>Warrant Fi<br>Warrant I  | ane Warrant Figure:   | indings                              |
| Lef Applicable \( \bigve{V} \)  Ir Design Hour Volum Cycles P | Right  ft Turn La  Warrant F  Warrant ontersection me of Turn er Hour (A          | igure:  Met?:  n Control: ning Lane: assumed):                                     | N/A                    | TURN  TURN  60 60             | 2.0%  N LANE V   | VARRANI  NGTH CA  Average   | Rig Applicable  LCULATION  # of Vehicles/Cy exhibit 11-6   | ht Turn La<br>Warrant Fi<br>Warrant I  | ane Warrant Figure: Figu  | indings                              |
| Lef Applicable \( \bigve{V} \)  Ir Design Hour Volum Cycles P | Right  ft Turn La  Warrant F  Warrant ontersection me of Turn er Hour (A          | igure:  Met?:  n Control: ning Lane: assumed):                                     | N/A                    | TURN signalized 4 60 60       | 2.0%  N LANE V  LANE LE  | VARRANI  NGTH CA  Average   | Applicable  Applicable  LCULATION  # of Vehicles/Cy  Exhibit 11-6  Deed (MPH)                            | ht Turn La Warrant Fi Warrant N  | ane Warrant Figure: Figu  | indings                              |
| Lef Applicable \( \bigve{V} \)  Ir Design Hour Volum Cycles P | Right  Fit Turn La  Warrant F  Warrant I  Intersection  me of Turn  eer Hour (II) | igure:  Met?:  n Control: ning Lane: assumed):                                     | N/A N/A Unsi           | TURN signalized 4 60 60       | 2.0%  N LANE V   | Average   | # of Vehicles/Cy Exhibit 11-6 Deed (MPH) 40-45   | ht Turn La Warrant Fi Warrant N  | ane Warrant Figure: Figu  | indings                              |
| Lef Applicable \( \bigve{V} \)  Ir Design Hour Volum Cycles P | Right  Fit Turn La  Warrant F  Warrant I  Intersection  me of Turn  eer Hour (II) | me Warrai<br>igure:<br>Met?:<br>n Control:<br>ning Lane:<br>assumed):<br>f Known): | N/A N/A Unsi           | TURN signalized 4 60 60       | 2.0%  N LANE V  LANE LE  | Average   | Applicable  Applicable  LCULATION  # of Vehicles/Cy  Exhibit 11-6  Deed (MPH)                            | ht Turn La Warrant Fi Warrant N  | ane Warrant Figure: Figu  | indings                              |
| Lef Applicable \( \bigve{V} \)  Ir Design Hour Volum Cycles P | Right  ft Turn La  Warrant F  Warrant I  ntersection me of Turn eer Hour (H  Type | igure:  Met?:  n Control: ning Lane: sssumed): f Known):                           | N/A N/A Unsi           | TURN signalized 4 60 60 High  | 2.0%  N LANE V  LANE LE  DennDOT Pub  25-35  Low A                 | Average Sp High B or C  | # of Vehicles/Cy Exhibit 11-6 Deed (MPH) 40-45 Demand Volume Low B or C                                  | ht Turn La Warrant Fi Warrant F  S  cle: High B or C                                       | Right Turn Volumane Warrant Figure: Figure: N/A  N/A  50-60  Low B or C | indings                              |
| Lef Applicable \( \bigve{V} \)  Ir Design Hour Volum Cycles P | Right  ft Turn La  Warrant F  Warrant I  ntersection me of Turn eer Hour (H  Type | igure:  Met?:  n Control: ning Lane: assumed): f Known):                           | N/A N/A Unsi           | TURN TURN 60 60 High          | LANE LE  | Average Strum D High  | # of Vehicles/Cy Exhibit 11-6 Deed (MPH) 40-45 Lemand Volume Low   | ht Turn La Warrant Fi Warrant F  | ne Warrant Figure: Figu Net?: N   | indings                              |
| Lef Applicable \( \bigve{V} \)  Ir Design Hour Volum Cycles P | Right  ft Turn La  Warrant F  Warrant I  ntersection me of Turn eer Hour (H  Type | igure:  Met?:  n Control: ning Lane: sssumed): f Known):                           | N/A N/A Unsi           | TURN signalized 4 60 60 High  | LANE LE  DennDOT Pub  25-35  Low A A                               | Average  Alication 46, E  Turn D  High  B or C                                      | # of Vehicles/Cy Exhibit 11-6 Deed (MPH) 40-45 Demand Volume Low B or C                                  | ht Turn La Warrant Fi Warrant I S  Cle: High Bor C Bor C                                   | Right Turn Volumane Warrant Figure: Figure: N/A  N/A  50-60  Low B or C | indings                              |
| Lef Applicable \( \bigve{V} \)  Ir Design Hour Volum Cycles P | Right  ft Turn La  Warrant F  Warrant I  ntersection me of Turn eer Hour (H  Type | igure:  Met?:  n Control: ning Lane: sssumed): f Known):                           | N/A N/A Unsi           | TURN signalized 4 60 60 High  | LANE LE  DennDOT Pub  25-35  Low A A                               | Average  Alication 46, E  Turn D  High  B or C                                      | # of Vehicles/Cy Exhibit 11-6 Deed (MPH) 40-45 Demand Volume Low B or C B e Length, Condition            | ht Turn La Warrant Fi Warrant I S  Cle: High Bor C Bor C                                   | N/A  So-60  Low BorC B  | indings ure 9                        |
| Lef Applicable \( \bigve{V} \)  Ir Design Hour Volum Cycles P | Right  ft Turn La  Warrant F  Warrant I  ntersection me of Turn eer Hour (H  Type | igure:  Met?:  n Control: ning Lane: sssumed): f Known):                           | N/A N/A Unsi           | TURN signalized 4 60 60 High  | LANE LE  DennDOT Pub  25-35  Low A A                               | Average  Alication 46, E  Turn D  High  B or C                                      | # of Vehicles/Cy exhibit 11-6 leed (MPH) 40-45 leemand Volume Low B or C B e Length, Condit              | ht Turn La Warrant Fi Warrant F  S  cle: High B or C B or C                                | N/A  N/A  N/A  N/A  | indings Ire 9 Io                     |
| Lef Applicable \( \bigve{V} \)  Ir Design Hour Volum Cycles P | Right  ft Turn La  Warrant F  Warrant I  ntersection me of Turn eer Hour (H  Type | igure:  Met?:  n Control: ning Lane: sssumed): f Known):                           | N/A N/A Unsi           | TURN signalized 4 60 60 High  | 2.0%  N LANE V  LANE LE  DennDOT Pub  25-35  Low A A  Right Turn I | Average  Signature Discrete Storage  Average  Turn D  High  B or C  C  Lane Storage | # of Vehicles/Cy exhibit 11-6 leed (MPH) 40-45 leemand Volume Low B or C B e Length, Condit              | ht Turn La Warrant Fi Warrant F  S  cle: High Bor C Bor C  tion A: tion B:                 | N/A  N/A  N/A   | indings ure 9 IO Feet Feet           |
| Lef Applicable \( \bigve{V} \)  Ir Design Hour Volum Cycles P | Right  ft Turn La  Warrant F  Warrant I  ntersection me of Turn eer Hour (H  Type | igure:  Met?:  n Control: ning Lane: sssumed): f Known):                           | N/A N/A Unsi           | TURN signalized 4 60 60 High  | 2.0%  N LANE V  LANE LE  DennDOT Pub  25-35  Low A A  Right Turn I | Average  Signature Discrete Storage  Average  Turn D  High  B or C  C  Lane Storage | # of Vehicles/Cy  Exhibit 11-6  Deed (MPH)  40-45  Demand Volume  Low  B or C  B  Condii  Condii  Condii | ht Turn La Warrant Fi Warrant F  S  cle: High B or C B or C tion A: tion B: tion C: ength: | N/A N/A N/A N/A   | indings Ire 9 Io Feet Feet Feet Feet |
| Lef Applicable \( \bigve{V} \)  Ir Design Hour Volum Cycles P | Right  ft Turn La  Warrant F  Warrant I  ntersection me of Turn eer Hour (H  Type | igure:  Met?:  n Control: ning Lane: sssumed): f Known):                           | N/A N/A Unsi           | TURN signalized 4 60 60 High  | 2.0%  N LANE V  LANE LE  DennDOT Pub  25-35  Low A A  Right Turn I | Average  Signature Discrete Storage  Average  Turn D  High  B or C  C  Lane Storage | # of Vehicles/Cy  Exhibit 11-6  Deed (MPH)  40-45  Demand Volume  Low  B or C  B  Condii  Condii  Condii | ht Turn La Warrant Fi Warrant F  S  cle: High B or C B or C tion A: tion B: tion C: ength: | N/A N/A N/A N/A   | indings Ire 9 Io Feet Feet Feet Feet |



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Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



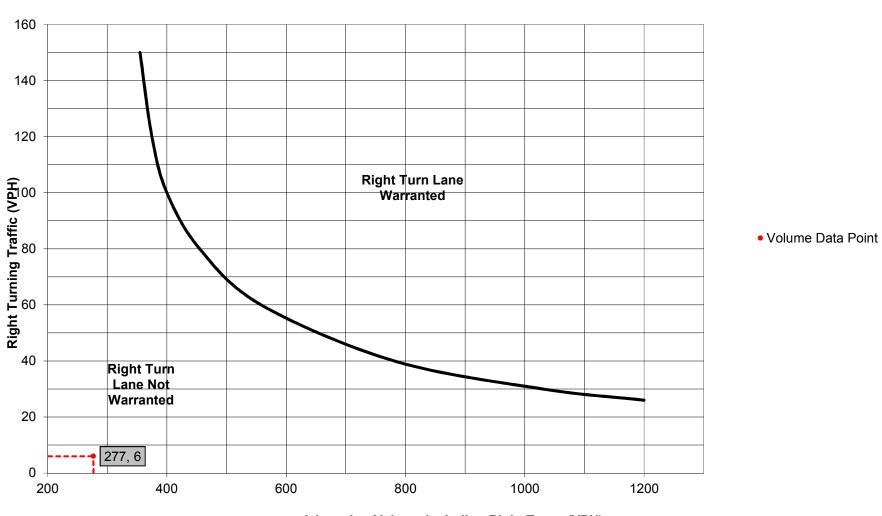
Volume Data Point

|                   |                  | STU                        | JDY LOC     | ATION AN      | ID ANAL      | SIS INFORM          | ATION       |                             |                 |
|-------------------|------------------|----------------------------|-------------|---------------|--------------|---------------------|-------------|-----------------------------|-----------------|
|                   | Mii              | nicipality:                | Caln To     | wnship        |              | Analysis I          | Date:       | 10/30                       | /2018           |
|                   | 1410             | County:                    |             | r County      |              | Conducte            |             | M                           |                 |
| PennDOT           | Engineerin       |                            |             | 6             |              | Checke              |             |                             |                 |
|                   |                  |                            |             |               | A            | gency/Company N     |             | TP                          | D               |
| Intersection & Ap | oproach De       | escription: Lloy           | d Avenue &  | Beaver Run/P  | roposed Driv | eway                |             |                             |                 |
|                   | Analys           | sis Period: 2              | 023 Project | ed Conditions |              | Number o            | f Approach  | Lanes:                      | 1               |
|                   | Des              | sign Hour:                 | PM          | Peak          |              | Undivided or        | Divided Hi  | ghway:                      | Undivided       |
| I                 | Intersection     | n Control:                 | Unsign      | nalized       |              |                     |             |                             |                 |
| Posted            | d Speed Lim      |                            |             | 35            |              |                     |             |                             | pe of Analysis  |
|                   | Туре о           | of Terrain:                | Le          | vel           |              | Left or Right-Tu    | rn Lane An  | alysis?: R                  | light Turn Lane |
|                   |                  |                            |             | VOLUME        | CALCUL       | ATIONS              |             |                             |                 |
|                   |                  |                            | Le          | eft Turn Lan  | e Volume C   | alculations         |             |                             |                 |
| Moveme            |                  | Include?                   | Volume      | % Trucks      | PCEV         | ]                   |             |                             |                 |
|                   | Left             | Yes                        | 10          | 2.0%          | N/A          | 1                   |             | Ivancing Volu               |                 |
| Advancing         | Through          | -                          | 284         | 3.0%          | N/A          | 1                   |             | pposing Volu                |                 |
|                   | Right            | Yes                        | 14          | 0.0%          | N/A          | 1                   | L           | eft Turn Volu               | ıme: N/A        |
| Onnasira          | Left             | Yes                        | 1<br>268    | 0.0%          | N/A          | -                   |             |                             |                 |
| Opposing          | Through<br>Right | Yes                        | 5           | 2.0%          | N/A<br>N/A   | % Left              | Turns in Ad | Ivancing Volu               | ıme: N/A        |
|                   |                  | !                          | Rig         | ght Turn Lar  | ne Volume    | Calculations        |             |                             | ·               |
| Moveme            | nt               | Include?                   | Volume      | % Trucks      | PCEV         | 7                   |             |                             |                 |
|                   | Left             | No                         | 1           | 0.0%          | N/A          |                     |             |                             |                 |
| Advancing         | Through          | -                          | 268         | 2.0%          | 271          |                     |             | Ivancing Volu               |                 |
|                   | Right            | -                          | 5           | 2.0%          | 6            | 1                   | Ri          | ght Turn Volu               | ıme: 6          |
|                   |                  |                            | TUR         | RN LANE V     | VARRAN'      | T FINDINGS          |             |                             |                 |
| Le                | ft Turn La       | ne Warrant F               | indings     |               |              | Right               | Turn Lan    | e Warrant F                 | Findings        |
| Applicable        | Warrant F        | igure:                     | N/A         |               |              | Applicable W        | arrant Figi | ure: Fig                    | ure 9           |
|                   | Warrant          | Met?:                      | N/A         |               |              | v                   | Varrant M   | et?:                        | No              |
|                   |                  |                            | TURN        | I LANE LE     | NGTH CA      | LCULATIONS          |             |                             |                 |
|                   | Intersection     | n Control:                 | Unsignalize | ed            |              |                     |             |                             |                 |
| Design Hour Volu  | ıme of Turr      | ning Lane:                 | 6           |               |              |                     |             |                             |                 |
| Cycles            | Per Hour (A      | Assumed):                  | 60          |               |              |                     |             |                             | _               |
| Cycles            | Per Hour (I      | f Known):                  | 60          |               | Average      | # of Vehicles/Cycle | e:          | N/A                         |                 |
|                   |                  |                            |             | PennDOT Pub   |              |                     |             |                             | _               |
|                   |                  |                            |             | 25-35         | Sp           | 40-45               | -           | 0.60                        |                 |
|                   | Туре             | of Traffic Contro          | 1           | 43-33         | Turn D       | emand Volume        | 50          | 0-60                        |                 |
|                   |                  |                            | High        | Low           | High         | Low                 | High        | Low                         |                 |
|                   | -                | Signalized<br>Unsignalized | A<br>A      | A<br>A        | B or C       | B or C              | B or C      | B or C                      | -               |
|                   |                  | Jibiiaiizea                |             |               |              | '                   |             |                             | <b>⊣</b>        |
|                   | <u> </u>         |                            |             | Right Turn    | Lane Storage | e Length, Condition |             | N/A                         | Feet            |
|                   |                  |                            |             |               |              | Condition           | n B:        | N/A                         | IF              |
|                   |                  |                            |             |               |              |                     |             |                             | Feet            |
|                   |                  |                            |             |               |              | Condition           | on C:       | N/A                         | Feet            |
|                   |                  |                            |             | Require       | d Right Turn |                     |             |                             |                 |
|                   |                  |                            |             | Require       | d Right Turn | Condition           | ngth:       | N/A<br>N/A<br>anal Findings | Feet<br>Feet    |
| dditional Commen  |                  | tions:                     |             | Require       | d Right Turn | Condition           | ngth:       | N/A<br>N/A                  | Feet<br>Feet    |



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Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)

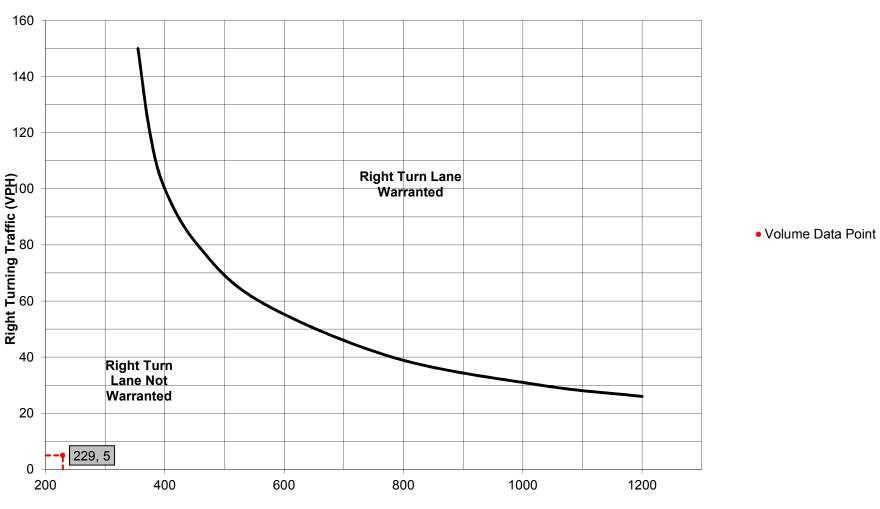


|                   |                       | 310                        | וטון נטנו    | ATION AN      | ND AINAL     | I SIS II VI CIKIVII | 4110IV      |                                |                                    |
|-------------------|-----------------------|----------------------------|--------------|---------------|--------------|---------------------|-------------|--------------------------------|------------------------------------|
|                   | Mu                    | nicipality:                | Caln To      | wnship        |              | Analysis I          | Date:       | 10/30                          | /2018                              |
|                   |                       | County:                    |              | County        |              | Conducte            |             |                                | 1B                                 |
| PennDOT           | Engineerin            |                            |              | 5             |              | Checke              |             |                                |                                    |
|                   | Ū                     |                            |              |               | A            | gency/Company N     | ame:        | TF                             | PD                                 |
| Intersection & Ap | oproach De            | scription: Lloye           | d Avenue &   | Beaver Run/P  | roposed Driv | eway                |             |                                |                                    |
|                   | Analys                | sis Period: 2              | 023 Projecto | ed Conditions |              | Number o            | f Approach  | Lanes:                         | 1                                  |
|                   |                       | sign Hour:                 | SAT          | Peak          |              | Undivided or        | Divided Hi  | ghway:                         | Undivided                          |
|                   | Intersection          |                            |              | nalized       |              |                     |             |                                |                                    |
| Posted            | d Speed Lim<br>Type o | of Terrain:                |              | vel           |              | Left or Right-Tu    | rn Lane An  |                                | ype of Analysis<br>Right Turn Lane |
|                   | •                     |                            |              | VOLUME        | CALCIII      |                     |             | -                              |                                    |
|                   |                       |                            | 1 6          | eft Turn Lan  |              |                     |             |                                |                                    |
| Movemer           | nt                    | Include?                   | Volume       | % Trucks      | PCEV         |                     |             |                                |                                    |
| Movemen           | Left                  | Yes                        | 10           | 2.0%          | N/A          | 1                   | Ad          | lvancing Volu                  | ume: N/A                           |
| Advancing         | Through               | -                          | 260          | 0.0%          | N/A          | 1                   |             | pposing Volu                   | -                                  |
| Č                 | Right                 | Yes                        | 9            | 0.0%          | N/A          |                     |             | eft Turn Volu                  |                                    |
|                   | Left                  | Yes                        | 3            | 0.0%          | N/A          | 1                   |             |                                |                                    |
| Opposing          | Through               | -                          | 224          | 0.0%          | N/A          |                     |             |                                | _                                  |
|                   | Right                 | Yes                        | 4            | 2.0%          | N/A          | % Left              | Turns in Ac | Ivancing Volu                  | ume: N/A                           |
|                   |                       |                            | Ri           | ght Turn Laı  | ne Volume (  | Calculations        |             |                                |                                    |
| Movemer           |                       | Include?                   | Volume       | % Trucks      | PCEV         | ]                   |             |                                |                                    |
|                   | Left                  | No                         | 3            | 0.0%          | N/A          |                     | _           |                                | 220                                |
| Advancing         | Through<br>Right      | -                          | 224<br>4     | 0.0%<br>2.0%  | 224<br>5     | -                   |             | lvancing Volu<br>ght Turn Volu |                                    |
|                   | MBITC                 |                            |              |               |              |                     | 1.11        | 5110 10111 4010                | James                              |
|                   |                       |                            |              | IN LANE V     | WARRAN       | T FINDINGS          |             |                                |                                    |
| Le                | ft Turn La            | ne Warrant F               | indings      | 1             |              | Right               | Turn Lan    | e Warrant                      | Findings                           |
| Applicable        | Warrant F             | igure:                     | N/A          |               |              | Applicable W        | arrant Fig  | ure: Fig                       | ure 9                              |
|                   | Warrant               | Met?:                      | N/A          |               |              | v                   | Varrant M   | et?:                           | No                                 |
|                   |                       |                            | TURN         | I LANE LE     | NGTH CA      | LCULATIONS          |             |                                |                                    |
| ,                 | Intersection          | n Control:                 | Unsignalize  | d             |              |                     |             |                                |                                    |
| Design Hour Volu  | ıme of Turr           | ning Lane:                 | 5            |               |              |                     |             |                                |                                    |
|                   | Per Hour (A           |                            | 60           |               |              |                     |             |                                | _                                  |
| Cycles            | Per Hour (I           | f Known):                  | 60           |               | Average      | # of Vehicles/Cycl  | e:          | N/A                            |                                    |
|                   |                       |                            |              | PennDOT Pub   |              | eed (MPH)           |             |                                |                                    |
|                   | <u>-</u>              | af Tuaffic Occid           |              | 25-35         |              | 40-45               | 50          | 0-60                           | 7                                  |
|                   | Type                  | of Traffic Control         |              |               |              | emand Volume        |             |                                |                                    |
|                   |                       | Ci l' '                    | High         | Low           | High         | Low                 | High        | Low                            | ╡                                  |
|                   | -                     | Signalized<br>Jnsignalized | A<br>A       | A<br>A        | B or C       | B or C              | B or C      | B or C                         | $\dashv$                           |
|                   | <u> </u>              |                            |              |               |              |                     |             | <u> </u>                       |                                    |
|                   |                       |                            |              | Kignt furn    | Lane Storage | e Length, Conditio  |             | N/A                            | Feet                               |
|                   |                       |                            |              |               |              | Conditio            |             | N/A<br>N/A                     | Feet                               |
|                   |                       |                            |              | Donuisa       | d Diah+ Tu   | Conditio            |             | N/A                            | Feet                               |
|                   |                       |                            |              | Require       | u Kignt Türn | Lane Storage Ler    | igun:       | N/A                            | Feet                               |
|                   |                       |                            |              |               |              |                     |             |                                |                                    |
|                   |                       |                            |              |               |              |                     | Additio     | nal Findings<br>N/             |                                    |



10/30/2018 LLOYD BEAVER SAT.xlsx

Figure 9. Warrant for right turn lanes on two-lane roadways (40 mph or lower speeds, unsignalized and signalized intersections)



# **APPENDIX N**SIGNAL WARRANT ANALYSIS

## EB/WB MANOR AVE (MAJOR) & NB RAMPS (MINOR) 2023 PROJECTED

#### **STUDY AND ANALYSIS INFORMATION**

Municipality: Caln Township
County: Chester County
PennDOT Engineering District: 6

Analysis Date: 10/30/2018
Conducted By: mb
Agency/Company Name: TPD

#### **Analysis Information**

Data Collection Date: 12/19/2017
Day of the Week: Tuesday

Is the intersection in a built-up area of an isolated community of <10,000 population?

Nο

#### **Major Street Information**

Major Street Name and Route Number: Manor Avenue (S.R. 0322)

Major Street Approach #1 Direction: E-Bound

Major Street Approach #2 Direction: W-Bound

Number of Lanes for Moving Traffic on Each Major Street Approach:

Speed Limit or 85th Percentile Speed on the Major Street:

45

MPH

#### **Minor Street Information**

Minor Street Name and Route Number: EB Route 30 Ramps
Minor Street Approach #1 Direction: N-Bound
Minor Street Approach #2 Direction:

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

#### TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS

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



|          | ENTER V  | OLUME DATA   | PER 15 MINU  | JTE INTERVAI | L, PER APPRO | ACH          |
|----------|----------|--------------|--------------|--------------|--------------|--------------|
|          |          |              |              |              |              |              |
|          |          | Major Street | Major Street | Major Street | Minor Street | Minor Street |
|          |          | Approach #1  | Approach #2  | Combined     | Approach #1  | Approach #2  |
| Time Ir  |          | (E-Bound)    | (W-Bound)    |              | (N-Bound)    | ()           |
| Begin At | End Of   | Volume       | Volume       | Total Volume | Volume       | Volume       |
| 12:00 AM | 12:14 AM |              |              | 0            |              |              |
| 12:15 AM | 12:29 AM |              |              | 0            |              |              |
| 12:30 AM | 12:44 AM |              |              | 0            |              |              |
| 12:45 AM | 12:59 AM |              |              | 0            |              |              |
| 1:00 AM  | 1:14 AM  |              |              | 0            |              |              |
| 1:15 AM  | 1:29 AM  |              |              | 0            |              |              |
| 1:30 AM  | 1:44 AM  |              |              | 0            |              |              |
| 1:45 AM  | 1:59 AM  |              |              | 0            |              |              |
| 2:00 AM  | 2:14 AM  |              |              | 0            |              |              |
| 2:15 AM  | 2:29 AM  |              |              | 0            |              |              |
| 2:30 AM  | 2:44 AM  |              |              | 0            |              |              |
| 2:45 AM  | 2:59 AM  |              |              | 0            |              |              |
| 3:00 AM  | 3:14 AM  |              |              | 0            |              |              |
| 3:15 AM  | 3:29 AM  |              |              | 0            |              |              |
| 3:30 AM  | 3:44 AM  |              |              | 0            |              |              |
| 3:45 AM  | 3:59 AM  |              |              | 0            |              |              |
| 4:00 AM  | 4:14 AM  |              |              | 0            |              |              |
| 4:15 AM  | 4:29 AM  |              |              | 0            |              |              |
| 4:30 AM  | 4:44 AM  |              |              | 0            |              |              |
| 4:45 AM  | 4:59 AM  |              |              | 0            |              |              |
| 5:00 AM  | 5:14 AM  |              |              | 0            |              |              |
| 5:15 AM  | 5:29 AM  |              |              | 0            |              |              |
| 5:30 AM  | 5:44 AM  |              |              | 0            |              |              |
| 5:45 AM  | 5:59 AM  |              |              | 0            |              |              |
| 6:00 AM  | 6:14 AM  |              |              | 0            |              |              |
| 6:15 AM  | 6:29 AM  |              |              | 0            |              |              |
| 6:30 AM  | 6:44 AM  |              |              | 0            |              |              |
| 6:45 AM  | 6:59 AM  |              |              | 0            |              |              |
| 7:00 AM  | 7:14 AM  | 839          | 624          | 1463         | 14           |              |
| 7:15 AM  | 7:29 AM  |              |              | 0            |              |              |
| 7:30 AM  | 7:44 AM  |              |              | 0            |              |              |
| 7:45 AM  | 7:59 AM  |              |              | 0            |              |              |
| 8:00 AM  | 8:14 AM  | 599          | 696          | 1295         | 14           |              |
| 8:15 AM  | 8:29 AM  |              |              | 0            |              |              |
| 8:30 AM  | 8:44 AM  |              |              | 0            |              |              |
| 8:45 AM  | 8:59 AM  |              |              | 0            |              |              |
| 9:00 AM  | 9:14 AM  |              |              | 0            |              |              |
| 9:15 AM  | 9:29 AM  |              |              | 0            |              |              |
| 9:30 AM  | 9:44 AM  |              |              | 0            |              |              |
| 9:45 AM  | 9:59 AM  |              |              | 0            |              |              |
| 10:00 AM | 10:14 AM |              |              | 0            |              |              |
| 10:15 AM | 10:29 AM |              |              | 0            |              |              |
| 10:30 AM | 10:44 AM |              |              | 0            |              |              |
| 10:45 AM | 10:59 AM |              |              | 0            |              |              |
| 11:00 AM | 11:14 AM | 657          | 786          | 1443         | 29           |              |
| 11:15 AM | 11:29 AM |              |              | 0            |              |              |
| 11:30 AM | 11:44 AM |              |              | 0            |              |              |
| 11:45 AM | 11:59 AM |              |              | 0            |              |              |

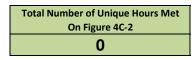


| Time In  | terval   | Major Street Approach #1 (E-Bound) | Major Street<br>Approach #2<br>(W-Bound) | Major Street<br>Combined | Minor Street<br>Approach #1<br>(N-Bound) | Minor Stree<br>Approach #<br>() |
|----------|----------|------------------------------------|--|--------------------------|--|---------------------------------|
| Begin At | End Of   | Volume                             | Volume                                   | Total Volume             | Volume                                   | Volume                          |
| 12:00 PM | 12:14 PM | 657                                | 770                                      | 1427                     | 17                                       |                                 |
| 12:15 PM | 12:29 PM |                                    |  | 0                        |  |                                 |
| 12:30 PM | 12:44 PM |                                    |  | 0                        |  |                                 |
| 12:45 PM | 12:59 PM |                                    |  | 0                        |  |                                 |
| 1:00 PM  | 1:14 PM  |                                    |  | 0                        |  |                                 |
| 1:15 PM  | 1:29 PM  |                                    |  | 0                        |  |                                 |
| 1:30 PM  | 1:44 PM  |                                    |  | 0                        |  |                                 |
| 1:45 PM  | 1:59 PM  |                                    |  | 0                        |  |                                 |
| 2:00 PM  | 2:14 PM  |                                    |  | 0                        |  |                                 |
| 2:15 PM  | 2:29 PM  |                                    |  | 0                        |  |                                 |
| 2:30 PM  | 2:44 PM  |                                    |  | 0                        |  |                                 |
| 2:45 PM  | 2:59 PM  |                                    |  | 0                        |  |                                 |
| 3:00 PM  | 3:14 PM  |                                    |  | 0                        |  |                                 |
| 3:15 PM  | 3:29 PM  |                                    |  | 0                        |  |                                 |
| 3:30 PM  | 3:44 PM  |                                    |  | 0                        |  |                                 |
| 3:45 PM  | 3:59 PM  |                                    |  | 0                        |  |                                 |
| 4:00 PM  | 4:14 PM  | 658                                | 1008                                     | 1666                     | 21                                       |                                 |
| 4:15 PM  | 4:29 PM  |                                    |  | 0                        |  |                                 |
| 4:30 PM  | 4:44 PM  |                                    |  | 0                        |  |                                 |
| 4:45 PM  | 4:59 PM  |                                    |  | 0                        |  |                                 |
| 5:00 PM  | 5:14 PM  | 644                                | 998                                      | 1642                     | 34                                       |                                 |
| 5:15 PM  | 5:29 PM  |                                    |  | 0                        |  |                                 |
| 5:30 PM  | 5:44 PM  |                                    |  | 0                        |  |                                 |
| 5:45 PM  | 5:59 PM  |                                    |  | 0                        |  |                                 |
| 6:00 PM  | 6:14 PM  |                                    |  | 0                        |  |                                 |
| 6:15 PM  | 6:29 PM  |                                    |  | 0                        |  |                                 |
| 6:30 PM  | 6:44 PM  |                                    |  | 0                        |  |                                 |
| 6:45 PM  | 6:59 PM  |                                    |  | 0                        |  |                                 |
| 7:00 PM  | 7:14 PM  |                                    |  | 0                        |  |                                 |
| 7:15 PM  | 7:29 PM  |                                    |  | 0                        |  |                                 |
| 7:30 PM  | 7:44 PM  |                                    |  | 0                        |  |                                 |
| 7:45 PM  | 7:59 PM  |                                    |  | 0                        |  |                                 |
| 8:00 PM  | 8:14 PM  |                                    |  | 0                        |  |                                 |
| 8:15 PM  | 8:29 PM  |                                    |  | 0                        |  |                                 |
| 8:30 PM  | 8:44 PM  |                                    |  | 0                        |  |                                 |
| 8:45 PM  | 8:59 PM  |                                    |  | 0                        |  |                                 |
| 9:00 PM  | 9:14 PM  |                                    |  | 0                        |  |                                 |
| 9:15 PM  | 9:29 PM  |                                    |  | 0                        |  |                                 |
| 9:30 PM  | 9:44 PM  |                                    |  | 0                        |  |                                 |
| 9:45 PM  | 9:59 PM  |                                    |  | 0                        |  |                                 |
| 10:00 PM | 10:14 PM |                                    |  | 0                        |  |                                 |
| 10:15 PM | 10:29 PM |                                    |  | 0                        |  |                                 |
| 10:30 PM | 10:44 PM |                                    |  | 0                        |  |                                 |
| 10:45 PM | 10:59 PM |                                    |  | 0                        |  |                                 |
| 11:00 PM | 11:14 PM |                                    |  | 0                        |  |                                 |
| 11:15 PM | 11:29 PM |                                    |  | 0                        |  |                                 |
| 11:30 PM | 11:44 PM |                                    |  | 0                        |  |                                 |



#### **MUTCD WARRANT 2, FOUR-HOUR VEHICULAR VOLUME**

| Number of La  | nes for Moving Traffic on Each<br>Approach |
|---------------|--|
| Major Street: | 1 Lane                                     |
| Minor Street: | 1 Lane                                     |



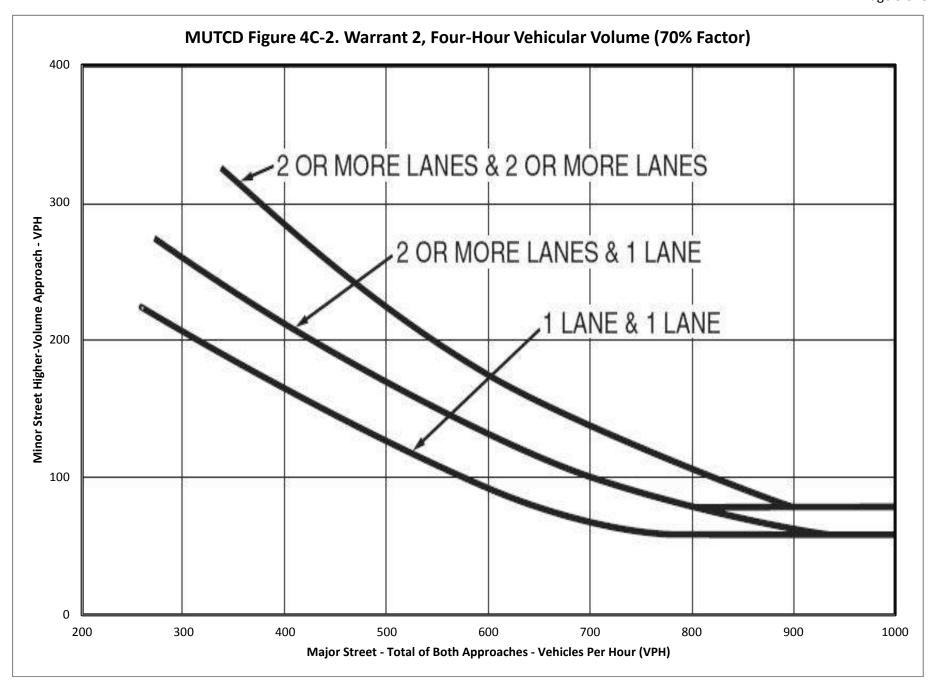
| В | uilt-up Isolated Community With Less Than 10,000 Population or Above 40 MPH | Yes |
|---|---|-----|
|   | on Major Street?  | res |

| Hourly Vehicular Volume |                         |                               |           |  |  |  |  |
|-------------------------|-------------------------|-------------------------------|-----------|--|--|--|--|
| Hour Interval           | Major Street Combined   | Highest Minor Street Approach | Hour Met? |  |  |  |  |
| Beginning At            | Vehicles Per Hour (VPH) | Vehicles Per Hour (VPH)       | nour wet: |  |  |  |  |
| 12:00 AM                | 0                       | 0                             |           |  |  |  |  |
| 12:15 AM                | 0                       | 0                             |           |  |  |  |  |
| 12:30 AM                | 0                       | 0                             |           |  |  |  |  |
| 12:45 AM                | 0                       | 0                             |           |  |  |  |  |
| 1:00 AM                 | 0                       | 0                             |           |  |  |  |  |
| 1:15 AM                 | 0                       | 0                             |           |  |  |  |  |
| 1:30 AM                 | 0                       | 0                             |           |  |  |  |  |
| 1:45 AM                 | 0                       | 0                             |           |  |  |  |  |
| 2:00 AM                 | 0                       | 0                             |           |  |  |  |  |
| 2:15 AM                 | 0                       | 0                             |           |  |  |  |  |
| 2:30 AM                 | 0                       | 0                             |           |  |  |  |  |
| 2:45 AM                 | 0                       | 0                             |           |  |  |  |  |
| 3:00 AM                 | 0                       | 0                             |           |  |  |  |  |
| 3:15 AM                 | 0                       | 0                             |           |  |  |  |  |
| 3:30 AM                 | 0                       | 0                             |           |  |  |  |  |
| 3:45 AM                 | 0                       | 0                             |           |  |  |  |  |
| 4:00 AM                 | 0                       | 0                             |           |  |  |  |  |
| 4:15 AM                 | 0                       | 0                             |           |  |  |  |  |
| 4:30 AM                 | 0                       | 0                             |           |  |  |  |  |
| 4:45 AM                 | 0                       | 0                             |           |  |  |  |  |
| 5:00 AM                 | 0                       | 0                             |           |  |  |  |  |
| 5:15 AM                 | 0                       | 0                             |           |  |  |  |  |
| 5:30 AM                 | 0                       | 0                             |           |  |  |  |  |
| 5:45 AM                 | 0                       | 0                             |           |  |  |  |  |
| 6:00 AM                 | 0                       | 0                             |           |  |  |  |  |
| 6:15 AM                 | 1463                    | 14                            |           |  |  |  |  |
| 6:30 AM                 | 1463                    | 14                            |           |  |  |  |  |
| 6:45 AM                 | 1463                    | 14                            |           |  |  |  |  |
| 7:00 AM                 | 1463                    | 14                            |           |  |  |  |  |
| 7:15 AM                 | 1295                    | 14                            |           |  |  |  |  |
| 7:30 AM                 | 1295                    | 14                            |           |  |  |  |  |
| 7:45 AM                 | 1295                    | 14                            |           |  |  |  |  |
| 8:00 AM                 | 1295                    | 14                            |           |  |  |  |  |
| 8:15 AM                 | 0                       | 0                             |           |  |  |  |  |
| 8:30 AM                 | 0                       | 0                             |           |  |  |  |  |
| 8:45 AM                 | 0                       | 0                             |           |  |  |  |  |
| 9:00 AM                 | 0                       | 0                             |           |  |  |  |  |
| 9:15 AM                 | 0                       | 0                             |           |  |  |  |  |
| 9:30 AM                 | 0                       | 0                             |           |  |  |  |  |
| 9:45 AM                 | 0                       | 0                             |           |  |  |  |  |
| 10:00 AM                | 0                       | 0                             |           |  |  |  |  |
| 10:15 AM                | 1443                    | 29                            |           |  |  |  |  |
| 10:30 AM                | 1443                    | 29                            |           |  |  |  |  |
| 10:45 AM                | 1443                    | 29                            |           |  |  |  |  |
| 11:00 AM                | 1443                    | 29                            |           |  |  |  |  |
| 11:15 AM                | 1427                    | 17                            |           |  |  |  |  |
| 11:30 AM                | 1427                    | 17                            |           |  |  |  |  |
|                         |                         |                               |           |  |  |  |  |
| 11:45 AM                | 1427                    | 17                            |           |  |  |  |  |



| Hourly Vehicular Volume   |                         |                         |           |  |  |  |  |
|---|-------------------------|-------------------------|-----------|--|--|--|--|
| Hour Interval Major Street Combined Highest Minor Street Approach |                         |                         |           |  |  |  |  |
| Beginning At  | Vehicles Per Hour (VPH) | Vehicles Per Hour (VPH) | Hour Wet? |  |  |  |  |
| 12:00 PM 1427   |                         | 17                      |           |  |  |  |  |
| 12:15 PM  | 0                       | 0                       |           |  |  |  |  |
| 12:30 PM 0  |                         | 0                       |           |  |  |  |  |
| 12:45 PM 0  |                         | 0                       |           |  |  |  |  |
| 1:00 PM   | 0                       | 0                       |           |  |  |  |  |
| 1:15 PM   | 0                       | 0                       |           |  |  |  |  |
| 1:30 PM   | 0                       | 0                       |           |  |  |  |  |
| 1:45 PM   | 0                       | 0                       |           |  |  |  |  |
| 2:00 PM   | 0                       | 0                       |           |  |  |  |  |
| 2:15 PM   | 0                       | 0                       |           |  |  |  |  |
| 2:30 PM   | 0                       | 0                       |           |  |  |  |  |
| 2:45 PM   | 0                       | 0                       |           |  |  |  |  |
| 3:00 PM   | 0                       | 0                       |           |  |  |  |  |
| 3:15 PM   | 1666                    | 21                      |           |  |  |  |  |
| 3:30 PM   | 1666                    | 21                      |           |  |  |  |  |
| 3:45 PM   | 1666                    | 21                      |           |  |  |  |  |
| 4:00 PM   | 1666                    | 21                      |           |  |  |  |  |
| 4:15 PM   | 1642                    | 34                      |           |  |  |  |  |
| 4:30 PM   | 1642                    | 34                      |           |  |  |  |  |
| 4:45 PM   | 1642                    | 34                      |           |  |  |  |  |
| 5:00 PM   | 1642                    | 34                      |           |  |  |  |  |
| 5:15 PM   | 0                       | 0                       |           |  |  |  |  |
| 5:30 PM   | 0                       | 0                       |           |  |  |  |  |
| 5:45 PM   | 0                       | 0                       |           |  |  |  |  |
| 6:00 PM   | 0                       | 0                       |           |  |  |  |  |
| 6:15 PM   | 0                       | 0                       |           |  |  |  |  |
| 6:30 PM   | 0                       | 0                       |           |  |  |  |  |
| 6:45 PM   | 0                       | 0                       |           |  |  |  |  |
| 7:00 PM   | 0                       | 0                       |           |  |  |  |  |
| 7:15 PM   | 0                       | 0                       |           |  |  |  |  |
| 7:30 PM   | 0                       | 0                       |           |  |  |  |  |
| 7:45 PM   | 0                       | 0                       |           |  |  |  |  |
| 8:00 PM   | 0                       | 0                       |           |  |  |  |  |
| 8:15 PM   | 0                       | 0                       |           |  |  |  |  |
| 8:30 PM   | 0                       | 0                       |           |  |  |  |  |
| 8:45 PM   | 0                       | 0                       |           |  |  |  |  |
| 9:00 PM   | 0                       | 0                       |           |  |  |  |  |
| 9:15 PM   | 0                       | 0                       |           |  |  |  |  |
| 9:30 PM   | 0                       | 0                       |           |  |  |  |  |
| 9:45 PM   | 0                       | 0                       |           |  |  |  |  |
| 10:00 PM  | 0                       | 0                       |           |  |  |  |  |
| 10:15 PM  | 0                       | 0                       |           |  |  |  |  |
| 10:30 PM  | 0                       | 0                       |           |  |  |  |  |
| 10:45 PM  | 0                       | 0                       |           |  |  |  |  |
| 11:00 PM  | 0                       | 0                       |           |  |  |  |  |





#### **MUTCD WARRANT 3, PEAK HOUR**

| Number of Lanes for Moving Traffic on Each |          |  |  |  |
|--|----------|--|--|--|
|  | Approach |  |  |  |
| Major Street: 1 Lane                       |          |  |  |  |
| Minor Street:                              | 1 Lane   |  |  |  |

| Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on<br>Major Street? | Yes |
|--|-----|
| Is this signal warrant being applied for an unusual case, such as office complexes,              |     |
| manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that            |     |
| attract or discharge large numbers of vehicles over a short time?                                |     |

| Indicate whether all three of the following conditions for the same 1 hour (any four consecutive 15-minute periods) of an average day are present*   |     |  |  |
|--|-----|--|--|
| Does the total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceed 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach? | No  |  |  |
| Does the volume on the same minor-street approach (one direction only) equal or exceed 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes?   | No  |  |  |
| Does the total entering volume serviced during the hour equal or exceed 650 vehicles per hour for intersection with three approaches or 800 vehicles per hour for intersections with four or more approaches?                                | Yes |  |  |
| *If applicable, attach all supporting calculations and documentation.  |     |  |  |

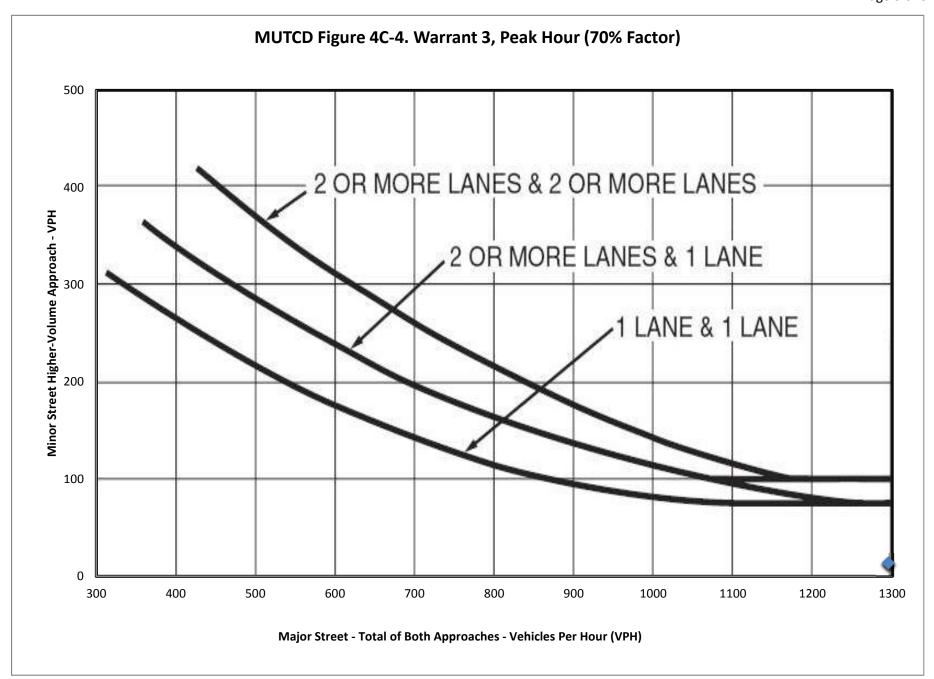
| Total Number of Unique Hours Met<br>On Figure 4C-4 |
|--|
| 0  |

| Hourly Vehicular Volume |                         |                               |            |  |  |  |
|-------------------------|-------------------------|-------------------------------|------------|--|--|--|
| Hour Interval           | Major Street Combined   | Highest Minor Street Approach | Hour Met?  |  |  |  |
| Beginning At            | Vehicles Per Hour (VPH) | Vehicles Per Hour (VPH)       | nour wiet: |  |  |  |
| 12:00 AM                | 0                       | 0                             |            |  |  |  |
| 12:15 AM                | 12:15 AM 0 0            |                               |            |  |  |  |
| 12:30 AM                | 0                       | 0                             |            |  |  |  |
| 12:45 AM                | 0                       | 0                             |            |  |  |  |
| 1:00 AM                 | 0                       | 0                             |            |  |  |  |
| 1:15 AM                 | 0                       | 0                             |            |  |  |  |
| 1:30 AM                 | 0                       | 0                             |            |  |  |  |
| 1:45 AM                 | 0                       | 0                             |            |  |  |  |
| 2:00 AM                 | 0                       | 0                             |            |  |  |  |
| 2:15 AM                 | 0                       | 0                             |            |  |  |  |
| 2:30 AM                 | 0                       | 0                             |            |  |  |  |
| 2:45 AM                 | 0                       | 0                             |            |  |  |  |
| 3:00 AM                 | 0                       | 0                             |            |  |  |  |
| 3:15 AM                 | 0                       | 0                             |            |  |  |  |
| 3:30 AM                 | 0                       | 0                             |            |  |  |  |
| 3:45 AM                 | 0                       | 0                             |            |  |  |  |
| 4:00 AM                 | 0                       | 0                             |            |  |  |  |
| 4:15 AM                 | 0                       | 0                             |            |  |  |  |
| 4:30 AM                 | 0                       | 0                             |            |  |  |  |
| 4:45 AM                 | 0                       | 0                             |            |  |  |  |
| 5:00 AM                 | 0                       | 0                             |            |  |  |  |
| 5:15 AM                 | 0                       | 0                             |            |  |  |  |
| 5:30 AM                 | 0                       | 0                             |            |  |  |  |
| 5:45 AM                 | 0                       | 0                             |            |  |  |  |
| 6:00 AM                 | 0                       | 0                             |            |  |  |  |
| 6:15 AM                 | 1463                    | 14                            |            |  |  |  |
| 6:30 AM                 | 1463                    | 14                            |            |  |  |  |
| 6:45 AM                 | 1463                    | 14                            |            |  |  |  |
| 7:00 AM                 | 1463                    | 14                            |            |  |  |  |
| 7:15 AM                 | 1295                    | 14                            |            |  |  |  |
| 7:30 AM                 | 1295                    | 14                            |            |  |  |  |
| 7:45 AM                 | 1295                    | 14                            |            |  |  |  |
| 8:00 AM                 | 1295                    | 14                            |            |  |  |  |
| 8:15 AM                 | 0                       | 0                             |            |  |  |  |



| Hourly Vehicular Volume |                         |                               |           |  |  |  |  |
|-------------------------|-------------------------|-------------------------------|-----------|--|--|--|--|
| Hour Interval           | Major Street Combined   | Highest Minor Street Approach | Hour Met? |  |  |  |  |
| Beginning At            | Vehicles Per Hour (VPH) | Vehicles Per Hour (VPH)       | Hour Metr |  |  |  |  |
| 8:30 AM                 | 0                       | 0                             |           |  |  |  |  |
| 8:45 AM                 | 0                       | 0                             |           |  |  |  |  |
| 9:00 AM                 | 0                       | 0                             |           |  |  |  |  |
| 9:15 AM                 | 0                       | 0                             |           |  |  |  |  |
| 9:30 AM                 | 0                       | 0                             |           |  |  |  |  |
| 9:45 AM                 | 0                       | 0                             |           |  |  |  |  |
| 10:00 AM                | 0                       | 0                             |           |  |  |  |  |
| 10:15 AM                | 1443                    | 29                            |           |  |  |  |  |
| 10:30 AM                | 1443                    | 29                            |           |  |  |  |  |
| 10:45 AM                | 1443                    | 29                            |           |  |  |  |  |
| 11:00 AM                | 1443                    | 29                            |           |  |  |  |  |
| 11:15 AM                | 1427                    | 17                            |           |  |  |  |  |
| 11:30 AM                | 1427                    | 17                            |           |  |  |  |  |
| 11:45 AM                | 1427                    | 17                            |           |  |  |  |  |
| 12:00 PM                | 1427                    | 17                            |           |  |  |  |  |
| 12:15 PM                | 0                       | 0                             |           |  |  |  |  |
| 12:30 PM                | 0                       | 0                             |           |  |  |  |  |
| 12:45 PM                | 0                       | 0                             |           |  |  |  |  |
| 1:00 PM                 | 0                       | 0                             |           |  |  |  |  |
| 1:15 PM                 | 0                       | 0                             |           |  |  |  |  |
| 1:30 PM                 | 0                       | 0                             |           |  |  |  |  |
| 1:45 PM                 | 0                       | 0                             |           |  |  |  |  |
| 2:00 PM                 | 0                       | 0                             |           |  |  |  |  |
| 2:15 PM                 | 0                       | 0                             |           |  |  |  |  |
| 2:30 PM                 | 0                       | 0                             |           |  |  |  |  |
| 2:45 PM                 | 0                       | 0                             |           |  |  |  |  |
| 3:00 PM                 | 0                       | 0                             |           |  |  |  |  |
| 3:15 PM                 | 1666                    | 21                            |           |  |  |  |  |
| 3:30 PM                 | 1666                    | 21                            |           |  |  |  |  |
| 3:45 PM                 | 1666                    | 21                            |           |  |  |  |  |
| 4:00 PM                 | 1666                    | 21                            |           |  |  |  |  |
| 4:15 PM                 | 1642                    | 34                            |           |  |  |  |  |
| 4:30 PM                 | 1642                    | 34                            |           |  |  |  |  |
| 4:45 PM                 | 1642                    | 34                            |           |  |  |  |  |
| 5:00 PM                 | 1642                    | 34                            |           |  |  |  |  |
| 5:15 PM                 | 0                       | 0                             |           |  |  |  |  |
| 5:30 PM                 | 0                       | 0                             |           |  |  |  |  |
| 5:45 PM                 | 0                       | 0                             |           |  |  |  |  |
| 6:00 PM                 | 0                       | 0                             |           |  |  |  |  |
| 6:15 PM                 | 0                       | 0                             |           |  |  |  |  |
| 6:30 PM                 | 0                       | 0                             |           |  |  |  |  |
| 6:45 PM                 | 0                       | 0                             |           |  |  |  |  |
| 7:00 PM                 | 0                       | 0                             |           |  |  |  |  |
| 7:15 PM                 | 0                       | 0                             |           |  |  |  |  |
| 7:30 PM                 | 0                       | 0                             |           |  |  |  |  |
| 7:45 PM                 | 0                       | 0                             |           |  |  |  |  |
| 8:00 PM                 | 0                       | 0                             |           |  |  |  |  |
| 8:15 PM                 | 0                       | 0                             |           |  |  |  |  |
| 8:30 PM                 | 0                       | 0                             |           |  |  |  |  |
| 8:45 PM                 | 0                       | 0                             |           |  |  |  |  |
| 9:00 PM                 | 0                       | 0                             |           |  |  |  |  |
| 9:15 PM                 | 0                       | 0                             |           |  |  |  |  |
| 9:30 PM                 | 0                       | 0                             |           |  |  |  |  |
| 9:45 PM                 | 0                       | 0                             |           |  |  |  |  |
| 10:00 PM                | 0                       | 0                             |           |  |  |  |  |
| 10:15 PM                | 0                       | 0                             |           |  |  |  |  |
| 10:30 PM                | 0                       | 0                             |           |  |  |  |  |
| 10:45 PM                | 0                       | 0                             |           |  |  |  |  |
| 11:00 PM                | 0                       | 0                             |           |  |  |  |  |





No

#### **MUTCD WARRANT 7, CRASH EXPERIENCE**

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

| Number of Lanes for Moving Traffic on Each |          |  |  |  |  |
|--|----------|--|--|--|--|
|  | Approach |  |  |  |  |
| Major Street: 1 Lane                       |          |  |  |  |  |
| Minor Street: 1 Lane                       |          |  |  |  |  |

Has adequate trial of alternatives with satisfactory observance and enforcement failed to reduce the crash frequency? No Five or more reportable and/or non-reportable crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period during the most recent 3 years of available crash data.\* No \*If applicable, attach a summary of the crash data analysis used for this criterion. For each of any 8 hours of an average day, the vehicles per hour given in both the 80% columns of Condition A in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection. No For each of any 8 hours of an average day, the vehicles per hour given in both the 80% columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection. No The volume of pedestrian traffic is not less than 80% of the requirements specified in Warrant 4, the Pedestrian Volume warrant.\* No \*If applicable, attach all supporting calculations and documentation.

#### **MUTCD WARRANT 8, ROADWAY NETWORK\***

Is the major street classified as an Urban Extension, Principal Arterial, or Minor Arterial that is a reasonable connection between two

Principal Arterials and/or Urban Extensions as shown on the official Functional Classification Map?

No

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

Does the intersection have a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any

5 hours of a non-normal business day (Saturday or Sunday)? No

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

Does the major street include rural or suburban highways outside, entering, or traversing a city? No

Does the major street appear as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study? No

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



## EB MANOR AVE (MAJOR) & WBL MANOR AVE (MINOR) 2018 EXISTING

#### STUDY AND ANALYSIS INFORMATION

Municipality: Caln Township
County: Chester County
PennDOT Engineering District: 6

Analysis Date: 2/2/2018
Conducted By: mb
Agency/Company Name: TPD

#### **Analysis Information**

Data Collection Date: 12/19/2017
Day of the Week: Tuesday

Is the intersection in a built-up area of an isolated community of <10,000 population?

No

#### **Major Street Information**

Major Street Approach #1 Direction:

Major Street Approach #2 Direction:

W-Bound

W-Bound

Number of Lanes for Moving Traffic on Each Major Street Approach:

Speed Limit or 85th Percentile Speed on the Major Street:

45

MPH

#### **Minor Street Information**

Minor Street Approach #1 Direction:

Minor Street Approach #2 Direction:

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

#### TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS

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



| ENTER VOLUME DATA PER 1 |                      |                          |                          | INUTE INTERVAL, PER APPROACH |                     |              |  |
|-------------------------|----------------------|--------------------------|--------------------------|------------------------------|---------------------|--------------|--|
|                         |                      | Major Street             | Major Street             | ı                            | Minor Street        | Minor Street |  |
|                         |                      | Major Street Approach #1 | Major Street             | Major Street                 | Minor Street        |              |  |
| Time Ir                 | atamıal              | (E-Bound)                | Approach #2<br>(W-Bound) | Combined                     | Approach #1         | Approach #2  |  |
| Begin At                | End Of               | Volume                   | Volume                   | Total Volume                 | (N-Bound)<br>Volume | ()<br>Volume |  |
| 12:00 AM                | 12:14 AM             | volume                   | volume                   | 1 Otal Volume                | volume              | volume       |  |
| 12:15 AM                | 12:14 AM<br>12:29 AM |                          |                          | 0                            |                     |              |  |
| 12:30 AM                | 12:44 AM             |                          |                          | 0                            |                     |              |  |
| 12:45 AM                | 12:59 AM             |                          |                          | 0                            |                     |              |  |
| 1:00 AM                 | 1:14 AM              |                          |                          | 0                            |                     |              |  |
| 1:15 AM                 | 1:29 AM              |                          |                          | 0                            |                     |              |  |
| 1:30 AM                 | 1:44 AM              |                          |                          | 0                            |                     |              |  |
| 1:45 AM                 | 1:59 AM              |                          |                          | 0                            |                     |              |  |
| 2:00 AM                 | 2:14 AM              |                          |                          | 0                            |                     |              |  |
| 2:15 AM                 | 2:29 AM              |                          |                          | 0                            |                     |              |  |
| 2:30 AM                 | 2:44 AM              |                          |                          | 0                            |                     |              |  |
| 2:45 AM                 | 2:59 AM              |                          |                          | 0                            |                     |              |  |
| 3:00 AM                 | 3:14 AM              |                          |                          | 0                            |                     |              |  |
| 3:15 AM                 | 3:29 AM              |                          |                          | 0                            |                     |              |  |
| 3:30 AM                 | 3:44 AM              |                          |                          | 0                            |                     |              |  |
| 3:45 AM                 | 3:59 AM              |                          |                          | 0                            |                     |              |  |
| 4:00 AM                 | 4:14 AM              |                          |                          | 0                            |                     |              |  |
| 4:15 AM                 | 4:29 AM              |                          |                          | 0                            |                     |              |  |
| 4:30 AM                 | 4:44 AM              |                          |                          | 0                            |                     |              |  |
| 4:45 AM                 | 4:59 AM              |                          |                          | 0                            |                     |              |  |
| 5:00 AM                 | 5:14 AM              |                          |                          | 0                            |                     |              |  |
| 5:15 AM                 | 5:29 AM              |                          |                          | 0                            |                     |              |  |
| 5:30 AM                 | 5:44 AM              |                          |                          | 0                            |                     |              |  |
| 5:45 AM                 | 5:59 AM              |                          |                          | 0                            |                     |              |  |
| 6:00 AM                 | 6:14 AM              |                          |                          | 0                            |                     |              |  |
| 6:15 AM                 | 6:29 AM              |                          |                          | 0                            |                     |              |  |
| 6:30 AM                 | 6:44 AM              |                          |                          | 0                            |                     |              |  |
| 6:45 AM                 | 6:59 AM              |                          |                          | 0                            |                     |              |  |
| 7:00 AM                 | 7:14 AM              | 710                      |                          | 710                          | 273                 |              |  |
| 7:15 AM                 | 7:29 AM              |                          |                          | 0                            |                     |              |  |
| 7:30 AM                 | 7:44 AM              |                          |                          | 0                            |                     |              |  |
| 7:45 AM                 | 7:59 AM              |                          |                          | 0                            |                     |              |  |
| 8:00 AM                 | 8:14 AM              | 509                      |                          | 509                          | 270                 |              |  |
| 8:15 AM                 | 8:29 AM              |                          |                          | 0                            |                     |              |  |
| 8:30 AM                 | 8:44 AM              |                          |                          | 0                            |                     |              |  |
| 8:45 AM                 | 8:59 AM              |                          |                          | 0                            |                     |              |  |
| 9:00 AM                 | 9:14 AM              |                          |                          | 0                            |                     |              |  |
| 9:15 AM                 | 9:29 AM              |                          |                          | 0                            |                     |              |  |
| 9:30 AM                 | 9:44 AM              |                          |                          | 0                            |                     |              |  |
| 9:45 AM                 | 9:59 AM              |                          |                          | 0                            |                     |              |  |
| 10:00 AM                | 10:14 AM             |                          |                          | 0                            |                     |              |  |
| 10:15 AM                | 10:29 AM             |                          |                          | 0                            |                     |              |  |
| 10:30 AM                | 10:44 AM             |                          |                          | 0                            |                     |              |  |
| 10:45 AM                | 10:59 AM             |                          |                          | 0                            |                     |              |  |
| 11:00 AM                | 11:14 AM             | 520                      |                          | 520                          | 223                 |              |  |
| 11:15 AM                | 11:29 AM             |                          |                          | 0                            |                     |              |  |
| 11:30 AM                | 11:44 AM             |                          |                          | 0                            |                     |              |  |
| 11:45 AM                | 11:59 AM             |                          |                          | 0                            |                     |              |  |



|                    | ENTER V            | OLUME DATA                         | PER 15 MIN                               | UTE INTERVAL             | ., PER APPRO                       | ACH                               |
|--------------------|--------------------|------------------------------------|--|--------------------------|------------------------------------|-----------------------------------|
| Time Ir            | nterval            | Major Street Approach #1 (E-Bound) | Major Street<br>Approach #2<br>(W-Bound) | Major Street<br>Combined | Minor Street Approach #1 (N-Bound) | Minor Street<br>Approach #2<br>() |
| Begin At           | End Of             | Volume                             | Volume                                   | Total Volume             | Volume                             | Volume                            |
| 12:00 PM           | 12:14 PM           | 520                                |  | 520                      | 210                                |                                   |
| 12:15 PM           | 12:29 PM           |                                    |  | 0                        |                                    |                                   |
| 12:30 PM           | 12:44 PM           |                                    |  | 0                        |                                    |                                   |
| 12:45 PM           | 12:59 PM           |                                    |  | 0                        |                                    |                                   |
| 1:00 PM            | 1:14 PM            |                                    |  | 0                        |                                    |                                   |
| 1:15 PM            | 1:29 PM            |                                    |  | 0                        |                                    |                                   |
| 1:30 PM            | 1:44 PM            |                                    |  | 0                        |                                    |                                   |
| 1:45 PM            | 1:59 PM            |                                    |  | 0                        |                                    |                                   |
| 2:00 PM            | 2:14 PM            |                                    |  | 0                        |                                    |                                   |
| 2:15 PM            | 2:29 PM            |                                    |  | 0                        |                                    |                                   |
| 2:30 PM            | 2:44 PM            |                                    |  | 0                        |                                    |                                   |
| 2:45 PM            | 2:59 PM            |                                    |  | 0                        |                                    |                                   |
| 3:00 PM            | 3:14 PM            |                                    |  | 0                        |                                    |                                   |
| 3:15 PM            | 3:29 PM            |                                    |  | 0                        |                                    |                                   |
| 3:30 PM            | 3:44 PM            |                                    |  | 0                        |                                    |                                   |
| 3:45 PM            | 3:59 PM            |                                    |  | 0                        |                                    |                                   |
| 4:00 PM            | 4:14 PM            | 554                                |  | 554                      | 198                                |                                   |
| 4:15 PM            | 4:29 PM            |                                    |  | 0                        |                                    |                                   |
| 4:30 PM            | 4:44 PM            |                                    |  | 0                        |                                    |                                   |
| 4:45 PM            | 4:59 PM            |                                    |  | 0                        |                                    |                                   |
| 5:00 PM            | 5:14 PM            | 545                                |  | 545                      | 191                                |                                   |
| 5:15 PM            | 5:29 PM            |                                    |  | 0                        |                                    |                                   |
| 5:30 PM            | 5:44 PM            |                                    |  | 0                        |                                    |                                   |
| 5:45 PM            | 5:59 PM            |                                    |  | 0                        |                                    |                                   |
| 6:00 PM            | 6:14 PM            |                                    |  | 0                        |                                    |                                   |
| 6:15 PM            | 6:29 PM            |                                    |  | 0                        |                                    |                                   |
| 6:30 PM<br>6:45 PM | 6:44 PM            |                                    |  | 0                        |                                    |                                   |
| 7:00 PM            | 6:59 PM<br>7:14 PM |                                    |  | 0                        |                                    |                                   |
| 7:00 PM            | 7:14 PM<br>7:29 PM |                                    |  |                          |                                    |                                   |
|                    | 7:29 PM<br>7:44 PM |                                    |  | 0                        |                                    |                                   |
| 7:30 PM<br>7:45 PM | 7:44 PM            |                                    |  | 0                        |                                    |                                   |
| 8:00 PM            | 8:14 PM            |                                    |  | 0                        |                                    |                                   |
| 8:15 PM            | 8:29 PM            |                                    |  | 0                        |                                    |                                   |
| 8:30 PM            | 8:44 PM            |                                    |  | 0                        |                                    |                                   |
| 8:45 PM            | 8:59 PM            |                                    |  | 0                        |                                    |                                   |
| 9:00 PM            | 9:14 PM            |                                    |  | 0                        |                                    |                                   |
| 9:15 PM            | 9:29 PM            |                                    |  | 0                        |                                    |                                   |
| 9:30 PM            | 9:44 PM            |                                    |  | 0                        |                                    |                                   |
| 9:45 PM            | 9:59 PM            |                                    |  | 0                        |                                    |                                   |
| 10:00 PM           | 10:14 PM           |                                    |  | 0                        |                                    |                                   |
| 10:15 PM           | 10:14 PM           |                                    |  | 0                        |                                    |                                   |
| 10:30 PM           | 10:44 PM           |                                    |  | 0                        |                                    |                                   |
| 10:45 PM           | 10:59 PM           |                                    |  | 0                        |                                    |                                   |
| 11:00 PM           | 11:14 PM           |                                    |  | 0                        |                                    |                                   |
| 11:15 PM           | 11:29 PM           |                                    |  | 0                        |                                    |                                   |
| 11:30 PM           | 11:44 PM           |                                    |  | 0                        |                                    |                                   |
| 11:45 PM           | 11:59 PM           |                                    |  | 0                        |                                    |                                   |
|                    | oach Totals:       | 3358                               | 0  | 3358                     | 1365                               | 0                                 |



#### **MUTCD WARRANT 2, FOUR-HOUR VEHICULAR VOLUME**

| Number of Lanes for Moving Traffic on Each Approach |        |  |
|---|--------|--|
| Major Street:                                       | 1 Lane |  |
| Minor Street:                                       | 1 Lane |  |

| Total Nu | mber of Unique Hours Met |  |  |
|----------|--------------------------|--|--|
|          | On Figure 4C-2           |  |  |
| 6        |                          |  |  |

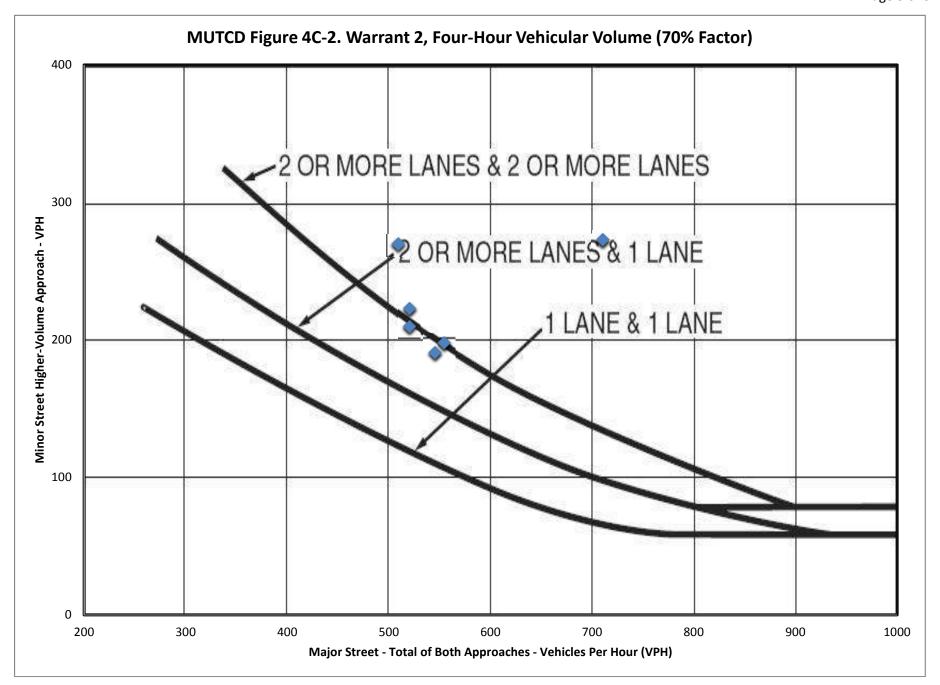
| Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH | Yes |
|--|-----|
| on Major Street?   | res |

| Hourly Vehicular Volume |   |                         |           |
|-------------------------|---|-------------------------|-----------|
| Hour Interval           | ır Interval Major Street Combined Highest Minor Street Approach |                         | Hour Met? |
| Beginning At            | Vehicles Per Hour (VPH)   | Vehicles Per Hour (VPH) | nour wet: |
| 12:00 AM                | 0   | 0                       |           |
| 12:15 AM                | 0   | 0                       |           |
| 12:30 AM                | 0   | 0                       |           |
| 12:45 AM                | 0   | 0                       |           |
| 1:00 AM                 | 0   | 0                       |           |
| 1:15 AM                 | 0   | 0                       |           |
| 1:30 AM                 | 0   | 0                       |           |
| 1:45 AM                 | 0   | 0                       |           |
| 2:00 AM                 | 0   | 0                       |           |
| 2:15 AM                 | 0   | 0                       |           |
| 2:30 AM                 | 0   | 0                       |           |
| 2:45 AM                 | 0   | 0                       |           |
| 3:00 AM                 | 0   | 0                       |           |
| 3:15 AM                 | 0   | 0                       |           |
| 3:30 AM                 | 0   | 0                       |           |
| 3:45 AM                 | 0   | 0                       |           |
| 4:00 AM                 | 0   | 0                       |           |
| 4:15 AM                 | 0   | 0                       |           |
| 4:30 AM                 | 0   | 0                       |           |
| 4:45 AM                 | 0   | 0                       |           |
| 5:00 AM                 | 0   | 0                       |           |
| 5:15 AM                 | 0   | 0                       |           |
| 5:30 AM                 | 0   | 0                       |           |
| 5:45 AM                 | 0   | 0                       |           |
| 6:00 AM                 | 0   | 0                       |           |
| 6:15 AM                 | 710   | 273                     | Met       |
| 6:30 AM                 | 710   | 273                     | Met       |
| 6:45 AM                 | 710   | 273                     | Met       |
| 7:00 AM                 | 710   | 273                     | Met       |
| 7:15 AM                 | 509   | 270                     | Met       |
| 7:30 AM                 | 509   | 270                     | Met       |
| 7:45 AM                 | 509   | 270                     | Met       |
| 8:00 AM                 | 509   | 270                     | Met       |
| 8:15 AM                 | 0   | 0                       |           |
| 8:30 AM                 | 0   | 0                       |           |
| 8:45 AM                 | 0   | 0                       |           |
| 9:00 AM                 | 0   | 0                       |           |
| 9:15 AM                 | 0   | 0                       |           |
| 9:30 AM                 | 0   | 0                       |           |
| 9:45 AM                 | 0   | 0                       |           |
| 10:00 AM                | 0   | 0                       |           |
| 10:15 AM                | 520   | 223                     | Met       |
| 10:30 AM                | 520   | 223                     | Met       |
| 10:45 AM                | 520   | 223                     | Met       |
| 11:00 AM                | 520   | 223                     | Met       |
| 11:15 AM                | 520   | 210                     | Met       |
| 11:30 AM                | 520   | 210                     | Met       |
| 11:45 AM                | 520   | 210                     | Met       |
| 11.73 /(1/1             | 520   | 210                     | Wet       |



| Hourly Vehicular Volume |                         |                               |           |
|-------------------------|-------------------------|-------------------------------|-----------|
| Hour Interval           | Major Street Combined   | Highest Minor Street Approach | Hour Met? |
| Beginning At            | Vehicles Per Hour (VPH) | Vehicles Per Hour (VPH)       | nour wet: |
| 12:00 PM                | 520                     | 210                           | Met       |
| 12:15 PM                | 0                       | 0                             |           |
| 12:30 PM                | 0                       | 0                             |           |
| 12:45 PM                | 0                       | 0                             |           |
| 1:00 PM                 | 0                       | 0                             |           |
| 1:15 PM                 | 0                       | 0                             |           |
| 1:30 PM                 | 0                       | 0                             |           |
| 1:45 PM                 | 0                       | 0                             |           |
| 2:00 PM                 | 0                       | 0                             |           |
| 2:15 PM                 | 0                       | 0                             |           |
| 2:30 PM                 | 0                       | 0                             |           |
| 2:45 PM                 | 0                       | 0                             |           |
| 3:00 PM                 | 0                       | 0                             |           |
| 3:15 PM                 | 554                     | 198                           | Met       |
| 3:30 PM                 | 554                     | 198                           | Met       |
| 3:45 PM                 | 554                     | 198                           | Met       |
| 4:00 PM                 | 554                     | 198                           | Met       |
| 4:15 PM                 | 545                     | 191                           | Met       |
| 4:30 PM                 | 545                     | 191                           | Met       |
| 4:45 PM                 | 545                     | 191                           | Met       |
| 5:00 PM                 | 545                     | 191                           | Met       |
| 5:15 PM                 | 0                       | 0                             |           |
| 5:30 PM                 | 0                       | 0                             |           |
| 5:45 PM                 | 0                       | 0                             |           |
| 6:00 PM                 | 0                       | 0                             |           |
| 6:15 PM                 | 0                       | 0                             |           |
| 6:30 PM                 | 0                       | 0                             |           |
| 6:45 PM                 | 0                       | 0                             |           |
| 7:00 PM                 | 0                       | 0                             |           |
| 7:15 PM                 | 0                       | 0                             |           |
| 7:30 PM                 | 0                       | 0                             |           |
| 7:45 PM                 | 0                       | 0                             |           |
| 8:00 PM                 | 0                       | 0                             |           |
| 8:15 PM                 | 0                       | 0                             |           |
| 8:30 PM                 | 0                       | 0                             |           |
| 8:45 PM                 | 0                       | 0                             |           |
| 9:00 PM                 | 0                       | 0                             |           |
| 9:15 PM                 | 0                       | 0                             |           |
| 9:30 PM                 | 0                       | 0                             |           |
| 9:45 PM                 | 0                       | 0                             |           |
| 10:00 PM                | 0                       | 0                             |           |
| 10:15 PM                | 0                       | 0                             |           |
| 10:30 PM                | 0                       | 0                             |           |
| 10:45 PM                | 0                       | 0                             |           |
| 11:00 PM                | 0                       | 0                             |           |





### **MUTCD WARRANT 3, PEAK HOUR**

| Number of Lanes for Moving Traffic on Each |        |  |  |  |  |  |
|--|--------|--|--|--|--|--|
| Approach                                   |        |  |  |  |  |  |
| Major Street:                              | 1 Lane |  |  |  |  |  |
| Minor Street:                              | 1 Lane |  |  |  |  |  |

| Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street? | Yes |
|---|-----|
| Is this signal warrant being applied for an unusual case, such as office complexes,           |     |
| manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that         |     |
| attract or discharge large numbers of vehicles over a short time?                             |     |

| Indicate whether all three of the following conditions for the same 1 hour (any four consecutive 15- |     |  |  |  |  |  |
|--|-----|--|--|--|--|--|
| minute periods) of an average day are present*   |     |  |  |  |  |  |
| Does the total stopped time delay experienced by the traffic on one minor-street                     |     |  |  |  |  |  |
| approach (one direction only) controlled by a STOP sign equal or exceed 4 vehicle-hours              | No  |  |  |  |  |  |
| for a one-lane approach or 5 vehicle-hours for a two-lane approach?                                  |     |  |  |  |  |  |
| Does the volume on the same minor-street approach (one direction only) equal or exceed               |     |  |  |  |  |  |
| 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two                | No  |  |  |  |  |  |
| moving lanes?  |     |  |  |  |  |  |
| Does the total entering volume serviced during the hour equal or exceed 650 vehicles per             |     |  |  |  |  |  |
| hour for intersection with three approaches or 800 vehicles per hour for intersections               | Yes |  |  |  |  |  |
| with four or more approaches?  |     |  |  |  |  |  |
| *If applicable, attach all supporting calculations and documentation.                                |     |  |  |  |  |  |

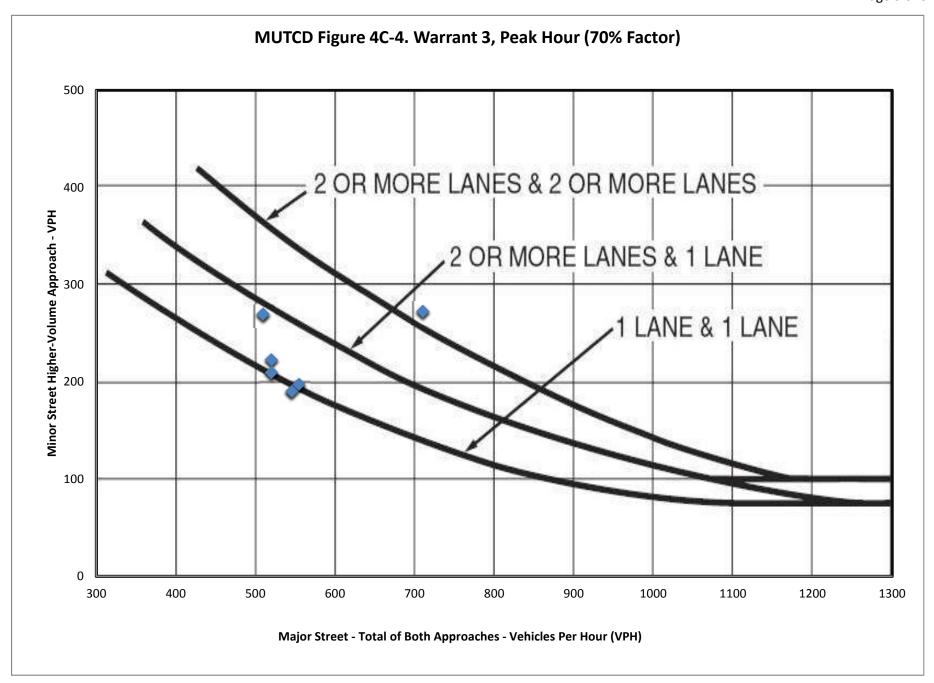
| Total Number of Unique Hours Met<br>On Figure 4C-4 |
|--|
| 5  |

|               | Hourly Vehicular Volume |                               |           |  |  |  |  |  |  |  |
|---------------|-------------------------|-------------------------------|-----------|--|--|--|--|--|--|--|
| Hour Interval | Major Street Combined   | Highest Minor Street Approach | Hour Met? |  |  |  |  |  |  |  |
| Beginning At  | Vehicles Per Hour (VPH) | Vehicles Per Hour (VPH)       | nour wetr |  |  |  |  |  |  |  |
| 12:00 AM      | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 12:15 AM      | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 12:30 AM      | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 12:45 AM      | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 1:00 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 1:15 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 1:30 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 1:45 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 2:00 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 2:15 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 2:30 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 2:45 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 3:00 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 3:15 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 3:30 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 3:45 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 4:00 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 4:15 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 4:30 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 4:45 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 5:00 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 5:15 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 5:30 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 5:45 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 6:00 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 6:15 AM       | 710                     | 273                           | Met       |  |  |  |  |  |  |  |
| 6:30 AM       | 710                     | 273                           | Met       |  |  |  |  |  |  |  |
| 6:45 AM       | 710                     | 273                           | Met       |  |  |  |  |  |  |  |
| 7:00 AM       | 710                     | 273                           | Met       |  |  |  |  |  |  |  |
| 7:15 AM       | 509                     | 270                           | Met       |  |  |  |  |  |  |  |
| 7:30 AM       | 509                     | 270                           | Met       |  |  |  |  |  |  |  |
| 7:45 AM       | 509                     | 270                           | Met       |  |  |  |  |  |  |  |
| 8:00 AM       | 509                     | 270                           | Met       |  |  |  |  |  |  |  |
| 8:15 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |



|               | Hourly Vehicular Volume |                               |           |  |  |  |  |  |  |  |
|---------------|-------------------------|-------------------------------|-----------|--|--|--|--|--|--|--|
| Hour Interval | Major Street Combined   | Highest Minor Street Approach | _         |  |  |  |  |  |  |  |
| Beginning At  | Vehicles Per Hour (VPH) | Vehicles Per Hour (VPH)       | Hour Met? |  |  |  |  |  |  |  |
| 8:30 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 8:45 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 9:00 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 9:15 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 9:30 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 9:45 AM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 10:00 AM      | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 10:15 AM      | 520                     | 223                           | Met       |  |  |  |  |  |  |  |
| 10:30 AM      | 520                     | 223                           | Met       |  |  |  |  |  |  |  |
| 10:45 AM      | 520                     | 223                           | Met       |  |  |  |  |  |  |  |
| 11:00 AM      | 520                     | 223                           | Met       |  |  |  |  |  |  |  |
| 11:15 AM      | 520                     | 210                           | Met       |  |  |  |  |  |  |  |
| 11:30 AM      | 520                     | 210                           | Met       |  |  |  |  |  |  |  |
| 11:45 AM      | 520                     | 210                           |           |  |  |  |  |  |  |  |
| 12:00 PM      | 520                     | 210                           | Met Met   |  |  |  |  |  |  |  |
|               |                         |                               | Wet       |  |  |  |  |  |  |  |
| 12:15 PM      | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 12:30 PM      |                         | 0                             |           |  |  |  |  |  |  |  |
| 12:45 PM      | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 1:00 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 1:15 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 1:30 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 1:45 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 2:00 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 2:15 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 2:30 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 2:45 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 3:00 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 3:15 PM       | 554                     | 198                           | Met       |  |  |  |  |  |  |  |
| 3:30 PM       | 554                     | 198                           | Met       |  |  |  |  |  |  |  |
| 3:45 PM       | 554                     | 198                           | Met       |  |  |  |  |  |  |  |
| 4:00 PM       | 554                     | 198                           | Met       |  |  |  |  |  |  |  |
| 4:15 PM       | 545                     | 191                           |           |  |  |  |  |  |  |  |
| 4:30 PM       | 545                     | 191                           |           |  |  |  |  |  |  |  |
| 4:45 PM       | 545                     | 191                           |           |  |  |  |  |  |  |  |
| 5:00 PM       | 545                     | 191                           |           |  |  |  |  |  |  |  |
| 5:15 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 5:30 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 5:45 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 6:00 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 6:15 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 6:30 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 6:45 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 7:00 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 7:15 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 7:30 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 7:45 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 8:00 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 8:15 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 8:30 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 8:45 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 9:00 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 9:15 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 9:30 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 9:45 PM       | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 10:00 PM      | 0                       | 0                             |           |  |  |  |  |  |  |  |
|               | 0                       |                               |           |  |  |  |  |  |  |  |
| 10:15 PM      |                         | 0                             |           |  |  |  |  |  |  |  |
| 10:30 PM      | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 10:45 PM      | 0                       | 0                             |           |  |  |  |  |  |  |  |
| 11:00 PM      | 0                       | 0                             |           |  |  |  |  |  |  |  |





No

#### **MUTCD WARRANT 7, CRASH EXPERIENCE**

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

| Number of Lanes for Moving Traffic on Each |                      |  |  |  |  |  |  |
|--|----------------------|--|--|--|--|--|--|
| Approach                                   |                      |  |  |  |  |  |  |
| Major Street:                              | 1 Lane               |  |  |  |  |  |  |
| Minor Street:                              | Minor Street: 1 Lane |  |  |  |  |  |  |

Has adequate trial of alternatives with satisfactory observance and enforcement failed to reduce the crash frequency? No Five or more reportable and/or non-reportable crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period during the most recent 3 years of available crash data.\* No \*If applicable, attach a summary of the crash data analysis used for this criterion. For each of any 8 hours of an average day, the vehicles per hour given in both the 80% columns of Condition A in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection. No For each of any 8 hours of an average day, the vehicles per hour given in both the 80% columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection. No The volume of pedestrian traffic is not less than 80% of the requirements specified in Warrant 4, the Pedestrian Volume warrant.\* No \*If applicable, attach all supporting calculations and documentation.

#### **MUTCD WARRANT 8, ROADWAY NETWORK\***

Is the major street classified as an Urban Extension, Principal Arterial, or Minor Arterial that is a reasonable connection between two

Principal Arterials and/or Urban Extensions as shown on the official Functional Classification Map? No

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

Does the intersection have a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any

5 hours of a non-normal business day (Saturday or Sunday)? No

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

Does the major street include rural or suburban highways outside, entering, or traversing a city? No

Does the major street appear as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study? No

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



# **APPENDIX O**WEAVE ANALYSIS

## TRAFFIC PLANNING



# AND DESIGN, INC.

### **Caln Royal Farms**

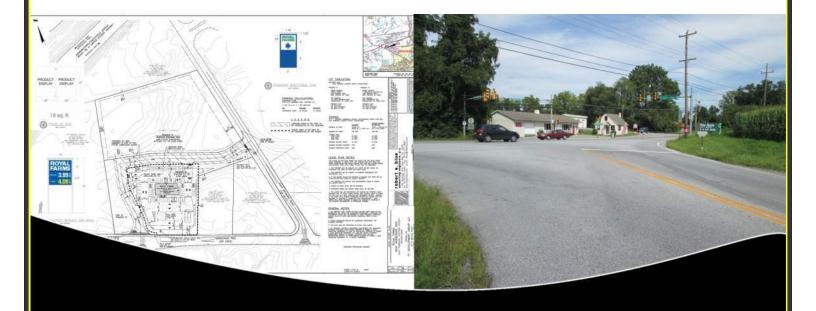
Transportation Impact Study Caln Township, Chester County

### For Submission To:

PennDOT District 6-0 & Caln Township

January 9, 2015 (Last Revised: November 20, 2015)

TPD# FCDG.A.00003



2500 E. High Street Suite 650 Pottstown, PA 19464 610.326.3100 TPD@TrafficPD.com

# CALN ROYAL FARMS TRANSPORTATION IMPACT STUDY

For Submission to:

## Caln Township, Chester County, PA & PennDOT District 6-0

### Prepared For:

Mr. Carl Freedman Caln Horseshoe, L.P. 201A Berlin Road Cherry Hill, NJ 08034 January 9, 2015 (Last Revised November 20, 2015) TPD # FCDG.A.00003

### Prepared By:

Traffic Planning and Design, Inc. Sanatoga Commons 2500 East High Street, Suite 650 Pottstown, Pennsylvania 19464

Phone: (610) 326-3100 Fax: (610) 326-9410

E-mail: TPD@TrafficPD.com Web Site: www.trafficpd.com REGISTERED
PROFESSIONAL
ROBERT GARICHARDSON
ENGINEER
No.,44727-E

Robert G. Richardson, P.E. Senior Vice President Pennsylvania License No. 044727-E

### CALN ROYAL FARMS - TRANSPORTATION IMPACT STUDY CALN TOWNSHIP, CHESTER COUNTY, PA



- Route 322 & Rock Raymond Road Widen WB Route 322 to provide an additional through/right lane. Shorten the existing cycle lengths during the AM and PM peak hours to 75-80 seconds.
- Route 322 & Lloyd Avenue/Proposed Driveway Widen WB Route 322 to provide an additional through/right lane in lieu of the proposed right-turn lane into the proposed site. Widen EB Route 322 to provide an additional through/right lane in lieu of the existing right-turn lane onto Lloyd Avenue. Shorten the existing cycle lengths during the AM and PM peak hours to 75-80 seconds.
- <u>Route 322 & WB Route 30 Ramps</u> In addition to the roadway improvements assumed under base conditions of this TIS (Signalization and Restriping), shorten the existing cycle lengths during the AM and PM peak hours to 75-80 seconds.
- Route 322 & EB Route 30 Ramps Provide signalization with shortened cycle lengths during the AM and PM peak hours of 75-80 seconds. Restripe the existing Route 322 cross-section to revert to two lanes in the EB and WB directions of Route 322 (shared EB thru/right and shared WB left/thru).

This list is being provided at the request of the Township, for informational purposes only.

#### Weave Analysis

TPD prepared a weave analysis utilizing HCM 2010 for the EB Route 30 Off Ramp movements and the SB Route 322 movements. This analysis assumed the off ramp at the existing location, as well as a second location further west as part of future development, closer to where the left-turn from the EB Route 30 Off Ramp accesses Route 322. This second condition assumes potential modification of the off ramp in the future. These analyses are also included in **Appendix G**.

#### 95TH PERCENTILE QUEUE ANALYSIS

Queue analyses were conducted at the signalized study area intersection using *Synchro 8* software. For this analysis, the 95<sup>th</sup> percentile queue is defined as the queue length that is exceeded in 5% of the signal cycles. As an example, for a signal with a 90-second cycle, this means that the 95<sup>th</sup> percentile queue length will be exceeded during 2 of the 40 signal cycles that occur during the peak hour. The queue analysis results are summarized in **Table 11** for the analyzed peak hours.

# APPENDIX G CAPACITY ANALYSES

### **WEAVE ANALYSIS**

|   |                                     |                    | REEWAY   | WEAV                     |  |                                | l                         |                      |   |
|---|-------------------------------------|--------------------|--|--------------------------|--|--------------------------------|---------------------------|----------------------|---|
| General   | Informati                           | on                 |  |                          | Site Info                                      | rmation                        |                           |                      |   |
| Analyst MB Agency/Company TPD Date Performed 3/3/2015 Analysis Time Period WEEKDAY AM  Project Description FCDG.A.00003 |                                     |                    |  |                          | Freeway/Dir<br>Weaving Seg<br>Analysis Yea     | gment Location                 |                           | 322<br>Projected - E | ixisting                                |
| Inputs  | •                                   |                    |  |                          |  |                                |                           |                      |   |
| Weaving se  | mber of lanes, N<br>gment length, L | S                  |  | 300ft                    | Segment typ                                    | imum speed,                    | S <sub>MIN</sub>          |                      | C-D Roadway<br>Multilan<br>Highway<br>1 |
| Freeway free-flow speed, FFS 45 mph   |                                     |                    |  | Freeway max              | ximum capac                                    | ity, C <sub>IFL</sub>          |                           | 180                  |   |
| Convers   | sions to po                         | c/h l Indo         | r Basa Co  | ndition                  | Terrain type                                   |                                |                           |                      | Leve                                    |
| CONVERS   | V (veh/h)                           | PHF                | Truck (%)  | RV (%)                   | E <sub>T</sub>                                 | E <sub>R</sub>                 | f <sub>HV</sub>           | fp                   | v (pc/h)                                |
| V <sub>FF</sub>   | 712                                 | 0.90               | 7  | 0                        | 1.5  | 1.2                            | 0.966                     | 1.00                 | 819                                     |
| V <sub>RF</sub>   | 134                                 | 0.90               | 2  | 0                        | 1.5  | 1.2                            | 0.990                     | 1.00                 | 150                                     |
| V <sub>FR</sub>   | 81                                  | 0.90               | 4  | 0                        | 1.5  | 1.2                            | 0.980                     | 1.00                 | 92                                      |
| V <sub>RR</sub>   | 15                                  | 0.90               | 4  | 0                        | 1.5  | 1.2                            | 0.980                     | 1.00                 | 17                                      |
| V <sub>NW</sub>   | 836                                 |                    | <u> </u>   | ,                        |  |                                |                           | V =                  | 1042                                    |
| V <sub>W</sub>  | 242                                 |                    |  |                          |  |                                |                           |                      |   |
| VR  | 0.224                               |                    |  |                          |  |                                |                           |                      |   |
| Configu   | ration Cha                          | aracteris          | tics   |                          |  |                                |                           |                      |   |
|   | aneuver lanes,                      |                    |  | 2 lc                     | Minimum we                                     | aving lane ch                  | nanges, LC <sub>MIN</sub> |                      | 392 lc/h                                |
| Interchange   | density, ID                         | ***                |  | 1.0 int/mi               | Weaving lane changes, $\mathrm{LC}_\mathrm{W}$ |                                |                           |                      | 392 lc/h                                |
| Minimum Rf  | Flane changes,                      | , LC <sub>RF</sub> |  | 2 lc/pc                  | Non-weaving lane changes, LC <sub>NW</sub>     |                                |                           |                      | 0 lc/h                                  |
| Minimum FF  | R lane changes,                     | , LC <sub>FR</sub> |  | 1 lc/pc                  | Total lane changes, LC <sub>ALL</sub>          |                                |                           |                      | 392 lc/h                                |
| Minimum Ri  | R lane changes                      | , LC <sub>RR</sub> |  | lc/pc                    |  |                                |                           |                      | 25                                      |
| Weaving   | g Segmen                            | t Speed,           | Density, l   | _evel of                 | Service,                                       | and Cap                        | acity                     |                      |   |
|   | gment flow rate                     | •                  |  | 1042 veh/h<br>2815 veh/h | Weaving seg                                    | ensity factor,<br>gment speed, | S                         |                      | 0.279<br>39.3 mph                       |
|   |                                     |                    | 0.370  | Average wea              | • .  | **                             |                           | 38.5 mph             |   |
| Weaving segment density, D 13.7 pc/mi/ln  |                                     |                    | Average non-weaving speed, $S_{\scriptscriptstyle NW}$ |                          |  |                                | 39.6 mph                  |                      |   |
| Level of Ser  | vice, LOS                           |                    |  | В                        | Maximum we                                     | eaving length                  | , L <sub>MAX</sub>        |                      | 4788 f                                  |
|   | egments longer t<br>Freeway Merge a |                    |  | ength should l           | pe treated as is                               | solated merge                  | and diverge are           | eas using the        | procedures of                           |

HCS 2010<sup>TM</sup> Version 6.50

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3/3/2015

|   |  |                    | REEWA                                      | WEAV                     |  |                | T                        |                      |   |
|---|--|--------------------|--|--------------------------|--|----------------|--------------------------|----------------------|---|
| General   | Informati  | on                 |  |                          | Site Info  | rmation        |                          |                      |   |
| Analyst MB Agency/Company TPD Date Performed 3/3/2015 Analysis Time Period WEEKDAY AM  Project Description FCDG.A.00003 |  |                    |  |                          | Freeway/Dir<br>Weaving Seg<br>Analysis Yea           | gment Location |                          | 322<br>Projected - F | Relocated                               |
| Inputs  |  |                    |  |                          |  |                |                          |                      |   |
| Weaving se  | nfiguration<br>mber of lanes, N<br>gment length, L<br>e-flow speed, Fl | 3                  |  | 4 4 0 6                  | Segment typ<br>Freeway min<br>Freeway max            | imum speed     |                          |                      | C-D Roadway<br>Multilan<br>Highway<br>1 |
|   |  |                    |  |                          | Terrain type   | хітішті сарас  | illy, C <sub>IFL</sub>   |                      | Leve                                    |
| Convers   | sions to po  | c/h Unde           | r Base Co                                  | ndition                  |  |                |                          |                      |   |
|   | V (veh/h)  | PHF                | Truck (%)                                  | RV (%)                   | E <sub>T</sub>                                       | E <sub>R</sub> | $f_{HV}$                 | fp                   | v (pc/h)                                |
| $V_{FF}$  | 712  | 0.90               | 7  | 0                        | 1.5  | 1.2            | 0.966                    | 1.00                 | 819                                     |
| $V_{RF}$  | 134  | 0.90               | 2  | 0                        | 1.5  | 1.2            | 0.990                    | 1.00                 | 150                                     |
| $V_{FR}$  | 81   | 0.90               | 4  | 0                        | 1.5  | 1.2            | 0.980                    | 1.00                 | 92                                      |
| $V_{RR}$  | 15   | 0.90               | 4  | 0                        | 1.5  | 1.2            | 0.980                    | 1.00                 | 17                                      |
| V <sub>NW</sub>   | 836  |                    |  | •                        |  |                | •                        | V =                  | 1042                                    |
| V <sub>W</sub>  | 242  |                    |  |                          |  |                |                          |                      | •                                       |
| VR  | 0.224  |                    |  |                          |  |                |                          |                      |   |
| Configu   | ration Cha   | aracteris          | tics                                       |                          |  |                |                          |                      |   |
| Minimum ma  | aneuver lanes,   | $N_{WL}$           |  | 2 lc                     | Minimum we   | eaving lane cl | nanges, ${\rm LC_{MIN}}$ |                      | 392 lc/h                                |
| Interchange   | density, ID  |                    |  | 1.0 int/mi               | Weaving lane changes, $LC_W$                         |                |                          |                      | 424 lc/h                                |
| Minimum Ri  | Flane changes,   | $LC_{RF}$          |  | 2 lc/pc                  | Non-weaving lane changes, LC <sub>NW</sub>           |                |                          |                      | 25 lc/h                                 |
| Minimum FF  | R lane changes,  | $LC_{FR}$          |  | 1 lc/pc                  | Total lane changes, LC <sub>ALL</sub>                |                |                          |                      | 449 lc/h                                |
| Minimum Ri  | R lane changes   | , LC <sub>RR</sub> |  | lc/pc                    | Non-weaving vehicle index, I <sub>NW</sub>           |                |                          |                      | 37                                      |
| Weaving   | g Segmen   | t Speed,           | Density, I                                 | Level of                 | Service,   | and Cap        | acity                    |                      |   |
|   | gment flow rate<br>gment capacity                                      | •                  |  | 1042 veh/h<br>2835 veh/h | Weaving intensity factor, W Weaving segment speed, S |                |                          |                      | 0.230<br>39.5 mph                       |
| · ·   |  |                    | 0.367                                      | Average wea              |  | **             |                          | 39.4 mph             |   |
| Weaving segment density, D 13.6 pc/mi/ln  |  |                    | Average non-weaving speed, S <sub>NW</sub> |                          |  |                | 39.6 mph                 |                      |   |
| Level of Ser  | vice, LOS  |                    |  | В                        | Maximum we   | eaving length  | ı, L <sub>MAX</sub>      |                      | 4788 f                                  |
| Chapter 13, "   | egments longer the   | and Diverge Se     |  |                          |  | solated merge  | and diverge are          | eas using the        | procedures of                           |

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|   |   |                    | REEWAY                                     | r WEAV                                |   |                | I   |                      |  |
|---|---|--------------------|--|---------------------------------------|---|----------------|---|----------------------|--|
| General   | Informati   | on                 |  |                                       | Site Info   | rmation        |   |                      |  |
| Analyst MB Agency/Company TPD Date Performed 3/3/2015 Analysis Time Period WEEKDAY PM  Project Description FCDG.A.00003 |   |                    |  |                                       | Freeway/Dir<br>Weaving Seg<br>Analysis Yea                | gment Location |   | 322<br>Projected - E | Existing   |
| Inputs  | p   |                    |  |                                       |   |                |   |                      |  |
| Weaving co<br>Weaving nu<br>Weaving se  | nfiguration<br>mber of lanes, N<br>gment length, L <sub>s</sub><br>e-flow speed, Fl | S                  |  | One-Sided<br>2<br>300ft<br>45 mph     | Segment typ<br>Freeway min<br>Freeway max<br>Terrain type | imum speed     | . S <sub>MIN</sub><br>ity, C <sub>IFL</sub> |                      | C-D Roadway<br>Multilan<br>Highway<br>1<br>180<br>Leve |
| Convers   | sions to po   | c/h Unde           | r Base Co                                  | ndition                               |   |                |   |                      | 2010   |
|   | V (veh/h)   | PHF                | Truck (%)                                  | RV (%)                                | Ε <sub>T</sub>  | E <sub>R</sub> | $f_{HV}$                                    | fp                   | v (pc/h)   |
| V <sub>FF</sub>   | 529   | 0.95               | 3  | 0                                     | 1.5   | 1.2            | 0.985                                       | 1.00                 | 565  |
| V <sub>RF</sub>   | 131   | 0.95               | 2  | 0                                     | 1.5   | 1.2            | 0.990                                       | 1.00                 | 139  |
| V <sub>FR</sub>   | 342   | 0.95               | 1  | 0                                     | 1.5   | 1.2            | 0.995                                       | 1.00                 | 362  |
| V <sub>RR</sub>   | 84  | 0.94               | 1  | 0                                     | 1.5   | 1.2            | 0.995                                       | 1.00                 | 90   |
| V <sub>NW</sub>   | 655   |                    |  | <u> </u>                              |   |                |   | V =                  | 1139   |
| v <sub>w</sub>  | 501   |                    |  |                                       |   |                |   |                      |  |
| VR  | 0.433   |                    |  |                                       |   |                |   |                      |  |
| Configu   | ration Cha  | aracteris          | tics                                       |                                       |   |                |   |                      |  |
| Minimum m   | aneuver lanes,  | N <sub>WI</sub>    |  | 2 lc                                  | Minimum we  | aving lane cl  | nanges, LC <sub>MIN</sub>                   |                      | 640 lc/h   |
| Interchange   | density, ID   | ***                |  | 1.0 int/mi                            | Weaving lane changes, $\mathrm{LC}_\mathrm{W}$            |                |   |                      | 640 lc/h   |
| Minimum RI  | F lane changes,   | , LC <sub>RF</sub> |  | 2 lc/pc                               | Non-weaving lane changes, LC <sub>NW</sub>                |                |   |                      | 0 lc/h   |
| Minimum Ff  | R lane changes,   | , LC <sub>FR</sub> |  | 1 lc/pc                               | Total lane changes, LC <sub>ALL</sub>                     |                |   |                      | 640 lc/h   |
| Minimum RI  | R lane changes  | , LC <sub>RR</sub> |  | lc/pc                                 |   |                |   |                      | 20   |
| Weaving   | g Segmen  | t Speed,           | Density, I                                 | Level of                              | Service,  | and Cap        | acity                                       |                      |  |
| ı   | gment flow rate   | •                  |  | 1139 veh/h<br>2528 veh/h              | Weaving intensity factor, W Weaving segment speed, S      |                |   |                      | 0.411<br>37.0 mph                                      |
| "   |   |                    | 0.451                                      | Average weaving speed, S <sub>W</sub> |   |                |   | 36.3 mph             |  |
| Weaving segment density, D 15.6 pc/mi/ln  |   |                    | Average non-weaving speed, S <sub>NW</sub> |                                       |   |                | 37.6 mph                                    |                      |  |
| Level of Ser  | rvice, LOS  |                    |  | В                                     | Maximum we  | eaving length  | ı, L <sub>MAX</sub>                         |                      | 7058 f   |
| Chapter 13, "   | egments longer to<br>Freeway Merge a<br>es that exceed the                          | and Diverge Se     |  |                                       |   | solated merge  | and diverge are                             | eas using the        | procedures of  |

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|   |  |                    | REEWAY                   | r WEAV                                  |   |                | I                         |                      |   |
|---|--|--------------------|--------------------------|---|---|----------------|---------------------------|----------------------|---|
| General   | Informati  | on                 |                          |   | Site Info   | rmation        |                           |                      |   |
| Analyst MB Agency/Company TPD Date Performed 3/3/2015 Analysis Time Period WEEKDAY PM  Project Description FCDG.A.00003 |  |                    |                          |   | Freeway/Dir<br>Weaving Seg<br>Analysis Yea                | gment Location |                           | 322<br>Projected - E | ixisting  |
| Inputs  | cription FCDG./  | H.00003            |                          |   |   |                |                           |                      |   |
| Weaving co<br>Weaving nu<br>Weaving se<br>Freeway fre   | mber of lanes, N<br>gment length, L<br>e-flow speed, F | s<br>FS            |                          | 440ft<br>45 mph                         | Segment typ<br>Freeway min<br>Freeway max<br>Terrain type | imum speed     |                           |                      | C-D Roadway<br>Multilan<br>Highway<br>1:<br>180<br>Leve |
| Conver  | sions to po  | c/h Unde           | r Base Co                | ndition                                 | ii .  | 1              | ,                         | 1                    |   |
|   | V (veh/h)  | PHF                | Truck (%)                | RV (%)                                  | E <sub>T</sub>  | E <sub>R</sub> | $f_{HV}$                  | fp                   | v (pc/h)  |
| $V_{FF}$  | 529  | 0.95               | 3                        | 0                                       | 1.5   | 1.2            | 0.985                     | 1.00                 | 565   |
| $V_{RF}$  | 131  | 0.95               | 2                        | 0                                       | 1.5   | 1.2            | 0.990                     | 1.00                 | 139   |
| $V_{FR}$  | 342  | 0.95               | 1                        | 0                                       | 1.5   | 1.2            | 0.995                     | 1.00                 | 362   |
| $V_{RR}$  | 84   | 0.94               | 1                        | 0                                       | 1.5   | 1.2            | 0.995                     | 1.00                 | 90  |
| V <sub>NW</sub>   | 655  |                    |                          | •                                       |   |                | •                         | V =                  | 1139  |
| v <sub>w</sub>  | 501  |                    |                          |   |   |                |                           | -                    | •   |
| VR  | 0.433  | 1                  |                          |   |   |                |                           |                      |   |
| Configu   | ration Cha   | aracteris          | tics                     |   | -   |                |                           |                      |   |
| Minimum m   | aneuver lanes,   | N <sub>WL</sub>    |                          | 2 lc                                    | Minimum we  | aving lane cl  | nanges, LC <sub>MIN</sub> |                      | 640 lc/h  |
| Interchange   | e density, ID  |                    |                          | 1.0 int/mi                              | Weaving lane changes, $LC_W$                              |                |                           |                      | 672 lc/h  |
| Minimum R   | F lane changes,  | , LC <sub>RF</sub> |                          | 2 lc/pc                                 | Non-weaving lane changes, LC <sub>NW</sub>                |                |                           |                      | 0 lc/h  |
| Minimum Fl  | R lane changes,  | , LC <sub>FR</sub> |                          | 1 lc/pc                                 | Total lane changes, LC <sub>ALL</sub>                     |                |                           |                      | 672 lc/h  |
| Minimum R   | R lane changes   | , LC <sub>RR</sub> |                          | lc/pc                                   |   |                |                           |                      | 29  |
| Weavin  | g Segmen   | t Speed,           | Density, I               | Level of                                | Service,  | and Cap        | acity                     |                      |   |
| Weaving segment flow rate, v 113  |  |                    | 1139 veh/h<br>2550 veh/h | Weaving inte                            | ensity factor,<br>gment speed                             | W<br>S         |                           | 0.316<br>37.7 mph    |   |
| "   |  |                    | 0.447                    | Average weaving speed, $S_{\mathrm{W}}$ |   |                |                           | 37.8 mph             |   |
| ı   | egment density,  | D                  | 1                        | 5.3 pc/mi/ln                            | Average non-weaving speed, $S_{\text{NW}}$                |                |                           |                      | 37.6 mph  |
| Level of Se   | rvice, LOS   |                    |                          | В                                       | Maximum we  | eaving length  | , L <sub>MAX</sub>        |                      | 7058 f  |
|   | egments longer t<br>'Freeway Merge a                   |                    |                          | ength should l                          | be treated as is  | solated merge  | and diverge are           | eas using the        | procedures of   |

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