THE WITNESS GROUP SITE TRAFFIC IMPACT STUDY

WORTHINGTON, OH

REVISED JANUARY 2018

PREPARED FOR:
THE WITNESS GROUP
600 ENTERPRISE DRIVE
LEWIS CENTER, OH

Mannik Smith GROUP

EXECUTIVE SUMMARY

This traffic impact study evaluated the traffic impacts to adjacent intersections from a proposed mixed-use development in Worthington, Ohio. The development, located in the southwest quadrant of the US-23 (N. High Street) & Wilson Bridge Road intersection, is slated to replace an existing Holiday Inn hotel with new hotel, restaurant, and office land uses. To determine the impact of the proposed development, the following tasks were performed for this study:

1. Summary of Proposed Changes (see Section 1.2) – The proposed development will include the following land uses:
    - Hotel – 111 total guestrooms
    - Restaurant – 17,662 total square feet
    - Office – 32,154 total square feet

In addition to the proposed land uses, the proposed development will include a signalized main entrance along Wilson Bridge Road (Drive A) in an effort to minimize traffic on Caren Avenue and provide a safe point of ingress/egress for the site. This entrance will be the first point of ingress/egress encountered for vehicles travelling from I-270 and is expected to receive 74% of inbound trips during the AM peak hour (the highest inbound total trips) and 73% of outbound trips during the PM peak hour (the highest outbound total trips)_. Two (2) other existing site driveways along Wilson Bridge Road (Drive B) and US-23 (N High Street) (Drive C) will be closed upon completion of the proposed development. A fourth existing site drive (Drive D) along Caren Avenue will remain. Therefore, the proposed project will have two (2) access points, a reduction from four (2) under the existing conditions. The elimination of one site access point to Wilson Bridge Road and one site access point to High Street will improve traffic flow and safety by reducing conflict points on those busy roadways.

The signalized, main entrance intersection will include the re-alignment of Mall Drive (to the north) to connect with the site's main entrance (Drive A). The intersection will also include a new westbound left turn lane (with 100 feet of storage). This westbound left turn lane can be constructed within existing pavement and will not require roadway widening. The new westbound left turn lane is not expected to interfere with queues in the dual eastbound left turn lanes at the upstream intersection (N. High Street & Wilson Bridge Road).

2. Trip Generation (see Section 3.1) – This study removed traffic volumes from the existing 232 Holiday Inn Hotel from future traffic projections and added traffic volumes for the proposed development:

    - The existing Holiday Inn (to be removed) generates 82 trips during the AM peak hour and 129 trips during the PM peak hour.
    - The proposed development is projected to generate 199 trips during the AM peak hour and 236 trips during the PM peak hour.
    - The net increase in traffic along adjacent roadways will be 117 trips during the AM peak hour and 107 trips during the PM peak hour.

3. Traffic Analyses (see Section 3.3) – Traffic analyses for this study were conducted according to procedures outlined in the Ohio Department of Transportation's (ODOT's) *Location & Design Manual* (L&D), ODOT's State *Highway Access Management Manual* (SHAMM), and guidelines set forth by the City of Worthington. The analysis was conducted for a No Build (future condition, does not include the proposed development) and a Build (future condition, includes the proposed development) during the AM and PM peak hours for an assumed opening year (2018) and a design year (10 years after the proposed development, 2028). The traffic analysis yielded the following conclusions:

Wilson Bridge Road & Mall Drive/Drive A

- This intersection currently carries 1,665 vehicles during the AM peak hour and 2,109 vehicles during the PM peak hour.
- The project is expected to add 121 net trips during the AM peak hour and 142 net trips during the PM peak hour.
- As a result of traffic added from the proposed development, level-of-service at the existing signalized intersection changes from A to D during the AM peak hour (and B to D during the PM peak hour (it may be noted that for this study, the threshold between acceptable and unacceptable traffic operations is LOS E).
- The project proposes the following improvements for this intersection:
    - Re-alignment of the Mall Drive approach to Wilson Bridge Road for connection to Drive A
    - Installation of a 100 foot westbound left turn lane (through restriping within existing pavement) along Wilson Bridge Road at Drive A
    - Traffic signal modifications to accommodate new northbound approach

US-23 (N. High Street) & Wilson Bridge Road

- This intersection currently carries 4,153 vehicles during the AM peak hour and 4,067 vehicles during the PM peak hour
- The project is projected to add 71 net trips to this intersection and 66 net trips to during the PM peak hour (it may be noted that this number is lower than that at Wilson Bridge Road & Mall Drive/Drive A. This is because less existing Holiday Inn trips were removed from Wilson Bridge & Mall Drive/Drive A and more proposed site trips were added to this intersection as the as the existing site features four (4) driveways and the current site features two (2) driveways.
- As a result of added traffic from the proposed development, level-of-service changes from D to E during the AM peak hour (an overall increase of 0.3 seconds of delay) and remains at LOS E during the PM peak hour.
- Despite the LOS degradation, the increase in delay (0.3 seconds) during the AM peak hour is negligible, mitigation improvements are not necessary for this intersection.

US-23 (N. High Street) & Caren Avenue

- This intersection currently carries 1,942 vehicles during the AM peak hour and 2,072 vehicles during the PM peak hour
- The project is projected to add 36 net trips to this intersection during the AM peak hour and 69 net trips during the PM peak hour
- With traffic added from the proposed development, level-of-service remains at C during both the AM and PM peak hours
- Mitigation improvements are not necessary for this intersection based on the intersection operations, however, signalization and pedestrian upgrades are proposed to enhance this location.

Caren Avenue & Drive D

- This intersection currently carries 386 vehicles during the AM peak hour and 360 vehicles during the PM peak hour
- The project is projected to add 35 net trips to this intersection during the AM peak hour and 20 net trips during the PM peak hour
- With traffic added from the proposed development, level-of-service remains at B during the AM and PM peak hours.
- Mitigation improvements are not necessary for this intersection.

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1.0 INTRODUCTION

1.1 General

At the request of The Witness Group, The Mannik & Smith Group has completed a Traffic Impact Study (TIS) for a proposed mixed-use development near the southwest corner of Wilson Bridge Road and US-23 (N. High Street) in Worthington, Ohio (see Figure 1.1). The proposed development is slated to replace an existing hotel with one (1) new hotel, restaurants, and office land uses. As the development is expected to increase traffic volumes along adjacent roadways, a TIS was necessary to determine what impacts, if any, the increased traffic will have on nearby traffic operations.

1.2 Summary of Proposed Changes

The Witness Group proposes six buildings for the site (see Figure 1.1 for the site's plan). The buildings will contain the following land uses:

- Buildings 1 & 2: Restaurant/Professional Services
- Buildings 3 & 4: Office/Professional Services
- Building 5: Hotel
- Building 6; Restaurant/Professional Services

For the purposes of this study, the buildings labeled as restaurant/professional services were assumed to contain up to 70% restaurant space and 30% professional services space. Further, professional services were assumed to function as office space. Based on these assumptions, this study evaluated traffic for the following land uses at the site:

- Hotels – 111 total guestrooms
- Restaurant – 17,662 total square feet
- Office – 32,154 total square feet

The existing 232 room Holiday Inn will be demolished to accommodate the new development. The new site will feature two (2) access points. One (1) access point will be located near the northwest corner of the site along Wilson Bridge Road (full signalized access), and the other access point will be located on the southern edge of the site along Caren Avenue (full un-signalized access). The proposed access configuration reflects a reduction in access points from the original site plan (the original plan had four; two on Wilson Bridge Road, one on N. High Street, and one on Caren Avenue). The reduction was initiated by the developer in an effort to improve site safety and roadway access management. It may be noted that one of the intents of the site design is to minimize traffic on Caren Avenue. As such, creating a major site access point on Wilson Bridge Road is desired. Proposed access for the site is illustrated in Figure 1.2.

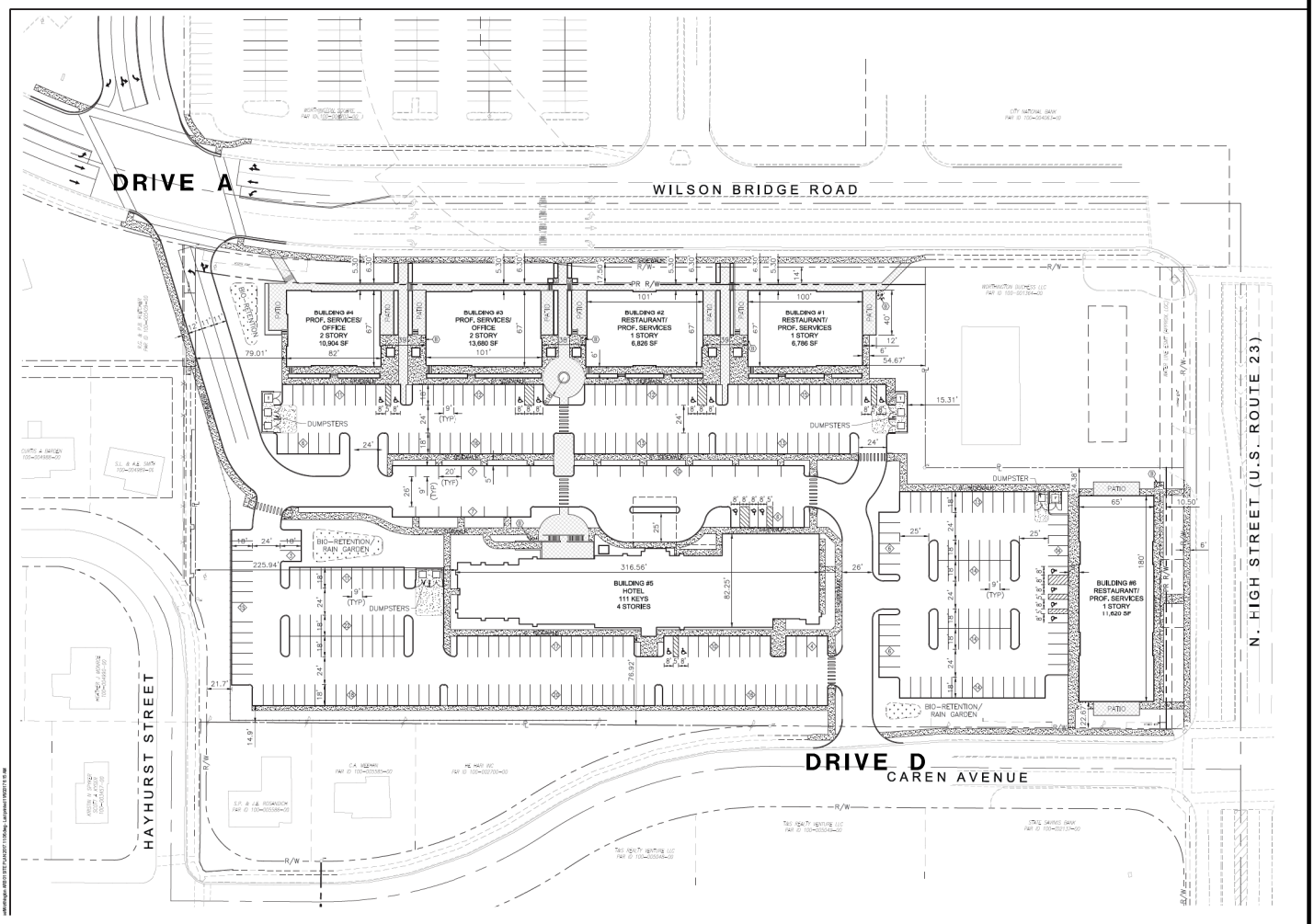

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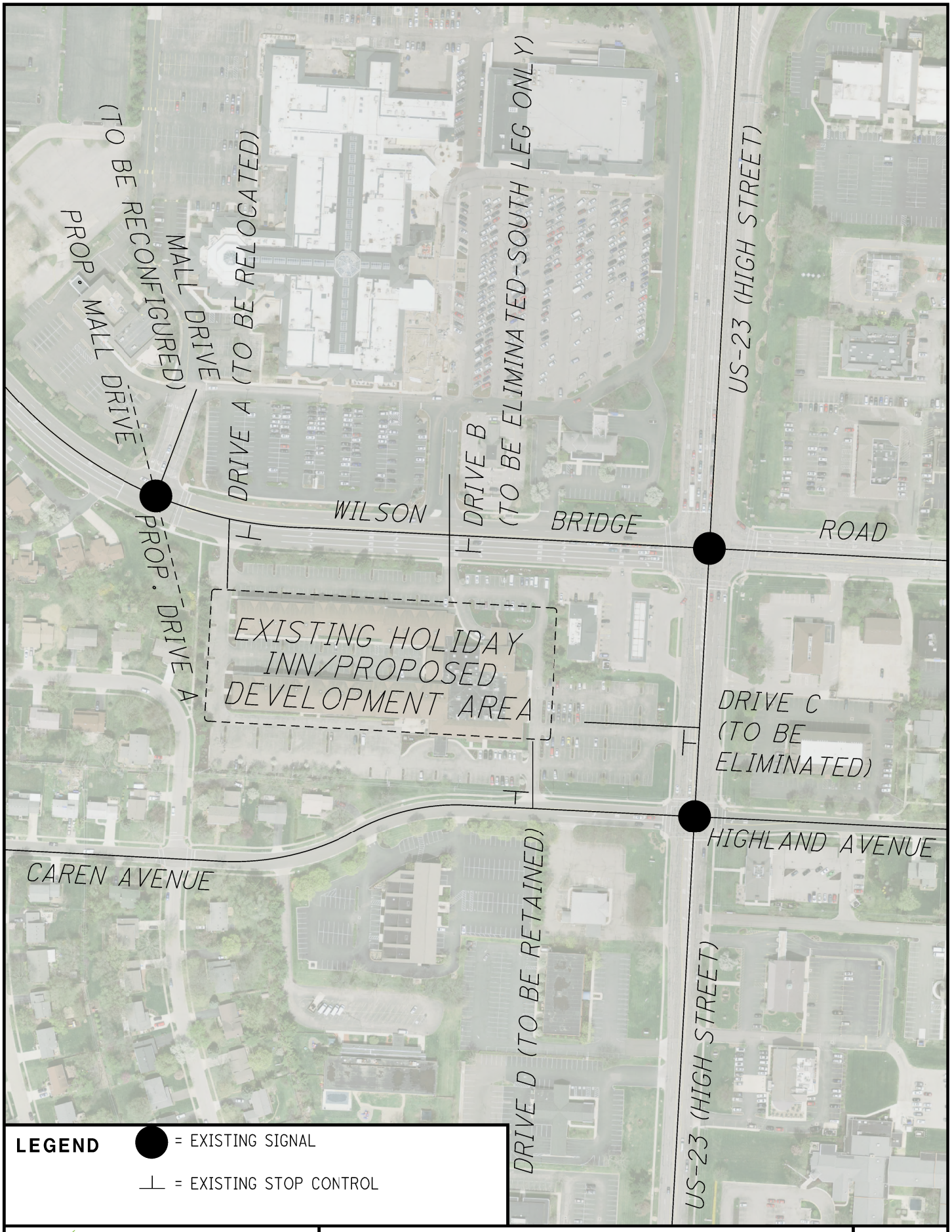
FIGURE 1.1

PROPOSED SITE PLAN



LEGEND

● = EXISTING SIGNAL

⊥⊥ = EXISTING STOP CONTROL

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FIGURE 1.2

STUDY AREA

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1.3 Methodology, Assumptions, and Data Collection

1.3.1 Methodology and Assumptions

This TIS includes the following elements:

- Analysis of future "No Build" traffic operations – The analysis of No Build (assumes that the development does not occur in future years with the existing hotel remaining) traffic conditions provides a baseline against which the traffic impacts of the proposed development will be evaluated. Analyses of the No Build conditions were conducted for an opening year (2018, the year in which the proposed development is expected to be completed) and a design year (2028, or 10 years after the expected completion of the proposed development). Locations with unsatisfactory traffic operations were identified.

- Trip generation – Trip generation calculates the number of trips that the proposed development is expected to add to the adjacent roadway network. Trip generation considers the subtraction of current site traffic as the existing hotel (Holiday Inn) will be demolished. This task will be completed using the Institute of Transportation Engineers' ITE's *Trip Generation Manual, 9th Edition*.

- Trip distribution – Trips generated by the proposed development and trips to be removed as a result of demolishing the existing land use (Holiday Inn) were combined with No Build traffic estimates to obtain a projection of Build (assumes that the proposed development does occur) traffic conditions. Trips added to the No Build traffic estimates were added based on existing traffic patterns. Build traffic conditions were developed for the opening year (2018) and the design year (2028).

- Analysis of future "Build" traffic conditions – This analysis included the comparison of Build conditions to No Build conditions to determine what impact, if any the proposed development has on the adjacent traffic network. Improvements were developed for roadway geometry and/or traffic control to mitigate the potential impact of the proposed development on the adjacent roadway network (Build with Improvements).

1.3.2 Data Collection

Manual intersection traffic counts were conducted at seven (7) locations surrounding the proposed development site. Counts at three (3) of the locations were used in the traffic analysis for this study, while counts at the remaining four (4) locations (i.e., the existing site drives A through D) were used to determine the trip generation characteristics of the existing Holiday Inn site. The counts were collected during an AM peak period (7:00 – 9:00) and a PM peak period (4:00 – 6:00) in fifteen (15) minute intervals and included classification for heavy vehicles. It may be noted that traffic counts were conducted on different dates. Because of this, traffic volumes between adjacent intersections may be unbalanced. Further information regarding existing traffic counts can be found in Appendix A. Counts occurred at the following locations (see Figure 1.2):

1. Wilson Bridge Road & Mall Entrance (signalized)
2. Wilson Bridge Road & Existing Site Drive A (un-signalized);
3. Wilson Bridge Road & Existing Site Drive B (un-signalized);
4. US-23 (N. High Street) & Wilson Bridge Road (signalized).
5. Wilson Bridge Road & Existing Site Drive C (un-signalized);
6. US-23 (N. High Street) & Caren Avenue/Highland Avenue (signalized)
7. Caren Avenue & Existing Site Drive D (un-signalized);

2.0 EXISTING/NO BUILD CONDITIONS

2.1 Existing Roadway Network

Current access to the proposed development site is provided along three (3) roadways: Wilson Bridge Road to the north, US-23 (N. High Street) to the east, and Caren Avenue to the south. Herein, the boundary formed by these three (3) roadways is known as the "study area". Existing roadways and lane configurations within the study area are illustrated in Figure 2.1.

Table 2.1 Existing Roadway Network

Roadway	No. Lanes	Functional Classification	Posted Speed Limit (mph)	Average Daily Traffic (ADT)
Wilson Bridge Road	6	Collector	35	22,281
US-23 (N. High Street)	6	Principal Arterial	35	38,299
Caren Avenue/ Highland Avenue	2	Local Roadway	25	N/A

2.2 Existing Land Uses and Trip Generation

The proposed development site is currently occupied by a 232 room Holiday Inn hotel. Peak hour driveway counts were used to estimate the trip generation of the existing hotel property. As illustrated in Figure 2.2, the existing Holiday Inn (see entering and exiting volumes at Drive A, Drive B, Drive C, and Drive D) generates 82 peak hour trips (52 entering, 30 exiting) during the AM peak hour and 129 peak hour trips (80 entering, 49 exiting) during the PM peak hour. These trip generation estimates were removed from existing peak hour traffic volumes in order to project future study area traffic volumes upon the completion of the proposed development.

Peak hour traffic occurred at each of the site access locations during the following times:

- Drive A – 7:00 – 8:00 (AM peak); 5:00 – 6:00 (PM peak)
- Drive B – 8:00 – 9:00 (AM peak); 4:00 – 5:00 (PM peak)
- Drive C – 8:00 – 9:00 (AM peak); 4:45 – 5:45 (PM peak)
- Drive D – 8:00 – 9:00 (AM peak); 5:00 – 6:00 (PM peak)

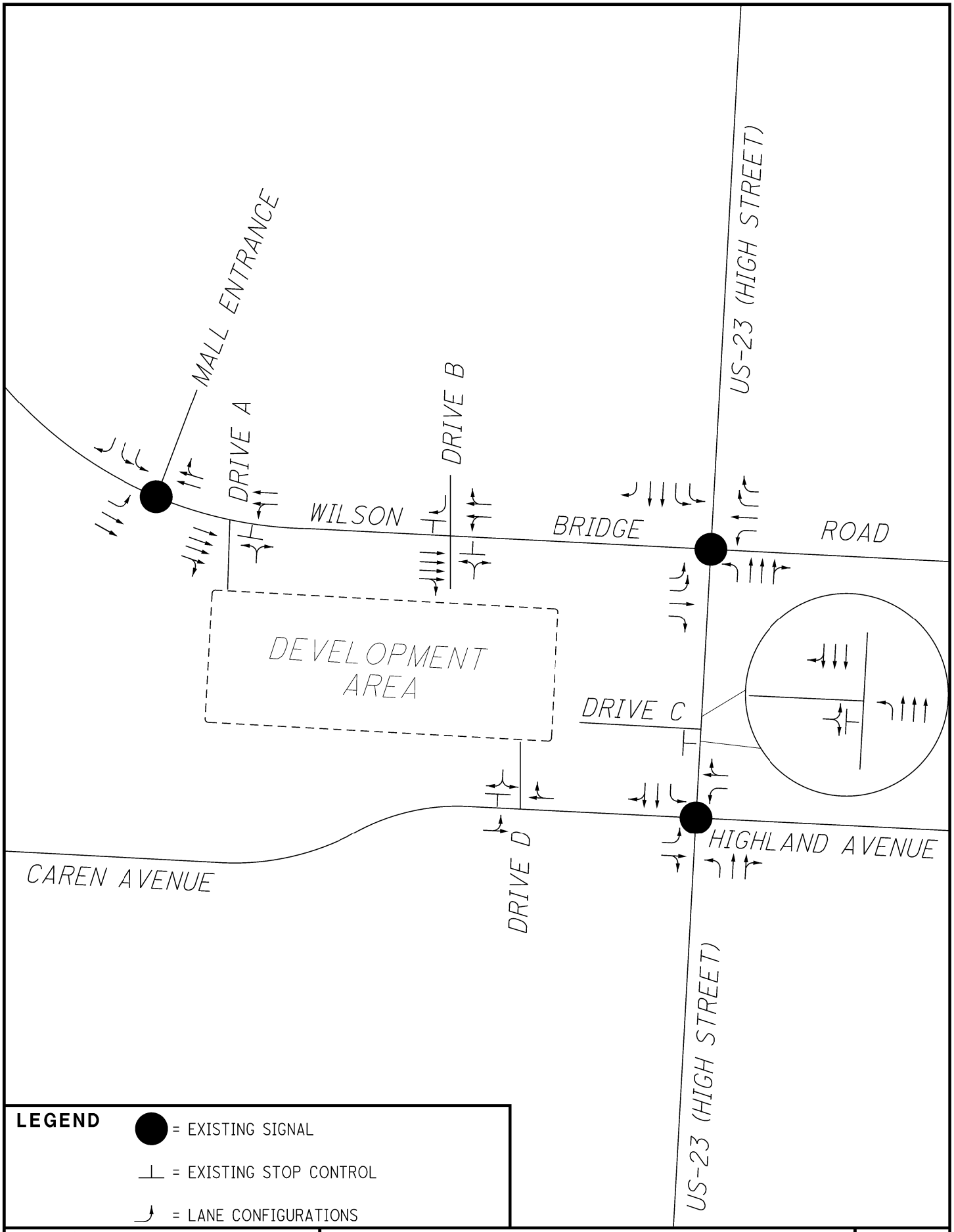

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FIGURE 2.1

EXISTING LANE CONFIGURATIONS

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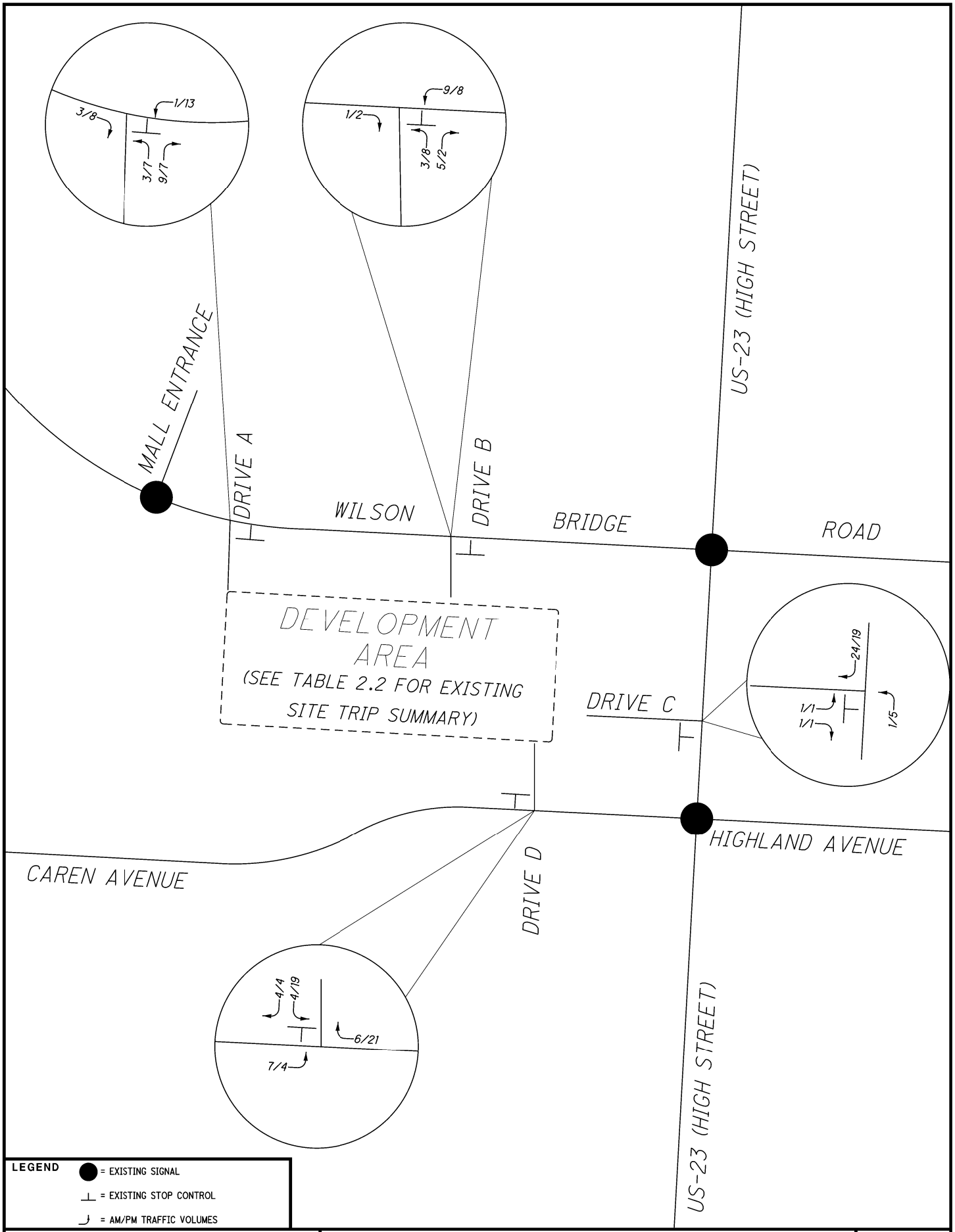

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FIGURE 2.2
HOLIDAY INN AM/PM PEAK HOUR TRIP GENERATION

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Table 2.2 Existing Holiday Inn Trip Generation						
Location	AM Peak			PM Peak		
	Inbound	Outbound	Total	Inbound	Outbound	Total
Drive A	4	12	16	21	14	35
Drive B	10	8	18	10	10	20
Drive C	25	2	27	24	2	26
Drive D	13	8	21	25	23	48
Total	52	30	82	80	49	129

2.3 Growth Rates

Traffic volume projections for 2018 and 2028 No Build conditions were developed through the use of an annual growth rate for background traffic (i.e., traffic not associated with the existing or proposed development site). For this project, a linear annual growth rate was obtained from the Mid-Ohio Regional Planning Commission (MORPC), the metropolitan planning organization for the Columbus, Ohio area. MORPC provided a linear annual growth rate of 0.66% for Wilson Bridge Road to the west of N. High Street and a growth rate of 0.63% for N. High Street to the south of Wilson Bridge Road. These growth rates were weighted by AADT to obtain an overall annual growth rate for the study area of 0.64%. It may be noted that no growth rate was applied to entering/exiting traffic at existing site drives. A summary of the growth rate information for the study is provided in Table 2.3. 2018 No Build AM and PM peak hour traffic volumes are shown in Figure 2.3 while 2028 No Build peak hour traffic volumes are shown in Figure 2.4.

Table 2.3 Growth Rate Calculations		
Location	Annual Growth Rate (Linear)	Existing AADT
Wilson Bridge Road west of N. High Street	0.66	22,281
N. High Street South of Wilson Bridge Road	0.63	38,299
Study Area Overall	0.64	

2.4 No Build Traffic Operations

2.4.1 Methodology

The analysis of No Build (assumes that the development does not occur in future years) traffic operations provides a baseline against which the traffic impacts of the proposed development will be evaluated. Analyses were conducted using Synchro traffic analysis software for the year 2018, the assumed opening year of the development, and 2028, the assumed design year of the development (10 years after the assumed completion of the development). The primary Synchro measures of effectiveness for this TIS analysis were Level-of-Service, or LOS (as calculated by the Highway Capacity Manual 2010).

LOS is a letter grade that describes traffic operations based on the amount of delay experienced by vehicles at an intersection, along an intersection approach (e.g., eastbound, westbound), or in a specific lane group (e.g., eastbound right turn, eastbound through-left). LOS can range from A to F with A representing the conditions in which vehicles experience the least amount of delay and F representing the conditions in which vehicles experience the most delay. For this study, intersection LOS values from A through D (with no intersection lane group greater than LOS E) will be assumed to represent satisfactory traffic operations. Under these conditions, changes are unlikely to be recommended for improving traffic conditions. Conversely, intersection LOS values of E and F (with intersection

lane groups at LOS F) will be assumed to represent unsatisfactory traffic conditions. In this scenario changes will be recommended to improve traffic conditions. Table 2.4 provides information regarding the delay thresholds for LOS.

It may be noted that LOS values are not typically presented in the same manner for signalized and un-signalized intersections. Typically, for signalized intersections, LOS is presented at the intersection movement, intersection approach, and intersection level as all movements and approaches are under the control of a traffic signal. For un-signalized intersections, different approaches may have different traffic control (stop sign, no control) and adjacent lanes may have different priority rules, therefore LOS is typically only provided for individual lanes and approaches. For this study, LOS at un-signalized intersections will be provided for the approach with the highest value.

Table 2.4 LOS Threshold Values

Control Delay (sec)		Level-of-Service (LOS)
Signalized Intersections	Un-signalized Intersections	
0.0 – 10.0	0.0 – 10.0	A
10.1 – 20.0	10.1 – 15.0	B
20.1 – 35.0	15.1 – 25.0	C
35.1 – 55.0	25.1 – 35.0	D
55.1 – 80.0	35.1 – 50.0	E
> 80.1	> 50.1	F

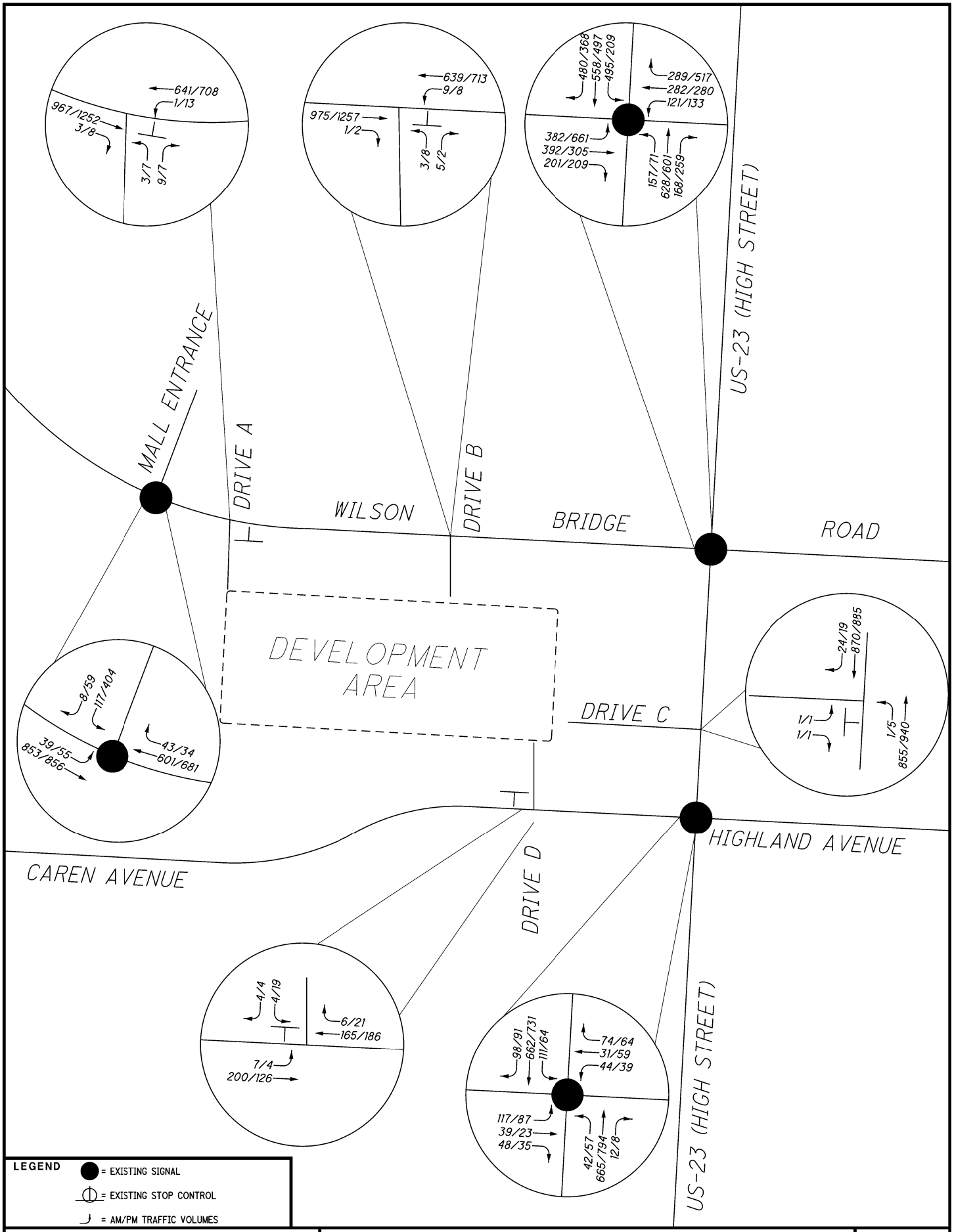

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FIGURE 2.3
2018 NO BUILD AM/PM PEAK HOUR TRAFFIC VOLUMES

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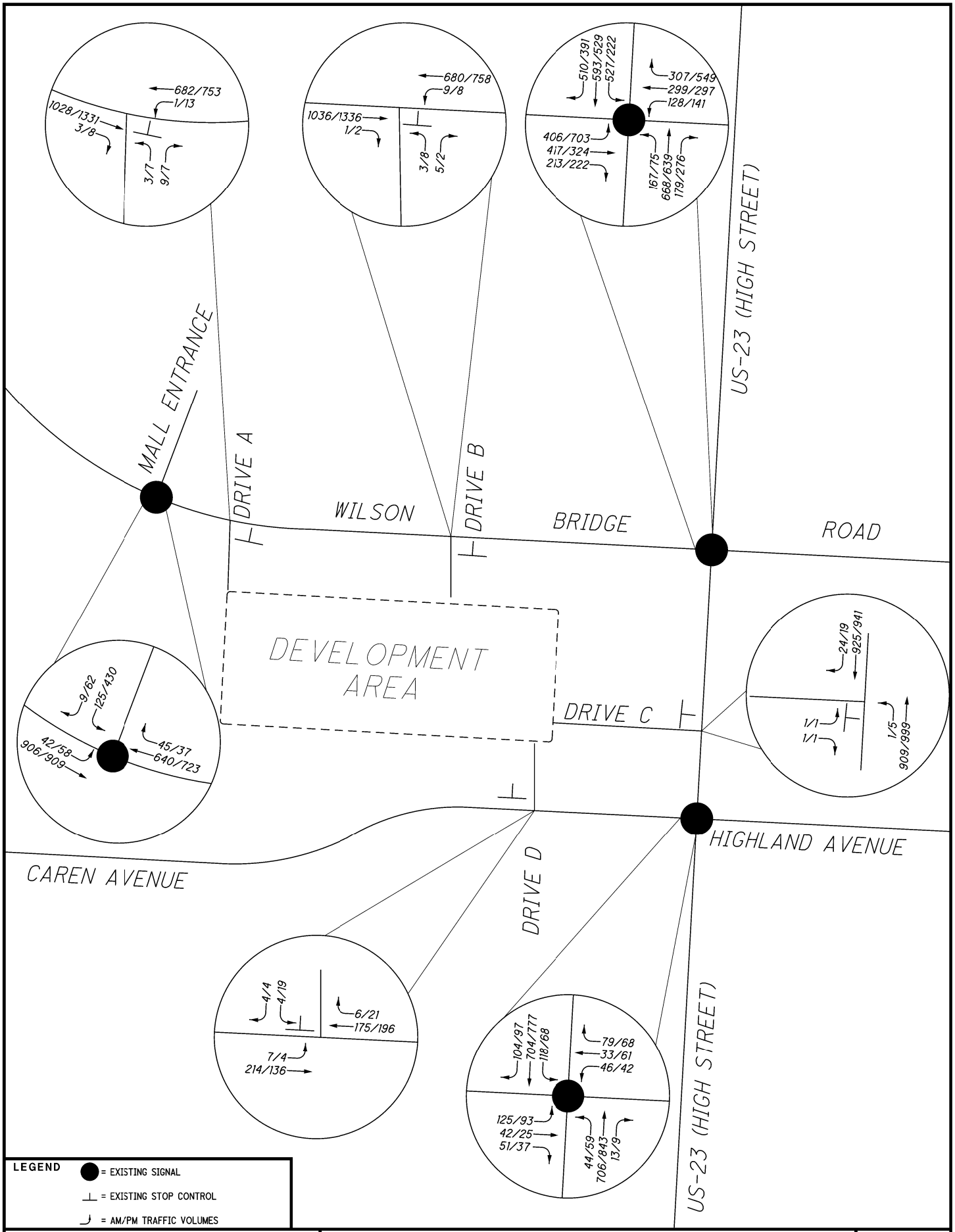

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FIGURE 2.4
2028 NO BUILD AM/PM PEAK HOUR TRAFFIC VOLUMES

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2.4.2 No Build Traffic Analysis

Table 2.5 provides a summary of the LOS and delay (in seconds) for the traffic analysis of the 2018 No Build and 2028 No Build conditions. Areas for concern have been identified from the analysis. It may be noted that HCM 2010 methodology cannot evaluate LOS for un-signalized intersections with more than four (4) lanes in one lane group along the major approach (see northbound approach at US-23/Drive C intersection). Therefore, to evaluate LOS for the US-23 (N. High Street) /Drive C intersection, the number of northbound lanes along US-23 (N. High Street) was reduced from four (4) to three (3) and through volumes were reduced by 25%.

US-23 (N. High Street) & Wilson Bridge Road

- During the AM peak hour under 2018 and 2028 No Build conditions, this intersection is projected to operate at LOS D and E, respectively. During the PM peak hour, this intersection is projected to operate at LOS E under 2018 No Build and 2028 No Build conditions.

- Several lane groups are projected to have unsatisfactory traffic operations at this intersection under the 2028 No Build conditions (see below). As many of these unsatisfactory lane groups are along conflicting approaches, changes to the roadway geometry (lane additions) would potentially be necessary at this intersection to achieve satisfactory traffic operations in the future, even if the proposed development does not occur.

  - *AM Peak Unsatisfactory Lane Groups* – southbound left (LOS F, 2028)

  - *PM Peak Unsatisfactory Lane Groups* – eastbound through (LOS F, 2028); northbound right (LOS F, 2028), southbound left (LOS F, 2018 and 2028)

Wilson Bridge Road and Drive A

- During the PM peak hour under 2018 and 2028 No Build conditions, the northbound (Drive A) approach at this intersection is projected to operate at LOS F.

- Movement restrictions, changes to traffic control, or alignment with the adjacent traffic signal (the Mall Drive signal is located approximately 140 feet to the west of Drive A) would potentially be necessary to achieve satisfactory traffic operations at this location, even if the proposed development does not occur.

Table 2.5 2018/2028 No Build LOS (Delay)

Intersection	Control Type	No Build	
		2018	2028
AM Peak Hour			
Wilson Bridge Road & Mall Drive	Signal	A (7.6)	A (7.9)
US-23 (N. High Street) & Wilson Bridge Road	Signal	D (54.7)	E (58.0)
US-23 (N. High Street) & Caren Avenue	Signal	C (26.3)	C (27.2)
Wilson Bridge Road & Drive A	Stop[a]	C (21.7)	C (23.9)
Caren Avenue & Drive D	Stop[a]	B (10.4)	B (10.5)
PM Peak Hour			
Wilson Bridge Road & Mall Drive	Signal	B (10.5)	B (11.1)
US-23 (N. High Street) & Wilson Bridge Road	Signal	E (55.0)	E (60.4)
US-23 (N. High Street) & Caren Avenue	Signal	C (25.5)	C (25.5)
Wilson Bridge Road & Drive A	Stop[a]	F (124.0)	F (159.9)
Caren Avenue & Drive D	Stop[a]	B (10.8)	B (11.0)

[a]LOS is shown for the highest delay intersection approach as HCM criteria does not provide overall LOS for unsignalized intersections.

3.0 PROPOSED CONDITIONS

3.1 Proposed Trip Generation

Trip generation for the proposed development was completed based on land use assumptions provided by the developer and guidelines set forth in the Institute of Transportation Engineers' (ITE's) *Trip Generation Manual, 9th Edition*. Three (3) reductions were applied to the trip generation for this development. Information regarding these reductions is provided below:

- Reduction for existing site land uses – The existing development site features a 232 guestroom Holiday Inn that will be demolished. The trips associated with this hotel were estimated from driveway counts performed at the current site and removed from the existing transportation network.

- Internal capture reduction – As the site features proposed restaurant and office spaces, it will be important to account for trips generated by specific land uses that originate from other land uses on site. These trips are not added to the adjacent roadway network and are subtracted from the overall trip generation totals. For this study, an internal capture percentage of 10% will applied to all land uses based on previously accepted values for other similar sites.

- Pass-by reduction – This reduction will account for trips generated by the site that have a different, off site, primary destination. These trips are not added to the adjacent roadway network, as their primary destination is not the proposed development site, but they are added at the driveway of the development as they count toward its trip generation total. Estimates for the number of pass-by trips were developed based on guidance provided in the *Trip Generation Manual, 9th Edition* as well as engineering judgement. It may be noted that the manual does not provide guidance on pass-by trips for the AM peak hour, therefore, this study assumes that AM peak hour pass-by percentages are approximately half of PM peak hour percentages.

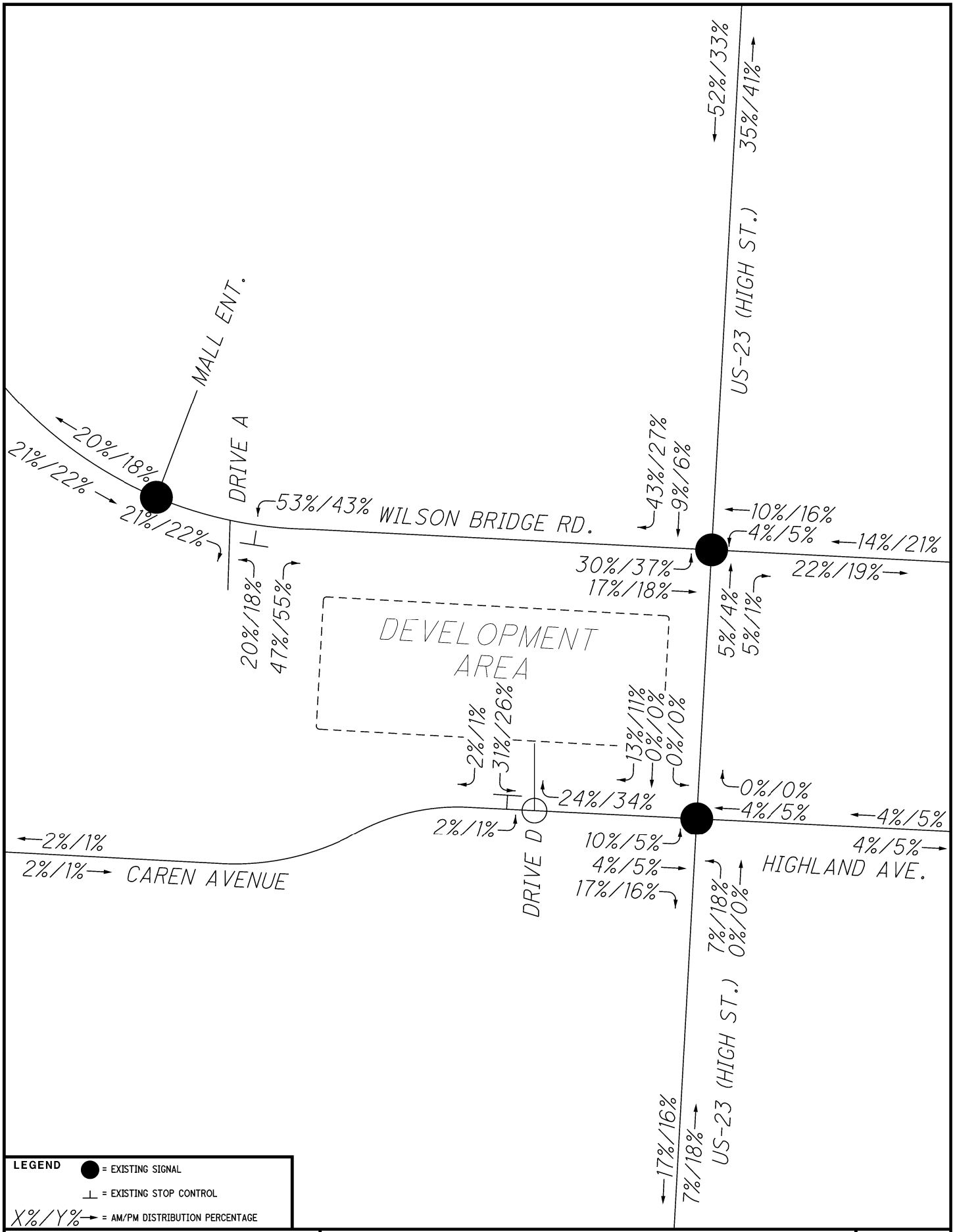
In addition to the reductions outlined above, the trip generation for this study was completed under the following assumptions:

- The restaurant land uses (17,662 square feet) is composed of 8,134 square feet (one restaurant) of ITE land use 931 (Quality Restaurant) and 9,528 total square feet (two restaurants) of ITE land use 932 (High-Turnover Restaurant).

Table 3.1 Trip Generation						
Proposed Land Use ITE Land Use Code / Units	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
New Site Trips						
Hotel Hotel (310) / 111 Rooms	35	24	59	34	33	67
Office General Office Building (710) – 32,154 SQFT.	69	9	78	20	95	115
Restaurant Quality Restaurant (931) – 8,134 SQFT.	4	3	7	41	20	61
Restaurant High-Turnover Restaurant (932) – 4,750 SQFT.	29	23	52	28	19	47
Restaurant High-Turnover Restaurant (932) – 4,778 SQFT.	29	23	52	29	19	48
Subtotal New Trips	166	82	248	152	186	338
Internal Capture Reduction						
10% Internal Capture Reduction (Applied to All Land Uses)	17	8	25	15	19	34
Subtotal (After Internal Capture Reduction)	149	74	223	137	167	304
Pass-By Reduction						
Restaurant (Quality Restaurant Only) (22% AM, 44% PM Reduction)	1	1	2	18	9	27
Restaurant (High-Turnover Restaurant Only) (21% AM, 43% PM Reduction)	12	10	22	25	16	41
Subtotal (Pass-By)	13	11	24	43	25	68
Total New Trips on Adjacent Roads (After Internal Capture and Pass-By Reductions)	136	63	199	94	142	236
Existing Site Trips Reduction						
Existing Holiday Inn Based on 2015 Driveway Counts	52	30	82	80	49	129
Net Site Trips on Adjacent Roads (After Existing Site Trip Reduction)	84	33	117	14	93	107

3.2 Proposed Trip Distribution

Distribution for new site trips and the removal of existing trips were performed based on existing study area traffic patterns. AM and PM peak hour trip distribution patterns within the study area are illustrated in Figure 3.1, pass-by trips during the AM and PM peak hours are illustrated in Figure 3.2, existing trips removed to account for the demolition of the existing Holiday Inn are illustrated in Figure 3.3, site trips for the AM and PM peak hours are illustrated in Figure 3.4, while 2018 and 2028 Build AM and PM peak hour traffic volumes are illustrated in Figures 3.5 and 3.6.



LEGEND
● = EXISTING SIGNAL
⊥ = EXISTING STOP CONTROL
X%/Y%→ = AM/PM DISTRIBUTION PERCENTAGE

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FIGURE 3.1
AM/PM PEAK HOUR TRIP DISTRIBUTION PATTERNS

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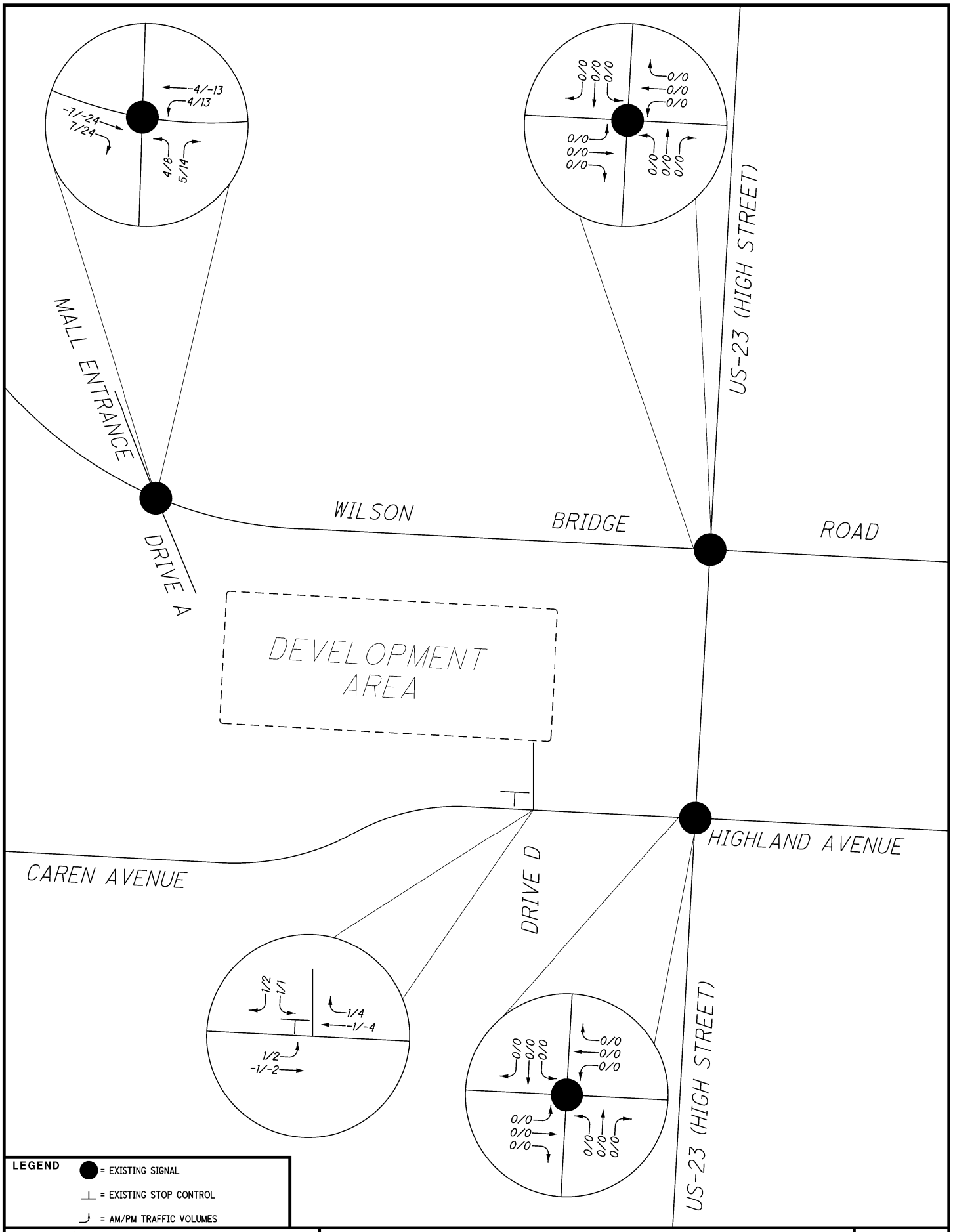

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FIGURE 3.2
AM/PM PEAK HOUR PASS BY TRIPS

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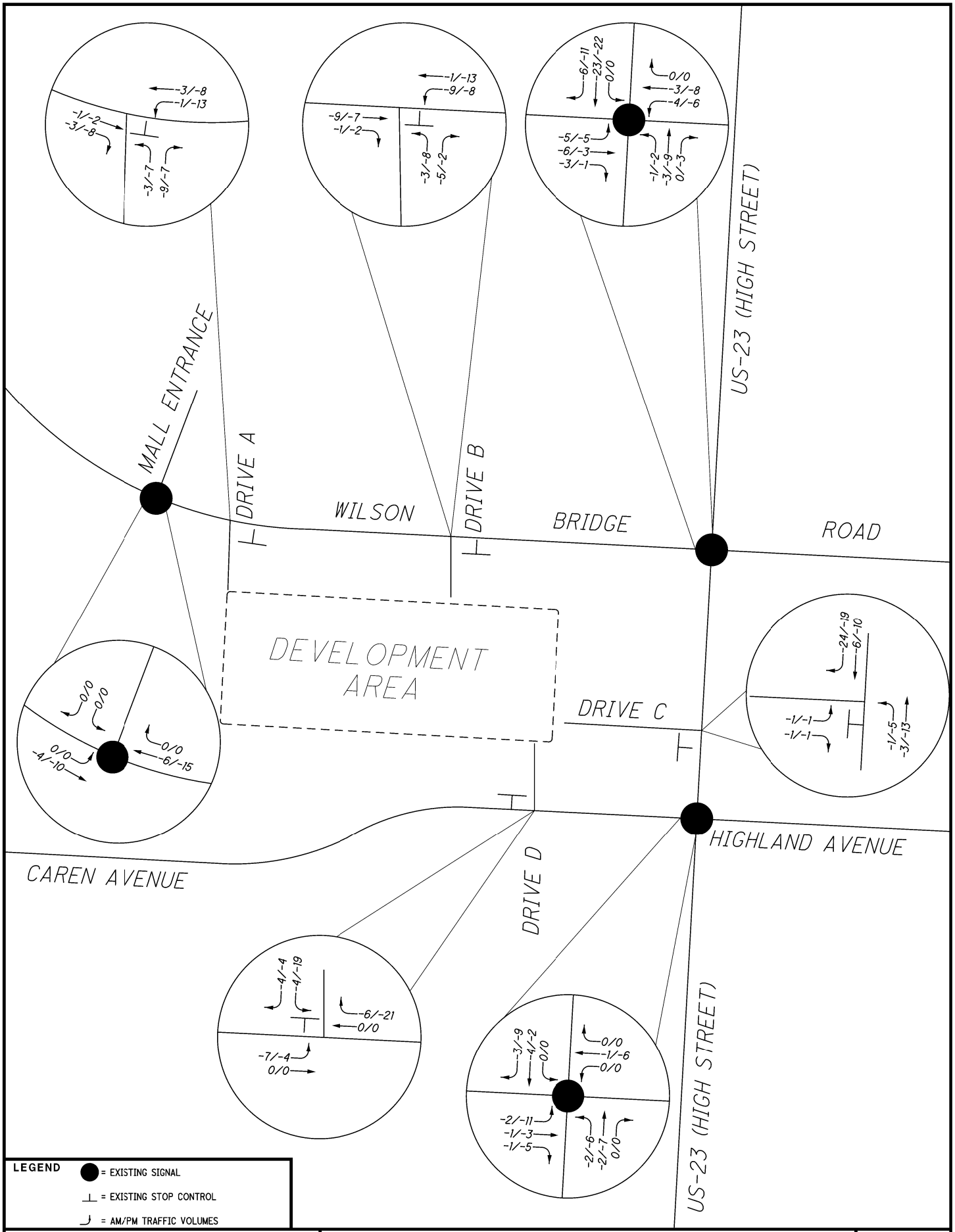

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FIGURE 3.3
AM/PM PEAK HOUR
HOLIDAY INN TRIPS REMOVED

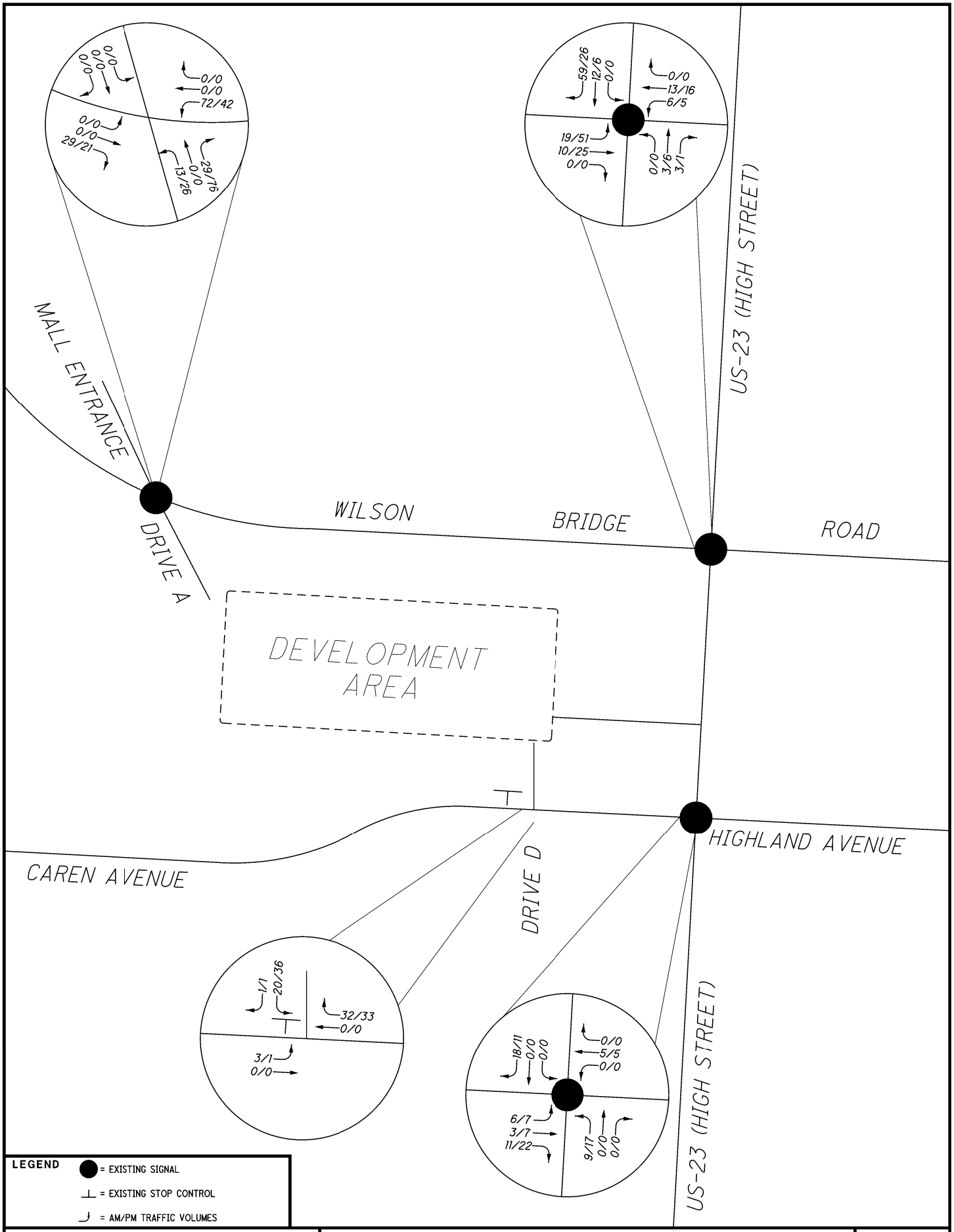

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FIGURE 3.4
NEW AM/PM PEAK HOUR SITE TRIPS
(DOES NOT INCLUDE PASS-BY: SEE FIG. 3.3)

$DATE$
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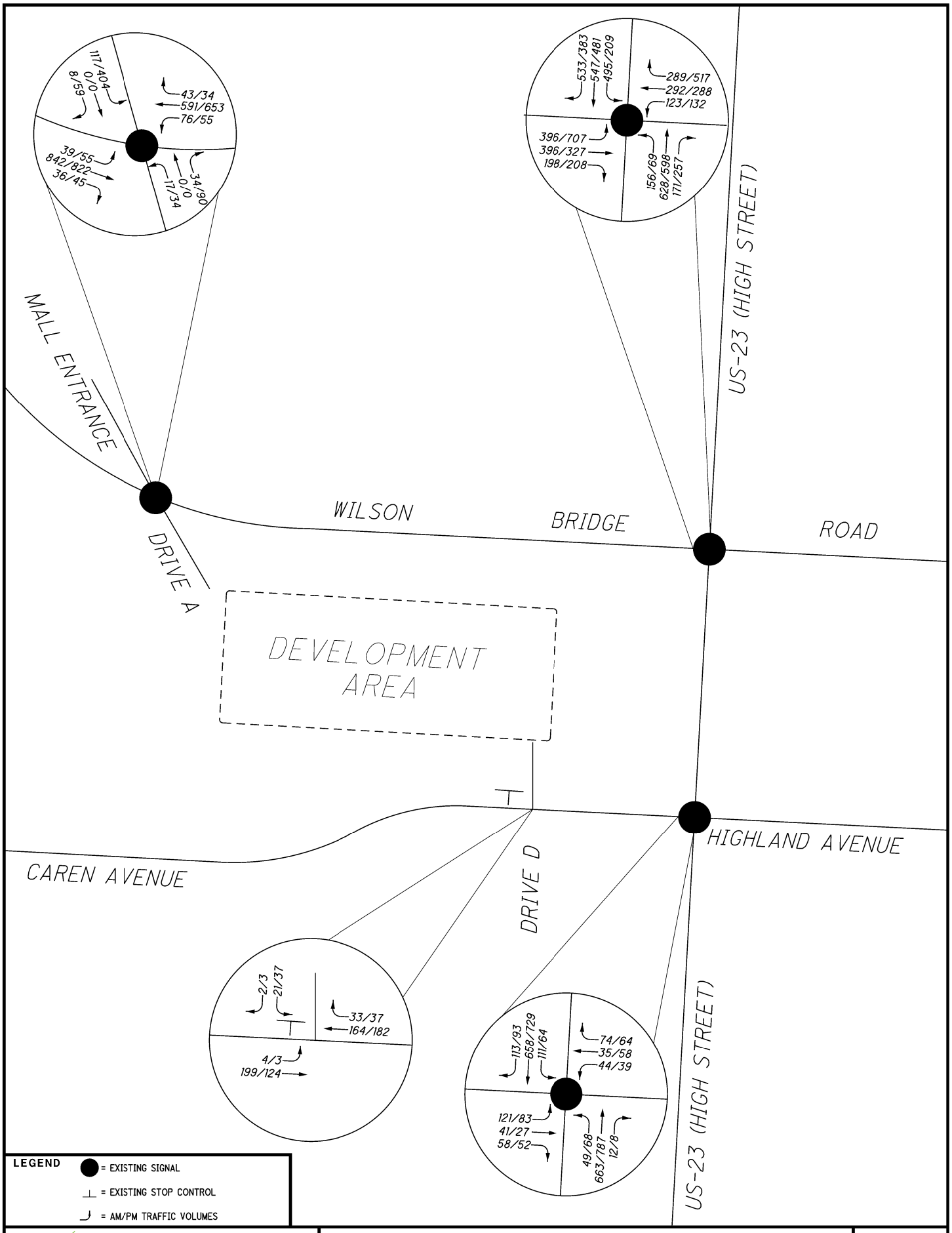

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FIGURE 3.5
2018 BUILD AM/PM PEAK HOUR TRAFFIC VOLUMES

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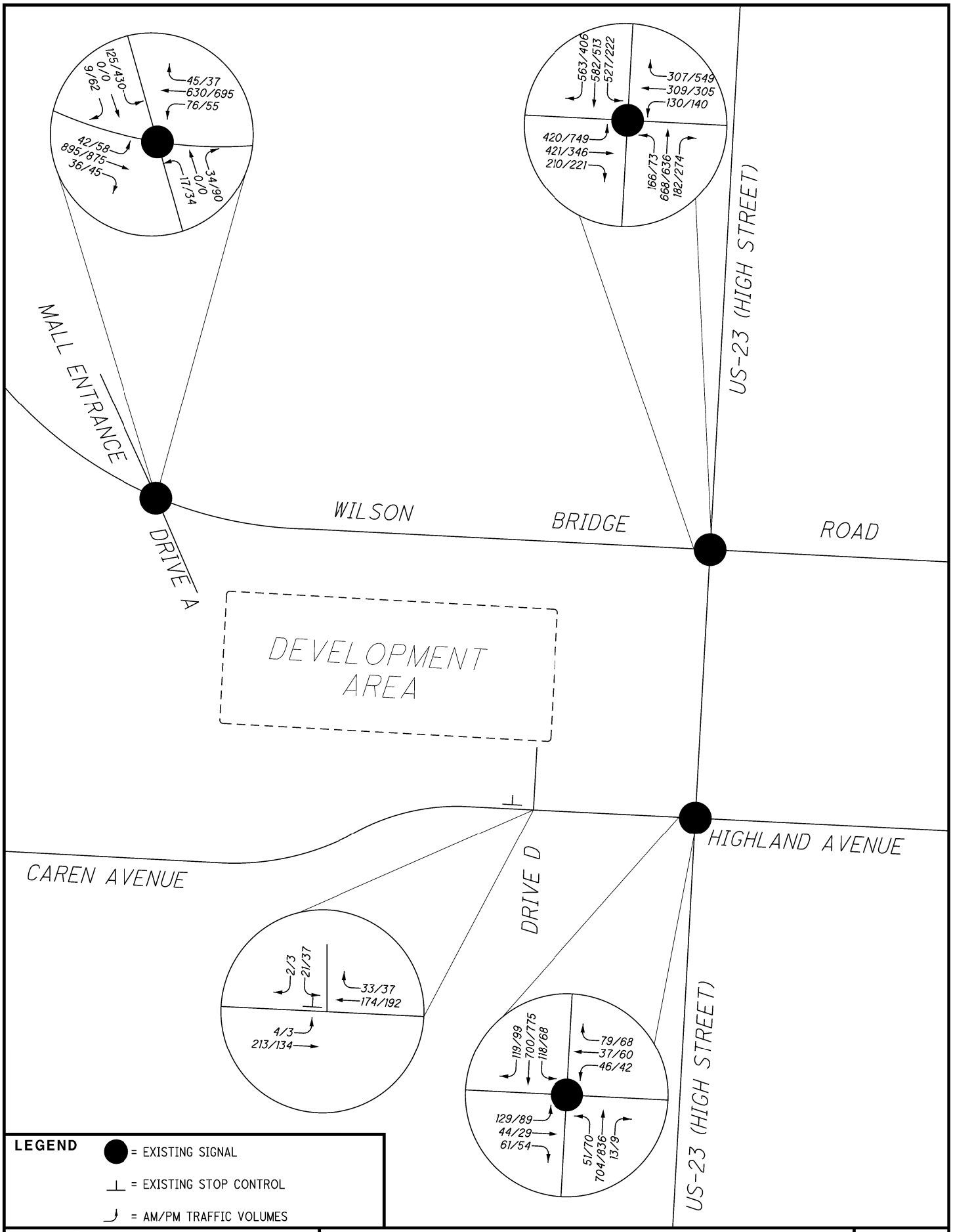

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FIGURE 3.6
2028 BUILD AM/PM PEAK HOUR TRAFFIC VOLUMES

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3.3 Proposed (Build) Traffic Operations

The 2018 and 2028 Build traffic operations were evaluated under the following assumptions:

- Drive A will connect to the existing Wilson Bridge Road & Mall Drive intersection (currently signalized) with the Mall Drive (southbound) approach being re-aligned to meet Drive A (see Figure 3.7).
- The re-configured Wilson Bridge Road & Mall Drive/Drive A intersection will remain signalized.
- Two (2) northbound lanes on Drive A at Wilson Bridge Road are needed in order to accommodate left and right turning vehicles from the development site (see Figure 3.7).
- Signal cycle lengths for the Wilson Bridge Road & Mall Drive intersection were modified to match nearby cycle lengths along US 23 (N. High Street) at Wilson Bridge Road and Caren Avenue. This modification was done to account for the possibility of future coordination between these signals.
- The re-configured signal was evaluated with split phasing for the northbound and southbound approaches, permitted left turns for the eastbound approach, and permitted/protected left turns for the westbound approach. It may be noted that split phasing was required to accommodate the proposed lane configuration along the southbound approach (Left – Through/Left – Right). This lane configuration is necessary to accommodate the existing southbound dual left turns while also accommodating the new southbound through movement. through Phasing for this intersection is presented in Figure 3.8

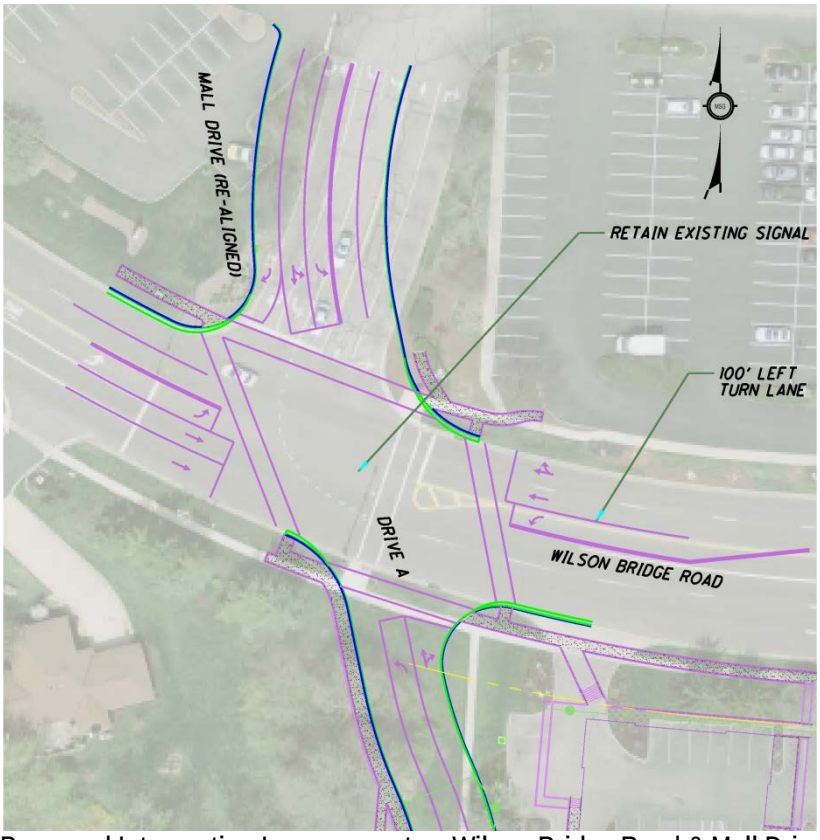

Figure 3.7 Proposed Intersection Improvements – Wilson Bridge Road & Mall Drive/Drive A

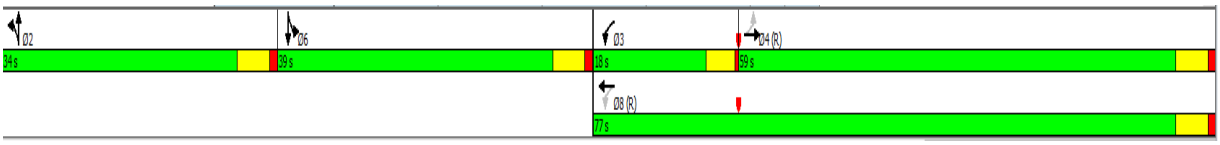

Figure 3.8 Proposed Phasing – Wilson Bridge Road & Mall Drive/Drive A Intersection

Un-signalized Left Turn Lane Warrant Analysis

A left turn lane warrant analysis was conducted for the eastbound approach at the Caren Avenue & Drive D intersection. This analysis was based on left turn lane warrant graphs provided in the Ohio Department of Transportation's (ODOT's) *State Highway Access Management Manual* (SHAMM). Left turn lane warrant graphs for the 2028 Build AM and PM peak hours are provided in Figures 3.9 and 3.10 respectively.

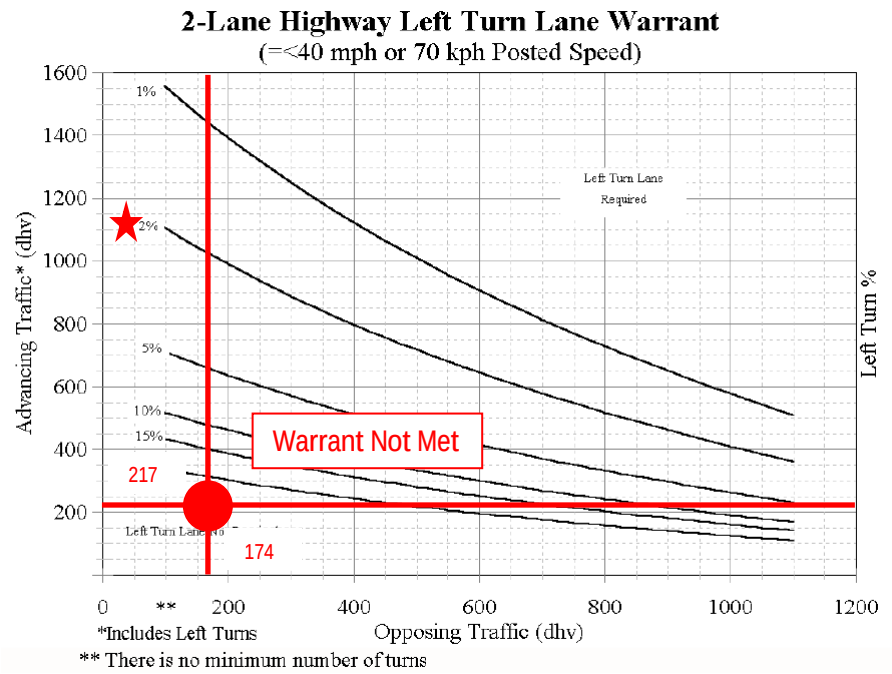

Figure 3.9 2028 Build AM Peak Left Turn Lane Warrant Analysis – EB Caren Avenue & Drive D

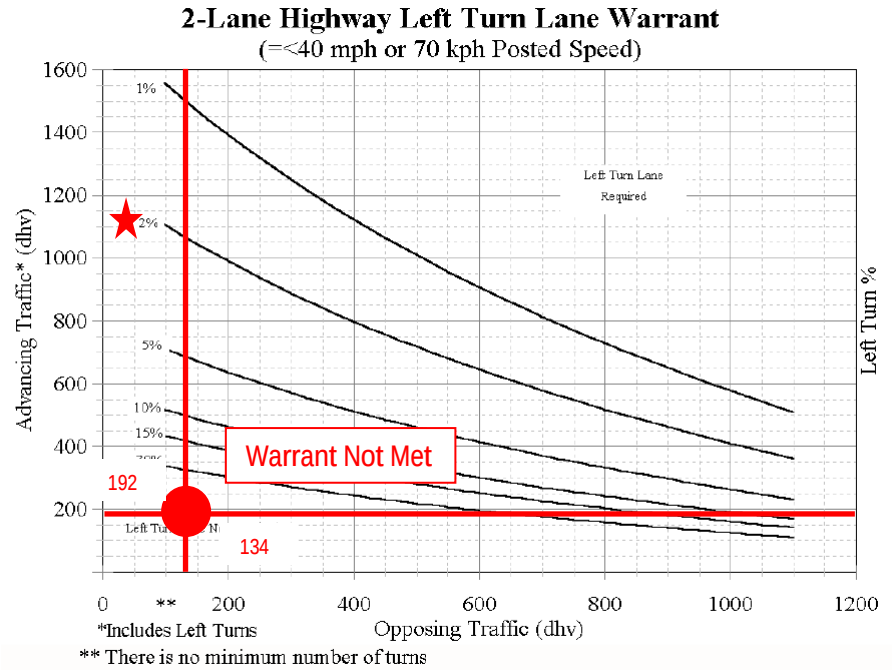

Figure 3.10 2028 Build PM Peak Left Turn Lane Warrant Analysis – EB Caren Avenue & Drive D

The benchmark for meeting ODOT's SHAMM criteria for left turn lane warrants is represented by the star in Figures 3.9 and 3.10. This criteria is based on the percentage of the total advancing volumes that left turns make up along the selected approach (~2% during the AM and PM peak hours). The figures illustrate that the eastbound approach of Caren Avenue at Drive D does not meet left turn lane warrants outlined in ODOT's SHAMM as eastbound advancing traffic volumes and volumes opposing the left turn are too low.

Right Turn Lane Warrant

A right turn lane warrant was conducted to determine if a right turn lane could be installed along the westbound approach of Caren Avenue to Drive D. This warrant was conducted according to procedures outlined in ODOT's SHAMM. Right turn lane warrant graphs are presented in Figures 3.11 and 3.12 respectively.

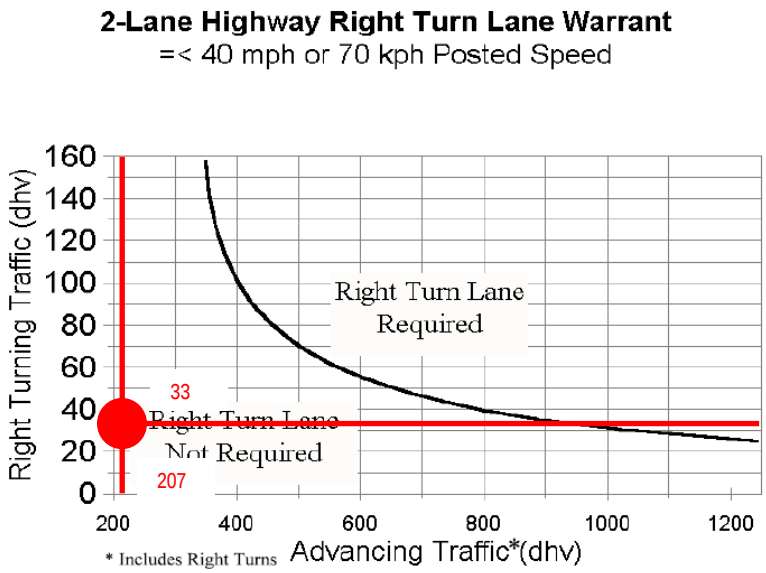

Figure 3.11 2028 Build AM Peak Right Turn Lane Warrant Analysis – EB Caren Avenue & Drive D

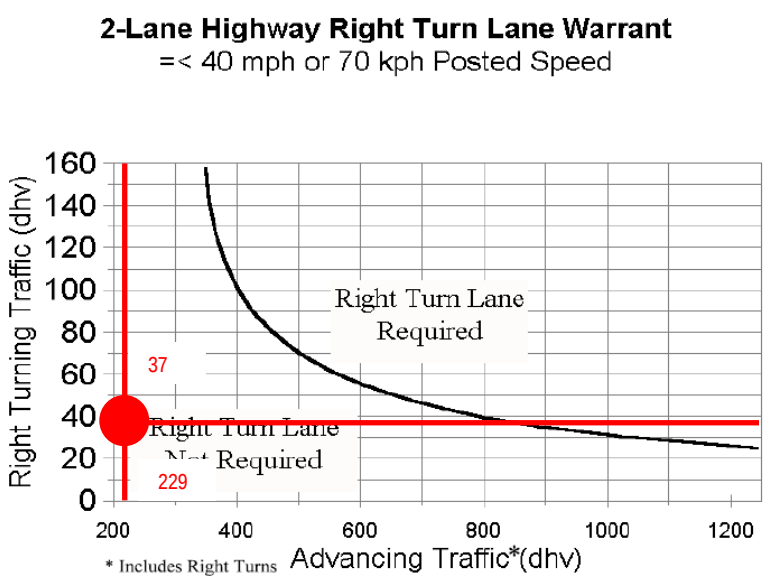

Figure 3.12 2028 Build PM Peak Right Turn Lane Warrant Analysis – EB Caren Avenue & Drive D

Based on the results presented in Figures 3.10 and 3.11 traffic volumes at this intersection do not meet warrants for the installation of a westbound right turn lane. A westbound right turn lane is not recommended for this intersection.

Signalized Left Turn Lane Analysis

A capacity analysis was conducted to determine the need for a westbound left turn lane along Wilson Bridge Road at Mall Drive/Drive A. The capacity analysis was conducted based on procedures outlined in ODOT's SHAMM. The SHAMM states that the use and number of left turn lanes should be based on a capacity analysis in which critical delays along conflicting approaches are balanced. If the Wilson Bridge Road westbound left turn movement has an unsatisfactory LOS, then a left turn will be recommended. Results of the capacity analysis are provided in Table 3.2. It may be noted that this analysis was conducted with 2028 volumes only.

Table 3.2 Capacity Analysis – Wilson Bridge Road Left Turn at Drive A		
Westbound Left Turn	2028 No Build	2028 Build
AM Peak	B (10.8)	E (71.9)
PM Peak	C (18.3)	E (66.2)

Based on the LOS and delay criteria set forth for this study (see section 2.4.1), the westbound left turn movement at Drive A is not projected to have unsatisfactory traffic operations in 2028 during the AM or PM peak hours. However, as the delay for this movement is somewhat close to the LOS F threshold during the AM peak hour (within 9 seconds), a westbound left turn lane is recommended for the westbound approach. Build analyses for this study include a westbound left turn lane along Wilson Bridge Road at Mall Drive/Drive A. See queueing analysis below for discussion on storage needs for the westbound left turn lane.

Signal Warrant Analysis

Signal warrant analyses were performed at the intersection of Wilson Bridge Road & Mall Drive, as well as at Wilson Bridge Road & Drive A to confirm warrants for this signal. The warrant analyses were conducted using 2018 Build traffic volumes and according to criteria outlined in the Ohio Manual on Uniform Traffic Control Devices (OMUTCD). The OMUTCD outlines criteria for nine (9) traffic signal warrants, however, only one (1) of them will be evaluated for this study (Warrant 1 – Eight Hour Vehicular Volume).

2017 Build peak hour driveway volumes and 2013 AADT data along Wilson Bridge Road obtained from the Ohio Department of Transportation's (ODOT's) Traffic Count Database System (TCDS) traffic volumes were extrapolated to eight (8) hours using hourly driveway data for a similar site and hourly volume percentages (for 24 hours based on functional classification) from ODOT. A detailed presentation of the warrant analyses for both intersections is provided in Table 3.3 and Figure 3.13.

Table 3.3 Signal Warrant Analysis	
Intersection	Warrant 1 – Eight Hour Vehicular Volume
Wilson Bridge Road & Mall Drive	Warrant Met
Wilson Bridge Road & Drive A	Warrant Not Met

Based on the analyses, the intersection of Wilson Bridge Road & Mall Drive meets Warrant 1, while Wilson Bridge Road & Drive A does not. Traffic analyses for mitigation improvements for this study will assume signalization of Drive A with Mall Drive.

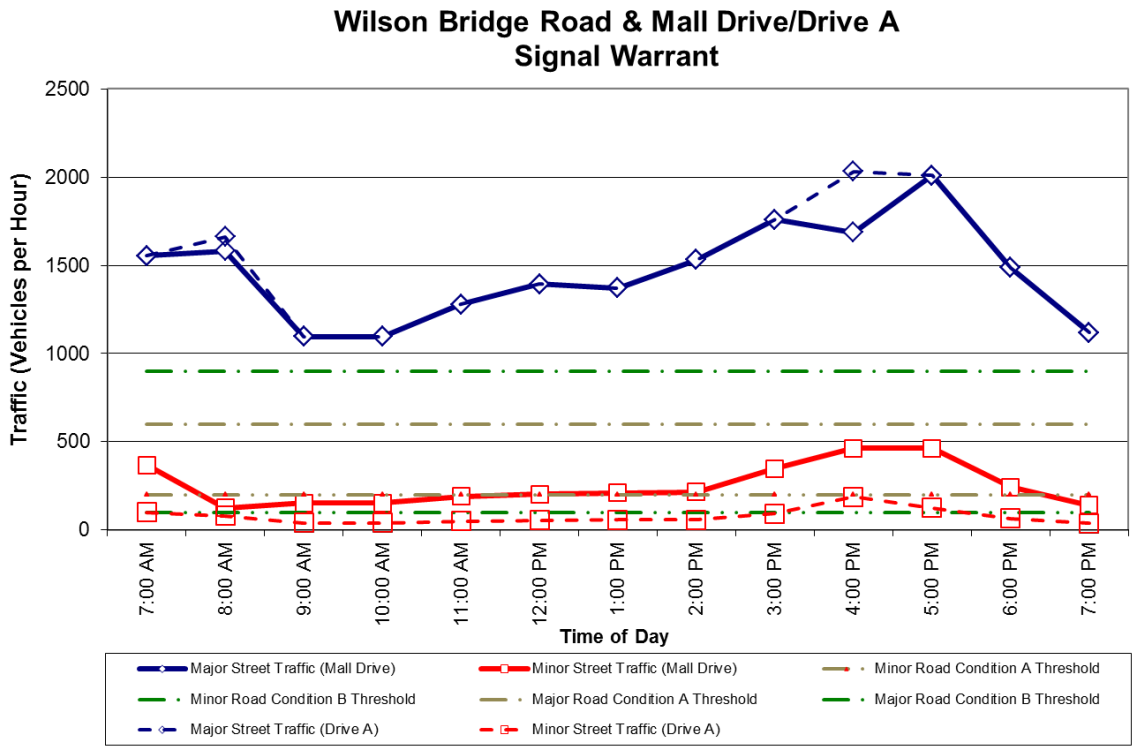

Figure 3.13 Signal Warrant Analysis

Traffic Operations

Table 3.4 provides a summary of the LOS and delay for the 2018 Build and 2028 Build conditions respectively. Intersections from the analysis achieving unsatisfactory traffic operations have been identified below.

Table 3.4 2018/2028 Build LOS (Delay)

Intersection	Control Type	No Build		Build (With Roadway Mitigation)	
		2018	2028	2018	2028
AM Peak Hour					
Wilson Bridge Road & Mall Drive/Drive A	Signal	A (7.6)	A (7.9)	D (50.3)	D (50.4)
US-23 (N. High Street) & Wilson Bridge Road	Signal	D (54.7)	E (58.0)	E (55.0)	E (57.3)
US-23 (N. High Street) & Caren Avenue	Signal	C (26.3)	C (27.2)	C (29.3)	C (30.2)
Caren Avenue & Drive D	Stop[a]	B (10.4)	B (10.5)	B (11.7)	B (12.0)
PM Peak Hour					
Wilson Bridge Road & Mall Drive/Drive A	Signal	B (10.5)	B (11.1)	D (48.3)	D (46.6)
US-23 (N. High Street) & Wilson Bridge Road	Signal	E (55.0)	E (60.4)	E (55.9)	E (60.6)
US-23 (N. High Street) & Caren Avenue	Signal	C (25.5)	C (25.5)	C (24.9)	C (25.6)
Caren Avenue & Drive D	Stop[a]	B (10.8)	B (11.0)	B (11.3)	B (11.5)

[a]LOS is shown for the highest delay intersection approach as HCM criteria does not provide overall LOS for un-signalized intersections.

US-23 (N. High Street) & Wilson Bridge Road

During the AM peak hour, the project has a negligible impact on traffic operations from the No Build conditions:

- Intersection delay is projected to increase by 0.3 seconds in 2018 (increasing LOS from D to E), and decrease by 0.7 seconds in 2028 (LOS remains at E).

During the PM peak hour, the project also has a negligible impact:

- Intersection delay is projected to increase by 0.9 seconds in 2018 (LOS remains at E), and by 0.2 seconds in 2028 (LOS remains at E).
- The following lane groups are projected to have unsatisfactory traffic operations at this intersection:
    - *AM Peak Unsatisfactory Lane Groups* – southbound left (LOS F in 2028 Build and No Build – Operations for this lane group are not impacted by the proposed development)
    - *PM Peak Unsatisfactory Lane Groups* – eastbound through (LOS F in 2028 Build and No Build – Operations for this lane group are not impacted by the proposed development); northbound right (LOS F in 2028 Build and No Build – Operations for this lane group are not impacted by the proposed development), southbound left (LOS F in 2018 and 2028 Build and No Build – Operations for this lane group are not impacted by the proposed development)

Wilson Bridge Road & Drive A/Mall Drive

During the AM peak hour, the project increases delay and LOS from the No Build condition, however, traffic operations remain satisfactory (intersection LOS D or better):

- Intersection delay is projected to increase by 42.7 seconds in 2018 (increasing LOS from A to D), and 42.5 seconds in 2028 (LOS A to LOS D).

During the PM peak hour, the project increases delay and LOS from the No Build condition, however, traffic operations remain satisfactory (LOS D or better):

- Delays for the northbound approach are projected to increase by 37.8 seconds with LOS remaining at satisfactory levels (LOS B to LOS D) in 2018 and 35.5 seconds (LOS B to LOS D) in 2028.

The results of the Build traffic analyses indicate that traffic operations at study area intersections are not degraded to unsatisfactory levels by the proposed development, however, the following improvements are proposed for this intersection as a part of this project (see Figure 3.14):

- Re-alignment of the Mall Drive approach to Wilson Bridge Road for connection to Drive A
- Installation of a 100 foot westbound left turn lane (through restriping within existing pavement) along Wilson Bridge Road at Drive A
- Traffic signal modifications to accommodate new northbound approach at Wilson Bridge Road & Drive A

During the AM and PM peak hours at the intersection of US-23 (N. High Street) & Caren Avenue, LOS remained at C from the No Build conditions in 2018 and 2028, while at Caren Avenue & Drive D, LOS remained at D from the No Build conditions in 2018 and 2028. As a means to improve safety and pedestrian accessibility, however, the following improvements are proposed at the intersection of US-23 (N. High Street) & Caren Avenue as a part of this project.

- Upgrade existing traffic signal to a mast arm configuration – this will improve the visibility of traffic signals for vehicles traveling along both US-23 (N. High Street) and Caren Avenue
- Improvements to pedestrian infrastructure

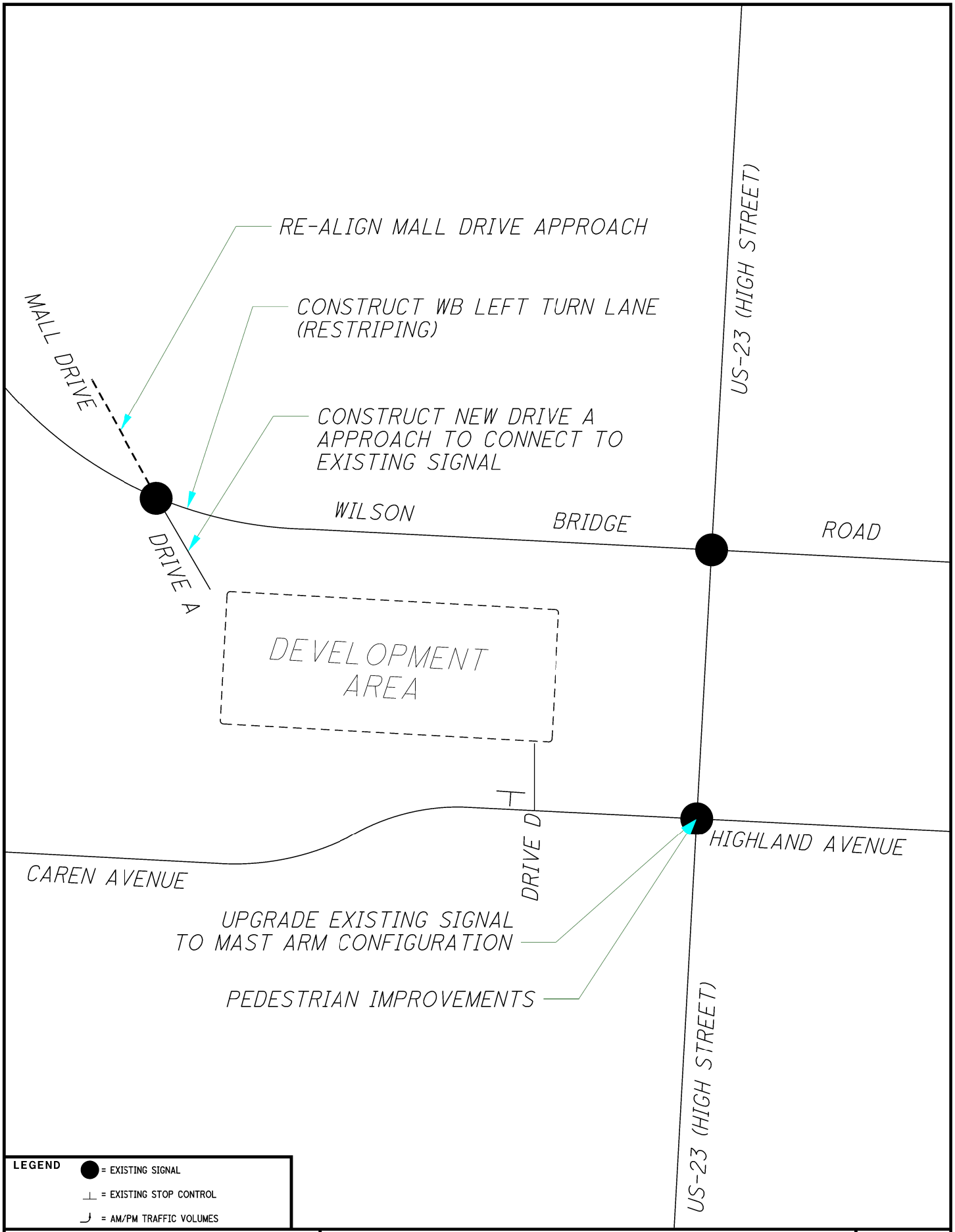

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FIGURE 3.14
PROPOSED STUDY AREA IMPROVEMENTS

$DATE$

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Queueing Analysis

A queueing analysis was completed for the 2018 and 2028 No Build and Build conditions at each approach for all study area intersections using the SimTraffic traffic analysis software package. The objective of the analysis was to identify intersection lane groups in which queueing (95th Percentile Queue) exceeded the critical queue length (the distance to upstream intersections or the extent of lane striping for turn lanes). The analysis included five (5) simulation runs and was conducted according to criteria for microsimulation outlined in ODOT's *Location & Design Manual*. Results from the queueing analysis are provided in Table 3.5 (AM peak hour) and Table 3.6 (PM peak hour).

Table 3.5 No Build/Build Queueing Analysis - AM Peak Hour

Intersection	Approach (Lane Group)	Critical Queue Length	No Build		Build	
			2018	2028	2018	2028
Wilson Bridge Road & Mall Drive/Drive A	Eastbound (L)	300	48	49	62	50
	Eastbound (TR)	520	5	5	405	323
	Westbound (L)	N/A			54	82
	Westbound (TR)	400	104	100	251	249
	Northbound (L)	N/A			38	34
	Northbound (TR)	N/A	32	30	44	45
	Southbound (L)	120	60	60	90	100
	Southbound (TR)	120	18	21	23	24
US-23 (N. High Street) & Wilson Bridge Road	Eastbound (L)	800	234	253	250	227
	Eastbound (T)	860	424	431	522	571
	Eastbound (R)	700	106	126	156	174
	Westbound (L)*	150	205	212	210	213
	Westbound (T)	1800	424	423	442	660
	Westbound (R)	350	145	167	142	164
	Northbound (L)	360	174	190	234	222
	Northbound (TR)	380	239	263	225	247
	Southbound (L)	525	340	433	425	597
	Southbound (T)	4,000	297	328	809	951
	Southbound (R)	900	162	197	644	721
US-23 (N. High Street) & Caren Avenue	Eastbound (L)	190	142	138	145	144
	Eastbound (TR)	890	107	95	124	117
	Westbound (L)	50	53	59	54	61
	Westbound (TR)	2020	100	127	111	145
	Northbound (L)	215	67	82	102	137
	Northbound (TR)	790	485	530	550	331
	Southbound (L)	180	111	117	163	139
	Southbound (TR)	380	117	116	186	195
Caren Avenue & Drive D	Eastbound (TL)	600	14	15	11	11
	Westbound (TR)	200	0	0	3	0
	Southbound (LR)	N/A	31	25	41	42

Red: 95th Percentile Queue Exceeds Available Vehicle Storage Capacity
*This is a two way left turn lane (TWLTL) and could store more than 150'

Table 3.6 No Build/Build Queuing Analysis - PM Peak Hour						
Intersection	Approach (Lane Group)	Vehicle Storage	No Build		Build	
			2018	2028	2018	2028
Wilson Bridge Road & Mall Drive/Drive A	Eastbound (L)	300	59	61	71	67
	Eastbound (TR)	520	31	37	379	382
	Westbound (L)	N/A			68	61
	Westbound (TR)	400	111	117	245	271
	Northbound (L)	N/A			55	62
	Northbound (TR)	N/A	30	36	77	68
	Southbound (L)	120	126	141	214	217
	Southbound (R)	120	39	44	48	52
US-23 (N. High Street) & Wilson Bridge Road	Eastbound (L)	800	352	371	500	601
	Eastbound (T)	860	368	385	461	468
	Eastbound (R)	700	97	106	120	130
	Westbound (L)*	150	208	211	214	209
	Westbound (T)	1800	458	584	427	625
	Westbound (R)	350	235	250	248	316
	Northbound (L)	360	97	94	115	100
	Northbound (TR)	380	266	271	282	291
	Southbound (L)	525	205	246	237	389
	Southbound (T)	4,000	269	278	613	915
	Southbound (R)	900	97	133	411	752
US-23 (N. High Street) & Caren Avenue	Eastbound (L)	190	102	118	115	102
	Eastbound (TR)	890	69	69	83	89
	Westbound (L)	50	61	70	49	58
	Westbound (TR)	2020	156	140	129	161
	Northbound (L)	215	89	85	138	146
	Northbound (TR)	790	626	609	598	618
	Southbound (L)	180	90	94	97	113
	Southbound (TR)	380	116	116	200	212
Caren Avenue & Drive D	Eastbound (TL)	600	13	9	8	7
	Westbound (TR)	200	0	0	0	0
	Southbound (LR)	N/A	43	43	47	51

Red: 95th Percentile Queue Exceeds Available Vehicle Storage Capacity
*This is a two way left turn lane (TWLTL) and could store more than 150'

The following intersection lane groups were observed to have queues that exceeded available vehicle storage capacity:

- Wilson Bridge Road & Mall Drive
  - Southbound left – All analysis scenarios (PM peak hour only). It may be noted that storage capacity is projected to be exceeded for both Build and No Build analysis scenarios and the need for additional queue storage is not a result of increased traffic from the proposed development.
  - As PM peak hour Build queues along the southbound approach to this intersection increased by more than 50 feet from the No Build condition, MSG estimated the impact that these queues would have on traffic circulation within the site on the north side of Wilson Bridge Road. Traffic operations were evaluated for the intersection immediately upstream of the southbound approach at the Wilson Bridge Road Mall Drive/Drive A intersection (see Figure 3.15/3.16). The additional analysis at the four (4) leg intersection was conducted for the 2028 Build PM peak hour and assumed that 50% of downstream traffic volumes (southbound approach of Mall Drive at Wilson Bridge Road) originated from the east leg, 25% originated from the north leg, and 25% originated from the west leg. As illustrated in Figures 3.15 and 3.16, the largest queue observed along the southbound Mall Drive approach at Wilson Bridge Road does block the upstream intersection, but is cleared within one (1) signal cycle (see vehicle 268 in Figure 3.15 and Figure 3.16). As southbound approach queues at the Wilson Bridge Road & Mall

Drive/Drive A intersection are unlikely to persist from cycle to cycle and should be cleared within one (1) signal cycle, no mitigation improvements are proposed to address queues at this intersection.

- US-23 (N. High Street) & Wilson Bridge Road
  - Westbound left – All analysis scenarios (AM peak hour; PM peak hour). It may be noted that storage capacity is projected to be exceeded for both Build and No Build analysis scenarios and the need for additional queue storage is not a result of increased traffic from the proposed development.

- US-23 (N. High Street) & Caren Avenue
  - Westbound left – AM peak hour (all analysis scenarios), PM peak hour (2028 only). It may be noted that storage capacity is projected to be exceeded for both Build and No Build analysis scenarios and the need for additional queue storage is not a result of increased traffic from the proposed development.

Based on the queuing analysis presented in Tables 3.5 and 3.6, the westbound left turn lane along Wilson Bridge Road at Drive A should be constructed with a storage length of 100 feet (largest 95th percentile queue is 86 feet). Construction of this westbound left turn lane can be completed through re-striping of existing pavement along Wilson Bridge Road. This restriping is not expected to impact queues in the eastbound dual left turn lanes at the upstream intersection of US 23 (N. High Street) & Wilson Bridge Road as these lanes have 800 feet of storage and a 95th percentile queue of 534 feet (266 feet of available space for construction of westbound left turn lane at Drive A).

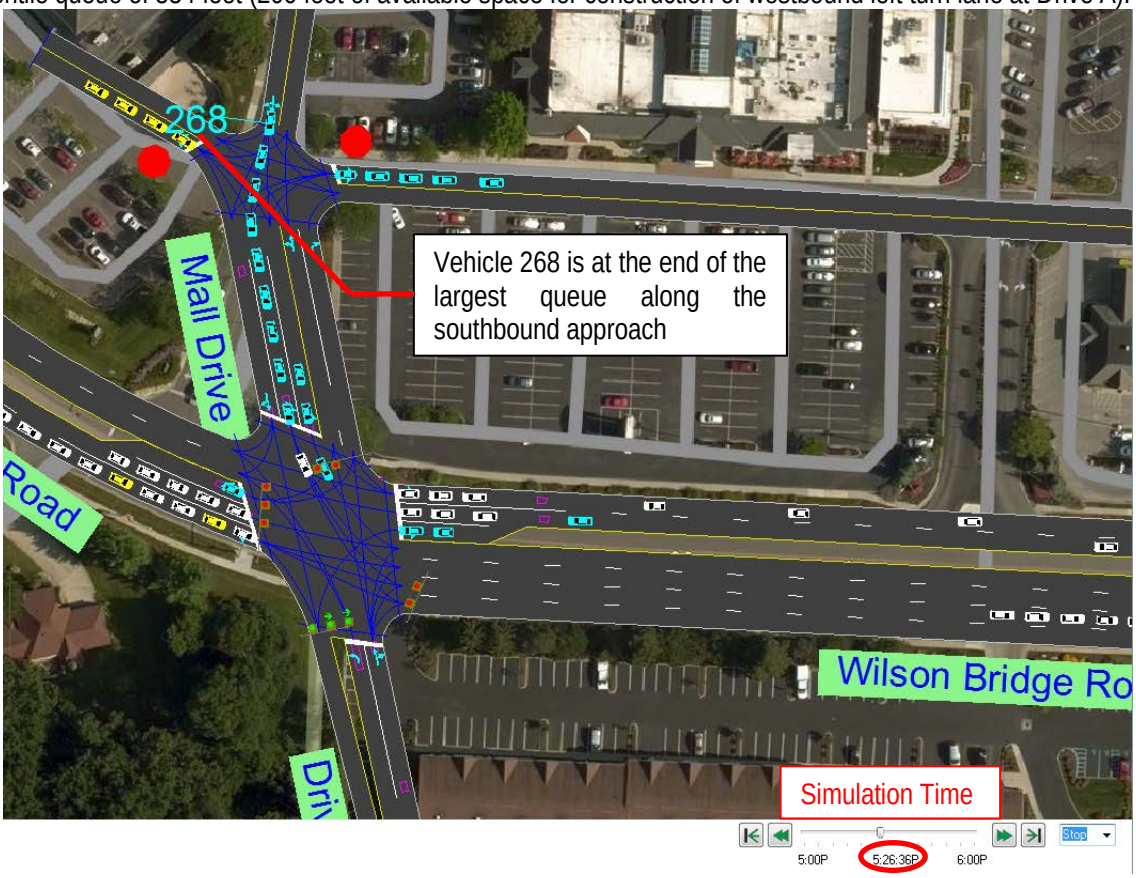


Figure 3.15 Wilson Bridge Road & Mall Drive/Drive A – 2028 Build PM Southbound (Largest Queue)

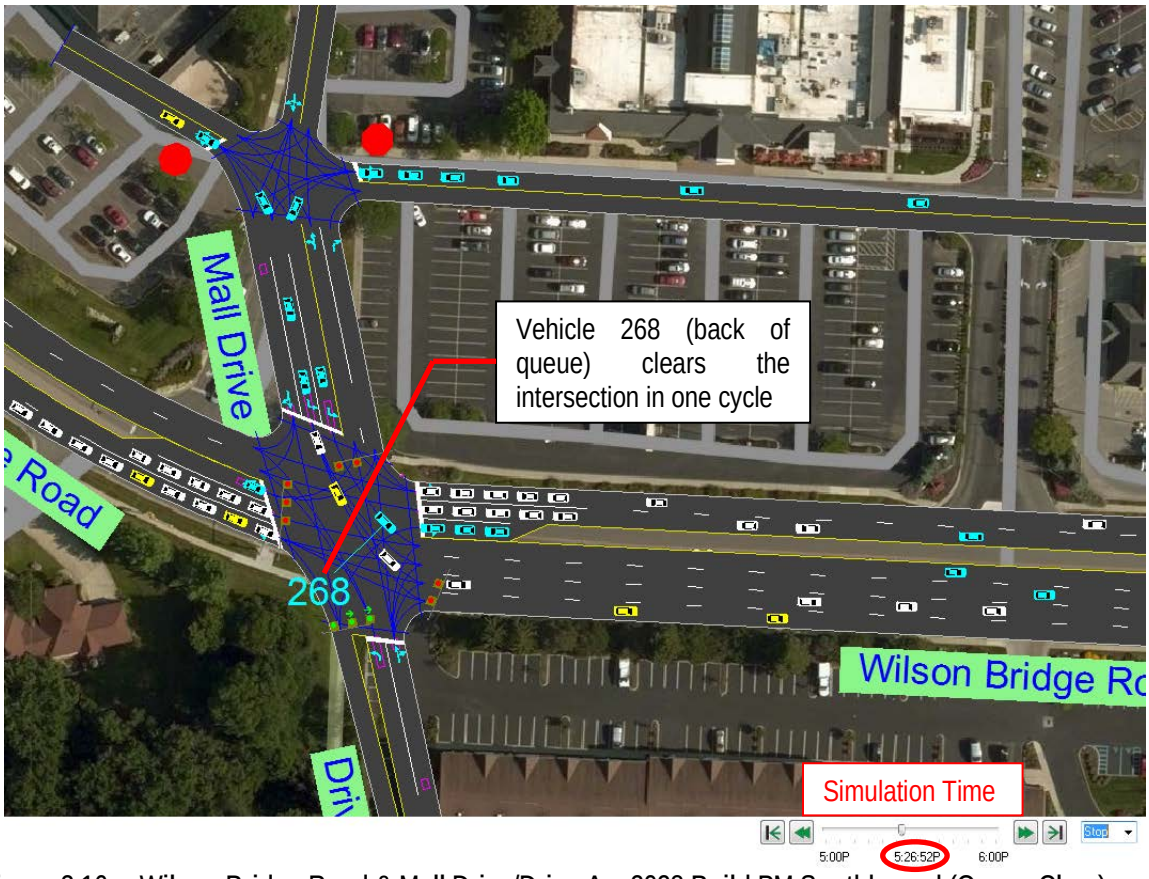


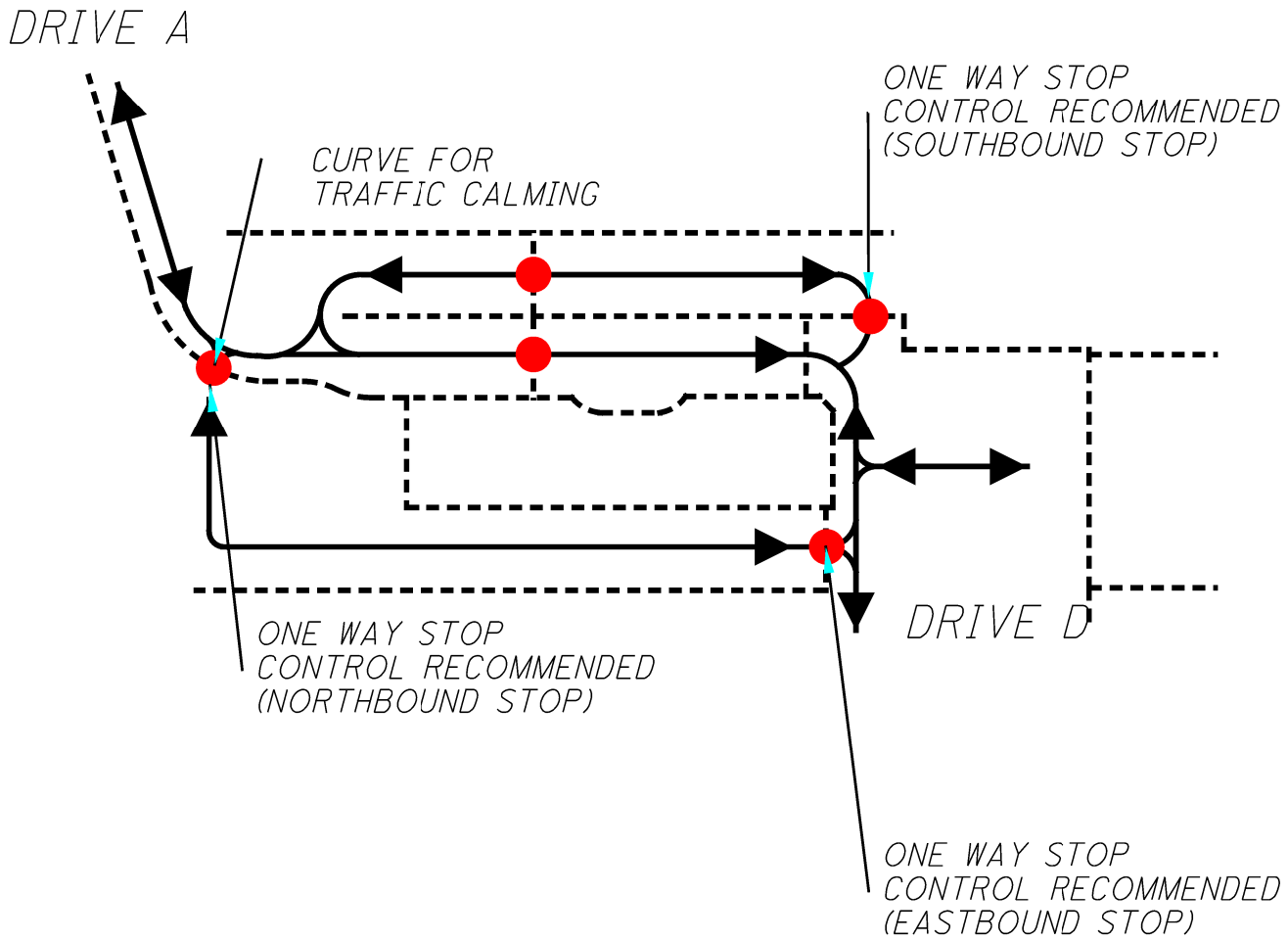
Figure 3.16 Wilson Bridge Road & Mall Drive/Drive A – 2028 Build PM Southbound (Queue Clear)

3.4 Internal Site Circulation

A qualitative review of internal site circulation was conducted in order to address traffic conflict points, internal safety concerns, and internal infrastructure needs. Figure 3.15 provides the higher volume pedestrian corridors, higher volume vehicular movements and potential conflict points. The results of the review indicate the following:

- Traffic calming measures (i.e., the roadway curve just south of the Drive A entrance) will help to maintain safe internal vehicle speeds
- Vehicle/pedestrian conflicts can be managed by stop or yield controlled approaches and pavement markings.
- An internal network of sidewalks is provided to reduce conflicts.

Recommendations for traffic control (stop signs) are provided in Figure 3.15. Additionally, painted or treated (raised crosswalks or decorative stamped concrete) can be used at pedestrian crossing locations.



LEGEND

TRAFFIC CONFLICT LOCATION

PEDESTRIAN TRAFFIC FLOW

VEHICULAR TRAFFIC FLOW

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FIGURE 3.17

INTERNAL SITE CIRCULATION

$DATE$

$FILEL$

4.0 CONCLUSIONS AND RECOMMENDATIONS

General

This traffic impact study was conducted to determine what impacts, if any, a proposed, mixed-use development in Worthington, Ohio would have on the adjacent roadway network. The development, proposed in the southwest quadrant of the intersection of US-23 (N. High Street) and Wilson Bridge Road is expected to include a hotel, restaurants, and office space. To determine the impacts of the proposed development, this study included a traffic analysis of No Build conditions (analysis in a future year under the assumption that the development does *not* occur), trip generation (based on ITE guidance), trip distribution, and an analysis of Build conditions (analysis in a future year under the assumption that the development *does* occur). This study was completed based on standards and guidelines of ODOT's State Highway Access Management Manual (SHAMM) and Location & Design Manual (L & D), as well as guidelines set forth by the City of Worthington.

Summary of Proposed Roadway Changes

The project proposes a signalized, main entrance along Wilson Bridge Road. This entrance will be created by re-aligning the north leg (Mall Drive) with a new, fourth leg (site drive) under signal control. Two (2) existing site drives will be closed, with one driveway being closed (1) along Wilson Bridge Road (Drive B) and a second closed along US-23 (N. High Street) (Drive C). A fourth site drive along Caren Avenue (Drive D) will be retained. The reduction in site access locations will increase safety and improve operations by allowing vehicles to have a signalized point of ingress and egress near the US-23 (N. High Street) & I-270 interchange.

The signalized, main entrance along Wilson Bridge Road will include a new westbound left turn lane for ingress to the proposed development site. Based on a queueing analysis, this turn lane should be constructed with a storage length of 100 feet. The new left turn lane can be constructed by restriping of existing pavement and is not expected to interfere with eastbound dual left turn lane storage at the upstream intersection (N. High Street & Wilson Bridge Road).

Trip Generation

The proposed development is expected to replace an existing hotel which generates 82 and 129 trips during the AM and PM peak hours respectively. These trips were removed from future traffic projections for traffic analyses. The proposed development is projected to add 199 and 236 trips during the AM and PM peak hours respectively for a net increase in peak hour trips for the site of 117 during the AM peak hour and 107 during the PM peak hour.

Traffic Analyses

Based on the results of the analysis of Build conditions, negligible impacts were observed at the intersections evaluated. While traffic operations at study area intersections are not degraded by the increase in traffic from the proposed development, the following improvements are proposed to improve safety and accessibility within the study area:

Wilson Bridge Road & Mall Drive/Drive A

- Re-alignment of the Mall Drive approach to Wilson Bridge Road for connection to Drive A
- Installation of a 100 foot westbound left turn lane (through restriping within existing pavement) along Wilson Bridge Road at Drive A
- Traffic signal modifications to accommodate new northbound approach

US-23 (N. High Street) & Caren Avenue

- Upgrade traffic signal to a mast arm configuration
- Improvements to pedestrian infrastructure

.

APPENDIX A
TRAFFIC COUNTS

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Int: W Wilson Bridge Rd & Mall Entrance
Counted By: MJL
Day: Wednesday
Weather: Sunny

File Name : Wilson Bridge Rd Mall Ent
Site Code : 00000000
Start Date : 12/16/2015
Page No : 1

Groups Printed- Cars - Trucks

	MALL ENTRANCE From North					W WILSON BRIDGE RD From East					MALL ENTRANCE From South					W WILSON BRIDGE RD From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	8	0	17	0	25	5	90	0	0	95	0	0	0	0	0	0	112	1	0	113	233
07:15 AM	1	0	16	0	17	4	97	0	1	102	0	0	0	0	0	0	172	7	0	179	298
07:30 AM	1	0	30	0	31	10	157	0	0	167	0	0	0	0	0	0	194	10	1	205	403
07:45 AM	4	0	25	0	29	10	170	0	0	180	0	0	0	1	1	0	249	7	2	258	468
Total	14	0	88	0	102	29	514	0	1	544	0	0	0	1	1	0	727	25	3	755	1402
08:00 AM	0	0	29	0	29	9	152	0	0	161	0	0	0	0	0	0	227	9	0	236	426
08:15 AM	3	0	32	0	35	13	115	0	0	128	0	0	0	2	2	0	171	13	0	184	349
08:30 AM	6	0	19	0	25	9	144	0	0	153	0	0	0	0	0	0	173	11	0	184	362
08:45 AM	10	0	38	0	48	12	92	0	0	104	0	0	0	0	0	0	170	11	0	181	333
Total	19	0	118	0	137	43	503	0	0	546	0	0	0	2	2	0	741	44	0	785	1470
*** BREAK ***																					
04:00 PM	16	0	85	0	101	8	156	0	0	164	0	0	0	0	0	0	163	9	0	172	437
04:15 PM	13	0	76	0	89	4	149	0	0	153	0	0	0	1	1	0	160	19	0	179	422
04:30 PM	16	0	98	0	114	10	145	0	0	155	0	0	0	5	5	0	205	11	1	217	491
04:45 PM	17	0	93	1	111	6	171	0	0	177	0	0	0	2	2	0	203	15	2	220	510
Total	62	0	352	1	415	28	621	0	0	649	0	0	0	8	8	0	731	54	3	788	1860
05:00 PM	13	0	114	0	127	7	167	0	0	174	0	0	0	0	0	0	260	10	0	270	571
05:15 PM	12	0	94	0	106	11	189	0	0	200	0	0	0	0	0	0	177	18	1	196	502
05:30 PM	6	0	82	0	88	13	150	0	0	163	0	0	0	0	0	0	176	19	0	195	446
05:45 PM	11	0	73	0	84	13	145	0	0	158	0	0	0	0	0	0	202	21	0	223	465
Total	42	0	363	0	405	44	651	0	0	695	0	0	0	0	0	0	815	68	1	884	1984
Grand Total	137	0	921	1	1059	144	2289	0	1	2434	0	0	0	11	11	0	3014	191	7	3212	6716
Apprch %	12.9	0	87	0.1		5.9	94	0	0		0	0	0	100		0	93.8	5.9	0.2		
Total %	2	0	13.7	0	15.8	2.1	34.1	0	0	36.2	0	0	0	0.2	0.2	0	44.9	2.8	0.1	47.8	
Cars	136	0	919	1	1056	144	2266	0	1	2411	0	0	0	11	11	0	2964	191	7	3162	6640
% Cars	99.3	0	99.8	100	99.7	100	99	0	100	99.1	0	0	0	100	100	0	98.3	100	100	98.4	98.9
Trucks	1	0	2	0	3	0	23	0	0	23	0	0	0	0	0	0	50	0	0	50	76
% Trucks	0.7	0	0.2	0	0.3	0	1	0	0	0.9	0	0	0	0	0	0	1.7	0	0	1.6	1.1

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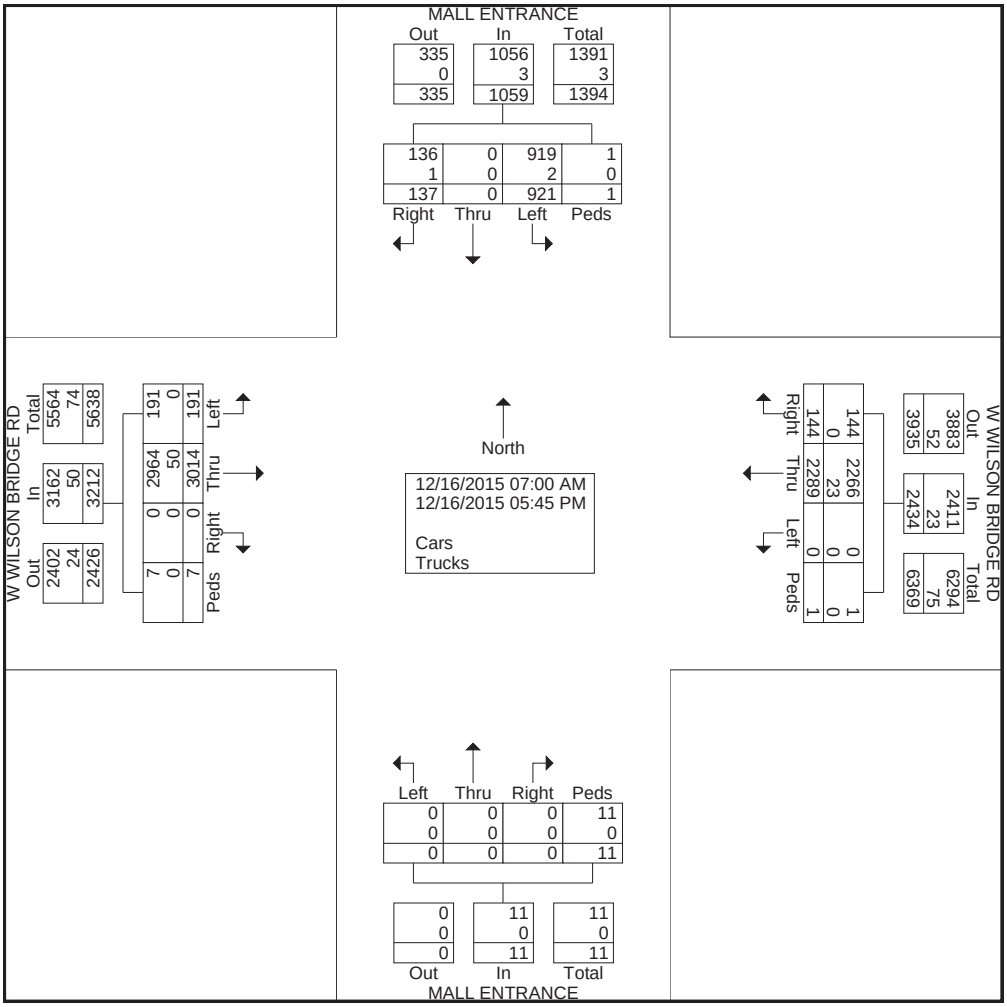
File Name : Wilson Bridge Rd Mall Ent
Site Code : 00000000
Start Date : 12/16/2015
Page No : 2



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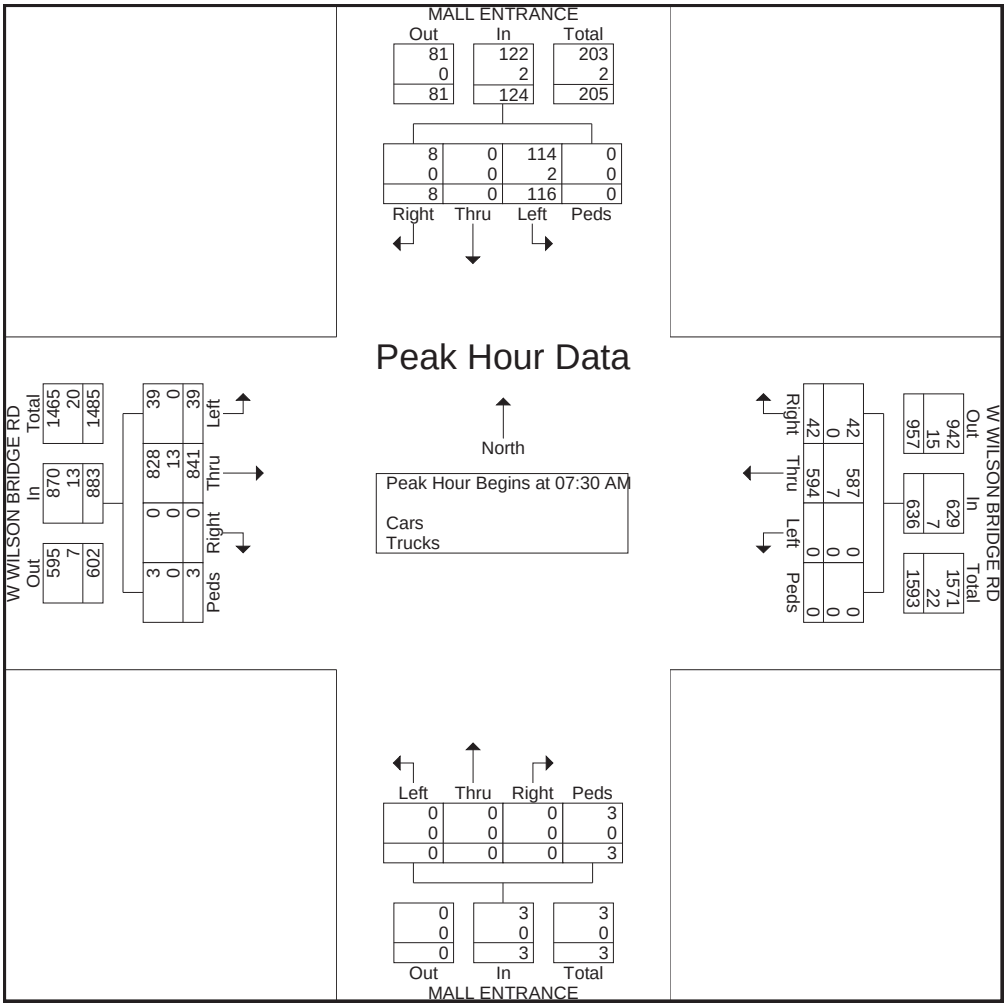
File Name : Wilson Bridge Rd Mall Ent
Site Code : 00000000
Start Date : 12/16/2015
Page No : 3

	MALL ENTRANCE From North					W WILSON BRIDGE RD From East					MALL ENTRANCE From South					W WILSON BRIDGE RD From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	1	0	30	0	31	10	157	0	0	167	0	0	0	0	0	0	194	10	1	205	403
07:45 AM	4	0	25	0	29	10	170	0	0	180	0	0	0	1	1	0	249	7	2	258	468
08:00 AM	0	0	29	0	29	9	152	0	0	161	0	0	0	0	0	0	227	9	0	236	426
08:15 AM	3	0	32	0	35	13	115	0	0	128	0	0	0	2	2	0	171	13	0	184	349
Total Volume	8	0	116	0	124	42	594	0	0	636	0	0	0	3	3	0	841	39	3	883	1646
% App. Total	6.5	0	93.5	0		6.6	93.4	0	0		0	0	0	100		0	95.2	4.4	0.3		
PHF	.500	.000	.906	.000	.886	.808	.874	.000	.000	.883	.000	.000	.000	.375	.375	.000	.844	.750	.375	.856	.879
Cars	8	0	114	0	122	42	587	0	0	629	0	0	0	3	3	0	828	39	3	870	1624
% Cars	100	0	98.3	0	98.4	100	98.8	0	0	98.9	0	0	0	100	100	0	98.5	100	100	98.5	98.7
Trucks	0	0	2	0	2	0	7	0	0	7	0	0	0	0	0	0	13	0	0	13	22
% Trucks	0	0	1.7	0	1.6	0	1.2	0	0	1.1	0	0	0	0	0	0	1.5	0	0	1.5	1.3



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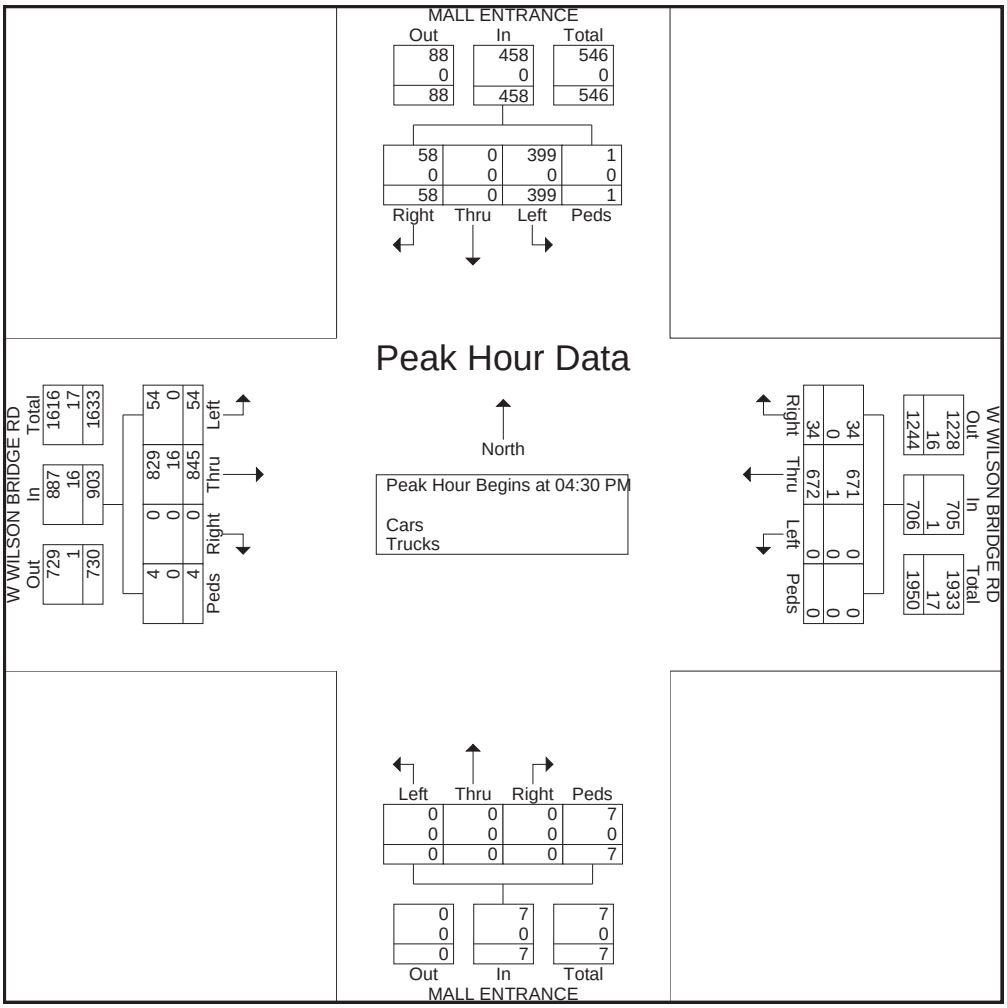
File Name : Wilson Bridge Rd Mall Ent
Site Code : 00000000
Start Date : 12/16/2015
Page No : 4

	MALL ENTRANCE From North					W WILSON BRIDGE RD From East					MALL ENTRANCE From South					W WILSON BRIDGE RD From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	16	0	98	0	114	10	145	0	0	155	0	0	0	5	5	0	205	11	1	217	491
04:45 PM	17	0	93	1	111	6	171	0	0	177	0	0	0	2	2	0	203	15	2	220	510
05:00 PM	13	0	114	0	127	7	167	0	0	174	0	0	0	0	0	0	260	10	0	270	571
05:15 PM	12	0	94	0	106	11	189	0	0	200	0	0	0	0	0	0	177	18	1	196	502
Total Volume	58	0	399	1	458	34	672	0	0	706	0	0	0	7	7	0	845	54	4	903	2074
% App. Total	12.7	0	87.1	0.2		4.8	95.2	0	0		0	0	0	100		0	93.6	6	0.4		
PHF	.853	.000	.875	.250	.902	.773	.889	.000	.000	.883	.000	.000	.000	.350	.350	.000	.813	.750	.500	.836	.908
Cars	58	0	399	1	458	34	671	0	0	705	0	0	0	7	7	0	829	54	4	887	2057
% Cars	100	0	100	100	100	100	99.9	0	0	99.9	0	0	0	100	100	0	98.1	100	100	98.2	99.2
Trucks	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	16	0	0	16	17
% Trucks	0	0	0	0	0	0	0.1	0	0	0.1	0	0	0	0	0	0	1.9	0	0	1.8	0.8



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Int: W Wilson Bridge Rd & Drive A
Counted By: MJL
Day: Thursday
Weather: Sunny

File Name : Wilson Bridge Rd Drive A
Site Code : 00000000
Start Date : 12/17/2015
Page No : 1

Groups Printed- Cars - Trucks

	DRIVE A From North					W WILSON BRIDGE RD From East					DRIVE A From South					W WILSON BRIDGE RD From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	1	0	0	0	1	4
07:15 AM	0	0	0	0	0	0	0	0	0	0	3	0	2	0	5	0	0	0	0	0	5
07:30 AM	0	0	0	0	0	0	0	0	0	0	2	0	1	0	3	1	0	0	0	1	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	2
Total	0	0	0	0	0	0	0	0	0	0	9	0	3	0	12	3	0	0	0	3	15
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	3	3
08:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	2
08:30 AM	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	2
08:45 AM	0	0	0	0	0	0	0	0	0	0	5	0	1	0	6	1	0	0	0	1	7
Total	0	0	0	0	0	0	0	1	0	1	7	0	1	0	8	3	0	0	2	5	14
*** BREAK ***																					
04:00 PM	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	2	0	0	0	2	4
04:15 PM	0	0	0	0	0	0	0	1	0	1	2	0	2	0	4	2	0	0	0	2	7
04:30 PM	0	0	0	0	0	0	0	4	0	4	3	0	0	0	3	0	0	0	0	0	7
04:45 PM	0	0	0	0	0	0	0	4	0	4	1	0	1	0	2	2	0	0	0	2	8
Total	0	0	0	0	0	0	0	10	0	10	7	0	3	0	10	6	0	0	0	6	26
05:00 PM	0	0	0	0	0	0	0	2	0	2	1	0	0	0	1	1	0	0	0	1	4
05:15 PM	0	0	0	0	0	0	0	2	0	2	2	0	3	0	5	3	0	0	0	3	10
05:30 PM	0	0	0	0	0	0	0	4	0	4	3	0	2	0	5	1	0	0	0	1	10
05:45 PM	0	0	0	0	0	0	0	5	0	5	1	0	2	0	3	3	0	0	0	3	11
Total	0	0	0	0	0	0	0	13	0	13	7	0	7	0	14	8	0	0	0	8	35
Grand Total	0	0	0	0	0	0	0	24	0	24	30	0	14	0	44	20	0	0	2	22	90
Apprch %	0	0	0	0		0	0	100	0		68.2	0	31.8	0		90.9	0	0	9.1		
Total %	0	0	0	0	0	0	0	26.7	0	26.7	33.3	0	15.6	0	48.9	22.2	0	0	2.2	24.4	
Cars	0	0	0	0	0	0	0	24	0	24	29	0	14	0	43	20	0	0	2	22	89
% Cars	0	0	0	0	0	0	0	100	0	100	96.7	0	100	0	97.7	100	0	0	100	100	98.9
Trucks	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
% Trucks	0	0	0	0	0	0	0	0	0	0	3.3	0	0	0	2.3	0	0	0	0	0	1.1

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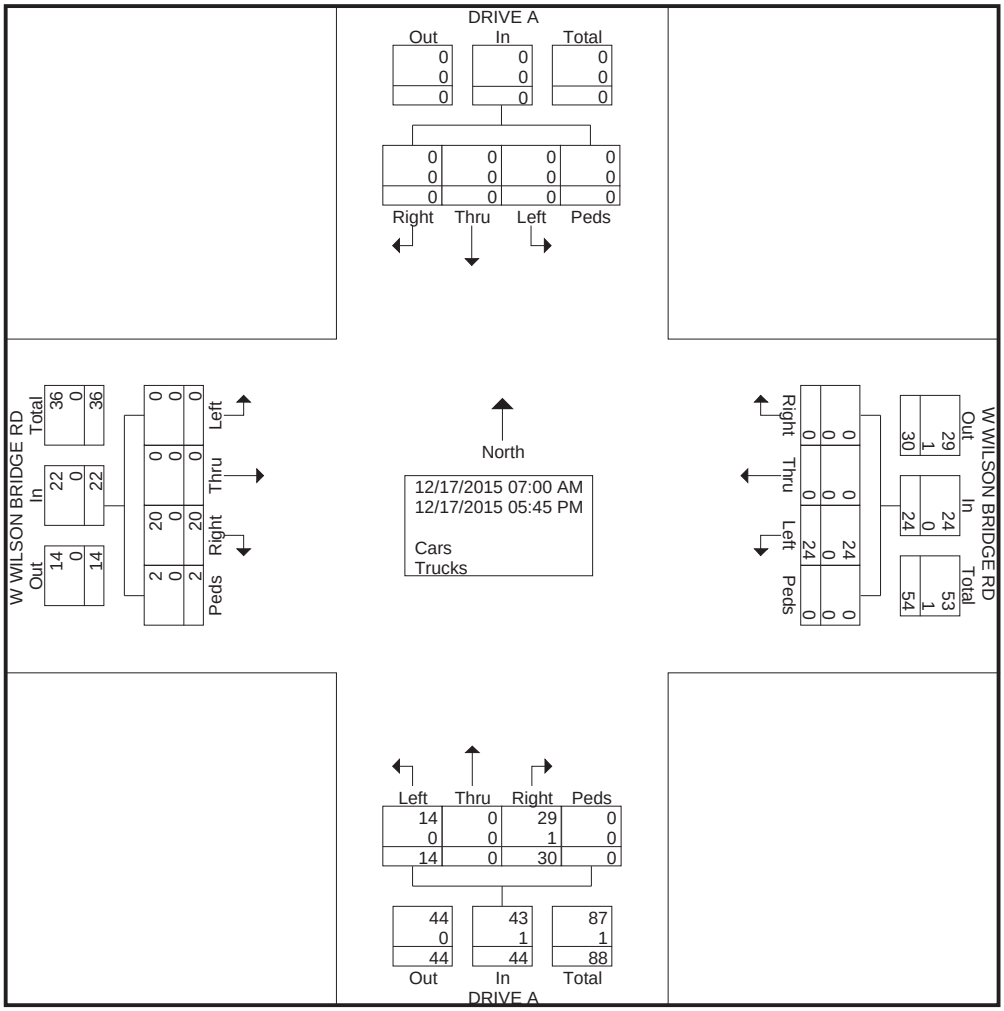
File Name : Wilson Bridge Rd Drive A
Site Code : 00000000
Start Date : 12/17/2015
Page No : 2



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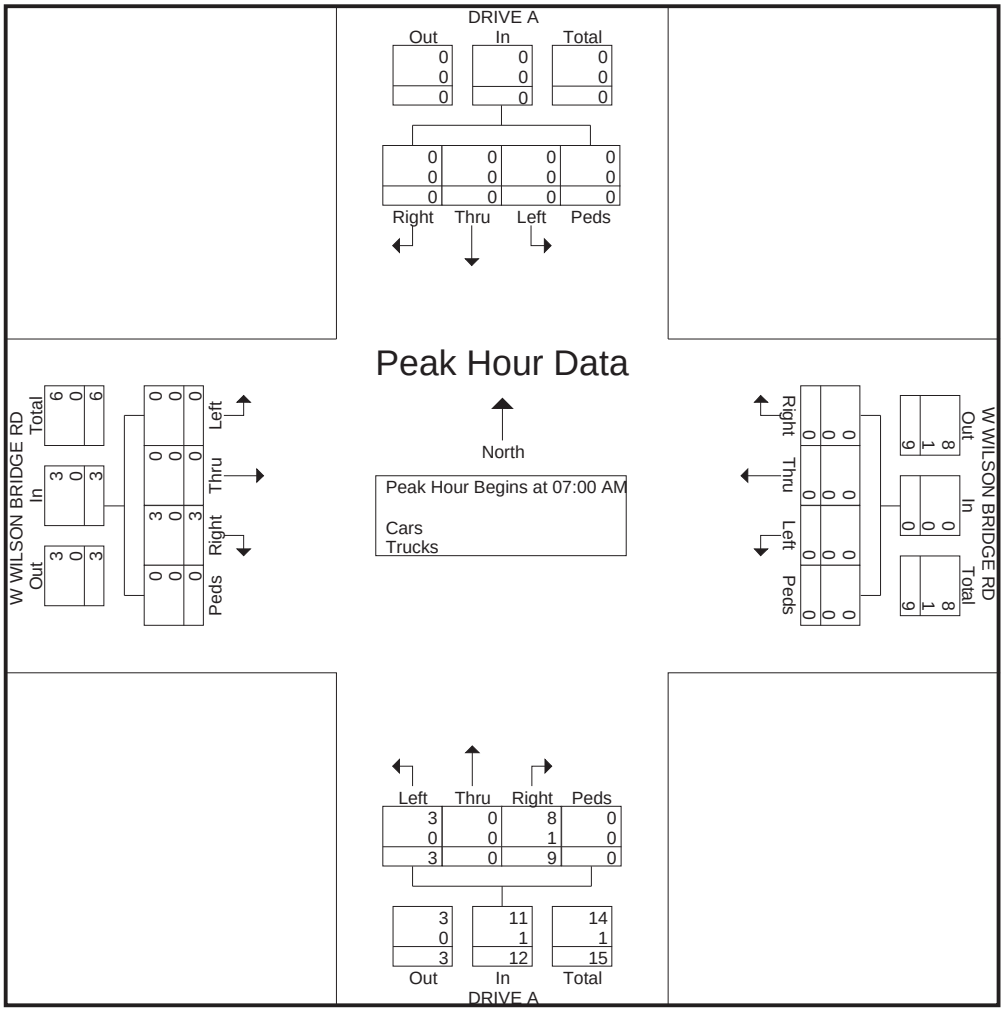
File Name : Wilson Bridge Rd Drive A
Site Code : 00000000
Start Date : 12/17/2015
Page No : 3

	DRIVE A From North					W WILSON BRIDGE RD From East					DRIVE A From South					W WILSON BRIDGE RD From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	1	0	0	0	1	4
07:15 AM	0	0	0	0	0	0	0	0	0	0	3	0	2	0	5	0	0	0	0	0	5
07:30 AM	0	0	0	0	0	0	0	0	0	0	2	0	1	0	3	1	0	0	0	1	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	2
Total Volume	0	0	0	0	0	0	0	0	0	0	9	0	3	0	12	3	0	0	0	3	15
% App. Total	0	0	0	0		0	0	0	0		75	0	25	0		100	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.750	.000	.375	.000	.600	.750	.000	.000	.000	.750	.750
Cars	0	0	0	0	0	0	0	0	0	0	8	0	3	0	11	3	0	0	0	3	14
% Cars	0	0	0	0	0	0	0	0	0	0	88.9	0	100	0	91.7	100	0	0	0	100	93.3
Trucks	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
% Trucks	0	0	0	0	0	0	0	0	0	0	11.1	0	0	0	8.3	0	0	0	0	0	6.7



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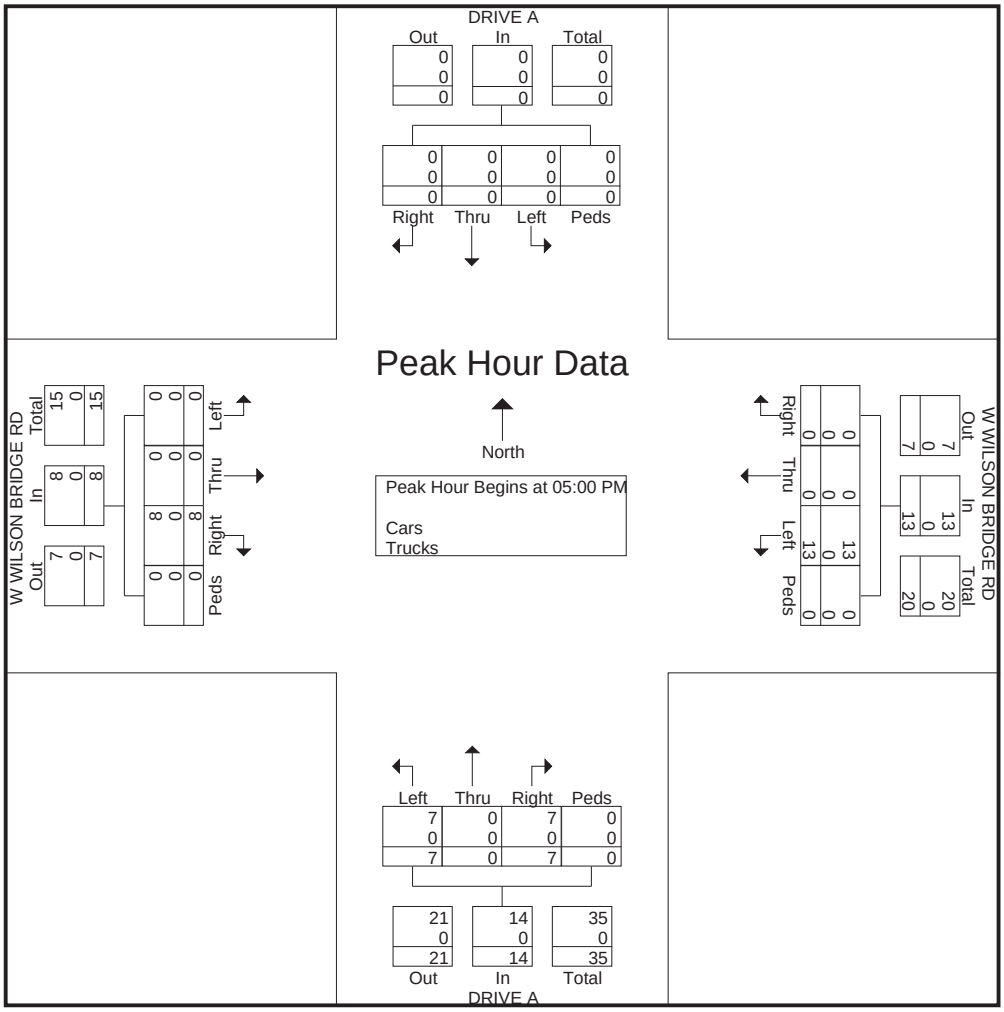
File Name : Wilson Bridge Rd Drive A
Site Code : 00000000
Start Date : 12/17/2015
Page No : 4

	DRIVE A From North					W WILSON BRIDGE RD From East					DRIVE A From South					W WILSON BRIDGE RD From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	0	0	0	0	0	0	2	0	2	1	0	0	0	1	1	0	0	0	1	4
05:15 PM	0	0	0	0	0	0	0	2	0	2	2	0	3	0	5	3	0	0	0	3	10
05:30 PM	0	0	0	0	0	0	0	4	0	4	3	0	2	0	5	1	0	0	0	1	10
05:45 PM	0	0	0	0	0	0	0	5	0	5	1	0	2	0	3	3	0	0	0	3	11
Total Volume	0	0	0	0	0	0	0	13	0	13	7	0	7	0	14	8	0	0	0	8	35
% App. Total	0	0	0	0		0	0	100	0		50	0	50	0		100	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.650	.000	.650	.583	.000	.583	.000	.700	.667	.000	.000	.000	.667	.795
Cars	0	0	0	0	0	0	0	13	0	13	7	0	7	0	14	8	0	0	0	8	35
% Cars	0	0	0	0	0	0	0	100	0	100	100	0	100	0	100	100	0	0	0	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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Int: W Wilson Bridge Rd & Drive B
Counted By: MJL
Day: Thursday
Weather: Sunny

File Name : Wilson Bridge Rd Drive B
Site Code : 00000000
Start Date : 12/17/2015
Page No : 1

Groups Printed- Cars - Trucks - Drive B

	DRIVE B From North					W WILSON BRIDGE RD From East					DRIVE B From South					W WILSON BRIDGE RD From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	2
Total	0	0	0	0	0	0	0	1	0	1	4	0	0	0	4	0	0	0	0	0	5
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
08:30 AM	0	0	0	0	0	0	0	7	0	7	4	0	0	0	4	0	0	0	0	0	11
08:45 AM	0	0	0	0	0	0	0	3	0	3	1	0	2	0	3	0	0	0	0	0	6
Total	0	0	0	0	0	0	0	10	0	10	5	0	3	0	8	0	0	0	2	2	20
*** BREAK ***																					
04:00 PM	0	0	0	0	0	0	0	1	0	1	4	0	0	0	4	0	0	0	0	0	5
04:15 PM	0	0	0	0	0	0	0	3	0	3	2	0	1	0	3	2	0	0	0	2	8
04:30 PM	0	0	0	0	0	0	0	2	0	2	1	0	0	0	1	0	0	0	0	0	3
04:45 PM	0	0	0	0	0	0	0	2	0	2	1	0	1	0	2	0	0	0	0	0	4
Total	0	0	0	0	0	0	0	8	0	8	8	0	2	0	10	2	0	0	0	2	20
05:00 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	3
05:15 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	1	2
05:30 PM	0	0	0	0	0	0	0	4	0	4	1	0	0	0	1	0	0	0	0	0	5
05:45 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	2
Total	0	0	0	0	0	0	0	5	0	5	6	0	0	0	6	1	0	0	0	1	12
Grand Total	0	0	0	0	0	0	0	24	0	24	23	0	5	0	28	3	0	0	2	5	57
Apprch %	0	0	0	0		0	0	100	0		82.1	0	17.9	0		60	0	0	40		
Total %	0	0	0	0	0	0	0	42.1	0	42.1	40.4	0	8.8	0	49.1	5.3	0	0	3.5	8.8	
Cars	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
% Cars	0	0	0	0	0	0	0	4.2	0	4.2	0	0	0	0	0	0	0	0	0	0	1.8
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Drive B	0	0	0	0	0	0	0	23	0	23	23	0	5	0	28	3	0	0	2	5	56
% Drive B	0	0	0	0	0	0	0	95.8	0	95.8	100	0	100	0	100	100	0	0	100	100	98.2

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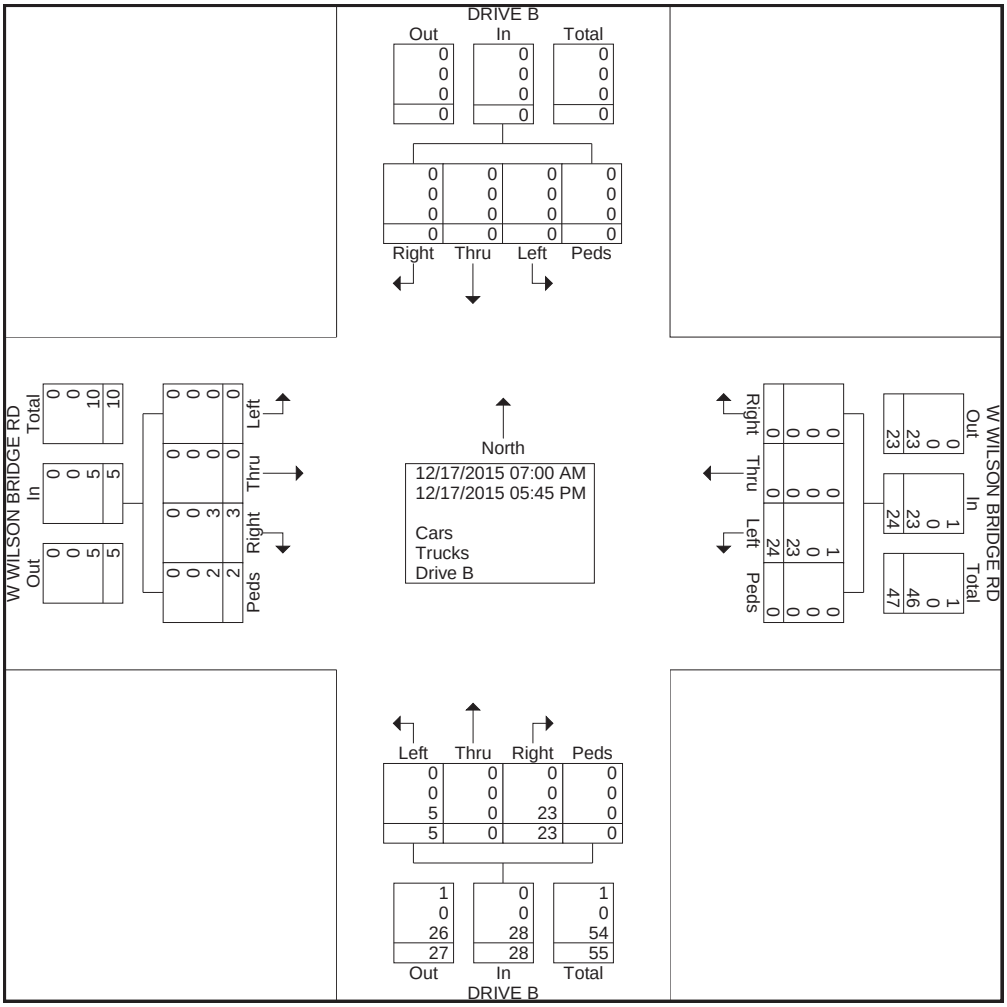
File Name : Wilson Bridge Rd Drive B
Site Code : 00000000
Start Date : 12/17/2015
Page No : 2



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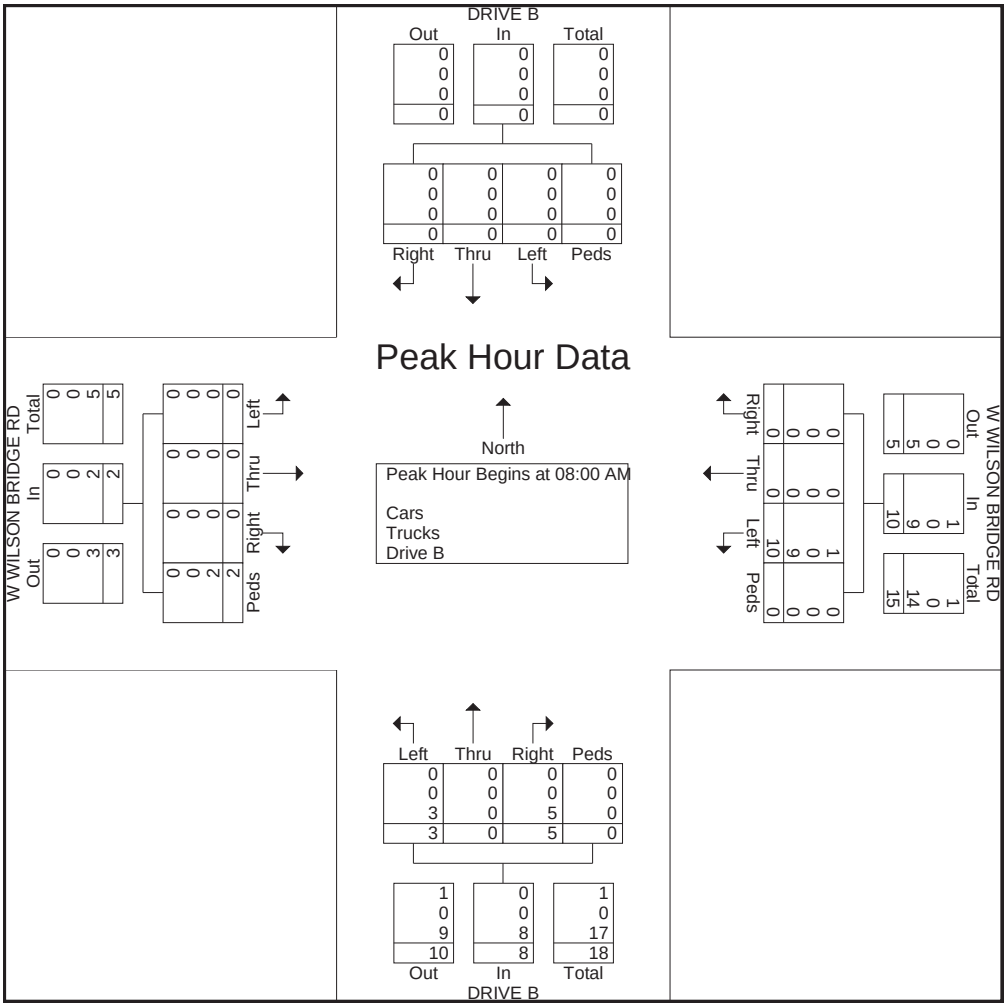
File Name : Wilson Bridge Rd Drive B
Site Code : 00000000
Start Date : 12/17/2015
Page No : 3

	DRIVE B From North					W WILSON BRIDGE RD From East					DRIVE B From South					W WILSON BRIDGE RD From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
08:30 AM	0	0	0	0	0	0	0	7	0	7	4	0	0	0	4	0	0	0	0	0	11
08:45 AM	0	0	0	0	0	0	0	3	0	3	1	0	2	0	3	0	0	0	0	0	6
Total Volume	0	0	0	0	0	0	0	10	0	10	5	0	3	0	8	0	0	0	2	2	20
% App. Total	0	0	0	0		0	0	100	0		62.5	0	37.5	0		0	0	0	100		
PHF	.000	.000	.000	.000	.000	.000	.000	.357	.000	.357	.313	.000	.375	.000	.500	.000	.000	.000	.250	.250	.455
Cars	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
% Cars	0	0	0	0	0	0	0	10.0	0	10.0	0	0	0	0	0	0	0	0	0	0	5.0
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Drive B	0	0	0	0	0	0	0	9	0	9	5	0	3	0	8	0	0	0	2	2	19
% Drive B	0	0	0	0	0	0	0	90.0	0	90.0	100	0	100	0	100	0	0	0	100	100	95.0



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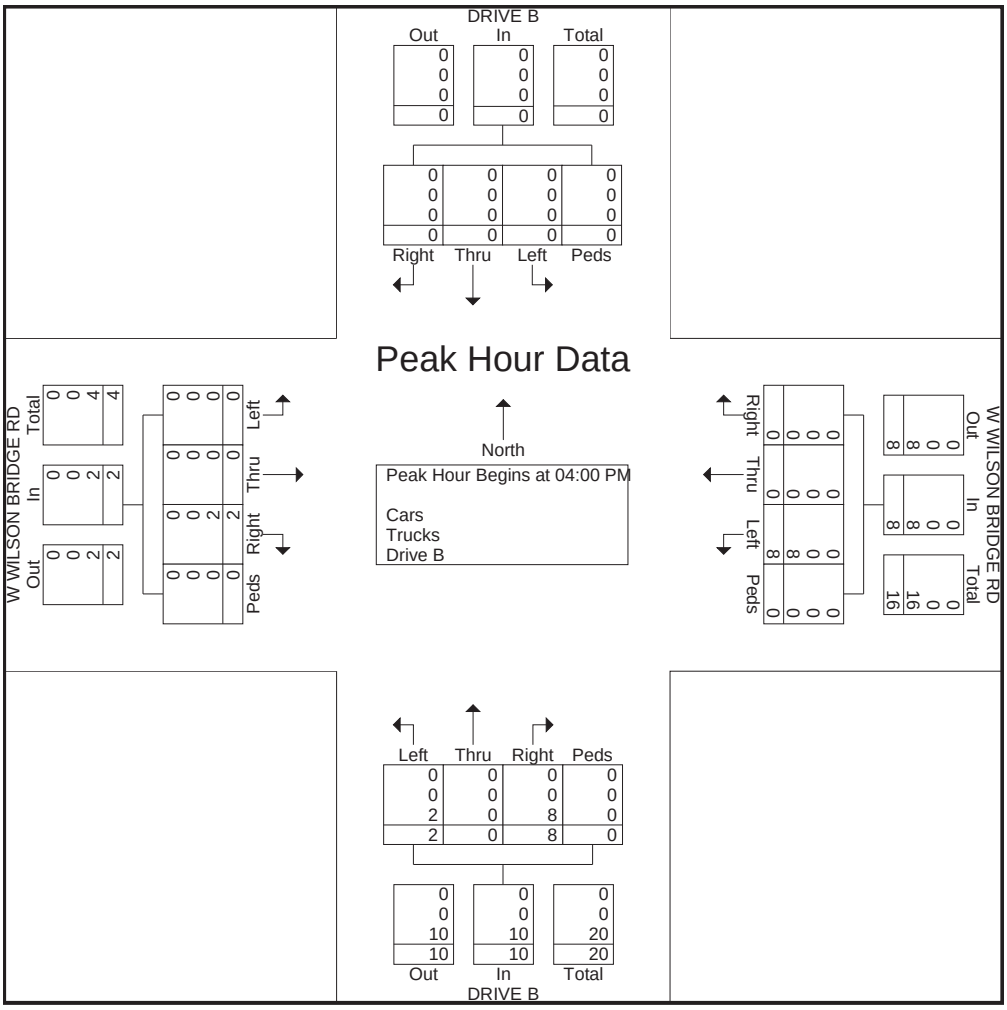
File Name : Wilson Bridge Rd Drive B
Site Code : 00000000
Start Date : 12/17/2015
Page No : 4

	DRIVE B From North					W WILSON BRIDGE RD From East					DRIVE B From South					W WILSON BRIDGE RD From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	1	0	1	4	0	0	0	4	0	0	0	0	0	5
04:15 PM	0	0	0	0	0	0	0	3	0	3	2	0	1	0	3	2	0	0	0	2	8
04:30 PM	0	0	0	0	0	0	0	2	0	2	1	0	0	0	1	0	0	0	0	0	3
04:45 PM	0	0	0	0	0	0	0	2	0	2	1	0	1	0	2	0	0	0	0	0	4
Total Volume	0	0	0	0	0	0	0	8	0	8	8	0	2	0	10	2	0	0	0	2	20
% App. Total	0	0	0	0		0	0	100	0		80	0	20	0		100	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.667	.000	.667	.500	.000	.500	.000	.625	.250	.000	.000	.000	.250	.625
Cars	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Cars	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Drive B	0	0	0	0	0	0	0	8	0	8	8	0	2	0	10	2	0	0	0	2	20
% Drive B	0	0	0	0	0	0	0	100	0	100	100	0	100	0	100	100	0	0	0	100	100



Mannik & Smith Group Inc.
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Int: W Wilson Bridge Rd & N High St
Counted By: MJL & MSW
Day: Tuesday
Weather: Sunny

File Name : Wilson Bridge Rd High Street Combined
Site Code : 00000000
Start Date : 12/15/2015
Page No : 1

Groups Printed- Cars - Trucks

	N HIGH ST From North					W WILSON BRIDGE RD From East					N HIGH ST From South					W WILSON BRIDGE RD From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	56	101	73	0	230	54	44	25	0	123	18	84	24	0	126	18	37	54	0	109	588
07:15 AM	103	139	102	0	344	73	44	33	0	150	34	120	25	0	179	30	51	67	0	148	821
07:30 AM	121	138	117	0	376	77	60	18	0	155	30	139	23	0	192	43	92	108	1	244	967
07:45 AM	138	144	119	0	401	70	79	32	0	181	41	157	49	1	248	40	94	94	2	230	1060
Total	418	522	411	0	1351	274	227	108	0	609	123	500	121	1	745	131	274	323	3	731	3436
08:00 AM	128	140	139	3	410	72	77	34	0	183	48	182	49	0	279	64	106	79	0	249	1121
08:15 AM	87	129	114	0	330	66	62	35	0	163	47	142	34	0	223	51	95	96	0	242	958
08:30 AM	109	104	100	3	316	80	38	31	0	149	54	126	30	0	210	40	79	72	0	191	866
08:45 AM	89	153	139	4	385	62	64	33	0	159	49	125	42	0	216	50	68	71	0	189	949
Total	413	526	492	10	1441	280	241	133	0	654	198	575	155	0	928	205	348	318	0	871	3894
*** BREAK ***																					
04:00 PM	95	114	62	1	272	134	65	35	0	234	27	182	58	0	267	57	54	124	1	236	1009
04:15 PM	88	142	47	4	281	108	74	34	0	216	26	149	63	0	238	60	69	107	0	236	971
04:30 PM	65	114	74	3	256	125	72	42	0	239	27	192	55	0	274	56	58	135	2	251	1020
04:45 PM	88	127	41	0	256	88	50	34	0	172	13	129	66	2	210	38	77	159	0	274	912
Total	336	497	224	8	1065	455	261	145	0	861	93	652	242	2	989	211	258	525	3	997	3912
05:00 PM	87	124	44	3	258	153	68	21	2	244	13	101	51	0	165	62	99	190	0	351	1018
05:15 PM	123	126	47	1	297	144	86	34	0	264	17	171	84	0	272	50	67	169	1	287	1120
05:30 PM	97	136	39	0	272	123	89	38	0	250	24	122	68	0	214	55	76	136	0	267	1003
05:45 PM	94	112	62	1	269	82	79	34	0	195	21	132	45	0	198	49	62	113	2	226	888
Total	401	498	192	5	1096	502	322	127	2	953	75	526	248	0	849	216	304	608	3	1131	4029
Grand Total	1568	2043	1319	23	4953	1511	1051	513	2	3077	489	2253	766	3	3511	763	1184	1774	9	3730	15271
Apprch %	31.7	41.2	26.6	0.5		49.1	34.2	16.7	0.1		13.9	64.2	21.8	0.1		20.5	31.7	47.6	0.2		
Total %	10.3	13.4	8.6	0.2	32.4	9.9	6.9	3.4	0	20.1	3.2	14.8	5	0	23	5	7.8	11.6	0.1	24.4	
Cars	1568	2043	1319	23	4953	1494	1037	507	2	3040	483	2197	758	3	3441	763	1183	1774	9	3729	15163
% Cars	100	100	100	100	100	98.9	98.7	98.8	100	98.8	98.8	97.5	99	100	98	100	99.9	100	100	100	99.3
Trucks	0	0	0	0	0	17	14	6	0	37	6	56	8	0	70	0	1	0	0	1	108
% Trucks	0	0	0	0	0	1.1	1.3	1.2	0	1.2	1.2	2.5	1	0	2	0	0.1	0	0	0	0.7

Mannik & Smith Group Inc.
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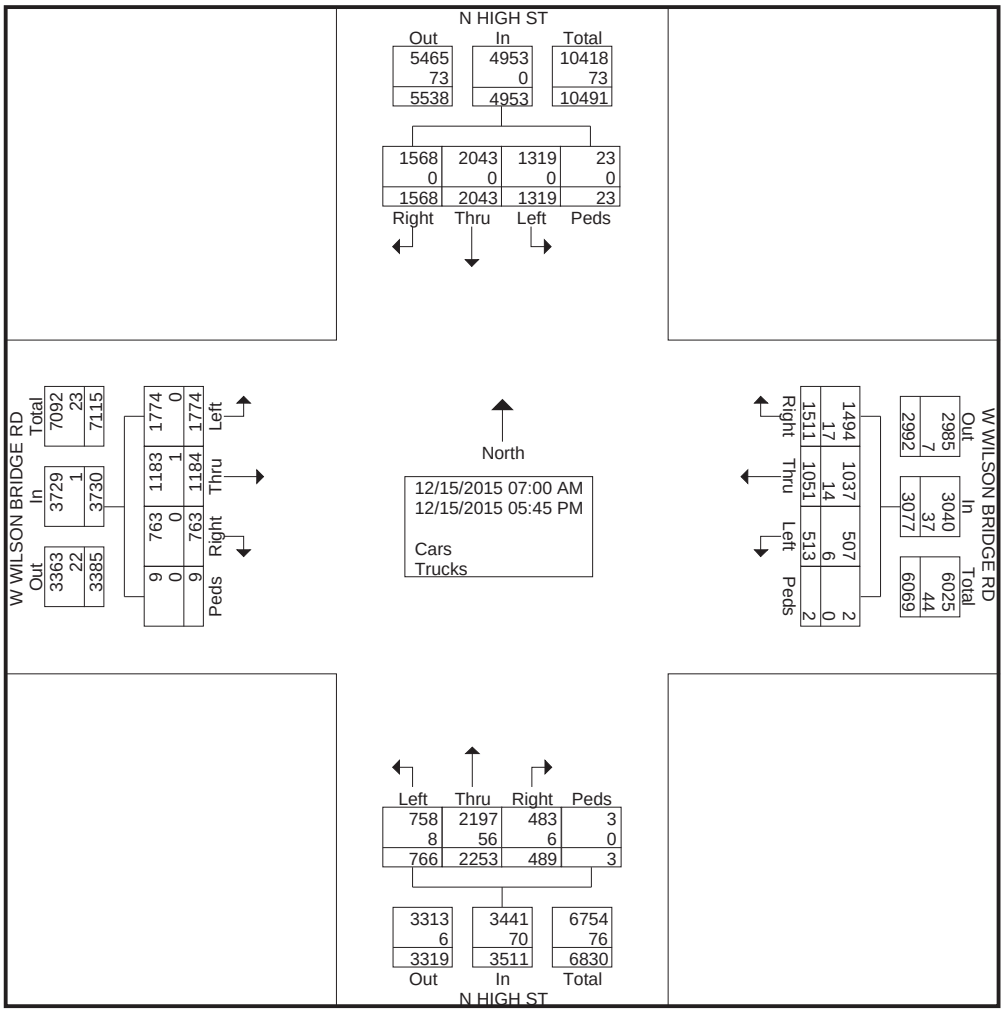
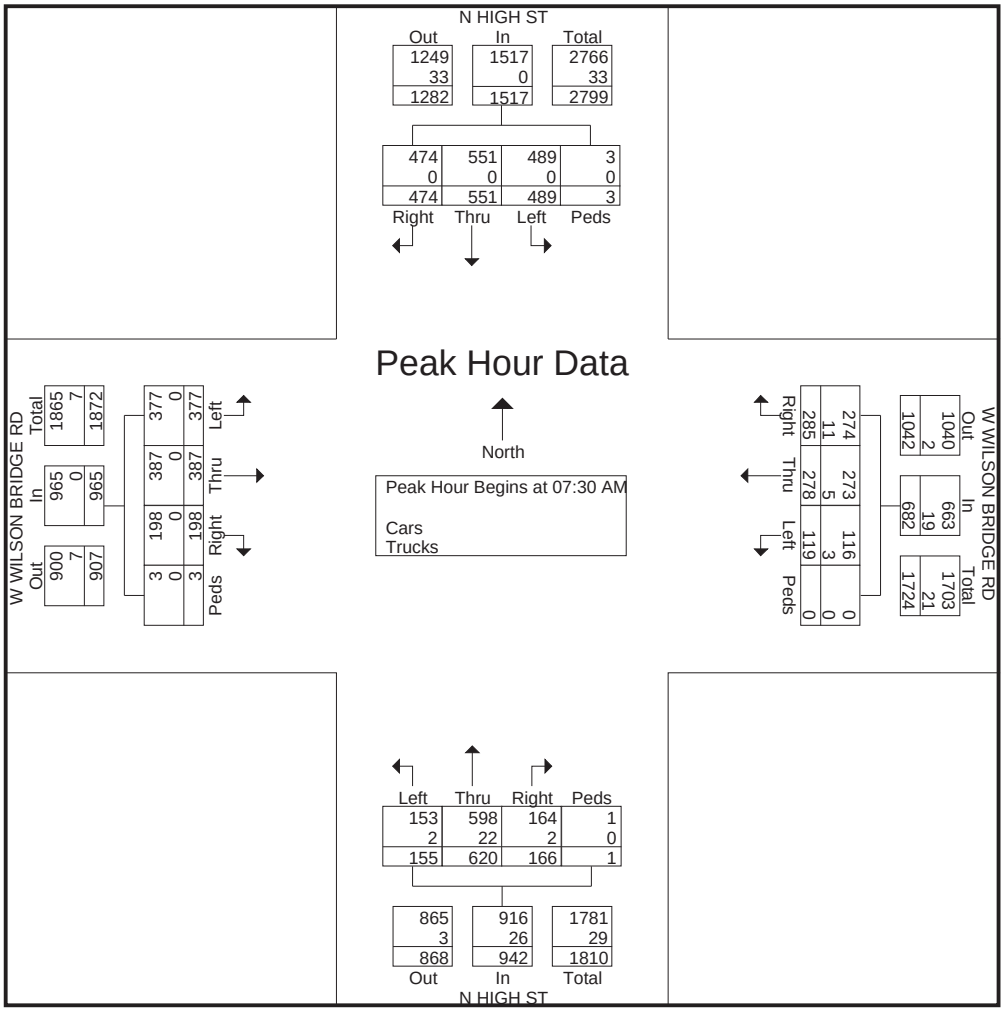
File Name : Wilson Bridge Rd High Street Combined
Site Code : 00000000
Start Date : 12/15/2015
Page No : 2



Mannik & Smith Group Inc.
www.manniksmithgroup.com

File Name : Wilson Bridge Rd High Street Combined
Site Code : 00000000
Start Date : 12/15/2015
Page No : 3

	N HIGH ST From North					W WILSON BRIDGE RD From East					N HIGH ST From South					W WILSON BRIDGE RD From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	121	138	117	0	376	77	60	18	0	155	30	139	23	0	192	43	92	108	1	244	967
07:45 AM	138	144	119	0	401	70	79	32	0	181	41	157	49	1	248	40	94	94	2	230	1060
08:00 AM	128	140	139	3	410	72	77	34	0	183	48	182	49	0	279	64	106	79	0	249	1121
08:15 AM	87	129	114	0	330	66	62	35	0	163	47	142	34	0	223	51	95	96	0	242	958
Total Volume	474	551	489	3	1517	285	278	119	0	682	166	620	155	1	942	198	387	377	3	965	4106
% App. Total	31.2	36.3	32.2	0.2		41.8	40.8	17.4	0		17.6	65.8	16.5	0.1		20.5	40.1	39.1	0.3		
PHF	.859	.957	.879	.250	.925	.925	.880	.850	.000	.932	.865	.852	.791	.250	.844	.773	.913	.873	.375	.969	.916
Cars	474	551	489	3	1517	274	273	116	0	663	164	598	153	1	916	198	387	377	3	965	4061
% Cars	100	100	100	100	100	96.1	98.2	97.5	0	97.2	98.8	96.5	98.7	100	97.2	100	100	100	100	100	98.9
Trucks	0	0	0	0	0	11	5	3	0	19	2	22	2	0	26	0	0	0	0	0	45
% Trucks	0	0	0	0	0	3.9	1.8	2.5	0	2.8	1.2	3.5	1.3	0	2.8	0	0	0	0	0	1.1



Mannik & Smith Group Inc.
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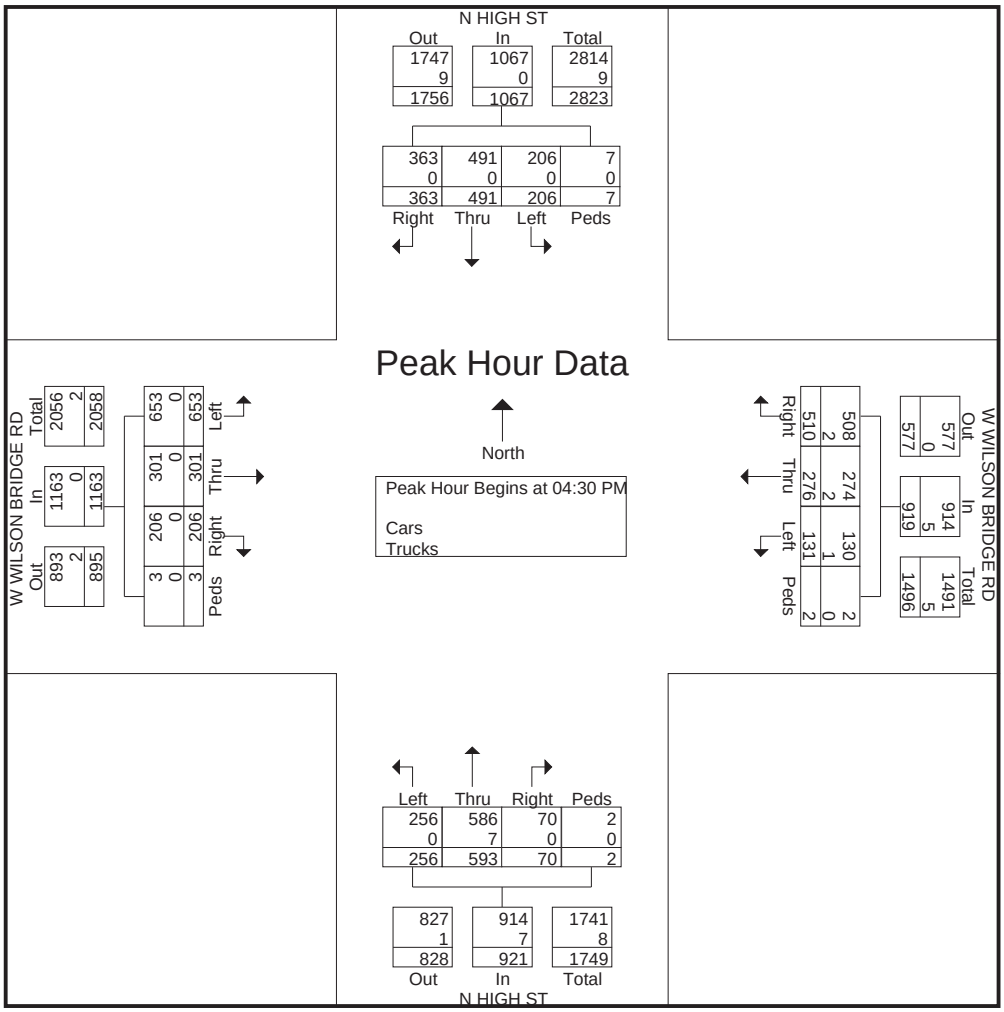
File Name : Wilson Bridge Rd High Street Combined
Site Code : 00000000
Start Date : 12/15/2015
Page No : 4

	N HIGH ST From North					W WILSON BRIDGE RD From East					N HIGH ST From South					W WILSON BRIDGE RD From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	65	114	74	3	256	125	72	42	0	239	27	192	55	0	274	56	58	135	2	251	1020
04:45 PM	88	127	41	0	256	88	50	34	0	172	13	129	66	2	210	38	77	159	0	274	912
05:00 PM	87	124	44	3	258	153	68	21	2	244	13	101	51	0	165	62	99	190	0	351	1018
05:15 PM	123	126	47	1	297	144	86	34	0	264	17	171	84	0	272	50	67	169	1	287	1120
Total Volume	363	491	206	7	1067	510	276	131	2	919	70	593	256	2	921	206	301	653	3	1163	4070
% App. Total	34	46	19.3	0.7		55.5	30	14.3	0.2		7.6	64.4	27.8	0.2		17.7	25.9	56.1	0.3		
PHF	.738	.967	.696	.583	.898	.833	.802	.780	.250	.870	.648	.772	.762	.250	.840	.831	.760	.859	.375	.828	.908
Cars	363	491	206	7	1067	508	274	130	2	914	70	586	256	2	914	206	301	653	3	1163	4058
% Cars	100	100	100	100	100	99.6	99.3	99.2	100	99.5	100	98.8	100	100	99.2	100	100	100	100	100	99.7
Trucks	0	0	0	0	0	2	2	1	0	5	0	7	0	0	7	0	0	0	0	0	12
% Trucks	0	0	0	0	0	0.4	0.7	0.8	0	0.5	0	1.2	0	0	0.8	0	0	0	0	0	0.3



Mannik & Smith Group Inc.
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Int: N High St & Drive C
Counted By: MM
Day: Thursday
Weather: Sunny

File Name : High St Drive C
Site Code : 00000000
Start Date : 12/17/2015
Page No : 1

Groups Printed- Cars - Trucks

	N HIGH ST From North					DRIVE C From East					N HIGH ST From South					DRIVE C From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	2	0	3	5
07:15 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:30 AM	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	2	0	3	5
07:45 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	6	0	0	0	6	0	0	0	0	0	0	0	0	0	0	2	0	4	0	6	12
08:00 AM	3	0	0	0	3	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	4
08:15 AM	11	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
08:30 AM	7	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	8
08:45 AM	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	4
Total	24	0	0	0	24	0	0	0	0	0	0	0	1	0	1	1	0	1	0	2	27
*** BREAK ***																					
04:00 PM	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
04:15 PM	4	0	0	0	4	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	6
04:30 PM	2	0	0	0	2	0	0	0	0	0	0	0	2	0	2	1	0	1	0	2	6
04:45 PM	3	0	0	0	3	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1	5
Total	11	0	0	0	11	0	0	0	0	0	0	0	5	0	5	1	0	2	0	3	19
05:00 PM	6	0	0	0	6	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	8
05:15 PM	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
05:30 PM	5	0	0	0	5	0	0	0	0	0	0	0	2	0	2	1	0	0	0	1	8
05:45 PM	3	0	0	0	3	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	4
Total	19	0	0	0	19	0	0	0	0	0	0	0	5	0	5	1	0	0	0	1	25
Grand Total	60	0	0	0	60	0	0	0	0	0	0	0	11	0	11	5	0	7	0	12	83
Apprch %	100	0	0	0		0	0	0	0		0	0	100	0		41.7	0	58.3	0		
Total %	72.3	0	0	0	72.3	0	0	0	0	0	0	0	13.3	0	13.3	6	0	8.4	0	14.5	
Cars	60	0	0	0	60	0	0	0	0	0	0	0	11	0	11	5	0	7	0	12	83
% Cars	100	0	0	0	100	0	0	0	0	0	0	0	100	0	100	100	0	100	0	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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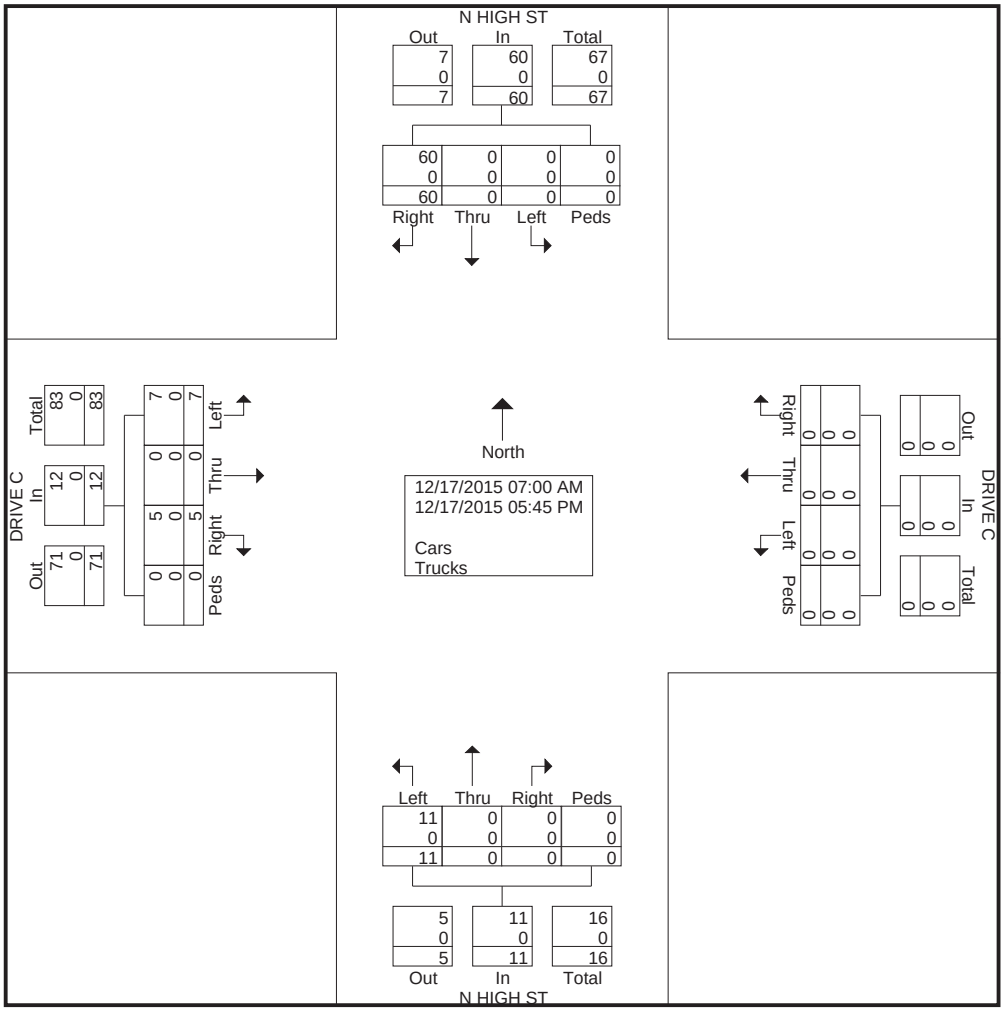
File Name : High St Drive C
Site Code : 00000000
Start Date : 12/17/2015
Page No : 2



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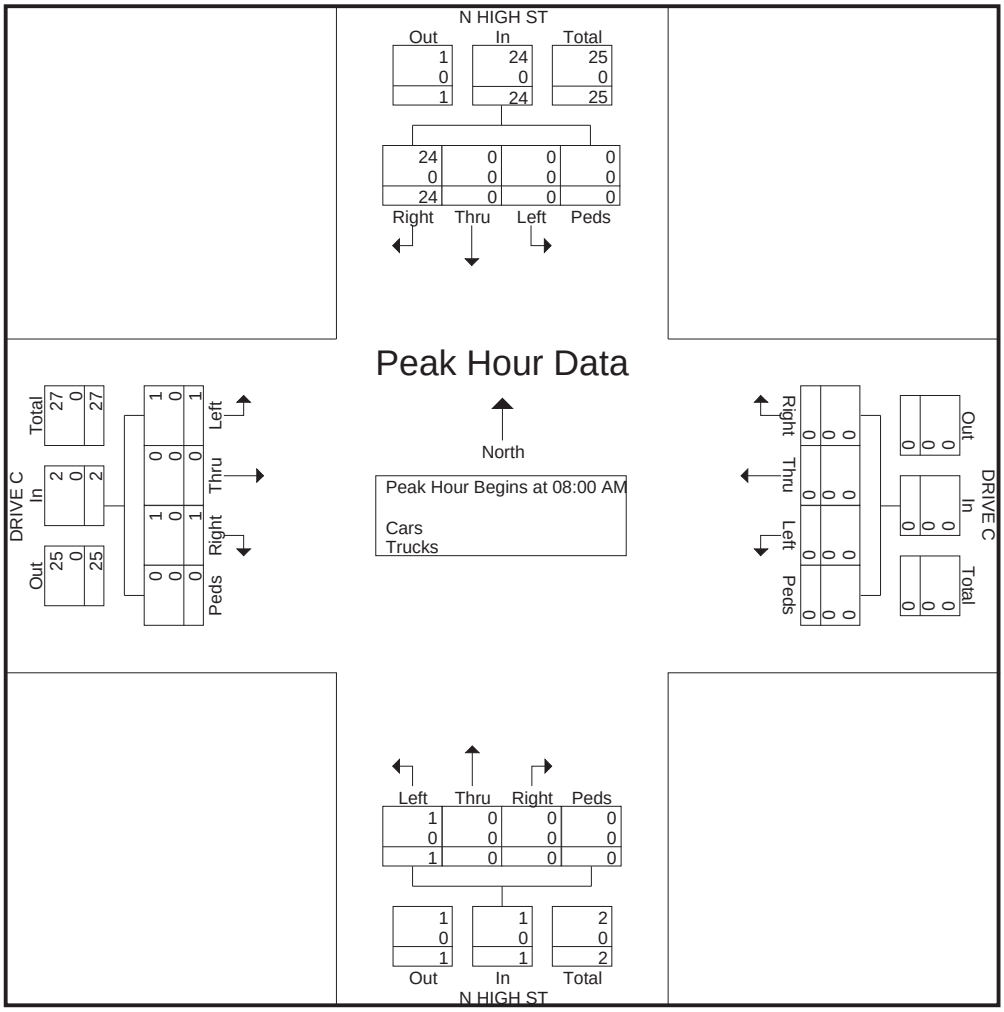
File Name : High St Drive C
Site Code : 00000000
Start Date : 12/17/2015
Page No : 3

	N HIGH ST From North					DRIVE C From East					N HIGH ST From South					DRIVE C From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	3	0	0	0	3	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	4
08:15 AM	11	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
08:30 AM	7	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	8
08:45 AM	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	4
Total Volume	24	0	0	0	24	0	0	0	0	0	0	0	1	0	1	1	0	1	0	2	27
% App. Total	100	0	0	0		0	0	0	0		0	0	100	0		50	0	50	0		
PHF	.545	.000	.000	.000	.545	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.250	.000	.250	.000	.500	.614
Cars	24	0	0	0	24	0	0	0	0	0	0	0	1	0	1	1	0	1	0	2	27
% Cars	100	0	0	0	100	0	0	0	0	0	0	0	100	0	100	100	0	100	0	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Mannik & Smith Group Inc.
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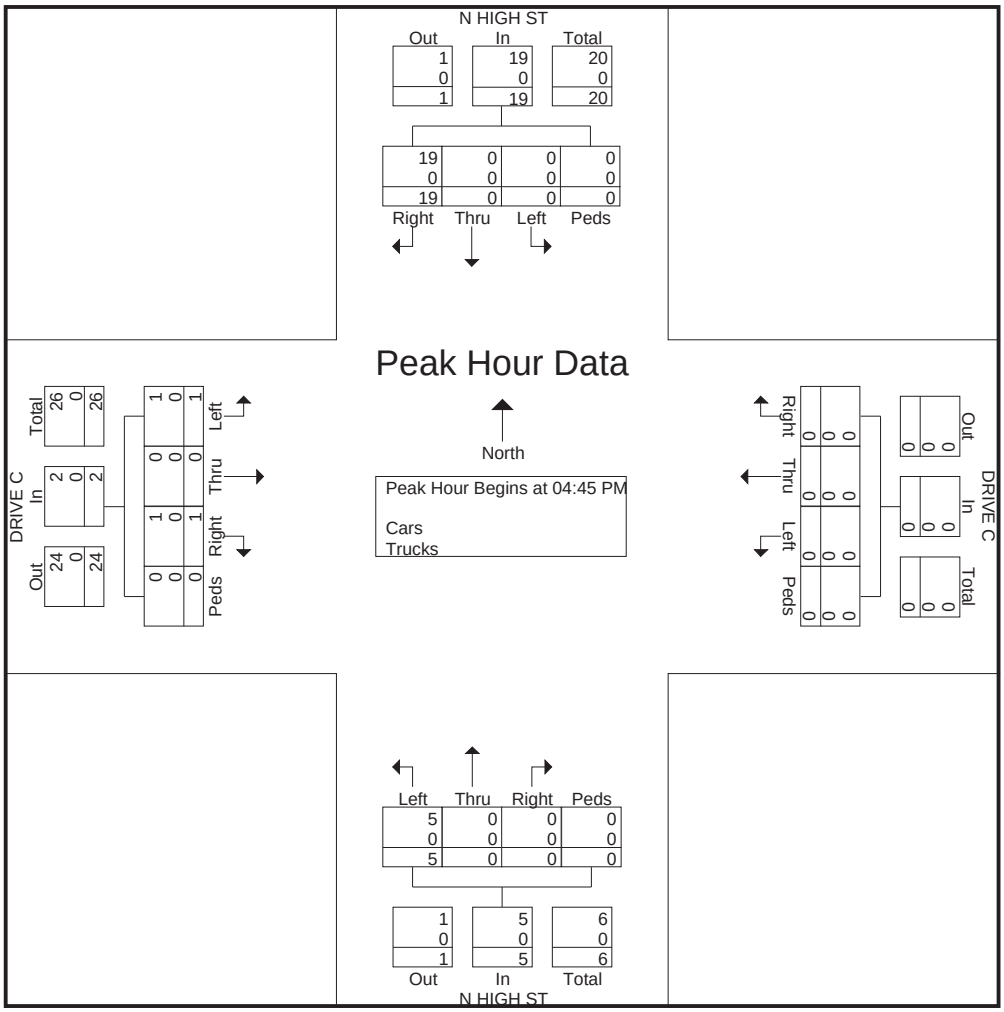
File Name : High St Drive C
Site Code : 00000000
Start Date : 12/17/2015
Page No : 4

	N HIGH ST From North					DRIVE C From East					N HIGH ST From South					DRIVE C From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	3	0	0	0	3	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1	5
05:00 PM	6	0	0	0	6	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	8
05:15 PM	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
05:30 PM	5	0	0	0	5	0	0	0	0	0	0	0	2	0	2	1	0	0	0	1	8
Total Volume	19	0	0	0	19	0	0	0	0	0	0	0	5	0	5	1	0	1	0	2	26
% App. Total	100	0	0	0		0	0	0	0		0	0	100	0		50	0	50	0		
PHF	.792	.000	.000	.000	.792	.000	.000	.000	.000	.000	.000	.000	.625	.000	.625	.250	.000	.250	.000	.500	.813
Cars	19	0	0	0	19	0	0	0	0	0	0	0	5	0	5	1	0	1	0	2	26
% Cars	100	0	0	0	100	0	0	0	0	0	0	0	100	0	100	100	0	100	0	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Mannik & Smith Group Inc.
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Int: N High St & Highland Ave
Counted By: MSW
Day: Wednesday
Weather: Sunny

File Name : High Street Highland Ave
Site Code : 00000000
Start Date : 12/16/2015
Page No : 1

Groups Printed- Cars - Trucks

	N HIGH ST From North					HIGHLAND AVE From East					N HIGH ST From South					CAREN AVE From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	11	140	6	0	157	10	4	5	0	19	1	96	3	0	100	4	3	16	0	23	299
07:15 AM	22	159	8	0	189	24	7	7	0	38	4	136	9	0	149	11	6	28	0	45	421
07:30 AM	29	173	14	0	216	13	6	17	0	36	2	119	12	0	133	9	11	25	0	45	430
07:45 AM	30	175	24	0	229	15	7	6	0	28	5	207	10	0	222	11	6	15	0	32	511
Total	92	647	52	0	791	62	24	35	0	121	12	558	34	0	604	35	26	84	0	145	1661
08:00 AM	22	167	35	0	224	19	12	11	2	44	5	153	16	0	174	17	11	33	0	61	503
08:15 AM	22	156	23	0	201	24	5	14	1	44	0	151	8	0	159	9	11	38	1	59	463
08:30 AM	20	160	28	0	208	15	7	12	0	34	2	146	7	0	155	10	9	32	0	51	448
08:45 AM	18	143	19	0	180	21	5	8	0	34	1	139	10	0	150	8	9	30	0	47	411
Total	82	626	105	0	813	79	29	45	3	156	8	589	41	0	638	44	40	133	1	218	1825
*** BREAK ***																					
04:00 PM	16	165	28	0	209	11	3	3	0	17	8	244	8	0	260	8	6	14	0	28	514
04:15 PM	18	157	25	0	200	10	12	11	1	34	8	229	18	1	256	10	3	24	0	37	527
04:30 PM	25	135	15	2	177	7	3	7	0	17	3	180	16	0	199	12	2	21	2	37	430
04:45 PM	23	159	17	0	199	12	19	14	0	45	2	200	23	1	226	7	4	20	1	32	502
Total	82	616	85	2	785	40	37	35	1	113	21	853	65	2	941	37	15	79	3	134	1973
05:00 PM	24	187	15	6	232	18	13	7	0	38	0	194	14	0	208	7	9	23	2	41	519
05:15 PM	22	195	17	0	234	20	16	10	0	46	2	202	1	0	205	10	5	24	0	39	524
05:30 PM	21	181	14	0	216	13	10	8	0	31	4	188	18	0	210	11	5	19	1	36	493
05:45 PM	19	155	11	0	185	7	6	6	0	19	1	173	17	0	191	8	3	18	0	29	424
Total	86	718	57	6	867	58	45	31	0	134	7	757	50	0	814	36	22	84	3	145	1960
Grand Total	342	2607	299	8	3256	239	135	146	4	524	48	2757	190	2	2997	152	103	380	7	642	7419
Apprch %	10.5	80.1	9.2	0.2		45.6	25.8	27.9	0.8		1.6	92	6.3	0.1		23.7	16	59.2	1.1		
Total %	4.6	35.1	4	0.1	43.9	3.2	1.8	2	0.1	7.1	0.6	37.2	2.6	0	40.4	2	1.4	5.1	0.1	8.7	
Cars	333	2562	298	8	3201	239	135	145	4	523	48	2707	183	2	2940	149	103	368	6	626	7290
% Cars	97.4	98.3	99.7	100	98.3	100	100	99.3	100	99.8	100	98.2	96.3	100	98.1	98	100	96.8	85.7	97.5	98.3
Trucks	9	45	1	0	55	0	0	1	0	1	0	50	7	0	57	3	0	12	1	16	129
% Trucks	2.6	1.7	0.3	0	1.7	0	0	0.7	0	0.2	0	1.8	3.7	0	1.9	2	0	3.2	14.3	2.5	1.7

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File Name : High Street Highland Ave
Site Code : 00000000
Start Date : 12/16/2015
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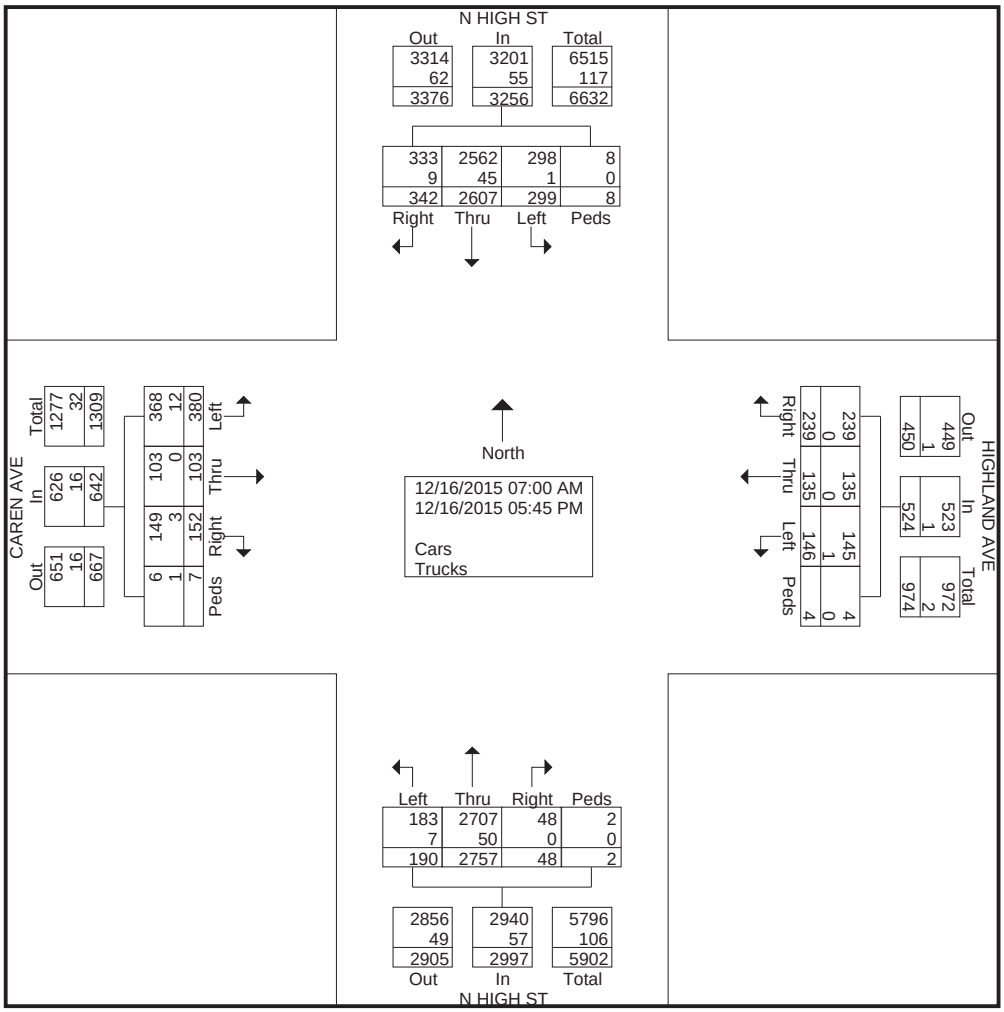

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File Name : High Street Highland Ave
Site Code : 00000000
Start Date : 12/16/2015
Page No : 3

	N HIGH ST From North					HIGHLAND AVE From East					N HIGH ST From South					CAREN AVE From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	30	175	24	0	229	15	7	6	0	28	5	207	10	0	222	11	6	15	0	32	511
08:00 AM	22	167	35	0	224	19	12	11	2	44	5	153	16	0	174	17	11	33	0	61	503
08:15 AM	22	156	23	0	201	24	5	14	1	44	0	151	8	0	159	9	11	38	1	59	463
08:30 AM	20	160	28	0	208	15	7	12	0	34	2	146	7	0	155	10	9	32	0	51	448
Total Volume	94	658	110	0	862	73	31	43	3	150	12	657	41	0	710	47	37	118	1	203	1925
% App. Total	10.9	76.3	12.8	0		48.7	20.7	28.7	2		1.7	92.5	5.8	0		23.2	18.2	58.1	0.5		
PHF	.783	.940	.786	.000	.941	.760	.646	.768	.375	.852	.600	.793	.641	.000	.800	.691	.841	.776	.250	.832	.942
Cars	93	654	110	0	857	73	31	43	3	150	12	652	40	0	704	47	37	116	1	201	1912
% Cars	98.9	99.4	100	0	99.4	100	100	100	100	100	100	99.2	97.6	0	99.2	100	100	98.3	100	99.0	99.3
Trucks	1	4	0	0	5	0	0	0	0	0	0	5	1	0	6	0	0	2	0	2	13
% Trucks	1.1	0.6	0	0	0.6	0	0	0	0	0	0	0.8	2.4	0	0.8	0	0	1.7	0	1.0	0.7

Mannik & Smith Group Inc.
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File Name : High Street Highland Ave
Site Code : 00000000
Start Date : 12/16/2015
Page No : 4

	N HIGH ST From North					HIGHLAND AVE From East					N HIGH ST From South					CAREN AVE From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 01:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	23	159	17	0	199	12	19	14	0	45	2	200	23	1	226	7	4	20	1	32	502
05:00 PM	24	187	15	6	232	18	13	7	0	38	0	194	14	0	208	7	9	23	2	41	519
05:15 PM	22	195	17	0	234	20	16	10	0	46	2	202	1	0	205	10	5	24	0	39	524
05:30 PM	21	181	14	0	216	13	10	8	0	31	4	188	18	0	210	11	5	19	1	36	493
Total Volume	90	722	63	6	881	63	58	39	0	160	8	784	56	1	849	35	23	86	4	148	2038
% App. Total	10.2	82	7.2	0.7		39.4	36.2	24.4	0		0.9	92.3	6.6	0.1		23.6	15.5	58.1	2.7		
PHF	.938	.926	.926	.250	.941	.788	.763	.696	.000	.870	.500	.970	.609	.250	.939	.795	.639	.896	.500	.902	.972
Cars	87	718	62	6	873	63	58	38	0	159	8	776	55	1	840	35	23	83	3	144	2016
% Cars	96.7	99.4	98.4	100	99.1	100	100	97.4	0	99.4	100	99.0	98.2	100	98.9	100	100	96.5	75.0	97.3	98.9
Trucks	3	4	1	0	8	0	0	1	0	1	0	8	1	0	9	0	0	3	1	4	22
% Trucks	3.3	0.6	1.6	0	0.9	0	0	2.6	0	0.6	0	1.0	1.8	0	1.1	0	0	3.5	25.0	2.7	1.1

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Int: Caren Ave & Drive D
Counted By: MM
Day: Thursday
Weather: Sunny

File Name : Caren Ave Drive D
Site Code : 00000000
Start Date : 12/17/2015
Page No : 1

Groups Printed- Cars - Trucks - Drive D

	DRIVE D From North					CAREN AVE From East					DRIVE D From South					CAREN AVE From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	2	0	3	0	5	0	0	0	0	0	0	0	0	0	0	1	0	2	0	3	8
07:15 AM	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	4
07:30 AM	3	0	1	0	4	1	0	0	0	1	0	0	0	0	0	1	0	3	0	4	9
07:45 AM	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
Total	7	0	5	0	12	2	0	0	0	2	0	0	0	0	0	2	0	7	0	9	23
08:00 AM	4	0	0	0	4	3	0	0	0	3	0	0	1	0	1	0	0	1	0	1	9
08:15 AM	13	0	2	0	15	1	0	0	0	1	0	0	0	0	0	0	0	1	0	1	17
08:30 AM	8	0	2	0	10	1	0	0	0	1	0	0	0	0	0	0	0	6	0	6	17
08:45 AM	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	5
Total	28	0	4	0	32	5	0	0	0	5	0	0	1	0	1	1	0	9	0	10	48
*** BREAK ***																					
04:00 PM	2	0	2	0	4	3	0	0	0	3	0	0	0	0	0	0	0	1	0	1	8
04:15 PM	5	0	5	0	10	2	0	0	0	2	0	0	2	0	2	0	0	1	0	1	15
04:30 PM	2	0	4	0	6	5	0	0	0	5	0	0	2	0	2	1	0	1	0	2	15
04:45 PM	5	0	3	0	8	2	0	0	0	2	0	0	1	0	1	0	0	3	0	3	14
Total	14	0	14	0	28	12	0	0	0	12	0	0	5	0	5	1	0	6	0	7	52
05:00 PM	6	0	3	0	9	6	0	0	0	6	0	0	2	0	2	0	0	0	0	0	17
05:15 PM	7	0	9	0	16	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	21
05:30 PM	7	0	1	0	8	4	0	0	0	4	0	0	2	0	2	1	0	2	0	3	17
05:45 PM	3	0	6	0	9	6	0	0	0	6	0	0	1	0	1	0	0	2	0	2	18
Total	23	0	19	0	42	21	0	0	0	21	0	0	5	0	5	1	0	4	0	5	73
Grand Total	72	0	42	0	114	40	0	0	0	40	0	0	11	0	11	5	0	26	0	31	196
Apprch %	63.2	0	36.8	0		100	0	0	0		0	0	100	0		16.1	0	83.9	0		
Total %	36.7	0	21.4	0	58.2	20.4	0	0	0	20.4	0	0	5.6	0	5.6	2.6	0	13.3	0	15.8	
Cars	60	0	0	0	60	0	0	0	0	0	0	0	11	0	11	5	0	7	0	12	83
% Cars	83.3	0	0	0	52.6	0	0	0	0	0	0	0	100	0	100	100	0	26.9	0	38.7	42.3
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Drive D	12	0	42	0	54	40	0	0	0	40	0	0	0	0	0	0	0	19	0	19	113
% Drive D	16.7	0	100	0	47.4	100	0	0	0	100	0	0	0	0	0	0	0	73.1	0	61.3	57.7

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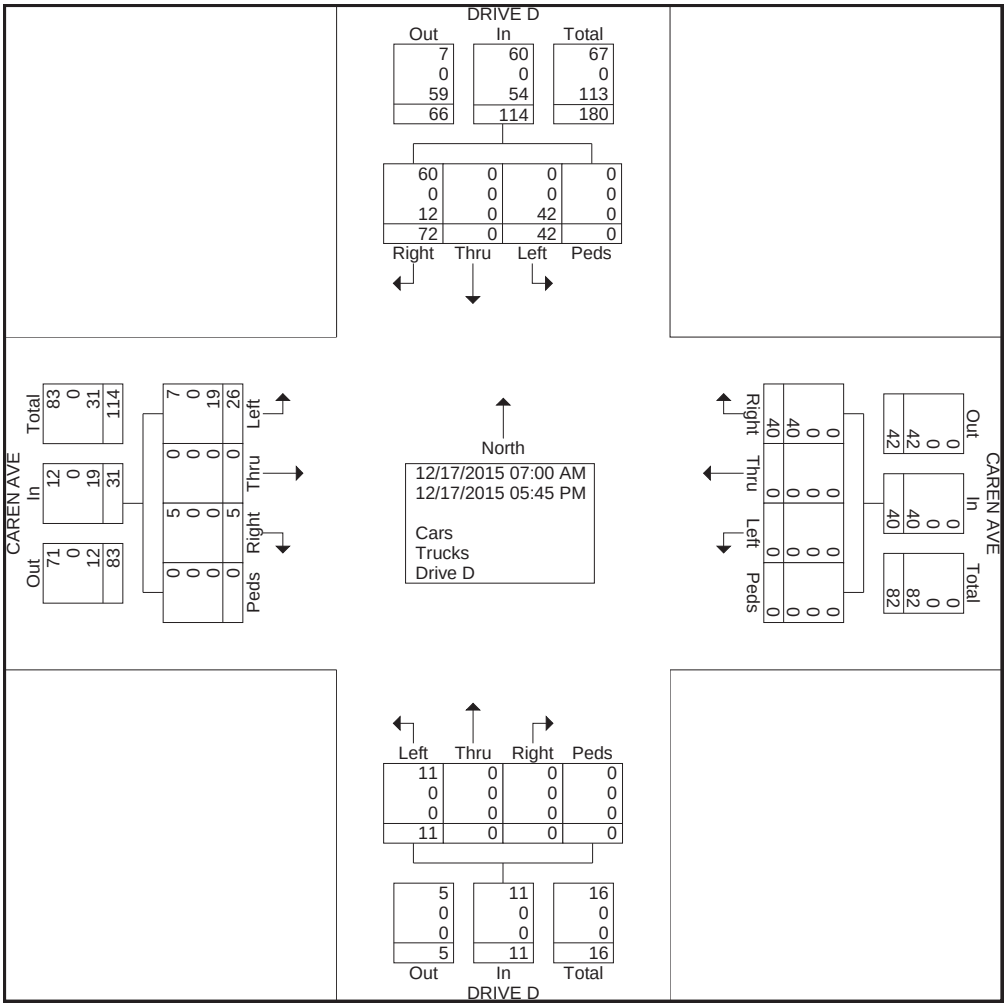
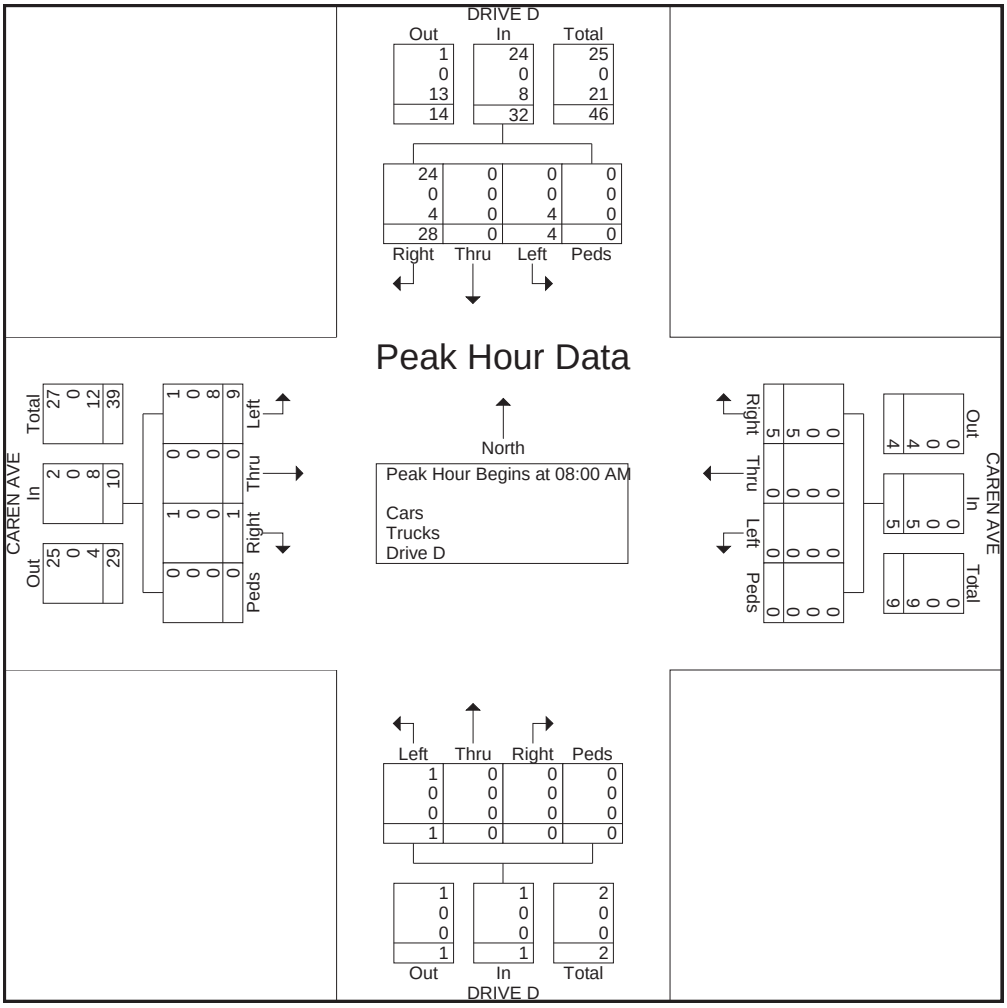
File Name : Caren Ave Drive D
Site Code : 00000000
Start Date : 12/17/2015
Page No : 2



www.manniksmithgroup.com

File Name : Caren Ave Drive D
Site Code : 00000000
Start Date : 12/17/2015
Page No : 3

	DRIVE D From North					CAREN AVE From East					DRIVE D From South					CAREN AVE From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	4	0	0	0	4	3	0	0	0	3	0	0	1	0	1	0	0	1	0	1	9
08:15 AM	13	0	2	0	15	1	0	0	0	1	0	0	0	0	0	0	0	1	0	1	17
08:30 AM	8	0	2	0	10	1	0	0	0	1	0	0	0	0	0	0	0	6	0	6	17
08:45 AM	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	5
Total Volume	28	0	4	0	32	5	0	0	0	5	0	0	1	0	1	1	0	9	0	10	48
% App. Total	87.5	0	12.5	0		100	0	0	0		0	0	100	0		10	0	90	0		
PHF	.538	.000	.500	.000	.533	.417	.000	.000	.000	.417	.000	.000	.250	.000	.250	.250	.000	.375	.000	.417	.706
Cars	24	0	0	0	24	0	0	0	0	0	0	0	1	0	1	1	0	1	0	2	27
% Cars	85.7	0	0	0	75.0	0	0	0	0	0	0	0	100	0	100	100	0	11.1	0	20.0	56.3
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Drive D	4	0	4	0	8	5	0	0	0	5	0	0	0	0	0	0	0	8	0	8	21
% Drive D	14.3	0	100	0	25.0	100	0	0	0	100	0	0	0	0	0	0	0	88.9	0	80.0	43.8



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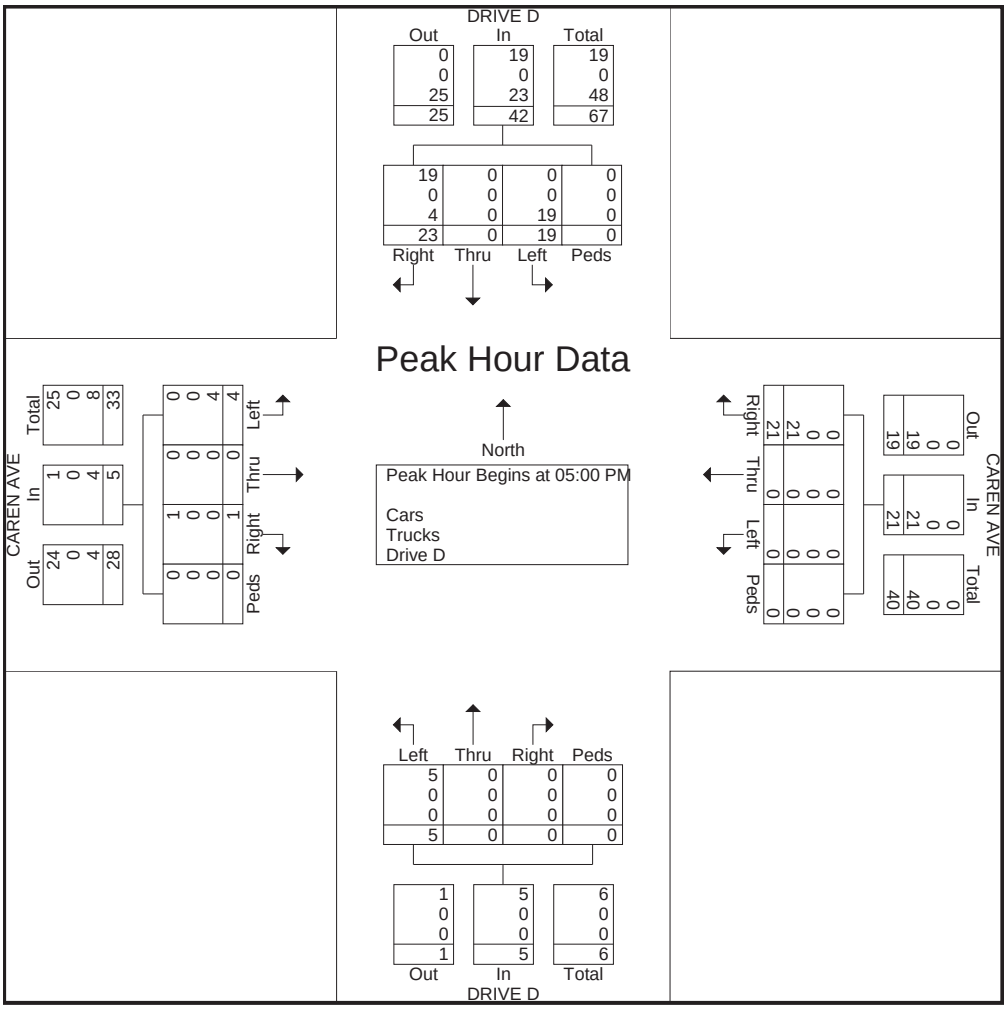
File Name : Caren Ave Drive D
Site Code : 00000000
Start Date : 12/17/2015
Page No : 4

	DRIVE D From North					CAREN AVE From East					DRIVE D From South					CAREN AVE From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	6	0	3	0	9	6	0	0	0	6	0	0	2	0	2	0	0	0	0	0	17
05:15 PM	7	0	9	0	16	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	21
05:30 PM	7	0	1	0	8	4	0	0	0	4	0	0	2	0	2	1	0	2	0	3	17
05:45 PM	3	0	6	0	9	6	0	0	0	6	0	0	1	0	1	0	0	2	0	2	18
Total Volume	23	0	19	0	42	21	0	0	0	21	0	0	5	0	5	1	0	4	0	5	73
% App. Total	54.8	0	45.2	0		100	0	0	0		0	0	100	0		20	0	80	0		
PHF	.821	.000	.528	.000	.656	.875	.000	.000	.000	.875	.000	.000	.625	.000	.625	.250	.000	.500	.000	.417	.869
Cars	19	0	0	0	19	0	0	0	0	0	0	0	5	0	5	1	0	0	0	1	25
% Cars	82.6	0	0	0	45.2	0	0	0	0	0	0	0	100	0	100	100	0	0	0	20.0	34.2
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Drive D	4	0	19	0	23	21	0	0	0	21	0	0	0	0	0	0	0	4	0	4	48
% Drive D	17.4	0	100	0	54.8	100	0	0	0	100	0	0	0	0	0	0	0	100	0	80.0	65.8



APPENDIX B
MORPC TRAFFIC PROJECTIONS

Kris Ball - RE: Traffic Growth Rates in Worthington, OH

From: Hwashik Jang <hjang@morpc.org>
To: Kris Ball <KBall@manniksmithgroup.com>
Date: 1/5/2016 8:47 AM
Subject: RE: Traffic Growth Rates in Worthington, OH
CC: Zhuojun Jiang <zjiang@morpc.org>, Nick Gill <NGILL@morpc.org>

Kris,

We have completed growth rate for N. High Street and Wilson Bridge Road in Worthington. Please use a linear annual growth rates as summarized in the following table below.

Location	Linear Annual Growth Rate
Wilson Bridge, e/o High St	0.45%
High St, n/o Wilson Bridge	0.42%
Wilson Bridge, w/o High St	0.66%
High St, s/o Wilson Bridge	0.63%

Note: This is planning level analysis based on MORPC regional travel demand model.
If you have any other questions, please let me know.

Thanks,

-Hwashik

Hwashik Jang | hjang@morpc.org | **MORPC**
Tel 614.233.4145 | **Fax 614.233.4245**

From: Kris Ball [mailto:KBall@manniksmithgroup.com]
Sent: Monday, December 21, 2015 2:35 PM
To: Hwashik Jang
Subject: RE: Traffic Growth Rates in Worthington, OH

Hwashik,

Thanks for the quick response. Information that you need for the growth rate is attached to this email. Responses to the numbered items below are provided in red.

>>> Hwashik Jang <hjang@morpc.org> 12/21/2015 12:33 PM >>>

Kris,

Generally, For all traffic growth requests, we need the following information to process growth rates:

1. Traffic Data upon which you would be applying these growth rates (preferably 24 hour counts). See attached.

2. Open Year & Design Year, for this study. Opening Year is 2017 and the Design Year is 2037.

3. Roadway network assumptions: Any roadway assumptions/changes in the vicinity, such as change in number of lanes or roadway alignments, etc. There are currently no changes planned for the surrounding roadway network.

4. Land use assumptions: General info on proposed site location & development, such as: site map, Trip Generation (excel file, preferably). We understand you need this info to update your model but we will have to check with our client to make sure that it is okay for us to release this information.

5. Project Review Contact Person: We also would like to know who is the person reviewing this study /or/ Project manager that you are working with local government agency, City/County/State? Because MORPC consistently provides services to local government agencies, this request is also addressed via that process. The City of Worthington has retained John Gallager from Carpenter Marty Transportation, Inc. to review this traffic study.

Thanks,

Hwashik

Hwashik Jang | hjang@morpc.org | **MORPC**
Tel 614.233.4145 | **Fax 614.233.4245**

From: Kris Ball [mailto:KBall@manniksmithgroup.com]
Sent: Monday, December 21, 2015 11:58 AM
To: Hwashik Jang
Subject: Traffic Growth Rates in Worthington, OH

Thanks for the response. Specifically, we're looking for growth rates near N. High Street and Wilson Bridge Road in Worthington, OH. Any help would be greatly appreciated.

Thanks!

Kristopher Ball

Kristopher D. Ball
The Mannik & Smith Group
1800 Indian Wood Circle
Maumee, OH
Phone: (419) 891-2222

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APPENDIX C
SYNCHRO REPORTS

HCM 2010 Signalized Intersection Summary
1: Wilson Bridge Road & Mall Drive

01/04/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	39	853	601	43	117	8
Future Volume (veh/h)	39	853	601	43	117	8
Number	7	4	8	18	1	16
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	1900	1863	1883	1900	1863	1900
Adj Flow Rate, veh/h	52	1015	691	53	129	16
Adj No. of Lanes	1	2	2	0	2	1
Peak Hour Factor	0.75	0.84	0.87	0.81	0.91	0.50
Percent Heavy Veh, %	0	2	1	1	2	0
Cap, veh/h	476	2005	1165	89	518	243
Arrive On Green	0.08	0.57	0.35	0.35	0.15	0.15
Sat Flow, veh/h	1810	3632	3461	258	3442	1615
Grp Volume(v), veh/h	52	1015	367	377	129	16
Grp Sat Flow(s),veh/h/ln	1810	1770	1788	1837	1721	1615
Q Serve(g_s), s	0.5	6.2	6.0	6.0	1.2	0.3
Cycle Q Clear(g_c), s	0.5	6.2	6.0	6.0	1.2	0.3
Prop In Lane	1.00			0.14	1.00	1.00
Lane Grp Cap(c), veh/h	476	2005	619	636	518	243
V/C Ratio(X)	0.11	0.51	0.59	0.59	0.25	0.07
Avail Cap(c_a), veh/h	691	3005	911	936	3409	1600
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	5.9	4.7	9.5	9.5	13.3	12.9
Incr Delay (d2), s/veh	0.1	0.2	0.9	0.9	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	3.0	3.0	3.1	0.6	0.3
LnGrp Delay(d),s/veh	6.0	4.9	10.4	10.4	13.5	13.0
LnGrp LOS	A	A	B	B	B	B
Approach Vol, veh/h		1067	744		145	
Approach Delay, s/veh		4.9	10.4		13.4	
Approach LOS		A	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				25.0		10.3	7.8	17.2
Change Period (Y+Rc), s				5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s				30.0		35.0	7.0	18.0
Max Q Clear Time (g_c+I1), s				8.2		3.2	2.5	8.0
Green Ext Time (p_c), s				5.8		0.5	0.0	4.3

Intersection Summary	
HCM 2010 Ctrl Delay	7.6
HCM 2010 LOS	A

HCM 2010 TWSC
2: Drive A & Wilson Bridge Road

01/04/2018

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	967	3	1	641	3	9
Future Vol, veh/h	967	3	1	641	3	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	75	92	92	38	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1051	4	1	697	8	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1055	0	1404	528
Stage 1	-	-	-	-	1053	-
Stage 2	-	-	-	-	351	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	656	-	131	495
Stage 1	-	-	-	-	297	-
Stage 2	-	-	-	-	684	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	656	-	131	495
Mov Cap-2 Maneuver	-	-	-	-	131	-
Stage 1	-	-	-	-	297	-
Stage 2	-	-	-	-	683	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	21.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	235	-	-	656	-
HCM Lane V/C Ratio	0.085	-	-	0.002	-
HCM Control Delay (s)	21.7	-	-	10.5	0
HCM Lane LOS	C	-	-	B	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

HCM 2010 Signalized Intersection Summary
4: US 23 (High Street) & Wilson Bridge Road

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	382	392	201	121	282	289	157	628	168	495	558	480
Future Volume (veh/h)	382	392	201	121	282	289	157	628	168	495	558	480
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1900	1900	1845	1863	1827	1881	1838	1900	1900	1900	1900
Adj Flow Rate, veh/h	439	431	261	142	320	311	199	739	193	562	581	558
Adj No. of Lanes	2	1	1	1	1	2	1	3	0	2	2	1
Peak Hour Factor	0.87	0.91	0.77	0.85	0.88	0.93	0.79	0.85	0.87	0.88	0.96	0.86
Percent Heavy Veh, %	0	0	0	3	2	4	1	4	4	0	0	0
Cap, veh/h	614	511	735	307	501	1245	430	968	250	658	880	675
Arrive On Green	0.17	0.27	0.27	0.17	0.27	0.27	0.38	0.49	0.49	0.19	0.24	0.24
Sat Flow, veh/h	3510	1900	1610	1757	1863	2724	1792	3972	1026	3510	3610	1609
Grp Volume(v), veh/h	439	431	261	142	320	311	199	621	311	562	581	558
Grp Sat Flow(s),veh/h/ln	1755	1900	1610	1757	1863	1362	1792	1672	1652	1755	1805	1609
Q Serve(g_s), s	18.9	34.3	16.8	11.6	24.3	11.2	10.0	24.2	24.7	24.8	23.2	39.0
Cycle Q Clear(g_c), s	18.9	34.3	16.8	11.6	24.3	11.2	10.0	24.2	24.7	24.8	23.2	39.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.62	1.00		1.00
Lane Grp Cap(c), veh/h	614	511	735	307	501	1245	430	815	403	658	880	675
V/C Ratio(X)	0.71	0.84	0.35	0.46	0.64	0.25	0.46	0.76	0.77	0.85	0.66	0.83
Avail Cap(c_a), veh/h	614	511	735	307	501	1245	430	815	403	658	880	675
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.2	55.3	28.2	59.2	51.7	26.7	24.0	37.2	37.3	62.9	54.5	41.4
Incr Delay (d2), s/veh	7.0	15.6	1.3	4.9	6.1	0.5	3.6	6.6	13.4	13.3	3.9	11.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.7	20.3	7.7	6.1	13.4	4.3	5.2	11.8	12.7	13.2	12.1	23.9
LnGrp Delay(d),s/veh	69.2	70.9	29.6	64.2	57.8	27.2	27.5	43.9	50.7	76.2	58.4	52.5
LnGrp LOS	E	E	C	E	E	C	C	D	D	E	E	D
Approach Vol, veh/h		1131			773			1131			1701	
Approach Delay, s/veh		60.7			46.6			42.9			62.3	
Approach LOS		E			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	35.0	44.0	33.0	48.0	35.0	44.0	33.0	48.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	39.0	28.0	43.0	30.0	39.0	28.0	43.0
Max Q Clear Time (g_c+I1), s	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	54.7
HCM 2010 LOS	D

HCM 2010 Signalized Intersection Summary
6: US 23 (High Street) & Caren Avenue/Highland Avenue

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	39	48	44	31	74	42	665	12	111	662	98
Future Volume (veh/h)	117	39	48	44	31	74	42	665	12	111	662	98
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1864	1900	1900	1900	1900	1863	1882	1900	1900	1881	1900
Adj Flow Rate, veh/h	154	44	70	57	48	97	66	842	20	141	704	126
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.76	0.89	0.69	0.77	0.65	0.76	0.64	0.79	0.60	0.79	0.94	0.78
Percent Heavy Veh, %	0	5	5	0	0	0	2	1	1	0	1	1
Cap, veh/h	497	231	367	525	200	404	367	1539	37	291	1307	234
Arrive On Green	0.04	0.36	0.36	0.04	0.36	0.36	0.04	0.43	0.43	0.09	0.86	0.86
Sat Flow, veh/h	1810	648	1031	1810	562	1135	1774	3569	85	1810	3031	542
Grp Volume(v), veh/h	154	0	114	57	0	145	66	422	440	141	415	415
Grp Sat Flow(s),veh/h/ln	1810	0	1679	1810	0	1696	1774	1788	1867	1810	1787	1786
Q Serve(g_s), s	7.0	0.0	7.5	3.1	0.0	9.6	3.2	28.1	28.1	7.0	9.5	9.6
Cycle Q Clear(g_c), s	7.0	0.0	7.5	3.1	0.0	9.6	3.2	28.1	28.1	7.0	9.5	9.6
Prop In Lane	1.00		0.61	1.00		0.67	1.00		0.05	1.00		0.30
Lane Grp Cap(c), veh/h	497	0	598	525	0	604	367	771	805	291	771	770
V/C Ratio(X)	0.31	0.00	0.19	0.11	0.00	0.24	0.18	0.55	0.55	0.48	0.54	0.54
Avail Cap(c_a), veh/h	497	0	598	525	0	604	367	771	805	291	771	770
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.3	0.0	35.6	29.9	0.0	36.3	23.2	33.9	33.9	26.8	6.9	6.9
Incr Delay (d2), s/veh	1.6	0.0	0.7	0.4	0.0	0.9	1.1	2.8	2.7	5.7	2.7	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	3.6	1.6	0.0	4.7	1.7	14.4	15.0	2.0	5.0	5.0
LnGrp Delay(d),s/veh	34.9	0.0	36.3	30.3	0.0	37.2	24.3	36.6	36.5	32.5	9.6	9.6
LnGrp LOS	C		D	C		D	C	D	D	C	A	A
Approach Vol, veh/h		268			202			928			971	
Approach Delay, s/veh		35.5			35.3			35.7			12.9	
Approach LOS		D			D			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	74.0	12.0	62.0	12.0	74.0	12.0	62.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	69.0	7.0	57.0	7.0	69.0	7.0	57.0
Max Q Clear Time (g_c+I1), s	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	26.3
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↱	
Traffic Vol, veh/h	7	200	165	6	4	4
Future Vol, veh/h	7	200	165	6	4	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	35	92	92	50	50	50
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	20	217	179	12	8	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	191	0	-	0	442	185
Stage 1	-	-	-	-	185	-
Stage 2	-	-	-	-	257	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1395	-	-	-	577	862
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	791	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1395	-	-	-	568	862
Mov Cap-2 Maneuver	-	-	-	-	568	-
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	778	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1395	-	-	-	685
HCM Lane V/C Ratio	0.014	-	-	-	0.023
HCM Control Delay (s)	7.6	-	-	-	10.4
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection: 1: Wilson Bridge Road & Mall Drive

Movement	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	T	T	T	TR	L	L	R
Maximum Queue (ft)	52	124	169	100	108	58	68	22
Average Queue (ft)	22	49	65	41	62	24	31	4
95th Queue (ft)	48	99	131	86	104	51	60	18
Link Distance (ft)		423	423	81	81	274	274	274
Upstream Blk Time (%)				1	2			
Queuing Penalty (veh)				2	7			
Storage Bay Dist (ft)	300							
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 2: Drive A & Wilson Bridge Road

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (ft)	9	9	36	69	35
Average Queue (ft)	0	0	2	7	11
95th Queue (ft)	7	5	19	40	35
Link Distance (ft)	81	81	317	317	185
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Drive B & Wilson Bridge Road

Movement	EB	EB	WB	NB
Directions Served	T	TR	LT	LR
Maximum Queue (ft)	120	54	48	44
Average Queue (ft)	18	2	7	8
95th Queue (ft)	91	39	31	32
Link Distance (ft)	317		390	167
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		250		
Storage Blk Time (%)	0	0		
Queuing Penalty (veh)	0	0		

Intersection: 4: US 23 (High Street) & Wilson Bridge Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	T	R	R	L	T	T	TR
Maximum Queue (ft)	252	242	398	150	174	450	177	152	206	219	232	244
Average Queue (ft)	162	150	290	50	135	255	82	33	97	154	146	154
95th Queue (ft)	234	222	424	106	205	424	145	97	174	213	216	239
Link Distance (ft)	390	390	390	390		1035	1035		250	250	250	250
Upstream Blk Time (%)			4						0	0	0	1
Queuing Penalty (veh)			10						0	0	0	2
Storage Bay Dist (ft)					150			350				
Storage Blk Time (%)					11	26						
Queuing Penalty (veh)					33	31						

Intersection: 4: US 23 (High Street) & Wilson Bridge Road

Movement	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	R
Maximum Queue (ft)	319	373	324	326	213
Average Queue (ft)	202	244	211	203	81
95th Queue (ft)	293	340	295	297	162
Link Distance (ft)			741	741	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	525	525			525
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: US 23 (High Street) & Drive C

Movement	EB	NB	NB	SB	SB	SB
Directions Served	LTR	LT	T	T	T	TR
Maximum Queue (ft)	30	44	18	66	149	114
Average Queue (ft)	1	2	1	10	14	22
95th Queue (ft)	11	21	13	45	77	76
Link Distance (ft)	159	94	94		250	250
Upstream Blk Time (%)		0				
Queuing Penalty (veh)		1				
Storage Bay Dist (ft)				50		
Storage Blk Time (%)				5	1	
Queuing Penalty (veh)				14	2	

Intersection: 6: US 23 (High Street) & Caren Avenue/Highland Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	166	142	71	138	77	442	518	106	100	106
Average Queue (ft)	70	46	20	44	30	95	333	63	64	80
95th Queue (ft)	142	107	53	100	67	254	485	111	111	117
Link Distance (ft)	201	201		376		521	521	94	94	94
Upstream Blk Time (%)	0	0				0	1	11	6	16
Queuing Penalty (veh)	0	0				0	0	35	19	48
Storage Bay Dist (ft)			50		200					
Storage Blk Time (%)			2	12		1				
Queuing Penalty (veh)			2	5		0				

Intersection: 7: Caren Avenue & Drive D

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	40	35
Average Queue (ft)	1	8
95th Queue (ft)	14	31
Link Distance (ft)	131	151
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 214

HCM 2010 Signalized Intersection Summary
1: Wilson Bridge Road & Mall Drive

01/04/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	856	681	34	404	59
Future Volume (veh/h)	55	856	681	34	404	59
Number	7	4	8	18	1	16
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	1863	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	73	1057	765	44	459	69
Adj No. of Lanes	1	2	2	0	2	1
Peak Hour Factor	0.75	0.81	0.89	0.77	0.88	0.85
Percent Heavy Veh, %	2	0	0	0	0	0
Cap, veh/h	440	1994	1179	68	747	344
Arrive On Green	0.10	0.55	0.34	0.34	0.21	0.21
Sat Flow, veh/h	1774	3705	3565	200	3510	1615
Grp Volume(v), veh/h	73	1057	398	411	459	69
Grp Sat Flow(s),veh/h/ln	1774	1805	1805	1865	1755	1615
Q Serve(g_s), s	0.9	7.9	7.9	8.0	5.0	1.5
Cycle Q Clear(g_c), s	0.9	7.9	7.9	8.0	5.0	1.5
Prop In Lane	1.00			0.11	1.00	1.00
Lane Grp Cap(c), veh/h	440	1994	613	634	747	344
V/C Ratio(X)	0.17	0.53	0.65	0.65	0.61	0.20
Avail Cap(c_a), veh/h	563	2713	848	876	5195	2390
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	7.3	6.0	11.9	11.9	15.2	13.8
Incr Delay (d2), s/veh	0.2	0.2	1.2	1.1	0.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	3.9	4.1	4.2	2.5	1.5
LnGrp Delay(d),s/veh	7.4	6.3	13.1	13.0	16.0	14.1
LnGrp LOS	A	A	B	B	B	B
Approach Vol, veh/h		1130	809		528	
Approach Delay, s/veh		6.3	13.0		15.7	
Approach LOS		A	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				28.5		14.1	9.0	19.5
Change Period (Y+Rc), s				5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s				32.0		63.0	7.0	20.0
Max Q Clear Time (g_c+I1), s				9.9		7.0	2.9	10.0
Green Ext Time (p_c), s				6.2		2.0	0.0	4.5

Intersection Summary	
HCM 2010 Ctrl Delay	10.5
HCM 2010 LOS	B

HCM 2010 TWSC
2: Drive A & Wilson Bridge Road

01/04/2018

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1252	8	13	708	7	7
Future Vol, veh/h	1252	8	13	708	7	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	67	75	65	92	58	58
Heavy Vehicles, %	2	0	0	2	0	0
Mvmt Flow	1869	11	20	770	12	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1879	0	2299	940
Stage 1	-	-	-	-	1874	-
Stage 2	-	-	-	-	425	-
Critical Hdwy	-	-	4.1	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	324	-	33	269
Stage 1	-	-	-	-	109	-
Stage 2	-	-	-	-	633	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	324	-	29	269
Mov Cap-2 Maneuver	-	-	-	-	29	-
Stage 1	-	-	-	-	109	-
Stage 2	-	-	-	-	565	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	124
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	52	-	-	324	-
HCM Lane V/C Ratio	0.464	-	-	0.062	-
HCM Control Delay (s)	124	-	-	16.8	0.9
HCM Lane LOS	F	-	-	C	A
HCM 95th %tile Q(veh)	1.7	-	-	0.2	-

HCM 2010 Signalized Intersection Summary
4: US 23 (High Street) & Wilson Bridge Road

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	661	305	209	133	280	517	71	601	259	209	497	368
Future Volume (veh/h)	661	305	209	133	280	517	71	601	259	209	497	368
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	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	1900	1900	1900	1881	1881	1900	1900	1887	1900	1900	1900	1900
Adj Flow Rate, veh/h	769	401	252	171	350	623	93	781	398	299	512	497
Adj No. of Lanes	2	1	1	1	1	2	1	3	0	2	2	1
Peak Hour Factor	0.86	0.76	0.83	0.78	0.80	0.83	0.76	0.77	0.65	0.70	0.97	0.74
Percent Heavy Veh, %	0	0	0	1	1	0	0	1	1	0	0	0
Cap, veh/h	960	456	548	490	451	964	303	870	403	351	915	847
Arrive On Green	0.27	0.24	0.24	0.27	0.24	0.24	0.20	0.51	0.51	0.10	0.25	0.25
Sat Flow, veh/h	3510	1900	1609	1792	1881	2832	1810	3435	1591	3510	3610	1602
Grp Volume(v), veh/h	769	401	252	171	350	623	93	781	398	299	512	497
Grp Sat Flow(s),veh/h/ln	1755	1900	1609	1792	1881	1416	1810	1718	1591	1755	1805	1602
Q Serve(g_s), s	30.6	30.5	18.4	11.5	26.1	27.9	4.9	30.9	37.0	12.6	18.5	31.9
Cycle Q Clear(g_c), s	30.6	30.5	18.4	11.5	26.1	27.9	4.9	30.9	37.0	12.6	18.5	31.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	960	456	548	490	451	964	303	870	403	351	915	847
V/C Ratio(X)	0.80	0.88	0.46	0.35	0.78	0.65	0.31	0.90	0.99	0.85	0.56	0.59
Avail Cap(c_a), veh/h	960	456	548	490	451	964	303	870	403	351	915	847
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.7	54.9	38.7	43.8	53.2	41.9	30.5	35.2	36.8	66.4	48.7	24.4
Incr Delay (d2), s/veh	7.0	20.8	2.8	2.0	12.3	3.3	2.6	13.9	41.8	22.1	2.5	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.8	18.7	8.6	6.0	15.1	11.4	2.6	16.2	20.8	7.2	9.6	14.8
LnGrp Delay(d),s/veh	57.7	75.7	41.5	45.7	65.5	45.2	33.1	49.1	78.6	88.5	51.2	27.3
LnGrp LOS	E	E	D	D	E	D	C	D	E	F	D	C
Approach Vol, veh/h		1422			1144			1272			1308	
Approach Delay, s/veh		59.9			51.5			57.2			50.7	
Approach LOS		E			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	43.0	46.0	41.0	20.0	43.0	46.0	41.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.0	38.0	41.0	36.0	15.0	38.0	41.0	36.0
Max Q Clear Time (g_c+I1), s	10.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	55.0
HCM 2010 LOS	E

HCM 2010 Signalized Intersection Summary
6: US 23 (High Street) & Caren Avenue/Highland Avenue

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	87	23	35	39	59	64	57	794	8	64	731	91
Future Volume (veh/h)	87	23	35	39	59	64	57	794	8	64	731	91
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	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	1827	1900	1900	1845	1900	1900	1863	1882	1900	1863	1877	1900
Adj Flow Rate, veh/h	97	36	44	56	78	81	93	819	16	69	786	97
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.64	0.80	0.70	0.76	0.79	0.61	0.97	0.50	0.93	0.93	0.94
Percent Heavy Veh, %	4	0	0	3	0	0	2	1	1	2	1	1
Cap, veh/h	483	280	342	557	307	319	337	1482	29	288	1320	163
Arrive On Green	0.05	0.36	0.36	0.05	0.36	0.36	0.05	0.41	0.41	0.09	0.83	0.83
Sat Flow, veh/h	1740	778	951	1757	854	886	1774	3586	70	1774	3193	394
Grp Volume(v), veh/h	97	0	80	56	0	159	93	408	427	69	439	444
Grp Sat Flow(s),veh/h/ln	1740	0	1728	1757	0	1740	1774	1787	1869	1774	1783	1804
Q Serve(g_s), s	5.3	0.0	4.7	2.9	0.0	9.7	4.5	26.0	26.0	3.2	12.6	12.6
Cycle Q Clear(g_c), s	5.3	0.0	4.7	2.9	0.0	9.7	4.5	26.0	26.0	3.2	12.6	12.6
Prop In Lane	1.00		0.55	1.00		0.51	1.00		0.04	1.00		0.22
Lane Grp Cap(c), veh/h	483	0	622	557	0	626	337	739	772	288	737	746
V/C Ratio(X)	0.20	0.00	0.13	0.10	0.00	0.25	0.28	0.55	0.55	0.24	0.60	0.60
Avail Cap(c_a), veh/h	483	0	622	557	0	626	337	739	772	288	737	746
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.3	0.0	32.2	27.3	0.0	33.8	23.7	33.5	33.5	24.0	8.7	8.7
Incr Delay (d2), s/veh	0.9	0.0	0.4	0.4	0.0	1.0	2.0	3.0	2.8	2.0	3.5	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	2.3	1.5	0.0	4.8	2.4	13.4	14.0	1.7	6.6	6.6
LnGrp Delay(d),s/veh	29.2	0.0	32.6	27.7	0.0	34.8	25.7	36.4	36.3	26.0	12.2	12.2
LnGrp LOS	C		C	C		C	C	D	D	C	B	B
Approach Vol, veh/h		177			215			928			952	
Approach Delay, s/veh		30.8			32.9			35.3			13.2	
Approach LOS		C			C			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	67.0	12.0	59.0	12.0	67.0	12.0	59.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	62.0	7.0	54.0	7.0	62.0	7.0	54.0
Max Q Clear Time (g_c+I1), s	11.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	25.5
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↱	
Traffic Vol, veh/h	4	126	186	21	19	4
Future Vol, veh/h	4	126	186	21	19	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	92	92	88	53	50
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	8	137	202	24	36	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	226	0	-	0	367	214
Stage 1	-	-	-	-	214	-
Stage 2	-	-	-	-	153	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1354	-	-	-	637	831
Stage 1	-	-	-	-	826	-
Stage 2	-	-	-	-	880	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1354	-	-	-	633	831
Mov Cap-2 Maneuver	-	-	-	-	633	-
Stage 1	-	-	-	-	826	-
Stage 2	-	-	-	-	875	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	10.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1354	-	-	-	662
HCM Lane V/C Ratio	0.006	-	-	-	0.066
HCM Control Delay (s)	7.7	-	-	-	10.8
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection: 1: Wilson Bridge Road & Mall Drive

Movement	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	T	T	T	TR	L	L	R
Maximum Queue (ft)	65	187	145	103	113	151	119	49
Average Queue (ft)	31	94	67	67	82	72	53	17
95th Queue (ft)	59	157	123	106	111	126	101	39
Link Distance (ft)		423	423	81	81	274	274	274
Upstream Blk Time (%)				4	8			
Queuing Penalty (veh)				15	27			
Storage Bay Dist (ft)	300							
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 2: Drive A & Wilson Bridge Road

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (ft)	57	70	102	123	40
Average Queue (ft)	5	5	22	25	10
95th Queue (ft)	30	31	70	85	35
Link Distance (ft)	81	81	317	317	185
Upstream Blk Time (%)	0	0			
Queuing Penalty (veh)	0	0			
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Drive B & Wilson Bridge Road

Movement	EB	EB	EB	WB	NB
Directions Served	T	T	T	LT	LR
Maximum Queue (ft)	17	6	48	53	39
Average Queue (ft)	1	0	2	6	8
95th Queue (ft)	11	6	22	29	30
Link Distance (ft)	317	317	317	390	167
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: US 23 (High Street) & Wilson Bridge Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	T	R	R	L	T	T	TR
Maximum Queue (ft)	383	374	390	123	174	532	246	225	107	214	230	268
Average Queue (ft)	245	237	232	51	125	256	159	116	51	139	146	179
95th Queue (ft)	352	347	368	97	208	458	235	221	97	197	214	266
Link Distance (ft)	390	390	390	390		1035	1035		250	250	250	250
Upstream Blk Time (%)	0	0	1							0	0	4
Queuing Penalty (veh)	1	1	3							0	0	10
Storage Bay Dist (ft)					150			350				
Storage Blk Time (%)					8	26						
Queuing Penalty (veh)					23	36						

Intersection: 4: US 23 (High Street) & Wilson Bridge Road

Movement	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	R
Maximum Queue (ft)	210	229	305	273	141
Average Queue (ft)	91	135	187	166	51
95th Queue (ft)	191	205	269	245	97
Link Distance (ft)			741	741	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	525	525			525
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: US 23 (High Street) & Drive C

Movement	EB	NB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LT	T	T	T	T	T	TR
Maximum Queue (ft)	30	54	15	10	45	49	142	151
Average Queue (ft)	2	4	1	0	4	3	28	44
95th Queue (ft)	14	26	11	7	31	23	92	110
Link Distance (ft)	159	94	94	94	94		250	250
Upstream Blk Time (%)		0			0		0	
Queuing Penalty (veh)		0			0		0	
Storage Bay Dist (ft)						50		
Storage Blk Time (%)						0	6	
Queuing Penalty (veh)						0	19	

Intersection: 6: US 23 (High Street) & Caren Avenue/Highland Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	120	86	70	237	109	540	540	102	107	106
Average Queue (ft)	51	31	20	68	41	283	467	45	86	91
95th Queue (ft)	102	69	61	156	89	642	626	90	119	116
Link Distance (ft)	201	201		376		521	521	94	94	94
Upstream Blk Time (%)						7	26	4	19	27
Queuing Penalty (veh)						0	0	11	57	81
Storage Bay Dist (ft)			50		200					
Storage Blk Time (%)			3	21		0				
Queuing Penalty (veh)			4	8		0				

Intersection: 7: Caren Avenue & Drive D

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	23	44
Average Queue (ft)	1	16
95th Queue (ft)	13	43
Link Distance (ft)	131	151
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 299

HCM 2010 Signalized Intersection Summary
1: Wilson Bridge Road & Mall Drive

01/04/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	42	906	640	45	125	9
Future Volume (veh/h)	42	906	640	45	125	9
Number	7	4	8	18	1	16
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	1900	1863	1883	1900	1863	1900
Adj Flow Rate, veh/h	56	1079	736	56	137	18
Adj No. of Lanes	1	2	2	0	2	1
Peak Hour Factor	0.75	0.84	0.87	0.81	0.91	0.50
Percent Heavy Veh, %	0	2	1	1	2	0
Cap, veh/h	464	2009	1161	88	528	248
Arrive On Green	0.08	0.57	0.34	0.34	0.15	0.15
Sat Flow, veh/h	1810	3632	3464	256	3442	1615
Grp Volume(v), veh/h	56	1079	390	402	137	18
Grp Sat Flow(s),veh/h/ln	1810	1770	1788	1837	1721	1615
Q Serve(g_s), s	0.6	6.8	6.6	6.6	1.3	0.3
Cycle Q Clear(g_c), s	0.6	6.8	6.6	6.6	1.3	0.3
Prop In Lane	1.00			0.14	1.00	1.00
Lane Grp Cap(c), veh/h	464	2009	616	633	528	248
V/C Ratio(X)	0.12	0.54	0.63	0.63	0.26	0.07
Avail Cap(c_a), veh/h	666	2764	798	820	3552	1667
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	6.0	4.8	9.9	9.9	13.4	13.0
Incr Delay (d2), s/veh	0.1	0.2	1.1	1.1	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	3.4	3.3	3.4	0.6	0.3
LnGrp Delay(d),s/veh	6.2	5.0	10.9	10.9	13.6	13.1
LnGrp LOS	A	A	B	B	B	B
Approach Vol, veh/h		1135	792		155	
Approach Delay, s/veh		5.1	10.9		13.6	
Approach LOS		A	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				25.3		10.5	8.0	17.4
Change Period (Y+Rc), s				5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s				28.0		37.0	7.0	16.0
Max Q Clear Time (g_c+I1), s				8.8		3.3	2.6	8.6
Green Ext Time (p_c), s				6.0		0.5	0.0	3.8

Intersection Summary	
HCM 2010 Ctrl Delay	7.9
HCM 2010 LOS	A

HCM 2010 TWSC
2: Drive A & Wilson Bridge Road

01/04/2018

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1028	3	1	682	3	9
Future Vol, veh/h	1028	3	1	682	3	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	75	92	92	38	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1117	4	1	741	8	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1121	0	1492	561
Stage 1	-	-	-	-	1119	-
Stage 2	-	-	-	-	373	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	619	-	114	471
Stage 1	-	-	-	-	274	-
Stage 2	-	-	-	-	666	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	619	-	114	471
Mov Cap-2 Maneuver	-	-	-	-	114	-
Stage 1	-	-	-	-	274	-
Stage 2	-	-	-	-	664	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	23.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	210	-	-	619	-
HCM Lane V/C Ratio	0.095	-	-	0.002	-
HCM Control Delay (s)	23.9	-	-	10.8	0
HCM Lane LOS	C	-	-	B	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

HCM 2010 Signalized Intersection Summary
4: US 23 (High Street) & Wilson Bridge Road

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	406	417	213	128	299	307	167	668	179	527	593	510
Future Volume (veh/h)	406	417	213	128	299	307	167	668	179	527	593	510
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1900	1900	1845	1863	1827	1881	1838	1900	1900	1900	1900
Adj Flow Rate, veh/h	467	458	277	151	340	330	211	786	206	599	618	593
Adj No. of Lanes	2	1	1	1	1	2	1	3	0	2	2	1
Peak Hour Factor	0.87	0.91	0.77	0.85	0.88	0.93	0.79	0.85	0.87	0.88	0.96	0.86
Percent Heavy Veh, %	0	0	0	3	2	4	1	4	4	0	0	0
Cap, veh/h	614	511	735	307	501	1245	422	967	251	658	880	675
Arrive On Green	0.17	0.27	0.27	0.17	0.27	0.27	0.38	0.49	0.49	0.19	0.24	0.24
Sat Flow, veh/h	3510	1900	1610	1757	1863	2724	1792	3966	1030	3510	3610	1609
Grp Volume(v), veh/h	467	458	277	151	340	330	211	662	330	599	618	593
Grp Sat Flow(s),veh/h/ln	1755	1900	1610	1757	1863	1362	1792	1673	1652	1755	1805	1609
Q Serve(g_s), s	20.3	37.2	18.1	12.4	26.1	12.0	10.8	26.8	27.3	26.7	25.0	39.0
Cycle Q Clear(g_c), s	20.3	37.2	18.1	12.4	26.1	12.0	10.8	26.8	27.3	26.7	25.0	39.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.62	1.00		1.00
Lane Grp Cap(c), veh/h	614	511	735	307	501	1245	422	815	403	658	880	675
V/C Ratio(X)	0.76	0.90	0.38	0.49	0.68	0.27	0.50	0.81	0.82	0.91	0.70	0.88
Avail Cap(c_a), veh/h	614	511	735	307	501	1245	422	815	403	658	880	675
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.8	56.4	28.6	59.6	52.3	26.9	24.6	37.9	38.0	63.7	55.2	42.8
Incr Delay (d2), s/veh	8.6	21.1	1.5	5.5	7.2	0.5	4.2	8.6	16.9	18.9	4.7	15.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.6	22.5	8.3	6.5	14.4	4.6	5.7	13.3	14.2	14.7	13.0	26.9
LnGrp Delay(d),s/veh	71.4	77.5	30.0	65.1	59.6	27.4	28.8	46.5	54.9	82.5	59.9	57.9
LnGrp LOS	E	E	C	E	E	C	C	D	D	F	E	E
Approach Vol, veh/h		1202			821			1203			1810	
Approach Delay, s/veh		64.2			47.7			45.7			66.7	
Approach LOS		E			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	35.0	44.0	33.0	48.0	35.0	44.0	33.0	48.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	39.0	28.0	43.0	30.0	39.0	28.0	43.0
Max Q Clear Time (g_c+I1), s	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	58.0
HCM 2010 LOS	E

HCM 2010 Signalized Intersection Summary
6: US 23 (High Street) & Caren Avenue/Highland Avenue

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	42	51	46	33	79	44	706	13	118	704	104
Future Volume (veh/h)	125	42	51	46	33	79	44	706	13	118	704	104
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1864	1900	1900	1900	1900	1863	1882	1900	1900	1881	1900
Adj Flow Rate, veh/h	164	47	74	60	51	104	69	894	22	149	749	133
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.76	0.89	0.69	0.77	0.65	0.76	0.64	0.79	0.60	0.79	0.94	0.78
Percent Heavy Veh, %	0	5	5	0	0	0	2	1	1	0	1	1
Cap, veh/h	488	232	366	519	199	405	351	1538	38	273	1309	232
Arrive On Green	0.04	0.36	0.36	0.04	0.36	0.36	0.04	0.43	0.43	0.09	0.86	0.86
Sat Flow, veh/h	1810	652	1027	1810	558	1138	1774	3566	88	1810	3035	539
Grp Volume(v), veh/h	164	0	121	60	0	155	69	448	468	149	441	441
Grp Sat Flow(s),veh/h/ln	1810	0	1679	1810	0	1696	1774	1788	1866	1810	1787	1786
Q Serve(g_s), s	7.0	0.0	8.0	3.3	0.0	10.4	3.4	30.4	30.4	7.0	10.7	10.7
Cycle Q Clear(g_c), s	7.0	0.0	8.0	3.3	0.0	10.4	3.4	30.4	30.4	7.0	10.7	10.7
Prop In Lane	1.00		0.61	1.00		0.67	1.00		0.05	1.00		0.30
Lane Grp Cap(c), veh/h	488	0	598	519	0	604	351	771	805	273	771	770
V/C Ratio(X)	0.34	0.00	0.20	0.12	0.00	0.26	0.20	0.58	0.58	0.54	0.57	0.57
Avail Cap(c_a), veh/h	488	0	598	519	0	604	351	771	805	273	771	770
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.1	0.0	35.7	30.0	0.0	36.5	23.3	34.5	34.5	28.9	7.0	7.0
Incr Delay (d2), s/veh	1.9	0.0	0.8	0.5	0.0	1.0	1.3	3.2	3.1	7.6	3.1	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	3.8	1.7	0.0	5.0	1.8	15.7	16.4	2.6	5.6	5.6
LnGrp Delay(d),s/veh	35.9	0.0	36.5	30.5	0.0	37.5	24.6	37.7	37.6	36.5	10.1	10.1
LnGrp LOS	D		D	C		D	C	D	D	D	B	B
Approach Vol, veh/h		285			215			985			1031	
Approach Delay, s/veh		36.2			35.5			36.7			13.9	
Approach LOS		D			D			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	74.0	12.0	62.0	12.0	74.0	12.0	62.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	69.0	7.0	57.0	7.0	69.0	7.0	57.0
Max Q Clear Time (g_c+I1), s	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	27.2
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↱	
Traffic Vol, veh/h	7	214	175	6	4	4
Future Vol, veh/h	7	214	175	6	4	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	35	92	92	50	50	50
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	20	233	190	12	8	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	202	0	-	0	469	196
Stage 1	-	-	-	-	196	-
Stage 2	-	-	-	-	273	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1382	-	-	-	556	850
Stage 1	-	-	-	-	842	-
Stage 2	-	-	-	-	778	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1382	-	-	-	547	850
Mov Cap-2 Maneuver	-	-	-	-	547	-
Stage 1	-	-	-	-	842	-
Stage 2	-	-	-	-	765	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1382	-	-	-	666
HCM Lane V/C Ratio	0.014	-	-	-	0.024
HCM Control Delay (s)	7.6	-	-	-	10.5
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection: 1: Wilson Bridge Road & Mall Drive

Movement	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	T	T	T	TR	L	L	R
Maximum Queue (ft)	60	126	170	101	101	81	72	26
Average Queue (ft)	22	53	63	46	64	24	32	6
95th Queue (ft)	49	107	122	90	100	57	60	21
Link Distance (ft)		423	423	81	81	274	274	274
Upstream Blk Time (%)				1	3			
Queuing Penalty (veh)				3	9			
Storage Bay Dist (ft)	300							
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 2: Drive A & Wilson Bridge Road

Movement	EB	WB	WB	NB
Directions Served	TR	LT	T	LR
Maximum Queue (ft)	5	47	74	47
Average Queue (ft)	0	4	7	11
95th Queue (ft)	4	29	40	36
Link Distance (ft)	81	317	317	185
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Drive B & Wilson Bridge Road

Movement	EB	EB	EB	WB	NB
Directions Served	T	T	TR	LT	LR
Maximum Queue (ft)	33	161	6	60	43
Average Queue (ft)	2	25	0	8	7
95th Queue (ft)	29	113	5	36	30
Link Distance (ft)	317	317		390	167
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			250		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: US 23 (High Street) & Wilson Bridge Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	T	R	R	L	T	T	TR
Maximum Queue (ft)	264	266	405	180	175	550	190	161	224	245	249	264
Average Queue (ft)	174	162	297	56	141	261	95	44	110	170	162	173
95th Queue (ft)	253	240	431	126	212	423	167	123	190	222	230	263
Link Distance (ft)	390	390	390	390		1035	1035		250	250	250	250
Upstream Blk Time (%)			5	0					0	0	0	3
Queuing Penalty (veh)			14	0					1	0	0	7
Storage Bay Dist (ft)					150			350				
Storage Blk Time (%)					12	25						
Queuing Penalty (veh)					38	32						

Intersection: 4: US 23 (High Street) & Wilson Bridge Road

Movement	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	R
Maximum Queue (ft)	430	468	348	326	240
Average Queue (ft)	250	295	222	208	99
95th Queue (ft)	383	433	328	312	197
Link Distance (ft)			741	741	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	525	525			525
Storage Blk Time (%)		0			
Queuing Penalty (veh)		0			

Intersection: 5: US 23 (High Street) & Drive C

Movement	EB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LT	T	T	T	T	TR
Maximum Queue (ft)	24	33	24	30	74	212	194
Average Queue (ft)	1	2	1	2	15	25	37
95th Queue (ft)	10	19	13	22	58	116	120
Link Distance (ft)	159	94	94	94		250	250
Upstream Blk Time (%)				0		0	
Queuing Penalty (veh)				0		0	
Storage Bay Dist (ft)					50		
Storage Blk Time (%)					10	1	
Queuing Penalty (veh)					32	4	

Intersection: 6: US 23 (High Street) & Caren Avenue/Highland Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	159	113	72	176	125	501	534	113	96	121
Average Queue (ft)	75	47	22	57	31	130	357	68	66	86
95th Queue (ft)	138	95	59	127	82	369	530	117	112	116
Link Distance (ft)	201	201		376		521	521	94	94	94
Upstream Blk Time (%)	0					1	3	16	8	21
Queuing Penalty (veh)	0					0	0	49	24	65
Storage Bay Dist (ft)			50		200					
Storage Blk Time (%)			2	14		1				
Queuing Penalty (veh)			2	7		0				

Intersection: 7: Caren Avenue & Drive D

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	29	31
Average Queue (ft)	2	6
95th Queue (ft)	15	25
Link Distance (ft)	131	151
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 287

HCM 2010 Signalized Intersection Summary
1: Wilson Bridge Road & Mall Drive

01/04/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	58	909	723	37	430	62
Future Volume (veh/h)	58	909	723	37	430	62
Number	7	4	8	18	1	16
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	1863	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	77	1122	812	48	489	73
Adj No. of Lanes	1	2	2	0	2	1
Peak Hour Factor	0.75	0.81	0.89	0.77	0.88	0.85
Percent Heavy Veh, %	2	0	0	0	0	0
Cap, veh/h	427	2005	1201	71	772	355
Arrive On Green	0.10	0.56	0.35	0.35	0.22	0.22
Sat Flow, veh/h	1774	3705	3559	205	3510	1615
Grp Volume(v), veh/h	77	1122	423	437	489	73
Grp Sat Flow(s),veh/h/ln	1774	1805	1805	1864	1755	1615
Q Serve(g_s), s	1.0	8.9	8.9	8.9	5.6	1.6
Cycle Q Clear(g_c), s	1.0	8.9	8.9	8.9	5.6	1.6
Prop In Lane	1.00			0.11	1.00	1.00
Lane Grp Cap(c), veh/h	427	2005	626	646	772	355
V/C Ratio(X)	0.18	0.56	0.68	0.68	0.63	0.21
Avail Cap(c_a), veh/h	534	2593	810	837	4965	2284
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	7.6	6.4	12.4	12.4	15.7	14.2
Incr Delay (d2), s/veh	0.2	0.2	1.5	1.4	0.9	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	4.4	4.6	4.8	2.8	1.6
LnGrp Delay(d),s/veh	7.8	6.6	13.9	13.9	16.6	14.5
LnGrp LOS	A	A	B	B	B	B
Approach Vol, veh/h		1199	860		562	
Approach Delay, s/veh		6.7	13.9		16.3	
Approach LOS		A	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				29.7		14.8	9.3	20.4
Change Period (Y+Rc), s				5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s				32.0		63.0	7.0	20.0
Max Q Clear Time (g_c+I1), s				10.9		7.6	3.0	10.9
Green Ext Time (p_c), s				6.7		2.2	0.0	4.5

Intersection Summary	
HCM 2010 Ctrl Delay	11.1
HCM 2010 LOS	B

HCM 2010 TWSC
2: Drive A & Wilson Bridge Road

01/04/2018

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1331	8	13	753	7	7
Future Vol, veh/h	1331	8	13	753	7	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	67	75	65	92	58	58
Heavy Vehicles, %	2	0	0	2	0	0
Mvmt Flow	1987	11	20	818	12	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1997	0	2441	999
Stage 1	-	-	-	-	1992	-
Stage 2	-	-	-	-	449	-
Critical Hdwy	-	-	4.1	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	291	-	27	245
Stage 1	-	-	-	-	94	-
Stage 2	-	-	-	-	616	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	291	-	24	245
Mov Cap-2 Maneuver	-	-	-	-	24	-
Stage 1	-	-	-	-	94	-
Stage 2	-	-	-	-	538	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	159.9
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	44	-	-	291	-
HCM Lane V/C Ratio	0.549	-	-	0.069	-
HCM Control Delay (s)	159.9	-	-	18.3	1.1
HCM Lane LOS	F	-	-	C	A
HCM 95th %tile Q(veh)	2	-	-	0.2	-

HCM 2010 Signalized Intersection Summary
4: US 23 (High Street) & Wilson Bridge Road

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	703	324	222	141	297	549	75	639	276	222	529	391
Future Volume (veh/h)	703	324	222	141	297	549	75	639	276	222	529	391
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	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	1900	1900	1900	1881	1881	1900	1900	1888	1900	1900	1900	1900
Adj Flow Rate, veh/h	817	426	267	181	371	661	99	830	425	317	545	528
Adj No. of Lanes	2	1	1	1	1	2	1	3	0	2	2	1
Peak Hour Factor	0.86	0.76	0.83	0.78	0.80	0.83	0.76	0.77	0.65	0.70	0.97	0.74
Percent Heavy Veh, %	0	0	0	1	1	0	0	1	1	0	0	0
Cap, veh/h	983	443	537	502	439	945	293	870	403	351	915	858
Arrive On Green	0.28	0.23	0.23	0.28	0.23	0.23	0.20	0.51	0.51	0.10	0.25	0.25
Sat Flow, veh/h	3510	1900	1609	1792	1881	2831	1810	3435	1591	3510	3610	1602
Grp Volume(v), veh/h	817	426	267	181	371	661	99	830	425	317	545	528
Grp Sat Flow(s),veh/h/ln	1755	1900	1609	1792	1881	1416	1810	1718	1591	1755	1805	1602
Q Serve(g_s), s	32.8	33.2	19.9	12.1	28.3	30.5	5.3	34.6	38.0	13.4	19.9	34.4
Cycle Q Clear(g_c), s	32.8	33.2	19.9	12.1	28.3	30.5	5.3	34.6	38.0	13.4	19.9	34.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	983	443	537	502	439	945	293	870	403	351	915	858
V/C Ratio(X)	0.83	0.96	0.50	0.36	0.85	0.70	0.34	0.95	1.05	0.90	0.60	0.62
Avail Cap(c_a), veh/h	983	443	537	502	439	945	293	870	403	351	915	858
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.7	56.8	40.0	43.2	54.9	43.5	30.8	36.2	37.0	66.8	49.2	24.4
Incr Delay (d2), s/veh	8.1	34.0	3.3	2.0	17.8	4.3	3.1	21.1	59.9	28.8	2.9	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.0	21.6	9.3	6.3	16.9	12.5	2.9	18.7	23.1	7.9	10.3	15.9
LnGrp Delay(d),s/veh	58.8	90.8	43.2	45.3	72.7	47.8	33.9	57.3	96.9	95.6	52.1	27.7
LnGrp LOS	E	F	D	D	E	D	C	E	F	F	D	C
Approach Vol, veh/h		1510			1213			1354			1390	
Approach Delay, s/veh		65.1			55.0			68.0			52.7	
Approach LOS		E			E			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	43.0	47.0	40.0	20.0	43.0	47.0	40.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.0	38.0	42.0	35.0	15.0	38.0	42.0	35.0
Max Q Clear Time (g_c+I1), s	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	60.4
HCM 2010 LOS	E

HCM 2010 Signalized Intersection Summary
6: US 23 (High Street) & Caren Avenue/Highland Avenue

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	25	37	42	61	68	59	843	9	68	777	97
Future Volume (veh/h)	93	25	37	42	61	68	59	843	9	68	777	97
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	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	1827	1900	1900	1845	1900	1900	1863	1882	1900	1863	1877	1900
Adj Flow Rate, veh/h	103	39	46	60	80	86	97	869	18	73	835	103
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.64	0.80	0.70	0.76	0.79	0.61	0.97	0.50	0.93	0.93	0.94
Percent Heavy Veh, %	4	0	0	3	0	0	2	1	1	2	1	1
Cap, veh/h	468	281	331	543	296	318	328	1504	31	277	1341	165
Arrive On Green	0.05	0.35	0.35	0.05	0.35	0.35	0.05	0.42	0.42	0.09	0.84	0.84
Sat Flow, veh/h	1740	794	937	1757	837	900	1774	3581	74	1774	3194	394
Grp Volume(v), veh/h	103	0	85	60	0	166	97	434	453	73	466	472
Grp Sat Flow(s),veh/h/ln	1740	0	1731	1757	0	1738	1774	1787	1868	1774	1783	1804
Q Serve(g_s), s	5.7	0.0	5.0	3.2	0.0	10.2	4.6	27.9	27.9	3.4	13.2	13.2
Cycle Q Clear(g_c), s	5.7	0.0	5.0	3.2	0.0	10.2	4.6	27.9	27.9	3.4	13.2	13.2
Prop In Lane	1.00		0.54	1.00		0.52	1.00		0.04	1.00		0.22
Lane Grp Cap(c), veh/h	468	0	612	543	0	614	328	751	784	277	749	758
V/C Ratio(X)	0.22	0.00	0.14	0.11	0.00	0.27	0.30	0.58	0.58	0.26	0.62	0.62
Avail Cap(c_a), veh/h	468	0	612	543	0	614	328	751	784	277	749	758
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.1	0.0	33.0	28.0	0.0	34.7	23.3	33.3	33.3	23.9	8.0	8.0
Incr Delay (d2), s/veh	1.1	0.0	0.5	0.4	0.0	1.1	2.3	3.2	3.1	2.3	3.9	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	2.5	1.6	0.0	5.1	2.4	14.4	15.0	1.8	7.0	7.1
LnGrp Delay(d),s/veh	30.2	0.0	33.5	28.5	0.0	35.8	25.5	36.5	36.4	26.2	11.9	11.8
LnGrp LOS	C		C	C		D	C	D	D	C	B	B
Approach Vol, veh/h		188			226			984			1011	
Approach Delay, s/veh		31.7			33.8			35.4			12.9	
Approach LOS		C			C			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	68.0	12.0	58.0	12.0	68.0	12.0	58.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	63.0	7.0	53.0	7.0	63.0	7.0	53.0
Max Q Clear Time (g_c+I1), s	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	25.5
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↱	
Traffic Vol, veh/h	4	136	196	21	19	4
Future Vol, veh/h	4	136	196	21	19	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	92	92	88	53	50
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	8	148	213	24	36	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	237	0	-	0	389	225
Stage 1	-	-	-	-	225	-
Stage 2	-	-	-	-	164	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1342	-	-	-	619	819
Stage 1	-	-	-	-	817	-
Stage 2	-	-	-	-	870	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1342	-	-	-	615	819
Mov Cap-2 Maneuver	-	-	-	-	615	-
Stage 1	-	-	-	-	817	-
Stage 2	-	-	-	-	865	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1342	-	-	-	644
HCM Lane V/C Ratio	0.006	-	-	-	0.068
HCM Control Delay (s)	7.7	-	-	-	11
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection: 1: Wilson Bridge Road & Mall Drive

Movement	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	L	T	T	T	TR	L	L	R
Maximum Queue (ft)	69	224	190	117	115	168	128	54
Average Queue (ft)	32	108	83	75	86	85	53	19
95th Queue (ft)	61	188	163	116	117	141	103	44
Link Distance (ft)		423	423	81	81	274	274	274
Upstream Blk Time (%)				8	12			
Queuing Penalty (veh)				29	48			
Storage Bay Dist (ft)	300							
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 2: Drive A & Wilson Bridge Road

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (ft)	87	77	146	156	51
Average Queue (ft)	7	6	35	39	14
95th Queue (ft)	42	37	102	114	43
Link Distance (ft)	81	81	317	317	185
Upstream Blk Time (%)	0	0			
Queuing Penalty (veh)	1	1			
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Drive B & Wilson Bridge Road

Movement	EB	EB	EB	WB	NB
Directions Served	T	T	T	LT	LR
Maximum Queue (ft)	61	46	41	66	48
Average Queue (ft)	5	3	3	9	10
95th Queue (ft)	41	26	28	39	36
Link Distance (ft)	317	317	317	390	167
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: US 23 (High Street) & Wilson Bridge Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	T	R	R	L	T	T	TR
Maximum Queue (ft)	383	381	391	123	174	653	276	241	107	230	244	268
Average Queue (ft)	265	258	238	54	129	309	170	128	53	152	162	198
95th Queue (ft)	371	368	385	106	211	584	250	227	94	217	230	271
Link Distance (ft)	390	390	390	390		1035	1035		250	250	250	250
Upstream Blk Time (%)	1	1	1							1	0	6
Queuing Penalty (veh)	3	2	4							1	1	17
Storage Bay Dist (ft)					150			350				
Storage Blk Time (%)					9	31	0					
Queuing Penalty (veh)					29	46	0					

Intersection: 4: US 23 (High Street) & Wilson Bridge Road

Movement	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	R
Maximum Queue (ft)	255	282	325	300	193
Average Queue (ft)	102	150	197	179	61
95th Queue (ft)	229	246	278	258	133
Link Distance (ft)			741	741	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	525	525			525
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: US 23 (High Street) & Drive C

Movement	EB	NB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LT	T	T	T	T	T	TR
Maximum Queue (ft)	24	69	37	15	94	16	123	142
Average Queue (ft)	1	6	1	1	8	1	28	44
95th Queue (ft)	12	38	17	11	47	8	89	111
Link Distance (ft)	159	94	94	94	94		250	250
Upstream Blk Time (%)		0	0		1			
Queuing Penalty (veh)		1	0		2			
Storage Bay Dist (ft)						50		
Storage Blk Time (%)							6	
Queuing Penalty (veh)							19	

Intersection: 6: US 23 (High Street) & Caren Avenue/Highland Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	146	94	75	203	105	544	541	97	99	120
Average Queue (ft)	56	30	26	65	43	355	507	54	84	92
95th Queue (ft)	118	69	70	140	85	697	609	94	116	116
Link Distance (ft)	201	201		376		521	521	94	94	94
Upstream Blk Time (%)						10	43	2	18	26
Queuing Penalty (veh)						0	0	7	57	83
Storage Bay Dist (ft)			50		200					
Storage Blk Time (%)			3	19		0				
Queuing Penalty (veh)			4	9		0				

Intersection: 7: Caren Avenue & Drive D

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	18	45
Average Queue (ft)	1	16
95th Queue (ft)	9	43
Link Distance (ft)	131	151
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 364

HCM 2010 Signalized Intersection Summary
4: US 23 (High Street) & Wilson Bridge Road

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	396	396	198	123	292	289	156	628	171	495	547	533
Future Volume (veh/h)	396	396	198	123	292	289	156	628	171	495	547	533
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1900	1900	1845	1863	1827	1881	1838	1900	1900	1900	1900
Adj Flow Rate, veh/h	455	435	257	145	332	311	197	739	197	562	570	620
Adj No. of Lanes	2	1	1	1	1	2	1	3	0	2	2	1
Peak Hour Factor	0.87	0.91	0.77	0.85	0.88	0.93	0.79	0.85	0.87	0.88	0.96	0.86
Percent Heavy Veh, %	0	0	0	3	2	4	1	4	4	0	0	0
Cap, veh/h	658	511	715	307	477	1210	414	964	254	658	925	715
Arrive On Green	0.19	0.27	0.27	0.17	0.26	0.26	0.35	0.49	0.49	0.19	0.26	0.26
Sat Flow, veh/h	3510	1900	1610	1757	1863	2723	1792	3953	1042	3510	3610	1609
Grp Volume(v), veh/h	455	435	257	145	332	311	197	624	312	562	570	620
Grp Sat Flow(s),veh/h/ln	1755	1900	1610	1757	1863	1362	1792	1673	1650	1755	1805	1609
Q Serve(g_s), s	19.4	34.7	16.9	11.9	25.8	11.5	10.3	24.4	24.9	24.8	22.3	41.0
Cycle Q Clear(g_c), s	19.4	34.7	16.9	11.9	25.8	11.5	10.3	24.4	24.9	24.8	22.3	41.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.63	1.00		1.00
Lane Grp Cap(c), veh/h	658	511	715	307	477	1210	414	815	402	658	925	715
V/C Ratio(X)	0.69	0.85	0.36	0.47	0.70	0.26	0.48	0.77	0.78	0.85	0.62	0.87
Avail Cap(c_a), veh/h	658	511	715	307	477	1210	414	815	402	658	925	715
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.7	55.5	29.5	59.3	53.9	27.9	25.2	37.3	37.4	62.9	52.6	40.3
Incr Delay (d2), s/veh	5.9	16.3	1.4	5.1	8.1	0.5	3.9	6.8	13.6	13.3	3.1	13.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.0	20.6	7.8	6.2	14.4	4.4	5.5	11.9	12.8	13.2	11.6	27.5
LnGrp Delay(d),s/veh	66.6	71.8	30.9	64.5	62.0	28.5	29.1	44.0	51.0	76.2	55.6	53.7
LnGrp LOS	E	E	C	E	E	C	C	D	D	E	E	D
Approach Vol, veh/h		1147			788			1133			1752	
Approach Delay, s/veh		60.5			49.2			43.4			61.5	
Approach LOS		E			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	35.0	44.0	33.0	48.0	33.0	46.0	35.0	46.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	39.0	28.0	43.0	28.0	41.0	30.0	41.0
Max Q Clear Time (g_c+I1), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	55.0
HCM 2010 LOS	E

HCM 2010 Signalized Intersection Summary
6: US 23 (High Street) & Caren Avenue/Highland Avenue

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	41	58	44	35	74	49	663	12	111	658	113
Future Volume (veh/h)	121	41	58	44	35	74	49	663	12	111	658	113
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1867	1900	1900	1900	1900	1863	1882	1900	1900	1881	1900
Adj Flow Rate, veh/h	159	46	84	57	54	97	77	839	20	141	700	145
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.76	0.89	0.69	0.77	0.65	0.76	0.64	0.79	0.60	0.79	0.94	0.78
Percent Heavy Veh, %	0	5	5	0	0	0	2	1	1	0	1	1
Cap, veh/h	520	189	344	537	194	349	365	1450	35	304	1198	248
Arrive On Green	0.09	0.32	0.32	0.09	0.32	0.32	0.06	0.41	0.41	0.13	0.81	0.81
Sat Flow, veh/h	1810	592	1081	1810	609	1094	1774	3569	85	1810	2950	611
Grp Volume(v), veh/h	159	0	130	57	0	151	77	420	439	141	424	421
Grp Sat Flow(s),veh/h/ln	1810	0	1673	1810	0	1703	1774	1788	1867	1810	1787	1773
Q Serve(g_s), s	9.2	0.0	9.2	3.1	0.0	10.6	3.9	29.2	29.2	7.3	13.5	13.6
Cycle Q Clear(g_c), s	9.2	0.0	9.2	3.1	0.0	10.6	3.9	29.2	29.2	7.3	13.5	13.6
Prop In Lane	1.00		0.65	1.00		0.64	1.00		0.05	1.00		0.34
Lane Grp Cap(c), veh/h	520	0	533	537	0	543	365	726	758	304	726	720
V/C Ratio(X)	0.31	0.00	0.24	0.11	0.00	0.28	0.21	0.58	0.58	0.46	0.58	0.58
Avail Cap(c_a), veh/h	520	0	533	537	0	543	365	726	758	304	726	720
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.3	0.0	40.3	29.4	0.0	40.7	24.3	36.9	36.9	26.0	10.2	10.2
Incr Delay (d2), s/veh	1.5	0.0	1.1	0.4	0.0	1.3	1.3	3.3	3.2	5.0	3.4	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	4.4	1.6	0.0	5.2	2.0	15.0	15.7	4.0	7.0	7.0
LnGrp Delay(d),s/veh	32.8	0.0	41.3	29.8	0.0	42.0	25.6	40.2	40.1	31.0	13.6	13.6
LnGrp LOS	C		D	C		D	C	D	D	C	B	B
Approach Vol, veh/h		289			208			936			986	
Approach Delay, s/veh		36.7			38.7			38.9			16.1	
Approach LOS		D			D			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	70.0	19.0	56.0	15.0	70.0	19.0	56.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	10.0	65.0	14.0	51.0	10.0	65.0	14.0	51.0
Max Q Clear Time (g_c+I1), s	11.3	31.2	5.1	11.2	5.9	15.6	11.2	12.6
Green Ext Time (p_c), s	0.0	19.8	0.0	3.0	0.0	24.1	0.1	3.0

Intersection Summary	
HCM 2010 Ctrl Delay	29.3
HCM 2010 LOS	C

Intersection						
Int Delay, s/veh	1.2					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	199	164	33	21	2
Future Vol, veh/h	4	199	164	33	21	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 Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	35	92	92	50	50	50
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	11	216	178	66	42	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	244	0	-	0	450	211
Stage 1	-	-	-	-	211	-
Stage 2	-	-	-	-	239	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1334	-	-	-	571	834
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	805	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1334	-	-	-	566	834
Mov Cap-2 Maneuver	-	-	-	-	566	-
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	798	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1334	-	-	-	582
HCM Lane V/C Ratio	0.009	-	-	-	0.079
HCM Control Delay (s)	7.7	-	-	-	11.7
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	842	36	76	591	43	17	0	34	117	0	8
Future Volume (veh/h)	39	842	36	76	591	43	17	0	34	117	0	8
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1864	1900	1900	1883	1900	1863	1863	1900	1863	1900	1900
Adj Flow Rate, veh/h	52	1002	39	83	679	53	18	0	37	129	0	16
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	2	1	0
Peak Hour Factor	0.75	0.84	0.92	0.92	0.87	0.81	0.92	0.92	0.92	0.91	0.92	0.50
Percent Heavy Veh, %	0	2	2	0	1	1	2	2	2	2	0	0
Cap, veh/h	275	1281	50	288	1660	129	355	0	317	731	0	342
Arrive On Green	0.37	0.37	0.37	0.03	0.16	0.16	0.20	0.00	0.20	0.21	0.00	0.21
Sat Flow, veh/h	735	3475	135	1810	3362	262	1774	0	1583	3442	0	1608
Grp Volume(v), veh/h	52	511	530	83	361	371	18	0	37	129	0	16
Grp Sat Flow(s),veh/h/ln	735	1771	1840	1810	1788	1835	1774	0	1583	1721	0	1608
Q Serve(g_s), s	8.4	40.9	40.9	4.2	29.0	29.0	1.3	0.0	3.1	4.9	0.0	1.3
Cycle Q Clear(g_c), s	17.4	40.9	40.9	4.2	29.0	29.0	1.3	0.0	3.1	4.9	0.0	1.3
Prop In Lane	1.00		0.07	1.00		0.14	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	275	653	678	288	883	906	355	0	317	731	0	342
V/C Ratio(X)	0.19	0.78	0.78	0.29	0.41	0.41	0.05	0.00	0.12	0.18	0.00	0.05
Avail Cap(c_a), veh/h	275	653	678	288	883	906	355	0	317	731	0	342
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	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	1.00
Uniform Delay (d), s/veh	40.7	44.8	44.8	31.7	46.0	46.0	51.7	0.0	52.4	51.5	0.0	50.1
Incr Delay (d2), s/veh	1.5	9.0	8.7	2.5	1.4	1.4	0.3	0.0	0.8	0.5	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	21.6	22.4	2.3	14.7	15.1	0.7	0.0	1.4	2.4	0.0	0.6
LnGrp Delay(d),s/veh	42.2	53.8	53.5	34.2	47.4	47.4	52.0	0.0	53.2	52.1	0.0	50.4
LnGrp LOS	D	D	D	C	D	D	D		D	D		D
Approach Vol, veh/h		1093			815			55			145	
Approach Delay, s/veh		53.1			46.1			52.8			51.9	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6		8
Phs Duration (G+Y+Rc), s		37.0	20.0	64.0		39.0		84.0
Change Period (Y+Rc), s		5.0	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s		32.0	16.0	59.0		34.0		79.0
Max Q Clear Time (g_c+I1), s		5.1	6.2	42.9		6.9		31.0
Green Ext Time (p_c), s		0.2	0.1	10.2		0.5		17.7

Intersection Summary	
HCM 2010 Ctrl Delay	50.3
HCM 2010 LOS	D

Intersection: 4: US 23 (High Street) & Wilson Bridge Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	T	R	R	L	T	T	TR
Maximum Queue (ft)	254	265	532	188	174	500	175	148	284	236	239	273
Average Queue (ft)	152	157	379	85	134	258	81	31	126	155	146	160
95th Queue (ft)	242	250	522	156	210	442	142	89	234	219	225	259
Link Distance (ft)	775	775	775	775		1034	1034		395	395	395	395
Upstream Blk Time (%)									0			
Queuing Penalty (veh)									0			
Storage Bay Dist (ft)					150			350				
Storage Blk Time (%)					10	24						
Queuing Penalty (veh)					32	30						

Intersection: 4: US 23 (High Street) & Wilson Bridge Road

Movement	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	R
Maximum Queue (ft)	393	514	706	709	549
Average Queue (ft)	230	278	322	514	283
95th Queue (ft)	350	425	749	809	644
Link Distance (ft)			736	736	
Upstream Blk Time (%)			1	7	
Queuing Penalty (veh)			0	0	
Storage Bay Dist (ft)	525	525			525
Storage Blk Time (%)		0	1	14	0
Queuing Penalty (veh)		0	7	72	1

Intersection: 6: US 23 (High Street) & Caren Avenue/Highland Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	172	136	72	138	147	534	537	191	197	210
Average Queue (ft)	73	62	19	52	40	184	351	85	98	117
95th Queue (ft)	145	124	54	111	102	469	550	163	170	186
Link Distance (ft)	201	201		375		521	521	395	395	395
Upstream Blk Time (%)	0					1	4			
Queuing Penalty (veh)	0					0	0			
Storage Bay Dist (ft)			50		200					
Storage Blk Time (%)			2	17		0				
Queuing Penalty (veh)			2	8		0				

Intersection: 7: Caren Avenue & Drive D

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	29	4	44
Average Queue (ft)	1	0	15
95th Queue (ft)	11	3	41
Link Distance (ft)	131	201	151
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 15: Drive A/Mall Drive & Wilson Bridge Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	L	TR
Maximum Queue (ft)	64	354	357	45	257	266	52	50	78	109	30
Average Queue (ft)	17	198	327	24	161	165	13	17	18	42	5
95th Queue (ft)	62	351	405	54	249	251	38	44	56	90	23
Link Distance (ft)		333	333		775	775	212	212	199	199	199
Upstream Blk Time (%)		2	31								
Queuing Penalty (veh)		0	0								
Storage Bay Dist (ft)	50			20							
Storage Blk Time (%)	1	40		23	30						
Queuing Penalty (veh)	3	16		68	23						

Network Summary

Network wide Queuing Penalty: 261

HCM 2010 Signalized Intersection Summary
4: US 23 (High Street) & Wilson Bridge Road

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	707	327	208	132	288	517	69	598	257	209	481	383
Future Volume (veh/h)	707	327	208	132	288	517	69	598	257	209	481	383
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	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	1900	1900	1900	1881	1881	1900	1900	1887	1900	1900	1900	1900
Adj Flow Rate, veh/h	822	430	251	169	360	623	91	777	395	299	496	518
Adj No. of Lanes	2	1	1	1	1	2	1	3	0	2	2	1
Peak Hour Factor	0.86	0.76	0.83	0.78	0.80	0.83	0.76	0.77	0.65	0.70	0.97	0.74
Percent Heavy Veh, %	0	0	0	1	1	0	0	1	1	0	0	0
Cap, veh/h	913	507	591	430	464	1021	309	847	392	398	939	836
Arrive On Green	0.26	0.27	0.27	0.24	0.25	0.25	0.20	0.49	0.49	0.11	0.26	0.26
Sat Flow, veh/h	3510	1900	1610	1792	1881	2832	1810	3435	1591	3510	3610	1602
Grp Volume(v), veh/h	822	430	251	169	360	623	91	777	395	299	496	518
Grp Sat Flow(s),veh/h/ln	1755	1900	1610	1792	1881	1416	1810	1718	1591	1755	1805	1602
Q Serve(g_s), s	33.9	32.2	17.6	11.9	26.7	27.1	4.9	31.4	37.0	12.4	17.7	34.4
Cycle Q Clear(g_c), s	33.9	32.2	17.6	11.9	26.7	27.1	4.9	31.4	37.0	12.4	17.7	34.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	913	507	591	430	464	1021	309	847	392	398	939	836
V/C Ratio(X)	0.90	0.85	0.42	0.39	0.78	0.61	0.29	0.92	1.01	0.75	0.53	0.62
Avail Cap(c_a), veh/h	913	507	591	430	464	1021	309	847	392	398	939	836
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.6	52.1	35.6	47.8	52.6	39.4	30.7	36.6	38.0	64.5	47.6	25.5
Incr Delay (d2), s/veh	13.7	16.1	2.2	2.7	12.0	2.7	2.4	16.3	47.1	12.3	2.1	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.2	19.1	8.2	6.2	15.4	10.9	2.6	16.6	21.3	6.7	9.1	15.9
LnGrp Delay(d),s/veh	67.3	68.2	37.9	50.5	64.6	42.1	33.1	52.9	85.1	76.8	49.7	29.0
LnGrp LOS	E	E	D	D	E	D	C	D	F	E	D	C
Approach Vol, veh/h		1503			1152			1263			1313	
Approach Delay, s/veh		62.7			50.4			61.6			47.7	
Approach LOS		E			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.0	42.0	41.0	45.0	20.0	44.0	44.0	42.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	17.0	37.0	36.0	40.0	15.0	39.0	39.0	37.0
Max Q Clear Time (g_c+I1), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	55.9
HCM 2010 LOS	E

HCM 2010 Signalized Intersection Summary
6: US 23 (High Street) & Caren Avenue/Highland Avenue

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	27	52	39	58	64	68	787	8	64	729	93
Future Volume (veh/h)	83	27	52	39	58	64	68	787	8	64	729	93
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	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	1827	1900	1900	1845	1900	1900	1863	1882	1900	1863	1877	1900
Adj Flow Rate, veh/h	92	42	65	56	76	81	111	811	16	69	784	99
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.64	0.80	0.70	0.76	0.79	0.61	0.97	0.50	0.93	0.93	0.94
Percent Heavy Veh, %	4	0	0	3	0	0	2	1	1	2	1	1
Cap, veh/h	476	237	368	523	297	317	345	1506	30	296	1337	169
Arrive On Green	0.05	0.35	0.35	0.05	0.35	0.35	0.05	0.42	0.42	0.09	0.84	0.84
Sat Flow, veh/h	1740	672	1040	1757	841	897	1774	3585	71	1774	3184	402
Grp Volume(v), veh/h	92	0	107	56	0	157	111	404	423	69	439	444
Grp Sat Flow(s),veh/h/ln	1740	0	1712	1757	0	1738	1774	1787	1868	1774	1783	1803
Q Serve(g_s), s	5.0	0.0	6.5	3.0	0.0	9.6	5.3	25.4	25.4	3.2	11.6	11.6
Cycle Q Clear(g_c), s	5.0	0.0	6.5	3.0	0.0	9.6	5.3	25.4	25.4	3.2	11.6	11.6
Prop In Lane	1.00		0.61	1.00		0.52	1.00		0.04	1.00		0.22
Lane Grp Cap(c), veh/h	476	0	605	523	0	614	345	751	785	296	749	757
V/C Ratio(X)	0.19	0.00	0.18	0.11	0.00	0.26	0.32	0.54	0.54	0.23	0.59	0.59
Avail Cap(c_a), veh/h	476	0	605	523	0	614	345	751	785	296	749	757
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.8	0.0	33.5	28.0	0.0	34.5	23.3	32.6	32.6	23.4	7.9	7.9
Incr Delay (d2), s/veh	0.9	0.0	0.6	0.4	0.0	1.0	2.5	2.8	2.6	1.8	3.3	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	3.2	1.5	0.0	4.8	2.8	13.2	13.7	1.7	6.1	6.1
LnGrp Delay(d),s/veh	29.7	0.0	34.1	28.4	0.0	35.5	25.8	35.4	35.3	25.2	11.2	11.2
LnGrp LOS	C		C	C		D	C	D	D	C	B	B
Approach Vol, veh/h		199			213			938			952	
Approach Delay, s/veh		32.1			33.6			34.2			12.2	
Approach LOS		C			C			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	68.0	12.0	58.0	12.0	68.0	12.0	58.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	63.0	7.0	53.0	7.0	63.0	7.0	53.0
Max Q Clear Time (g_c+I1), s	5.2	27.4	5.0	8.5	7.3	13.6	7.0	11.6
Green Ext Time (p_c), s	0.0	20.4	0.0	2.8	0.0	24.2	0.0	2.8

Intersection Summary	
HCM 2010 Ctrl Delay	24.9
HCM 2010 LOS	C

HCM 2010 TWSC
7: Caren Avenue & Drive D

01/04/2018

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	124	182	37	37	3
Future Vol, veh/h	3	124	182	37	37	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, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	92	92	88	53	50
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	6	135	198	42	70	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	240	0	-	0	366	219
Stage 1	-	-	-	-	219	-
Stage 2	-	-	-	-	147	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1339	-	-	-	638	826
Stage 1	-	-	-	-	822	-
Stage 2	-	-	-	-	885	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1339	-	-	-	635	826
Mov Cap-2 Maneuver	-	-	-	-	635	-
Stage 1	-	-	-	-	822	-
Stage 2	-	-	-	-	881	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	11.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1339	-	-	-	647
HCM Lane V/C Ratio	0.004	-	-	-	0.117
HCM Control Delay (s)	7.7	-	-	-	11.3
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.4

HCM 2010 Signalized Intersection Summary
15: Drive A/Mall Drive & Wilson Bridge Road

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	822	45	55	653	34	34	0	90	404	0	59
Future Volume (veh/h)	55	822	45	55	653	34	34	0	90	404	0	59
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		0.99	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	1900	1863	1900	1900	1898	1900	1863	1863	1900	1900	1900	1900
Adj Flow Rate, veh/h	73	1015	49	60	734	44	37	0	98	459	0	69
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	2	1	0
Peak Hour Factor	0.75	0.81	0.92	0.92	0.89	0.77	0.92	0.92	0.92	0.88	0.92	0.85
Percent Heavy Veh, %	0	2	2	0	0	0	2	2	2	0	0	0
Cap, veh/h	267	1237	60	266	1659	99	343	0	303	796	0	363
Arrive On Green	0.36	0.36	0.36	0.06	0.32	0.32	0.19	0.00	0.19	0.23	0.00	0.23
Sat Flow, veh/h	704	3436	166	1810	3456	207	1774	0	1566	3510	0	1600
Grp Volume(v), veh/h	73	523	541	60	383	395	37	0	98	459	0	69
Grp Sat Flow(s),veh/h/ln	704	1770	1832	1810	1803	1860	1774	0	1566	1755	0	1600
Q Serve(g_s), s	11.9	40.2	40.3	2.8	25.2	25.2	2.6	0.0	8.1	17.4	0.0	5.2
Cycle Q Clear(g_c), s	19.2	40.2	40.3	2.8	25.2	25.2	2.6	0.0	8.1	17.4	0.0	5.2
Prop In Lane	1.00		0.09	1.00		0.11	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	267	637	660	266	865	893	343	0	303	796	0	363
V/C Ratio(X)	0.27	0.82	0.82	0.23	0.44	0.44	0.11	0.00	0.32	0.58	0.00	0.19
Avail Cap(c_a), veh/h	267	637	660	266	865	893	343	0	303	796	0	363
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	0.67	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	1.00
Uniform Delay (d), s/veh	39.6	43.6	43.6	29.8	35.0	35.0	49.8	0.0	52.1	51.6	0.0	46.9
Incr Delay (d2), s/veh	2.5	11.3	11.0	2.0	1.6	1.6	0.6	0.0	2.8	3.0	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	21.6	22.3	1.5	13.0	13.4	1.3	0.0	3.7	8.8	0.0	2.4
LnGrp Delay(d),s/veh	42.1	54.9	54.6	31.7	36.6	36.6	50.5	0.0	54.9	54.6	0.0	48.0
LnGrp LOS	D	D	D	C	D	D	D		D	D		D
Approach Vol, veh/h		1137			838			135			528	
Approach Delay, s/veh		53.9			36.3			53.7			53.8	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6		8
Phs Duration (G+Y+Rc), s		34.0	18.0	59.0		39.0		77.0
Change Period (Y+Rc), s		5.0	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s		29.0	14.0	54.0		34.0		72.0
Max Q Clear Time (g_c+I1), s		10.1	4.8	42.3		19.4		27.2
Green Ext Time (p_c), s		0.6	0.1	8.4		1.9		18.7

Intersection Summary	
HCM 2010 Ctrl Delay	48.3
HCM 2010 LOS	D

Intersection: 4: US 23 (High Street) & Wilson Bridge Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	T	R	R	L	T	T	TR
Maximum Queue (ft)	513	554	556	153	174	510	266	242	146	247	265	307
Average Queue (ft)	316	321	272	66	126	253	167	122	60	146	149	185
95th Queue (ft)	489	500	461	120	214	427	248	231	115	226	228	282
Link Distance (ft)	775	775	775	775		1034	1034		395	395	395	395
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					150			350				
Storage Blk Time (%)					8	26						
Queuing Penalty (veh)					24	36						

Intersection: 4: US 23 (High Street) & Wilson Bridge Road

Movement	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	R
Maximum Queue (ft)	215	323	605	687	548
Average Queue (ft)	78	137	189	390	130
95th Queue (ft)	183	237	534	613	411
Link Distance (ft)			736	736	
Upstream Blk Time (%)				1	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)	525	525			525
Storage Blk Time (%)			0	4	0
Queuing Penalty (veh)			0	14	0

Intersection: 6: US 23 (High Street) & Caren Avenue/Highland Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	147	112	71	168	203	535	550	120	198	220
Average Queue (ft)	54	37	17	62	53	269	422	50	105	124
95th Queue (ft)	115	83	49	129	138	570	598	97	183	200
Link Distance (ft)	201	201		375		521	521	395	395	395
Upstream Blk Time (%)						3	14			
Queuing Penalty (veh)						0	0			
Storage Bay Dist (ft)			50		200					
Storage Blk Time (%)			2	20		2				
Queuing Penalty (veh)			2	8		2				

Intersection: 7: Caren Avenue & Drive D

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	12	55
Average Queue (ft)	1	23
95th Queue (ft)	8	47
Link Distance (ft)	131	151
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 15: Drive A/Mall Drive & Wilson Bridge Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	L	TR
Maximum Queue (ft)	74	356	343	74	261	271	70	99	205	207	64
Average Queue (ft)	22	228	257	24	133	148	21	37	128	134	22
95th Queue (ft)	71	358	379	68	233	245	55	77	202	214	48
Link Distance (ft)		324	324		775	775	212	212	192	192	192
Upstream Blk Time (%)		3	12						2	5	
Queuing Penalty (veh)		0	0						0	0	
Storage Bay Dist (ft)	50			50							
Storage Blk Time (%)	1	43		4	18						
Queuing Penalty (veh)	6	24		12	10						

Network Summary

Network wide Queuing Penalty: 137

HCM 2010 Signalized Intersection Summary
4: US 23 (High Street) & Wilson Bridge Road

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	420	421	210	130	309	307	166	668	182	527	582	563
Future Volume (veh/h)	420	421	210	130	309	307	166	668	182	527	582	563
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1900	1900	1845	1863	1827	1881	1838	1900	1900	1900	1900
Adj Flow Rate, veh/h	483	463	273	153	351	330	210	786	209	599	606	655
Adj No. of Lanes	2	1	1	1	1	2	1	3	0	2	2	1
Peak Hour Factor	0.87	0.91	0.77	0.85	0.88	0.93	0.79	0.85	0.87	0.88	0.96	0.86
Percent Heavy Veh, %	0	0	0	3	2	4	1	4	4	0	0	0
Cap, veh/h	768	511	715	307	419	1125	406	964	254	658	925	766
Arrive On Green	0.22	0.27	0.27	0.17	0.22	0.22	0.35	0.49	0.49	0.19	0.26	0.26
Sat Flow, veh/h	3510	1900	1610	1757	1863	2722	1792	3953	1042	3510	3610	1609
Grp Volume(v), veh/h	483	463	273	153	351	330	210	664	331	599	606	655
Grp Sat Flow(s),veh/h/ln	1755	1900	1610	1757	1863	1361	1792	1673	1650	1755	1805	1609
Q Serve(g_s), s	19.9	37.7	18.2	12.6	28.8	13.0	11.2	27.0	27.5	26.7	24.0	41.0
Cycle Q Clear(g_c), s	19.9	37.7	18.2	12.6	28.8	13.0	11.2	27.0	27.5	26.7	24.0	41.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.63	1.00		1.00
Lane Grp Cap(c), veh/h	768	511	715	307	419	1125	406	815	402	658	925	766
V/C Ratio(X)	0.63	0.91	0.38	0.50	0.84	0.29	0.52	0.81	0.82	0.91	0.66	0.86
Avail Cap(c_a), veh/h	768	511	715	307	419	1125	406	815	402	658	925	766
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.6	56.6	29.8	59.6	59.2	31.4	25.8	37.9	38.0	63.7	53.2	37.2
Incr Delay (d2), s/veh	3.9	22.4	1.5	5.7	17.8	0.7	4.7	8.8	17.1	18.9	3.6	11.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.1	23.0	8.3	6.6	16.9	5.0	5.9	13.4	14.2	14.7	12.4	28.0
LnGrp Delay(d),s/veh	60.5	78.9	31.4	65.3	77.0	32.1	30.4	46.7	55.2	82.5	56.8	49.0
LnGrp LOS	E	E	C	E	E	C	C	D	E	F	E	D
Approach Vol, veh/h		1219			834			1205			1860	
Approach Delay, s/veh		61.0			57.1			46.2			62.3	
Approach LOS		E			E			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	35.0	44.0	33.0	48.0	33.0	46.0	40.0	41.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	39.0	28.0	43.0	28.0	41.0	35.0	36.0
Max Q Clear Time (g_c+I1), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	57.3
HCM 2010 LOS	E

HCM 2010 Signalized Intersection Summary
6: US 23 (High Street) & Caren Avenue/Highland Avenue

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	129	44	61	46	37	79	51	704	13	118	700	119
Future Volume (veh/h)	129	44	61	46	37	79	51	704	13	118	700	119
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1900	1867	1900	1900	1900	1900	1863	1882	1900	1900	1881	1900
Adj Flow Rate, veh/h	170	49	88	60	57	104	80	891	22	149	745	153
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.76	0.89	0.69	0.77	0.65	0.76	0.64	0.79	0.60	0.79	0.94	0.78
Percent Heavy Veh, %	0	5	5	0	0	0	2	1	1	0	1	1
Cap, veh/h	511	191	343	531	192	351	348	1449	36	288	1200	246
Arrive On Green	0.09	0.32	0.32	0.09	0.32	0.32	0.06	0.41	0.41	0.13	0.81	0.81
Sat Flow, veh/h	1810	599	1075	1810	603	1100	1774	3566	88	1810	2955	607
Grp Volume(v), veh/h	170	0	137	60	0	161	80	447	466	149	451	447
Grp Sat Flow(s),veh/h/ln	1810	0	1673	1810	0	1702	1774	1788	1866	1810	1787	1774
Q Serve(g_s), s	9.9	0.0	9.7	3.3	0.0	11.4	4.0	31.6	31.6	7.8	15.3	15.3
Cycle Q Clear(g_c), s	9.9	0.0	9.7	3.3	0.0	11.4	4.0	31.6	31.6	7.8	15.3	15.3
Prop In Lane	1.00		0.64	1.00		0.65	1.00		0.05	1.00		0.34
Lane Grp Cap(c), veh/h	511	0	533	531	0	543	348	726	758	288	726	721
V/C Ratio(X)	0.33	0.00	0.26	0.11	0.00	0.30	0.23	0.62	0.62	0.52	0.62	0.62
Avail Cap(c_a), veh/h	511	0	533	531	0	543	348	726	758	288	726	721
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.6	0.0	40.4	29.5	0.0	41.0	24.5	37.6	37.6	26.8	10.3	10.3
Incr Delay (d2), s/veh	1.7	0.0	1.2	0.4	0.0	1.4	1.5	3.9	3.7	6.5	4.0	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	0.0	4.7	1.7	0.0	5.6	2.1	16.4	17.1	4.3	8.1	8.0
LnGrp Delay(d),s/veh	33.3	0.0	41.6	29.9	0.0	42.4	26.0	41.5	41.3	33.3	14.3	14.3
LnGrp LOS	C		D	C		D	C	D	D	C	B	B
Approach Vol, veh/h		307			221			993			1047	
Approach Delay, s/veh		37.0			39.0			40.2			17.0	
Approach LOS		D			D			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	70.0	19.0	56.0	15.0	70.0	19.0	56.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	10.0	65.0	14.0	51.0	10.0	65.0	14.0	51.0
Max Q Clear Time (g_c+I1), s	11.9	33.6	5.3	11.7	6.0	17.3	11.9	13.4
Green Ext Time (p_c), s	0.0	20.2	0.1	3.2	0.0	25.9	0.1	3.1

Intersection Summary	
HCM 2010 Ctrl Delay	30.2
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	213	174	33	21	2
Future Vol, veh/h	4	213	174	33	21	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 Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	35	92	92	50	50	50
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	11	232	189	66	42	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	255	0	-	0	476	222
Stage 1	-	-	-	-	222	-
Stage 2	-	-	-	-	254	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1322	-	-	-	551	823
Stage 1	-	-	-	-	820	-
Stage 2	-	-	-	-	793	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1322	-	-	-	545	823
Mov Cap-2 Maneuver	-	-	-	-	545	-
Stage 1	-	-	-	-	820	-
Stage 2	-	-	-	-	785	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	12
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1322	-	-	-	561
HCM Lane V/C Ratio	0.009	-	-	-	0.082
HCM Control Delay (s)	7.7	-	-	-	12
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	895	36	76	630	45	17	0	34	125	0	9
Future Volume (veh/h)	42	895	36	76	630	45	17	0	34	125	0	9
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	1863	1863	1900	1900	1883	1900	1863	1863	1900	1863	1900	1900
Adj Flow Rate, veh/h	56	1065	39	83	724	56	18	0	37	137	0	18
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	2	1	0
Peak Hour Factor	0.75	0.84	0.92	0.92	0.87	0.81	0.92	0.92	0.92	0.91	0.92	0.50
Percent Heavy Veh, %	2	2	2	0	1	1	2	2	2	2	0	0
Cap, veh/h	261	1327	49	282	1703	132	344	0	305	710	0	332
Arrive On Green	0.38	0.38	0.38	0.03	0.17	0.17	0.19	0.00	0.19	0.21	0.00	0.21
Sat Flow, veh/h	689	3482	127	1810	3364	260	1774	0	1576	3442	0	1608
Grp Volume(v), veh/h	56	541	563	83	385	395	18	0	37	137	0	18
Grp Sat Flow(s),veh/h/ln	689	1770	1840	1810	1788	1836	1774	0	1576	1721	0	1608
Q Serve(g_s), s	9.7	43.6	43.6	4.1	30.9	30.9	1.3	0.0	3.1	5.3	0.0	1.4
Cycle Q Clear(g_c), s	20.6	43.6	43.6	4.1	30.9	30.9	1.3	0.0	3.1	5.3	0.0	1.4
Prop In Lane	1.00		0.07	1.00		0.14	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	261	675	701	282	905	929	344	0	305	710	0	332
V/C Ratio(X)	0.21	0.80	0.80	0.29	0.42	0.43	0.05	0.00	0.12	0.19	0.00	0.05
Avail Cap(c_a), veh/h	261	675	701	282	905	929	344	0	305	710	0	332
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	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	1.00
Uniform Delay (d), s/veh	41.1	44.1	44.1	31.6	45.8	45.8	52.5	0.0	53.3	52.5	0.0	51.0
Incr Delay (d2), s/veh	1.9	9.8	9.4	2.6	1.5	1.4	0.3	0.0	0.8	0.6	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	23.2	24.0	2.2	15.7	16.1	0.7	0.0	1.4	2.6	0.0	0.7
LnGrp Delay(d),s/veh	43.0	53.9	53.5	34.2	47.2	47.2	52.8	0.0	54.1	53.1	0.0	51.3
LnGrp LOS	D	D	D	C	D	D	D		D	D		D
Approach Vol, veh/h		1160			863			55			155	
Approach Delay, s/veh		53.2			46.0			53.7			52.9	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6		8
Phs Duration (G+Y+Rc), s		36.0	20.0	66.0		38.0		86.0
Change Period (Y+Rc), s		5.0	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s		31.0	16.0	61.0		33.0		81.0
Max Q Clear Time (g_c+I1), s		5.1	6.1	45.6		7.3		32.9
Green Ext Time (p_c), s		0.2	0.1	10.4		0.5		19.7

Intersection Summary	
HCM 2010 Ctrl Delay	50.4
HCM 2010 LOS	D

Intersection: 4: US 23 (High Street) & Wilson Bridge Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	T	R	R	L	T	T	TR
Maximum Queue (ft)	262	235	567	240	174	634	174	137	272	238	244	286
Average Queue (ft)	137	137	416	89	137	355	98	40	124	149	137	150
95th Queue (ft)	227	219	571	174	213	660	164	109	222	214	211	247
Link Distance (ft)	760	760	760	760		1034	1034		395	395	395	395
Upstream Blk Time (%)						0						
Queuing Penalty (veh)						0						
Storage Bay Dist (ft)					150			350				
Storage Blk Time (%)					13	37						
Queuing Penalty (veh)					42	49						

Intersection: 4: US 23 (High Street) & Wilson Bridge Road

Movement	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	R
Maximum Queue (ft)	502	550	751	751	550
Average Queue (ft)	271	375	600	712	501
95th Queue (ft)	461	597	951	894	721
Link Distance (ft)			736	736	
Upstream Blk Time (%)			9	43	
Queuing Penalty (veh)			0	0	
Storage Bay Dist (ft)	525	525			525
Storage Blk Time (%)	0	1	7	46	0
Queuing Penalty (veh)	0	2	38	254	1

Intersection: 6: US 23 (High Street) & Caren Avenue/Highland Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	177	144	72	222	224	456	366	166	210	218
Average Queue (ft)	72	58	24	60	47	249	209	67	110	128
95th Queue (ft)	144	117	61	145	137	387	331	139	185	195
Link Distance (ft)	201	201		375		521	521	395	395	395
Upstream Blk Time (%)	0					0				
Queuing Penalty (veh)	0					0				
Storage Bay Dist (ft)			50		200					
Storage Blk Time (%)			2	18	0	17				
Queuing Penalty (veh)			2	9	0	9				

Intersection: 7: Caren Avenue & Drive D

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	29	45
Average Queue (ft)	1	16
95th Queue (ft)	11	42
Link Distance (ft)	131	151
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Drive A/Mall Drive & Wilson Bridge Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	L	R
Maximum Queue (ft)	68	296	323	74	266	263	46	62	106	128	29
Average Queue (ft)	12	174	294	35	154	165	10	17	23	44	6
95th Queue (ft)	50	315	323	82	246	249	34	45	70	100	24
Link Distance (ft)		281	281		760	760	220	220	191	191	191
Upstream Blk Time (%)		4	47								
Queuing Penalty (veh)		0	0								
Storage Bay Dist (ft)	50			50							
Storage Blk Time (%)	1	38		5	22						
Queuing Penalty (veh)	4	16		16	17						

Network Summary

Network wide Queuing Penalty: 460

HCM 2010 Signalized Intersection Summary
3: Drive A/Mall Drive & Wilson Bridge Road

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	875	45	55	695	37	34	0	90	430	0	62
Future Volume (veh/h)	58	875	45	55	695	37	34	0	90	430	0	62
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		0.99	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	1900	1863	1900	1900	1898	1900	1863	1863	1900	1900	1900	1900
Adj Flow Rate, veh/h	77	1080	49	60	781	48	37	0	98	489	0	73
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	2	1	0
Peak Hour Factor	0.75	0.81	0.92	0.92	0.89	0.77	0.92	0.92	0.92	0.88	0.92	0.85
Percent Heavy Veh, %	0	2	2	0	0	0	2	2	2	0	0	0
Cap, veh/h	285	1264	57	280	1725	106	331	0	292	749	0	341
Arrive On Green	0.37	0.37	0.37	0.11	0.50	0.50	0.19	0.00	0.19	0.21	0.00	0.21
Sat Flow, veh/h	671	3447	156	1810	3450	212	1774	0	1566	3510	0	1599
Grp Volume(v), veh/h	77	554	575	60	408	421	37	0	98	489	0	73
Grp Sat Flow(s),veh/h/ln	671	1770	1834	1810	1803	1859	1774	0	1566	1755	0	1599
Q Serve(g_s), s	12.6	43.3	43.4	2.6	21.9	22.0	2.6	0.0	8.1	19.1	0.0	5.6
Cycle Q Clear(g_c), s	14.5	43.3	43.4	2.6	21.9	22.0	2.6	0.0	8.1	19.1	0.0	5.6
Prop In Lane	1.00		0.09	1.00		0.11	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	285	649	673	280	901	930	331	0	292	749	0	341
V/C Ratio(X)	0.27	0.85	0.85	0.21	0.45	0.45	0.11	0.00	0.34	0.65	0.00	0.21
Avail Cap(c_a), veh/h	285	649	673	280	901	930	331	0	292	749	0	341
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.4	43.8	43.8	28.2	24.2	24.2	50.7	0.0	52.9	53.9	0.0	48.6
Incr Delay (d2), s/veh	2.3	13.5	13.1	1.7	1.6	1.6	0.7	0.0	3.1	4.4	0.0	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	23.5	24.3	1.4	11.3	11.6	1.3	0.0	3.8	9.7	0.0	2.6
LnGrp Delay(d),s/veh	37.7	57.3	56.9	30.0	25.9	25.8	51.4	0.0	56.0	58.3	0.0	50.1
LnGrp LOS	D	E	E	C	C	C	D		E	E		D
Approach Vol, veh/h		1206			889			135			562	
Approach Delay, s/veh		55.9			26.1			54.7			57.3	
Approach LOS		E			C			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6		8
Phs Duration (G+Y+Rc), s		33.0	20.0	60.0		37.0		80.0
Change Period (Y+Rc), s		5.0	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s		28.0	16.0	55.0		32.0		75.0
Max Q Clear Time (g_c+I1), s		10.1	4.6	45.4		21.1		24.0
Green Ext Time (p_c), s		0.6	0.1	7.5		1.8		21.8

Intersection Summary	
HCM 2010 Ctrl Delay	46.6
HCM 2010 LOS	D

HCM 2010 Signalized Intersection Summary
4: US 23 (High Street) & Wilson Bridge Road

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	749	346	221	140	305	549	73	636	274	222	513	406
Future Volume (veh/h)	749	346	221	140	305	549	73	636	274	222	513	406
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	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	1900	1900	1900	1881	1881	1900	1900	1888	1900	1900	1900	1900
Adj Flow Rate, veh/h	871	455	266	179	381	661	96	826	422	317	529	549
Adj No. of Lanes	2	1	1	1	1	2	1	3	0	2	2	1
Peak Hour Factor	0.86	0.76	0.83	0.78	0.80	0.83	0.76	0.77	0.65	0.70	0.97	0.74
Percent Heavy Veh, %	0	0	0	1	1	0	0	1	1	0	0	0
Cap, veh/h	936	481	569	454	451	983	300	870	403	374	939	847
Arrive On Green	0.27	0.25	0.25	0.25	0.24	0.24	0.20	0.51	0.51	0.11	0.26	0.26
Sat Flow, veh/h	3510	1900	1609	1792	1881	2832	1810	3435	1591	3510	3610	1602
Grp Volume(v), veh/h	871	455	266	179	381	661	96	826	422	317	529	549
Grp Sat Flow(s),veh/h/ln	1755	1900	1609	1792	1881	1416	1810	1718	1591	1755	1805	1602
Q Serve(g_s), s	36.3	35.3	19.2	12.4	29.0	29.8	5.1	34.3	38.0	13.3	19.1	37.0
Cycle Q Clear(g_c), s	36.3	35.3	19.2	12.4	29.0	29.8	5.1	34.3	38.0	13.3	19.1	37.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	936	481	569	454	451	983	300	870	403	374	939	847
V/C Ratio(X)	0.93	0.95	0.47	0.39	0.84	0.67	0.32	0.95	1.05	0.85	0.56	0.65
Avail Cap(c_a), veh/h	936	481	569	454	451	983	300	870	403	374	939	847
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.6	55.0	37.6	46.5	54.3	41.8	30.5	36.1	37.0	65.8	48.1	25.6
Incr Delay (d2), s/veh	16.8	29.4	2.7	2.6	17.3	3.7	2.8	20.4	57.6	20.5	2.4	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	19.7	22.4	9.0	6.5	17.2	12.2	2.7	18.5	22.8	7.5	9.8	17.2
LnGrp Delay(d),s/veh	70.4	84.4	40.3	49.0	71.6	45.4	33.3	56.5	94.6	86.3	50.6	29.4
LnGrp LOS	E	F	D	D	E	D	C	E	F	F	D	C
Approach Vol, veh/h		1592			1221			1344			1395	
Approach Delay, s/veh		69.4			54.1			66.8			50.3	
Approach LOS		E			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	43.0	43.0	43.0	20.0	44.0	45.0	41.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	16.0	38.0	38.0	38.0	15.0	39.0	40.0	36.0
Max Q Clear Time (g_c+I1), s	15.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green Ext Time (p_c), s	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	60.6
HCM 2010 LOS	E

HCM 2010 Signalized Intersection Summary
6: US 23 (High Street) & Caren Avenue/Highland Avenue

01/04/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	29	54	42	60	68	70	836	9	68	775	99
Future Volume (veh/h)	89	29	54	42	60	68	70	836	9	68	775	99
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	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	1827	1900	1900	1845	1900	1900	1863	1882	1900	1863	1877	1900
Adj Flow Rate, veh/h	99	45	68	60	79	86	115	862	18	73	833	105
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.90	0.64	0.80	0.70	0.76	0.79	0.61	0.97	0.50	0.93	0.93	0.94
Percent Heavy Veh, %	4	0	0	3	0	0	2	1	1	2	1	1
Cap, veh/h	469	241	364	517	294	320	328	1504	31	279	1338	169
Arrive On Green	0.05	0.35	0.35	0.05	0.35	0.35	0.05	0.42	0.42	0.09	0.84	0.84
Sat Flow, veh/h	1740	683	1031	1757	831	905	1774	3580	75	1774	3185	401
Grp Volume(v), veh/h	99	0	113	60	0	165	115	430	450	73	466	472
Grp Sat Flow(s),veh/h/ln	1740	0	1714	1757	0	1737	1774	1787	1868	1774	1783	1803
Q Serve(g_s), s	5.4	0.0	6.8	3.2	0.0	10.2	5.5	27.6	27.6	3.4	13.2	13.2
Cycle Q Clear(g_c), s	5.4	0.0	6.8	3.2	0.0	10.2	5.5	27.6	27.6	3.4	13.2	13.2
Prop In Lane	1.00		0.60	1.00		0.52	1.00		0.04	1.00		0.22
Lane Grp Cap(c), veh/h	469	0	606	517	0	614	328	751	784	279	749	757
V/C Ratio(X)	0.21	0.00	0.19	0.12	0.00	0.27	0.35	0.57	0.57	0.26	0.62	0.62
Avail Cap(c_a), veh/h	469	0	606	517	0	614	328	751	784	279	749	757
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.0	0.0	33.6	28.1	0.0	34.7	23.5	33.2	33.2	23.9	8.0	8.0
Incr Delay (d2), s/veh	1.0	0.0	0.7	0.5	0.0	1.1	2.9	3.2	3.0	2.3	3.9	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	3.3	1.6	0.0	5.1	3.0	14.3	14.9	1.8	7.0	7.1
LnGrp Delay(d),s/veh	30.0	0.0	34.3	28.6	0.0	35.7	26.5	36.4	36.3	26.1	11.9	11.9
LnGrp LOS	C		C	C		D	C	D	D	C	B	B
Approach Vol, veh/h		212			225			995			1011	
Approach Delay, s/veh		32.3			33.8			35.2			12.9	
Approach LOS		C			C			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	68.0	12.0	58.0	12.0	68.0	12.0	58.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	63.0	7.0	53.0	7.0	63.0	7.0	53.0
Max Q Clear Time (g_c+I1), s	5.4	29.6	5.2	8.8	7.5	15.2	7.4	12.2
Green Ext Time (p_c), s	0.0	21.1	0.0	2.9	0.0	26.0	0.0	2.9

Intersection Summary	
HCM 2010 Ctrl Delay	25.6
HCM 2010 LOS	C

HCM 2010 TWSC
7: Caren Avenue & Drive D

01/04/2018

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	134	192	37	37	3
Future Vol, veh/h	3	134	192	37	37	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, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	92	92	88	53	50
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	6	146	209	42	70	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	251	0	-	0	388	230
Stage 1	-	-	-	-	230	-
Stage 2	-	-	-	-	158	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1326	-	-	-	619	814
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	875	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1326	-	-	-	616	814
Mov Cap-2 Maneuver	-	-	-	-	616	-
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	871	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1326	-	-	-	628
HCM Lane V/C Ratio	0.005	-	-	-	0.121
HCM Control Delay (s)	7.7	-	-	-	11.5
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection: 3: Drive A/Mall Drive & Wilson Bridge Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	L	TR
Maximum Queue (ft)	75	340	337	74	277	298	94	84	199	202	65
Average Queue (ft)	20	236	270	20	150	170	23	37	126	144	25
95th Queue (ft)	67	361	382	61	252	271	62	68	201	217	52
Link Distance (ft)		317	317		775	775	212	212	187	187	187
Upstream Blk Time (%)		4	16						2	6	
Queuing Penalty (veh)		0	0						0	0	
Storage Bay Dist (ft)	50			50							
Storage Blk Time (%)	2	43		2	18						
Queuing Penalty (veh)	8	25		9	10						

Intersection: 4: US 23 (High Street) & Wilson Bridge Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	T	R	R	L	T	T	TR
Maximum Queue (ft)	582	541	483	154	174	700	344	238	120	251	301	343
Average Queue (ft)	355	350	300	76	130	322	184	133	55	152	162	200
95th Queue (ft)	601	570	468	130	209	625	316	231	100	215	236	291
Link Distance (ft)	775	775	775	775		1034	1034		395	395	395	395
Upstream Blk Time (%)	0	0										
Queuing Penalty (veh)	0	0										
Storage Bay Dist (ft)					150			350				
Storage Blk Time (%)					10	31						
Queuing Penalty (veh)					31	44						

Intersection: 4: US 23 (High Street) & Wilson Bridge Road

Movement	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	R
Maximum Queue (ft)	252	488	734	751	550
Average Queue (ft)	97	180	478	612	364
95th Queue (ft)	209	389	915	867	752
Link Distance (ft)			736	736	
Upstream Blk Time (%)			6	26	
Queuing Penalty (veh)			0	0	
Storage Bay Dist (ft)	525	525			525
Storage Blk Time (%)		0	4	32	0
Queuing Penalty (veh)		0	7	127	1

Intersection: 6: US 23 (High Street) & Caren Avenue/Highland Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	125	108	68	222	212	541	550	151	221	238
Average Queue (ft)	54	43	21	72	60	427	505	57	122	139
95th Queue (ft)	102	89	58	161	146	676	618	113	197	212
Link Distance (ft)	201	201		375		521	521	395	395	395
Upstream Blk Time (%)						11	41			
Queuing Penalty (veh)						0	0			
Storage Bay Dist (ft)			50		200					
Storage Blk Time (%)			1	20	0	4				
Queuing Penalty (veh)			2	9	0	3				

Intersection: 7: Caren Avenue & Drive D

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	12	61
Average Queue (ft)	0	24
95th Queue (ft)	7	51
Link Distance (ft)	131	151
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 277

APPENDIX D
SIGNAL WARRANTS

OMUTCD Signal Warrants
Intersection: Wilson Bridge Road at Mall Drive
Date: 1/4/2018
Traffic Scenario: 2018 Build

	Major	Minor										
Pk Hr	1664	463										
ADT	22851	4121			**Condition A**		**Condition B**		**Minor Road**		**Major Road**	
	Major	**Minor**	**Major**	**Minor**	**Major**	**Minor**	**Major**	**Minor**	**A**	**B**	**A**	**B**
Hour	**ex%distr**	**adj % dist**	**Hrly Vol**	**Hrly Vol**	**600**	**200**	**900**	**100**	200	100	600	900
7:00 AM	6.8	8.9	1554	367	YES	YES	YES	YES	200	100	600	900
8:00 AM	6	6.8	1582	125	YES	NO	YES	YES	200	100	600	900
9:00 AM	4.8	3.7	1097	153	YES	NO	YES	YES	200	100	600	900
10:00 AM	4.8	3.7	1097	153	YES	NO	YES	YES	200	100	600	900
11:00 AM	5.6	4.6	1280	190	YES	NO	YES	YES	200	100	600	900
12:00 PM	6.1	4.9	1394	202	YES	YES	YES	YES	200	100	600	900
1:00 PM	6	5.1	1372	211	YES	YES	YES	YES	200	100	600	900
2:00 PM	6.7	5.2	1532	215	YES	YES	YES	YES	200	100	600	900
3:00 PM	7.7	8.4	1760	347	YES	YES	YES	YES	200	100	600	900
4:00 PM	8.4	9.9	1688	463	YES	YES	YES	YES	200	100	600	900
5:00 PM	8.8	11.2	2011	462	YES	YES	YES	YES	200	100	600	900
6:00 PM	6.5	5.9	1486	244	YES	YES	YES	YES	200	100	600	900
7:00 PM	4.9	3.4	1120	141	YES	NO	YES	YES	200	100	600	900
	83.1	**3.1**	**18973**	**3273**	**Warrant A:Yes (8)**		**Warrant B: Yes (13)**					

OMUTCD Signal Warrants
Intersection: Wilson Bridge Road at Drive A
Date: 1/4/2018
Traffic Scenario: 2018 Build

	Major	Minor										
Pk Hr	800	124										
ADT	22851	1104			**Condition A**		**Condition B**		**Minor Road**		**Major Road**	
	Major	**Minor**	**Major**	**Minor**	**Major**	**Minor**	**Major**	**Minor**	**A**	**B**	**A**	**B**
Hour	**ex%distr**	**adj % dist**	**Hrly Vol**	**Hrly Vol**	**600**	**200**	**900**	**100**	200	100	600	900
7:00 AM	6.8	8.9	1554	99	YES	NO	YES	NO	200	100	600	900
8:00 AM	6	6.8	1663	79	YES	NO	YES	NO	200	100	600	900
9:00 AM	4.8	3.7	1097	41	YES	NO	YES	NO	200	100	600	900
10:00 AM	4.8	3.7	1097	41	YES	NO	YES	NO	200	100	600	900
11:00 AM	5.6	4.6	1280	51	YES	NO	YES	NO	200	100	600	900
12:00 PM	6.1	4.9	1394	55	YES	NO	YES	NO	200	100	600	900
1:00 PM	6	5.1	1372	57	YES	NO	YES	NO	200	100	600	900
2:00 PM	6.7	5.2	1532	58	YES	NO	YES	NO	200	100	600	900
3:00 PM	7.7	8.4	1760	93	YES	NO	YES	NO	200	100	600	900
4:00 PM	8.4	9.9	2033	187	YES	NO	YES	YES	200	100	600	900
5:00 PM	8.8	11.2	2011	124	YES	NO	YES	YES	200	100	600	900
6:00 PM	6.5	5.9	1486	66	YES	NO	YES	NO	200	100	600	900
7:00 PM	4.9	3.4	1120	38	YES	NO	YES	NO	200	100	600	900
	83.1	**3.1**	**19399**	**989**	**Warrant A:No (0)**		**Warrant B: No (4)**					