Appendix C: Traffic Technical Report

EXIT 4A – Traffic and Transportation Technical Report

I-93 Exit 4A Supplemental Draft Environmental Impact Statement

Prepared for:

Town of Derry
Town of Londonderry
New Hampshire Department of Transportation

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1.0 Introduction

The Interstate 93 (I-93) Exit 4A Project (the "Project") involves a new diamond interchange between Interstate 93 Exits 4 and 5 in the Town of Londonderry, approximately one mile north of Exit 4. The new diamond interchange would provide access to the east side of I-93 only. A 1-mile connector roadway would be built on new alignment from the interchange to Folsom Road, near the intersection of North High Street and Madden Road, in the Town of Derry. Folsom Road, and subsequently Tsienneto Road, would be upgraded, and the intersections would be improved.

The Project was the subject of a Draft Environmental Impact Statement (DEIS) in 2007 (FHWA, 2007). Due to the amount of time that has elapsed since the 2007 DEIS, the FHWA has requested the preparation of updated studies that will be documented in a Supplemental Draft Environmental Impact Statement (SDEIS) in accordance with the National Environmental Policy Act (NEPA). The SDEIS will provide an up-to-date assessment of the environmental effects of the Project and the evaluation of reasonable alternatives that will consider updated information including, but not limited to, traffic, socioeconomic projections, land development proposals in the project area, and changes in environmental resources and regulatory requirements.

The purpose of this report is to document the development of traffic projections and operational analyses for the Project as part of the SDEIS. This report is a compilation of previous memoranda issued as the project proceeded as well as to present the findings of the analyses of the various alternatives.

The traffic analysis tasks described in this report includes the following:

- Collection of traffic count data at various roadways and intersections in the Exit 4A study area to develop 2015 Average Weekday Traffic (AWDT) volumes.
- Use of these 2015 counts to calibrate the Southern New Hampshire Planning Commission (SNHPC)'s regional traffic model to be viable to project future traffic volumes in the 2040 design year with and without the proposed Exit 4A.
- Preparation of land use and socioeconomic projections (conducted concurrently by the Land Use Working Group) for the SNHPC model area and allocated to the Traffic Analysis Zone (TAZ) level for each alternative scenario to be used as the basis for traffic generation and trip assignments to the regional roadway network.
- Development of 2040 No-Build (without Exit 4A) and Build (with Exit 4A) traffic volume assignments on key roadway segments and intersections in the study area network.
- Derivation of AM and PM peak hour traffic volumes on the mainline I-93 and interchange ramps as well as key segments and intersections in the study area for the various Exit 4A alternative layouts for analysis purposes (see Figure 1).
- Analysis of interstate operations using the *2010 Highway Capacity Manual* (TRB, 2010) Freeway Facilities methodologies for the existing 2015 and all 2040 No-Build and Build scenarios. Analysis of signalized and unsignalized intersection operations of the existing 2015 and all 2040 scenarios using HCM methodologies and emulated in the *SYNCHRO/Sim-Traffic (Trafficware, 2016)*software for

derivation of Level of Service and estimated queue lengths for conceptual design purposes.

In addition to the traffic data collection, Project Team specialists and the Land Use Working Group conducted interviews and compiled socioeconomic (e.g., population and employment) projections that were used by the SNHPC to allocate these trip-generation characteristics to their traffic zone system to generate traffic assignments to the roadway network under both No-Build (without 4A) and the Build alternatives that were included in the DEIS from 2007. A separate Land Use Scenario Technical Report was prepared that documents the land use and socioeconomic forecasting efforts that were used in conjunction with the traffic modeling. (Louis Berger, 2017).

2.0 Purpose and Need for the Project

The Purpose and Need for the Project, as described in the 2007 DEIS, is as follows:

- Providing for transportation improvements that will promote the safe and efficient movement of people, goods, and services between I-93 and the towns served by NH Route 102, specifically Derry and Londonderry, that are immediately adjacent to I-93 Exit 4;
- Providing an alternative route to the Interstate system for traffic using NH Route 102 to and from the east, thus removing a large volume of through traffic from the heavily congested downtown Derry street network;
- Providing improved Interstate access for commercially and industrially zoned lands near NH Routes 28 and 102 in both Derry and Londonderry, thus allowing for the planned and orderly development of such lands to further locally-defined economic development goals and tax base diversification; and
- Enhancing and promoting the economic vitality of the downtown Derry area, presently characterized by traffic congestion and decreasing vehicular and pedestrian safety, by separating local destination-oriented traffic from through-traffic destined for the Interstate system.

For purposes of this project, the downtown Derry area has been defined as NH Route 102 easterly from its intersection with Fordway to the NH 28 (Crystal Avenue/Birch Street) intersection (CLD|Fuss & O'Neill, 2018). This is also consistent with the defined Central Business District zoning map for the Town of Derry (Town of Derry, 2015).

3.0 Traffic Data Collection

The study area for the Project was established and agreed upon as part of the 2007 DEIS document, and encompasses the expected extent of the roadway network that would likely be influenced by the introduction of a new I-93 interchange and associated connector roadways. An updated inventory of the key area roadways and intersections was conducted to ensure that the traffic modeling and subsequent analyses reflect existing conditions.

The various contracts for the I-93 widening project affecting the study area also needed to be considered. The Exit 5 improvements are already in place, and the Exit 4 interchange is being reconstructed now as part of Contract 14633-D. The widening of the mainline I-93 to four lanes between Exits 4 and 5 under Contracts 'D' and 'I' is also underway.

3.1 Traffic Counts

The traffic counting program was developed for the project, based on the key roadway segments and intersections in the study area, to assist in the development of 2015 base Average Annual Weekday Traffic (AAWDT) volumes for use in the traffic model calibration. Most of these locations were counted in 2005 as part of the preparation of the original 2007 DEIS document. This effort was coordinated with the annual traffic counting programs conducted by both the NHDOT and SNHPC within the study area, and the new data collected in May and June of 2016 while school was still in session. Some of these locations had already been counted in 2014 or 2015 (NHDOT, 2016a, 2016b, 2016c), so all data was evaluated and subsequently adjusted to reflect 2015 AAWDT conditions.

The Automatic Traffic Recorder (ATR) counts were taken for a 3-5 day period. A listing of the locations is included below and shown in Figure 2.

<u>Interstate Locations (15)</u>

I-93 NB and SB, south of Exit 4 (NHDOT permanent recorder)
I-93 Exit 4 – NB and SB on- and off-ramps (5)
I-93 Exit 5 – NB and SB on- and off-ramps (4)
I-93 NB and SB between Exits 4 and 5 (2)
I-93 NB and SB north of Exit 5 (2)

<u>State Highways/Local Streets (22)</u>

Crystal Avenue (NH Route 28), south of Tsienneto Road
Folsom Road, west of NH Route 28
Pinkerton Street, east of Tsienneto Road
Tsienneto Road, east of Pinkerton Street
Chester Road (NH Route 102), east of NH Route 28 Bypass (Sylvestri Circle)
North Main Street (NH Route 28 Bypass), north of Pinkerton Street (Academy Drive)
North Main Street (NH Route 28 Bypass), north of Tsienneto Road
South Main Street (NH Route 28 Bypass), south of Thornton Street
Tsienneto Road, west of NH Route 102
NH Route 102, at Derry Town line
NH Route 28, at Derry/Londonderry Town line
Gilcreast Road, north of NH Route 102
NH Route 102, west of Abbot Street
NH Route 102, east of Griffin Street
Fordway, over Beaver Brook

Franklin Street, north of Folsom Road
Ash Street at Londonderry Town line
Ash Street, east of Londonderry Road
NH Route 28, east of Perkins Road
NH Route 28, south of Rollins Street
NH Route 28, north of Liberty Drive
NH Route 102, east of Hampton Drive

<u>Intersection Turning Movement Counts (TMCs) – AM and PM Peak Periods (19)</u>

The intersection counts were taken in groups of intersections within five general groups or 'zones' in close proximity to each other to facilitate ease of data collection and to minimize significant differences between locations, even if there were intervening roadways or driveways that would not allow balancing between sites. These groups of intersections were numbered as follows and shown in Figure 3:

<u>Zone 1</u>
#3 Exit 5 SB ramps
#4 Exit 5 NB ramps

<u>Zone 2</u>
#1 Exit 4 SB ramps
#2 Exit 4 NB ramps

<u>Zone 3</u>
#5 NH Route 102/Londonderry Road/St. Charles Street
#6 NH Route 102 (Broadway)/Fordway/Madden Hill Road
#7 NH Routes 102/28 (Crystal Avenue/Broadway/Birch Street)
#8 North High Street/Ash Street Extension
#9 North High Street/Madden Road
#10 North High Street/Folsom Road/Franklin Street/Franklin Street Extension

<u>Zone 4</u>
#11 NH Route 28/Folsom Road/Tsienneto Road (Ross' Corner)
#12 Tsienneto Road/Pinkerton Street
#13 NH Route 28/Linlew Drive
#14 NH Route 28/Ashleigh Drive
#15 NH Route 28/Scobie Pond Road

<u>Zone 5</u>
#16 NH Routes 102/28 Bypass/East Derry Road (traffic circle)
#17 NH Route 28 Bypass/Pinkerton Street/Nesmith Street
#18 NH Route 28 Bypass/Tsienneto Road
#19 NH Route 102/Tsienneto Road

Copies of the relevant raw traffic count data are included in Appendix A.

Other new intersections that would be created by some of the Exit 4A alternatives will also need to be evaluated and analyzed. In addition, it was determined as the study progressed that additional intersections at the east end of the study area should be collected, since they will be influenced by any improvements at the NH Route 102/Tsienneto Road intersection. These intersections were at NH Route 102/North Shore Road (#26) and at NH Route 102/English Range Road (#27). This data is also included in Appendix A.

Adjustment Factors used for Data Reduction

Because of the nature of the regional roadway network, there are several different adjustment factors that need to be applied to the raw counts to derive AWDT. In general, there are seasonal factors, annual growth factors, and axle correction factors, based on the type of roadway being considered. NHDOT develops these factors for various roadway types based on their evaluation of permanent traffic recorder stations across the state. NHDOT differentiates between Rural and Urban Interstates (called Groups 1 and 3, respectively), as well as Rural and Urban Highways (Groups 2 and 4, respectively), for which there is a wealth of short-term and long-term factors that are developed annually by NHDOT as part of their normal practice (NHDOT, 2016d). Appendix B includes the tables showing the various seasonal, annual and axle correction factors applied to the raw traffic counts in this report.

Seasonal Factors

In this study area, there are Interstate roadways (I-93) as well as state highways and local streets in an urbanized area, so the Group 3 and 4 seasonal factors in Appendix B were applied here. Since counts were taken on specific dates in May, the 2015 seasonal adjustment factors were applied to each count separately based on the date of the count and the type of roadway.

Annual Growth Factors

Annual growth factors are also applied because of the different years that the counts were taken. There is an NHDOT permanent traffic recorder in the immediate study area on I-93 just south of Exit 4 at the Derry/Windham town line, but it may not be indicative of growth on the local street network because the interstate is more prone to fluctuations in regional traffic. A comparison of May 2015 to May 2016 traffic counts on I-93 indicates a 1.1% growth rate on the Interstate system. It should be noted that this counter is located north of the current construction area, so it should not have been influenced by drivers trying to avoid construction-related delays. This 1.1% annual growth rate was applied to the 2016 mainline I-93 traffic data only to adjust the data downward to the 2015 base year AWDT.

Another permanent recorder is located on NH Route 28 in Windham south of the study area that should be more representative of the urbanized roadways within the Derry/Londonderry area. A comparison of May 2015 to May 2016 traffic counts at the NH Route 28 location indicates a 2.5% growth rate, which was then applied to the rest of the study area roadway system to derive the 2015 AWDT.

There are also ramp volume counts at Exits 4 and 5 that need to be seasonally adjusted**. In discussions with the NHDOT Bureau of Traffic (NHDOT, 2016e), it was agreed that these ramp volumes would exhibit characteristics more in line with the local street network as opposed to seasonal variations in Interstate traffic.** As such, the 2.5% growth rate was also applied to the ramp volumes to derive the 2015 AWDT.

Axle Correction Factors

Axle correction factors are also applied to adjust for differences in vehicle classification on various types of roadways to derive a total number of actual vehicles. It is essentially a correction for the assumed number of two-axle vehicles gathered by the field-counting apparatus (such as road tubes) to account for multi-axle vehicles in the traffic stream, based on the FHWA 13-tiered classification system. These factors are developed by NHDOT based on vehicle classification information collected on the various functional classifications of roadways in the state.

Each of the major roadways in the study area has already been functionally classified based on its overall role in the regional roadway network. Since this is an urbanized area, the classifications that are applied here are urban interstate (FC 11), urban principle arterials (FC 14), urban minor arterials (FC 16), collector roadways (FC 17), and local streets (FC 19). The 2015 axle correction factors table is also provided in Appendix B.

Development of 2015 AAWDT Base Volumes

Table 1 shows a summary of the adjusted 2015 AAWDT volumes derived from applying the various adjustment factors to the 2015 and 2016 raw traffic counts. In some cases, such as for the 2014 counts, the NHDOT has already developed the AAWDT for locations of interest in the study area, which only need to be annually adjusted upward to 2015. This adjustment factor has also been applied to the AM and PM peak hour volumes and ‘k’ factors (the percentage of AAWDT during each peak hour for each movement) calculated for comparison to the intersection TMCs for future analysis purposes.

TABLE 1

ATR Count Summary - Adjusted 2015 AAWDT and Peak Hour Volumes

Annual Growth rates:	
2014->2015	**1.025**
2015->2015	**1.000**
2016->2015	**0.975**

Seasonal: Use Urban Highway Group 4 adjustment factors

Intersection Turning Movement Counts		AM Peak	PM Peak
April	Adj Factor=	**0.96**	**0.99**
May		**0.96**	**0.98**
June		**0.96**	**0.94**
July		**1.04**	**0.96**
Sept		**0.95**	**0.97**

	Count Location	Count Month/Yr	Raw AAWDT	Adj 2015 AAWDT	700-800am Counted AM Peak Volume	Adj 2015 AM Peak Volume	AM Pk as % of AAWDT	400-500pm Counted PM Peak Volume	Adj 2015 PM Peak Volume	PM Pk as % of AAWDT
Derry	Crystal Ave (NH Route 28), S of Tsienneto	May-16	15585	15195	836	803	5.28%	1418	1390	9.15%
	Folsom Rd W of NH Route 28	May-16	12070	11768	778	747	6.35%	1199	1175	9.98%
	Pinkerton St E of Tsienneto	May-16	10722	10454	695	667	6.38%	1017	997	9.54%
	Tsienneto Rd, W of NH Route 102	May-16	5532	5394	483	464	8.60%	511	501	9.29%
	Tsienneto Rd E of Pinkerton	May-16	15012	14637	1113	1068	7.30%	1499	1469	10.04%
	NH Route 102, E of NH Route 28 Bypass	May-16	7456	7270	595	571	7.85%	661	648	8.91%
	NH Route 28 Byp, N of Academy Dr	May-16	8615	8400	756	726	8.64%	881	863	10.27%
	NH Route 28 Byp, N of Tsienneto Rd	May-16	12250	11944	997	957	8.01%	1201	1177	9.85%
	NH Route 28 Byp, S of Thornton Rd	May-16	14341	13982	1110	1066	7.62%	1392	1364	9.76%
	NH Route 102 E of Griffin St	Apr-14	16000	16400	1054	1012	6.17%	1224	1212	7.39%
	NH Route 102 W of Abbot St	Apr-14	14000	14350	1020	979	6.82%	1148	1137	7.92%
	Fordway over Beaver Brook	Apr-14	5200	5330	410	394	7.39%	481	476	8.93%
	Franklin St Ext, N. of Folsom Rd	Apr-14	1800	1845	99	95	5.15%	171	169	9.16%
	Ash St at Londonderry town line	Apr-14	6600	6765	410	394	5.82%	722	715	10.57%
	Crystal Av (NH Route 28), S of Rollins	Jun-15	13000	13000	819	786	6.05%	1174	1104	8.49%
	average						6.90%			9.28%
L-derry	NH Route 102, E of Hampton Dr	Jul-15	32000	32000	2478	2577	8.05%	2842	2728	8.53%
	NH Route 102 at Derry Town line	May-16	22656	22090	1718	1649	7.46%	1796	1760	7.97%
	NH Route 28 at Derry Town line	May-16	17324	16891	1279	1228	7.27%	1682	1648	9.76%
	NH Route 28 N of Liberty Dr	Sep-15	13000	13000	1176	1117	8.59%	1054	1022	7.86%
	Gilcreast Rd N of NH Route 102	May-16	10070	9818	697	669	6.81%	1008	988	10.06%
	Ash St E of Londonderry Rd	Jun-15	6900	6900	427	410	5.94%	723	680	9.86%
	average						7.36%			9.00%
					700-800am			400-500pm		
	Exit 4 NB Off-ramp	May-16	10249	9993	435	418	4.18%	1223	1199	12.00%
	Exit 4 NB On-ramp	May-16	10303	10045	1079	1036	10.31%	812	796	7.92%
	Exit 4 SB Off-ramp	May-16	9862	9615	753	723	7.52%	952	933	9.70%
	Exit 4 SB On-ramp - EB to SB	May-16	5310	5177	673	646	12.48%	311	305	5.89%
	Exit 4 SB On-ramp - WB to SB	May-16	4767	4648	537	516	11.10%	244	239	5.14%
	average						9.12%			8.13%
	Exit 5 NB Off-ramp	May-16	5745	5601	400	384	6.86%	472	463	8.27%
	Exit 5 NB On-ramp	May-16	9580	9341	992	952	10.19%	793	777	8.32%
	Exit 5 SB Off-ramp	May-16	9520	9282	781	750	8.08%	939	920	9.91%
	Exit 5 SB On-ramp	May-16	5645	5504	519	498	9.05%	427	418	7.59%
	average						8.54%			8.52%

Note - Exit 5 SB off-ramp AM peak volume does not include one count that appears anomalous when compared to other counts in same hour

Red counts are from NHDOT Town summary data - 2014-2015

3.2 Existing Signal Information – Timing and Phasing

Information about the current signal timing and phasing plans at each of the signalized intersections was compiled from records available from the entity with current maintenance responsibility, which is either the NHDOT Bureau of Traffic or the Town of Derry (none of the signals in Londonderry are under their jurisdiction). Current records for one of the locations (NH Route 102/Fordway) were not readily available, so the required information was gathered in the field by observation. This information, combined with the current lane use at each location, was compiled into a data file in the SYNCHRO signal analysis program, which emulates the procedures in Volume 3 (Interrupted Flow) of the *Highway Capacity Manual* 2000 *(HCM)* (TRB, 2000) analysis procedures, for use in future analysis. The HCM 2000 procedures are being used for signalized intersections because these procedures can analyze non-standard timing and phasing parameters, since as leading pedestrian start times, which were found in the field, and to be consistent with the analyses in the Interstate Justification Report (Louis Berger, 2018).

3.3 Crash Data – 2010-2014 – Data Reduction and Summary

Data compiled by the NH Department of Safety for the last five full calendar years was made available by the NHDOT for the two study area towns. Since the crash records are identified by State Plane coordinates, this data search was narrowed further to include only those crashes located within the limits of the study area, roughly bounded by I-93 to the west, NH Route 102 to the south, NH Routes 28 and 28 Bypass north of Tsienneto Road to the north, and the Tsienneto Road/NH Route 102 intersection to the east. The records were assigned to specific roadway segments or individual intersections if sufficient locational information was available. In some cases these identifiers overlapped, so the sum of the segment and intersection crashes is more than the total.

The findings are summarized in Table 2 below. A total of 716 crashes were identified within the project area within the five-year time span, with only one fatality (a single-car incident in 2014 on NH Route 102 in Londonderry). About 24% of the crashes were injury or fatality, with almost 87% of these being on the major roadways in the study area. NH Routes 102 and 28 combined accounted for about 2/3 of the total reported crashes, averaging 48 per year, with the Interstate only accounting for 19%, or 25 per year. The traffic circle at NH Route 28 Bypass and NH Route 102 had the most reported crashes of any intersection during this period, averaging almost 5 per year.

Although there was a consistent number of crashes during three of the five years that data was compiled (between 182 and 185 per year), the other two years show wide fluctuations within this period (115 and 52 crashes). Almost 80% of the crashes involved another motor vehicle, with another 13% involving a crash with a fixed object. Seven of the crashes involved a bicyclist or pedestrian, while another six involved a crash with an animal.

TABLE 2

EXIT 4A STUDY AREA CRASH SUMMARY 2010-2014

Location	**Fatal Crashes**	**Injury Crashes**	**Property Damage Only**	**Unknown Damage**	**Total Crashes**
Roadways					
NH Route 102, Exit 4 to Tsienneto Road.	1	58	172	9	240
NH Route 28, Exit 5 to NH Route 102	0	40	162	9	211
I-93, Exit 4 to Exit 5	0	27	97	3	127
NH Route 28 Bypass, NH Route 102 to Auburn Town Line	0	19	39	0	58
Folsom Road/Tsienneto Road	0	3	27	2	32
TOTAL	1	147	497	23	668
% OF TOTAL	0.1%	22.0%	74.4%	3.4%	100.0%
AVG PER YEAR	0.2	29.4	99.4	4.6	133.6
Major Intersections					
NH Route 102/NH Route 28 Bypass	0	7	16	0	23
NH Route 28 Bypass/Tsienneto Road	0	3	14	0	17
NH Route 102/NH Route 28	0	3	14	0	17
NH Route 102/Fordway/High St.	0	3	12	0	15
Tsienneto Road/Pinkerton Street	0	1	10	0	11
Folsom Road/Franklin Street	0	1	8	1	10
NH Route 28/Folsom Road/Tsienneto Road/ (Ross' Corner)	0	1	9	0	10
NH Route 28/Ashleigh Dr.	0	3	6	1	10
NH Route 28/Linlew Dr.	0	0	9	0	9
NH Route 102/Londonderry Road	0	2	5	1	8
NH Route 102/Tsienneto Road	0	1	4	0	5
TOTAL	0	25	107	3	135
% OF TOTAL	0.0%	18.5%	79.3%	2.2%	100.0%
AVG PER YEAR	0	5	21.4	0.6	27

ADDITIONAL INFO BELOW

Year					
2010	0	45	132	5	182
2011	0	32	83	0	115
2012	0	45	135	5	185
2013	0	8	40	4	52
2014	1	39	133	9	182
	1	169	523	23	716

23.7% (approx. percent that are injury or fatality)

Crash Types	Number	% Total
Animal	6	0.84%
Bicyclist	2	0.28%
Fixed Object	91	12.71%
Jackknife	1	0.14%
Other Motor Vehicle	568	79.33%
Other Object	3	0.42%
Overturn	14	1.96%
Parked Motor Vehicle	9	1.26%
Pedestrian	5	0.70%
Spill (two-wheeled vehicles)	3	0.42%
Other	14	1.96%
	716	

4.0 Development of Base Traffic Networks

The time periods to be analyzed will be the 2015 AM and PM peak hours as determined by the traffic counts. The analysis will focus on operations of both the Interstate system (freeway facilities, ramp terminals, ramp merge/diverge, weaving sections) as well as local intersection Levels of Service, using the methodologies in the current version of the HCM.

There are two different approaches that need to be considered for the Interstate system versus the local roadways. The Interstate section within the study area from south of Exit 4 to north of Exit 5 is a closed system – traffic enters and exits at specific locations, so the entire system needs to balance in both directions. The local roadways are not a closed system; counts between the local intersections may not necessarily balance in most locations because there are other intervening driveways for adjacent land uses and other minor streets where traffic is able to enter or exit the network.

Interstate Volume Balancing

Within the closed Interstate system, there are two adjustments that need to be made. One is for the overall mainline/ramp system, where a starting point was chosen (in this case, at the NHDOT permanent traffic recorder location south of Exit 4) and add or subtract the on- and off-ramp volumes both northbound and southbound to develop the base AM and PM peak hour networks along I-93.

The second adjustment is to balance volumes between the ramp terminals at both Exits 4 and 5, based on the peak hour volume counts and the recent TMCs that were collected in May 2016. This second process will be discussed later in the report.

Directional counts from the I-93 permanent recorder station during May 2015 were reviewed and compiled to determine the AWDT during that period (taking the Memorial Day holiday count out of consideration). These were adjusted seasonally to develop the 2015 AWDT for both northbound and southbound traffic as the starting point. The ramp counts taken in May 2016 were also seasonally and annually adjusted to the 2015 AWDT and then added and subtracted accordingly going north and south on the Interstate. The resulting mainline 2015 AWDT volumes for the AM and PM peak hours are shown in Figures 4 and 5, respectively. The counts and calculations are provided in Appendix C.

Ramp Terminal Balancing – Exits 4 and 5

The turning movement volumes at the ramp terminals at Exits 4 and 5 must also balance between the intersections while agreeing with the overall ramp volumes. While the ramp volumes were collected with automatic traffic recorders, which only summarized data on an hourly basis, the turning movements were collected at 15-minute intervals. Furthermore, the individual intersections also have their own peak hours, which may not necessarily match the adjacent ramp or the hourly ramp volume. Therefore, an overall peak for each interchange was developed from a summary of the turning movement counts at each location and the turning percentages applied to the balanced interstate ramp volumes derived above. The AM peak period was determined to be from 7:30-8:30, while the PM peak was from 4:45-5:45. The balanced 2015 AM and PM peak hour volumes at the two interchanges are also shown in Figures 4 and 5, respectively. The calculations are also provided in Appendix C.

Other Intersection Counts

As noted above, the local intersection turning movement counts were collected in groups of intersections in close proximity to each other to minimize significant differences between locations, even if there were intervening roadways or driveways that would not allow balancing between sites. There are only four intersections on the local network where traffic should essentially balance between adjacent intersections:

- Between Ross' Corner (NH Route 28/Folsom/Tsienneto) and at Pinkerton Street;
- Between North High Street/Madden Road and the North High Street/Folsom/ Franklin/Franklin Street Extension intersection;
- Between the NH Route 28 Bypass/NH Route 102 traffic circle and the intersection at NH Route 28 Bypass/Pinkerton Street/Perkins Street to the north; and
- Between NH Route 102/Tsienneto Road easterly to include the North Shore Road and English Range Road intersections.

Counts at these locations were balanced and all counts were adjusted to the 2015 AWDT using the NHDOT seasonal and annual factors for Group 4 Urban Highways noted above. The 2015 AM and PM peak hour volumes at the local intersections are shown in Figures 6 and 7, respectively.

5.0 Model Calibration

The SNHPC regional traffic model is an Average Annual Weekday Traffic (AAWDT) model for the greater Manchester, NH area that includes Derry and Londonderry as well as other surrounding towns. The model area has expanded since its use in the 2007 DEIS project to include towns to the south, east and west of the Exit 4A area with added roadway links and TAZs to provide traffic generation capabilities for the SNHPC's planning horizon of 2040.

However, to be a useful travel forecasting tool, the model needs to be able to replicate actual traffic volumes throughout its network within certain reasonable margins of error established by the Federal Highway Administration (FHWA) for regional traffic models. As such, the various 2015 traffic volume counts provided in Table 1 for the Exit 4A study area, among other locations in the SNHPC region, were used as a guide to test the validity of the SNHPC traffic model as a predictive tool of actual 2015 counts found in the region. This was found to be the case, and the findings of the calibration process were presented to the Exi4 4A Working Group in October, 2016. A more detailed memo describing the various calibration procedures undertaken as part of this project is included in Appendix D.

It should be noted that the current SNHPC traffic model is based on expected trip making behavior from observations of past conditions and predicting these out to a future date, in this case the 2040 design year. With the advent of autonomous/connected vehicles (AV/CVs) and the increasing likelihood of them being a larger share of the vehicle fleet within the planning horizon now covered by the model, there is much uncertainty about how and to what extent current and forecasted individual driving habits may be affected by this potentially transformative technology.

A recent study prepared by the Texas A&M Transportation Institute (Texas A&M, 2017) looked at the possible implications of AV/CVs on the transportation planning process. Some of the key modeling components they identified that could be affected by the eventual deployment of AV/CVs into the traffic stream include:

- the possible changes on the socio-economic factors that typically influence trip making and vehicle ownership;
- future characteristics of the highway network, including the effect on roadway and intersection capacity, safety and operations;
- the need to consider changes to the model area geography (e.g. traffic zones) based on possible household locational decisions;
- the possible effects on trip generation, distribution and mode choices with the availability of AV/CVs, including the likelihood of zero-occupant vehicles on the roadway network

The current transportation planning process looks at changes to demographics and roadway networks to predict future travel demands, assuming trip making will be similar to today. With AV/CVs becoming a larger component of future transportation options, the current process is not suited to predict future trip-making behavior since there is no way to reasonably predict the impact of these technologies on individual travel demand decisions. There is also the likelihood that populations that now are unable to drive or own a vehicle will have greater mobility options available to them, and therefore may result in more trips on the network than would normally be forecasted.

Therefore, until such time as traffic demand modelling on a regional basis can account for the increased deployment of AV/CVs at some critical mass to be able to better assess the impact on some/all of the trip-making factors noted above, the current transportation planning and regional travel demand modeling process is the best available option for forecasting future traffic on the roadway network for a project such as Exit 4A.

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6.0 Capacity Analyses – 2015 Base Conditions

In general, traffic analyses focus on the facilities that present the most likely constraints to overall operations on the roadway network. For interstate facilities, traffic operations are governed largely by the combination of mainline traffic flow at a given speed and number of lanes as it may be influenced by merging and diverging traffic at on and off-ramps at interchanges, as well as any weaving sections between ramps in close proximity to each other. For local roadway networks, traffic flow tends to be governed by intersection capacity which acts to meter volumes onto adjacent roadway segments based on its ability to allow conflicting movemetns to be served.

The *2010 Highway Capacity Manual (TRB, 2010)* provide the technical procedures to analyze traffic operations of freeway facilities (basic freeways, ramp merge/diverge and weaving sections) used in this report. Chapter 10 of the *2010 HCM* defines the methodologies used to analyze typical freeway facility operations for extended lengths of continuously connected basic freeway, weaving, merge and diverge segments, such as those along I-93 in the Exit 4A study area. This methodology allows for the analysis of multiple/continuous 15-minute time periods and is capable of identifying locations where the facility may break down and the impacts of such on the rest of the facility. As such, the analysis determines where the 'weakest link' in the facility may control overall operations along a freeway network in either direction.

The 2000 *Highway Capacity Manual* (TRB, 2000) provided methodologies for signalized and unsignalized intersections, including roundabouts, that will be used to analyze the NH Route 102/NH Route Bypass 28 traffic circle. Because of the phasing and timing limitations of the existing intersections, the HCM 2000 procedures were used for the signalized and unsignalied intersection analyses, as well as to be consistent with the IJR. Chapters 18 and 19 of the *2000 HCM* define the methodologies for signalized and two-way stop controlled intersections.

The Highway Capacity Software (McTrans, 2018) as well as the SYNCHRO/Sim-Traffic programs (Trafficware, 2016) are common software packages used by traffic engineers to evaluate how traffic volumes react under interrupted and uninterrupted flow conditions under various volume, speed, traffic composition, lane use and signal timing conditions. The Level of Service (LOS) criteria for freeway facilities and intersection operations defined in the both versions of the HCM are provided in Appendix E. In general, a LOS C is considered desirable for freeway facilities operations; however, LOS D is considered acceptable for both freeways and intersection operations in urbanized areas.

6.1 Mainline Interstate Operations

The 2015 base weekday AM and PM peak hour volumes along I-93 from just south of Exit 4 to north of Exit 5 are shown in Figures 4 and 5.

The existing two-lane I-93 freeway facility was segmented along its length both northbound and southbound, based on the spacing of on- and off-ramps connecting the basic two-lane freeway segments on either side. Northbound, there were five basic freeway segments, two diverge (i.e., off-ramp) and two merge (i.e. on-ramp) segments under existing conditions. Southbound, there is one additional freeway and one more merge segment to account for the SB loop on-ramp at Exit 4 from the east and the segment between the SB on-ramps. Because of the distance between the existing interchanges, there are currently no weaving sections along I-93 in the Exit 4A study area network.

6.1.1 Mainline Freeway Segments

Five freeway segments are contained in the I-93 project study area going northbound, with a sixth one added in the southbound direction because of the additional on-ramp at Exit 4. There will be additional segments created when the Exit 4A alternatives are analyzed.

The demand and geometric factors input for segments and facility analyses include:

Demand

- Vehicles/hour
- Percent trucks and recreatonal vehicles (RVs)
- Driver population factor

Geometry

- Number of lanes
- Average lane width
- Right-side lateral clearance
- Terrain
- Free-flow speed
- Location of/distance to merge/diverge segments, with number of lanes, length of acceleration/deceleration lanes

A description of the existing facility segments and the detailed reports are summarized in Table 3 and included in Appendix F.

TABLE 3
HCS 2010 - FREEWAY FACILITIES ANALYSIS - 2015 BASE- AM AND PM PEAK HOURS

1-May-17		AM Peak Hour Level of Service (LOS)/d/c ratio			PM Peak Hour Level of Service (LOS)/d/c ratio		
Segment	Northbound Direction	BASIC	DIVERGE	MERGE	BASIC	DIVERGE	MERGE
1	I-93 Mainline south of Exit 4	B/0.45			D/0.77		
2	Exit 4 NB off-ramp		B/0.26			D/0.62	
3	I-93 Mainline between Exit 4 ramps	B/0.36			B/0.50		
4	Exit 4 NB on-ramp			B/0.57			C/0.44
5	I-93 Mainline between Exit 4 NB on- and Exit 5 NB off-ramps	C/0.60			C/0.68		
6	Exit 5 NB off-ramp		C/0.27			C/0.34	
7	I-93 Mainline between Exit 5 ramps	B/0.51			C/0.57		
8	Exit 5 NB on-ramp			D/0.58			D/0.42
9	I-93 Mainline north of Exit 5	D/0.74			D/0.75		
	Facility Operations	C			C		
	Space Mean Speed (mph)	63.2			62.7		
	Density (veh/mi/hr)	19.8			24.4		
Segment	Southbound Direction						
1	I-93 Mainline north of Exit 5	D/0.74			D/0.76		
2	Exit 5 SB off-ramp		D/0.50			D/0.50	
3	I-93 Mainline between Exit 5 ramps	C/0.57			C/0.55		
4	Exit 5 SB on-ramp			C/0.31			C/0.25
5	I-93 Mainline between Exit 5 SB on- and Exit 4 SB off-ramps	C/0.69			C/0.65		
6	Exit 4 SB off-ramp		C/0.39			C/0.49	
7	I-93 Mainline between Exit 4 SB off- and SB on ramp from east	B/0.51			B/0.44		
8	Exit 4 SB on-ramp from east			B/0.33			B/0.13
9	I-93 Mainline between Exit 4 SB on-ramps	C/0.63			B/0.49		
10	Exit 4 SB on-ramp from west			C/0.40		B/0.18	
11	I-93 Mainline south of Exit 4	D/0.78			C/0.56		
	Facility Operations	C			C		
	Space Mean Speed (mph)	62.5			62.8		
	Density (veh/mi/hr)	24.4			22.1		

Note: d/c = Demand-to-capacity ratio

6.1.2 Merge/Diverge Operations

Merge/diverge operations are the result of off-ramp and on-ramp traffic leaving and/or getting onto the freeway and how the ramp traffic interacts with the mainline freeway traffic. Since all traffic on I-93 in the study area is entering or exiting in the rightmost lane, which is also where most heavy vehicles travel, this Lane 1 volume is critical to the determination of operations. The ramp spacing and order of operation (e.g. off-ramp followed by an on-ramp, as opposed to an off-ramp followed by another off-ramp) also plays a role in how and to what degree these movements impede mainline freeway traffic flow.

There are currently four merge (on-ramp) and diverge (off-ramp) arrangements in the Exit 4A study area in the northbound direction and a fifth in the southbound direction (the second SB on-ramp at Exit 4). The introduction of a new interchange between Exits 4 and 5 will add another merge and diverge in each direction. The differences between the northerly and southerly interchange alternatives and their relative proximity to Exits 4 and 5 will ultimately determine how these new ramps will affect mainline operations. Table 3 provides the analysis results for the merge/diverge operations along I-93 in the study area under 2015 AM and PM peak hour conditions.

6.1.3 Weaving Operations

Weaving operations occur on highway segments between on- and off-ramps where merging and diverging traffic conflict while completing their respective movements. This analysis is mostly governed by the distance between these ramps, the number of lanes available to make such a movement, the volumes making their respective merge and/or diverge movements, and the ability of these movements to occur independently without influencing each other. This is more of an issue in areas where there are closely spaced interchange ramps.

In the current condition, Exits 4 and 5 are more than two miles apart, so there is essentially no weaving that occurs between the ramps. With the introduction of Exit 4A to the I-93 network, weaving between the Exit 4 NB on-ramp and the Exit 4A NB off-ramp may need to be considered for the southerly interchange alternatives. However, the HCS Freeway Facilities calculations allow for an overlap of the 1500-foot ‘influence areas’ between adjacent ramps, which was included in the analyses. At this point, it does not appear that a weaving section will be created between Exit 4A and Exit 5 because of the greater spacing between them.

7.0 Signalized Intersection Operations – 2015 Base Condition

The existing signal timing/phasing information gathered earlier, combined with the current lane use at each location along with the 2015 AM and PM peak hour volumes, was compiled into a data file in the SYNCHRO (Trafficware, 2016) signal analysis program, which emulates the procedures in Volume 3 (Interrupted Flow) of the *Highway Capacity Manual* 2000 *(HCM)* analysis procedures (TRB, 2000). Because of the phasing and timing limitations of the existing intersections, the HCM 2000 procedures were used for the signalized intersection analyses. The overall delay and LOS was determined by using the HCM module in SYNCHRO, while the queuing calculation results came directly from five runs of the Sim-Traffic module within SYNCHRO per NHDOT guidance (NHDOT, 2017a). The volume-to-capacity (v/c) ratios, average delays and LOS for the signalized intersections are shown in Table 4 below. The peak queues by approach are shown in Table 5 later in this report.

Table 4
Summary of 2015 Signalized Intersection Capacity Analyses

Signalized Intersections							
		AM Peak Hour			**PM Peak Hour**		
Intersection	**Existing Lane Use**	**v/c**	**Delay**	**LOS**	**v/c**	**Delay**	**LOS**
#1 - Exit 4 SB Off-Ramp/NH Route 102	**EB-** T, T; **WB-** T, T **SB-** L, R	0.55	17.7	B	0.67	40.2	D
#2 - Exit 4 NB Off-Ramp/NH Route 102	**EB-** L, T, T; **WB-** T, T, R **NB-** L, L, R	0.86	34.6	C	0.71	29.8	C
#3 - Exit 5 SB Off-Ramp/NH Route 28	**EB-** T, T, R; **WB-** L, T, T **SB-** L, L, R	0.74	21.0	C	0.63	21.8	C
#4 - Exit 5 NB Off-Ramp/NH Route 28	**EB-** L, T, T; **WB-** T, T, R **NB-** L, R	0.78	15.9	B	0.66	20.3	C
#6 - NH Route 102/Fordway	**EB-** T, R; **WB-** L/T; **NB-** L/R; **SB-** L/T/R	0.89	25.7	C	0.94	34.1	C
#7 - NH Routes 102/28	**EB-** L,T/R; **WB-** L,T/R; **NB-** L,T/R; **SB-** L, T, R	0.84	39.9	D	0.83	39.9	D
#11- Ross' Corner (Folsom/NH Route 28)	**EB-** L,T,R; **WB-** L,T,R; **NB-** L, T, T, R; **SB-** L, T, T, R	0.61	37.1	D	0.78	47.2	D
#13 -NH Route 28/Linlew Drive	**EB-** L/T, R; **WB-** L/T, R; **NB-** L, T, T/R; **SB-** L, T, T/R	0.41	13.3	B	0.61	18.9	B
#14 - NH Route 28/Ashleigh Drive	**EB-** L,T/R; **WB-** L, L/T, R; **NB-** L, T, T/R; **SB-** L, L, T, T,/R	0.48	16.9	B	0.72	24.0	C
#18 - NH Route 28 Bypass/ Tsienneto Road	**EB-** L,T/R; **WB-** L,T/R; **NB-** L,T/R; **SB-** L, T, R	0.80	36.5	D	0.83	35.4	D

The HCM and SYNCHRO printouts are provided in Appendices G 1-3.

The results of these analyses show which movements at the various intersections exhibit some current capacity constraints (LOS E or worse). Some of these, such as at the Exit 4 ramp terminals, will be addressed by the ongoing I-93 widening project, while issues at other local intersections may need to be addressed in some form, either through added lanes and/or optimized signal timings, by the 2040 design year. These existing deficiencies are discussed briefly below:

- Exit 4 SB Off-Ramp

  The turns from the off-ramp are the most constrained movements, with the higher-volume right turn from a single lane showing the most delay and queuing. A second right-turn lane is proposed as part of the ongoing improvements to Exit 4.

- Exit 4 NB Ramps

  The westbound thru traffic is under duress during the AM peak, while the eastbound left turn to the on-ramp is at LOS E in the PM peak. While the right turn from the off-ramp operates at a good LOS because it is not controlled by the signal, field observations show it is often impeded by either the eastbound traffic through the intersection and/or the downstream queuing of traffic on NH Route 102 east of the interchange.

- NH Route 102/NH Route 28 (Crystal Avenue/Broadway/Birch Street)

  This major crossroads in the heart of downtown Derry has several movements that exhibit substantial delays during AM and/or PM peak hours, and results in queuing along Broadway. The level of parking and pedestrian activity also affects overall traffic operations as the mix of local and through traffic results in significant congestion, even if not directly reflected in the overall capacity/LOS calculations.

  Because the reduction in this through traffic in downtown Derry is one of the primary purposes for the proposed Exit 4A project, it was necessary to find a more qualitative assessment of downtown congestion that may not be reflected in the capacity calculations. To do this, we looked at Google Maps snapshots during the course of typical weekday AM and PM peak hours (Google, 2018). These are based on real-time on-the-ground observations of travel times in the study area. The snapshots for AM and PM peak hours between Monday, January 22, 2018 and Friday, January 26, 2018 are provided in Appendix H. It should be noted that Exit 4 is currently under construction, although there should be minimal work going on during the winter when these snapshots were taken.
  These figures show regular congestion at the NH Route 102/28 intersection as well as other key intersections in the study area during any given weekday peak

hour. Congestion in and around Exit 4 is oriented westbound in the AM peak and eastbound in the PM peak, and is shown to affect other segments along Broadway in both directions to varying degrees. Key intersections along the north-south corridors of NH Route 28 and NH Route 28 Bypass, such as at Ross' Corner, Tsienneto Road, and the traffic circle at NH Route 102, appear to exhibit regular levels of delay and congestion based on this sample of peak hour travel times.

- Ross' Corner (NH Route 28/Tsienneto Road/Folsom Road)

  This intersection leads to the major commercial corridor in north Derry as well as serving as a commuter route. Traffic currently uses the Ash Street Extension and Folsom Road as an alternative route to NH Route 102 to avoid the aforementioned downtown congestion. Several turning movements experience significant delays, even with recent improvements that provided a second SB left-turn lane onto Tsienneto Road. The proximity of the Pinkerton Street unsignalized intersection just east of this location also affects overall traffic flow in this area.

- NH Route28/Ashleigh Drive

  This intersection serves as the primary access drive to the new Wal-Mart supercenter as well as other commercial establishments on the east side of NH Route 28. The heavy turning movements into and out of this town road, combined with significant commuter volumes along the NH Route 28 corridor, result in less than desirable levels of delay for several movements, particularly in the PM peak, even though the overall LOS is at LOS C.

- NH Route 28 Bypass/Tsienneto Road

  The Tsienneto Road corridor west of NH Route 28 Bypass as well as the lands adjacent to this intersection has seen a fair share of new development over the years, as well as increased use by east-west commuter traffic avoiding NH Route 102 and the downtown area. With only a single east-west lane through the intersection, calculated delays now exceed acceptable LOS thresholds for some movements during both peaks.

8.0 Unsignalized Intersection Operations

Similarly, the unsignalized intersections in the study area network were analyzed for the 2015 AM and PM peak hours using the standard 2010 HCM procedures. These results are provided in Table 6, with the printouts in Appendix I. It should be noted that the traffic circle at the intersection of NH Route 28 Bypass, NH Route 102, and East Derry Road was analyzed as a roundabout, since all turns at this location are right turns in the counterclockwise direction. The circle was evaluated using updated roundabout analysis procedures from HCM 6, published in 2016 (TRB, 2016), because it incorporates updated data from actual field operations of the growing number of roundabouts in the USA and, as such, should be more representative of local driver behavior.

As observed in the field and confirmed by the SYNCHRO analyses, left turns from the minor side streets experience significant delays due to the high volumes on the major streets, either on the State highway system or local streets such as Tsienneto Road. Of particular concern is the heavy left-turn volume exiting from Pinkerton Street onto Tsienneto Road in close proximity to the signalized intersection at Ross' Corner. Special attention will be needed to address this condition under future No-Build and Build conditions.

The table also shows the peak design queue by approach for both the signalized and unsignalized intersections, based on the 2015 capacity analysis of base conditions. This will be an important component of evaluating the future 2040 Build condition layouts under the various alternatives.

Table 5
2015 Signalized Intersection Capacity and Queuing Analyses

Signalized Intersections

		AM Peak Hour				PM Peak Hour			
Intersection	Lane Groups	95% queue (ft)	v/c ratio	Average Delay	LOS	95% queue (ft)	v/c ratio	Average Delay	LOS
#1 - Exit 4 SB Off-Ramp/NH Route 102	EB Thru	212	0.46	11.5	B	230	0.44	11.0	B
	WB Thru	18	0.31	1.9	A	18	0.41	1.8	A
	SB LT	251	0.64	39.5	D	317	0.69	50.4	D
	SB RT	176	0.75	13.6	B	630	1.08	80.9	F
#2 - Exit 4 NB Off-Ramp/NH Route 102	NB LT	107	0.57	46.2	D	281	0.50	33.3	C
	NB RT	0	0.15	0.2	A	0	0.41	0.8	A
	EB LT	610	0.88	43.8	D	548	0.91	62.3	E
	EB Thru	83	0.24	4.3	A	242	0.40	19.5	B
	WB Thru	448	0.97	58.7	E	250	0.76	51.5	D
#3 - Exit 5 SB Off-Ramp/NH Route 28	EB Thru	212	0.68	32.7	C	197	0.56	27.8	C
	EB RT	0	0.21	0.3	A	0	0.21	0.3	A
	WB LT	211	0.81	40.0	D	151	0.62	45.3	D
	WB Thru	59	0.43	7.0	A	52	0.28	4.8	A
	SB LT	138	0.68	29.2	C	254	0.73	36.5	D
	SB RT	148	0.78	28.7	C	63	0.45	6.2	A
#4 - Exit 5 NB Off-Ramp/NH Route 28	EB LT	251	0.86	55.0	D	223	0.72	48.4	D
	EB Thru	5	0.44	2.2	A	308	0.53	12.7	B
	WB Thru	189	0.56	26.1	C	192	0.37	27.4	C
	WB RT	0	0.53	1.3	A	0	0.38	0.7	A
	NB LT	233	0.87	49.4	D	180	0.75	44.1	D
	NB RT	0	0.10	0.1	A	143	0.77	35.2	D
#6 - NH Route 102/Fordway	EB all	247	0.12	17.7	B	591	1.00	47.1	D
	WB all	368	0.94	26.4	C	306	0.81	26.8	C
	NB all	304	0.72	51.7	D	215	0.84	36.6	D
	SB all	22	0.86	12.4	B	90	0.18	15.9	B
#7 - NH Routes 102/28	EB L	148	0.83	83.0	F	155	0.70	55.8	E
	EB T/R	170	0.42	20.1	C	393	0.73	34.2	C
	WB L	47	0.28	40.6	D	119	0.68	69.5	E
	WB T/R	385	0.88	42.7	D	272	0.67	35.1	D
	NB L	101	0.79	90.6	F	80	0.43	42.5	D
	NB T/R	274	0.85	48.3	D	316	0.86	51.3	D
	SB L	121	0.86	103.4	F	174	0.79	67.9	E
	SB Thru	188	0.61	33.9	C	346	0.77	43.3	D
	SB RT	2	0.23	1.1	A	35	0.21	3.5	A

Table 5 (Cont'd)

Signalized Intersections (cont.)

Intersection	Existing Lane Use	AM Peak Hour 95% queue (ft)	AM v/c ratio	AM Average Delay	AM LOS	PM Peak Hour 95% queue (ft)	PM v/c ratio	PM Average Delay	PM LOS
#11- Ross' Corner (Folsom/NH Route 28)	EB L	191	0.16	88.0	F	324	0.89	78.7	E
	EB Thru	169	0.27	45.1	D	310	0.73	49.0	D
	EB R	0	0.25	0.0	A	0	0.17	0.7	A
	WB L	157	0.70	66.1	E	273	1.14	165.5	F
	WB Thru	323	0.21	80.3	F	241	0.75	60.7	E
	WB R	108	0.26	8.0	A	190	0.52	16.4	B
	NB L	35	0.90	40.5	D	134	0.58	66.6	E
	NB Thru	90	0.63	25.5	C	198	0.43	40.0	D
	NB R	0	0.01	1.2	A	0	0.27	1.1	A
	SB L	131	0.74	42.0	D	248	0.76	49.7	D
	SB Thru	72	0.95	19.5	B	419	0.64	35.6	D
	SB RT	27	0.48	4.1	A	51	0.28	4.8	A
#13 -NH Route 28/Linlew Drive	EB L/T	10	0.06	33.0	C	40	0.18	39.4	D
	EB R	0	0.04	0.2	A	0	0.05	0.3	A
	WB L/T	61	0.35	40.6	D	69	0.46	48.8	D
	WB R	93	0.71	18.9	B	43	0.66	13.0	B
	NB L	0	0.00	0.0	A	36	0.19	46.3	D
	NB T/R	675	0.35	12.9	B	296	0.50	15.5	B
	SB L	63	0.35	42.8	D	125	0.64	37.4	D
	SB T/R	134	0.38	4.9	A	437	0.57	14.3	B
#14 - NH Route 28/Ashleigh Drive	EB L	20	0.12	40.8	D	60	0.54	65.2	E
	EB T/R	16	0.11	30.0	C	29	0.25	34.5	C
	WB L	110	0.52	46.5	D	232	0.84	69.2	E
	WB L/T	111	0.53	46.7	D	227	0.83	67.0	E
	WB R	38	0.22	6.0	A	63	0.29	10.9	B
	NB L	56	0.05	61.6	D	3	0.06	65.0	E
	NB T/R	183	0.50	10.1	B	311	0.69	14.8	B
	SB L	8	0.41	42.9	E	39	0.47	47.4	D
	SB T/R	285	0.35	10.3	B	234	0.60	14.0	B
#18 - NH Route 28 Bypass/ Tsienneto Road	EB L	126	0.88	77.5	E	278	0.86	54.0	D
	EB T/R	114	0.49	24.2	C	394	0.69	30.0	C
	WB L	82	0.50	41.9	D	36	0.15	35.1	D
	WB T/R	309	0.95	59.4	E	248	0.86	58.0	E
	NB L	119	0.70	57.5	E	97	0.53	44.2	D
	NB T/R	193	0.48	26.8	C	307	0.69	37.0	D
	SB L	36	0.18	35.8	D	80	0.44	42.4	D
	SB Thru	171	0.63	35.7	D	149	0.39	29.4	C
	SB R	71	0.41	7.9	A	30	0.20	2.3	A

Table 6
2015 Unsignalized Intersection Capacity and Queuing Analyses

Intersection	Existing Lane Use	AM Peak Hour 95% queue (ft)	AM v/c ratio	AM Average Delay	AM LOS	PM Peak Hour 95% queue (ft)	PM v/c ratio	PM Average Delay	PM LOS
#5 - NH Route 102/Londonderry Road	EB L	13	0.142	12.3	B	40	0.354	11.7	B
	WB L	0	0.005	8.6	A	0	0.008	10.7	B
	NB all	0	0.008	11.9	B	65	1.078	*	F
	SB L/T	20	0.253	115.0	F	68	1.130	*	F
	SB R	65	0.505	36.1	E	45	0.395	19.9	C
#8 - North High Street/Ash Street Extension	EB all	45	0.383	15.4	C	445	1.152	123.5	F
	NB LT	0	0.005	8.2	A	0	0.005	8.4	A
#9 - North High Street/Madden Road	EB all	8	0.079	18.7	C	10	0.11	27.2	D
	NB LT	0	0.000	0.0	A	0	0.00	0.0	A
#10 – North High/Folsom/Franklin Streets	EB all	3	0.035	8.3	A	3	0.043	8.4	A
	WB all	3	0.025	8.0	A	3	0.038	9.2	A
	NB all	15	0.160	14.2	B	30	0.293	23.7	C
	SB all	8	0.096	10.5	B	50	0.424	22.5	C
#12 - Tsienneto Road/Pinkerton Street	WB L	8	0.088	8.5	A	13	0.138	9.3	A
	WB L/T	0	0.000	0.0	A	0	0.000	0.7	A
	NB L	309	1.156	154.3	F	340	1.424	282.3	F
	NB R	13	0.154	11.8	B	28	0.279	15.0	C
#15 - NH Route 28/Scobie Pond Road	EB L	3	0.022	9.5	A	5	0.061	10.3	B
	SB all	183	1.011	143.2	F	318	2.116	*	F
#16 - NH Route 102/NH Route 28 Bypass/East Derry Road (Traffic Circle-RT only)	EDR WB	375	1.031	77.5	F	450	1.112	103.3	F
	28 Byp NB	175	0.781	29.5	D	525	1.268	169.4	D
	28 Byp SB	400	1.058	83.5	F	750	1.250	146.4	F
	102 EB	475	1.106	96.6	F	850	1.456	240.0	F
	102 WB	325	1.026	86.1	F	100	0.622	24.6	C
#17 - NH Route 28Bypass/ Pinkerton/Nesmith	EB L/T	125	3.388	*	F	60	0.521	69.4	F
	EB R	40	0.350	13.6	B	140	0.692	20.6	C
	WB all	245	1.371	296.3	F	73	0.599	76.5	F
	NB all	30	0.289	9.5	A	15	0.175	8.5	A
	SB all	0	0.014	8.5	A	3	0.025	8.4	A
#19 - NH Route 102/Tsienneto Road	EB L	3	0.020	9.5	A	0	0.016	8.4	A
	SB L/R	30	0.287	19.3	C	218	0.869	60.9	F

Note- Assumes 25 ft per queued vehicle
* - calculated delay exceeds 300s

9.0 Summary of SNHPC Model Assignments – 2015, 2040

The SNHPC calibration of their regional traffic forecasting model was discussed with the Traffic Working Group (TWG) in October 2016. This calibration process was based on the least-mean squared comparison of the 2015 assignments (based on the various socioeconomic characteristics of each Traffic Analysis Zone (TAZ) used by the model to generate origins and destinations to be assigned to the network) to the calculated 2015 Average Annual Weekday Traffic (AAWDT) on the key links in the study area network that were derived from the extensive traffic counting program initiated at the start of this SDEIS project. This comparison was found to fall within the FHWA's acceptable margin of error for traffic modeling as summarized in Appendix D. **As such, it was agreed by the TWG at this meeting that the model was in compliance with FHWA standards for model accuracy and could be used as a tool to reasonably project future volumes for this project.**

It was further agreed by the TWG that the relative differences between the model AAWDT assignments for 2015 and 2040 would be applied to the calculated 2015 AAWDT volumes. AM and PM peak hour volumes were to be derived as a percentage of the AAWDT as determined in both the roadway and intersection turning movement count data. AAWDT assignments at individual intersections would be used to develop any adjustments to peak hour existing turning movements, based on both the increase/decrease in traffic volume as well as any changes in turning movement percentages of any particular movement. The derivation of these future intersection volumes was completed only after consensus was reached with the TWG on the reasonableness of the 2040 AAWDT traffic assignments for each alternative.

The future model includes known/programmed roadway improvements in the SNHPC's Regional Transportation Plan - 2015-2040 (SNHPC, 2017) that includes Exit 4A; however, this interchange was not included in any of the No-Build networks. While it was recognized that there may be locations where existing/projected capacity deficiencies may exist, only those projects either programmed in the State's Ten-Year Highway Plan (NHDOT, 2018) or the Regional Transportation Plan were included in the 2040 No-Build network.

The 2040 SNHPC model assignments were developed by including the population and employment projections for each community in the SNHPC model area, as outlined in the Lane Use Scenarios report (Louis Berger, 2017) and disaggregated to the TAZ level. This report also included alternative development scenarios without and with the proposed Exit 4A interchange, notably for the Woodmont Commons development on the east side of I-93, since the development of that parcel would be directly impacted by the location of the proposed interchange. In general, the Woodmont Commons–East development was assumed to reach its build-out potential under only the southerly interchange options (A and B), and would have a lesser development scenario under the 2040 No-Build C, D, and F alternatives.

It should also be noted that the Woodmont Commons traffic impact study for the full development project submitted to the Town of Londonderry (TEC, 2013) assumed that, because of the ‘live-work-play’ design intent of the proposed mixed-use development, a certain percentage of site-generated trips would remain ‘internally captured’ within the site itself and would not be assigned to the adjacent street network outside of the development. An adjustment factor of 23% was applied to the total site traffic generation for the various proposed land uses assumed in the Woodmont Commons traffic impact study to account for this estimated internal capture rate.

However, it should be noted that the methodologies used to develop trip generation, distribution and assignments for an individual traffic impact study versus a regional model are quite different. The model applies its trip distribution and assignment algorithms directly to the trip productions and attractions generated by each TAZ, based on their socioeconomic characteristics, which does not differentiate between trips that should or should not be assigned to other TAZs. In addition, the Woodmont Commons development is included as part of several TAZs, so correcting for only some trips from a particular TAZ and not others may appear to be arbitrary and jeopardize the validity of the model.

After consultation with the NHDOT Bureau of Traffic, it was agreed, as the initial step, all the model-generated traffic from all TAZs, including Woodmont Commons, was assigned to the SNHPC model network without regard to the internal capture rate assumptions noted in their site-specific traffic impact study. (NHDOT, 2017b) This should provide a conservatively worst-case estimate of traffic being assigned to the study area roadway network. Should the design intent of Woodmont Commons be realized and less traffic is actually generated as the project evolves, overall operations would be better than projected and the design life of any proposed improvements would be extended.

Individual spreadsheets were created for the key links in the network under each 2040 alternative for purposes of calculating the projected 2040 AAWDT and AM and PM peak hour volumes, based on the relative increase/decrease between 2015 and 2040 model assignments.

9.1 AAWDT Comparisons – 2040

Table 7 presents a summary of the projected 2040 AAWDT on key links in the study area roadway network, including the I-93 mainline and all interchange ramps. As noted above, these were derived by applying the growth rate between SNHPC’s 2015 and 2040 model assignments to the calculated 2015 AAWDT derived from the updated traffic counting program created for this project. These assignments also provide projected volumes for newly created road segments, including the Exit 4A on- and off-ramps as well as the connector roadway between the new proposed interchange and the existing roadway network.

TABLE 7

Adjusted 2040 AAWDT volume comparison - All Alternatives

7-Apr-17
rev 1-26-18

	Loc Code	Count Location	Raw 2015 AAWDT	Adj 2015 AAWDT	2015 AAWDT Base Model Assigns	2040 AAWDT No-Build Assigns	% Growth to '15 base No-Build 2015-40	2040 No-Build AAWDT	2040 AAWDT Alt A Assigns	% Growth to '15 base Alt A 2015-40	2040 Alt A AAWDT	AAWDT Difference Alt A vs No-Build	2040 AAWDT Alt B Assigns	% Growth to '15 base Alt B 2015-40	2040 Alt B AAWDT	AAWDT Difference Alt B vs No-Build	2040 AAWDT Alt C Assigns	% Growth to '15 base Alt C 2015-40	2040 Alt C AAWDT	AAWDT Difference Alt C vs No-Build	2040 AAWDT Alt D Assigns	% Growth to '15 base Alt D 2015-40	2040 Alt D AAWDT	AAWDT Difference Alt D vs No-Build	2040 AWDT Alt F Assigns	% Growth to '15 base Alt F 2015-40	2040 Alt F AAWDT	AAWDT Difference Alt F vs No-Build
		Derry Locations																										
Derry	1	Crystal Av (NH 28), S of Tsienneto	15,585	15,195	13,406	10,220	-23.77%	11,584	7,242	-45.98%	8,208	-29.1%	10,565	-21.19%	11,975	3.4%	12,279	-8.41%	13,918	20.1%	13,225	-1.35%	14,990	29.4%	10,313	-23.07%	11,689	0.9%
	2	Folsom Rd W of NH 28	12,070	11,768	8,960	10,537	17.60%	13,839	29,612	230.49%	38,892	181.0%	4,730	-47.21%	6,212	-55.1%	9,494	5.96%	12,469	-9.9%	8,646	-3.50%	11,356	-17.9%	9,223	2.94%	12,113	-12.5%
	3	Pinkerton St E of Tsienneto	10,722	10,454	8,776	6,396	-27.12%	7,619	9,059	3.22%	10,791	41.6%	9,178	4.58%	10,933	43.5%	11,138	26.91%	13,268	74.1%	11,608	32.27%	13,827	81.5%	6,356	-27.58%	7,571	-0.6%
	4	Tsiennto Rd, W of NH 102	5,532	5,394	5,666	9,072	60.11%	8,636	10,824	91.03%	10,304	19.3%	16,182	185.60%	15,405	78.4%	15,529	174.07%	14,784	41.6%	11,363	100.55%	10,818	25.3%	9,191	62.21%	8,750	1.3%
	5	Tsienneto Rd E of Pinkerton	15,012	14,637	14,200	18,876	32.93%	19,457	22,226	56.52%	22,910	17.7%	15,241	7.33%	15,710	-19.3%	15,644	10.17%	16,125	-17.1%	20,041	41.13%	20,658	6.2%	18,976	33.63%	19,560	0.5%
	6	NH 102, E of NH 28 Bypass	7,456	7,270	7,016	6,126	-12.69%	6,348	6,924	-1.31%	7,175	13.0%	4,277	-39.04%	4,432	-30.2%	3,324	-52.62%	3,444	-45.7%	5,942	-15.31%	6,157	-3.0%	6,450	-8.07%	6,684	5.3%
	7	NH 28 Byp, N of Academy Dr	8,615	8,400	7,318	2,853	-61.01%	3,275	2,333	-68.12%	2,678	-18.2%	2,375	-67.55%	2,726	-16.8%	2,436	-66.71%	2,796	-14.6%	2,420	-66.93%	2,778	-15.2%	2,785	-61.94%	3,197	-2.4%
	8	NH 28 Byp, N of Tsienneto Rd	12,250	11,944	9,377	4,072	-56.57%	5,187	4,229	-54.90%	5,387	3.9%	2,696	-71.25%	3,434	-33.8%	2,290	-75.58%	2,917	-43.8%	4,218	-55.02%	5,373	3.6%	4,145	-55.80%	5,280	1.8%
	9	NH 28 Byp, S of Thornton Rd S.	14,341	13,982	12,227	7,327	-40.08%	8,379	7,652	-37.42%	8,750	4.4%	7,791	-36.28%	8,909	6.3%	8,741	-28.51%	9,996	19.3%	8,136	-33.46%	9,304	11.0%	7,191	-41.19%	8,223	-1.9%
	10	NH 102 E of Griffin St	16,000	16,820	18,002	20,810	15.60%	19,444	16,885	-6.20%	15,776	-18.9%	16,759	-6.90%	15,659	-19.5%	16,330	-9.29%	15,258	-21.5%	18,591	3.27%	17,370	-10.7%	24,147	34.14%	22,562	16.0%
	11	NH 102 W of Abbot St	14,000	14,350	11,128	14,902	33.91%	19,217	15,442	38.77%	19,913	3.6%	11,283	1.39%	14,550	-24.3%	9,968	-10.42%	12,854	-33.1%	11,885	6.80%	15,326	-20.2%	15,829	42.24%	20,412	6.2%
	12	Fordway over Beaver Brook	5,200	5,330	5,114	3,511	-31.35%	3,659	4,748	-7.16%	4,949	35.3%	4,273	-16.45%	4,453	21.7%	4,206	-17.76%	4,384	19.8%	3,926	-23.23%	4,092	11.8%	3,595	-29.70%	3,747	2.4%
	13	Franklin St Ext, N. of Folsom Rd	1,800	1,845	1,254	1,959	56.22%	2,882	1,367	9.01%	2,011	-30.2%	4,736	277.67%	6,968	141.8%	2,083	66.11%	3,065	6.3%	2,019	61.00%	2,971	3.1%	1,783	42.19%	2,623	-9.0%
	14	Ash St at Londonderry town line	6,600	6,765	5,936	13,790	132.31%	15,716	6,065	2.17%	6,912	-56.0%	5,923	-0.22%	6,750	-57.1%	8,843	48.97%	10,078	-35.9%	8,511	43.38%	9,700	-38.3%	12,825	116.05%	14,616	-7.0%
	15	Crystal Av (NH 28), S of Rollins St	13,000	13,000	13,215	10,463	-20.82%	10,293	11,087	-16.10%	10,907	6.0%	11,110	-15.93%	10,929	6.2%	11,753	48.97%	10,078	-2.1%	11,998	-9.21%	11,803	14.7%	11,022	-16.59%	10,843	5.3%
		NH 102, at Derry/Chester town line	8,200	8,200	10,839	12,783	17.94%	9,671	14,181	30.83%	10,728	10.9%	14,668	35.33%	11,097	14.7%	14,002	-11.06%	11,562	19.6%	14,138	30.44%	10,696	10.6%	12,808	18.17%	9,690	0.2%
		Londonderry Locations																										
L-derry	16	NH 102, E of Hampton Dr	32,000	32,000	30,418	51,401	68.98%	54,074	56,306	85.11%	59,234	9.5%	56,263	84.97%	59,189	9.5%	50,680	66.61%	53,316	-1.4%	51,066	67.88%	53,722	-0.7%	52,565	72.81%	55,299	2.3%
	17	NH 102, E of Exit 4		26,800	20,818	32,410	55.68%	41,723	15,723	-24.47%	20,241	-51.5%	16,852	-19.05%	21,694	-48.0%	18,986	-8.80%	24,442	-41.4%	20,775	-0.21%	26,745	-35.9%	34,151	64.05%	43,964	5.4%
	18	NH 102 at Derry/L'derry Town line	22,656	22,090	22,983	29,904	30.11%	28,742	20,413	-11.18%	19,620	-31.7%	20,908	-9.03%	20,096	-30.1%	21,661	-5.75%	20,819	-27.6%	23,215	1.01%	22,313	-22.4%	32,520	41.50%	31,256	8.7%
	19	NH 28 at Derry/L'derry Town line	17,324	16,891	19,392	15,638	-19.36%	13,621	9,440	-51.32%	8,223	-39.6%	8,125	-58.10%	7,077	-48.0%	42,458	118.95%	36,982	171.5%	40,462	108.65%	35,244	158.7%	15,477	-20.19%	13,481	-1.0%
	20	NH 28 N of Liberty Dr	13,000	13,000	15,406	14,733	-4.37%	12,432	9,984	-35.19%	8,425	-32.2%	8,697	-43.55%	7,339	-41.0%	4,904	-68.17%	4,138	-66.7%	4,757	-69.12%	4,014	-67.7%	14,584	-5.34%	12,306	-1.0%
	21	Gilcreast Rd N of NH 102	10,070	9,818	9,397	16,438	74.93%	17,174	15,318	63.01%	16,004	-6.8%	15,035	60.00%	15,709	-8.5%	15,112	60.82%	15,789	-8.1%	14,742	56.88%	15,402	-10.3%	16,006	70.33%	16,723	-2.6%
	22	Londonderry Rd, N of NH 102		4,622	4,742	4,823	1.71%	4,701	6,536	37.83%	6,371	35.5%	6,034	27.25%	5,881	25.1%	7,633	60.97%	7,440	58.3%	7,354	55.08%	7,168	52.5%	4,521	-4.66%	4,407	-6.3%
	23	Ash St E of Londonderry Rd	6,900	6,900	5,949	14,001	135.35%	16,239	6,065	1.95%	7,035	-56.7%	5,923	-0.44%	6,870	-57.7%	8,682	45.94%	10,070	-38.0%	8,457	42.16%	9,809	-39.6%	13,023	118.91%	15,105	-7.0%
		Connector Rd, E. of Exit 4A (L'derry)	-	-					53,720				54,523				38,516				36,728				0			
		Connector Rd, W. of N High St (Derry)	-	-					40,974																			
		Connector Rd, W. of NH 28 (Derry)	-	-									35,565															
		Connector Rd, E. of NH 28 (Derry)	-	-									16,193				13,888											
		Connector Rd, N. of NH 102 (Derry)											16,182				15,529											
	24	Exit 4 NB Off-ramp	10,249	9,993	10,389	20,215	94.58%	19,444	18,073	73.96%	17,384	-10.6%	18,135	74.56%	17,444	-10.3%	18,728	80.27%	18,014	-7.4%	19,497	87.67%	18,754	-3.5%	20,417	96.53%	19,639	1.0%
	25	Exit 4 NB On-ramp	10,303	10,045	9,550	21,343	123.49%	22,449	15,150	58.64%	15,935	-29.0%	17,638	84.69%	18,552	-17.4%	15,903	66.52%	16,727	-25.5%	15,411	61.37%	16,210	-27.8%	21,378	123.85%	22,486	0.2%
	26	Exit 4 SB Off-ramp	9,862	9,615	8,157	18,349	124.95%	21,629	13,795	69.12%	16,261	-24.8%	14,795	81.38%	17,439	-19.4%	12,694	55.62%	14,963	-30.8%	12,431	52.40%	14,653	-32.3%	18,730	129.62%	22,078	2.1%
	27	Exit 4 SB On-ramp - EB to SB	5,310	5,177	4,907	10,778	119.65%	11,371	11,836	141.21%	12,487	9.8%	11,659	137.60%	12,301	8.2%	10,850	121.11%	11,447	0.7%	10,881	121.74%	11,480	1.0%	10,705	118.16%	11,294	-0.7%
	28	Exit 4 SB On-ramp - WB to SB	4,767	4,648	3,637	7,402	103.52%	9,460	3,879	6.65%	4,957	-47.6%	4,125	13.42%	5,272	-44.3%	5,140	41.33%	6,569	-30.6%	5,152	41.66%	6,584	-30.4%	7,494	106.05%	9,577	1.2%
		Exit 4A NB Off-ramp	-	-					8,732		8,732		9,488		9,488		2,795		2,795		1,504		1,504					
		Exit 4A NB On-ramp	-	-					15,240		15,240		13,208		13,208		13,410		13,410		13,630		13,630					
		Exit 4A SB Off-ramp	-	-					18,996		18,996		19,376		19,376		17,290		17,290		16,972		16,972					
		Exit 4A SB On-ramp	-	-					10,752		10,752		12,450		12,450		5,021		5,021		4,621		4,621					
																									6,256			
	29	Exit 5 NB Off-ramp	5,745	5,601	4,430	6,401	44.49%	8,093	7,521	69.77%	9,509	17.5%	7,036	58.83%	8,896	9.9%	6,626	49.57%	8,377	3.5%	7,054	59.23%	8,919	10.2%	13,329	41.22%	7,910	-2.3%
	30	Exit 5 NB On-ramp	9,580	9,341	9,101	13,499	48.32%	13,855	10,863	19.36%	11,149	-19.5%	10,468	15.02%	10,744	-22.5%	7,829	-13.98%	8,035	-42.0%	7,985	-12.26%	8,196	-40.8%	12,249	46.46%	13,680	-1.3%
	31	Exit 5 SB Off-ramp	9,520	9,282	9,234	13,577	47.03%	13,648	7,670	-16.94%	7,710	-43.5%	6,036	-34.63%	6,067	-55.5%	5,728	-37.97%	5,758	-57.8%	5,790	-37.30%	5,820	-57.4%	5,882	32.65%	12,313	-9.8%
	32	Exit 5 SB On-ramp	5,645	5,504	3,919	5,884	50.14%	8,264	6,879	75.53%	9,661	16.9%	5,355	36.64%	7,521	-9.0%	5,916	50.96%	8,309	0.5%	5,879	50.01%	8,257	-0.1%		50.09%	8,261	0.0%
		I-93, south of Exit 4 (DOT PATR)		71,060	72,378	118,908	64.29%	116,743	123,109	70.09%	120,867	3.5%	123,558	70.71%	121,308	3.9%	119,322	64.86%	117,149	0.3%	119,380	64.94%	117,206	0.4%	119,129	64.59%	116,960	0.2%
		NB			36,417	59,234	62.65%	-	61,455	68.75%	-		61,615	69.19%	60,470		59,601	63.66%	-		59,527	63.46%	-		59,424	63.18%	-	
		SB			35,961	59,674	65.94%	-	61,654	71.45%	-		61,943	72.25%	60,839		59,721	66.07%	-		59,853	66.44%	-		59,705	66.03%	-	
		I-93, between Exits 4 and 4A		71,000	71,152	120,205	68.94%	119,948	118,266	66.22%	118,013	-1.6%	122,072	71.57%	121,811	1.6%	113,200	59.10%	112,958	-5.8%	111,723	57.02%	111,484	-7.1%	120,621	69.53%	120,363	0.3%
		NB			35,578	60,363	69.66%	0	58,532	64.52%	-		61,119	71.79%	-		56,776	59.58%	-		55,441	55.83%	-		60,385	69.73%	-	
		SB			35,574	59,842	68.22%	0	59,734	67.91%	-		60,953	71.34%	-		56,424	58.61%	-		56,282	58.21%	-		60,236	69.33%	-	
		I-93, between Exits 4A and 5		71,000	71,152	120,205	68.94%	119,948	133,018	86.95%	132,734	10.7%	132,718	86.53%	132,434	10.4%	136,083	91.26%	135,792	13.2%	136,200	91.42%	135,909	13.3%	120,621	69.53%	120,363	0.3%
		NB			35,578	60,363	69.66%	-	65,040	82.81%			64,839	82.24%			67,390	89.41%			67,567	89.91%			60,385	69.73%	-	
		SB			35,574	59,842	68.22%	-	67,978	91.09%			67,879	90.81%			68,693	93.10%			68,633	92.93%			60,236	69.33%	-	
		I-93, north of Exit 5		76,000	81,139	134,995	66.37%	126,445	137,153	69.03%	128,466	1.6%	136,851	68.66%	128,183	1.4%	137,099	68.97%	128,416	1.6%	137,042	68.90%	128,362	1.5%	135,061	66.46%	126,507	0.0%
		NB			40,250	67,460	67.60%	-	68,383	69.90%	-		68,290	69.66%	-		68,593	70.42%	-		68,497	70.18%	-		67,458	67.60%	-	
		SB			40,889	67,535	65.17%	-	68,770	68.19%	-		68,561	67.68%	-		68,506	67.54%	-		68,545	67.64%	-		67,603	65.33%	-	
				Adj 2015 AAWDT	2015 AWDT Base Model Assigns	2040 AAWDT No-Build Assigns	% Growth 2015-40	2040 No-Build AAWDT	2040 AWDT Alt A Assigns	% Growth 2015-40	2040 Alt A AAWDT	AAWDT Difference Alt A vs No-Build	2040 AWDT Alt B Assigns	% Growth 2015-40	2040 Alt B AAWDT	AAWDT Difference Alt B vs No-Build	2040 AWDT Alt C Assigns	% Growth 2015-40	2040 Alt C AAWDT	AAWDT Difference Alt C vs No-Build	2040 AWDT Alt D Assigns	% Growth 2015-40	2040 Alt D AAWDT	AAWDT Difference Alt D vs No-Build	2040 AWDT Alt F Assigns	% Growth 2015-40	2040 Alt F AAWDT	AAWDT Difference Alt F vs No-Build

9.1.1 No-Build Conditions

A review of the table indicates that there is a reduction in trips on north-south roadways such as NH Route 28 Bypass, NH Route 28 and Fordway under No-Build conditions. This appears to be as a result of the additional capacity provided by the widening of I-93 to four lanes each way which allows through traffic to use the interstate for these north-south trips as opposed to the local roadways through Derry. Mainline volumes on I-93 increase by between 64-68% from 2015 and 2040, which is about a 2.5% annual growth rate. Volumes on the Exit 4 ramps increase between 95-125% from 2015 to 2040, while ramp volumes at Exit 5 only grow between 45-50% during the same period. This would appear to indicate the influence of the Woodmont Commons development in Londonderry on both sides of the Interstate being accessed from either side of Exit 4, and is also reflected in volume increase on NH Route 102 west of the interchange. Local roads in the Woodmont area, such as Gilcreast Road and Ash Street, also experience marked increases in traffic volumes under 2040 No-Build conditions.

9.1.2 Alternative A

Mainline volumes on I-93 show slightly higher growth rates under 2040 conditions with Exit 4A –Alternative A in place than in the No-Build condition. This is driven in part by Woodmont Commons because this development is assumed to reach its maximum potential with Alternative A in place, as opposed to either No-Build or most other Exit 4A options.

Exit 4 ramp volumes are affected to differing degrees with Alternative A in place. Growth rates for the NB on-ramp and SB off-ramp are about half what they are under the No-Build case, since this traffic is diverted to Exit 4A. The projected NB off-ramp volume of 17,385 vehicles per day (vpd), shows a 10% reduction over 2040 No-Build volumes. The development of Woodmont Commons to the west is reflected in the 10% increase in SB on-ramp volumes from the west side of the interchange, whereas the SB on-ramp volume from the east shows a 48% reduction in traffic that is now presumably using Exit 4A.

Exit 5 ramp volumes show greater increases on the NB off-ramp and SB on-ramp under Alternative A compared to the No-Build case. This would indicate increased interaction between Exit 4A and 5 to and from the north more than between Exits 4 and 4A, which is consistent with the findings in the previous DEIS for this project. (FHWA, 2007) The Exit 5 SB off-ramp actually shows a 43.5% reduction in traffic compared to No-Build, indicating that this traffic is likely continuing on the mainline down to Exit 4A. The NB on-ramp traffic volume is also about 20% lower than under No-Build conditions, indicating redistribution of some NB trips to Exit 4A and away from NH Route 28.

Exit 4A volumes range between 8,700-10,700 vehicles per day (vpd) on the NB off-ramp and SB on-ramp, and from 15,200 to 19,000 vpd on the NB on-ramp and SB off-ramp, respectively. The two northerly-oriented ramps have the higher volumes, consistent with the increased interaction between the new interchange and Exit 5. The projected volume on the connector road east of the Alternative A interchange is 53,700 vpd.

The local roadways are also affected by the introduction of a new interchange to the regional network. Volumes on NH Route 102 just east of Exit 4 are about half of the projected 2040 No-Build condition, while volumes closer to the downtown area show reductions of around 19%. Folsom Road shows significant increases, since it is now the primary connection between the new interchange and the local street network. Some of this increase continues easterly along the Tsienneto Road corridor (+3000 vpd over No-Build) and NH Route 102 east at the Chester town line (+1000 vpd over No-Build).

9.1.3 Alternative B

Mainline volumes on I-93 under this scenario show similar growth rates as Alternative A as compared to 2040 No-Build conditions. This is consistent with the earlier DEIS when comparing southerly versus northerly interchange locations.

Exit 4 ramp volumes show some differences as compared to Alternative A. Projected volumes on the NB on-ramp and SB off-ramp are slightly higher under Alternative B than A, but still 17-19% less than what they are under the No-Build case. This may be because Alternative B provides a section of new roadway onto the Derry street network, which may attract more traffic. The NB off-ramp shows a 10% volume reduction under Alternative B than under No-Build, similar to Alternative A. This development of Woodmont Commons to the west is reflected in an 8% increase in SB on-ramp volumes from the west side of the interchange, whereas the SB on-ramp volume from the east shows about a 44% reduction in projected traffic, similar to Alternative A.

Exit 5 ramp volumes show smaller increases on the NB off-ramp and SB on-ramp than under Alternative A. This continues to indicate the increased interaction between Exit 4A and 5 to and from the north more than between Exits 4 and 4A, which is consistent with the previous DEIS for this project. The Exit 5 SB off-ramp actually shows a greater reduction in traffic under Alternative B than under A, and this is reflected in a similarly higher volume at the Exit 4A SB off-ramp as compared to Alternative A. The Exit 5 NB on-ramp traffic is also lower than under No-Build conditions or Alternative A, indicating redistribution of some NB trips to Exit 4A and away from NH Route 28. These results appear to show that this alternative supports more of a north-south trip pattern than the east-west pattern exhibited under Alternative A.

Exit 4A volumes with Alternative B range between 9,500-12,400 vpd on the NB off-ramp and SB on-ramp, and from 13,200 to 19,400 vpd on the NB on-ramp and SB off-ramp, respectively. The SB on- and off-ramp volumes are higher than under Alternative A, but the NB on-ramp traffic is slightly lower than under Alternative A. The projected connector road volume east of the Alternative B interchange are about 54,500 vpd, and decrease to 16,200 vpd east of NH Route 28 along the Ashleigh Drive alignment.

The projected volumes on the local roadways under Alternative B have similar but generally slightly lower volumes than Alternative A. Volumes on NH Route 102 just east of Exit 4 are about 48% of the projected 2040 No-Build condition, while volumes closer to the downtown area show reductions around 19%. Folsom and Tsienneto Roads do not see the same increases as under Alternative A, since the new main connection road goes north of this area to intersect with Franklin Street Extension and Ashleigh Drive on the new alignment. The existing Tsienneto Road corridor sees minimal change since Alternative B creates a new roadway for the east-west traffic that currently uses this roadway to access the Interstate, but traffic volumes at the east end of the study area are higher than under Alternative A.

9.1.4 Alternative C

Mainline volumes on I-93 south of Exit 5 under this scenario show slightly higher growth rates than the southerly interchange alternatives (A and B) when compared to 2040 No-Build conditions. Projected volumes north of Exit 5 are consistent across all interchange alternatives, being slightly higher than No-Build.

Exit 4 ramp volumes under this alternative are slightly lower than the southerly interchange options, notably on the NB on-ramp and SB off-ramp, but higher for the SB on-ramp from the east than either Alternative A or B. This is likely indicative of the increased distance of the northerly interchange from the NH Route 102 corridor and the expectation of less effectiveness in reducing east-west traffic through the downtown area.

Impacts on Exit 5 ramp volumes show larger reductions in both the NB on-ramp and SB off-ramp volumes than the southerly interchange options. This makes sense, given the greater proximity of Alternatives C (and D) to Exit 5, which further emphasizes the increased interaction between Exit 4A and 5 to and from the north more than between Exits 4 and 4A, which is consistent with the previous DEIS for this project.

Exit 4A ramp volumes for trips to/from the south with Alternative C are noticeably lower than with the southerly interchange options, ranging between 2,800-5,000 vpd on the NB off-ramp and SB on-ramp. Trips on the NB on-ramp are similar to Alternative B but are lower on the SB off-ramp, respectively. The projected connector road volume east of the C interchange is less than under A or B (about 38,500 vpd), and decrease to 13,900 vpd west of NH Route 28 along the Ashleigh Drive alignment.

The projected volumes on the local roadways under Alternative C have similar but slightly larger volume reductions than Alternatives A or B. Volumes on NH Route 102 just east of Exit 4 are slightly lower than 2040 No-Build volumes but slightly higher than 2015 base conditions. Volumes further east on NH Route 102 show slightly larger reductions than under A or B. With the main connection road going north to NH Route 28 near the town line, volumes on this section of NH Route 28 more than double than under existing conditions. The existing Tsienneto Road corridor sees similar volume levels as Alternative B since C follows the new roadway to serve this east-west traffic demand.

9.1.5 Alternative D

Mainline volumes on I-93 under this scenario show similar growth rates as Alternative C as compared to 2040 No-Build conditions. This is consistent with the earlier DEIS where comparing southerly versus northerly interchange locations. Exits 4 and 5 ramp volumes under this option are also quite similar to Alternative C.

Exit 4A volumes with Alternative D are similar to Alternative C - the NB off-ramp and SB on-ramp volumes are lower than Alternative C but the SB off-ramp traffic is slightly higher. The projected connector road volume east of the Alternative D interchange is about 36,700 vpd.

The projected volumes on the local roadways under Alternative D have similarly but generally slightly lower reductions than Alternatives A or B. Volumes on NH Route 102 just east of Exit 4 are about the same as under 2015 base conditions, even if slightly lower than 2040 No-Build volumes. Volumes further east on NH Route 102 show smaller traffic reductions than any of the other interchange options. With the main connection road going north to NH Route 28 near the town line, volumes along this part of the NH Route 28 corridor more than double over existing conditions. The existing Tsienneto Road corridor also sees marked growth over existing volumes with this option since it follows the present roadway for east-west traffic.

9.1.6 Alternative F

Alternative F is essentially the Transportation Systems Management (TSM) option, which from the traffic model’s perspective is essentially a third lane along NH Route 102 to provide some additional capacity at intersections east of Exit 4 into downtown Derry.

Mainline volumes on I-93 under this scenario show similar growth rates compared to 2040 No-Build conditions and lower than with an interchange alternative. This is consistent with the lower growth scenario as compared to those with a new interchange. Exits 4 and 5 ramp volumes under this option are also quite similar to 2040 No-Build conditions. With the provision of some additional capacity along the existing NH Route 102 corridor easterly into downtown Derry, traffic volumes are higher than under No-Build conditions or with any of the interchange alternatives, so it does not meet the Purpose and Need for the project.

Figures 8 through 12 graphically show these volume comparisons by alternative for key areas of interest as part of this study: the Exit 4 ramps, Exit 5 ramps, Exit 4A ramps, points along the NH Route 102 corridor, and other local streets of interest, respectively.

9.2 Composition of Through Traffic in Downtown Derry

While the volume reductions may not be as profound on the surface as one might expect, it is the composition of the trips in the downtown area that are of interest, since one of the Purposes and Needs of the project is to reduce through traffic in downtown Derry that had neither an origin nor destination there. Existing travel patterns suggest that a good deal of existing traffic is already finding alternative routes to avoid the downtown area.

To test the sensitivity of the hypothesis of a reduction in ‘through’ traffic as a result of a new interchange, a link on NH Route 102 just west of the main downtown area, which is the location east of Griffin Street near the Beaver Brook bridge, was chosen as a representative location of downtown traffic. The SNHPC model can generate trip tables that will provide the origin and destination zone for trips on any link in the network in either direction. This traffic pattern was evaluated by comparing the number of trips from zones and external stations from the east and northeast that are currently assigned to that link under existing (2015) base, 2040 No-Build and 2040 –Alternative A conditions, which was the Preferred Alternative in the previous DEIS for this project, that might be diverted to another route/path under any Build scenario.

A series of TAZs from the SNHPC traffic model area to the east and northeast were aggregated to see how many trips remained on this link under the different scenarios, as shown in Figures 13 and 14. The ones of primary interest were noted as follows:

- North Derry – TAZs 121-124, 126, 127
- East Derry – TAZs 128-130, 145-147, 221, 225
- Chester – TAZs 148-155
- Raymond/Deerfield/Candia – TAZs 156-191
- External Stations east and northeast – Stations 308-324

Table 8 shows a summary of the assigned trips to this link in each direction as well as combined under the three scenarios. In summary, the table shows that, in general, the trips to and from these zones to the east that now pass through the downtown area are lower with an interchange alternative (in this case, Alternative A) in place than under the 2040 No-Build scenario. However, since the overall link volume is reduced as well, these trips make up a slightly higher percentage of the total trips on that link than under No-Build conditions. This appears logical, because this link is likely the shortest path from these easterly zones to destinations in downtown Derry. Nevertheless, this analysis appears to show that an interchange alternative will reduce the amount of through traffic in downtown Derry for trips to and from the east and northeast.

TABLE 8

SELECT LINK ANALYSIS

NH ROUTE 102, EAST OF GRIFFIN ROAD, DERRY, NH

Eastbound (To)	N Derry	E Derry	Chester	Raymond/Candia/ Deerfield	N/NE/SE External Stations				
Traffic Zones	121-124. 126,127	128-130, 145-147, 221, 225	148-155	156-191	308-324	Target zone total	Increase over 2015 Base	Total trips on link	% of total to target zones
2015 Base	1194	642	162	293	1209	3500		8,806	39.7%
% total on link	13.6%	7.3%	1.8%	3.3%	13.7%				
2040 No-Build	1332	1056	130	78	1282	3878	1.1%	9,642	40.2%
% total on link	13.8%	11.0%	1.3%	0.8%	13.3%				
2040 Alt A	571	1235	236	146	1845	4033	1.2%	9,108	44.3%
% total on link	6.3%	13.6%	2.6%	1.6%	20.3%				
Westbound (From)	N Derry	E Derry	Chester	Raymond/Candia/ Deerfield	N/NE/SE External Stations				
Traffic Zones	121-124. 126,127	128-130, 145-147, 221, 225	148-155	156-191	308-324	Target zone total	Increase over 2015 Base	Total trips on link	% of total to target zones
2015 Base	1177	814	114	192	760	3057		9,191	33.3%
% total on link	12.8%	8.9%	1.2%	2.1%	8.3%				
2040 No-Build	1663	1465	64	37	773	4002	1.1%	11,168	35.8%
% total on link	14.9%	13.1%	0.6%	0.3%	6.9%				
2040 Alt A	307	1097	156	113	1073	2746	0.8%	7,776	35.3%
% total on link	3.9%	14.1%	2.0%	1.5%	13.8%				
Both Directions	N Derry	E Derry	Chester	Raymond/Candia/ Deerfield	N/NE/SE External Stations				
Traffic Zones	121-124. 126,127	128-130, 145-147, 221, 225	148-155	156-191	308-324	Target zone total	Increase over 2015 Base	Total trips on link	% of total to target zones
2015 Base	2371	1456	276	485	1969	6557		18,002	36.4%
% total on link	13.2%	8.1%	1.5%	2.7%	10.9%				
2040 No-Build	2995	2521	194	115	2055	7880	2.3%	20,810	37.9%
% total on link	14.4%	12.1%	0.9%	0.6%	9.9%				
2040 Alt A	878	2332	392	259	2918	6779	1.9%	16,885	40.1%
% total on link	5.2%	13.8%	2.3%	1.5%	17.3%				

9.3 Comparison to I-93 SEIS 2030 Mainline Projections

An additional comparison was made to the projected 2030 mainline volumes on I-93 as shown in the SEIS for the I-93 project (NHDOT, 2009). This document utilized the statewide traffic model that was available at the time, and also included the proposed Exit 4A Preferred Alternative as part of the network.

However, there are some major differences between the two scenarios. First, there are two different design years: the I-93 SEIS went out only to 2030 while this Exit 4A SDEIS extends out to 2040, so there are ten more years of overall growth that contributes additional traffic onto the network. Secondly, the I-93 SEIS did not account for the full Woodmont Commons development scenario included in the Exit 4A project for the Preferred Alternative, which adds a substantial number of trips to the area in and around Exit 4 and the proposed Exit 4A. Given these factors, it is expected that design hourly volumes would be higher under the 2040 case.

Table 9 shows excerpts from Tables 4-12 and 4-13 from the 2009 I-93 SEIS, which includes the projected ADT and DDHV for 2020 and 2030 from that document. The current table includes a projection of these volumes to 2040 using the same growth rates, including Exit 4A which was included in the I-93 SEIS Build condition, and the projected AAWDT and DDHV from the latest SNHPC modeling to the 2040 design year, and a comparison between the two modelling efforts.

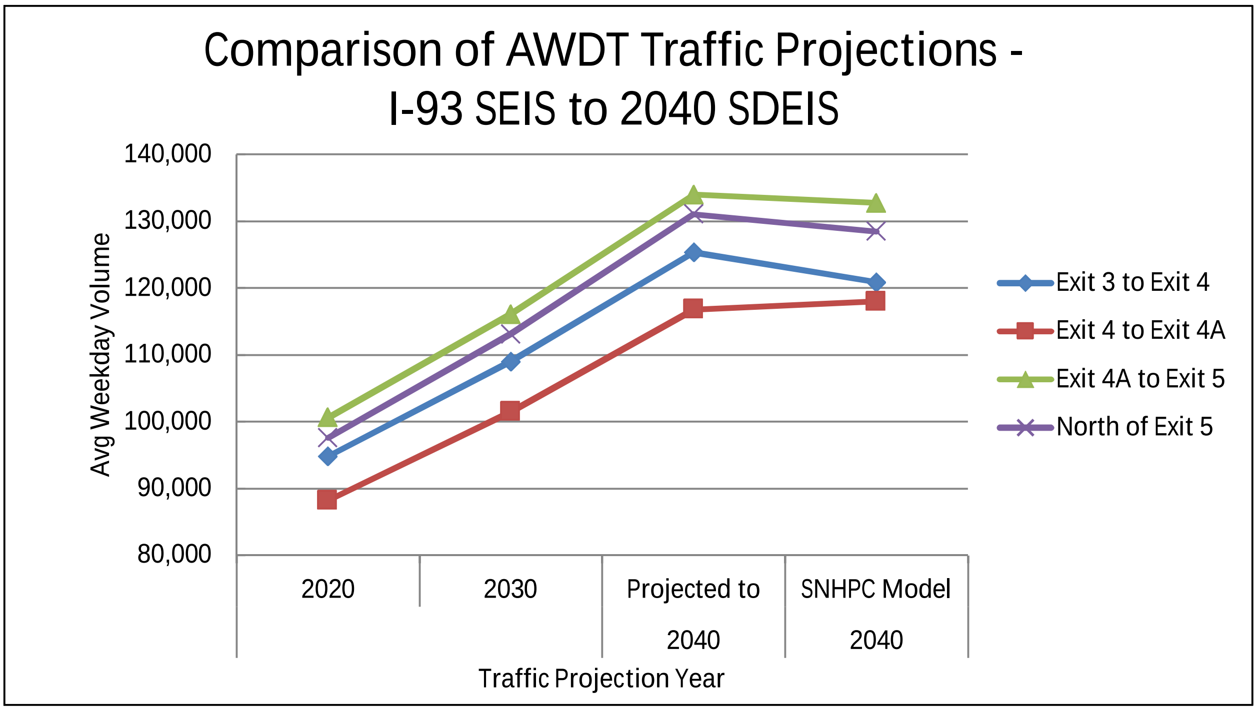
These comparisons show that the more recent SNHPC AAWDT traffic projections are consistent with the growth trend line from the I-93 SEIS if it were extended to the same 2040 design year within less than 4%. Similarly, the differences calculated DDHV extended to 2040 are within 3% when using the same methodology. The last two points on the graphs compare the 2040 projections for both the I-93 numbers and the latest SNHPC projections. Therefore, it would appear that the two modelling efforts are reasonably close to each other when extending the original I-93 design horizon out to 2040.

The original I-93 SEIS also noted that the congested flow capacity for I-93 would be 1,800 vph per lane, which would be 7,200 vph for the projected four-lane Interstate project. Should this volume be exceeded, the volumes would have to be adjusted to account for the effect of peak spreading that would likely occur into the adjacent hours before and after this demand was projected. At first glance, it appears that this scenario may also occur between Exits 4A and 5 and north of Exit 5 when using the SNHPC 2040 model projections, using the same DDHV calculation assumptions as in the I-93 SEIS. However, a more detailed review of the projected 2040 mainline volumes, which are discussed below, indicates that this 7,200 vph threshold will not likely be reached under any Exit 4A scenario.

TABLE 9
COMPARISON OF I-93 SEIS AND EXIT 4A SDEIS TRAFFIC PROJECTIONS
2020, 2030 AND 2040 DESIGN YEARS, INCLUDING EXIT 4A

Average Annual Weekday Traffic (AAWDT) Projections

	I-93 SEIS				SNHPC 2040	
I-93 Segment	2020 Build	2030 Build	Growth Rate/Year	Projected To 2040	Model Projections Alternative A	% Difference
Exit 3 to Exit 4	94,800	109,000	1.014	125,330	120,860	-3.6%
Exit 4 to Exit 4A	88,200	101,500	1.014	116,810	118,015	1.0%
Exit 4A to Exit 5	100,600	116,100	1.014	133,990	132,734	-0.9%
North of Exit 5	97,600	113,100	1.015	131,060	128,466	-2.0%



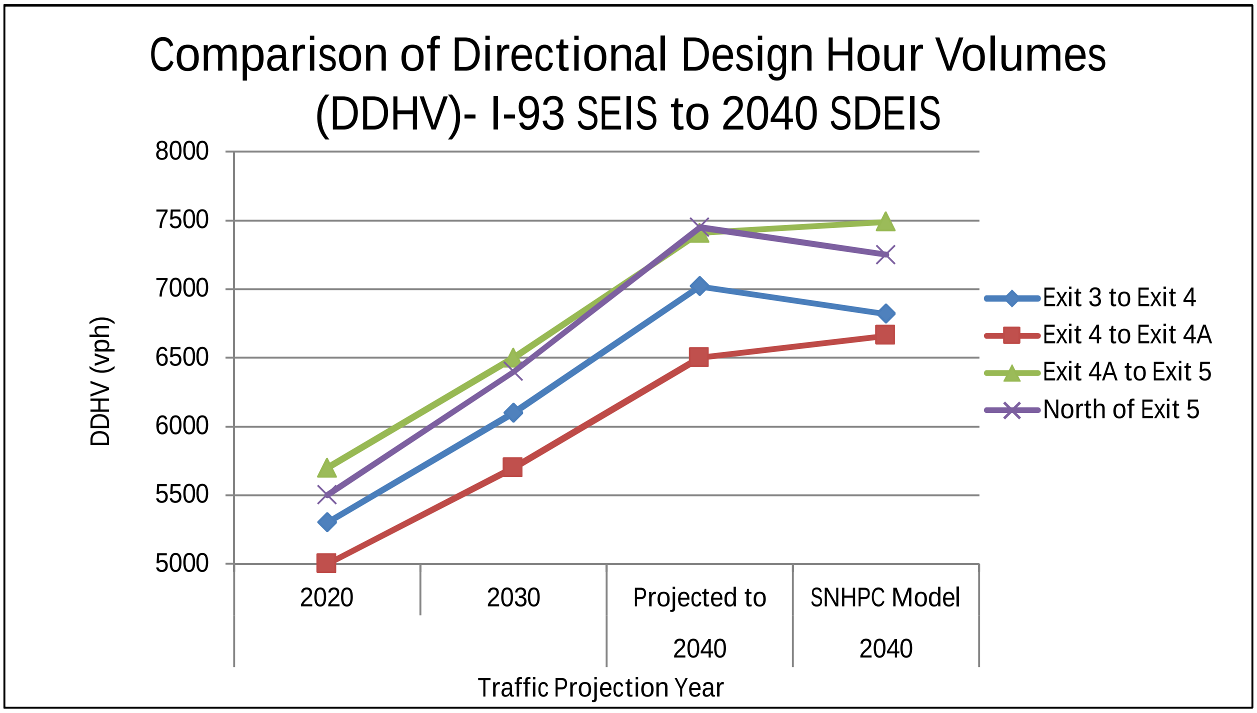
Notes:
DDHV calculated as 9.4% of ADT with a 60/40 directional split, consistent with I-93 SEIS, using Scenario 2 (OEP Projections)

Source: NHDOT, Supplemental Environmental Impact Statement and Reevaluation/Section4(f) Evaluation, August 2009, Tables 4-12 and 4-13

TABLE 9 (Cont'd)
COMPARISON OF I-93 SEIS AND EXIT 4A SDEIS TRAFFIC PROJECTIONS
2020, 2030 AND 2040 DESIGN YEARS, INCLUDING EXIT 4A

Directional Design Hourly Volume (DDHV) Projections

I-93 Segment	I-93 SEIS 2020 Build	2030 Build	Growth Rate/Year	Projected To 2040	SNHPC 2040 Calculated DDHV Alternative A	% Difference
Exit 3 to Exit 4	5,300	6,100	1.014	7,020	6,820	-2.8%
Exit 4 to Exit 4A	5,000	5,700	1.013	6,500	6,660	2.5%
Exit 4A to Exit 5	5,700	6,500	1.013	7,410	7,490	1.1%
North of Exit 5	5,500	6,400	1.015	7,450	7,250	-2.7%



Notes:
DDHV calculated as 9.4% of ADT with a 60/40 directional split, consistent with I-93 SEIS, using Scenario 2 (OEP Projections)

Source: NHDOT, Supplemental Environmental Impact Statement and Reevaluation/Section4(f) Evaluation, August 2009, Tables 4-12 and 4-13

10.0 Derivation of 2040 Volumes for Analysis Purposes

Now that the projected 2040 AAWDT volumes have been provided by the SNHPC model and appear to be reasonable, these need to be reduced to AM and PM peak volumes for analysis purposes. Since the SNHPC model provides only daily volumes, these must be reduced to peak hours on both the I-93 mainline and interchange ramp terminals as well as at the various study area intersections that may be directly or indirectly affected by any alternative. Different procedures were used to develop these volumes to be used for analysis purposes.

As noted earlier, the full development potential of Woodmont Commons was assigned to the study area traffic model network as a worse-case scenario, but if much of the site-generated traffic is captured internally to the site - as is the design intent of this mixed-use development - operations would be better than projected and the design life of any roadway and intersection improvements would be extended.

10.1 Mainline Interstate Volumes

A different procedure was used to generate the 2040 No-Build interstate networks as was done for deriving the 2015 base network for calibration. The projected 2040 AAWDT was calculated based on the projected growth (positive or negative) reflected in the model assignments on that segment between 2015 and 2040, then this growth rate was applied to the adjusted 2015 AAWDT. Then, the 2040 projected AM and PM peak hour volumes were derived based on the percentage that the existing (2015) AM and/or PM peak hour volume was as a percentage of the adjusted 2015 AAWDT, since these percentages should not change substantially over time. These peak hour percentages generally fell in the range of 6-9% of AAWDT. Tables J-1 through J-6 in Appendix J show summary tables of the projected 2040 peak hour volumes for each alternative on the key links on the interstate and local roadway networks.

As in the 2015 base case, the most logical starting point for developing the balanced interstate networks is south of Exit 4, where NHDOT permanent recorder data should provide more reliability. The various interchange ramp volumes were then taken directly from the appropriate tables in Appendix J, and the mainline volumes were balanced through the network to the point north of Exit 5. This process was followed to develop 2040 AM and PM peak hour volumes along the Interstate for each alternative, which are shown graphically in Figures 15 through 26.

10.2 Local Intersection Volumes

A more detailed procedure was needed to derive peak hour intersection volumes for each alternative from the regional traffic model to be used for design purposes. Since the SNHPC model only provides daily volumes, a relationship needs to be established between the peak hour volumes from the actual turning movement count at any intersection and the model output that can be made available. The SNHPC model can provide daily volumes between any two nodes through one central node that would simulate movements at an intersection. As such, information was requested from SNHPC for the daily model assignments for each study area intersection for each alternative to assist in developing turning movements at each location. Then a procedure was developed to estimate intersection turning movements at each study area location based on the existing turning movement volumes for both the AM and PM peak hours and how the total and individual turn volumes change as a result of the reassignment of traffic under any scenario. This process had to be usable regardless of alternative or the magnitude of change in traffic assignments for any movement at a specific intersection from one alternative to another. The procedure is discussed in greater detail in the memorandum dated September 29, 2017, which is attached in Appendix K. **The memo was reviewed and approved by the NHDOT before the procedure was applied to the rest of the alternatives (NHDOT, 2017c).**

The resulting AM and PM peak hour volumes for each study area intersection for each of the 2040 alternatives are provided in Figures 27 through 38.

11.0 Analysis of Interstate Operations

As in the existing case, the Freeway Facilities procedure from the *2010 HCM* and replicated in the HCS was used to evaluate the mainline interstate operations under all 2040 conditions. A free flow speed of 70 mph and a Peak Hour Factor of 0.94 were agreed upon by NHDOT (NHDOT, 2017d) to be used in the HCM analysis. With the introduction of a northerly or southerly interchanges, certain design parameters consistent with the I-93 layout were agreed upon with the NHDOT to ensure that the appropriate distances would be used in the analyses. A conceptual layout for the southerly interchange for Alternatives A and B had already been provided in the 2007 DEIS as well as part of the I-93 design between Exits 4 and 5, and was used to determine ramps spacing for analysis purposes. The previous conceptual layout for the northerly interchange for Alternatives C and D from the 2007 DEIS was used as the starting point for this study.

The HCM procedure accounts for a 1,500 foot ‘influence area’ in the ramp merge or diverge areas. With the southerly interchange, there is overlap between the influence areas of the Exit 4 NB on-ramp and the Exit 4A NB off-ramp, as well as the Exit 4A SB on-ramp and the Exit 4 SB off-ramp. As such, the HCS analysis software allows for this overlap to be considered, and is reflected in the results.

The Freeway Facilities criteria in the HCS were provided in Appendix E when the 2015 operations were discussed for the existing two-lane facility. The 2040 results for the proposed four-lane facility are summarized in Table 10 with the HCM printouts provided in Appendix L. By definition, if the demand/ capacity (d/c) ratio is greater than 1.00, ramp merge/diverge or mainline operations will be constrained, either by traffic unable to merge onto the interstate and subsequently affecting ‘topside’ operations at the ramp terminals, or by the off-ramp being unable to process the demand for exiting traffic, which may affect mainline traffic free flow speeds.

The 2040 cases where d/c ratios are 0.98 or greater, indicating potential capacity constraints to I-93 operations with a single-lane ramp, are noted below:

- Alternative A – Exit 4A SB off-ramp diverge – AM peak
- Alternative B – Exit 4A SB off-ramp diverge – AM peak
- Alternative B – Exit 4 NB on-ramp merge – AM peak
- Alternative B – Exit 4 SB off-ramp diverge – PM peak
- Alternative F – Exit 4 NB on-ramp merge – AM and PM peaks
- Alternative F – Exit 4 SB off-ramp diverge – PM peak

These results appear to reflect the increased demands from the higher development scenarios from the Woodmont Commons development under Alternatives A and B, as well as the projected limitations at the Exit 4 interchange with Alternative F in place, even with a lesser development scenario for Woodmont Commons.

If the projected Exit 4 NB on-ramp volumes reach levels where the merge with the mainline I-93 is affected as shown, it would likely result in backups of traffic back to the ramp terminal itself, affecting the topside intersections along NH Route 102. Both the Exit 4 and Exit 4A SB off-ramp diverge constraints could be ameliorated by providing a two-lane off-ramp to service the projected traffic should actual volumes meet projections in the future.

However, given the aforementioned discussion about the possible realization of the Woodmont Commons internal capture rate and the subsequent reduction in traffic assignments onto the study area network, a sensitivity analysis was conducted at the Exit 4A SB off-ramp to determine what kind of volume reduction would be needed to provide an acceptable LOS for a single-lane off-ramp at this location. If the projected off-ramp AM peak volume was reduced by only 200 vph, this ramp would function at a LOS D with a demand/capacity ratio of 0.94, which would be acceptable. Therefore, should the full impact of the traffic projections from Woodmont Commons or the overall study area development scenario not be realized, the ramps that are projected to be capacity-constrained may operate better than these analyses would indicate.

19-Jun-17
rev 4-12-18

TABLE 10
HCS 2010 - FREEWAY FACILITIES ANALYSIS - 2040 NO-BUILD AND BUILD (South Interchange) CASES - AM and PM PEAK HOURS

		2040 No Build						**4A Alternative A**						**4A Alternative B**					
		AM Peak Hour (LOS) / (d/c ratio)			PM Peak Hour (LOS) / (d/c ratio)			AM Peak Hour (LOS) / (d/c ratio)			PM Peak Hour (LOS) / (d/c ratio)			AM Peak Hour (LOS) / (d/c ratio)			PM Peak Hour (LOS) / (d/c ratio)		
Segment	Northbound Direction	BASIC	DIVERGE	MERGE	BASIC	DIVERGE	MERGE	BASIC	DIVERGE	MERGE	BASIC	DIVERGE	MERGE	BASIC	DIVERGE	MERGE	BASIC	DIVERGE	MERGE
1	I-93 Mainline south of Exit 4	B/0.37			C/0.63			B/0.38			C/0.66			B/0.38			C/0.66		
2	Exit 4 NB off-ramp		A/0.26			B/0.61			A/0.23			B/0.67			A/0.23			B/0.67	
3	I-93 Mainline between Exit 4 ramps	A/0.28			B/0.37			A/0.30			B/0.42			A/0.30			B/0.42		
4	Exit 4 NB on-ramp			C/1.25			C/0.99			B/0.89			C/0.70			C/1.03			C/0.81
5	I-93 Mainline between Exit 4 on-ramp and Exit 4A off-ramp							B/0.49			C/0.56			C/0.52			C/0.59		
6	Exit 4A NB off-ramp	N/A							C/0.48			C/0.41			C/0.52			C/0.44	
7	I-93 Mainline between Exit 4A ramps							B/0.40			B/0.48			B/0.43			B/0.50		
8	Exit 4A NB on-ramp									C/0.84			C/0.72			C/0.73			C/0.48
9	I-93 Mainline between Exit 4(4A) NB on- and Exit 5 NB off-ramps	B/0.55			C/0.57			C/0.56			C/0.62			C/0.56			C/0.62		
10	Exit 5 NB off-ramp		C/0.37			C/0.49			C/0.43			D/0.58			C/0.41			D/0.54	
11	I-93 Mainline between Exit 5 ramps	B/0.48			B/0.49			B/0.49			C/0.53			B/0.49			C/0.54		
12	Exit 5 NB on-ramp			C/0.83			C/0.62			C/0.67			C/0.50			C/0.65			C/0.48
13	I-93 Mainline north of Exit 5	C/0.64			C/0.62			C/0.62			C/0.65			C/0.62			C/0.65		
	Facility operations	B			C			B			C			B			C		
	Space Mean Speed (mph)	68.4			68.6			68.5			67.9			67.6			67.9		
	Density (veh/mi/hr)	15.8			19.2			16.4			20.2			17.3			20.4		
Segment	Southbound Direction																		
1	I-93 Mainline north of Exit 6	C/0.59			C/0.64			C/0.62			C/0.62			C/063			C/0.62		
2	Exit 5 SB off-ramp		D/0.73			D/0.74			C/0.41			C/0.62			C/0.32			C/033	
3	I-93 Mainline between Exit 5 ramps	B/0.46			B/0.49			C/0.55			C/0.53			C/0.57			C/0.55		
4	Exit 5 SB on-ramp			C/0.45			C/0.38			C/0.52			B/0.44			B/0.40			B/0.34
5	I-93 Mainline between Exit 5 SB on- and Exit 4A SB off-ramps							C/0.65			C/0.61			C/0.65			C/0.62		
6	Exit 4A SB off-ramp	N/A							C/0.94			D/0.89			C/0.94			D/0.91	
7	I-93 Mainline between Exit 4A ramps							B/0.46			B/0.44			B/0.45			B/0.44		
8	Exit 4A SB on-ramp									B/0.60			C/0.51			C/0.70			C/0.58
9	I-93 Mainline between Exit 5(4A) SB on- and Exit 4 SB off-ramps	C/0.55			C/0.56			D/0.57			D/0.54			D/0.58			D/055		
10	Exit 4 SB off-ramp		C/0.84			D/1.10			D/0.76*			C/0.91			C/0.81			D/0.98	
11	I-93 Mainline between Exit 4 SB off- and SB on ramp from east	B/0.36			B/0.33			B/0.43			B/0.36			B/0.43			B/0.36		
12	Exit 4 SB on-ramp from east			B/0.66			B/0.30			B/0.49			A/0.16			B/0.37			A/0.17
13	I-93 Mainline between Exit 4 SB on-ramps	B/0.48			B/0.38			B/0.49			B/0.39			B/0.49			B/0.39		
14	Exit 4 SB on-ramp from west			C/0.85		B/0.40				C/0.93			B/0.44			C/0.92		B/0.43	
15	I-93 Mainline south of Exit 5	C/0.64			B/0.46			C/0.66			B/0.47			C/0.66			B/0.47		
	Facility operations	C			C			C			C			C			C		
	Space Mean Speed (mph)	68.5			68.3			67.4			68.6			67.3			68.4		
	Density (veh/mi/hr)	18.8			19.1			20.6			18.4			20.9			18.9		

* = 2-lane off-ramp assumed

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TABLE 10 (cont.)

HCS 2010 - FREEWAY FACILITIES ANALYSIS - 2040 NO-BUILD AND BUILD (North or No Interchange) CASES - AM and PM PEAK HOURS

2040 No Build

Segment	Direction	AM Peak Hour (LOS) / (d/c ratio) BASIC	DIVERGE	MERGE	PM Peak Hour (LOS) / (d/c ratio) BASIC	DIVERGE	MERGE
Segment	Northbound Direction						
1	I-93 Mainline south of Exit 4	B/0.37			C/0.63		
2	Exit 4 NB off-ramp		A/0.26			B/0.61	
3	I-93 Mainline between Exit 4 ramps	A/0.28			B/0.37		
4	Exit 4 NB on-ramp			C/1.25			C/0.99
5	I-93 Mainline between Exit 4 on-ramp and Exit 4A off-ramp						
6	Exit 4A NB off-ramp	N/A					
7	I-93 Mainline between Exit 4A ramps						
8	Exit 4A NB on-ramp						
9	I-93 Mainline between Exit 4 (4A) NB on- and Exit 5 NB off-ramps	B/0.55			C/0.57		
10	Exit 5 NB off-ramp		C/0.37			C/0.49	
11	I-93 Mainline between Exit 5 ramps	B/0.48			B/0.49		
12	Exit 5 NB on-ramp			C/0.83			C/0.62
13	I-93 Mainline north of Exit 5	C/0.64			C/0.62		
	Facility operations	B			C		
	Space Mean Speed (mph)	68.4			68.6		
	Density (veh/mi/hr)	15.8			19.2		
Segment	Southbound Direction						
1	I-93 Mainline north of Exit 6	C/0.59			C/0.64		
2	Exit 5 SB off-ramp		D/0.73			D/0.74	
3	I-93 Mainline between Exit 5 ramps	B/0.46			B/0.49		
4	Exit 5 SB on-ramp			C/0.45			C/0.38
5	I-93 Mainline between Exit 5 SB on- and Exit 4A SB off-ramps						
6	Exit 4A SB off-ramp	N/A					
7	I-93 Mainline between Exit 4A ramps						
8	Exit 4A SB on-ramp						
9	I-93 Mainline between Exit 5(4A) SB on- and Exit 4 SB off-ramps	C/0.55			C/0.56		
10	Exit 4 SB off-ramp		C/0.84			D/1.10	
11	I-93 Mainline between Exit 4 SB off- and SB on ramp from east	B/0.36			B/0.33		
12	Exit 4 SB on-ramp from east			B/0.66			B/0.30
13	I-93 Mainline between Exit 4 SB on-ramps	B/0.48			B/0.38		
14	Exit 4 SB on-ramp from west			C/0.85		B/0.40	
15	I-93 Mainline south of Exit 5	C/0.64			B/0.46		
	Facility operations	C			C		
	Space Mean Speed (mph)	68.5			68.3		
	Density (veh/mi/hr)	18.8			19.1		

4A Alternative C

Segment	Direction	AM Peak Hour (LOS) / (d/c ratio) BASIC	DIVERGE	MERGE	PM Peak Hour (LOS) / (d/c ratio) BASIC	DIVERGE	MERGE
Segment	Northbound Direction						
1	I-93 Mainline south of Exit 4	B/0.37			C/0.64		
2	Exit 4 NB off-ramp		A/0.24			B/0.56	
3	I-93 Mainline between Exit 4 ramps	A/0.28			B/0.39		
4	Exit 4 NB on-ramp			B/0.93			B/0.73
5	I-93 Mainline between Exit 4 on-ramp and Exit 4A off-ramp	B/0.49			C/0.54		
6	Exit 4A NB off-ramp		B/0.15			C/0.13	
7	I-93 Mainline between Exit 4A ramps	B/0.46			B/0.51		
8	Exit 4A NB on-ramp			C/0.74			C/0.63
9	I-93 Mainline between Exit 4 (4A) NB on- and Exit 5 NB off-ramps	C/0.60			C/0.64		
10	Exit 5 NB off-ramp		C/0.40			C/0.51	
11	I-93 Mainline between Exit 5 ramps	C/0.53			C/0.56		
12	Exit 5 NB on-ramp			C/0.48			C/0.36
13	I-93 Mainline north of Exit 5	C/0.63			C/0.63		
	Facility operations	B			C		
	Space Mean Speed (mph)	68.4			68.3		
	Density (veh/mi/hr)	16.4			19.7		
Segment	Southbound Direction						
1	I-93 Mainline north of Exit 6	C/0.62			C/0.61		
2	Exit 5 SB off-ramp		C/0.31			C/0.31	
3	I-93 Mainline between Exit 5 ramps	C/0.57			C/0.55		
4	Exit 5 SB on-ramp			C/0.45			C/0.38
5	I-93 Mainline between Exit 5 SB on- and Exit 4A SB off-ramps	C/0.66			C/0.63		
6	Exit 4A SB off-ramp		D/0.92			D/0.79	
7	I-93 Mainline between Exit 4A ramps	B/0.48			B/0.46		
8	Exit 4A SB on-ramp			B/0.27			B/0.23
9	I-93 Mainline between Exit 5(4A) SB on- and Exit 4 SB off-ramps	B/0.52			B/0.51		
10	Exit 4 SB off-ramp		C/0.64			C/0.76	
11	I-93 Mainline between Exit 4 SB off- and SB on ramp from east	B/0.40			B/0.34		
12	Exit 4 SB on-ramp from east			B/0.46			B/0.21
13	I-93 Mainline between Exit 4 SB on-ramps	C/0.48			B/0.38		
14	Exit 4 SB on-ramp from west			C/0.86			B/0.40
15	I-93 Mainline south of Exit 5	C/0.64			B/0.46		
	Facility operations	C			C		
	Space Mean Speed (mph)	67.9			68.5		
	Density (veh/mi/hr)	19.9			17.8		

4A Alternative D

Segment	Direction	AM Peak Hour (LOS) / (d/c ratio) BASIC	DIVERGE	MERGE	PM Peak Hour (LOS) / (d/c ratio) BASIC	DIVERGE	MERGE
Segment	Northbound Direction						
1	I-93 Mainline south of Exit 4	B/0.37			C/0.64		
2	Exit 4 NB off-ramp		A/0.25			B/0.59	
3	I-93 Mainline between Exit 4 ramps	A/0.28			B/0.38		
4	Exit 4 NB on-ramp			B/0.90			B/0.71
5	I-93 Mainline between Exit 4 on-ramp and Exit 4A off-ramp	B/0.48			B/0.52		
6	Exit 4A NB off-ramp		B/0.08			B/0.07	
7	I-93 Mainline between Exit 4A ramps	B/0.46			B/0.51		
8	Exit 4A NB on-ramp			C/0.76			C/0.64
9	I-93 Mainline between Exit 4 (4A) NB on- and Exit 5 NB off-ramps	C/0.60			C/0.64		
10	Exit 5 NB off-ramp		C/0.41			D/0.55	
11	I-93 Mainline between Exit 5 ramps	C/0.53			C/0.55		
12	Exit 5 NB on-ramp			C/0.49			C/0.39
13	I-93 Mainline north of Exit 5	C/0.63			C/0.63		
	Facility operations	B			C		
	Space Mean Speed (mph)	68.6			68.4		
	Density (veh/mi/hr)	16.4			19.5		
Segment	Southbound Direction						
1	I-93 Mainline north of Exit 6	C/0.62			C/0.61		
2	Exit 5 SB off-ramp		C/0.31			C/0.32	
3	I-93 Mainline between Exit 5 ramps	C/0.57			C/0.55		
4	Exit 5 SB on-ramp			C/0.44			C/0.38
5	I-93 Mainline between Exit 5 SB on- and Exit 4A SB off-ramps	C/0.66			C/0.62		
6	Exit 4A SB off-ramp		D/0.91			D/0.78	
7	I-93 Mainline between Exit 4A ramps	B/0.48			B/0.46		
8	Exit 4A SB on-ramp			B/0.25			B/0.21
9	I-93 Mainline between Exit 5(4A) SB on- and Exit 4 SB off-ramps	B/0.52			B/0.50		
10	Exit 4 SB off-ramp		C/0.63			C/0.75	
11	I-93 Mainline between Exit 4 SB off- and SB on ramp from east	B/0.40			B/0.34		
12	Exit 4 SB on-ramp from east			B/0.46			B/0.21
13	I-93 Mainline between Exit 4 SB on-ramps	B/0.48			B/0.38		
14	Exit 4 SB on-ramp from west			C/0.85			B/0.40
15	I-93 Mainline south of Exit 5	C/0.64			B/0.46		
	Facility operations	C			C		
	Space Mean Speed (mph)	67.9			68.6		
	Density (veh/mi/hr)	19.8			17.8		

4A Alternative F

Segment	Direction	AM Peak Hour (LOS) / (d/c ratio) BASIC	DIVERGE	MERGE	PM Peak Hour (LOS) / (d/c ratio) BASIC	DIVERGE	MERGE
Segment	Northbound Direction						
1	I-93 Mainline south of Exit 4	B/037			C/0.64		
2	Exit 4 NB off-ramp		A/0.26			B/0.62	
3	I-93 Mainline between Exit 4 ramps	A/0.28			B/0.37		
4	Exit 4 NB on-ramp			C/1.25			C/0.99
5	I-93 Mainline between Exit 4 on-ramp and Exit 4A off-ramp	B/0.55			C/0.57		
6	Exit 4A NB off-ramp						
7	I-93 Mainline between Exit 4A ramps						
8	Exit 4A NB on-ramp						
9	I-93 Mainline between Exit 4 (4A) NB on- and Exit 5 NB off-ramps						
10	Exit 5 NB off-ramp		C/0.36			C/0.48	
11	I-93 Mainline between Exit 5 ramps	B/0.49			B/0.49		
12	Exit 5 NB on-ramp			C/0.82			C/0.62
13	I-93 Mainline north of Exit 5	C/0.65			C/0.62		
	Facility operations	B			C		
	Space Mean Speed (mph)	68.4			68.6		
	Density (veh/mi/hr)	15.8			19.2		
Segment	Southbound Direction						
1	I-93 Mainline north of Exit 6	C/0.58			C/0.64		
2	Exit 5 SB off-ramp		C/0.66			C/0.67	
3	I-93 Mainline between Exit 5 ramps	B/0.47			B/0.50		
4	Exit 5 SB on-ramp			B/0.45			B/0.38
5	I-93 Mainline between Exit 5 SB on- and Exit 4A SB off-ramps	C/0.55			C/0.57		
6	Exit 4A SB off-ramp						
7	I-93 Mainline between Exit 4A ramps	N/A					
8	Exit 4A SB on-ramp						
9	I-93 Mainline between Exit 5(4A) SB on- and Exit 4 SB off-ramps						
10	Exit 4 SB off-ramp		C/0.85			D/1.12	
11	I-93 Mainline between Exit 4 SB off- and SB on ramp from east	B/0.36			B/0.33		
12	Exit 4 SB on-ramp from east			B/0.67			B/0.30
13	I-93 Mainline between Exit 4 SB on-ramps	B/0.48			B/0.38		
14	Exit 4 SB on-ramp from west			C/0.84			B/0.39
15	I-93 Mainline south of Exit 5	C/0.64			B/0.46		
	Facility operations	C			B		
	Space Mean Speed (mph)	68.5			68.4		
	Density (veh/mi/hr)	18.8			19.1		

12.0 Estimated Contribution of Woodmont Commons Traffic to Interstate Ramp Volumes

During the review of the traffic projections, the NHDOT inquired as to the potential impact that traffic from the Woodmont Commons development may have on the Exit 4 ramps under the various alternatives, since the southerly interchange alternatives (A and B) assume a higher intensity of development that under all other alternatives, including the No-Build.

As noted earlier, the 2040 projections from the SNHPC regional traffic model do not account for the same level of 'internally captured' trips within the development itself in the traffic assignments used for the Exit 4A project, as opposed to the site-specific traffic study prepared for the Woodmont project that assumed as much as a 23% internal captured trip rate in their projections and traffic assignments (TEC, 2013). Nevertheless, the model assignments should be able to present an 'order of magnitude' assessment of the relative contribution of traffic to the Exit 4 and 4A ramps from the three traffic analysis zones that Woodmont Commons would eventually occupy.

To accomplish this, SNHPC was tasked with providing 'select link' assignments to the Exit 4 and 4A ramps for trips from the three Woodmont Common zones (Zone 277 to the west, and Zones 69 and 375 to the east) under different scenarios: 2015 No-Build; 2040 No-Build; and 2040 Build with either Alternative A (southern interchange) and Alternative C (northern interchange). This information was summarized in a technical memo provided to the NHDOT for their review and concurrence (CLD, 2018), which is attached in Appendix M.

The results show that under the 2015 No-Build case, the three Woodmont zones only account for about 13% of the total traffic volume on all Exit 4 ramps, almost exclusively from the existing development in Zone 277 on the west side of I-93 in the Garden Lane area. Under the 2040 No-Build condition, the total volumes on the Exit 4 ramps would more than double, even with a lesser Woodmont development scenario, and these three zones now comprise almost 27% of this total Exit 4 ramp traffic and almost 40% of the projected increase in traffic.

With Exit 4A in place under Alternative A, which also assumes the most intense Woodmont development scenario, traffic assignments from the three subject zones account for 36% of the total Exit 4 ramp volume, most of which comes from Zone 277 on the west side. At Exit 4A, the two easterly Woodmont zones also account for 36% of total Exit 4A ramp traffic with no traffic assigned to these ramps from the west side.

With Alternative C in place, which assumes the same development scenario for Woodmont as in the 2040 No-Build case, the total traffic on the Exit 4 ramps is roughly the same as under Alternative A, but the Woodmont contribution is a slightly lower percentage (32%) of the total. At Exit 4A, Woodmont traffic would comprise only about 1% of the total ramp assignments, given that it is further removed from the traffic zones in question.

This analysis is only intended to show the relative potential contribution of Woodmont Commons traffic to both Exits 4 and 4A based on the full assignment of this traffic to the network as reflected in the SNHPC regional traffic model. As the Woodmont Commons development progresses and traffic is added to the adjacent road network, this situation should be monitored to determine how the actual additional traffic impacts affect overall traffic operations. Should the magnitude of the 'internal capture' trip rate be closer to what the TEC study anticipated, operations on the ramps, their intersections with the local road system, and the overall Interstate system would be better than by using the more conservative SNHPC model projections.

13.0 Exit 4A and Connecting Roadways

The Exit 4A interchange is currently proposed as a diamond configuration with access only to and from the east. As such, it creates two new ramp terminal intersections that will be provided with sufficient lanes to operate at an acceptable LOS. The connector road to the existing roadway network was assumed to be a four-lane limited access arterial roadway between the interchange and NH Route 28 to the east, with future breaks in access reserved for the proposed Woodmont Commons-East parcel based on their future development layout. New intersections would be created under all Build alternatives and existing intersections that would be affected by each of the respective layouts would need to be upgraded, which will be discussed in the next section.

The following is a listing of new intersections created by the connector roadway under the various interchange alternatives:

- Alternative A – Connector Road with North High Street.
- Alternative B – Connector Road with Franklin Street Extension, NH Route 28 Bypass, and relocated Tsienneto Road. In addition, the existing intersection with Ashleigh Drive will be reconfigured.
- Alternative C– Connector Road with NH Route 28 near the Londonderry town line, as well as NH Route 28 Bypass and relocated Tsienneto Road.
- Alternative D – Connector Road with NH Route 28 near Londonderry town line.

14.0 Analysis of Local Intersection Operations

Only those known programmed projects in the SNHPC 2040 Long-Range Transportation Plan (SNHPC, 2017) were included as foreseeable projects in the traffic modeling for this study. However, it is also assumed that ongoing State and Town traffic maintenance projects, such as signal retiming and optimization, will occur during the duration of the design horizon. Therefore, any intersection analyses assumes the optimization of signal timing and phasing at a specific location as a base condition, with any additional lane improvements evaluated as an impact associated with a specific alternative.

In addition, the Woodmont Commons development has also developed conceptual plans along the NH Route 102 corridor, as well as other intersections in Londonderry and Derry, to accommodate their projected traffic as that project moves forward (TEC, 2013). **The NHDOT has agreed that these projects should be considered as part of the 2040**

No-Build condition (NHDOT, 2016f). While most of these future improvements on NH Route 102 are west of Exit 4, including the Garden Lane and Gilcreast Road intersections, there are other improvements in the Exit 4A study area east of I-93 that will be considered as part of this No-Build condition for analysis purposes. These include:

- # 5 - NH Route 102/Londonderry Road intersection – signalization and lane additions, including a second east-west through lane on NH Route 102.
- # 8- North High Street/Ash Street Extension – providing a four-way stop controlled intersection, as well as separate left- and right-turn lanes exiting Ash Street, and adding an exclusive SB right-turn lane from North High Street onto Ash Street Extension.

It also should be noted that not all of the study area intersections are directly affected by the Exit 4A alternatives, even though the redistribution of traffic will have an indirect effect. Only those intersections that a specific alternative passes through were considered for any additional improvements as part of the project to maintain an acceptable LOS D or better for the overall intersection as well as on any individual approach. Analyses were conducted for all of the study area intersections, either with or without any required improvements.

It was also assumed that signalization would be required at many of the existing unsignalized locations where an alternative passes through it or where new intersections were being created at major State or local roadways. No formal signal warrants study was performed, but engineering judgment was applied to treat each of these locations the same if they were part of the layout of an alternative. Conversely, if the alternative did not go through that location, the existing traffic control was assumed to remain in place, regardless of operational efficiency, since these locations have not yet been programmed for further improvements.

15. Signalized Intersections

A summary table for the comparison of lane use and operations at each existing or proposed signalized intersection is provided in Table 11. No additional improvements to the lane use at the Exits 4 and 5 ramp terminals were investigated as part of any Build alternative, since these are being reconstructed as part of the ongoing I-93 project. The results are provided using the HCM 2000 procedures, since these procedures can address many non-standard timing and phasing parameters that later versions of the HCM cannot, as well as to be consistent with the Interstate Justification Report being conducted separately. (Louis Berger, 2018). The actual HCM and Synchro printouts for all the 2040 alternatives are provided in Appendices N through S.

Table 11
Summary of 2040 Capacity Analyses by Alternative

Signalized Intersections

Intersection	2040 Alternative	AM Peak Hour v/c ratio	AM Peak Hour Average Delay	AM Peak Hour LOS	PM Peak Hour v/c ratio	PM Peak Hour Average Delay	PM Peak Hour LOS	Comments/ Lane Use Revisions
#1 - Exit 4 SB Off Ramp/NH 102	No-Build	1.08	44.5	D	1.22	106.4	f	Current lane use per I93 project
	Alternative A	0.92	25.9	C	1.09	50.9	D	Current lane use per I93 project
	Alternative B	0.93	26.8	C	1.09	53.9	D	Current lane use per I93 project
	Alternative C	1.00	36.1	D	1.09	57.2	E	Current lane use per I93 project
	Alternative D	0.99	35.1	D	1.11	59.6	E	Current lane use per I93 project
	Alternative F	1.09	51.0	D	1.14	61.5	E	Current lane use per I93 project
#2 - Exit 4 NB Off Ramp/NH 102	No-Build	1.10	61.4	E	1.12	92.8	F	Current lane use per I93 project
	Alternative A	1.04	71.2	E	1.11	115.1	F	Current lane use per I93 project
	Alternative B	0.99	54.8	D	1.06	88.0	F	Current lane use per I93 project
	Alternative C	1.02	62.1	E	1.05	82.0	F	Current lane use per I93 project
	Alternative D	1.04	67.3	E	1.06	81.8	F	Current lane use per I93 project
	Alternative F	1.06	57.5	E	1.15	91.8	F	Current lane use per I93 project
#3 - Exit 5 SB Off Ramp/NH 28	No-Build	1.17	77.0	E	0.90	31.2	C	Current lane use per I93 project
	Alternative A	1.06	49.3	D	0.83	20.1	C	Current lane use per I93 project
	Alternative B	0.86	28.0	C	0.70	16.9	B	Current lane use per I93 project
	Alternative C	0.83	22.9	C	0.62	15.0	B	Current lane use per I93 project
	Alternative D	0.82	23.3	C	0.61	15.2	B	Current lane use per I93 project
	Alternative F	1.10	62.1	E	0.87	27.8	C	Current lane use per I93 project
#4 - Exit 5 NB Off Ramp/NH 28	No-Build	1.10	51.7	D	1.04	37.7	D	Current lane use per I93 project
	Alternative A	1.11	63.0	E	0.99	39.2	D	Current lane use per I93 project
	Alternative B	1.03	50.2	D	0.93	33.9	C	Current lane use per I93 project
	Alternative C	1.02	49.9	D	0.87	27.7	C	Current lane use per I93 project
	Alternative D	1.02	50.5	D	0.89	32.6	C	Current lane use per I93 project
	Alternative F	1.07	44.0	D	0.99	35.1	D	Current lane use per I93 project
#5 - NH Rte 102/Londonderry Rd/ St. Charles Street	No-Build	0.85	17.7	B	1.16	67.5	E	Add 2nd E-W lane per Woodmont concept
	Alternative A	0.52	11.4	B	0.58	14.8	B	Add 2nd E-W lane per Woodmont concept
	Alternative B	0.48	7.2	A	0.54	14.2	B	Add 2nd E-W lane per Woodmont concept
	Alternative C	0.52	8.2	A	0.53	13.1	B	Add 2nd E-W lane per Woodmont concept
	Alternative D	0.56	8.3	A	0.65	16.3	B	Add 2nd E-W lane per Woodmont concept
	Alternative F	0.75	12.3	B	0.87	27.9	C	Add 2nd E-W lane per Woodmont concept
#6 - NH Rte 102/Fordway/Madden Hill Road	No-Build	0.92	30.8	C	1.04	47.3	D	Current lane use
	Alternative A	0.79	23.4	C	0.99	42,5	D	Current lane use
	Alternative B	0.80	23.0	C	0.91	29.1	C	Current lane use
	Alternative C	0.78	22.3	C	0.92	30.0	C	Current lane use
	Alternative D	0.81	23.2	C	0.94	30.2	C	Current lane use
	Alternative F	0.93	28.7	C	0.96	29.9	C	Add NB LT, EB RT lanes
#7 - NH Rtes 102/28	No-Build	0.88	47.4	D	0.79	37.5	D	Current lane use
	Alternative A	0.89	55.3	E	0.84	47.9	D	Current lane use
	Alternative B	0.87	44.1	D	0.80	40.5	D	Current lane use
	Alternative C	0.77	35.0	C	0.84	40.2	D	Current lane use
	Alternative D	0.89	48.1	D	0.86	46.2	D	Current lane use
	Alternative F	0.63	28.6	C	0.83	34.0	C	Add NB LT, WB Th, EB RT lanes

Table 11 (Cont'd)
Summary of 2040 Capacity Analyses by Alternative

Signalized Intersections

Intersection	2040 Alternative	AM Peak Hour v/c ratio	AM Peak Hour Average Delay	AM Peak Hour LOS	PM Peak Hour v/c ratio	PM Peak Hour Average Delay	PM Peak Hour LOS	Comments/ Lane Use Revisions
#9A - Connector Rd/N High St	No-Build		n/a/			n/a/		Does not exist
	Alternative A	0.59	25.0	C	0.95	37.5	D	Prop lane use: EB - T,T,R; WB-L,T,T; NB- L,L,R lanes
	Alternative B		n/a/			n/a/		Does not exist
	Alternative C		n/a/			n/a/		Does not exist
	Alternative D		n/a/			n/a/		Does not exist
	Alternative F		n/a/			n/a/		Does not exist
#10 - N High/Folsom/Franklin Sts.	No-Build		n/a/			n/a/		Would remain unsignalized
	Alternative A	0.65	17.9	B	0.92	32.2	C	EB - L,T,T,TR; WB-L,T,TR; SB- LT,R; NB- L,TR lanes
	Alternative B		n/a/			n/a/		Would remain unsignalized
	Alternative C		n/a/			n/a/		Would remain unsignalized
	Alternative D		n/a/			n/a/		Would remain unsignalized
	Alternative F		n/a/			n/a/		Would remain unsignalized
#11- Ross' Corner (Folsom/NH 28)	No-Build	0.72	91.3	F	0.80	56.4	E	Current lane use
	Alternative A	0.56	22.3	C	0.79	32.9	C	Add 2nd EB LT and Th lanes; add 2nd WB Th lane
	Alternative B	0.49	28.4	C	0.66	38.3	D	Current lane use
	Alternative C	0.73	32.5	C	0.83	46.1	D	Current lane use
	Alternative D	0.73	27.0	C	0.80	35.2	D	Add 2nd EB LT lane; add 2nd WB RT lane
	Alternative F	0.61	32.6	C	0.72	42.7	D	Current lane use
#12 - Tsienneto Rd/Pinkerton St	No-Build		n/a/			n/a/		Would remain unsignalized
	Alternative A	0.61	13.7	B	0.65	12.5	B	Signalized and coord with Ross' Corner
	Alternative B		n/a/			n/a/		Would remain unsignalized
	Alternative C		n/a/			n/a/		Would remain unsignalized
	Alternative D	0.69	20.1	C	0.64	24.2	C	Signalized and coord with Ross' Corner
	Alternative F		n/a/			n/a/		Would remain unsignalized
#13 -NH 28/Linlew Dr	No-Build	0.41	18.9	B	0.48	17.2	B	Current lane use
	Alternative A	0.19	11.7	B	0.46	25.0	C	Current lane use
	Alternative B	0.36	6.3	A	0.49	13.8	B	Current lane use
	Alternative C	0.39	5.2	A	0.49	12.9	B	Current lane use
	Alternative D	0.56	14.9	B	0.78	20.4	C	Current lane use
	Alternative F	0.28	11.3	B	0.40	16.1	B	Current lane use
#14 - NH 28/Ashleigh Dr	No-Build	0.43	17.3	B	0.59	24.8	C	Current lane use
	Alternative A	0.35	17.0	B	0.48	21.7	C	Current lane use
#22 - B/C Connector/NH 28	Alternative B	0.73	26.8	C	0.83	35.6	D	Revised Lane Use: EB- L,T,R; WB-L,L,T,TR; NB-L,T,T,R,R; SB-L,T,T,R

Table 11 (Cont'd)
Summary of 2040 Capacity Analyses by Alternative

Signalized Intersections

Intersection	2040 Alternative	AM Peak Hour v/c ratio	AM Peak Hour Average Delay	AM Peak Hour LOS	PM Peak Hour v/c ratio	PM Peak Hour Average Delay	PM Peak Hour LOS	Comments/ Lane Use Revisions
#22 - B/C Connector/NH 28	Alternative C	0.71	22.0	C	0.84	29.7	C	Revised Lane Use: EB- L,L,T,TR; WB-L,T,TR; NB-L,TR; SB-LT,R
	Alternative D	0.58	21.0	C	0.84	34.8	C	Add WB RT lane to current lane use
	Alternative F	0.38	16.9	B	0.55	26.2	C	Current lane use
#18 - NH Byp 28/Tsienneto Rd	No-Build	0.69	58.1	E	0.90	112.0	F	Current lane use
	Alternative A	0.64	33.6	C	0.80	23.8	C	Add 2nd EB/WB Th lanes
	Alternative B	0.54	32.4	C	0.59	33.0	C	Current lane use
	Alternative C	0.58	23.9	C	0.79	28.4	C	Current lane use
	Alternative D	0.56	25.2	C	0.60	22.9	C	Add 2nd EB/WB Th lanes
	Alternative F	0.74	32.4	C	0.87	34.8	C	Current lane use
#19 - NH 102/Tsienneto Rd, coord w/ #26 - NH 102/North Shore Rd	No-Build *	0.53	24.9	C	1.53	247.7	F	LOS as unsignalized
	Alternative A	0.62	13.2	B	0.76	19.6	D	Add EB LT, WB RT lanes at signal
	Alternative B	0.60	11.0	B	0.61	9.9	A	Add EB LT, WB RT lanes at signal
	Alternative C	0.60	12.7	B	0.60	9.0	A	Add EB LT, WB RT lanes at signal
	Alternative D	0.63	12.1	B	0.65	6.9	A	Add EB LT, WB RT lanes at signal
	Alternative F*	0.30	24.3	C	1.46	247.5	F	LOS as unsignalized
#20 - Exit 4A SB off ramp/Connector Rd	No-Build		n/a/			n/a/		Does not exist
	Alternative A	0.97	41.2	D	0.88	28.9	C	2 SB LT lanes from off-ramp, 2 WB LT lanes to on-ramp
	Alternative B	1.04	52.3	D	0.94	34.6	C	2 SB LT lanes from off-ramp, 2 WB LT lanes to on-ramp
	Alternative C	0.73	20.1	C	0.65	18.3	B	2 SB LT lanes from off-ramp, 2 WB LT lanes to on-ramp
	Alternative D	0.70	19.2	B	0.63	18.2	B	2 SB LT lanes from off-ramp, 2 WB LT lanes to on-ramp
	Alternative F		n/a/			n/a/		Does not exist
#21 - Exit 4A NB off ramp/Connector Rd	No-Build		n/a/			n/a/		Does not exist
	Alternative A	0.93	20.4	C	0.84	16.1	B	EB - T,T; WB T,T,R,R; NB- LR,R
	Alternative B	0.97	27.5	C	0.88	15.8	B	EB - T,T; WB T,T,R,R; NB- LR,R
	Alternative C	0.65	7.9	A	0.58	7.1	A	EB - T,T; WB T,T,R,R; NB- LR,R
	Alternative D	0.59	5.7	A	0.53	5.1	A	EB - T,T; WB T,T,R,R; NB- LR,R
	Alternative F		n/a/			n/a/		Does not exist
#23 - B/C Connector Road/NH Bypass 28	No-Build		n/a/			n/a/		Does not exist
	Alternative A		n/a/			n/a/		Does not exist
	Alternative B	0.25	17.0	B	0.32	16.9	B	Prop lane use: EB- L,T,TR; WB- L,T,TR; NB-L,TR; SB-L,T,R
	Alternative C	0.37	18.5	B	0.46	20.4	C	Prop lane use: EB- L,TR; WB- L,TR; NB-L,TR; SB-L,T,R
	Alternative D		n/a/			n/a/		Does not exist
	Alternative F		n/a/			n/a/		Does not exist

Table 11 (Cont'd)
Summary of 2040 Capacity Analyses by Alternative
Signalized Intersections

Intersection	2040 Alternative	AM Peak Hour v/c ratio	AM Peak Hour Average Delay	AM Peak Hour LOS	PM Peak Hour v/c ratio	PM Peak Hour Average Delay	PM Peak Hour LOS	Comments/ Lane Use Revisions
#25 - C/D Connector Road/NH 28	No-Build		n/a/			n/a/		Does not exist
	Alternative A		n/a/			n/a/		Does not exist
	Alternative B		n/a/			n/a/		Does not exist
	Alternative C	0.81	10.6	B	0.79	12.2	B	Prop lane use: EB- L,T,T; WB- T TR, SB- L,R
	Alternative D	0.96	13.7	B	0.87	14.1	B	Prop lane use: EB- L,T,T; WB- T TR, SB- L,R
	Alternative F		n/a/			n/a/		Does not exist

#1 – Exit 4 SB off-ramp at NH Route 102

The results show that this ramp terminal as presently proposed will still experience capacity constraints into the 2040 design horizon. All 4A Build interchange alternatives appear to function better than No-Build, with Alternatives A and B doing better than the northerly or no interchange alternatives, even though they both have a higher potential development scenario for Woodmont Commons than the others. The heavy SB right turn onto NH Route 102 from the ramp, even with two lanes, combined with heavy WB flow from the NB ramps located to the east, contribute to the decline in LOS. The single left turn lane from the off-ramp also appears insufficient to handle the peak hour demands.

#2 – Exit 4 NB ramps at NH Route 102

The results show that this ramp terminal as presently proposed will also experience capacity constraints into the 2040 design horizon. All 4A Build interchange alternatives improve 2040 AM peak hour operations, with Alternatives C and D doing slightly better than Alternatives A and B in the PM peak. The heavy EB left-turn onto the on-ramp, even with two lanes, is the dominant volume at this location, as well as the NB left turn from the off-ramp. Alternatives C and D appear to operate at a slightly better LOS, but the Woodmont Commons development scenario is also less intense in these cases than under Alternatives A and B. Alternative F fares worse than any of the alternatives as proposed.

#3 – Exit 5 SB ramps at NH Route 28

The results show that this ramp terminal as presently proposed will still experience some capacity constraints into the 2040 design horizon. All 4A Build interchange alternatives provide better operations than the No-Build condition. The single WB left turn and SB right-turn lanes appear to be the constraints to better operations across all alternatives. Alternatives C and D appear to function better than No-Build or the southerly or no interchange alternatives, likely because of their proximity to this interchange and the increased likelihood of diverting some of the traffic demand, as opposed to the other alternatives.

#4 – Exit 5 NB ramps at NH Route 28

The results show that this ramp terminal as presently proposed will also experience capacity constraints into the 2040 design horizon. All 4A Build interchange alternatives provide slightly better operations than under No-Build conditions. The heavy EB left-turn demand onto the on-ramp in a single lane, as well as the single-lane NB left turn from the off-ramp, are the critical movements at this intersection. Alternatives C and D appear to operate at a slightly better LOS than Alternatives A and B, again because of their proximity to this interchange and increased likelihood of diverting some of the traffic demand. Alternative F fares worse than any of the alternatives as proposed.

#5 – NH Route 102/Londonderry Road/St. Charles Street
With the addition of a second east-west through lane on NH Route 102 as part of the proposed Woodmont Commons improvements, this intersection would operate at acceptable LOS under all alternatives. Alternative F would operate slightly worse than the other alternatives, because of projected increased traffic on NH Route 102, but would still be at an acceptable LOS.

#6 – NH Route 102/Fordway/ Madden Hill Road
This existing intersection would operate at acceptable LOS under all alternatives except Alternative F. Alternative A appears to draw more traffic to the Madden Hill Road approach that opposes the heavy Fordway volumes on the same permissive phase (where both approaches have a concurrent green light and must wait for gaps in opposing traffic to proceed), so it operates slightly worse than the other interchange alternatives, particularly in the 2040 PM peak. Alternative F would necessitate provision of lane separation out of Fordway as well as an exclusive EB right-turn lane to maintain an acceptable LOS.

#7 - NH Routes 102/28
Based solely on the capacity calculations, this existing intersection would operate at acceptable LOS under all alternatives except Alternative F. As noted earlier, there are many other unquantifiable factors in the downtown area, such as pedestrian activity and friction from side street and on-street parking maneuvers, that contribute to reduced traffic speeds and the general diversion/avoidance of the area by through traffic to other routes such as Ash Street Extension, North High Street, Folsom Road, and Tsienneto Road.

The traffic model indicates that Alternative A appears to draw more traffic to the eastern part of downtown that then makes a right turn to NH Route 28 in the direction of Exit 4A and the Woodmont Commons development. In reality, much of this traffic may divert to the traffic circle to the east and use the Pinkerton/Tsienneto corridor to complete such a trip. Other Build alternatives show similar operational/LOS characteristics than under No-Build conditions. With additional traffic through the downtown area and no interchange option, Alternative F would necessitate provision of a second NB left-turn lane, an EB exclusive right-turn lane, and a second WB thru lane to maintain an acceptable LOS in the 2040 design horizon.

#9A - Alternative A Connector Road/North High Street
This new intersection is created by the Alternative A connector road with the local street network. The existing intersection of North High Street with Madden Road would be relocated off the new connector road as a minor roadway serving the small number of residences there. It is envisioned that this new intersection would need to be signalized and widened to provide acceptable operations, given the projected traffic volumes. The Connector Road eastbound approach would consist of two thru lanes and an exclusive right-turn lane to North High Street. The Connector Road westbound approach would consist of an exclusive left-turn lane and two thru lanes. The North High Street northbound approach would

consist of two left-turn lanes and a right-turn lane. Given the projected volumes and this lane use, this intersection would operate at a LOS D in the 2040 PM peak hour.

#10 - Alternative A Connector Road/Franklin Street/Franklin Street Extension
This existing intersection is presently unsignalized and operates at a poor LOS for the north/south side street approaches, which experience difficulty entering the main traffic flow during peak periods. With the increase in development activity nearby, this condition would be exacerbated into the future to the point where there may need to be consideration of additional improvements to provide acceptable operations, even with other interchange alternatives beyond Alternative A.

With the Alternative A connector road in place, this intersection will require significant widening and signalization to provide sufficient lanes to handle the project volumes as a direct result of Exit 4A. The east/west approaches would have at least two thru lanes (the projections suggest a third lane may be needed for the eastbound approach) with exclusive left-turn lanes. The north/south approaches would have two lanes with an exclusive lane oriented to the west to handle the projected traffic. This configuration would operate at a LOS C in the 2040 PM peak hour.

#11 - Ross' Corner (NH Route 28/Folsom Road/Tsienneto Road)
This intersection was upgraded several years ago to provide a second southbound left-turn lane from NH Route 28 onto Tsienneto Road to serve the predominant southbound-to-eastbound travel demand between I-93 and Derry and points to the east. With the projected growth to 2040, the existing lane geometry will no longer be sufficient to meet the expected traffic demands.

With an Exit 4A interchange in place, and with the Alternative A connector road in particular, the existing north-south traffic orientation now becomes an east-west flow. As such, improvements to handle the increase east-west travel demand will be required. With Alternative A, a second EB left-turn lane and second EB thru lane will be needed, as well as a second WB thru lane, to provide an acceptable LOS. Alternatives B and C are on a new east-west alignment north of this intersection so no changes to the existing lane use are required. With Alternative D, the interchange is north of this intersection, so movements oriented in that direction will need to be augmented. This means the addition of a second EB left-turn lane and second WB right-turn lane at this location. Alternative F maintains the existing traffic distribution, and the existing lane use can accommodate the projected traffic volumes.

#12 - Tsienneto Road/Pinkerton Street (Alternatives A and D only)
This intersection is in close proximity (300 feet +/-) from the Ross' Corner signal, but is not currently signalized. As such, left-turn exits experience lengthy delays while waiting for a gap in the Tsienneto Road traffic flow. The eastbound right-

turn movement has been separated from the main traffic stream by a channelizing island to help exiting traffic, but the opposing traffic flow limits the number of available gaps for exiting traffic. At some point in the future, regardless of this project, this intersection may need to be signalized and coordinated with the Ross' Corner signal, but there are no defined plans to do that at this time. Therefore, except for those alternatives that directly impact this intersection, namely Alternatives A and D, the intersection is assumed to remain unsignalized and is expected to operate at a poor LOS for the minor street approach from Pinkerton Street.

For Alternatives A and D, a second lane for thru traffic would be provided in both the eastbound and westbound directions, as well as an exclusive westbound left-turn lane into Pinkerton Street. With this geometry and coordinated phasing with Ross' Corner as a cluster intersection, this location would operate at an acceptable LOS C or better in the 2040 design year.

#13 - NH Route 28/Linlew Drive

No changes to the existing lane use at this intersection are required to accommodate traffic volumes under any of the proposed alternatives.

#14/22 - NH Route 28/Ashleigh Drive/Alternative B-C Connector Road

This intersection would see significant changes depending on which alternative would be in place. For Alternatives B and C, the proposed connector road would create a new east-west roadway that would require reconfiguration of lanes to accommodate the new distribution of traffic for either a southerly or northerly interchange. Under Alternative B, the new roadway would need two thru lanes in the east-west direction, as well as double-turn lanes to and from NH Route 28 to the south, along with other lane use changes. With Alternative C, a double SB left-turn lane into Ashleigh Drive would be needed to serve traffic from the new interchange to the north and the connector road, among other lane use changes. An acceptable LOS C or better can be provided for all alternatives with the appropriate revisions to the lane use.

#18 - NH Route 28 Bypass/Tsienneto Road

The 2040 No-Build analysis shows that the existing intersection would operate at or over capacity during both peak hours, so some improvements would appear to be needed at some point in the future. Alternatives B and C reduce east-west traffic through this intersection, so the existing lane use can provide an acceptable LOS D or better in 2040. Alternatives A and D will require the addition of a second east-west thru lane to accommodate the increased east-west traffic at an acceptable LOS.

#19/26- NH Route 102/Tsienneto Road/North Shore Road (Alternatives A-D)

A review of the existing traffic counts at the North Shore Road and English Range Road intersections indicate that existing 2015 left-turn volumes currently satisfy turn-lane warrants at both locations. As such, any improvements at the Tsienneto

Road/NH Route 102 intersection associated with any of the alternatives should take this into consideration in the design.

Because existing PM peak analyses already indicate a poor LOS for exiting traffic, combined with the projected increase in left-turn volumes exiting Tsienneto Road, it has been assumed that this location will need to be signalized as part of any interchange alternative. Because of the proximity of North Shore Road, that intersection would be incorporated into the signalized intersection, similar to Ross' Corner and Pinkerton Street. An exclusive right-turn lane would be provided for NH Route 102 WB traffic entering Tsienneto Road, as well as a WB left-turn lane into North Shore Road. This left-turn lane would also be carried easterly towards the English Range Road intersection for continuity, where an EB left turn lane would be provided. There would still only be a single lane exiting Tsienneto Road, despite the higher volumes, because of the complexity of accommodating a double left-turn lane onto NH Route 102 and then tapering back to a single lane with North Shore Road being so close.

With signalization of the intersection as proposed, an acceptable LOS C or better can be provided for all interchange alternatives in the 2040 design horizon.

#20/21 - Exit 4A SB and NB Ramp Terminals (Alternatives A-D)
With either a northerly or southerly interchange, it is envisioned that both ramp terminals would be signalized as part of the diamond configuration. The SB off-ramp would have two lanes exiting the ramp, while there would be two lanes provided for the left turn onto the SB on-ramp. This ramp would be close to capacity in the 2040 AM peak hour, assuming full realization of the traffic projections on the SB off-ramp.

At the NB ramps, there would be two east-west thru lanes with a single EB left-turn lane and double WB right-turn lanes onto the NB on-ramp. On the off-ramp, there would be a shared left/right lane and an exclusive right-turn lane, since there is no access to the west. An acceptable LOS D or better can be provided at this ramp terminal under all interchange alternatives.

#23 - NH Route 28 Bypass/B-C Connector Road (Alternatives B and C)
This new intersection is created by the connector road roughly along the alignment of the existing Ashleigh Drive. With Alternative B, two east-west thru lanes need to be provided so that an acceptable LOS C can be achieved. Only one east-west thru lane is required with Alternative C because of less overall traffic volume through the intersection.

#25 - C-D Connector Road/NH Route 28 (Alternatives C-D)
This new intersection is created by the connector road from the northerly interchange where it would intersect with the existing two-lane section of NH Route 28 just north of the Derry/Londonderry town line. NH Route 28 southbound would become the minor approach to the intersection and would have

separate left- and right-turn lanes. The EB approach would have an exclusive left lane and two thru lanes, while the WB approach would have a thru lane and a shared thru/right lane. This configuration would provide a LOS B during the 2040 peak hours.

16. Unsignalized Intersections

A summary table showing a comparison of operations at each existing or proposed unsignalized intersection is provided in Table 12. In most cases, the existing or projected deficiencies for the minor street approaches are exacerbated, except where traffic diversions may reduce the volume of traffic on the major approach that would conflict with traffic turning from the minor street approach(es).

It is not envisioned that any of these intersections would warrant signals, except those that are directly impacted by a specific alternative, such as Tsienneto Road/Pinkerton Street or NH Route 102/Tsienneto Road/North Shore Road. Delays at the North High Street /Ash Street Extension and the North High Street/Folsom Road/Franklin Streets locations are excessive and should be monitored as the Woodmont Commons development progresses to determine if and when signal warrants may be satisfied.

Table 12
Summary of 2040 Capacity Analyses by Alternative
Unsignalized Intersections

Intersection	2040 Alternative	AM Peak Hour v/c ratio	AM Average Delay	AM LOS	PM v/c ratio	PM Average Delay	PM LOS	Comments/ Lane Use Revisions
#8 - N High St/Ash St Ext (Critical Movement - EB LT)	No-Build	1.04	78.0	F	3.04	>300	F	
	Alternative A	0.53	17.4	C	1.47	228.8	F	
	Alternative B	0.42	14.3	B	0.96	56.5	F	
	Alternative C	0.76	29.3	D	1.09	90.6	F	
	Alternative D	0.74	25.7	D	1.70	>300	F	
	Alternative F	0.74	27.1	D	1.79	>300	F	
#10 - N High/Folsom/Franklin Sts. (Critical Movement varies between NB and SB)	No-Build	0.20	21.8	C	0.55	82.0	F	NB all is critical
	Alternative A		n/a/			n/a/		Signalized
	Alternative B	0.94	96.5	F	3.00+	>300*	F	NB all is critical
	Alternative C	1.35	219.6	F	3.31	>300*	F	SB all is critical
	Alternative D	0.22	10.9	B	1.21	160.2	F	
	Alternative F	0.36	31.7	D	2.31	>300	F	NB critical in AM, SB critical in PM
#12 -Tsienneto Rd/Pinkerton St (Critical Movement - NW LT)	No-Build	0.25	16.1	C	0.97	84.0	F	
	Alternative A		n/a/			n/a/		Signalized
	Alternative B	0.89	80.0	F	1.00	126.4	F	
	Alternative C	2.04	>300*	F	2.54	>300*	F	
	Alternative D		n/a/			n/a/		Signalized
	Alternative F	0.65	66.1	F	4.10	>300	F	
#15 - NH 28/Scobie Pond Rd (Critical Movement - SB all)	No-Build	1.01	144.7	F	0.58	32.2	D	
	Alternative A	0.18	14.4	B	0.19	16.4	C	
	Alternative B	0.18	13.3	B	0.23	16.5	C	
	Alternative C	0.67	>300*	F	4.44	>300*	F	
	Alternative D	1.34	>300*	F	6.67	4259.8*	F	
	Alternative F	0.31	27.4	D	0.47	51.0	F	
#16 - NH 102/NH Byp 28/E Derry Rd (Traffic Circle-RT only) (HCM 2010) (Critical Movement - E Derry Rd)	No-Build	0.87	31.9	D	1.26	151.2	F	
	Alternative A	1.11	94.0	F	0.92	41.9	E	
	Alternative B	0.77	21.4	C	0.68	16.4	C	
	Alternative C	0.73	18.8	C	0.78	21.7	C	
	Alternative D	0.84	28.3	D	0.89	33.6	D	
	Alternative F	0.91	40.1	E	1.21	128.7	F	
#17 - NH Byp 28/Pinkerton/Nesmith (HCM 2010) (Critical Movement - WB all)	No-Build	-	-	F	-	-	F	Left turns from Nesmith
	Alternative A	1.01	138.9	F	0.52	55.3	F	
	Alternative B	1.13	188.1	F	0.53	57.3	F	
	Alternative C	0.96	127.6	F	0.41	41.7	E	
	Alternative D	1.35	280.7	F	0.63	78.3	F	
	Alternative F	0.45	26.2	D	0.46	49.1	E	
#24 - B/C Connector Rd/Tsienneto Road (Critical Movement - NB LT)	No-Build		n/a/			n/a/	-	Does not exist
	Alternative A		n/a/			n/a/	-	Does not exist
	Alternative B	0.09	38.9	E	0.00	0.0	A	
	Alternative C	0.00	0.0	A	0.00	0.0	A	
	Alternative D		n/a/			n/a/	-	Does not exist
	Alternative F		n/a/			n/a/		Does not exist

Table 12 (Cont'd)
Summary of 2040 Capacity Analyses by Alternative

Unsignalized Intersections

-		AM Peak Hour			PM Peak Hour			-
Intersection	2040 Alternative	v/c ratio	Average Delay	LOS	v/c ratio	Average Delay	LOS	Comments/ Lane Use Revisions
#27 - NH 102/English Range Road	No-Build		n/a/			n/a/	-	
(Critical Movement - SEB all)	Alternative A	0.17	20.8	C	0.16	28.4	D	
	Alternative B	0.23	24.5	C	0.22	26.1	D	
	Alternative C	0.17	20.8	C	0.23	42.1	E	
	Alternative D	0.17	21.0	C	0.18	32.8	D	
	Alternative F	0.17	20.8	C	0.16	28.4	D	

* - calculated delay exceeds 300s

17. Findings and Conclusions

The results of the traffic modeling for the Project indicates that the provision of a new interchange on I-93 will provide varying levels of traffic relief to NH Route 102 east of Exit 4 and into the downtown Derry area by the 2040 design year, as shown in Table 7.

Examples on key links include:

- NH Route 102 east of Exit 4: In the 2040 No-Build case, there is projected to be 41,725 vpd on this segment. Alternative A provides the most relief on this segment (-51.5%) to a volume of 20,240 vpd, which is the same magnitude as the 2015 base volume. Alternative B shows a 48% reduction, while Alternatives C and D show lesser reductions. Alternative F shows a slight increase in projected traffic than any interchange alternative.
- NH Route 102 east of Griffin Street (downtown): Alternatives A, B and C show similar reductions, on the order of 19-21%, or 3000-4000 vpd, over 2040 No-Build conditions. Alternative D shows a lesser reduction, but still lower volume than the 2015 base. Alternative F projects higher volumes than any interchange alternative and would be higher than either the 2015 or 2040 No-Build case.
- Volumes on the Exit 4 ramps are lower under most interchange alternatives, with Alternative A providing the most overall relief over No-Build conditions, even under the highest potential development scenario for the Woodmont Commons development.
- Volumes on the Exit 5 ramps see the highest traffic reductions under Alternatives C and D (northerly interchange) than under a southerly interchange scenario.

Mainline freeway facilities operational analyses indicates that the four-lane I-93 mainline will function at an acceptable LOS C or better under all scenarios, with a couple of exceptions where two-lane on- or off-ramps may be needed to accommodate all projected volumes. A sensitivity analyses of the Exit 4A SB off-ramp indicated that a 200-vph reduction in the assigned traffic would allow this ramp to function as a single lane off-ramp if these traffic projections are not fully realized.

The Exit 4 ramps would have slightly higher volumes under either Alternatives A or B, but this is more reflective of the higher potential development scenario assumed for the Woodmont Commons development than for Alternatives C, D or F, which use the same scenario as the No-Build condition. As noted earlier, should the 23% internal capture rate for Woodmont Commons trips be realized in some form, the number of trips assigned to the study area network may be reduced accordingly, which should result in better traffic operations than the worse-case scenario assumed in this study.

The level of intersection improvements needed to accommodate the alternative and connector road corridors vary greatly depending on alternative. In general, all intersections can provide an acceptable LOS under any alternative with appropriate lane use and signalization/coordination as required. The traffic circle at NH Route 102/NH Route 28 Bypass will continue to function at a poor LOS regardless of alternative.

In summary, from a purely traffic standpoint, Alternatives A appears to best satisfy the Purpose and Need for the Project by providing the greatest reductions in NH Route 102 traffic through downtown Derry than the other alternatives evaluated. Volumes on NH Route 102 just east of Exit 4 would be roughly half of 2040 No-Build levels and similar to existing (2015) conditions. Alternative B provides some relief as well, but primarily serves a north-south trip pattern as opposed to the east-west pattern needed to reduce traffic on NH 102 in downtown Derry. Alternatives C and D would provide some, but not as much, relief to the NH Route 102 corridor, because of the increased distance between these northerly interchange alternatives and the NH Route 102 corridor.

Other natural and cultural resource impact criteria will be used to provide the final assessment of the Preferred Alternative, but the previous finding of Alternative A as the Preferred Alternative from a traffic standpoint is supported by the updated analyses contained herein.

18. References

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Figure 1 - I-93 Exit 4A Supplemental Draft EIS - Alternative

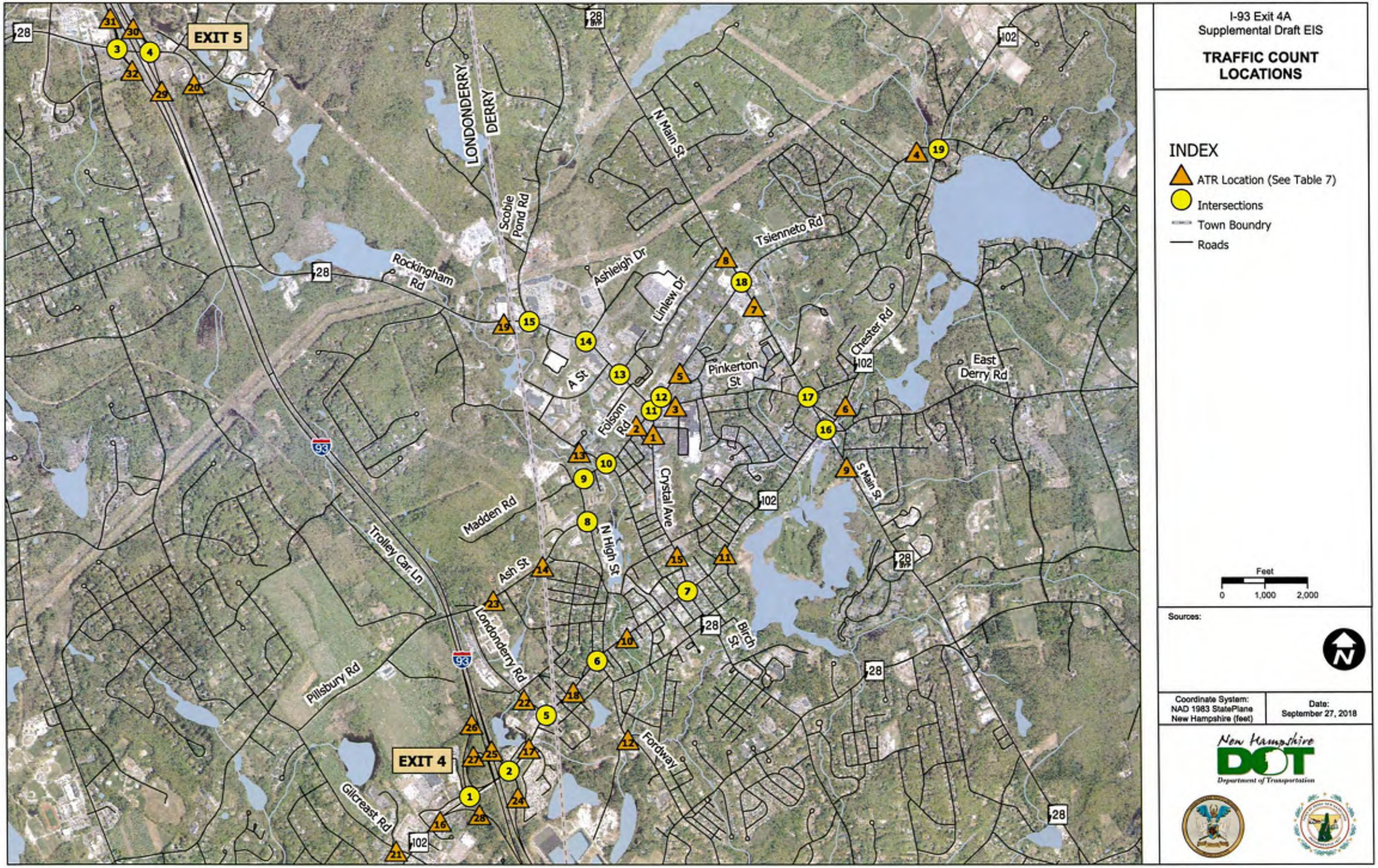
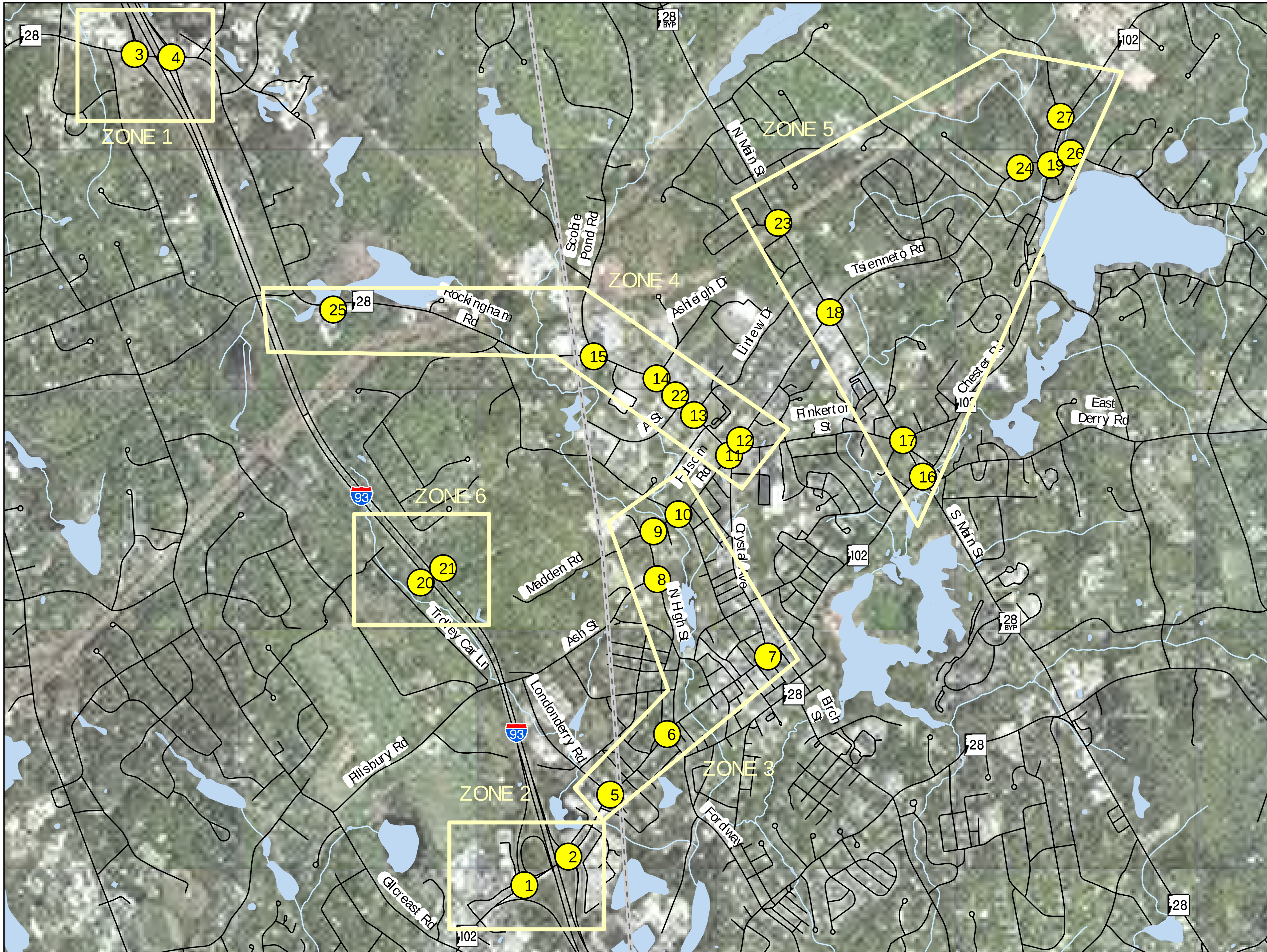


Figure 2 - Traffic Count Locations



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10. N. High St./ Folsom Rd./ Franklin St
11. NH 28/ Folsom Rd./ Tsienneto Rd.
12. Tsienneto Rd./ Pinkerton St.
13. NH 28/ Linlew Dr.
14. NH28/ Ashleigh Dr.
15. NH 28/ Scobie Pond Rd.
16. NH 102/ NH 28 Bypass/ E. Derry Rd.
17. NH 28 Bypass/ Pinkerton St.
18. NH 28 Bypass/ Tsienneto Rd.
19. NH 102/ Tsienneto Rd.
20. Exit 4A SB Ramps
21. Exit 4A NB Ramps
22. NH 28/ B-C Connector
23. NH 28 Bypass/ B-C Connector
24. Tsienneto Rd/ B-C Connector
25. NH 28/ C-D Connector
26. NH 102/ North Shore Rd
27. NH 102/ English Range Rd

Feet
0 1,000 2,000

Sources:

Coordinate System: NAD 1983 StatePlane New Hampshire (feet)	Date: January 24, 2018

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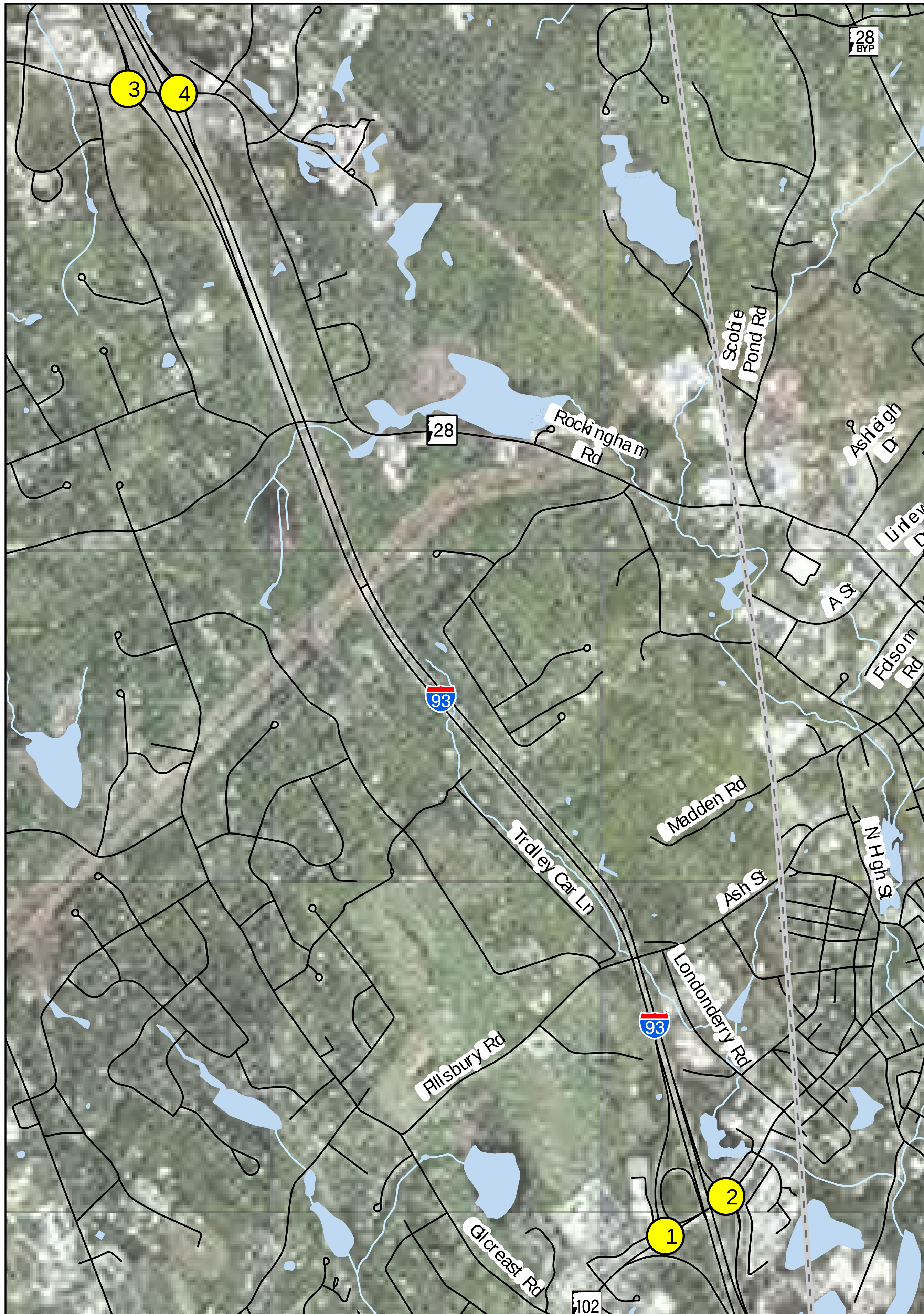
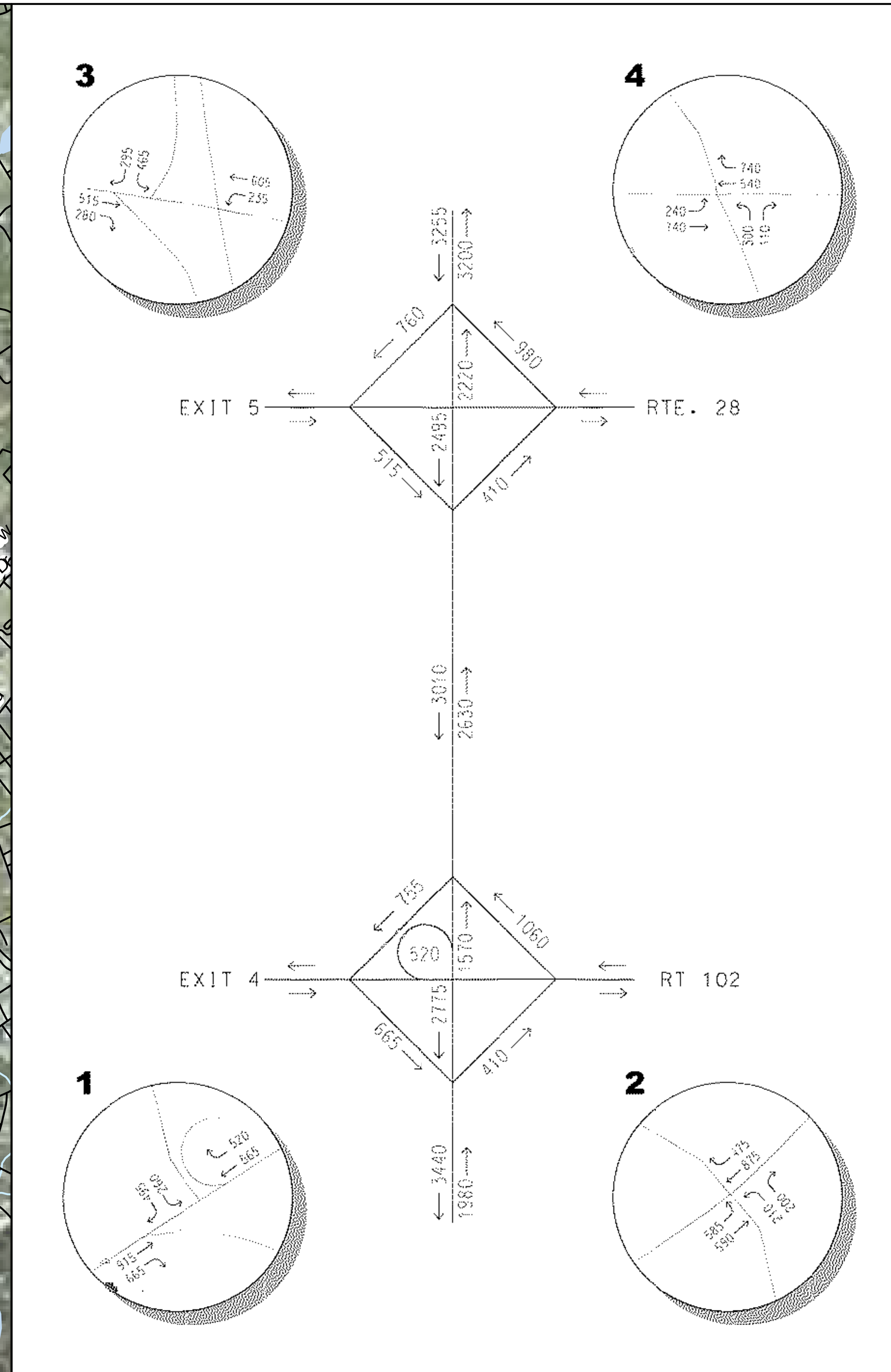
Figure 3 - I-93 Exit 4A Supplemental Draft EIS – Zones 1-6 Locus Map





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Feet
0 1,000 2,000

Sources:

Coordinate System NAD 1983 StatePlane New Hampshire (feet)	Date: January 24, 2018

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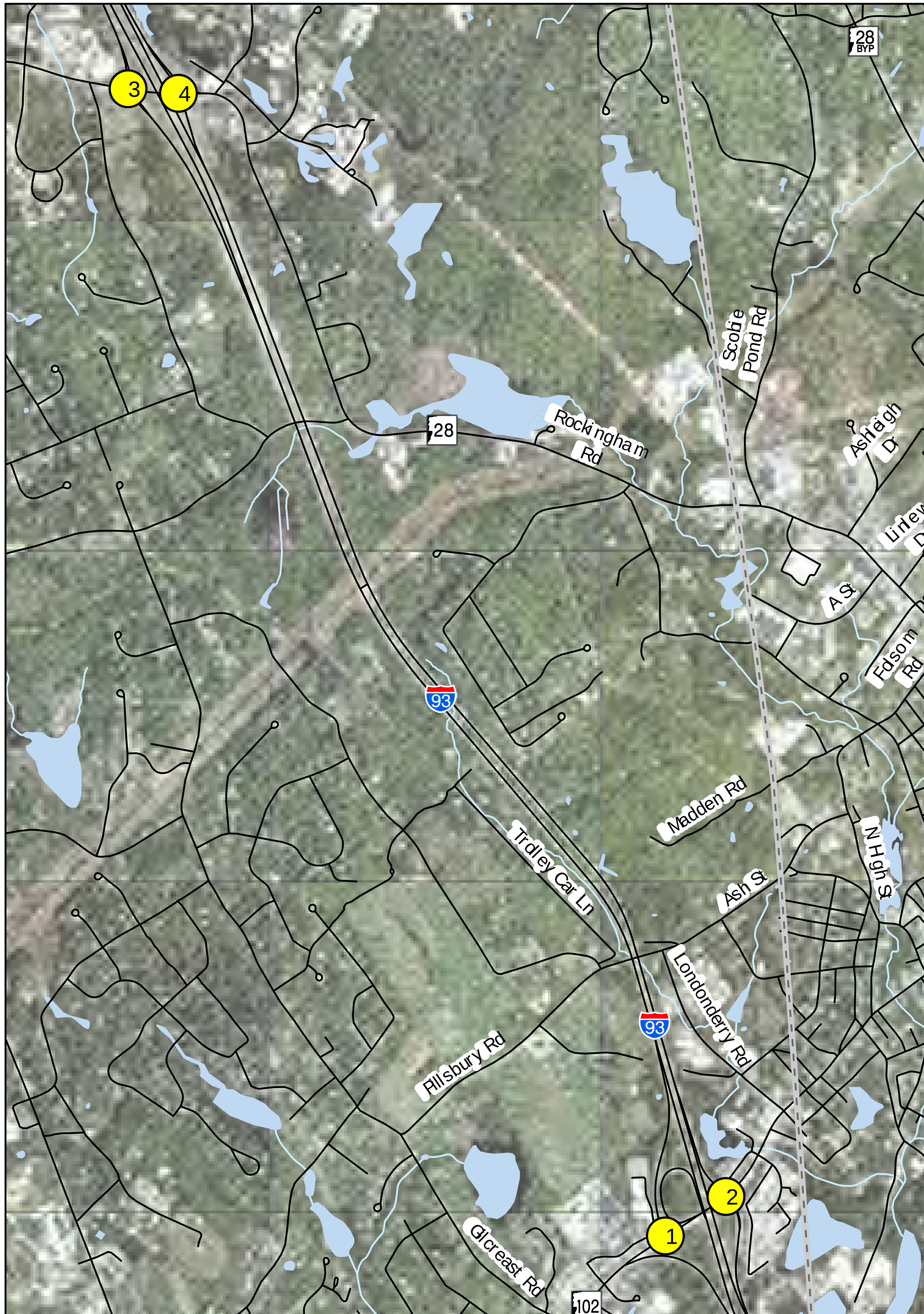
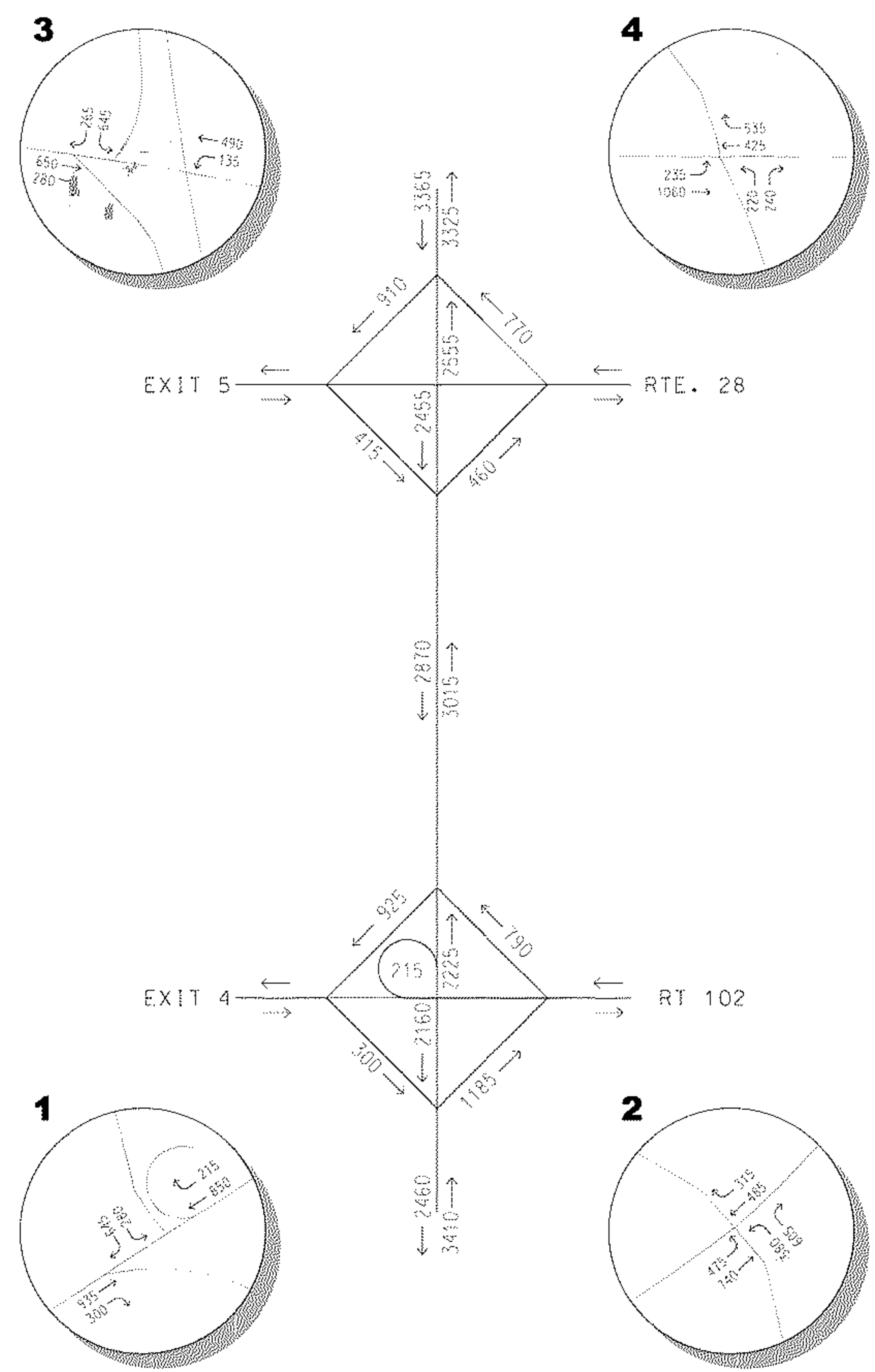
Figure 4 - 2015 No-Build AM Peak Hour Base Volumes - Locations 1-4





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Feet
0 1,000 2,000

Sources:

Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

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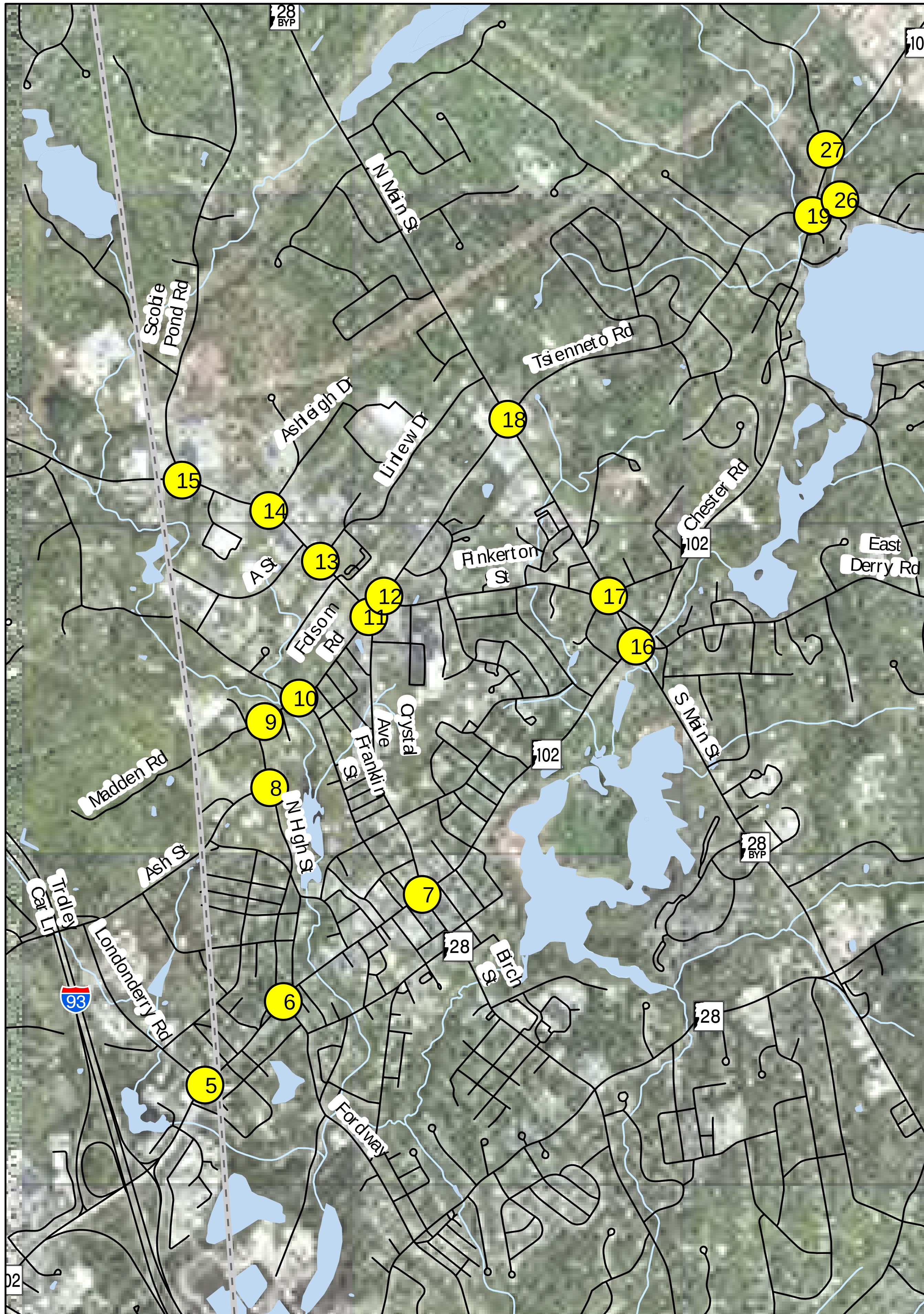
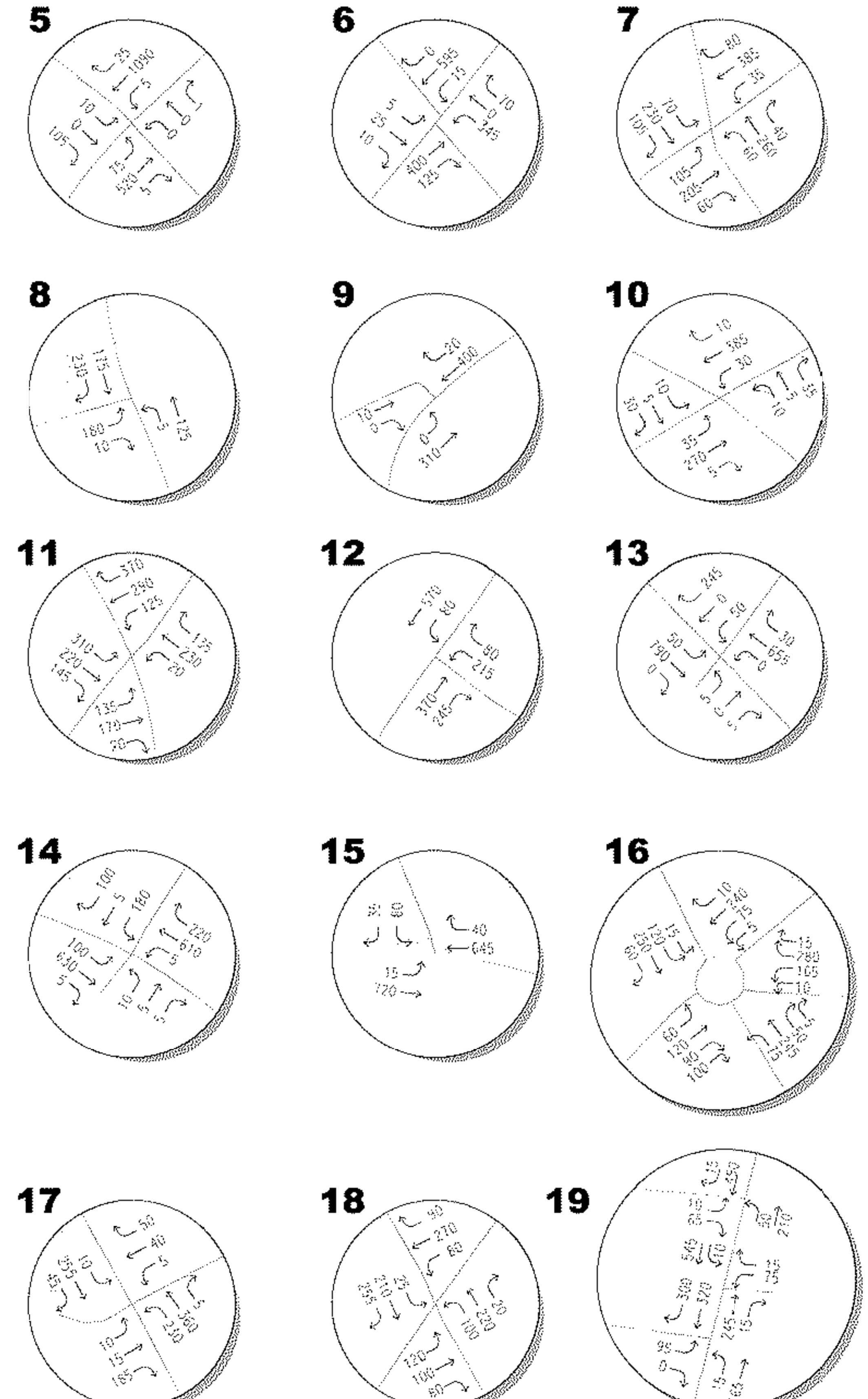
Figure 5 - 2015 No-Build PM Peak Hour Base Volumes – Locations 1-4





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26. NH 102/ North Shore Rd
27. NH 102/ English Range Rd

Feet
0 1,000 2,000

Sources:

Coordinate System
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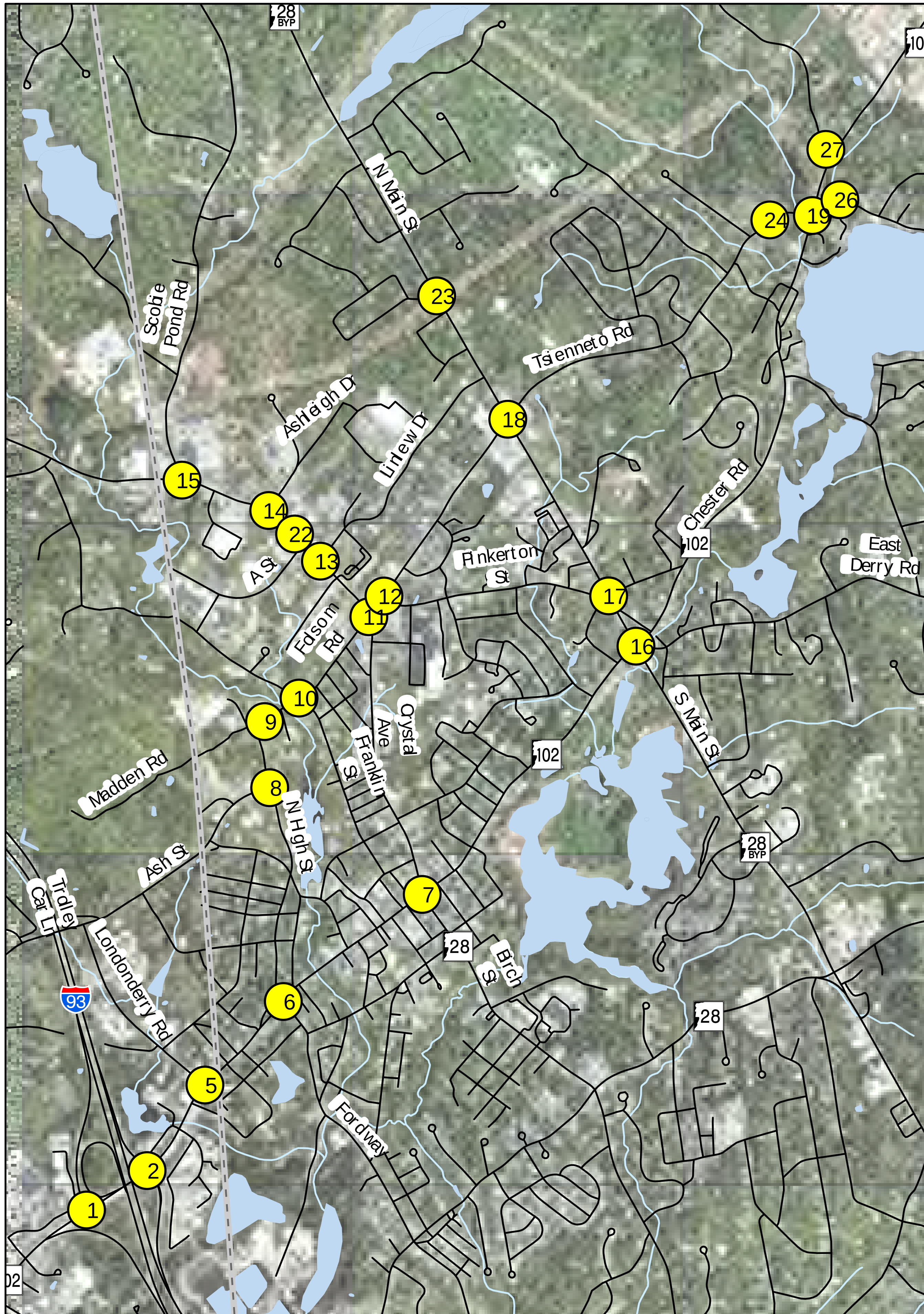
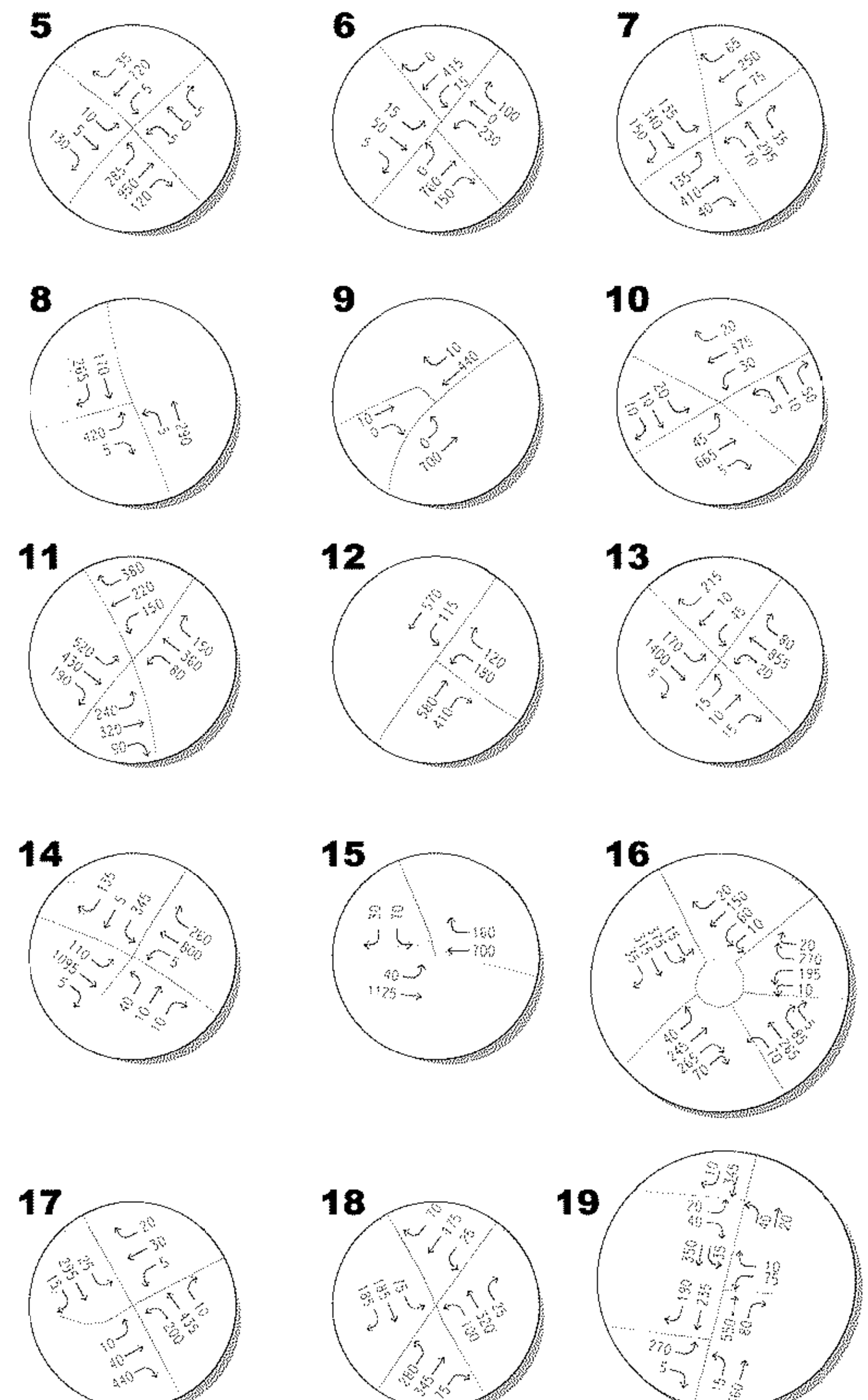
Figure 6 - 2015 No-Build AM Peak Hour Base Volumes - Locations 5-19 and 26-27





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26. NH 102/ North Shore Rd.
27. NH 102/ English Range Rd.

Feet
0 1,000 2,000

Sources:

Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

Date:
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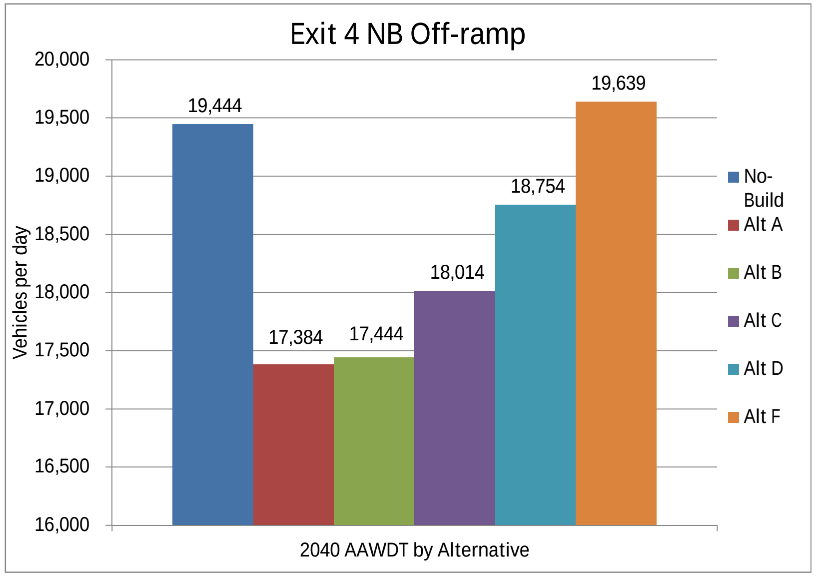
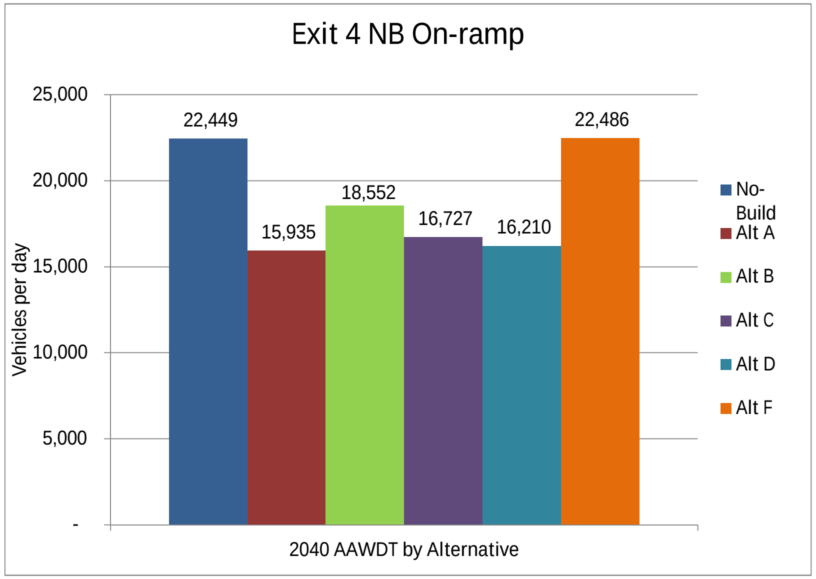
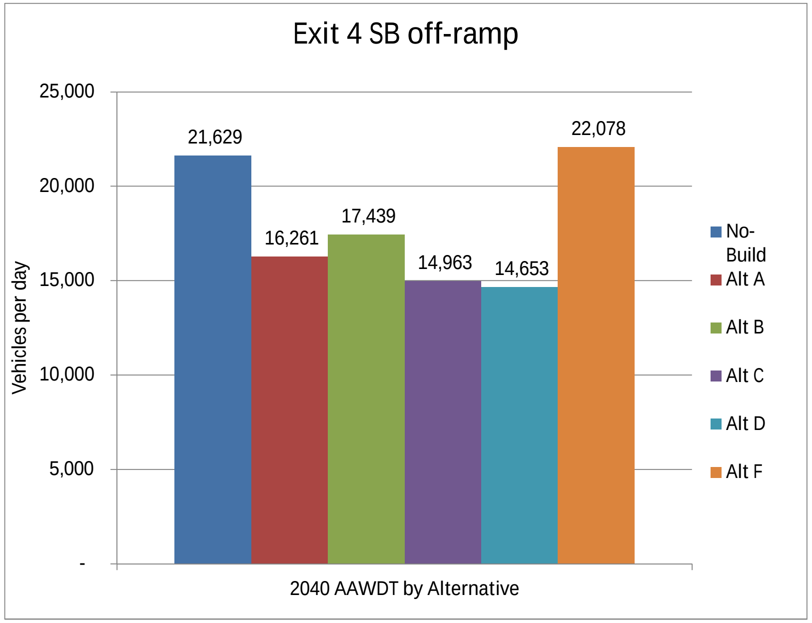
Figure 7 - 2015 No-Build PM Peak Hour Base Volumes – Locations 5-19 and 26-27

FIGURE 8 - VOLUME COMPARISONS - EXIT 4 RAMPS







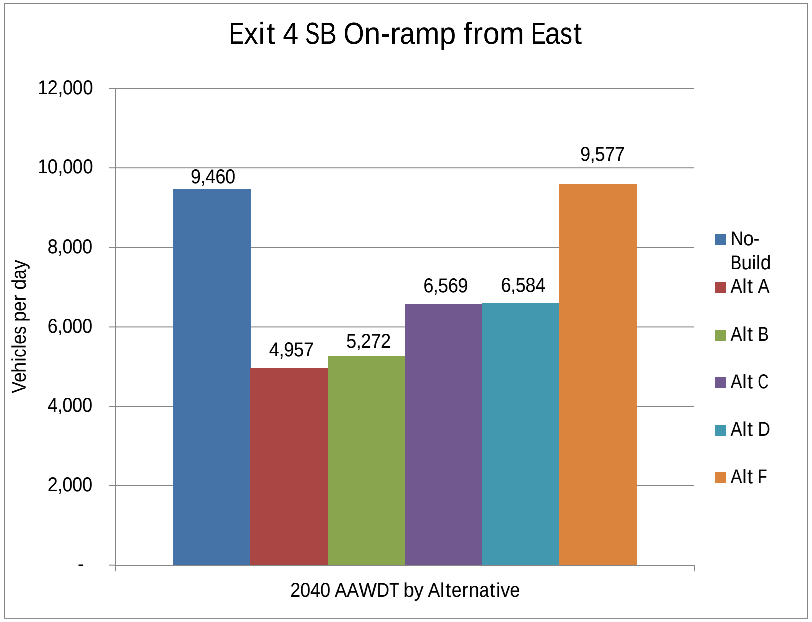
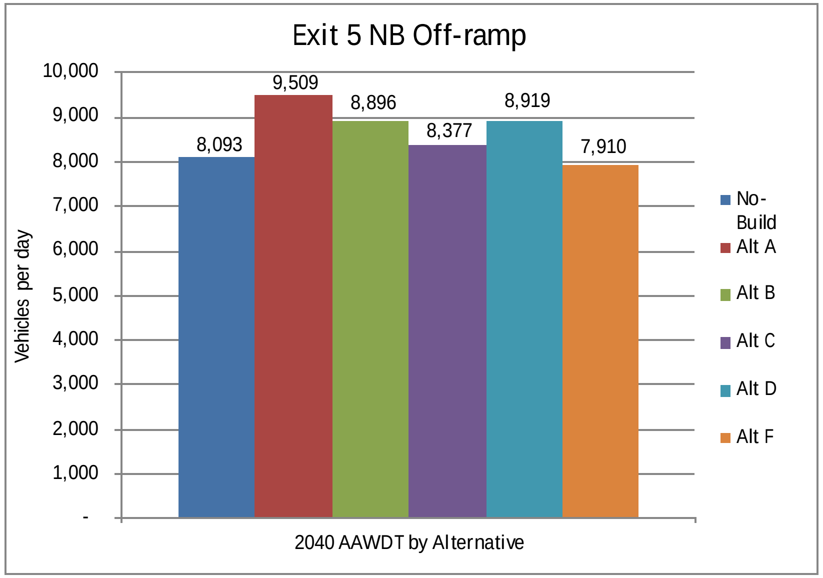
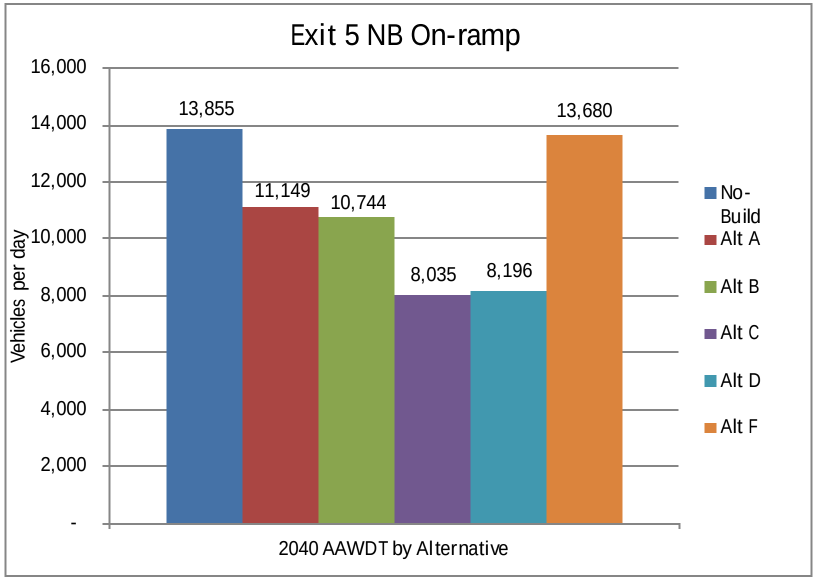
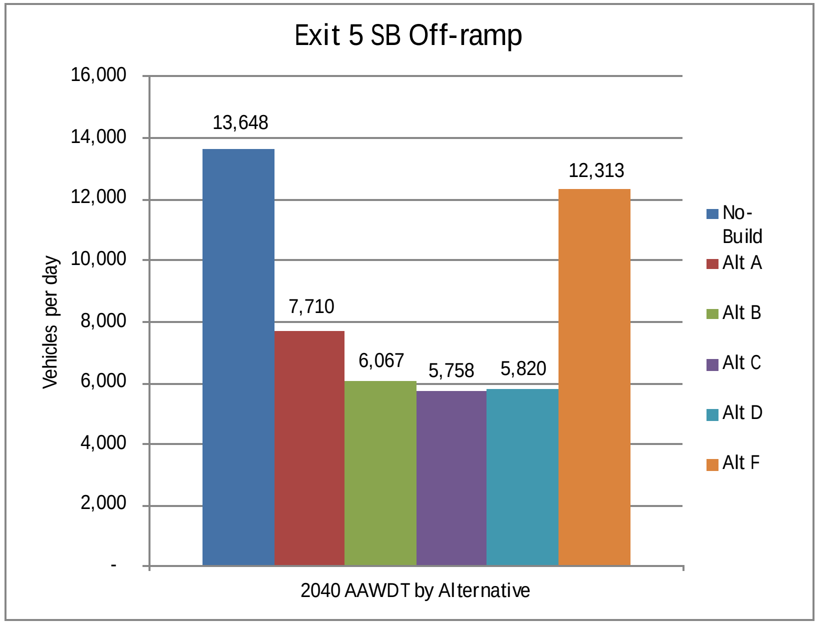


FIGURE 9 - VOLUME COMPARISONS - EXIT 5 RAMPS







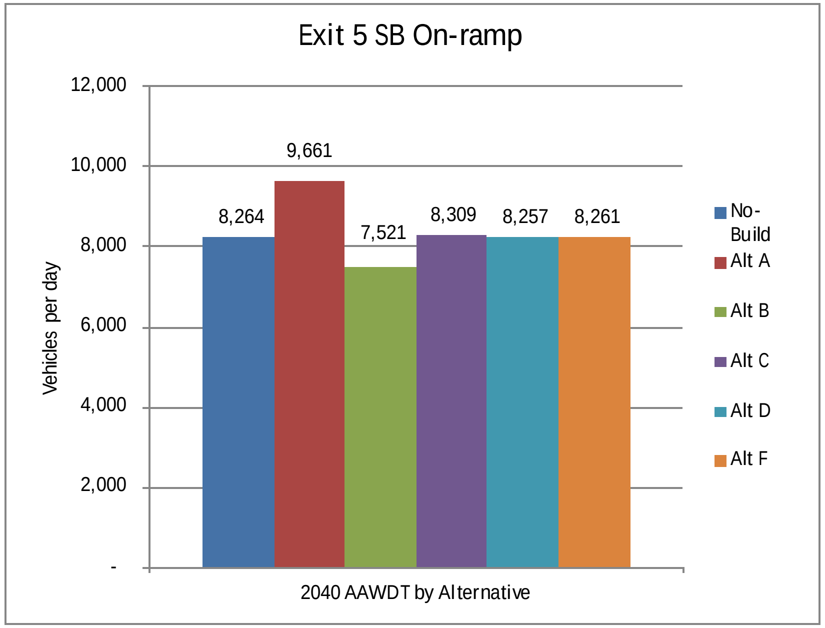


FIGURE 10- VOLUME COMPARISONS - EXIT 4A RAMPS

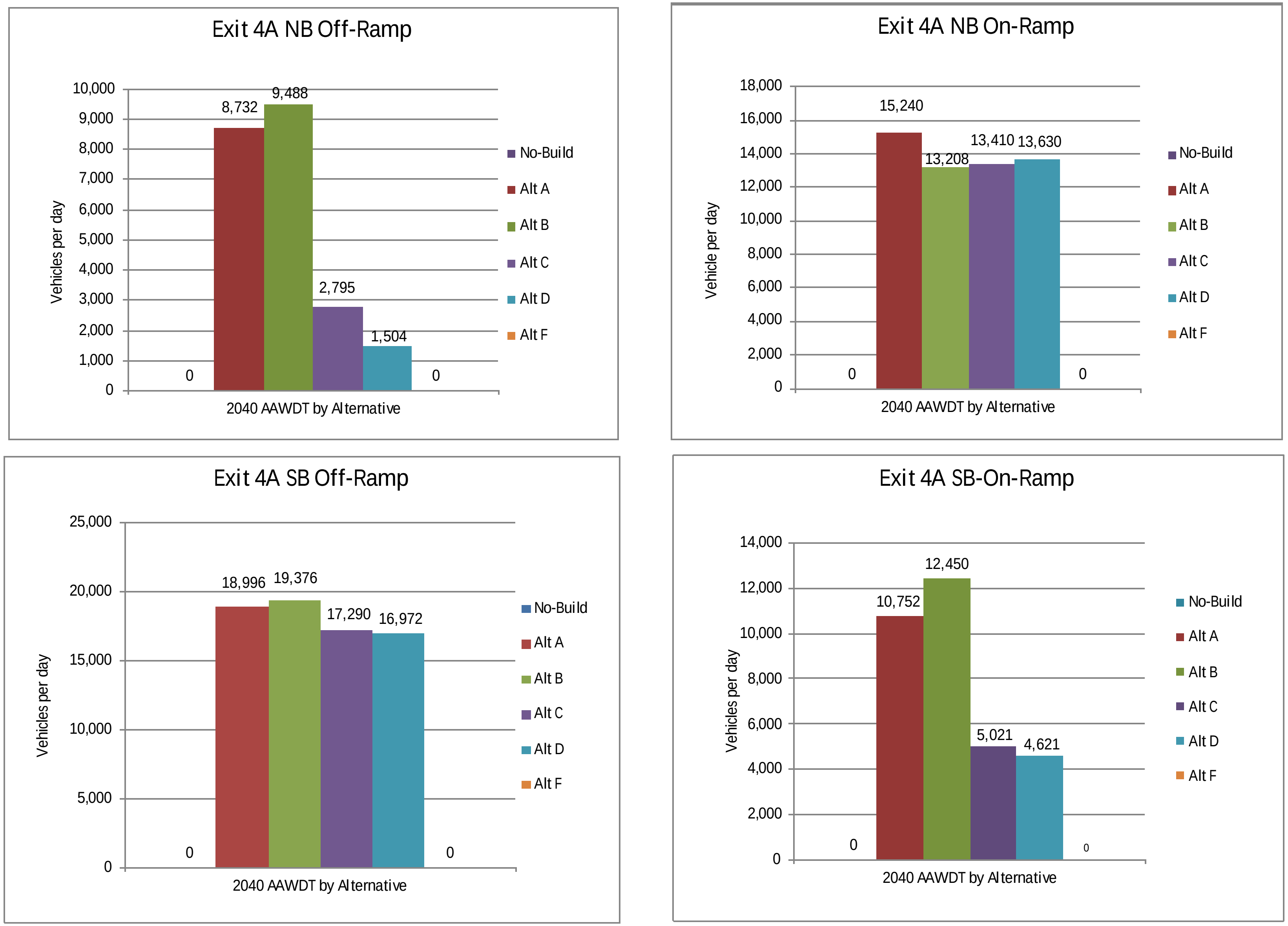


FIGURE 11 - VOLUME COMPARISONS - NH ROUTE 102 CORRIDOR

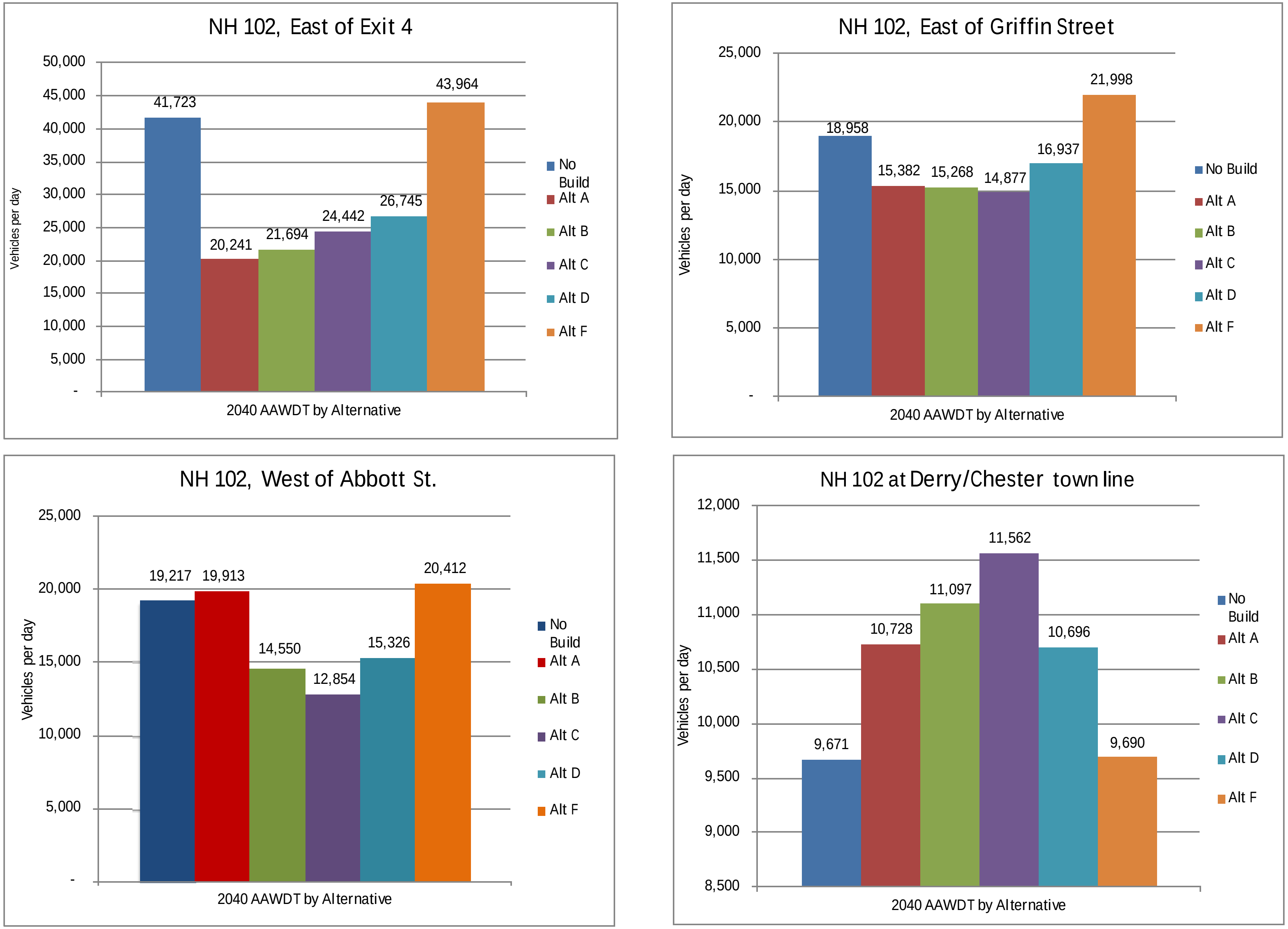
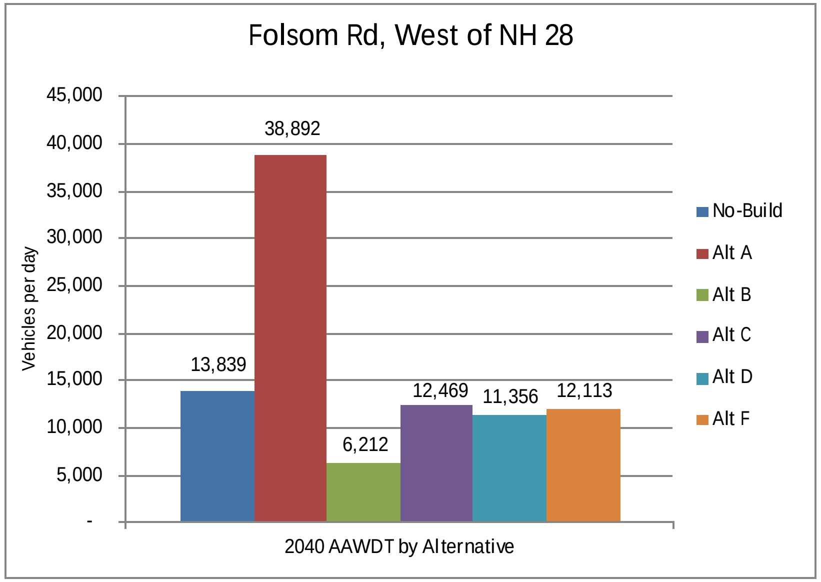
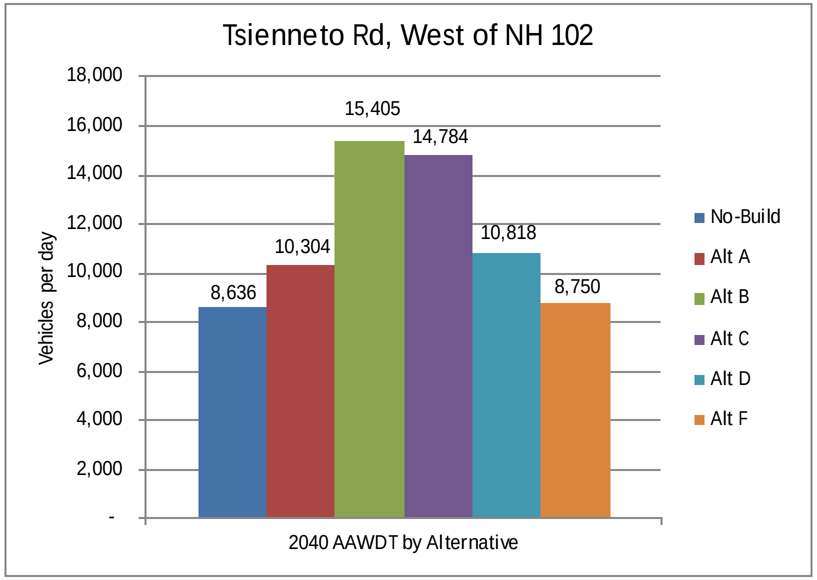
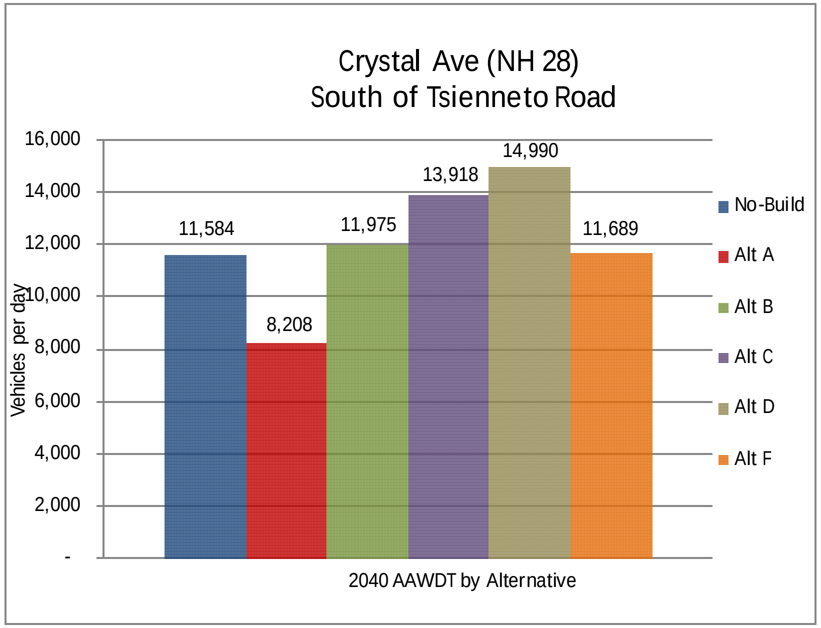
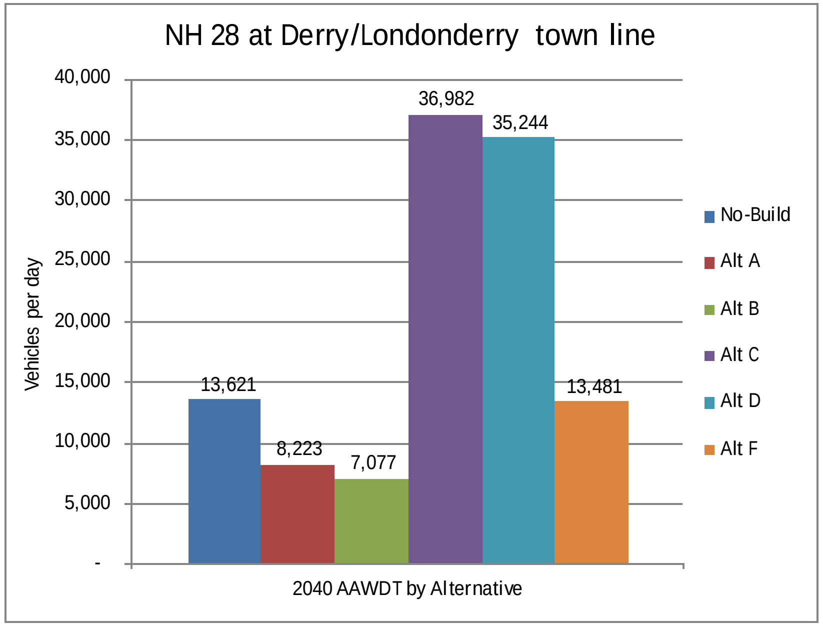


FIGURE 12- VOLUME COMPARISONS- OTHER LOCAL STREETS









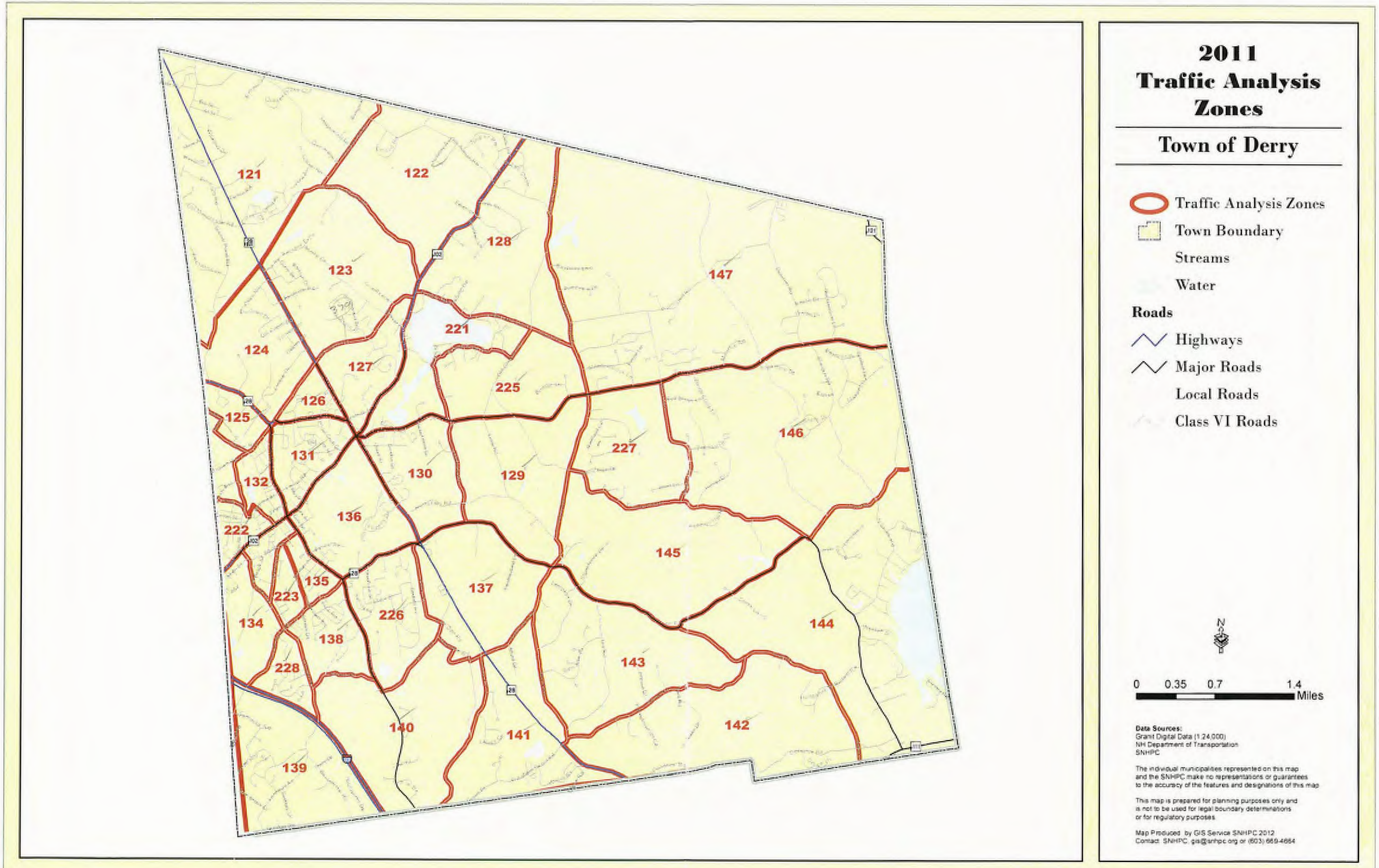


Figure 13 - SNHPC Traffic Analysis Zones - Derry NH

<u>Exhibit #8A</u>- Traffic Analysis Zones in the SNHPC Region

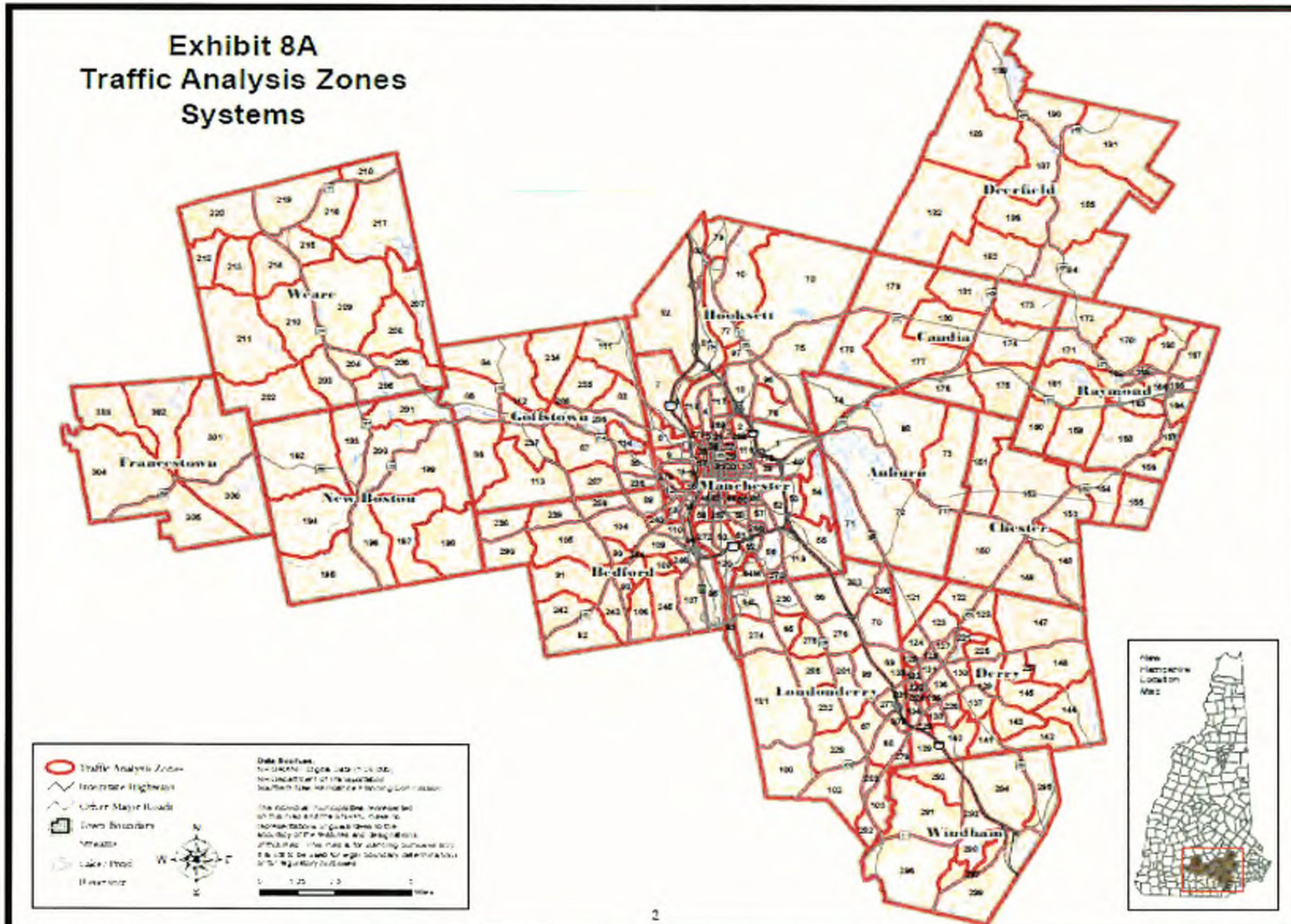


Figure 14 - SNHPC Traffic Analysis Zones - Region wide

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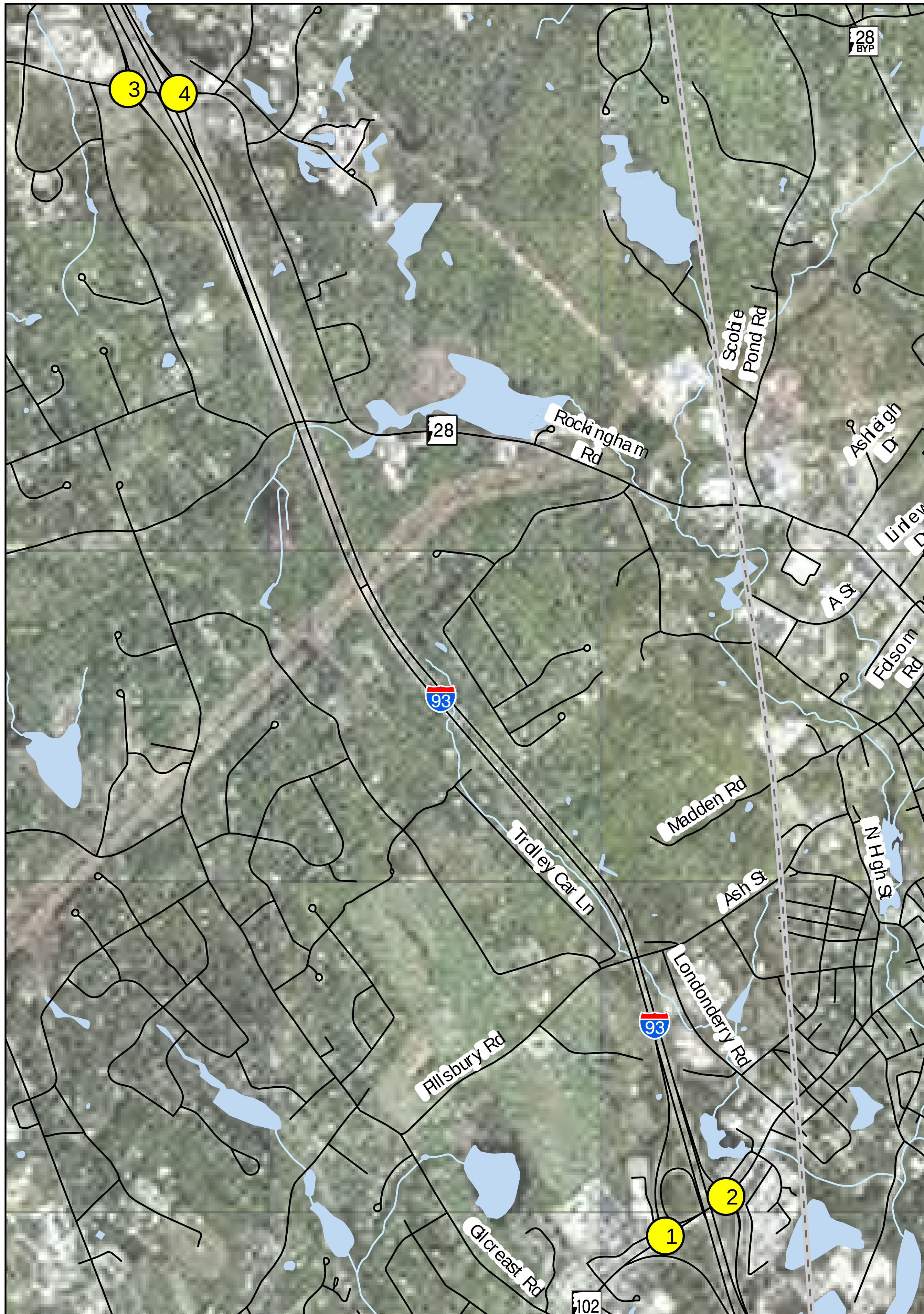

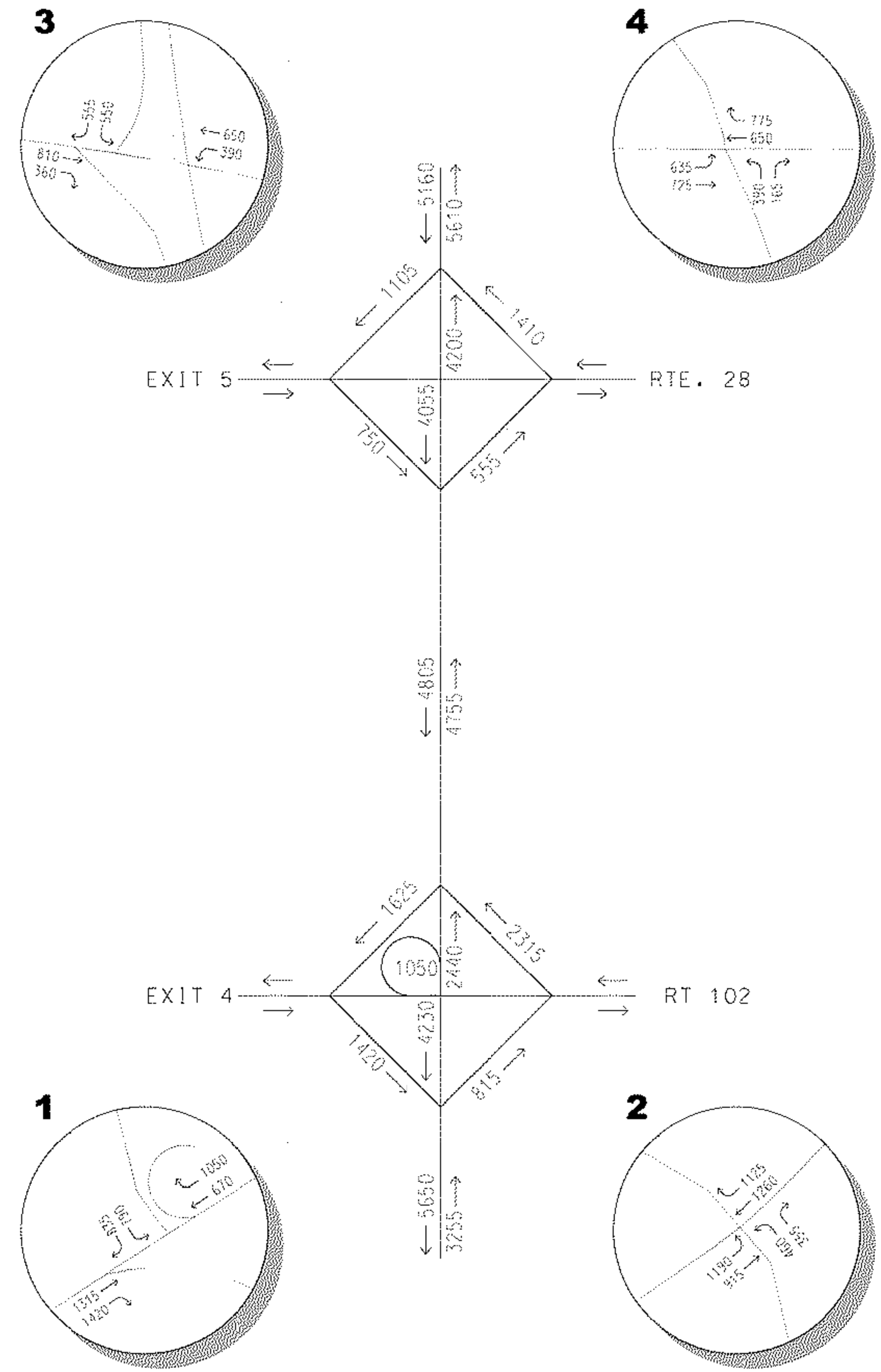

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1. Exit 4 SB Ramps
2. Exit 4 NB Ramps
3. Exit 5 SB Ramps
4. Exit 5 NB Ramps

Feet
0 1,000 2,000

Sources:

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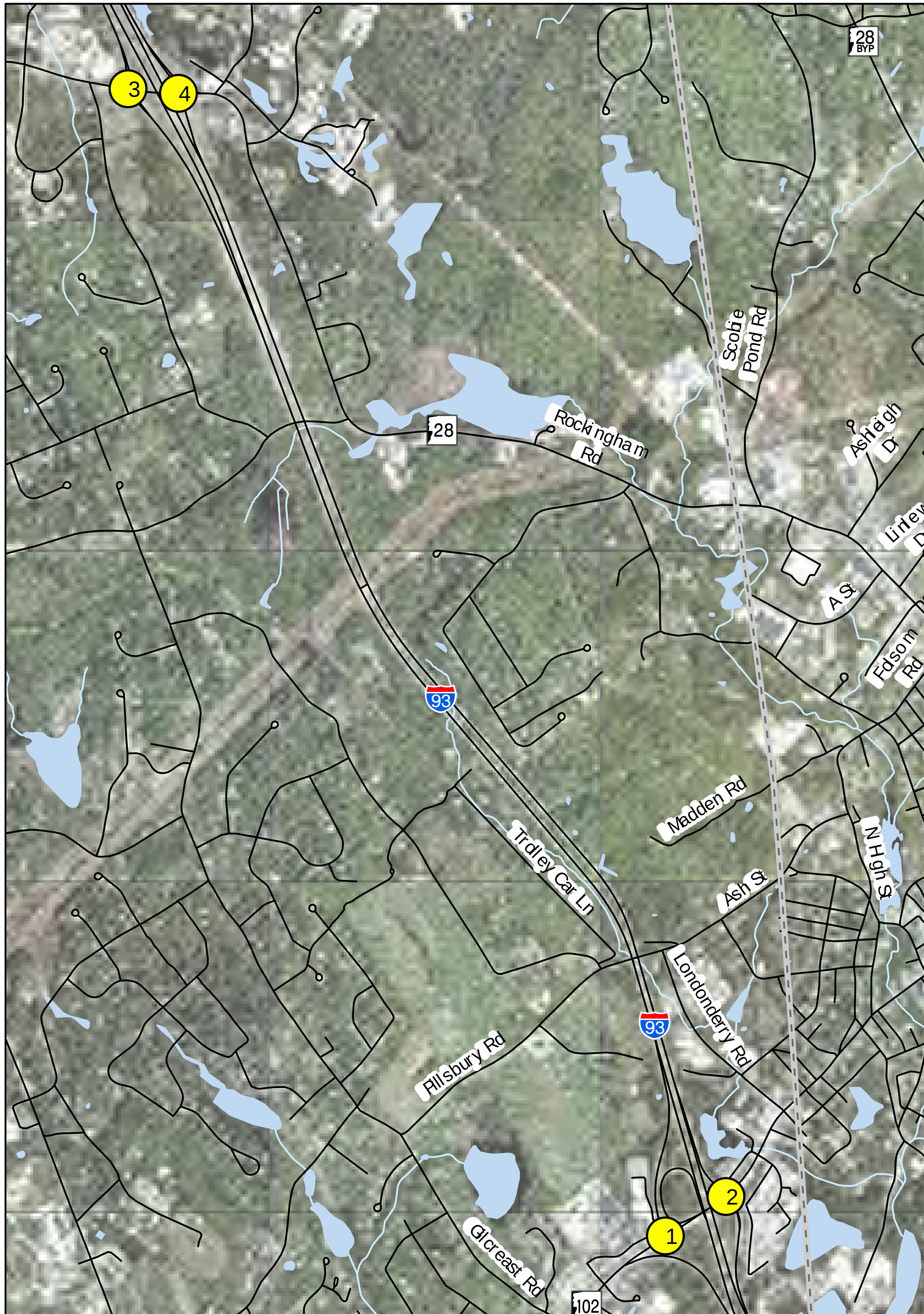
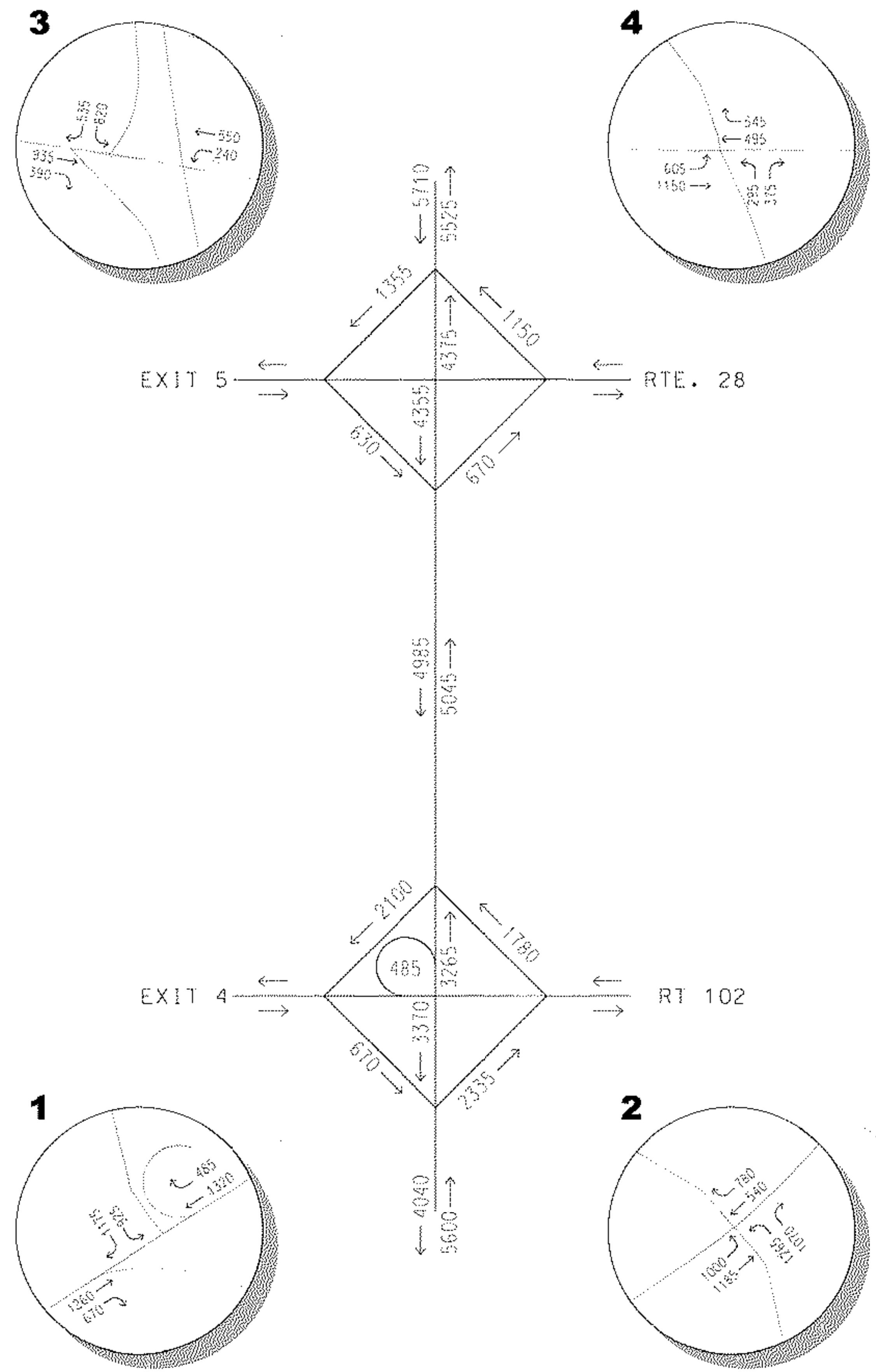
Figure 15 - 2040 No-Build AM Peak Hour Base Volumes – Locations 1-4





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Feet
0 1,000 2,000

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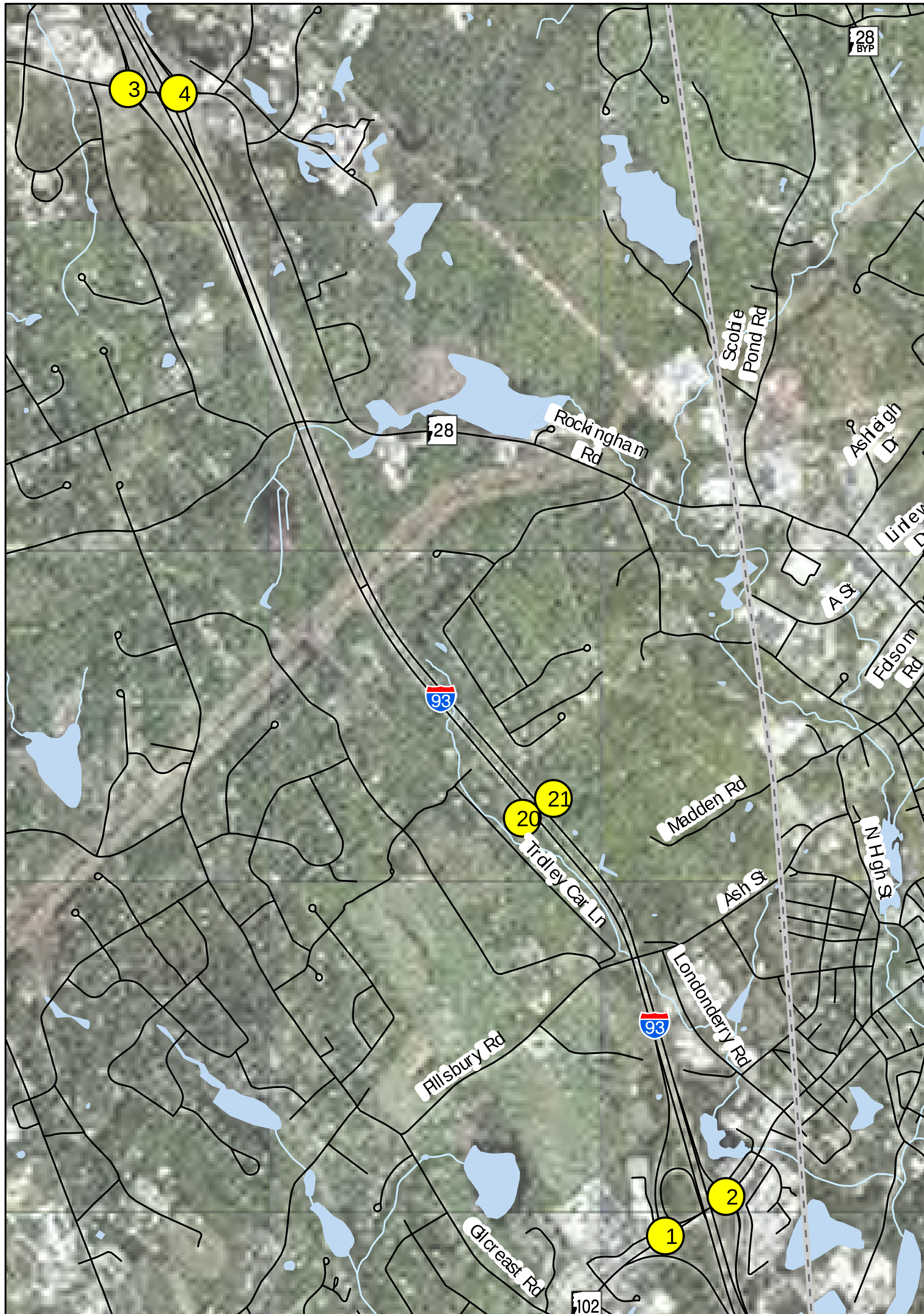
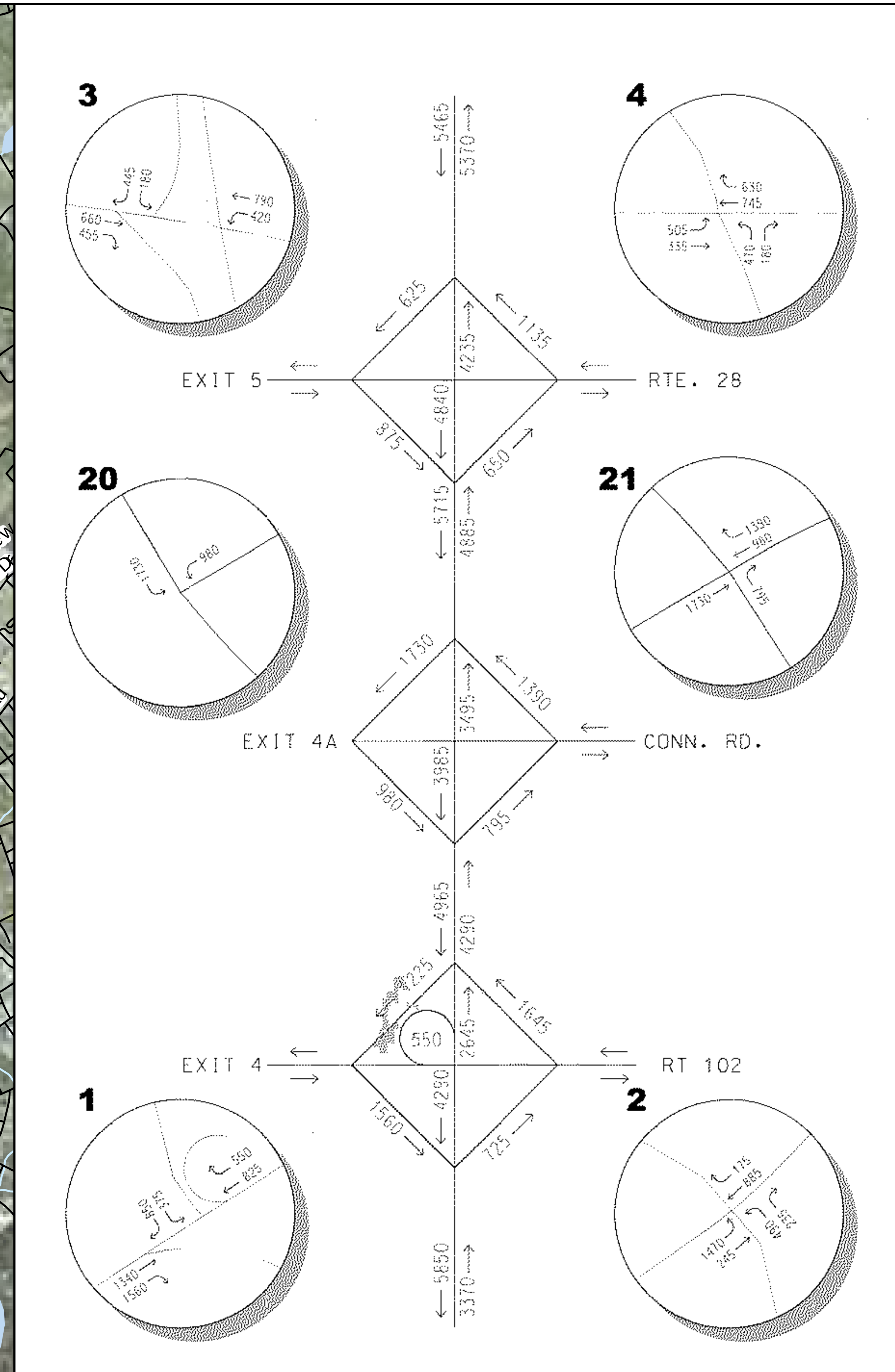
Figure 16 - 2040 No-Build PM Peak Hour Base Volumes – Locations 1-4





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2040 ALT A AM PEAK HOUR BASE VOLUMES

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3. Exit 5 SB Ramps
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20. Exit 4A SB Ramps
21. Exit 4A NB Ramps

Feet
0 1,000 2,000

Sources:

Coordinate System NAD 1983 StatePlane New Hampshire (feet)	Date: January 24, 2018

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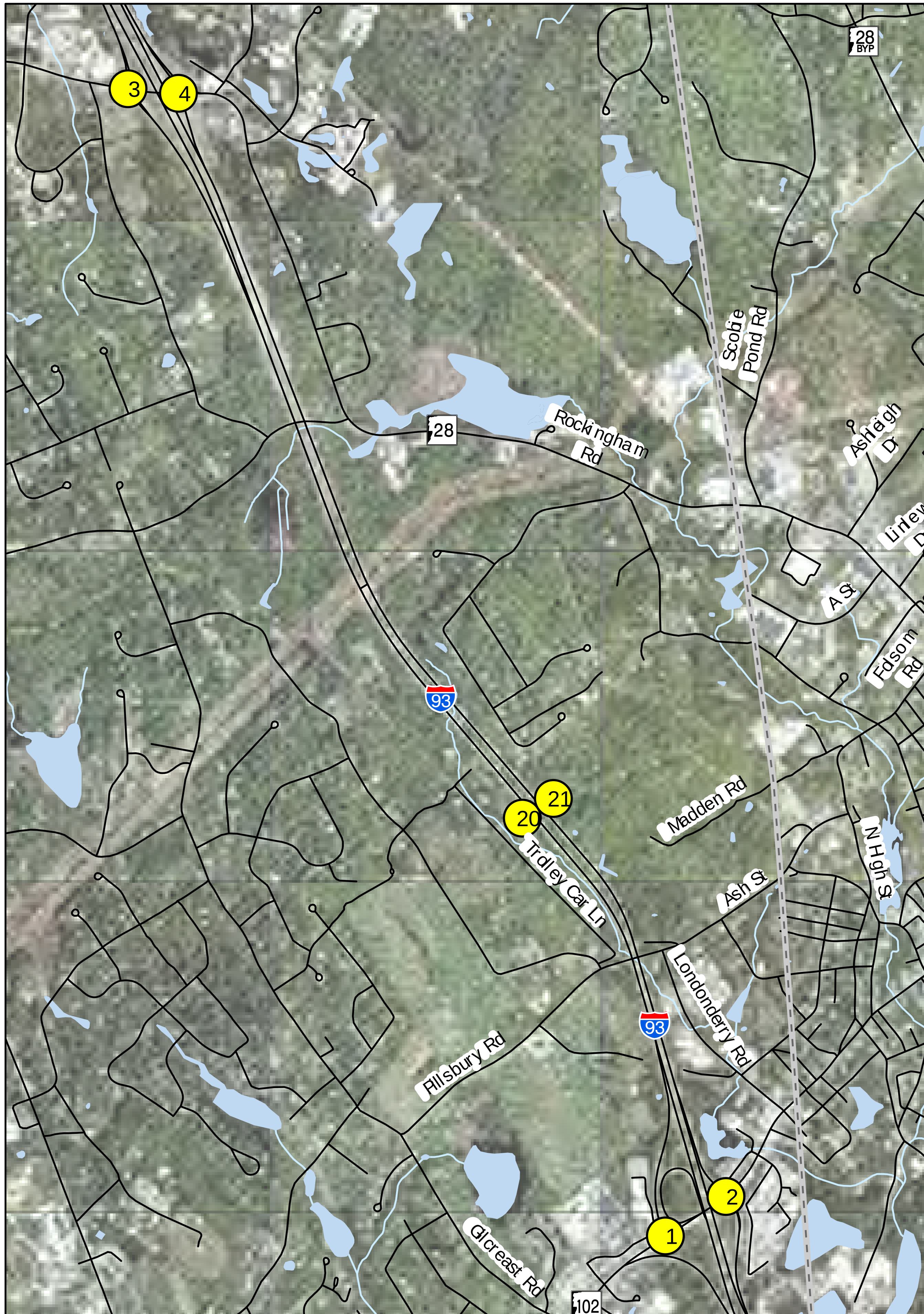
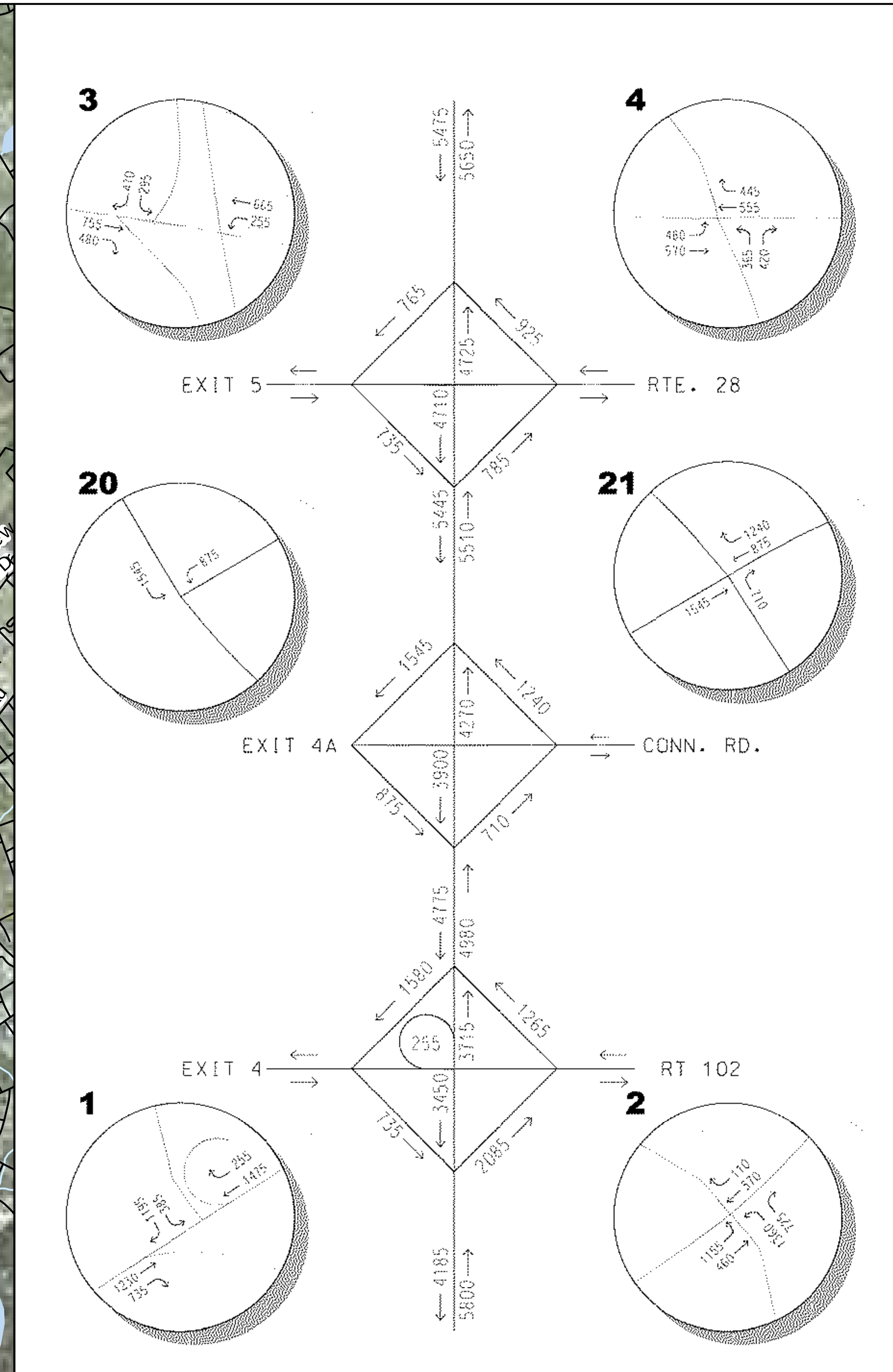
Figure 17 - 2040 Alternative A AM Peak Hour Base Volumes – Locations 1-4 and 20-21





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4. Exit 5 NB Ramps
20. Exit 4A SB Ramps
21. Exit 4A NB Ramps

Feet
0 1,000 2,000

Sources:

Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

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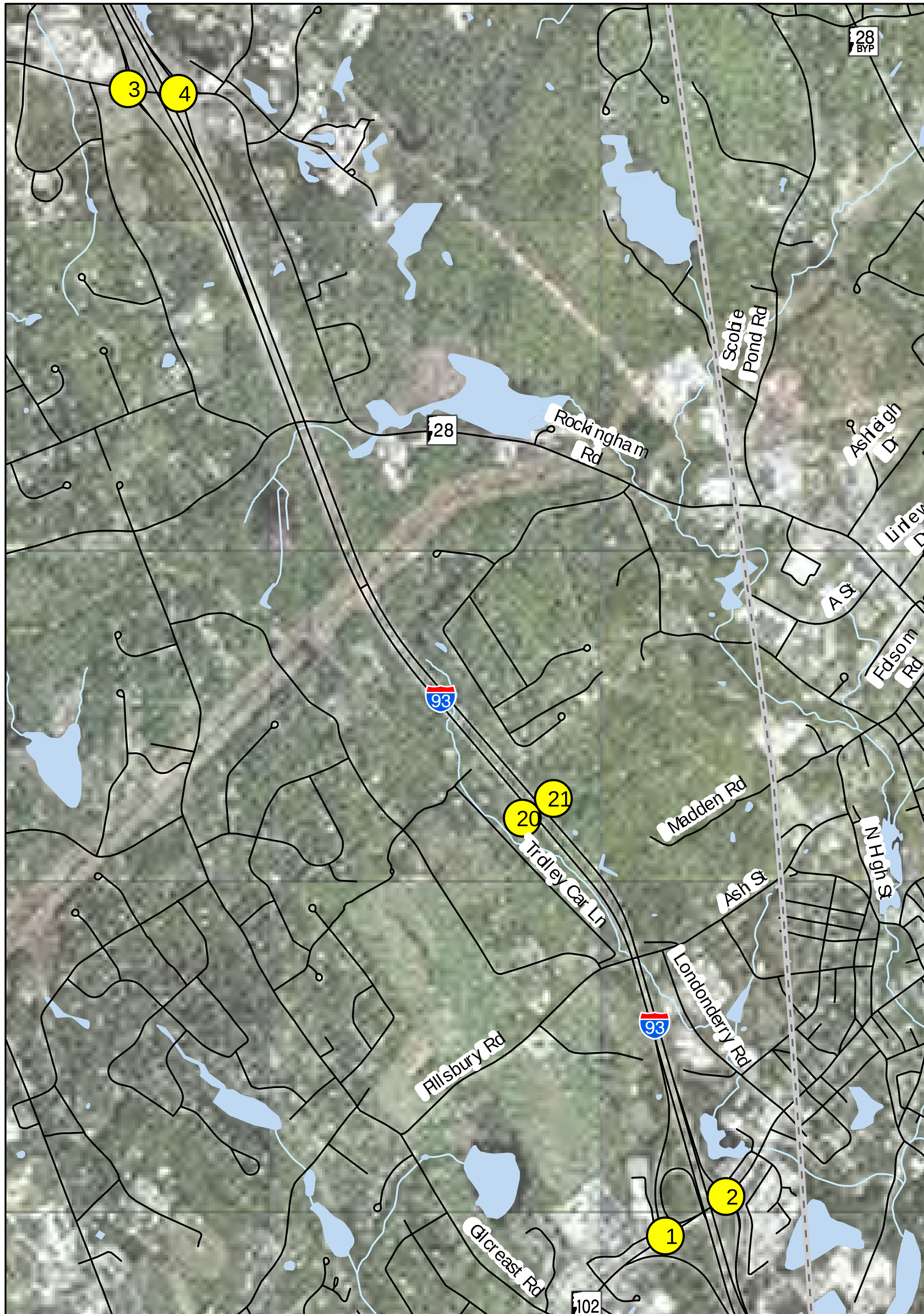
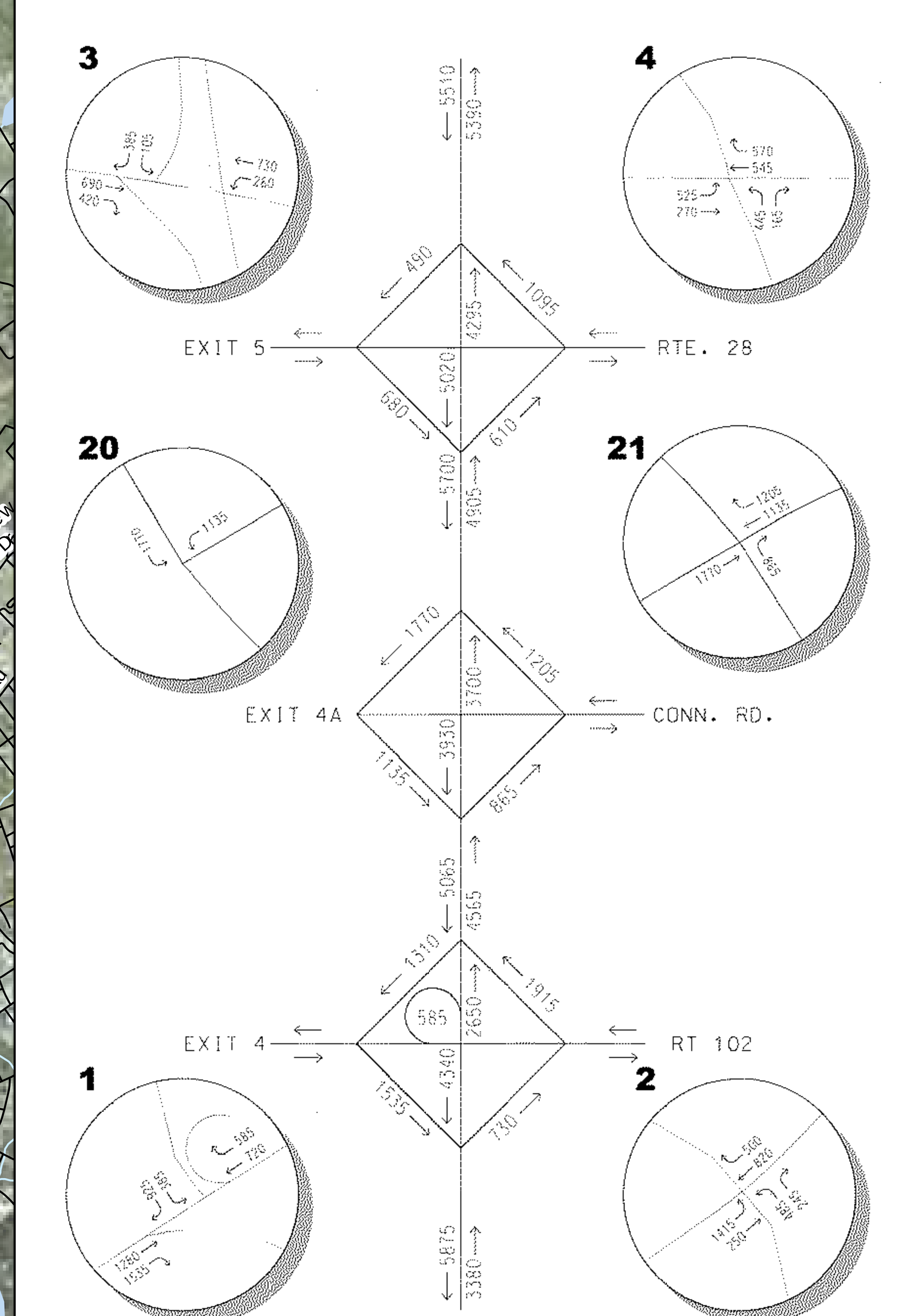
Figure 18 - 2040 Alternative A PM Peak Hour Base Volumes – Locations 1-4 and 20-21





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2040 ALT B AM PEAK HOUR BASE VOLUMES

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1. Exit 4 SB Ramps
2. Exit 4 NB Ramps
3. Exit 5 SB Ramps
4. Exit 5 NB Ramps
20. Exit 4A SB Ramps
21. Exit 4A NB Ramps

Feet
0 1,000 2,000

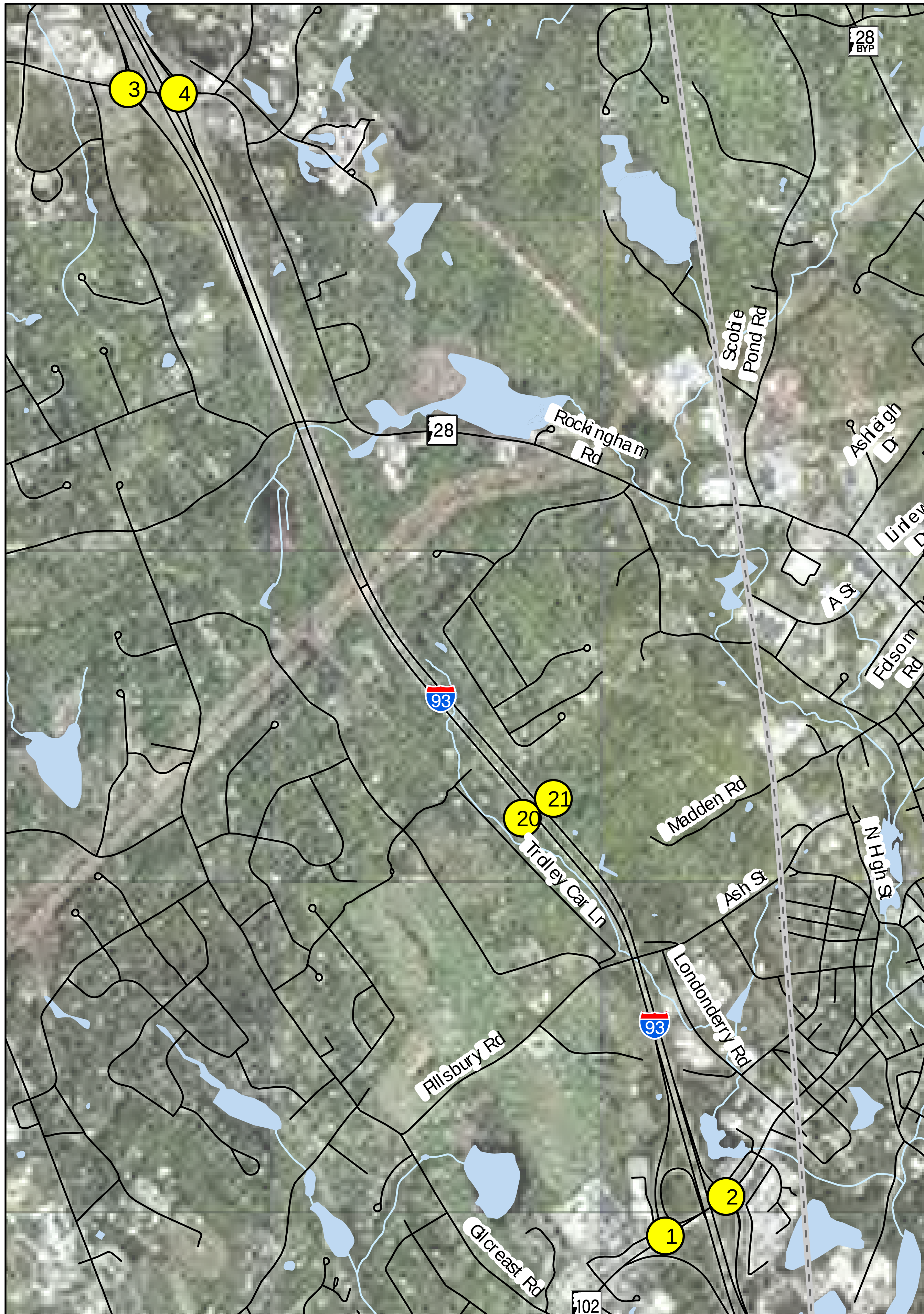
Sources:

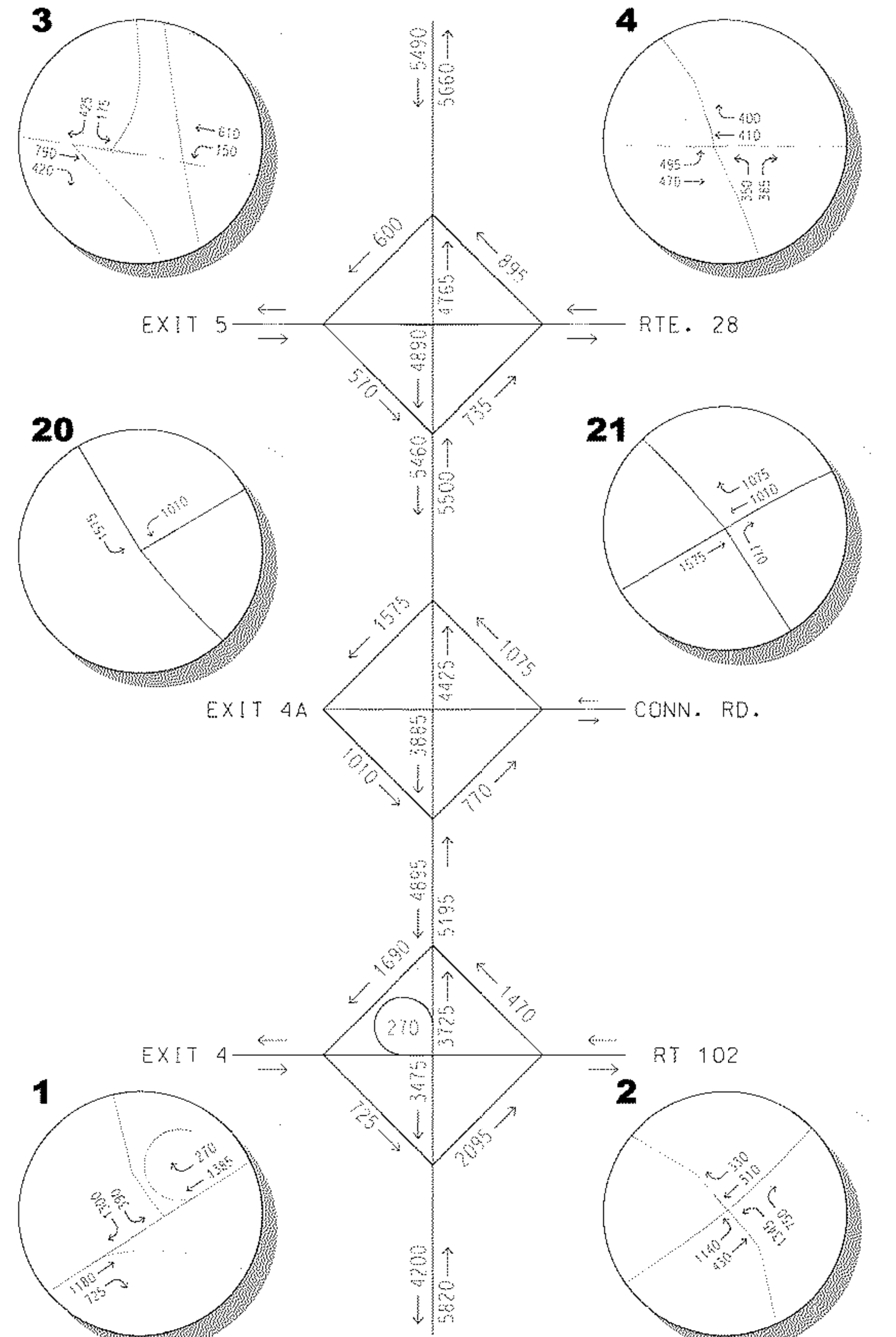
Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

Date:
January 24, 2018

New Hampshire DOT
Department of Transportation

Figure 19 - 2040 Alternative B AM Peak Hour Base Volumes – Locations 1-4 and 20-21





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2040 ALT B PM PEAK HOUR BASE VOLUMES

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1. Exit 4 SB Ramps
2. Exit 4 NB Ramps
3. Exit 5 SB Ramps
4. Exit 5 NB Ramps
20. Exit 4A SB Ramps
21. Exit 4A NB Ramps

Feet
0 1,000 2,000

Sources:

Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

Date:
January 24, 2018

New Hampshire DOT
Department of Transportation

Figure 20 - 2040 Alternative B PM Peak Hour Base Volumes – Locations 1-4 and 20-21

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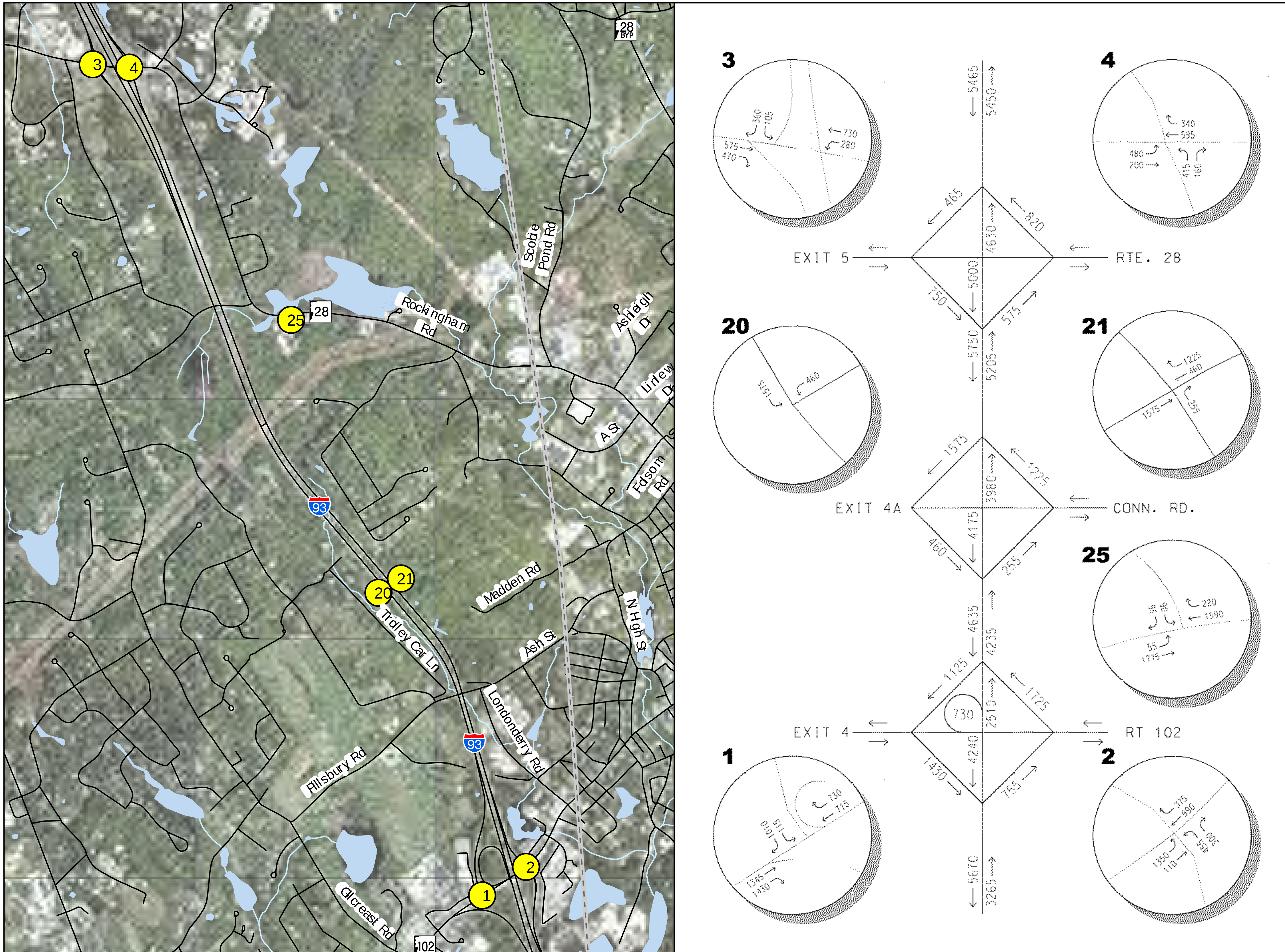
2040 ALT C AM PEAK HOUR BASE VOLUMES



INDEX

1. Exit 4 SB Ramps
2. Exit 4 NB Ramps
3. Exit 5 SB Ramps
4. Exit 5 NB Ramps
20. Exit 4A SB Ramps
21. Exit 4A NB Ramps
25. NH 28/ C-D Connector

Feet
0 1,000 2,000

Sources:

Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

Date:
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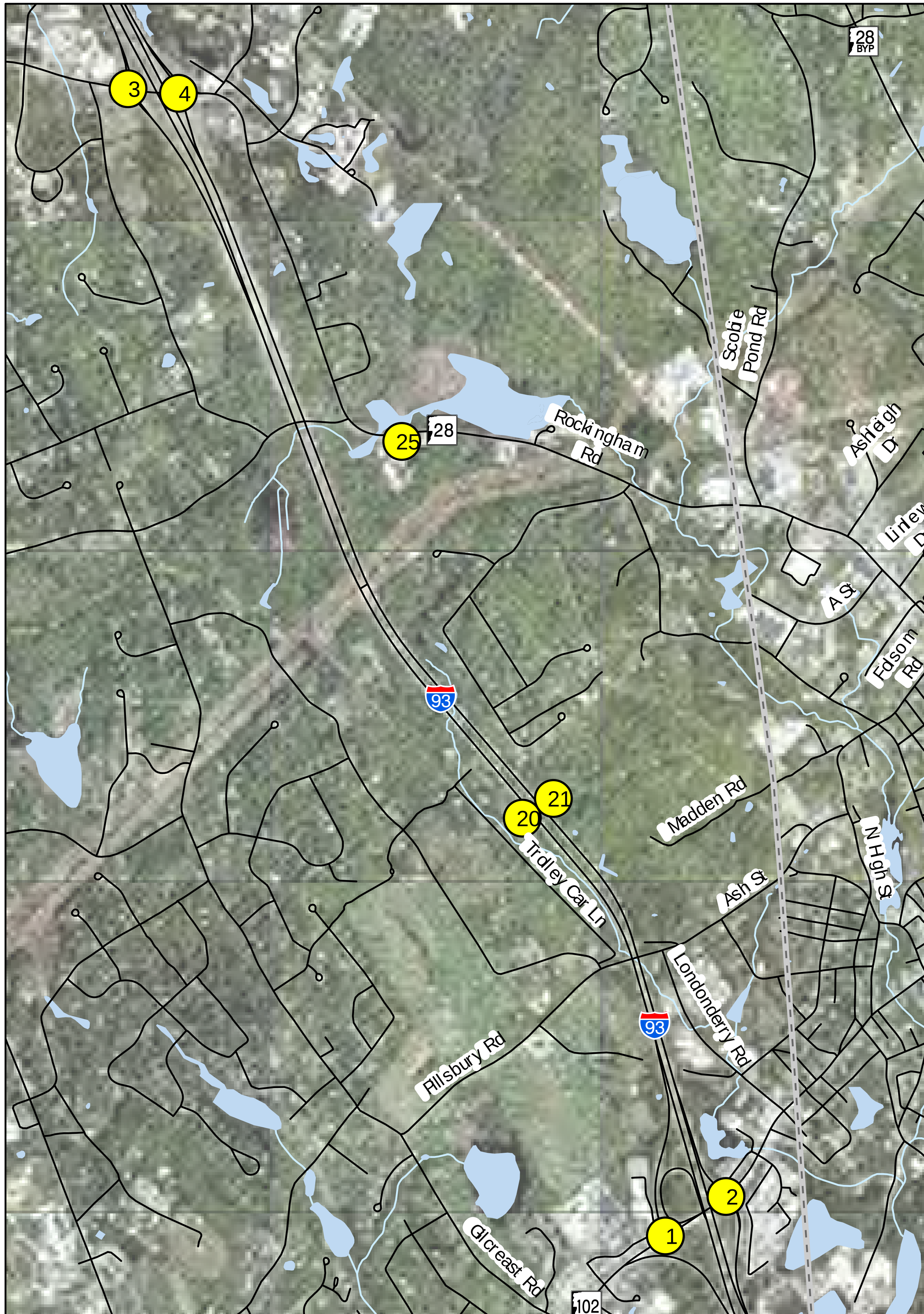
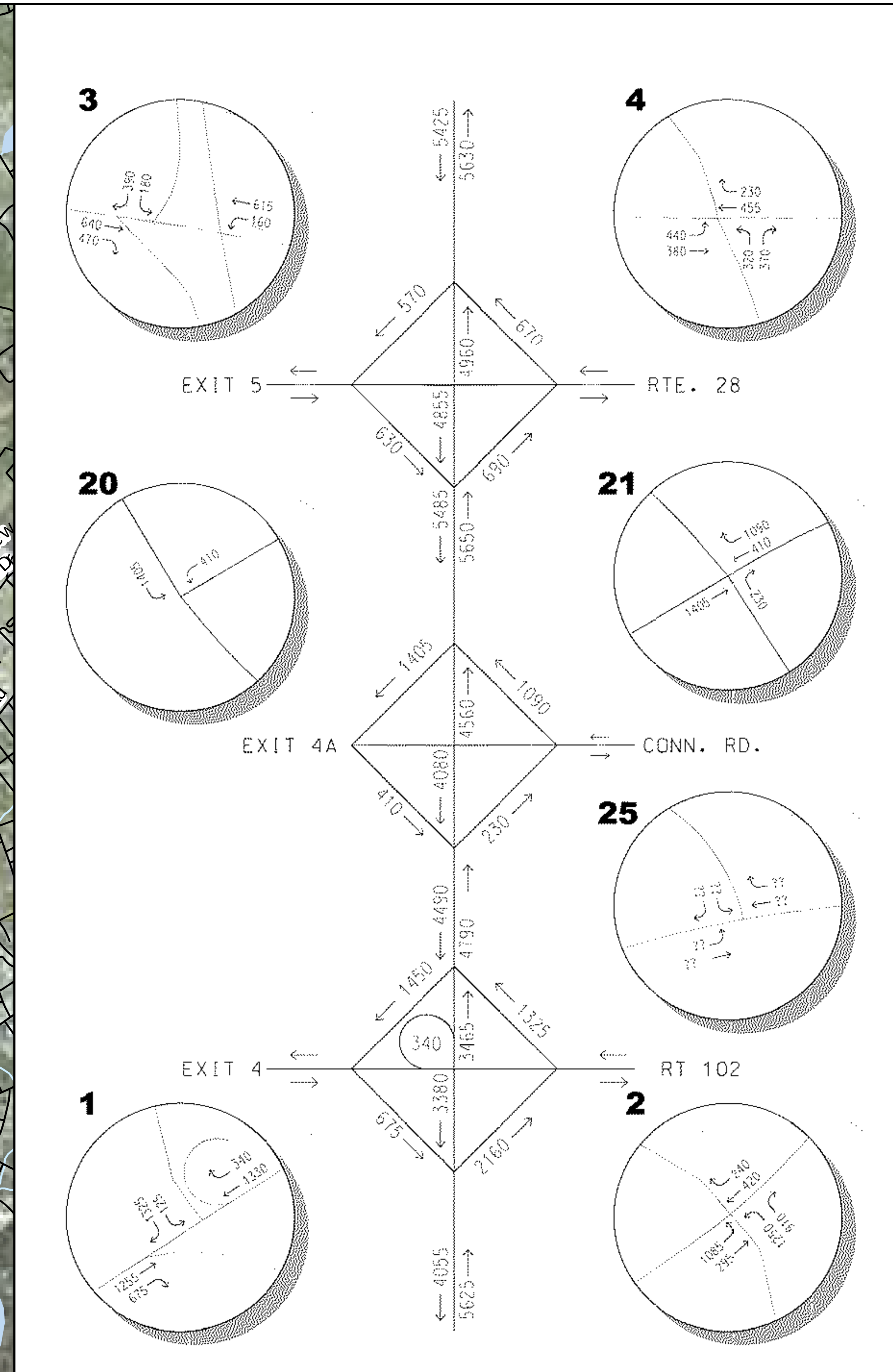
Department of Transportation

Figure 21 - 2040 Alternative C AM Peak Hour Base Volumes – Locations 1-4, 20-21, and 25





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2040 ALT C PM PEAK HOUR BASE VOLUMES

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1. Exit 4 SB Ramps
2. Exit 4 NB Ramps
3. Exit 5 SB Ramps
4. Exit 5 NB Ramps
20. Exit 4A SB Ramps
21. Exit 4A NB Ramps
25. NH 28/ C-D Connector

Feet
0 1,000 2,000

Sources:

Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

Date:
January 24, 2018

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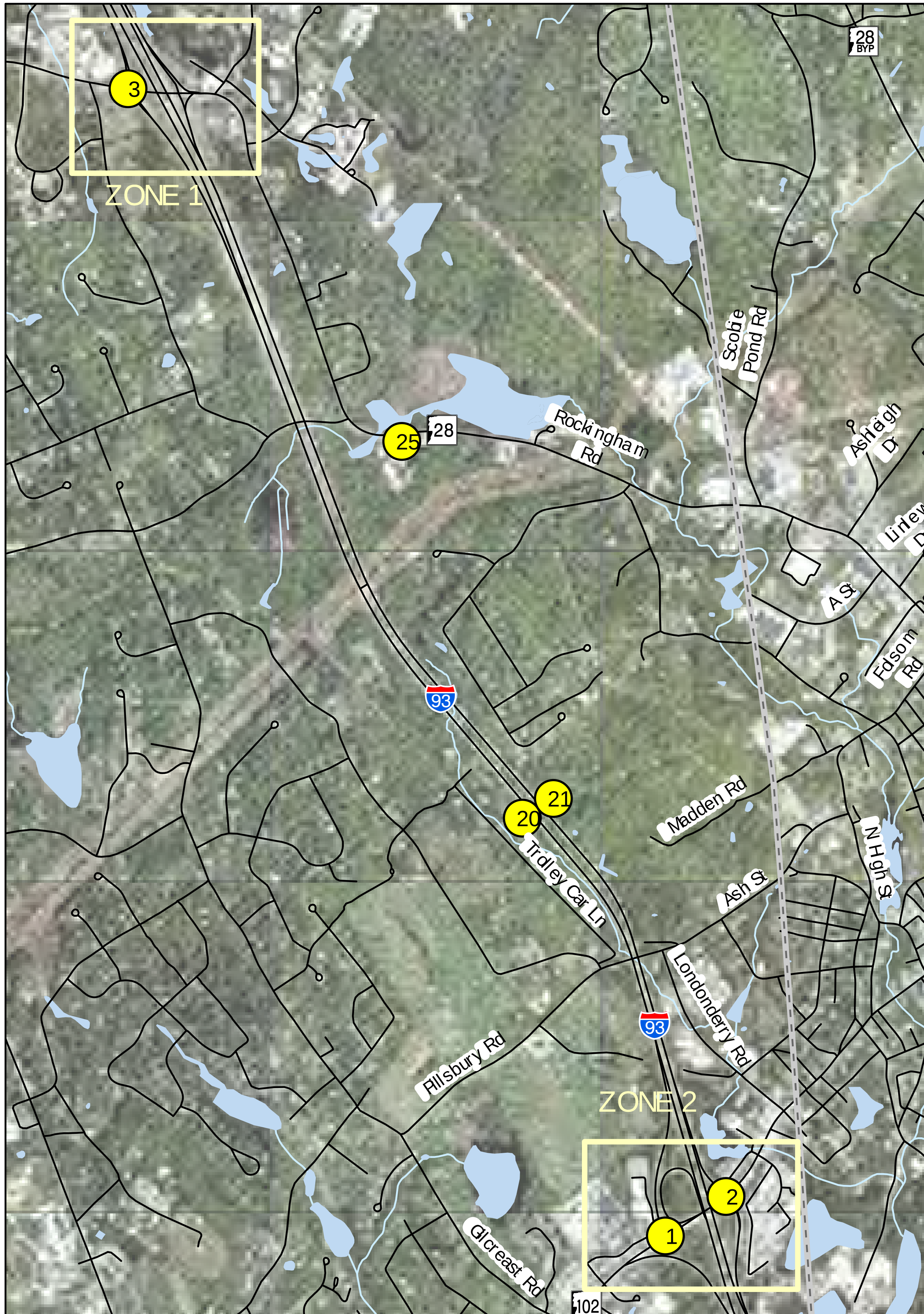
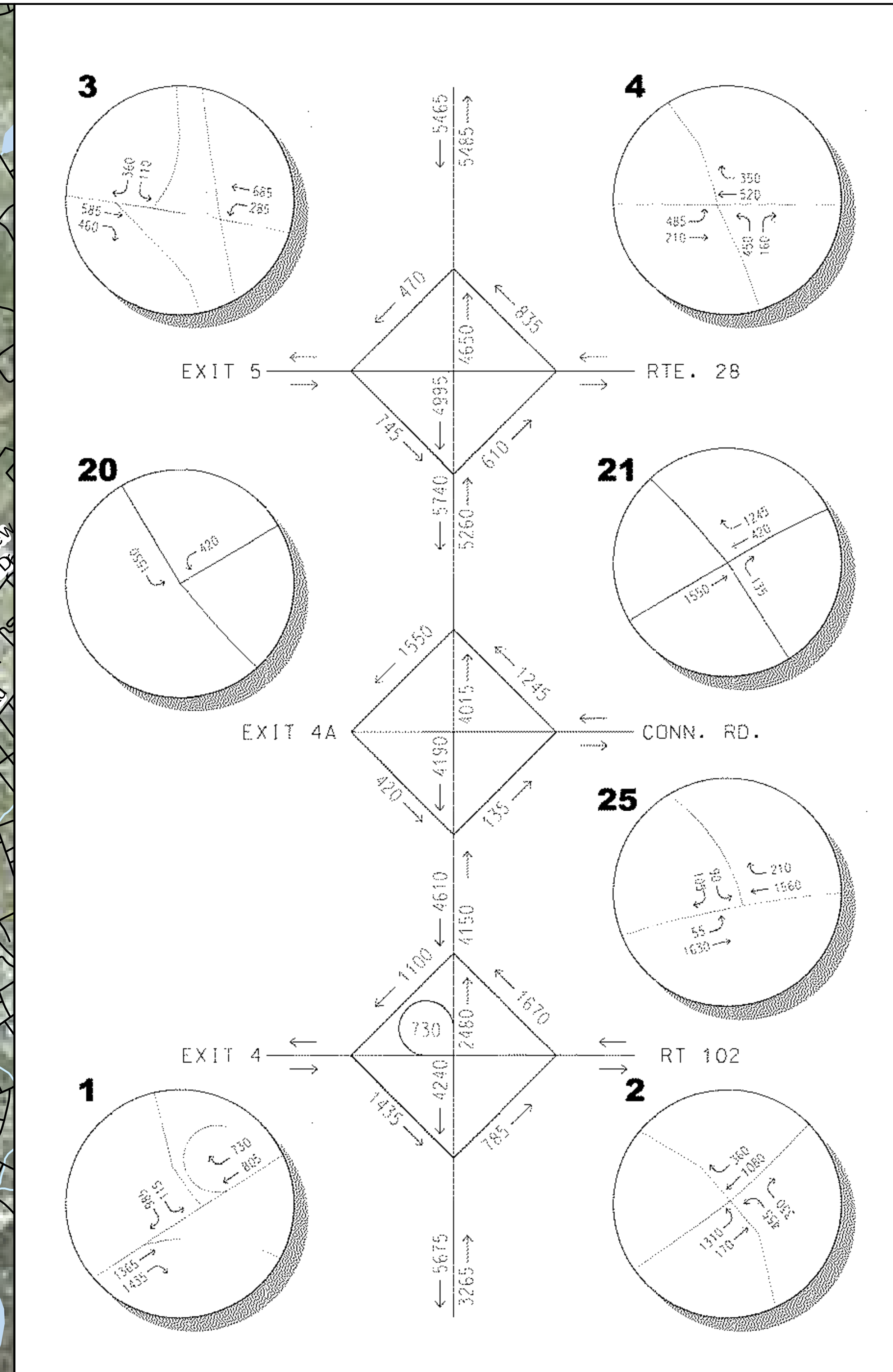
Department of Transportation

Figure 22 - 2040 Alternative C PM Peak Hour Base Volumes – Locations 1-4, 20-21, and 25





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2040 ALT D AM PEAK HOUR BASE VOLUMES

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1. Exit 4 SB Ramps
2. Exit 4 NB Ramps
3. Exit 5 SB Ramps
4. Exit 5 NB Ramps
20. Exit 4A SB Ramps
21. Exit 4A NB Ramps
25. NH 28/ C-D Connector

Feet
0 1,000 2,000

Sources:

Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

Date:
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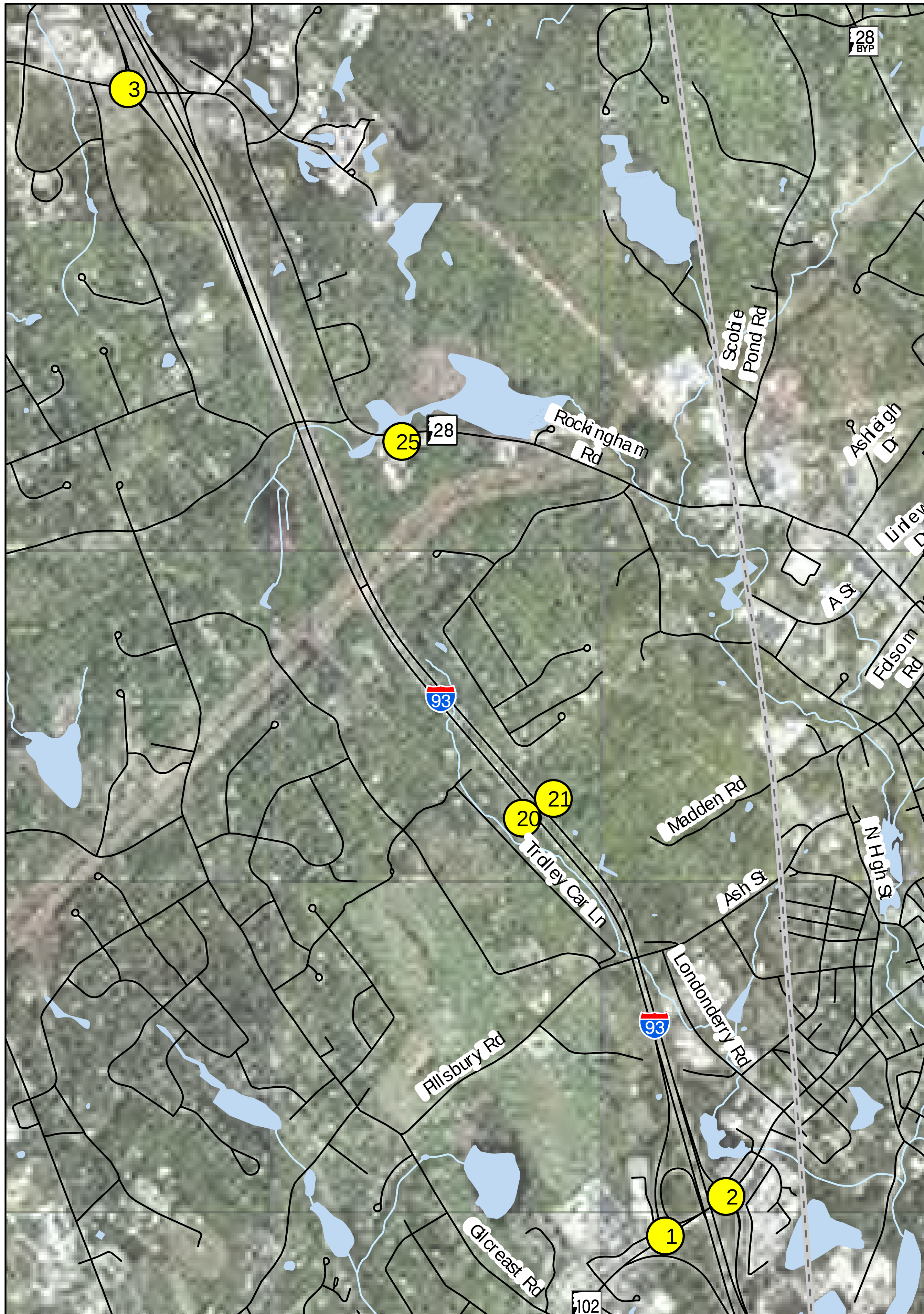
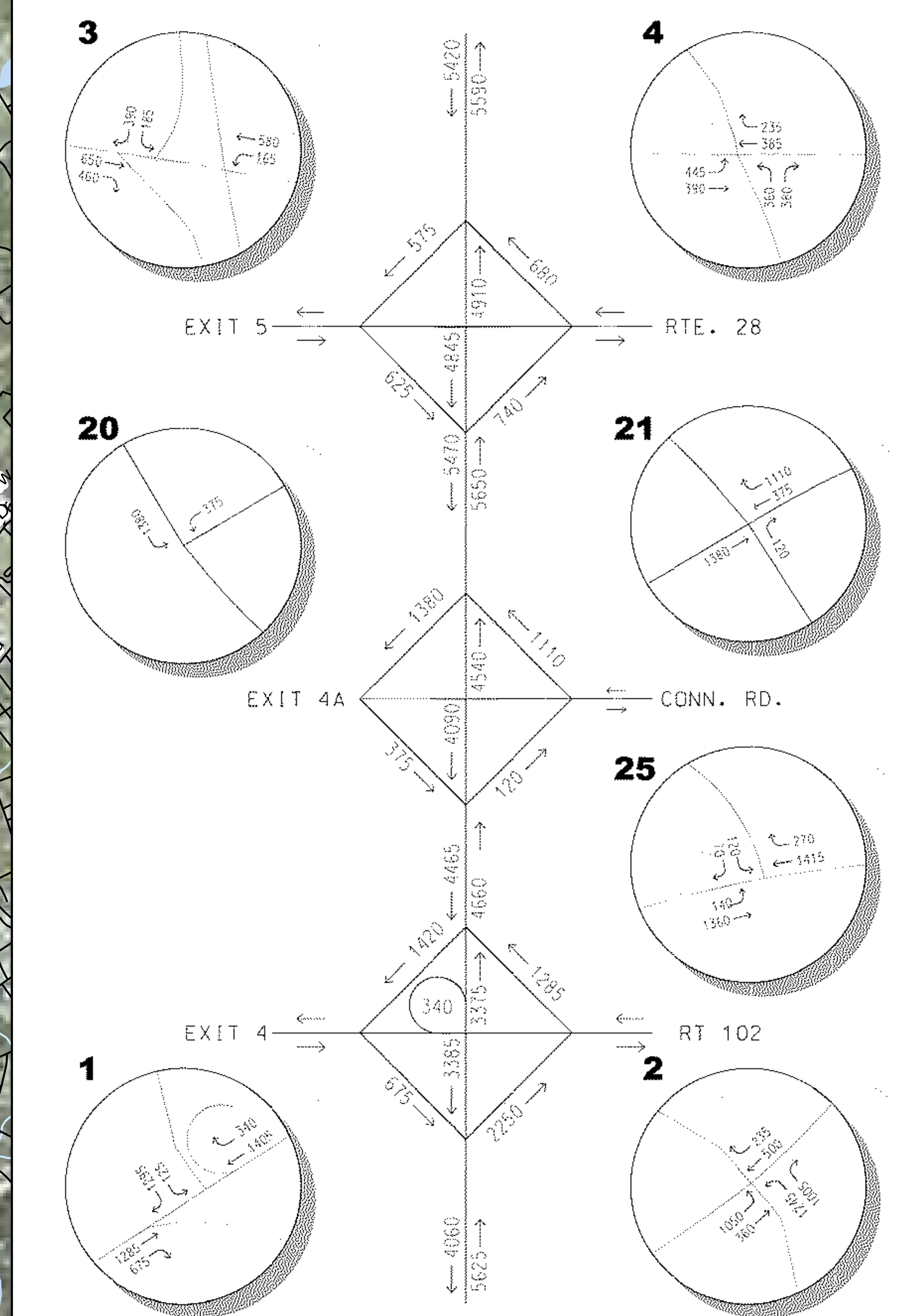
Department of Transportation

Figure 23 - 2040 Alternative D AM Peak Hour Base Volumes – Locations 1-4, 20-21, and 25





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1. Exit 4 SB Ramps
2. Exit 4 NB Ramps
3. Exit 5 SB Ramps
4. Exit 5 NB Ramps
20. Exit 4A SB Ramps
21. Exit 4A NB Ramps
25. NH 28/ C-D Connector

Feet
0 1,000 2,000

Sources:

Coordinate System NAD 1983 StatePlane New Hampshire (feet)	Date: January 24, 2018

New Hampshire DOT Department of Transportation

Figure 24 - 2040 Alternative D PM Peak Hour Base Volumes – Locations 1-4, 20-21, and 25

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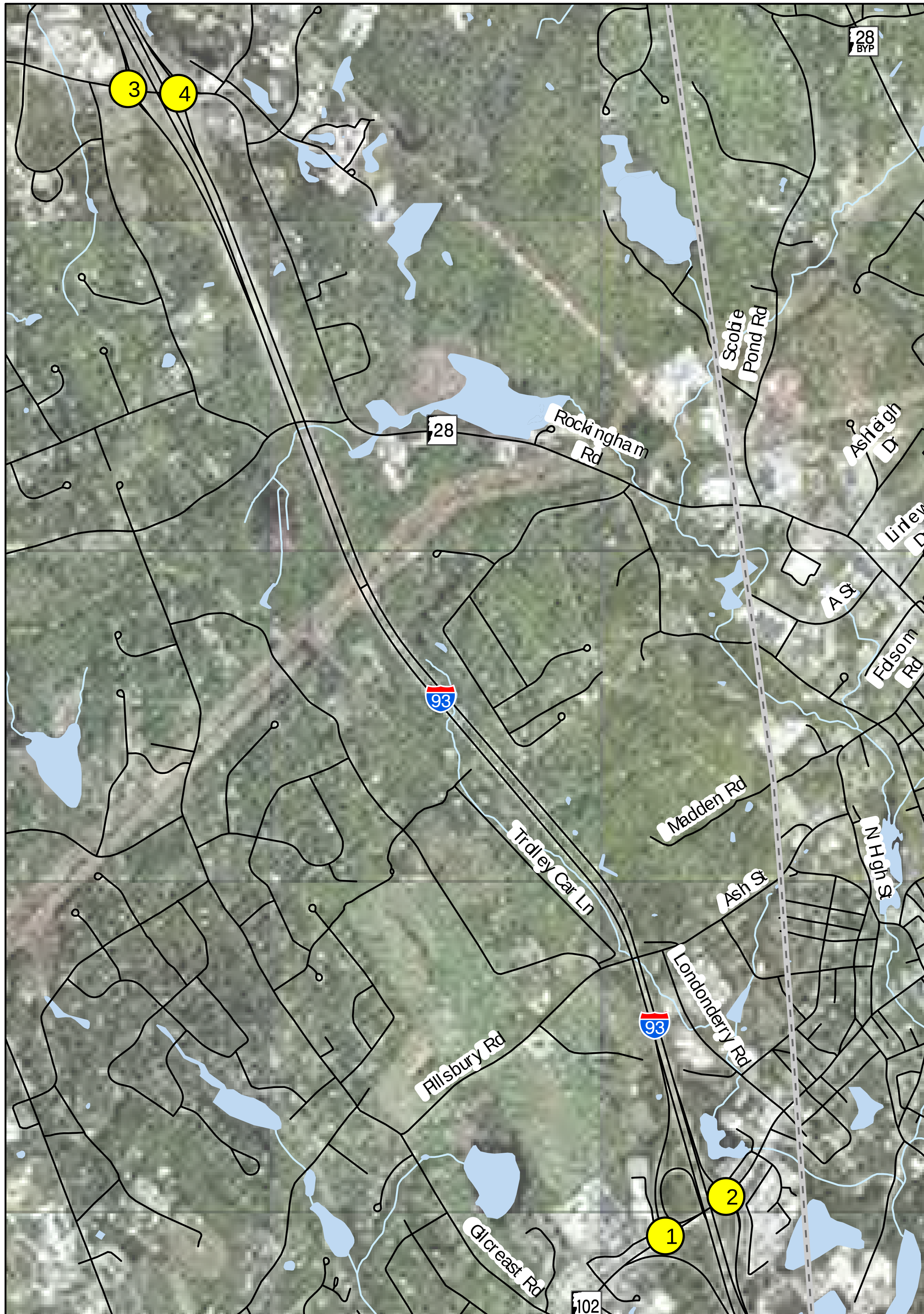
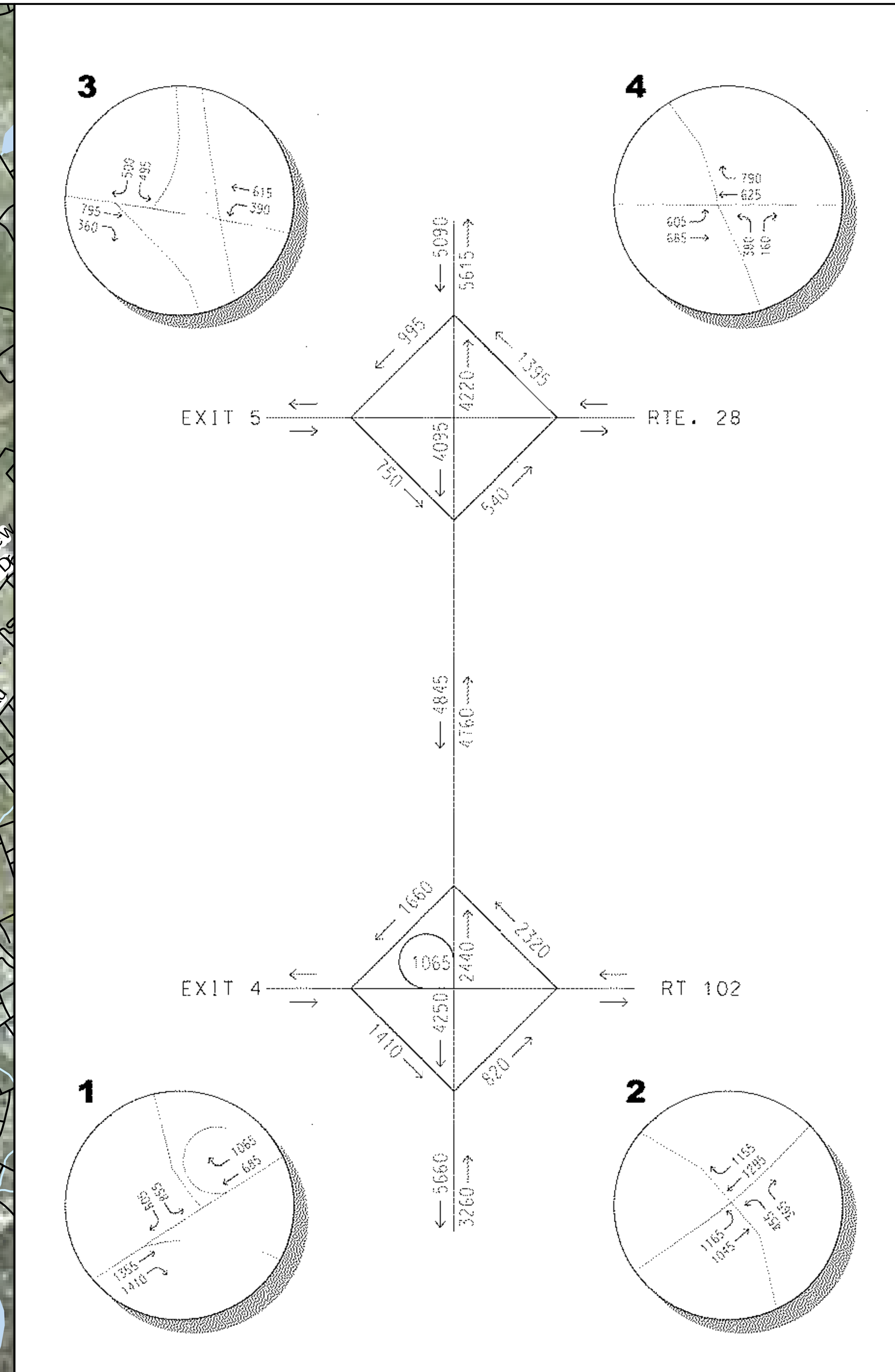
2040 ALT F AM PEAK HOUR BASE VOLUMES





INDEX

1. Exit 4 SB Ramps
2. Exit 4 NB Ramps
3. Exit 5 SB Ramps
4. Exit 5 NB Ramps

Feet
0 1,000 2,000

Sources:

Coordinate System NAD 1983 StatePlane New Hampshire (feet)	Date: January 24, 2018

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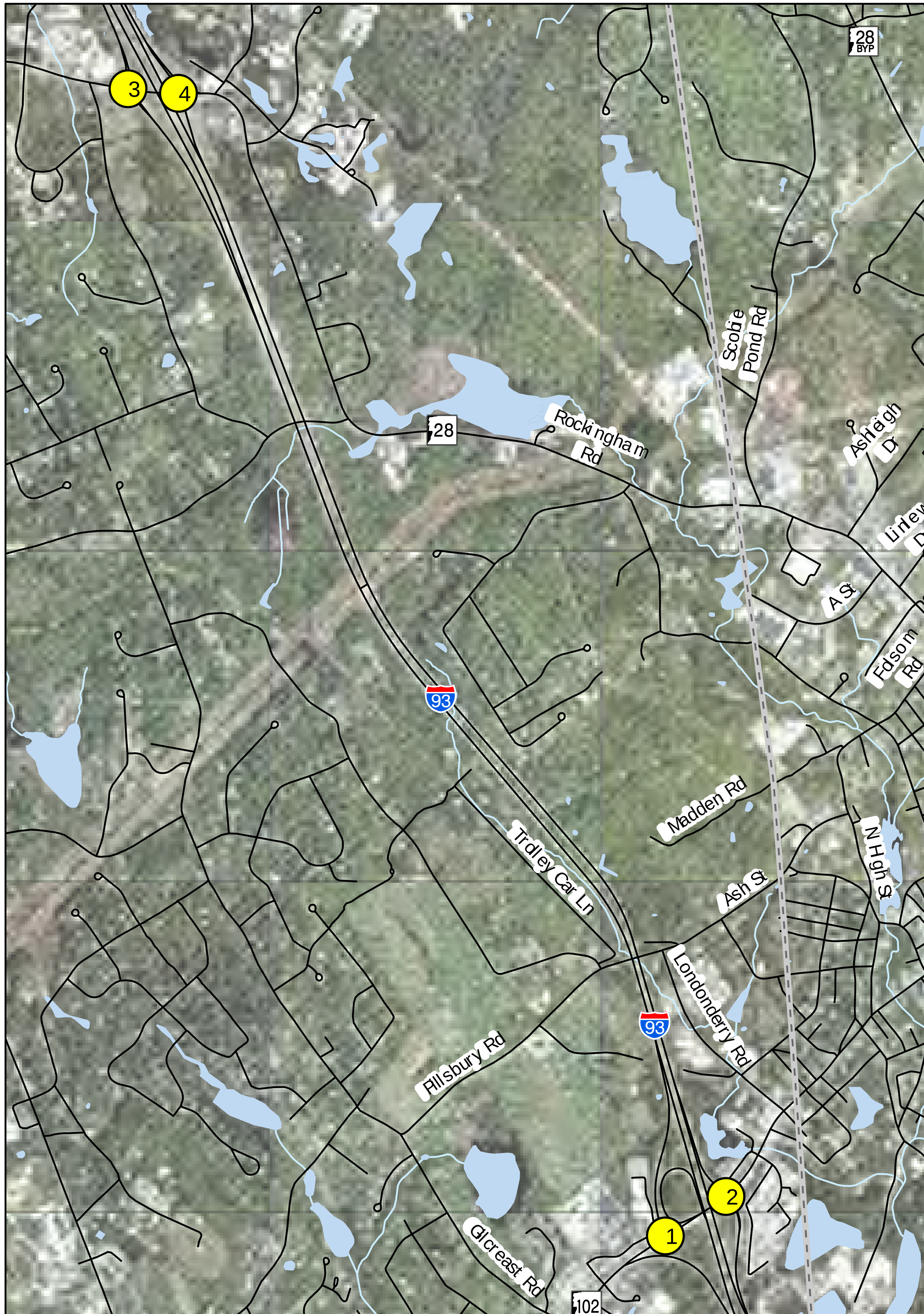
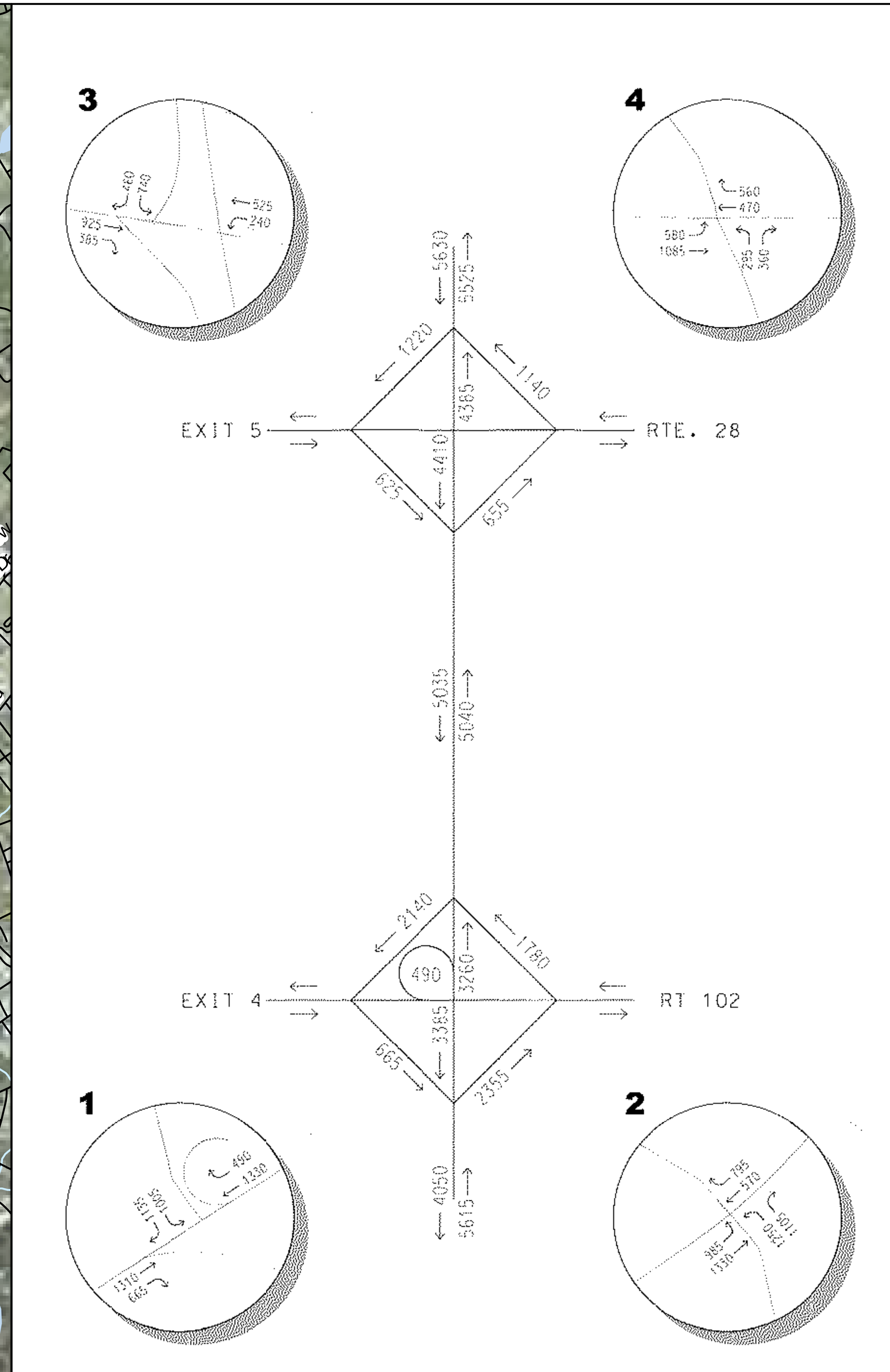
Department of Transportation

Figure 25 - 2040 Alternative F AM Peak Hour Base Volumes – Locations 1-4





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1. Exit 4 SB Ramps
2. Exit 4 NB Ramps
3. Exit 5 SB Ramps
4. Exit 5 NB Ramps

Feet
0 1,000 2,000

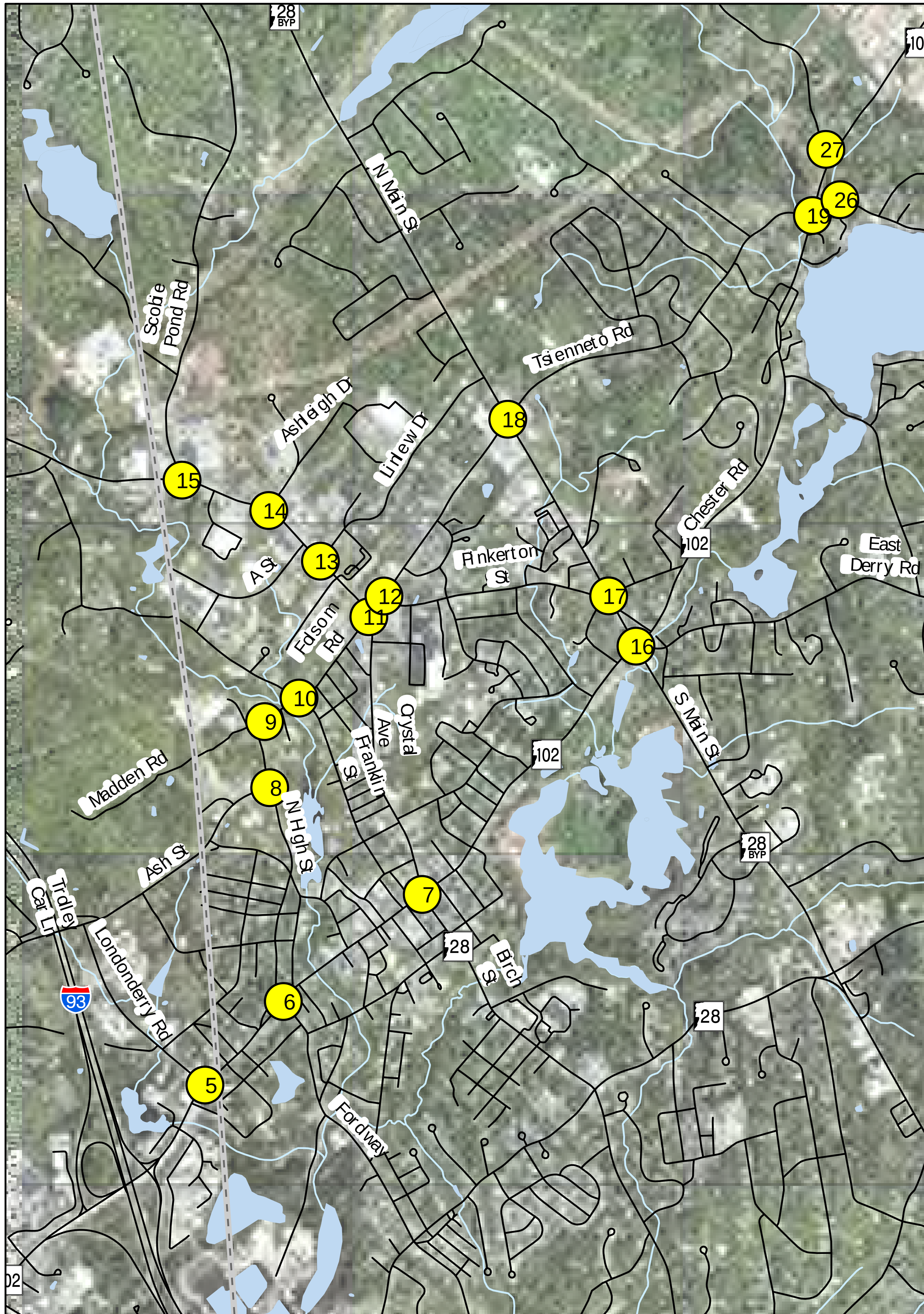
Sources:

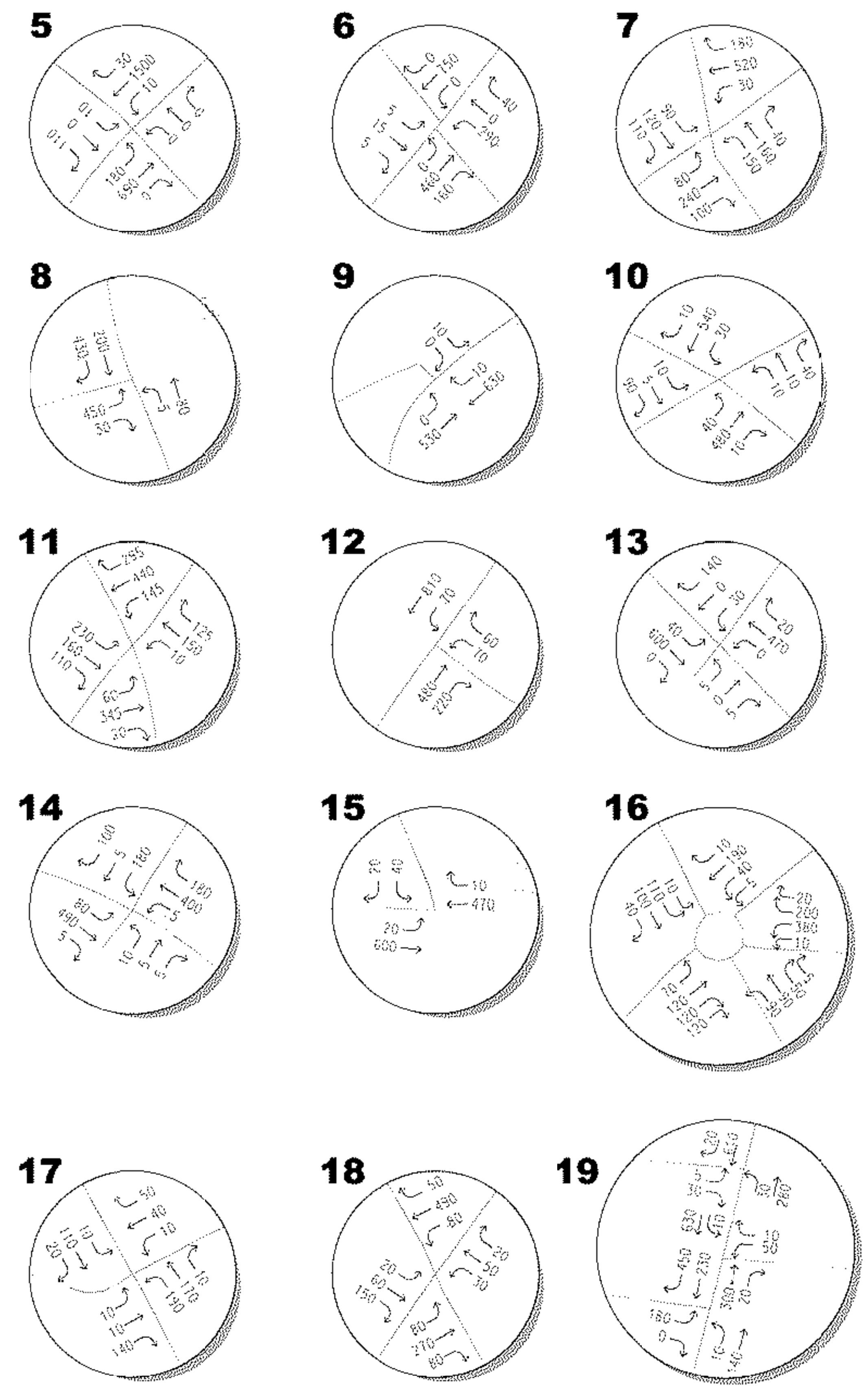
Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

Date:
January 24, 2018

New Hampshire DOT
Department of Transportation

Figure 26 - 2040 Alternative F PM Peak Hour Base Volumes – Locations 1-4





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2040 NO-BUILD AM PEAK HOUR BASE VOLUMES

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5. NH 102/ Londonderry Road
6. NH 102/ Fordway/ High St.
7. NH 102/ NH 28
8. N High St./ Ash St. Extension
9. N High St./ Madden Rd.
10. N High St./ Folsom Rd/ Franklin St.
11. NH 28/ Folsom Rd./ Tsienneto Rd.
12. Tsienneto Rd./ Pinkerton St.
13. NH 28/ Linlew Dr.
14. NH28/ Ashleigh Dr.
15. NH 28/ Scobie Pond Rd.
16. NH 102/ NH 28 Bypass/ E. Derry Rd.
17. NH 28 Bypass/ Pinkerton St.
18. NH 28 Bypass/ Tsienneto Rd.
19. NH 102/ Tsienneto Rd.
26. NH 102/ North Shore Rd.
27. NH 102/ English Range Rd.

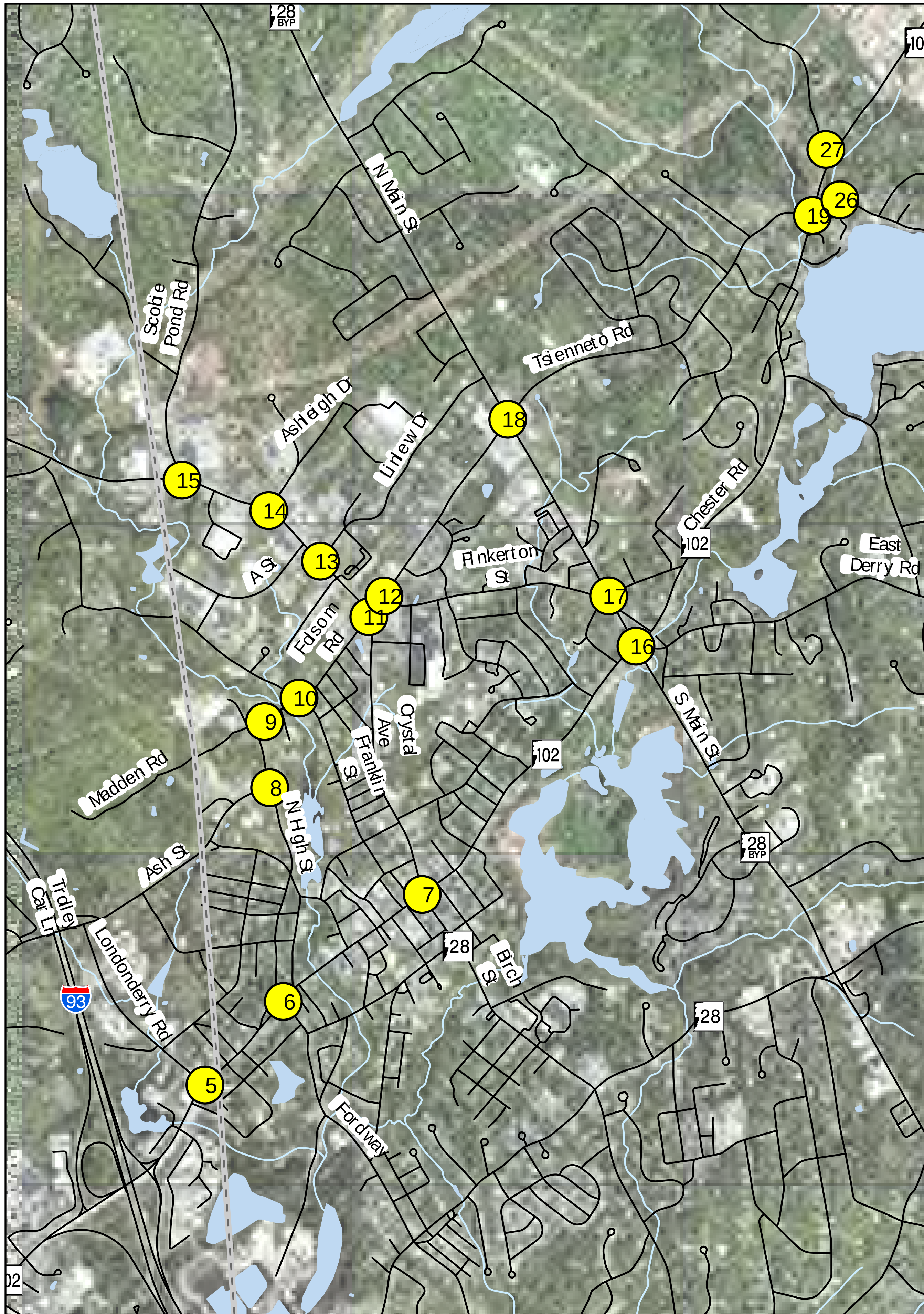
Feet
0 1,000 2,000

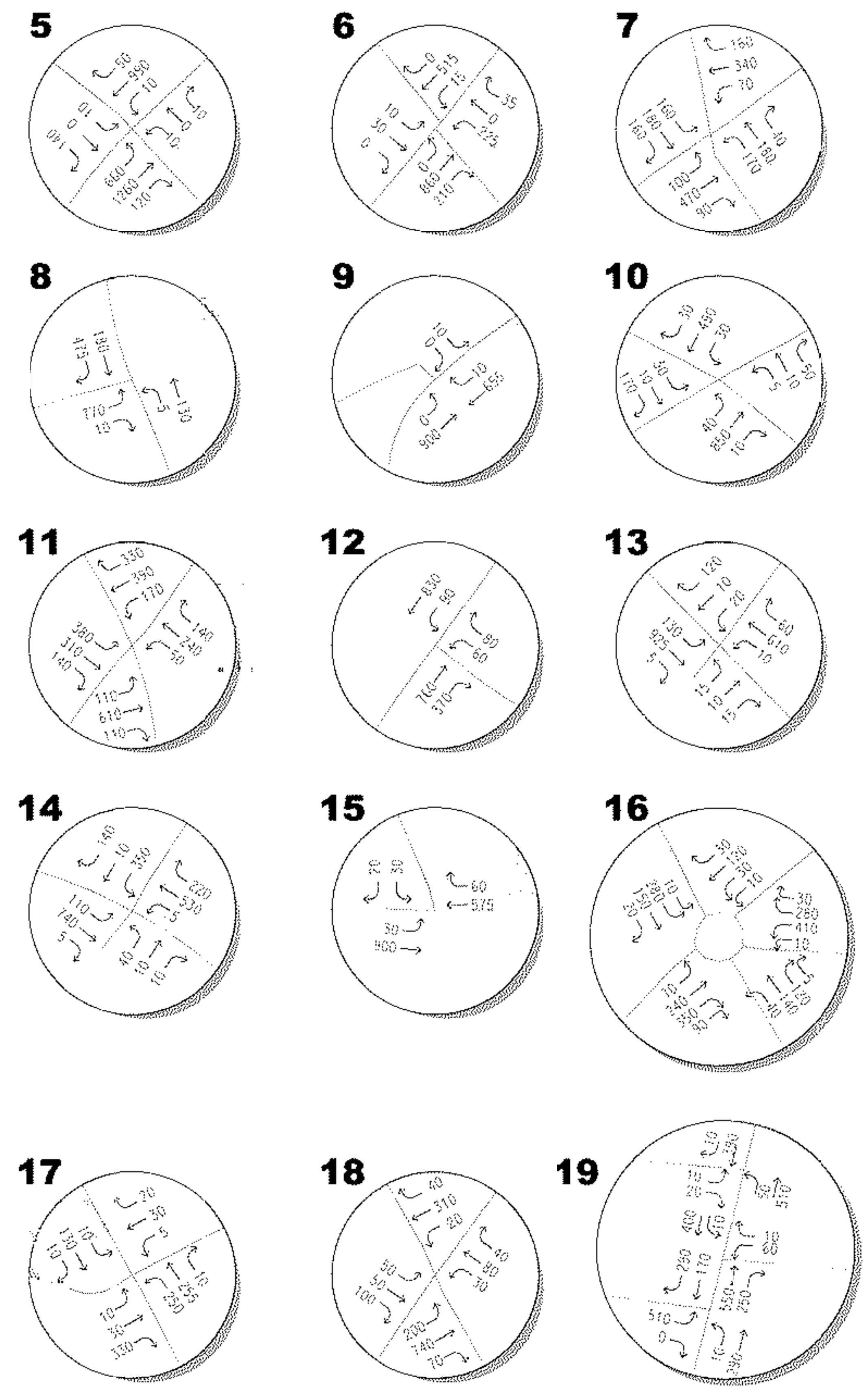
Sources:

Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

Date:
January 24, 2018

Figure 27 - 2040 No-Build AM Peak Hour Base Volumes – Locations 5-19 and 26-27





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2040 NO-BUILD PM PEAK HOUR BASE VOLUMES

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5. NH 102/ Londonderry Road
6. NH 102/ Fordway/ High St.
7. NH 102/ NH 28
8. N High St./ Ash St. Extension
9. N High St./ Madden Rd.
10. N High St./ Folsom Rd./ Franklin St.
11. NH 28/ Folsom Rd./ Tsienneto Rd.
12. Tsienneto Rd./ Pinkerton St.
13. NH 28/ Linlew Dr.
14. NH28/ Ashleigh Dr.
15. NH 28/ Scobie Pond Rd.
16. NH 102/ NH 28 Bypass/ E. Derry Rd.
17. NH 28 Bypass/ Pinkerton St.
18. NH 28 Bypass/ Tsienneto Rd.
19. NH 102/ Tsienneto Rd.
26. NH 102/ North Shore Rd.
27. NH 102/ English Range Rd.

Feet
0 1,000 2,000

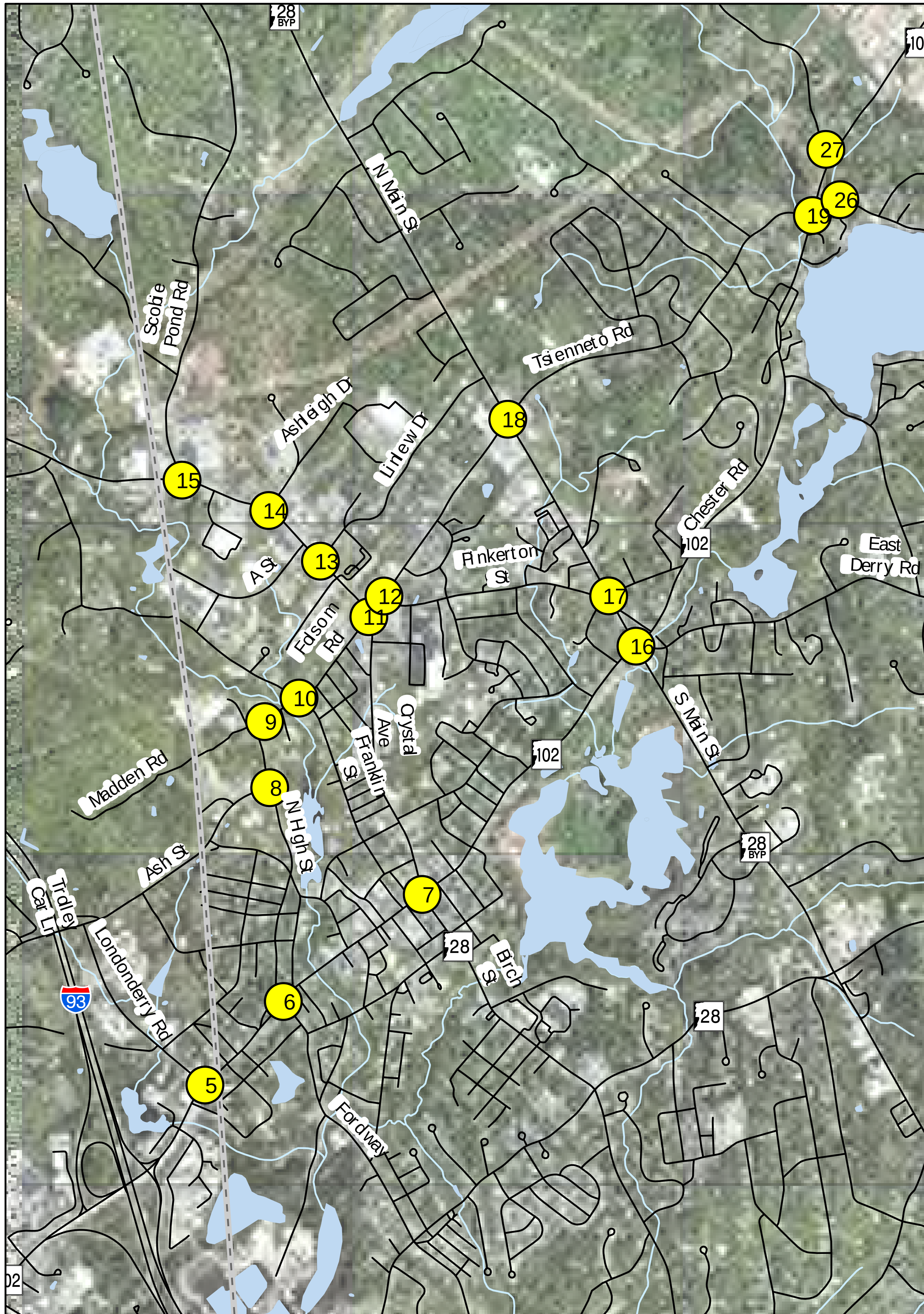
Sources:

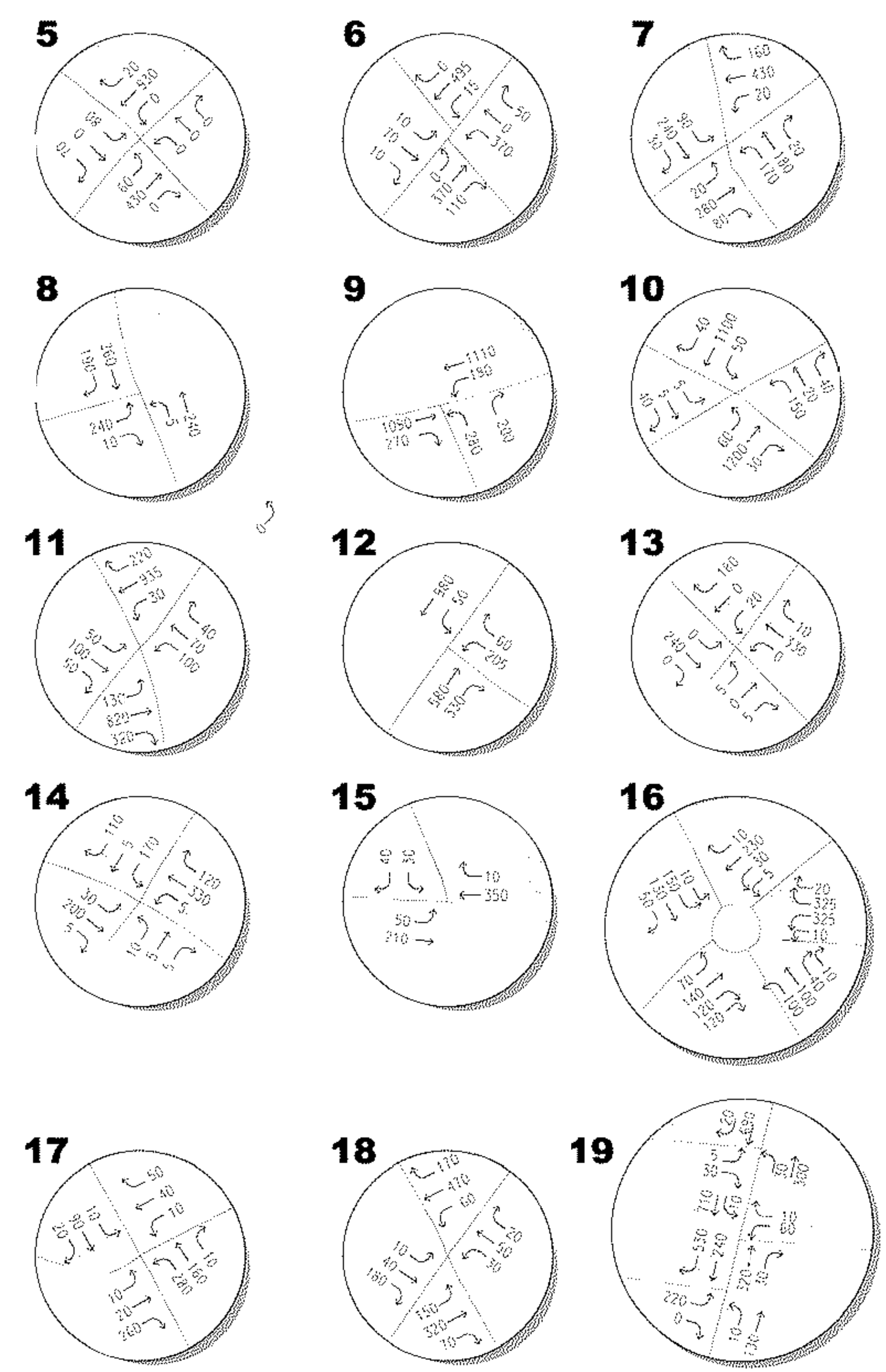
Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

Date:
January 24, 2018

New Hampshire DOT Department of Transportation

Figure 28 - 2040 No-Build PM Peak Hour Base Volumes – Locations 5-19 and 26-27





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2040 ALT A AM PEAK HOUR BASE VOLUMES

INDEX

5. NH 102/ Londonderry Road
6. NH 102/ Fordway/ High St.
7. NH 102/ NH 28
8. N High St./ Ash St. Extension
9. N High St./ Madden Rd.
10. N High St./ Folsom Rd./ Franklin St.
11. NH 28/ Folsom Rd./ Tsienneto Rd.
12. Tsienneto Rd./ Pinkerton St.
13. NH 28/ Linlew Dr.
14. NH28/ Ashleigh Dr.
15. NH 28/ Scobie Pond Rd.
16. NH 102/ NH 28 Bypass/ E. Derry Rd.
17. NH 28 Bypass/ Pinkerton St.
18. NH 28 Bypass/ Tsienneto Rd.
19. NH 102/ Tsienneto Rd.
26. NH 102/ North Shore Rd.
27. NH 102/ English Range Rd.

Feet
0 1,000 2,000

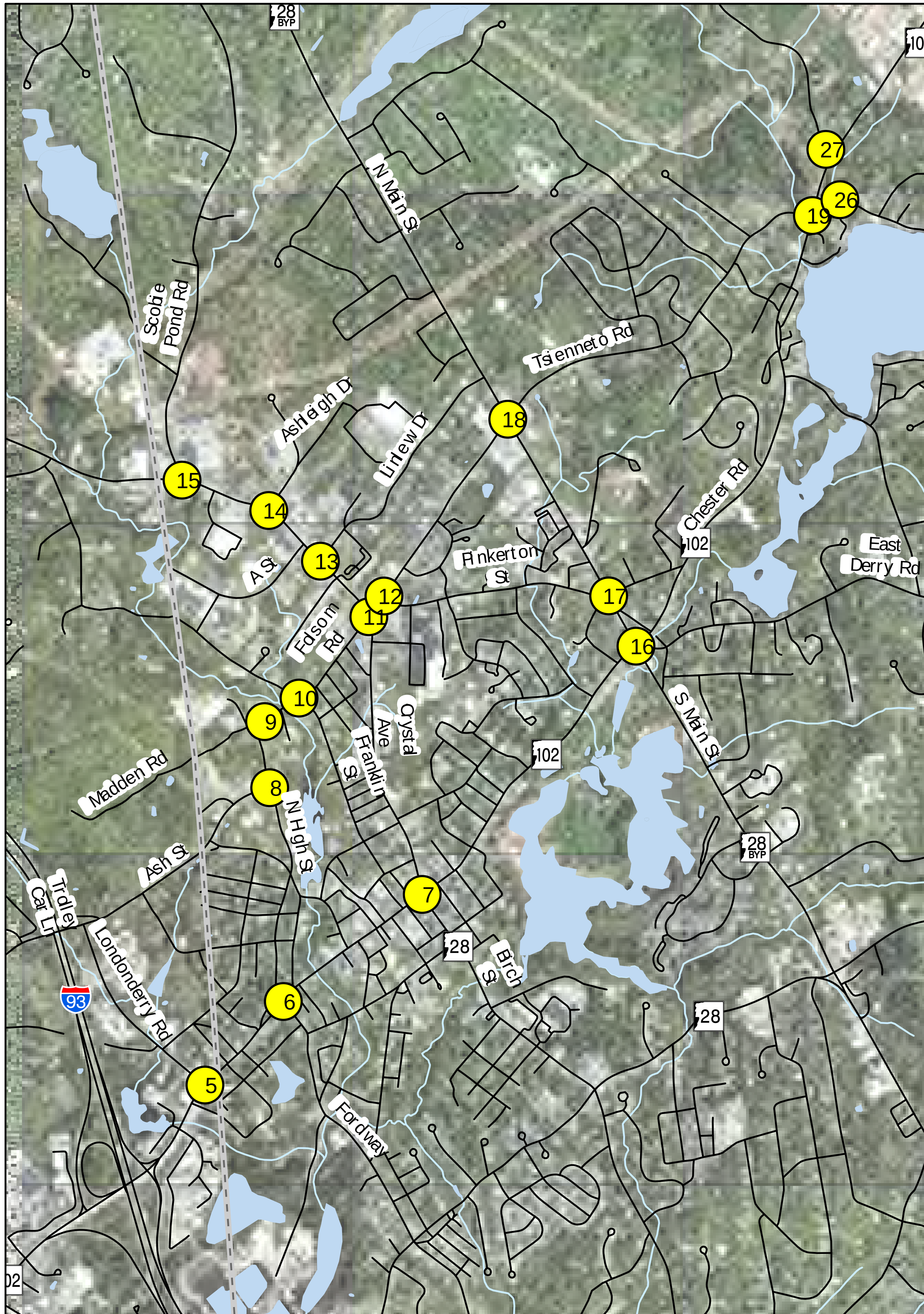
Sources:

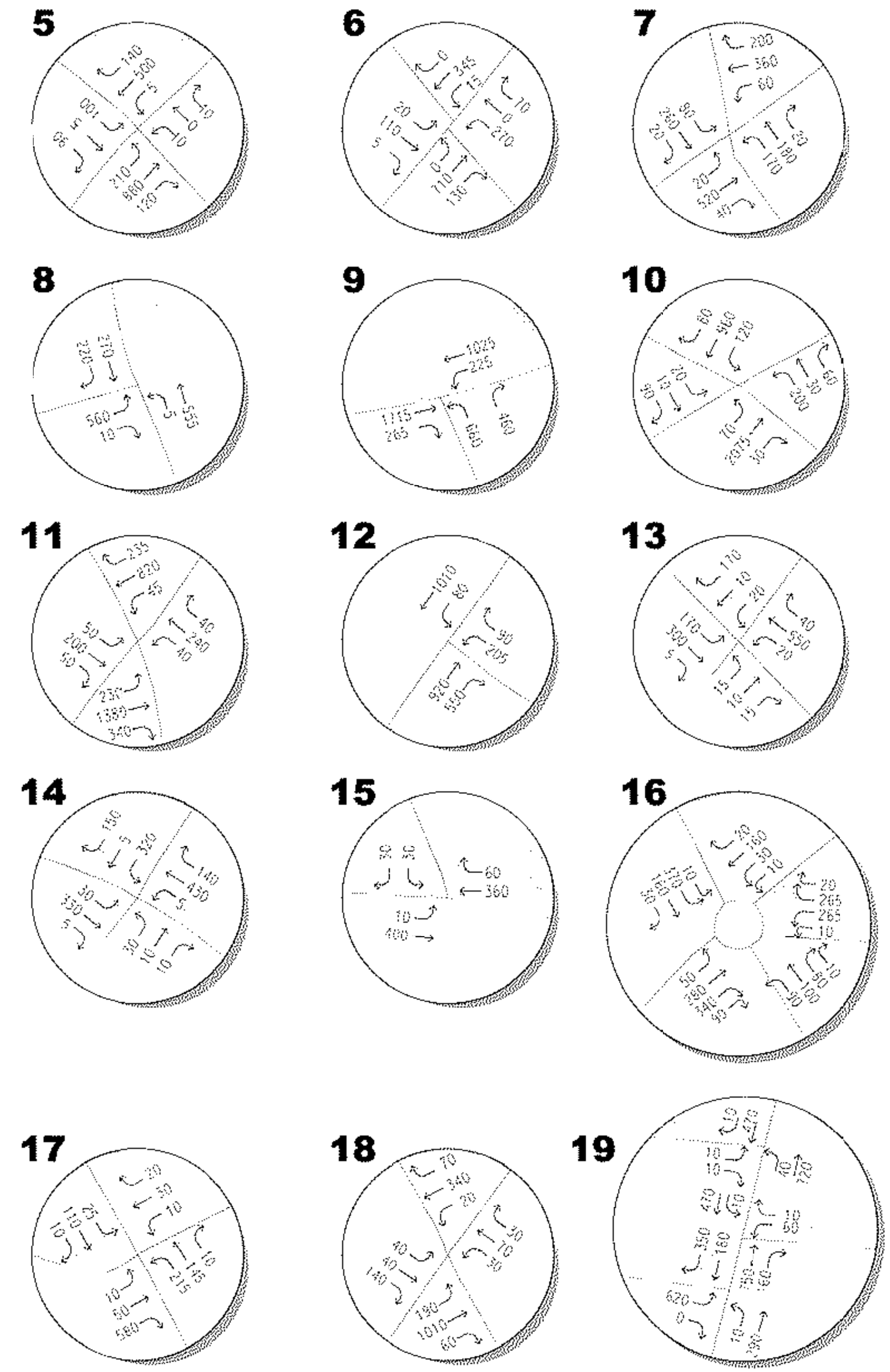
Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

Date:
January 24, 2018

New Hampshire DOT
Department of Transportation

Figure 29 - 2040 Alternative A AM Peak Hour Base Volumes – Locations 5-19 and 26-27





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2040 ALT A PM PEAK HOUR BASE VOLUMES

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5. NH 102/ Londonderry Road
6. NH 102/ Fordway/ High St.
7. NH 102/ NH 28
8. N High St./ Ash St. Extension
9. N High St./ Madden Rd.
10. N High St./ Folsom Rd./ Franklin St.
11. NH 28/ Folsom Rd./ Tsienneto Rd.
12. Tsienneto Rd./ Pinkerton St.
13. NH 28/ Linlew Dr.
14. NH28/ Ashleigh Dr.
15. NH 28/ Scobie Pond Rd.
16. NH 102/ NH 28 Bypass/ E. Derry Rd.
17. NH 28 Bypass/ Pinkerton St.
18. NH 28 Bypass/ Tsienneto Rd.
19. NH 102/ Tsienneto Rd.
26. NH 102/ North Shore Rd.
27. NH 102/ English Range Rd.

Feet
0 1,000 2,000

Sources:

N

Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

Date:
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Figure 30 - 2040 Alternative A PM Peak Hour Base Volumes – Locations 5-19 and 26-27

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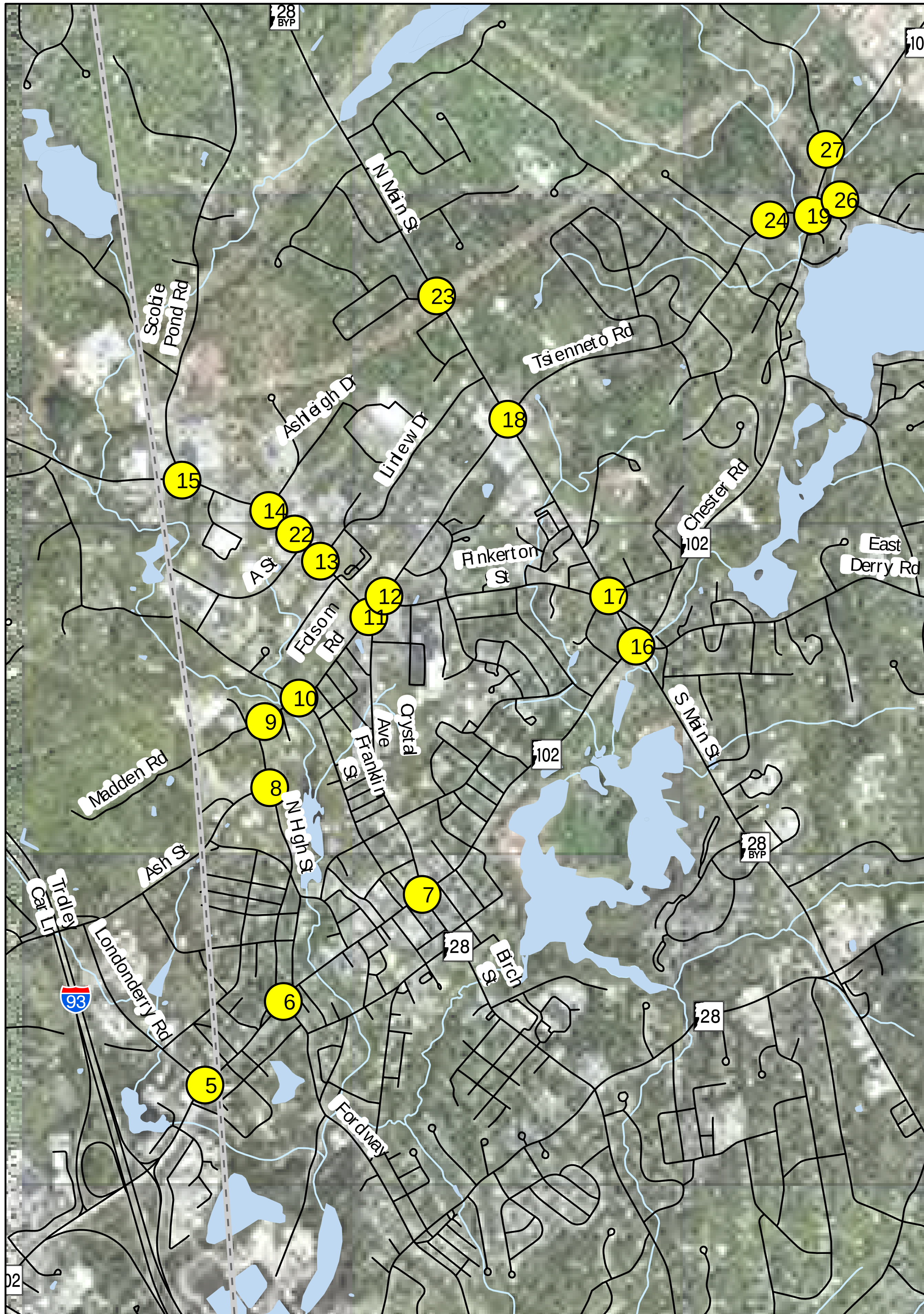
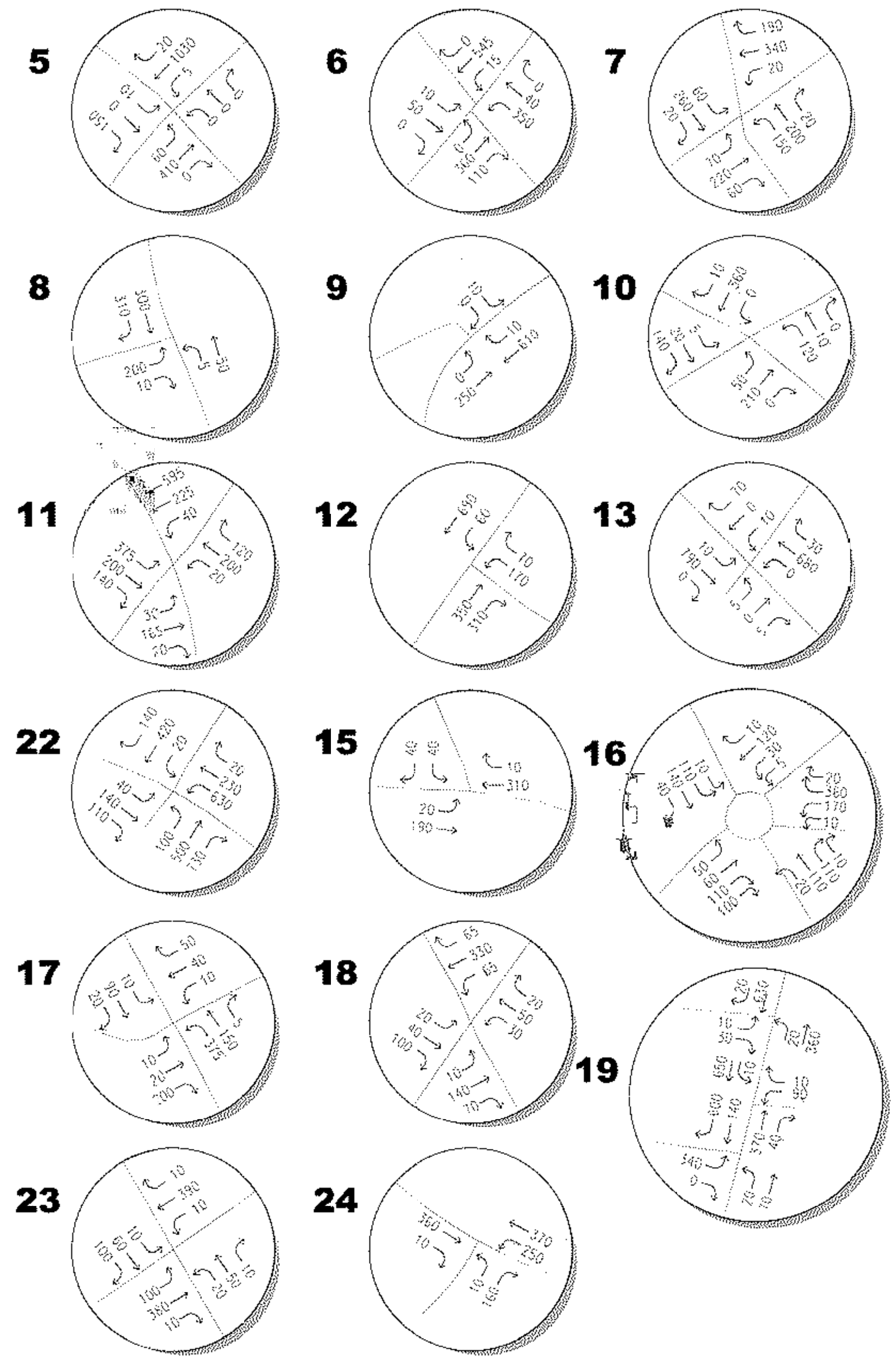
2040 ALT B AM PEAK HOUR BASE VOLUMES





INDEX

Feet
0 1,000 2,000

Sources:

Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

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Figure 31 - 2040 Alternative B AM Peak Hour Base Volumes – Locations 5-19, 22-24, and 26-27

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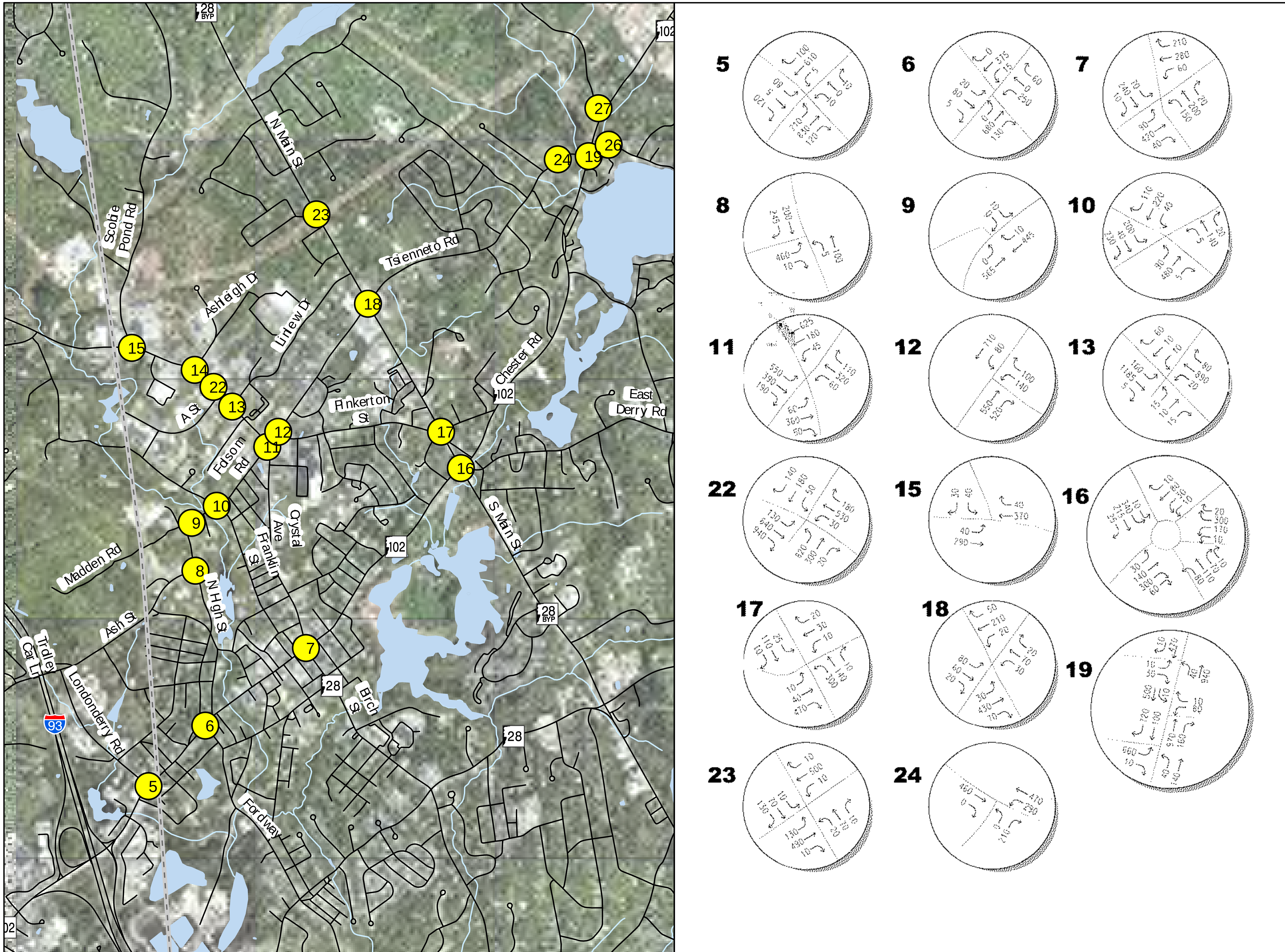

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5. NH 102/ Londonderry Road
6. NH 102/ Fordway/ High St.
7. NH 102/ NH 28
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9. N High St./ Madden Rd.
10. N High St./ Folsom Rd./ Franklin St
11. NH 28/ Folsom Rd./ Tsienneto Rd.
12. Tsienneto Rd./ Pinkerton St.
13. NH 28/ Linlew Dr.
14. NH 28/ Ashleigh Dr.
15. NH 28/ Scobie Pond Rd.
16. NH 102/ NH 28 Bypass/ E. Derry Rd.
17. NH 28 Bypass/ Pinkerton St.
18. NH 28 Bypass/ Tsienneto Rd.
19. NH 102/ Tsienneto Rd.
22. NH 28/ B-C Connector
23. NH 28 Bypass/ B-C Connector
24. Tsienneto Rd/ B-C Connector
26. NH 102/ North Shore Rd
27. NH 102/ English Range Rd

Feet
0 1,000 2,000

Sources:

Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

Date:
January 24, 2018

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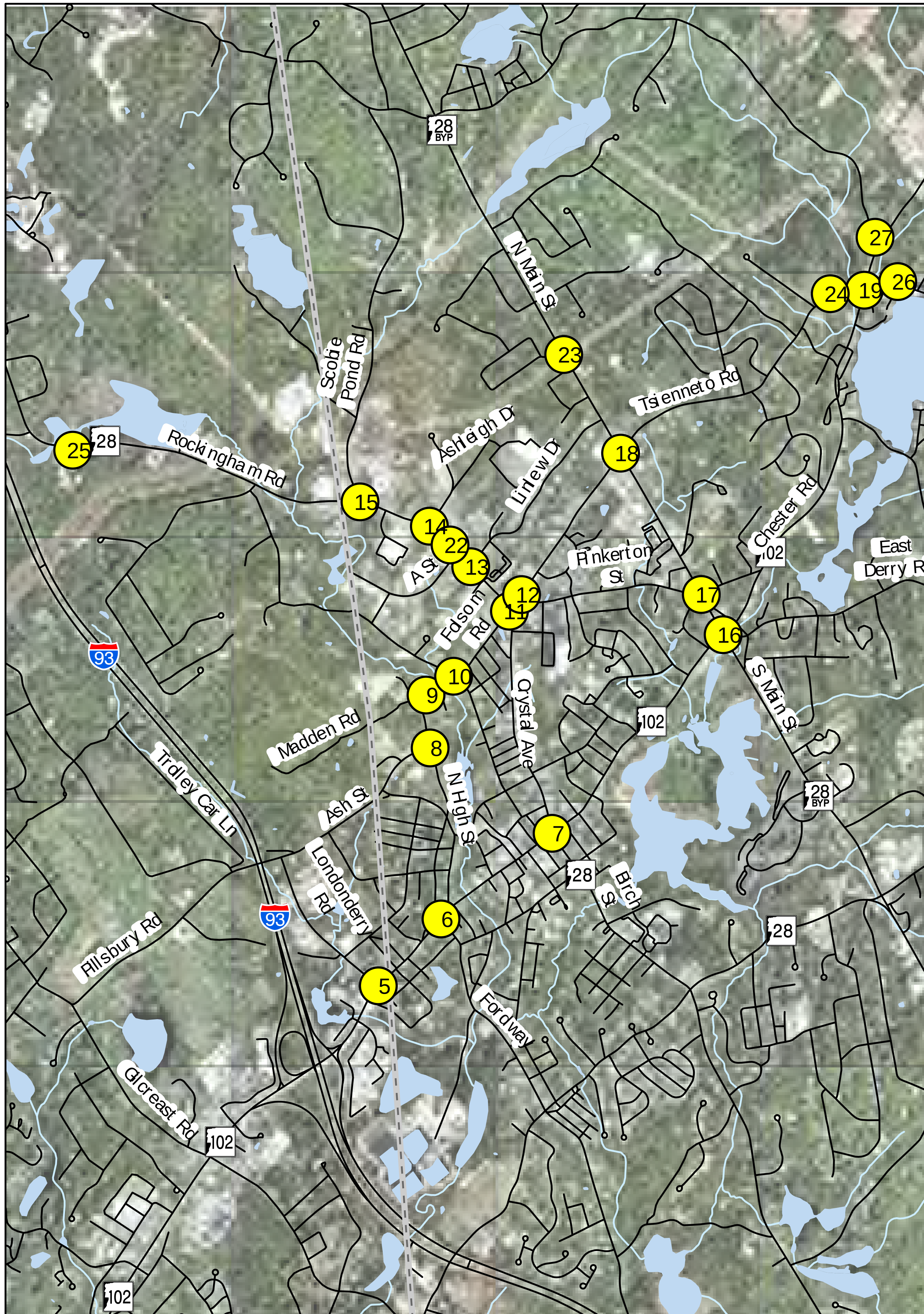
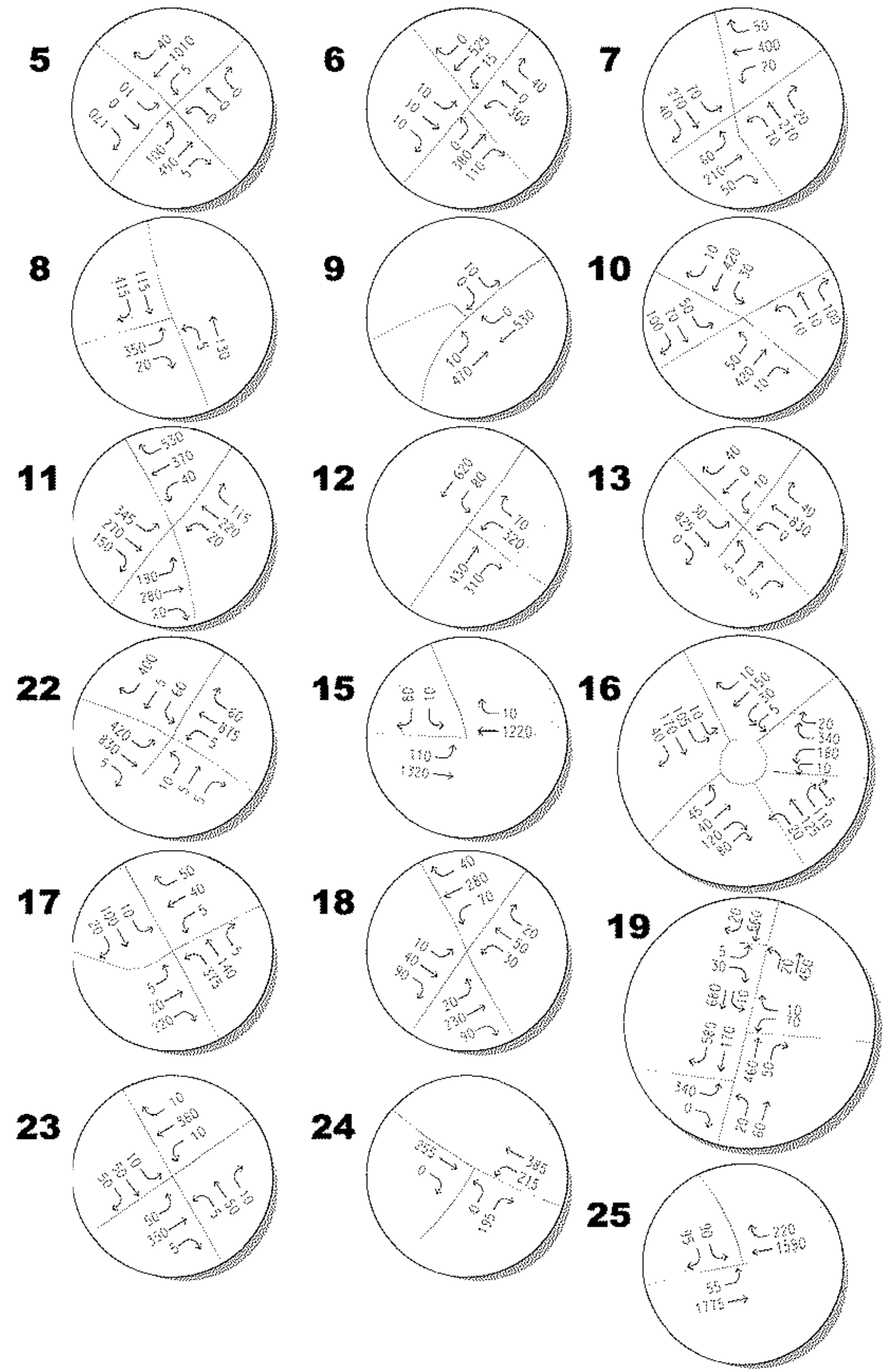
Figure 32 - 2040 Alternative B PM Peak Hour Base Volumes – Locations 5-19, 22-24, and 26-27





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2040 ALT C AM PEAK HOUR BASE VOLUMES

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5. NH 102/ Londonderry Road
6. NH 102/ Fordway/ High St.
7. NH 102/ NH 28
8. N. High St./ Ash St. Extension
9. N. High St./ Madden Rd.
10. N. High St./ Folsom Rd./ Franklin St.
11. NH 28/ Folsom Rd./ Tsienneto Rd.
12. Tsienneto Rd./ Pinkerton St.
13. NH 28/ Linlew Dr.
14. NH 28/ Ashleigh Dr.
15. NH 28/ Scobie Pond Rd.
16. NH 102/ NH 28 Bypass/ E. Derry Rd.
17. NH 28 Bypass/ Pinkerton St.
18. NH 28 Bypass/ Tsienneto Rd.
19. NH 102/ Tsienneto Rd.
22. NH 28/ B-C Connector
23. NH 28 Bypass/ B-C Connector
24. Tsiennetto Rd/ B-C Connector
25. NH 28/ C-D Connector
26. NH 102/ North Shore Rd.
27. NH 102/ English Range Rd.

Feet
0 1,000 2,000

Sources:

Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

Date:
January 24, 2018

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Figure 33 - 2040 Alternative C AM Peak Hour Base Volumes – Locations 5-19 and 22-27

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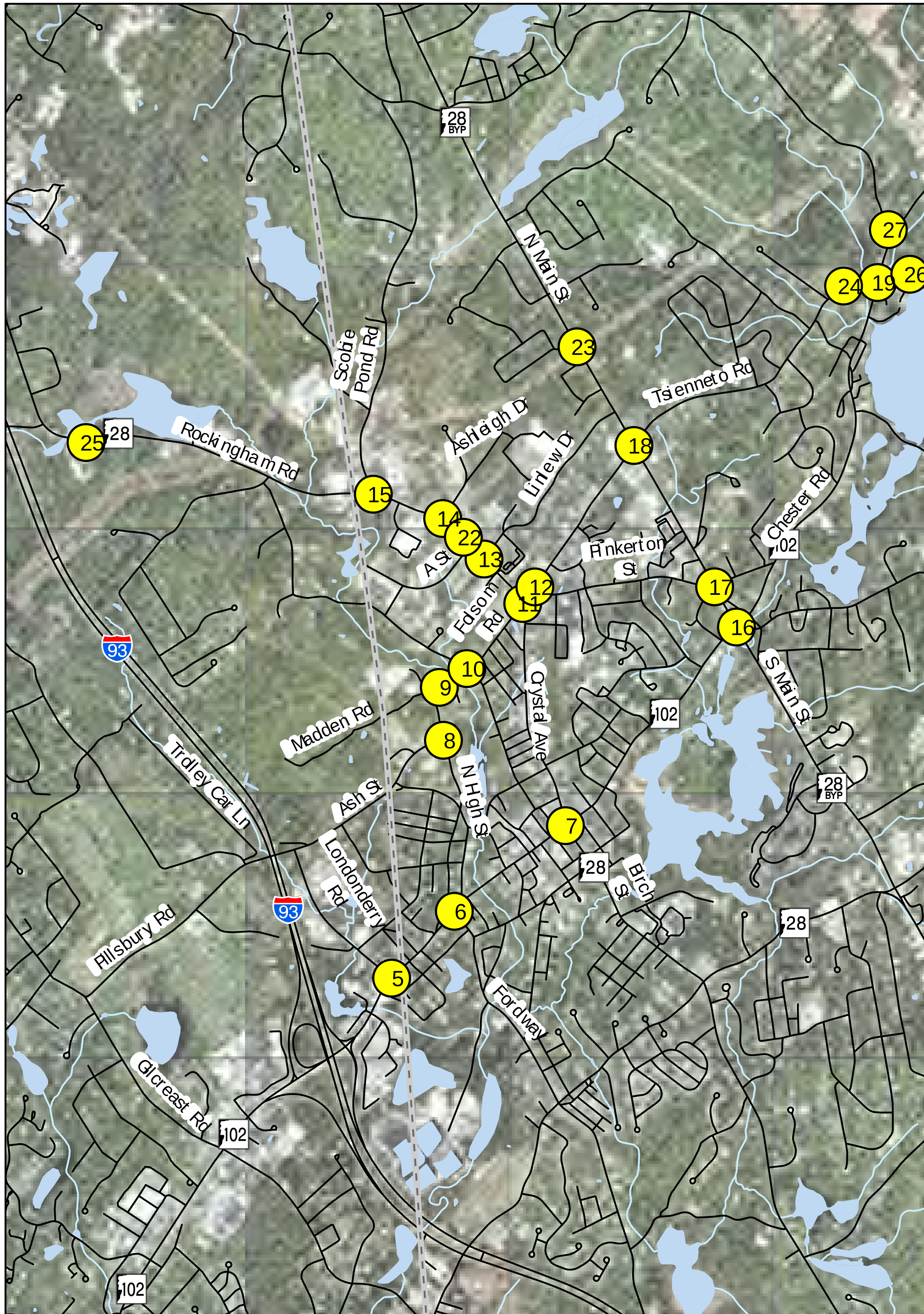
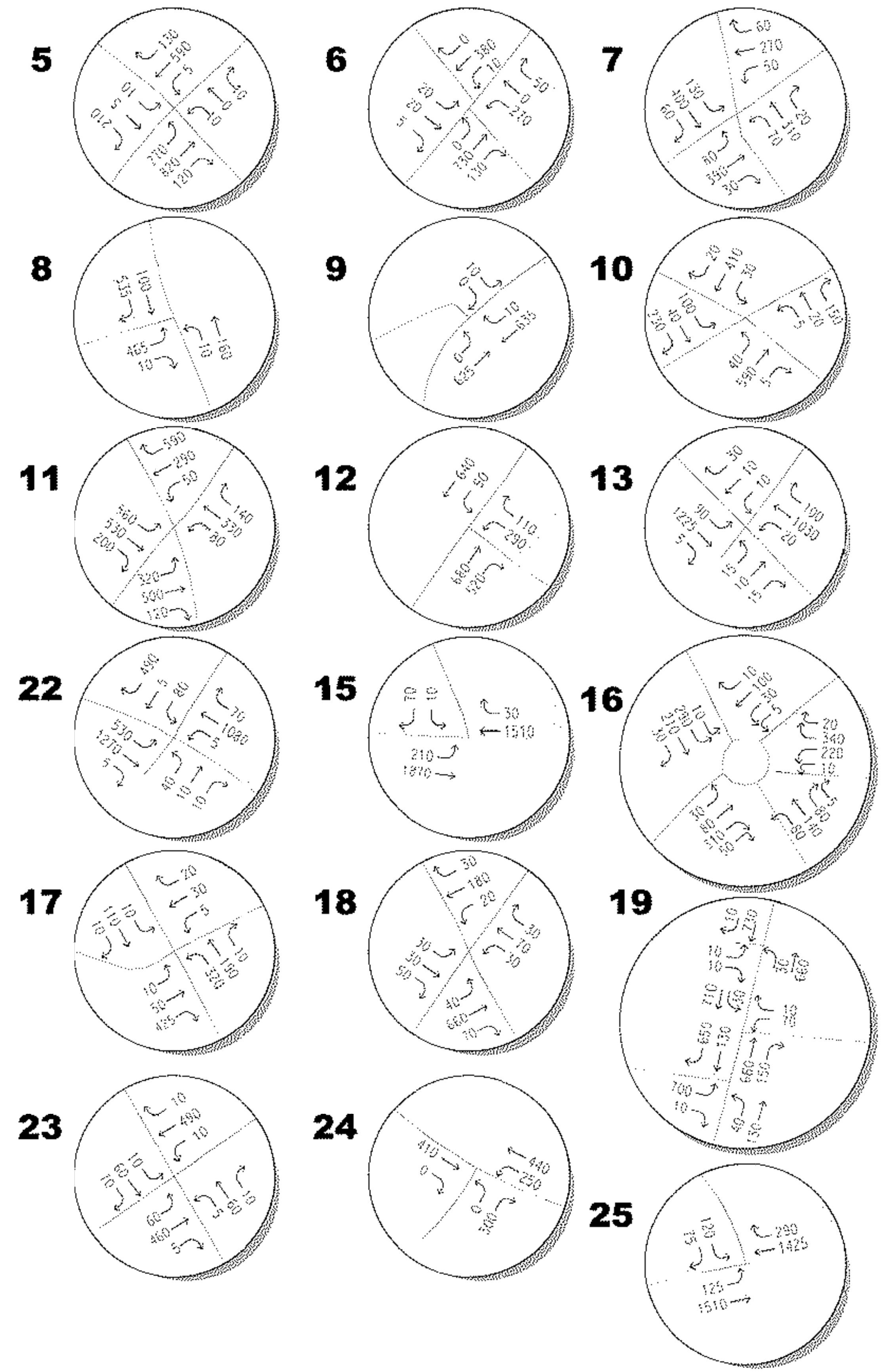
2040 ALT C PM PEAK HOUR BASE VOLUMES





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10. N High St./ Folsom Rd./ Franklin St
11. NH 28/ Folsom Rd./ Tsienneto Rd.
12. Tsienneto Rd./ Pinkerton St.
13. NH 28/ Linlew Dr.
14. NH 28/ Ashleigh Dr.
15. NH 28/ Scobie Pond Rd.
16. NH 102/ NH 28 Bypass/ E. Derry Rd.
17. NH 28 Bypass/ Pinkerton St.
18. NH 28 Bypass/ Tsienneto Rd.
19. NH 102/ Tsienneto Rd.
22. NH 28/ B-C Connector
23. NH 28 Bypass/ B-C Connector
24. Tsienneto Rd/ B-C Connector
25. NH 28/ C-D Connector
26. NH 102/ North Shore Rd
27. NH 102/ English Range Rd

Feet
0 1,000 2,000

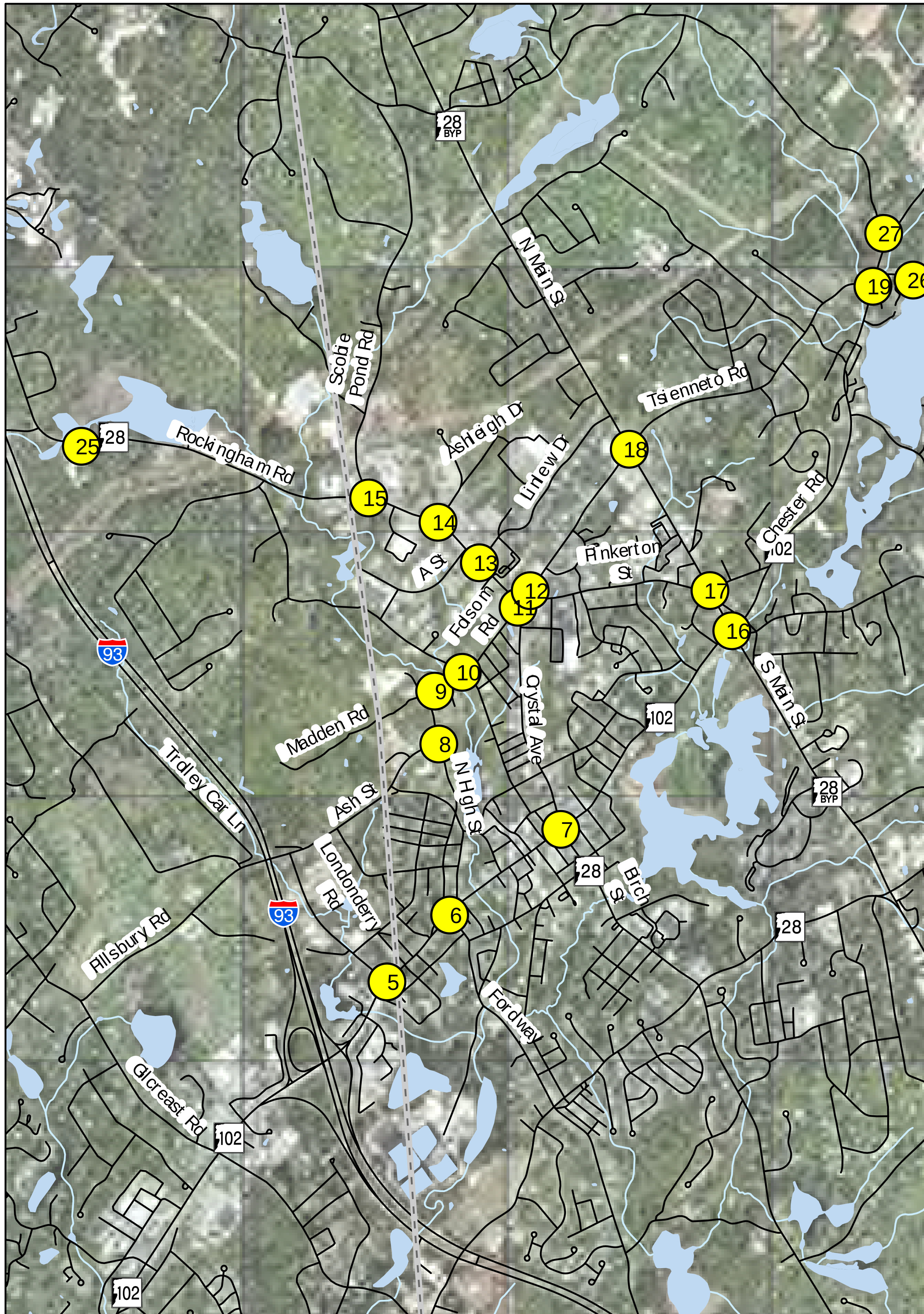
Sources:

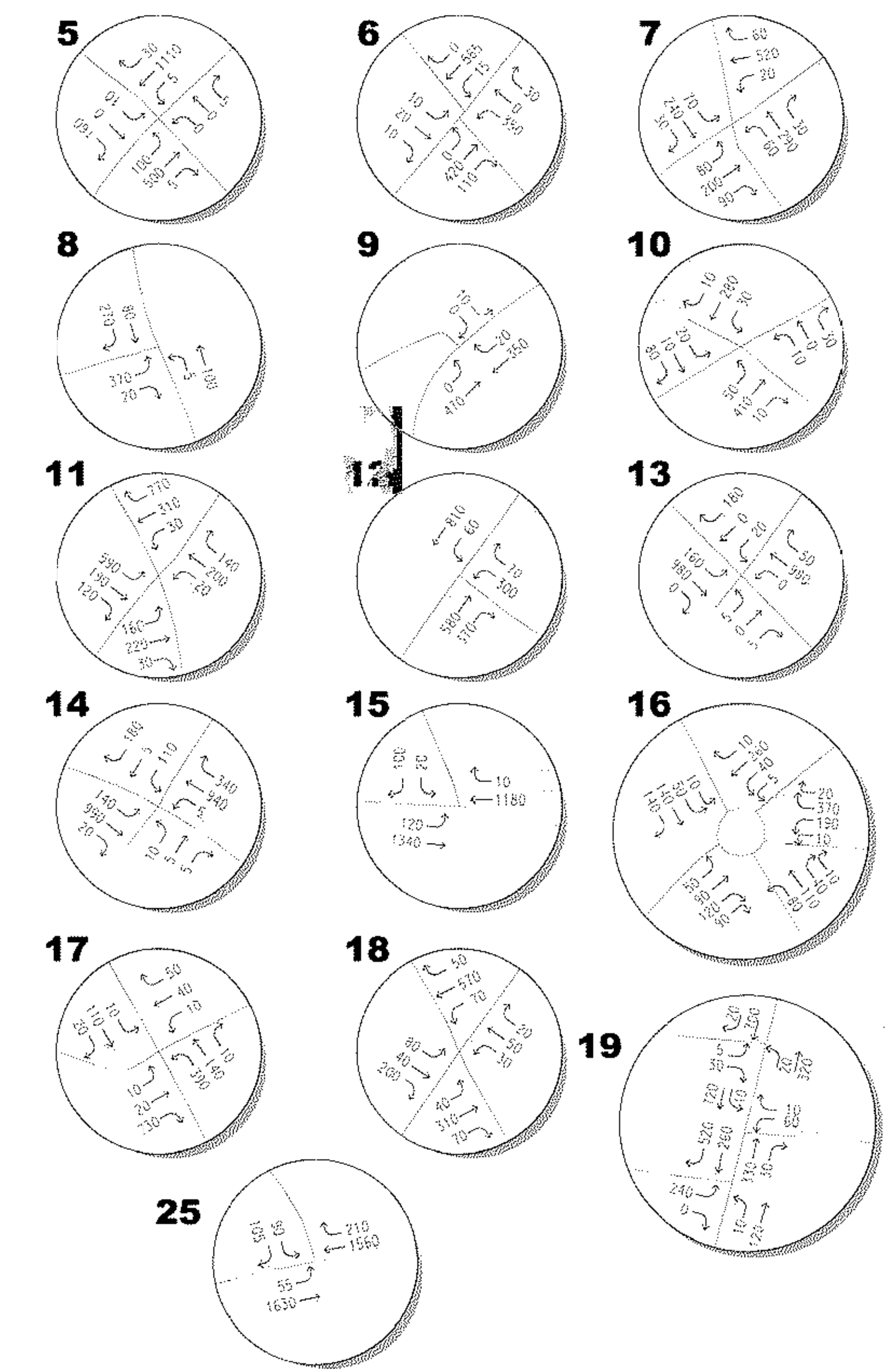
Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

Date:
January 24, 2018

New Hampshire DOT
Department of Transportation

Figure 34 - 2040 Alternative C PM Peak Hour Base Volumes – Locations 5-19 and 22-27





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2040 ALT D AM PEAK HOUR BASE VOLUMES

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7. NH 102/ NH 28
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10. N High St./ Folsom Rd./ Franklin St
11. NH 28/ Folsom Rd./ Tsienneto Rd.
12. Tsienneto Rd./ Pinkerton St.
13. NH 28/ Linlew Dr.
14. NH28/ Ashleigh Dr.
15. NH 28/ Scobie Pond Rd.
16. NH 102/ NH 28 Bypass/ E. Derry Rd.
17. NH 28 Bypass/ Pinkerton St.
18. NH 28 Bypass/ Tsienneto Rd.
19. NH 102/ Tsienneto Rd.
25. NH 28/ C-D Connector
26. NH 102/ North Shore Rd
27. NH 102/ English Range Rd

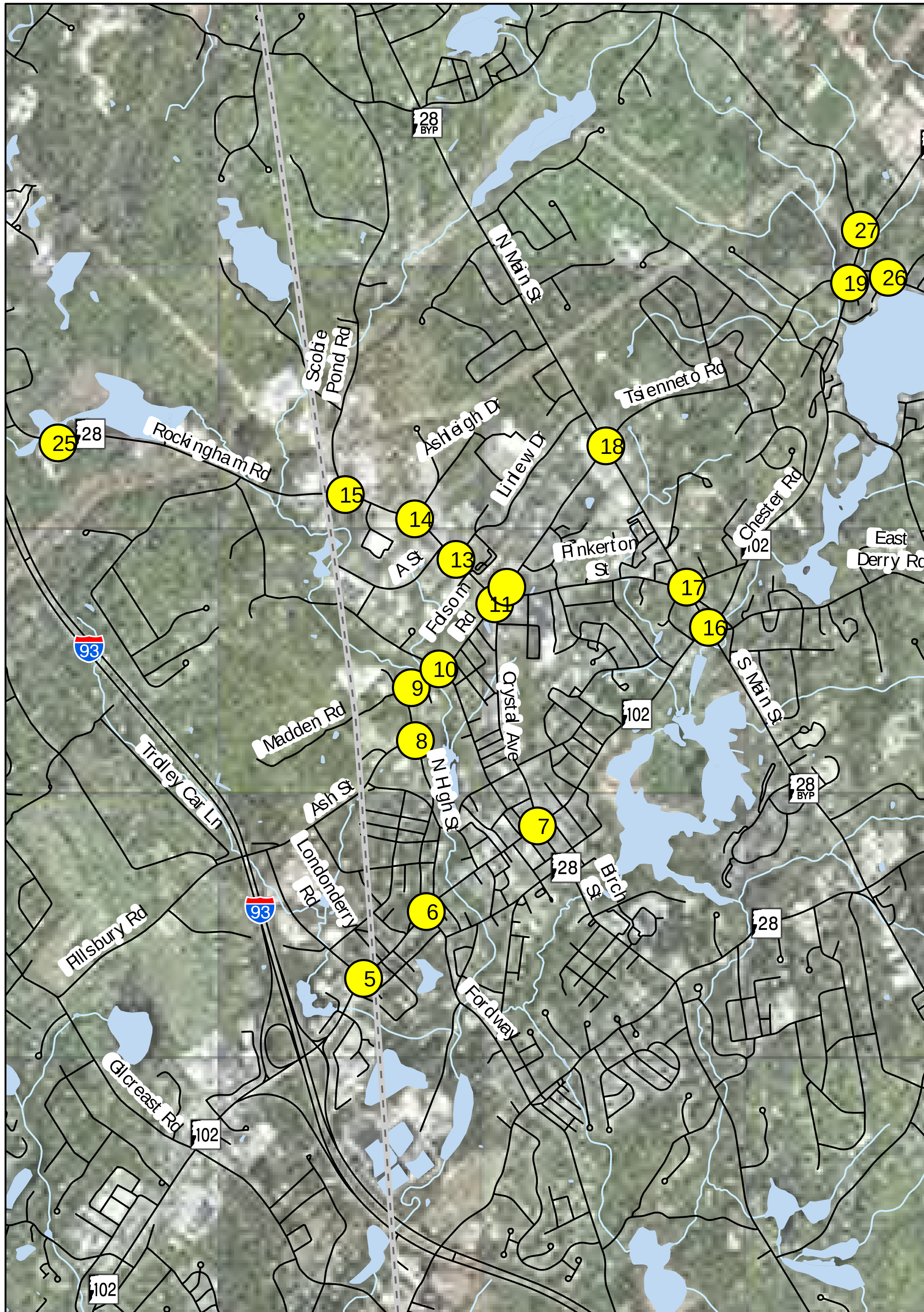
Feet
0 1,000 2,000

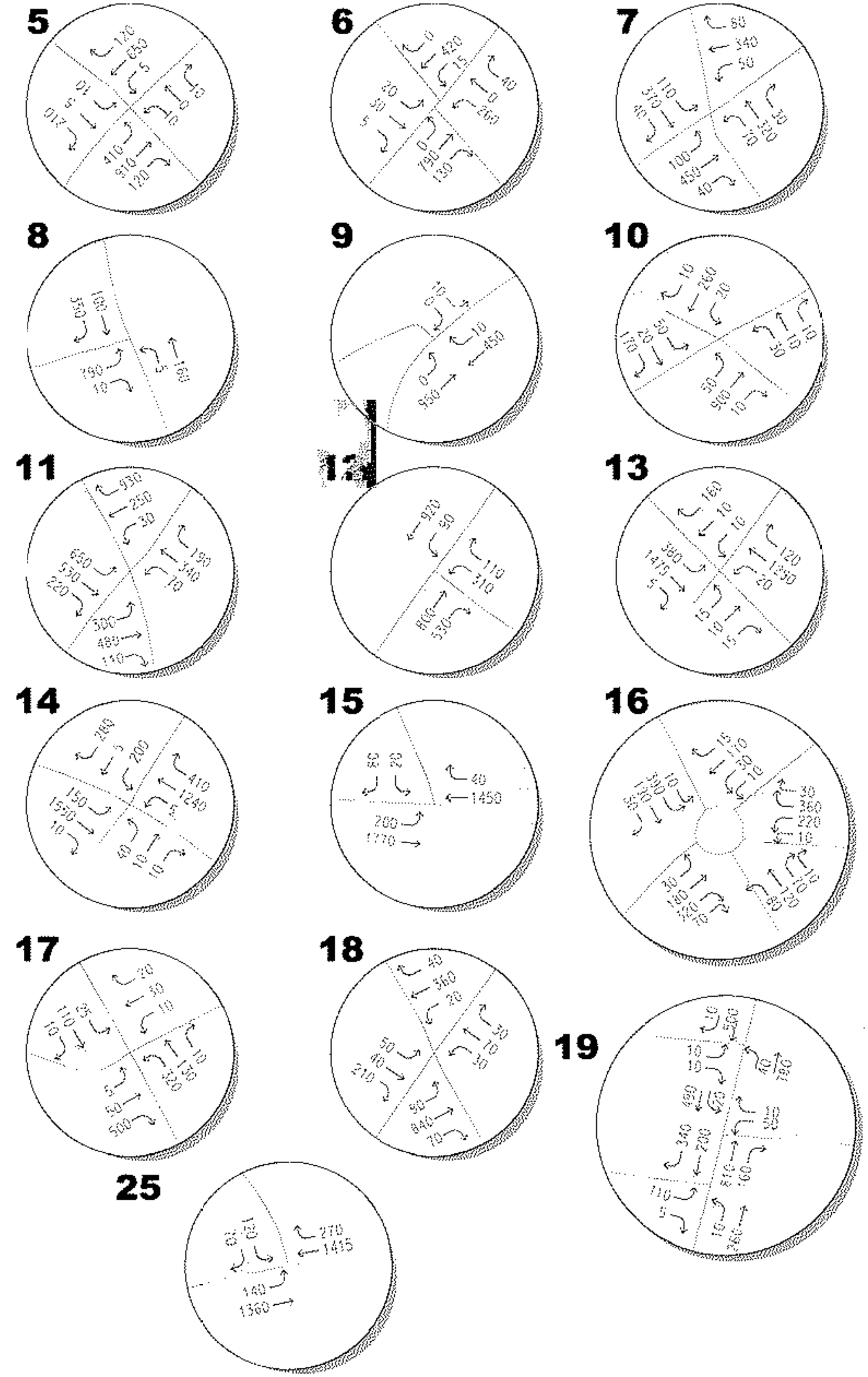
Sources:

Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

Date:
January 24, 2018

Figure 35 - 2040 Alternative D AM Peak Hour Base Volumes – Locations 5-19 and 25-27





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2040 ALT D PM PEAK HOUR BASE VOLUMES

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5. NH 102/ Londonderry Road
6. NH 102/ Fordway/ High St.
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10. N High St./ Folsom Rd./ Franklin St.
11. NH 28/ Folsom Rd./ Tsienneto Rd.
12. Tsienneto Rd./ Pinkerton St.
13. NH 28/ Linlew Dr.
14. NH28/ Ashleigh Dr.
15. NH 28/ Scobie Pond Rd.
16. NH 102/ NH 28 Bypass/ E. Derry Rd.
17. NH 28 Bypass/ Pinkerton St.
18. NH 28 Bypass/ Tsienneto Rd.
19. NH 102/ Tsienneto Rd.
25. NH 28/ C-D Connector
26. NH 102/ North Shore Rd.
27. NH 102/ English Range Rd.

Feet
0 1,000 2,000

Sources:

Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

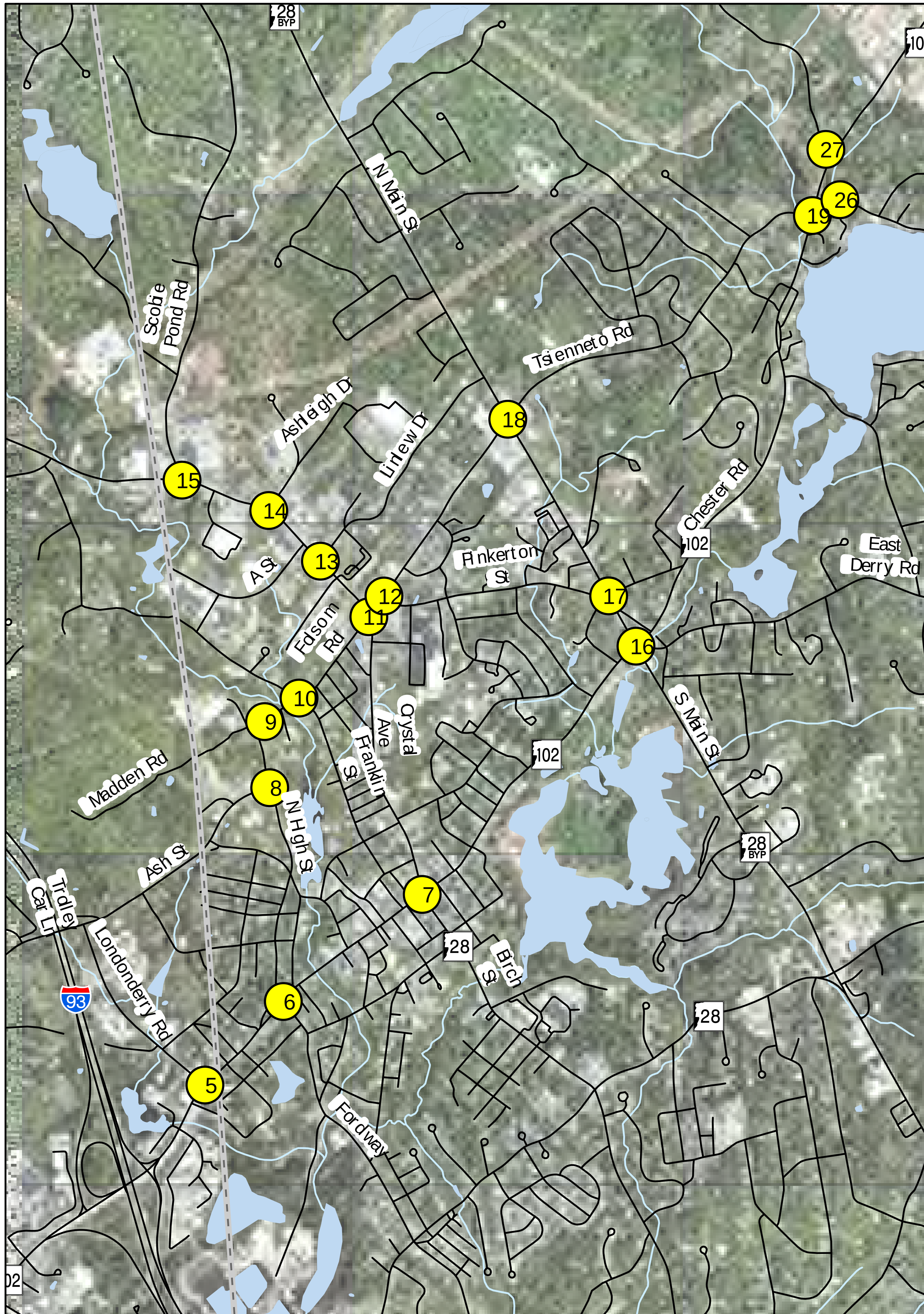
Date:
January 24, 2018

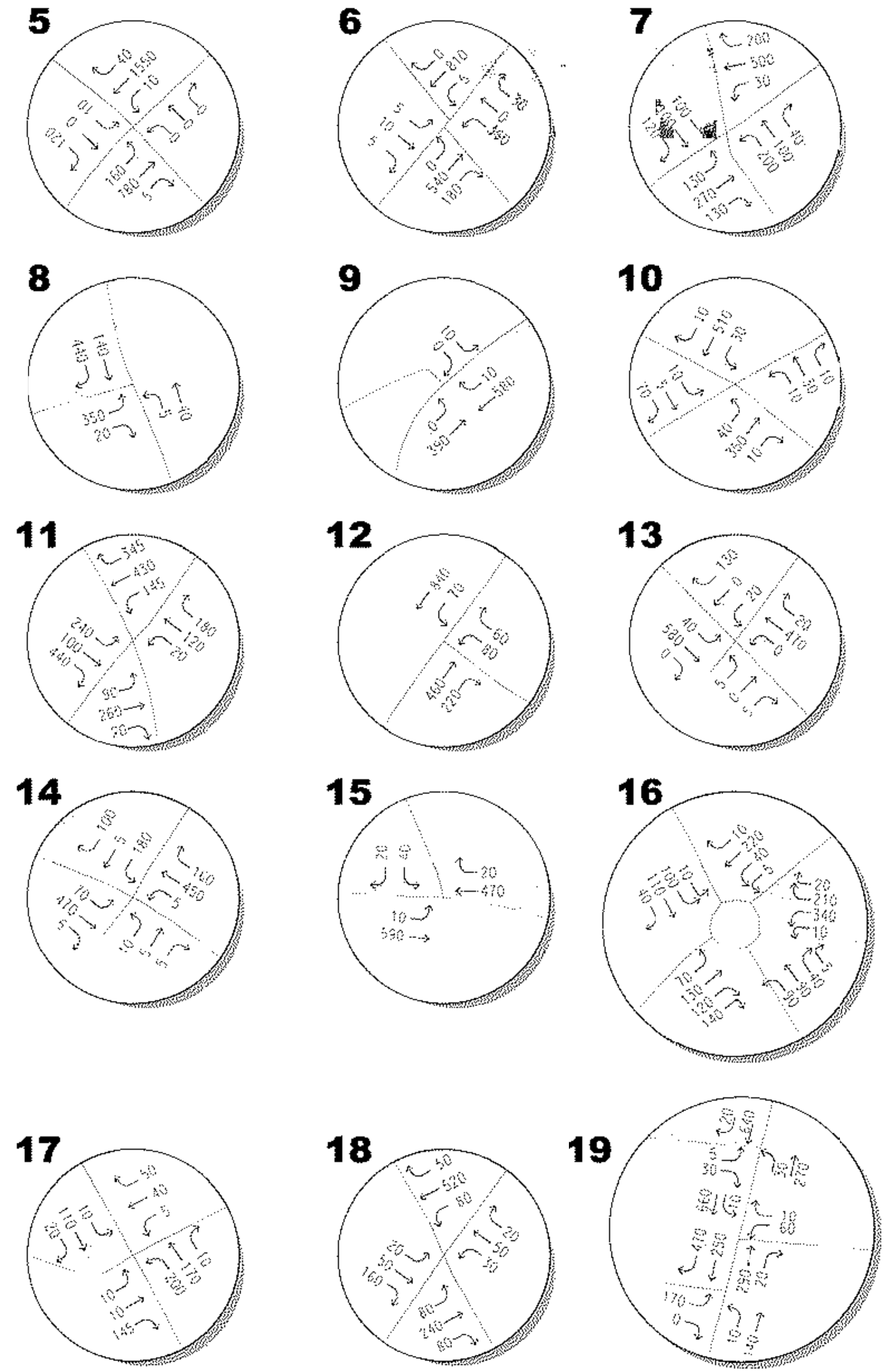
New Hampshire DOT
Department of Transportation

Figure 36 - 2040 Alternative D PM Peak Hour Base Volumes – Locations 5-19 and 25-27

I-93 Exit 4A
Supplemental Draft EIS

2040 ALT F AM PEAK HOUR BASE VOLUMES





INDEX

5. NH 102/ Londonderry Road
6. NH 102/ Fordway/ High St.
7. NH 102/ NH 28
8. N High St./ Ash St. Extension
9. N High St./ Madden Rd.
10. N High St./ Folsom Rd./ Franklin St.
11. NH 28/ Folsom Rd./ Tsienneto Rd.
12. Tsienneto Rd./ Pinkerton St.
13. NH 28/ Linlew Dr.
14. NH28/ Ashleigh Dr.
15. NH 28/ Scobie Pond Rd.
16. NH 102/ NH 28 Bypass/ E. Derry Rd.
17. NH 28 Bypass/ Pinkerton St.
18. NH 28 Bypass/ Tsienneto Rd.
19. NH 102/ Tsienneto Rd.
26. NH 102/ North Shore Rd
27. NH 102/ English Range Rd

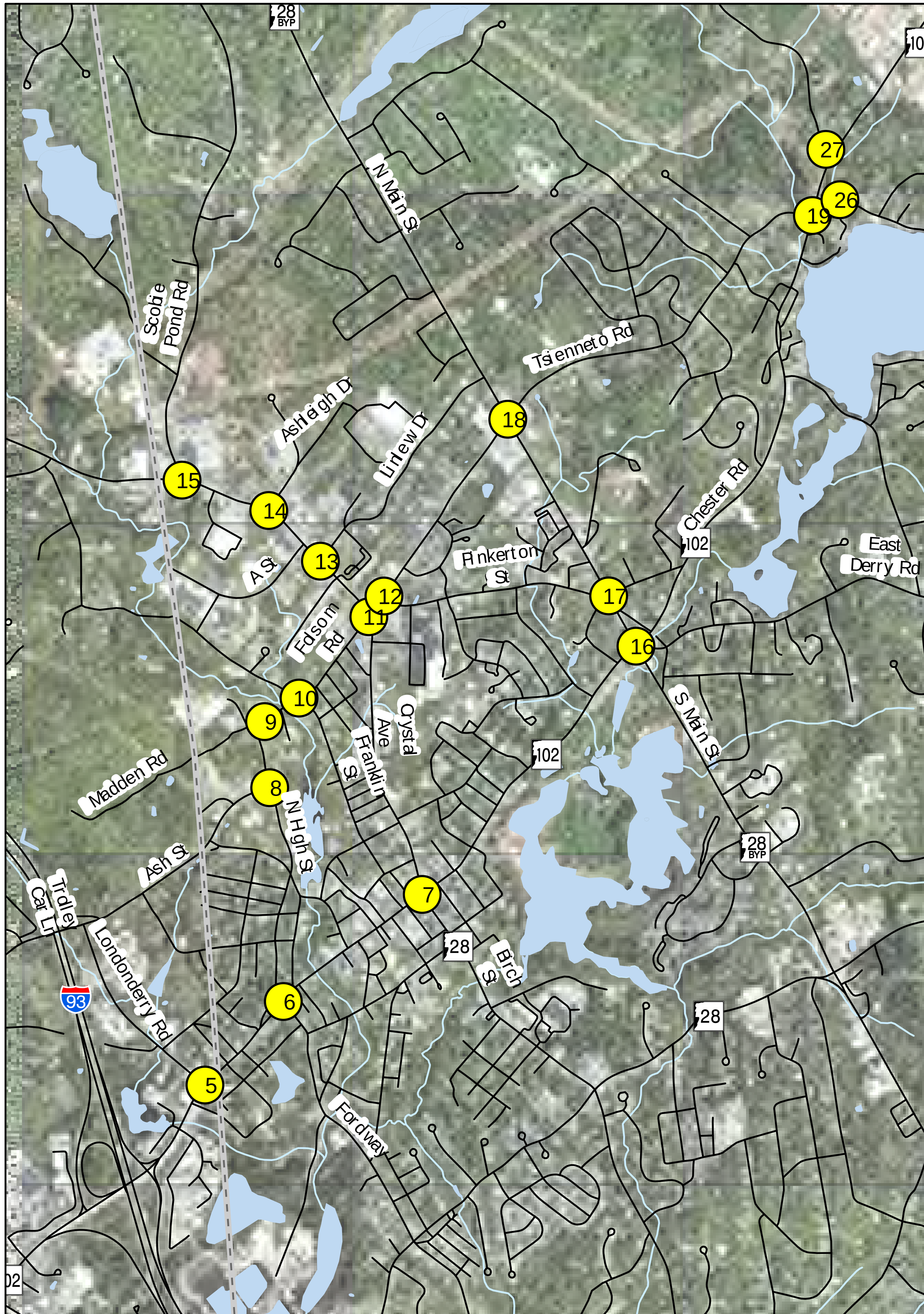
Feet
0 1,000 2,000

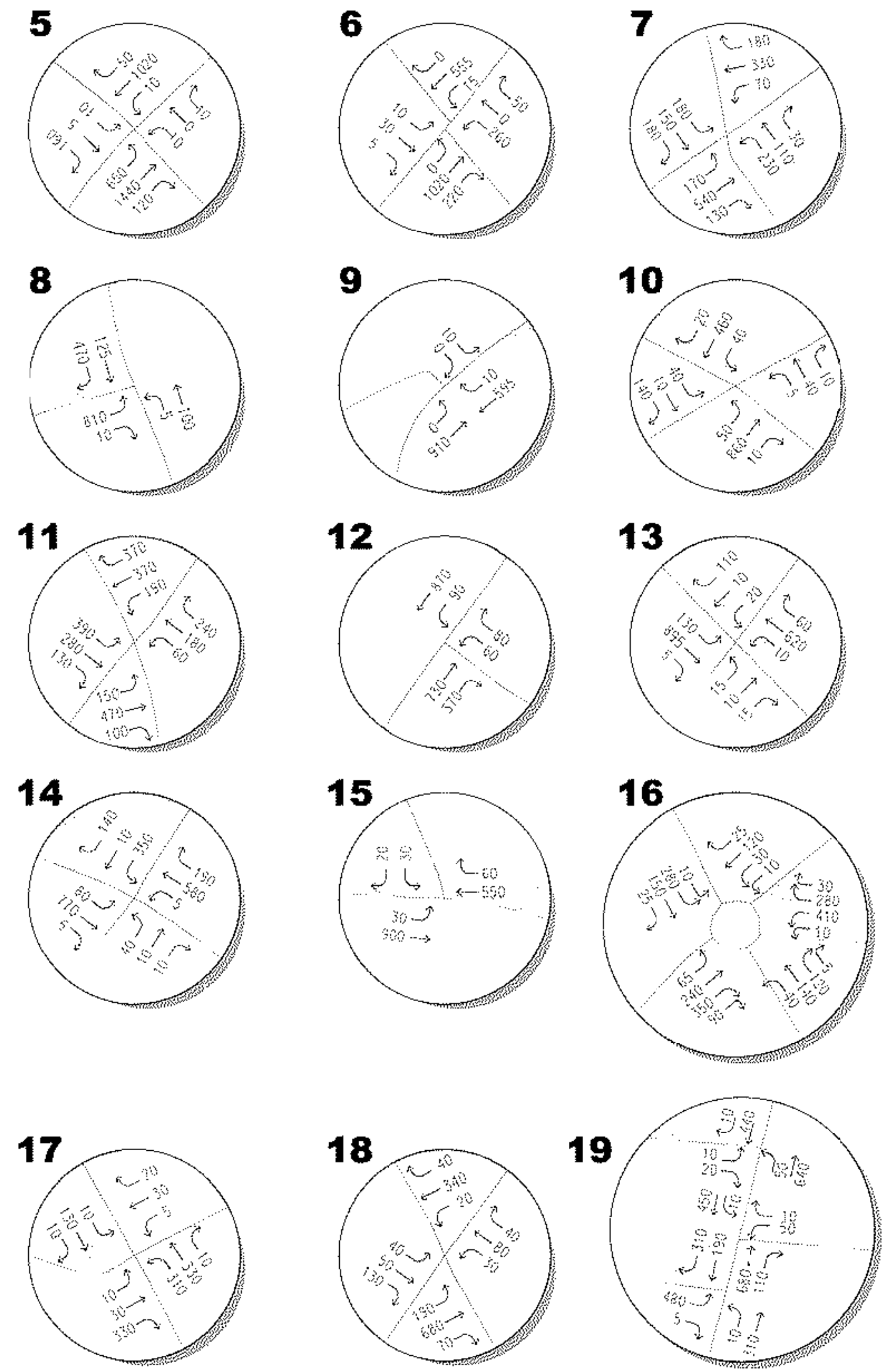
Sources:

Coordinate System NAD 1983 StatePlane New Hampshire (feet)	Date: January 24, 2018

New Hampshire DOT
Department of Transportation

Figure 37 - 2040 Alternative F AM Peak Hour Base Volumes – Locations 5-19 and 26-27





I-93 Exit 4A
Supplemental Draft EIS

2040 ALT F PM PEAK HOUR BASE VOLUMES

INDEX

5. NH 102/ Londonderry Road
6. NH 102/ Fordway/ High St.
7. NH 102/ NH 28
8. N High St./ Ash St. Extension
9. N High St./ Madden Rd.
10. N High St./ Folsom Rd./ Franklin St
11. NH 28/ Folsom Rd./ Tsienneto Rd.
12. Tsienneto Rd./ Pinkerton St.
13. NH 28/ Linlew Dr.
14. NH28/ Ashleigh Dr.
15. NH 28/ Scobie Pond Rd.
16. NH 102/ NH 28 Bypass/ E. Derry Rd.
17. NH 28 Bypass/ Pinkerton St.
18. NH 28 Bypass/ Tsienneto Rd.
19. NH 102/ Tsienneto Rd.
26. NH 102/ North Shore Rd
27. NH 102/ English Range Rd

Feet
0 1,000 2,000

Sources:

Coordinate System
NAD 1983 StatePlane
New Hampshire (feet)

Date:
January 24, 2018

New Hampshire DOT
Department of Transportation

Figure 38 - 2040 Alternative F PM Peak Hour Base Volumes – Locations 5-19 and 26-27

APPENDIX A: TRAFFIC COUNT DATA

NHDOT PERMANENT RECORDER COUNTS - I93 S OF EXIT 4 - MAY 2016

489003

WINDHAM I-93 **NB** AT BETWEEN EXITS 3-4 (02489002)

MN	DY	D	H1	H2	H3	H4	H5	H6	H7	7-8 AM	H9	H10	H11	H12	H13	H14	H15	H16	H17	5-6 PM	H19	H20	H21	H22	H23	H24	txtTotal
5	1	1	561	377	205	159	153	498	352	837	1171	1368	1526	2164	2305	2287	2153	2245	2287	2067	1912	1485	1104	818	576	465	29083
5	8	1	376	354	162	129	113	155	333	618	960	1398	2012	2313	2571	2401	2364	2507	2493	2551	2303	1627	1462	976	641	416	31745
5	2	2	419	209	147	125	262	635	1397	2230	1679	1540	1623	1698	1760	1959	2480	2889	3376	3611	2448	1582	1364	961	610	466	35130
5	9	2	240	151	151	122	267	685	1476	2290	1979	1600	1629	1585	1811	1646	2452	3260	3647	3578	2578	1714	1314	982	656	581	35757
5	3	3	270	182	174	141	227	619	1402	2192	1986	1596	1512	1659	1740	1911	2602	3249	3807	3537	2577	1721	1250	1050	682	503	36593
5	10	3	343	181	139	145	247	653	1466	2292	1973	1705	1724	1664	1756	1571	2615	3315	3798	3599	2737	1651	1364	1056	795	761	38258
5	4	4	266	199	161	151	268	609	1444	2261	1952	1558	1353	1814	1890	1952	2742	3329	3406	3540	2727	1627	1434	1176	677	524	37272
5	5	5	338	209	156	156	263	607	1357	2205	1909	1704	1625	1709	1826	1455	3061	3254	3585	3545	2755	2119	1388	1162	615	627	38048
5	6	6	393	281	173	166	290	625	1468	2250	1941	1669	1621	2177	2262	2564	3228	3665	3833	3546	3004	2257	1573	1413	1106	894	42494
5	7	7	476	295	151	151	146	351	880	1314	1949	2290	2445	2636	2674	2710	2662	2744	2555	2308	2659	1708	1393	1251	1031	753	37060

	H1	H2	H3	H4	H5	H6	H7	7-8 AM	H9	H10	H11	H12	H13	H14	H15	H16	H17	5-6 PM	H19	H20	H21	H22	H23	H24	txtTotal
ADT-sum	3704	2433	1514	1431	2256	5137	11437	18489	17650	16416	17608	19344	20786	21050	26653	30477	32747	32012	25100	18086	13385	10819	7532	5993	362160
ADT	370	243	161	143	226	514	1144	1849	1765	1642	1761	1934	2079	2105	2665	3048	3275	3201	2510	1809	1339	1082	753	599	36216
AWDT-sum	2271	1412	1056	1001	1844	4441	9952	15720	13570	11370	11325	12329	13206	13652	19274	27981	25432	25206	18826	13066	9407	7774	5284	4353	264752
AWDT	324	202	151	143	263	634	1422	2246	1939	1624	1618	1761	1887	1950	2753	3283	3633	3601	2589	1867	1344	1111	755	622	37822

WINDHAM I-93 **SB** BETWEEN EXITS 3-4 (02489002)

MN	DY	D	H1	H2	H3	H4	H5	H6	H7	7-8 AM	H9	H10	H11	H12	H13	H14	H15	H16	H17	5-6 PM	H19	H20	H21	H22	H23	H24	txtTotal
5	1	1	309	243	155	164	177	358	595	900	1740	1687	2299	2623	2726	2605	2602	2645	2747	2286	1895	1475	1077	748	475	260	32524
5	8	1	331	210	131	105	124	325	512	813	1301	1932	2745	3127	3201	2336	2809	2676	2724	2533	2106	1726	1261	929	586	266	35325
5	2	2	150	136	187	291	1012	2537	3092	3145	2807	2356	1549	1652	1731	1681	1769	1568	2027	2202	1386	924	784	623	420	254	35072
5	9	2	174	154	155	285	1350	2590	3407	3344	2974	2377	1757	1879	1736	1615	1969	2106	2200	2461	1556	1079	672	668	451	246	37211
5	3	3	173	118	171	265	1018	2532	3245	3358	3209	2213	1753	1752	1730	1551	1930	2650	2178	2449	1621	1184	902	683	437	247	36729
5	10	3	166	135	162	271	1043	2756	3373	3456	3130	2356	1731	1726	1760	1732	1994	2263	2410	2530	1558	1222	899	776	514	277	38268
5	4	4	203	139	158	255	1026	2633	2317	3457	3085	2289	1730	1714	1765	1763	1930	2184	1792	2723	1623	1158	881	731	495	282	37250
5	5	5	191	143	171	259	973	2576	3103	3107	3099	2412	1625	1942	1784	1607	2294	2744	2332	2523	1588	1176	933	862	551	321	37664
5	6	6	202	170	213	289	950	2489	3110	3367	2795	2201	1834	2012	2007	2098	2356	2561	2465	2717	2025	1466	1077	884	741	432	40538
5	7	7	255	177	133	161	314	753	1044	1426	1677	2176	2333	2615	2587	2460	2555	2756	2780	2553	2109	1667	1283	1002	787	565	36361

	H1	H2	H3	H4	H5	H6	H7	7-8 AM	H9	H10	H11	H12	H13	H14	H15	H16	H17	5-6 PM	H19	H20	H21	H22	H23	H24	txtTotal
ADT-sum	2156	1577	1636	2289	7684	19602	24804	26418	25547	21999	19432	21303	21017	20348	22257	23353	23670	24865	17555	13004	9989	8026	5484	3147	367162
ADT	216	158	164	229	768	1960	2480	2642	2555	2200	1943	2130	2102	2035	2226	2335	2367	2487	1756	1300	999	803	548	315	36736
AWDT-sum	1261	947	1217	1919	7074	18206	22653	23249	21129	16197	12049	12938	12508	12127	14231	15276	15419	17583	11445	8133	6348	5347	3642	2054	262952
AWDT	180	135	174	274	1011	2601	3236	3321	3018	2314	1721	1848	1787	1732	2033	2182	2203	2512	1635	1162	907	764	520	293	37565

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF MAY 2015
WINDHAM- I-93 BETWEEN EXITS 3-4 (SB-NB) (01489004-01489003)

MN	DY	D	H1	H2	H3	H4	H5	H6	H7	7-8 AM	H9	H10	H11	H12	H13	H14	H15	H16	H17	5-6 PM	H19	H20	H21	H22	H23	H24	txtTotal	
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5	26	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
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5	20	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	27	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	7	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
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5	21	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	28	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	1	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	8	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	15	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	22	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	29	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
							AVG Weekday			5533										5997							76450	

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF MAY 2015
WINDHAM- I-93 NB AT BETWEEN EXITS 3-4 (02489002)

MN	DY	D	H1	H2	H3	H4	H5	H6	H7	7-8 AM	H9	H10	H11	H12	H13	H14	H15	H16	H17	5-6 PM	H19	H20	H21	H22	H23	H24	txtTotal	
5	3	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	10	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	17	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	24	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	31	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	2	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	9	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	16	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	23	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	30	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	25	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Holiday
5	4	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	11	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	18	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	5	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	12	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	19	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	26	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	6	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	13	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	20	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	27	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	7	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	14	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	21	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	28	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	1	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	8	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	15	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	22	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	29	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
							AVG Weekday			2021										3483							38076	

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF MAY 2015
WINDHAM- I-90 SB BETWEEN EXITS 3-4 (02489007)

MN	DY	G	H1	H2	H3	H4	H5	H6	H7	7-8 AM	H9	H10	H11	H12	H13	H14	H15	H16	H17	5-6 PM	H19	H20	H21	H22	H23	H24	totTotal	
5	3	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	10	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	17	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	24	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	31	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	2	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	9	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	16	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	23	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	30	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	25	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Holiday
5	4	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	11	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	18	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	5	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	12	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	19	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	26	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	6	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	13	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	20	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	27	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	7	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	14	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	21	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	28	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	1	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	8	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	15	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	22	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5	29	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
						AVG Weekday				3517										2535							38412	

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC
IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF **MAY 2016**

81 269107 LONDONDERRY - I-93 NB OFF RAMP EXIT 4

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
5	2	1	101	137	54	35	26	25	97	199	232	339	480	585	707	705	631	676	660	672	653	509	405	272	148	123	8471
5	3	3	70	45	44	36	45	110	242	422	467	423	408	471	492	534	616	1042	1330	1476	1056	615	460	324	210	175	11288
5	4	4	91	59	49	34	41	106	269	442	475	391	453	502	559	572	637	1108	1201	1178	1040	672	480	387	190	194	11330
5	5	5	122	52	50	43	54	90	236	435	494	483	454	398	560	419	911	1076	1152	1128	1024	735	474	359	244	188	11181
5	6	6	122	81	46	41	63	109	254	441	456	405	450	562	587	667	900	1060	1113	1108	913	658	431	392	304	290	11483
5	7	7	150	97	60	42	31	61	138	295	451	644	593	666	754	816	857	791	795	666	627	521	461	365	291	246	10418
Sum	AWDT		405	247	189	154	203	415	1001	1740	1894	1702	1765	1933	2198	2192	3464	4306	4766	4890	4033	2680	1845	1462	948	850	45282
	AWDT		101	62	47	39	51	104	250	435	474	426	441	483	550	548	866	1077	1192	1223	1008	670	461	366	237	213	11321

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC
IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF **MAY 2016**

81 269106 LONDONDERRY- I-93 NB ON RAMP EXIT 4

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
5	8	1	72	51	35	30	25	58	107	194	274	438	603	609	657	599	639	569	546	439	421	377	303	238	116	76	7476
5	3	3	17	30	31	36	83	224	690	1091	856	610	559	542	591	596	680	830	686	729	619	401	305	223	132	68	10834
5	4	4	42	26	19	42	75	235	718	1115	877	608	568	605	619	617	692	798	782	773	572	438	329	206	146	74	10976
5	5	5	39	26	31	35	78	238	697	1068	865	691	591	618	759	654	753	871	930	896	633	433	332	252	167	85	11732
5	6	6	49	37	40	48	62	237	669	1043	899	650	616	625	703	688	806	945	878	859	627	465	377	296	223	134	11978
5	7	7	80	51	43	40	48	67	209	341	500	569	641	733	773	740	715	712	644	556	502	413	338	279	225	153	9392
Sum AWDT			147	119	121	161	303	934	2774	4317	3497	2559	2336	2390	2672	2555	2931	3444	3476	3247	2451	1737	1343	977	668	361	45520
AWDT			37	30	30	40	76	234	694	1079	874	640	584	598	668	639	733	861	869	812	613	434	336	244	167	90	11380

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC
IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF **MAY 2016**

81 269104 LONDONDERRY-I-93 SB OFF RAMP EXIT 4

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
5	8	1	112	68	45	20	30	68	85	192	318	424	523	529	636	686	554	632	550	496	456	340	300	187	118	63	7534
5	3	3	72	25	27	41	103	265	537	776	784	518	561	528	543	693	674	852	917	949	629	442	347	258	143	101	10785
5	4	4	58	34	28	46	104	277	544	773	770	537	545	698	615	570	689	804	621	953	647	435	316	251	165	88	10472
5	5	5	63	23	26	37	104	270	522	745	752	545	578	677	564	677	658	833	857	948	630	430	340	320	202	110	10911
5	6	6	76	53	45	38	112	263	511	717	734	553	619	604	665	694	724	896	950	956	674	502	357	286	218	155	11402
5	7	7	95	59	43	27	54	92	174	344	444	523	528	626	607	638	623	693	615	636	520	405	325	289	223	156	8738
Sum	AWDT		269	135	126	164	423	1075	2114	3011	3040	2153	2303	2307	2387	2634	2745	3385	3445	3806	2580	1809	1362	1115	728	454	43570
	AWDT		67	34	32	41	106	269	529	753	760	538	576	577	597	659	686	846	861	952	645	452	341	279	182	114	10893

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC
IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF **MAY 2016**

81 269108 LONDONDERRY- I-93 SB ON RAMP EXIT 4 EB TO SB

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
5	8	1	30	8	12	10	15	53	73	113	192	236	366	384	384	378	315	290	294	259	238	214	126	100	44	20	4214
5	3	3	8	19	17	39	127	438	646	687	587	339	282	259	289	284	288	294	266	296	239	142	99	79	40	18	5782
5	4	4	10	17	25	34	144	450	597	690	546	398	253	295	265	225	313	299	301	330	212	141	112	100	63	24	5845
5	5	5	18	16	18	25	141	419	609	677	619	358	309	261	274	292	288	313	293	298	220	155	103	80	40	19	5874
5	6	6	8	15	29	43	130	422	532	637	514	402	311	325	288	278	305	314	308	319	255	162	125	102	106	29	5959
5	7	7	20	10	12	17	44	99	171	195	268	343	362	437	430	348	379	383	318	260	245	163	154	121	55	70	4914
Sum	AWDT		44	67	89	141	542	1729	2384	2691	2266	1527	1155	1140	1116	1080	1194	1220	1168	1243	926	600	439	361	249	89	23460
	AWDT		11	17	22	35	136	432	596	673	567	382	289	285	279	270	299	305	292	311	232	150	110	90	62	22	5865

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC
IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF **MAY 2016**

81 269105 LONDONDERRY- I-93 SB ON RAMP EXIT 4 WB TO SB

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
5	8	1	37	29	7	8	22	56	83	86	173	249	383	369	369	331	323	299	283	294	200	232	158	121	115	40	4269
5	3	3	19	14	28	52	198	521	552	**534**	396	309	229	256	184	209	246	243	212	228	167	126	102	94	81	22	5022
5	4	4	17	22	32	52	200	514	568	561	414	280	244	206	240	245	249	264	268	248	160	152	110	88	80	29	5243
5	5	5	21	21	27	48	187	511	548	527	413	302	192	271	300	247	295	274	253	233	176	136	119	116	79	47	5343
5	6	6	19	19	35	50	192	484	527	524	418	283	237	245	243	264	269	260	265	268	260	159	140	110	125	56	5452
5	7	7	19	16	22	21	52	135	150	219	266	273	293	397	352	377	343	346	340	295	335	290	222	120	107	101	5136
Sum	AWDT		76	76	122	202	777	2030	2195	2146	1641	1174	902	978	967	965	1059	1041	998	977	763	573	471	408	365	154	21060
	AWDT		19	19	31	51	194	508	549	**537**	410	294	226	245	242	241	265	260	250	**244**	191	143	118	102	91	39	5265

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC
IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF **MAY 2016**

81 269103 LONDONDERRY - I-93 NB OFF RAMP EXIT 5

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
5	8	1	27	49	28	19	26	17	40	72	106	161	247	269	277	270	282	260	276	234	231	191	173	116	83	53	3507
5	29	1	48	34	25	17	29	18	46	84	129	135	185	231	224	256	234	234	184	193	193	172	120	103	98	71	3065
5	30	2	41	29	19	12	18	17	40	53	65	111	142	173	201	223	218	203	185	176	200	163	125	108	66	49	2679
5	3	3	36	43	41	42	81	165	299	387	327	292	266	299	322	365	418	478	503	356	412	287	187	144	112	65	5950
5	24	3	48	36	34	45	74	178	320	**422**	321	253	240	319	290	305	391	491	555	479	389	338	207	149	132	88	6074
5	31	3	18	23	19	41	60	193	294	375	366	295	310	315	352	318	404	536	553	515	362	292	199	199	126	102	6267
5	25	4	51	39	48	36	88	172	319	443	336	294	273	323	320	311	615	511	507	505	425	289	240	157	140	110	6452
5	26	5	64	40	38	42	93	159	300	371	345	315	256	311	311	258	547	470	491	502	391	304	223	192	142	116	6281
5	6	6	54	53	39	43	67	153	260	386	341	244	305	349	377	379	564	507	525	441	352	254	217	181	153	127	6421
5	27	6	70	37	36	39	91	160	285	419	379	306	321	365	416	405	481	438	450	409	288	253	218	163	136	124	6309
5	7	7	62	60	28	29	38	34	97	118	174	236	246	317	306	301	338	340	303	276	287	220	181	144	139	92	4396
5	28	7	53	49	23	29	22	42	85	131	186	240	277	599	299	259	264	221	205	220	185	178	136	141	120	102	3979
Sum	AWDT		341	271	255	288	554	1230	2077	2803	2415	1999	1971	2281	2388	2341	3240	3431	3584	3307	2619	1987	1491	1185	941	755	43754
	AWDT		49	39	36	41	79	176	297	**400**	345	286	282	326	341	334	463	490	512	**472**	374	284	213	169	134	108	6251

excl 5/30 - Holiday

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC
IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF **MAY 2016**

81 269102 LONDONDERRY - I-93 NB ON RAMP EXIT 5

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
5	8	1	75	31	27	17	26	53	86	147	256	417	451	530	526	525	541	445	463	397	391	326	254	159	138	53	6334
5	29	1	58	45	30	17	21	60	116	186	237	356	455	455	507	440	475	426	356	333	267	230	216	152	120	94	5683
5	30	2	38	28	23	23	26	56	123	136	182	293	364	451	447	426	416	386	360	305	307	248	241	153	108	78	5222
5	3	3	61	34	26	66	79	197	593	1063	796	512	447	460	491	507	675	825	858	657	555	381	294	192	139	71	10199
5	24	3	82	36	32	75	99	222	615	1008	736	513	472	518	454	494	716	806	813	792	544	423	305	205	133	95	10188
5	31	3	42	21	25	64	75	231	624	1007	833	566	557	516	513	481	751	823	799	768	525	456	305	225	151	86	10433
5	4	4	85	35	51	46	70	216	619	986	823	520	511	497	535	528	698	778	820	744	488	364	299	174	144	76	10119
5	25	4	105	69	45	63	80	246	633	965	834	569	478	547	534	553	708	863	823	821	636	436	352	250	166	98	10674
5	5	5	93	30	25	47	89	199	595	990	853	574	510	526	586	529	722	919	859	819	526	464	284	237	135	95	10708
5	26	5	115	68	33	56	108	247	604	1013	684	615	550	578	611	517	738	676	796	841	569	456	360	235	213	117	11100
5	6	6	112	48	39	63	80	220	600	939	800	585	546	591	635	620	733	931	861	621	615	505	380	244	224	136	11080
5	27	6	100	55	35	57	100	242	575	938	797	632	594	610	650	611	760	862	697	674	599	464	324	292	207	140	11031
5	7	7	111	42	32	37	45	98	197	350	443	516	578	634	594	613	647	527	522	502	437	374	301	230	190	126	8146
5	28	7	89	45	32	57	46	94	195	356	442	536	559	493	542	465	586	534	478	431	350	319	264	207	150	104	7395
Sum	AWDT		795	399	314	527	780	2020	5456	8929	7353	5086	4657	4845	4889	4840	6511	7653	7326	7137	5056	3991	2903	2055	1512	916	95952
	AWDT		88	44	35	59	87	224	606	992	817	565	517	538	543	538	723	850	814	793	562	443	323	228	168	102	10661

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC
IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF MAY 2016

81 269099 LONDONDERRY- I-93 SB OFF RAMP EXIT 5

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
5	6	1	90	63	53	30	35	39	67	141	228	332	447	559	561	562	556	527	472	452	362	346	269	189	131	61	6572
5	29	1	97	62	36	20	18	25	109	152	219	283	345	408	427	444	449	420	422	401	369	304	249	236	150	112	5776
5	30	2	75	38	33	16	26	40	72	129	152	223	305	415	456	441	497	472	419	360	342	340	274	223	161	75	5586
5	3	3	47	37	34	47	149	321	739	737	629	450	394	433	494	513	601	780	905	943	564	436	329	279	150	103	10134
5	24	3	47	35	33	40	157	301	666	647	902	465	446	512	495	447	564	752	899	962	584	435	344	283	143	121	10280
5	31	3	56	28	23	40	160	295	741	821	706	501	472	493	547	548	677	820	893	908	544	444	327	291	198	118	10651
5	4	4	56	45	27	42	146	306	704	746	633	442	416	482	496	516	586	793	1127	1090	708	378	337	270	147	99	10594
5	25	4	71	71	33	41	171	323	736	754	610	483	448	510	527	571	622	848	923	977	614	437	433	351	168	126	10850
5	5	5	72	38	35	41	153	305	690	866	414	252	457	499	526	520	674	798	977	890	653	434	369	324	161	139	10297
5	26	5	113	60	34	61	142	313	687	791	674	484	472	535	523	578	639	831	889	971	620	485	374	347	227	158	11008
5	6	6	75	59	44	45	173	273	714	763	649	500	459	512	584	582	644	871	940	996	618	464	356	329	216	169	11035
5	27	6	81	42	28	57	122	256	707	768	601	514	461	539	577	581	669	837	822	715	482	432	336	292	223	169	10314
5	7	7	91	64	37	38	30	100	167	311	399	443	488	523	542	561	620	621	598	547	435	335	307	297	197	159	7910
5	28	7	110	61	53	42	27	60	177	276	391	428	425	457	473	469	463	450	436	456	393	348	309	319	207	159	6992
Sum	AWDT		618	415	291	414	1383	2693	6386	6893	5818	4091	4027	4515	4769	4856	5676	7330	8375	8455	5407	3945	3205	2766	1633	1202	95163
	AWDT		69	46	32	46	154	299	710	**766**	646	455	447	502	530	540	631	814	931	**939**	601	438	356	307	181	134	10574

excl 5-24

6246
781

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC
IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF **MAY 2016**

81 269101 LONDONDERRY- I-93 SB ON RAMP EXIT 5

	MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
	5	8	1	35	25	18	16	19	45	82	134	170	212	288	297	329	303	275	251	265	214	185	135	104	54	54	23	3534
	5	29	1	31	29	11	21	23	43	66	102	147	192	283	270	266	253	246	200	177	203	164	129	119	89	61	43	3170
	5	30	2	31	15	13	27	35	58	63	80	125	151	194	249	245	212	211	209	180	170	192	146	130	79	43	28	2883
	5	3	3	54	27	39	66	175	390	520	499	453	376	273	275	318	299	341	437	385	393	268	167	129	95	65	47	6114
	5	24	3	51	34	35	61	204	396	521	532	381	331	287	271	316	265	327	393	436	474	191	190	131	93	59	46	6025
	5	31	3	38	18	27	58	185	400	566	523	462	377	327	327	286	312	364	406	460	473	228	139	133	86	94	61	6350
	5	4	4	53	32	39	65	187	423	518	515	456	349	324	275	296	304	327	400	358	449	273	185	124	94	66	55	6167
	5	25	4	54	29	33	65	183	476	527	549	461	363	289	270	298	275	360	465	423	431	264	182	141	95	67	56	6356
	5	5	5	52	34	42	45	184	425	538	499	418	413	317	310	313	262	324	425	442	411	251	173	116	102	82	45	6218
	5	26	5	69	31	34	54	198	413	535	520	476	387	301	252	309	289	297	458	474	405	281	193	138	110	72	64	6363
	5	6	6	57	26	42	42	155	377	479	484	455	384	301	289	353	308	403	458	461	411	299	226	148	119	75	57	6439
	5	27	6	47	34	53	60	183	363	494	504	403	356	337	326	332	316	384	403	343	355	260	167	136	102	77	64	6101
	5	7	7	49	15	15	29	48	119	126	209	259	313	288	322	307	314	309	295	319	262	196	180	134	100	103	68	4391
	5	28	7	45	37	31	20	46	72	136	192	273	254	286	249	242	243	251	228	204	186	172	165	143	102	73	57	3709
ADD	6	1	4	46	30	31	63	193	402	554	561	460	350	366	274	272	268	309	399	389	469	252	162	141	90	79	42	6201
Sum	AWDT			521	295	375	579	1874	4065	5255	5186	4425	3686	3119	2869	3093	2900	3436	4244	4171	4271	2587	1784	1337	986	739	537	62334
	AWDT			52	30	38	58	187	407	526	**519**	443	369	312	287	309	290	344	424	417	**427**	259	178	134	99	74	54	6233

DERRY
CRYSTAL AVE
SO OF TSIENNETO RD
STATE COUNT

Southern New Hampshire Planning Commission

438 Dubuque Street, Manchester, NH 03102
Tel: 603-669-4664 Fax:603-669-4350
Web: www.snhpc.org

Site Code: 82119050
Station ID:

Latitude: 0' 0.0000 Undefined

Start Time	Mon 02-May-16	Tue 03-May-16	Wed 04-May-16	Thu 05-May-16	Fri 06-May-16	Average Day	Sat 07-May-16	Sun 08-May-16	Week Average
12:00 AM	*	*	90	74	119	94	137	156	115
01:00	*	*	44	47	54	48	70	73	58
02:00	*	*	27	30	27	28	49	47	36
03:00	*	*	29	27	44	33	24	15	28
04:00	*	*	62	68	77	69	42	29	56
05:00	*	*	164	170	183	172	93	63	135
06:00	*	*	434	410	437	427	203	128	322
07:00	*	*	833	878	797	836	469	273	650
08:00	*	*	871	950	895	905	710	481	781
09:00	*	923	884	922	949	920	1116	769	927
10:00	*	948	968	933	1034	971	1239	948	1012
11:00	*	**1089**	**1113**	**1083**	**1257**	**1136**	**1468**	**1096**	**1184**
12:00 PM	*	1271	1295	1307	1477	1338	1373	**1199**	1320
01:00	*	1161	1223	1219	1360	1241	**1437**	1155	1259
02:00	*	**1368**	1348	1357	1488	1390	1371	1068	**1333**
03:00	*	1354	1348	1334	1490	1382	1313	979	1303
04:00	*	1287	**1478**	1381	**1528**	**1418**	1170	1038	1314
05:00	*	1304	1257	**1444**	1519	1381	1212	964	1283
06:00	*	1113	1133	1272	1328	1212	1091	871	1135
07:00	*	905	844	994	1112	964	1006	824	948
08:00	*	747	684	767	989	797	796	632	769
09:00	*	405	433	504	687	507	587	392	501
10:00	*	253	241	311	468	318	351	258	314
11:00	*	161	141	170	243	179	276	126	186
Day Total	0	14289	16944	17652	19562	17766	17603	13584	16969
% Avg. WkDay	0.0%	80.4%	95.4%	99.4%	110.1%				
% Avg. Week	0.0%	84.2%	99.9%	104.0%	115.3%	104.7%	103.7%	80.1%	
AM Peak	-	11:00	11:00	11:00	11:00	11:00	11:00	11:00	11:00
Vol.	-	1089	1113	1083	1257	1136	1468	1096	1184
PM Peak	-	14:00	16:00	17:00	16:00	16:00	13:00	12:00	14:00
Vol.	-	1368	1478	1444	1528	1418	1437	1199	1333

Southern New Hampshire Planning Commission

438 Dubuque Street, Manchester, NH 03102
Tel: 603-669-4664 Fax:603-669-4350
Web: www.snhpc.org

DERRY
FOLSOM RD
WEST OF NH 28
STATE COUNT

Site Code: 82119076
Station ID:

Latitude: 0' 0.0000 Undefined

Start Time	Mon 02-May-16	Tue 03-May-16	Wed 04-May-16	Thu 05-May-16	Fri 06-May-16	Average Day	Sat 07-May-16	Sun 08-May-16	Week Average
12:00 AM	*	*	36	37	43	39	63	78	51
01:00	*	*	17	18	25	20	35	40	27
02:00	*	*	15	16	14	15	29	17	18
03:00	*	*	19	25	26	23	23	15	22
04:00	*	*	94	95	84	91	26	19	64
05:00	*	*	233	219	209	220	86	40	157
06:00	*	*	558	539	524	540	182	110	383
07:00	*	*	777	818	738	778	426	236	599
08:00	*	*	**795**	811	835	814	578	360	676
09:00	*	709	689	672	735	701	800	547	692
10:00	*	764	747	764	831	776	977	**793**	813
11:00	*	**776**	787	**843**	**903**	**827**	**1077**	747	**856**
12:00 PM	*	813	875	938	995	905	1025	**917**	927
01:00	*	860	904	888	1029	920	**1105**	766	925
02:00	*	1041	1033	1049	1088	1053	1032	796	1006
03:00	*	1083	1122	1084	**1211**	1125	991	750	1040
04:00	*	1126	**1296**	1165	1208	**1199**	918	685	**1066**
05:00	*	**1188**	1129	**1180**	1185	1170	811	650	1024
06:00	*	860	834	901	974	892	738	565	812
07:00	*	523	567	623	681	598	571	475	573
08:00	*	368	399	415	490	418	438	325	406
09:00	*	254	244	274	348	280	291	202	269
10:00	*	133	135	179	252	175	200	132	172
11:00	*	66	82	93	142	96	145	54	97
Day Total	0	10564	13387	13646	14570	13675	12567	9319	12675
% Avg. WkDay	0.0%	77.3%	97.9%	99.8%	106.5%				
% Avg. Week	0.0%	83.3%	105.6%	107.7%	115.0%	107.9%	99.1%	73.5%	
AM Peak	-	11:00	08:00	11:00	11:00	11:00	11:00	10:00	11:00
Vol.	-	776	795	843	903	827	1077	793	856
PM Peak	-	17:00	16:00	17:00	15:00	16:00	13:00	12:00	16:00
Vol.	-	1188	1296	1180	1211	1199	1105	917	1066

Southern New Hampshire Planning Commission
438 Dubuque Street, Manchester, NH 03102
Tel: 603-669-4664 Fax:603-669-4350
Web: www.snhpc.org

DERRY
PINKERTON ST
EAST OF TSIENNETO RD
STATE COUNT

Site Code: 82119069
Station ID:

Latitude: 0' 0.0000 Undefined

Start Time	Mon 02-May-16	Tue 03-May-16	Wed 04-May-16	Thu 05-May-16	Fri 06-May-16	Average Day	Sat 07-May-16	Sun 08-May-16	Week Average
12:00 AM	*	*	54	48	78	60	88	101	74
01:00	*	*	29	27	33	30	37	45	34
02:00	*	*	23	39	31	31	28	36	31
03:00	*	*	31	39	38	36	23	34	33
04:00	*	*	54	68	60	61	38	19	48
05:00	*	*	197	170	195	187	82	37	136
06:00	*	*	592	636	637	622	182	109	431
07:00	*	*	661	**703**	720	**695**	382	279	549
08:00	*	*	633	583	636	617	429	394	535
09:00	*	*	521	531	589	547	653	574	574
10:00	*	*	554	630	656	613	796	746	676
11:00	*	**613**	**665**	636	**725**	660	**928**	**769**	**723**
12:00 PM	*	626	709	743	731	702	854	**907**	762
01:00	*	739	684	705	783	728	932	818	777
02:00	*	933	917	881	992	931	**984**	812	920
03:00	*	910	857	890	1016	918	922	780	896
04:00	*	984	997	**1015**	**1072**	1017	903	740	952
05:00	*	**1047**	**1036**	1009	1061	**1038**	864	720	**956**
06:00	*	864	843	889	945	885	768	585	816
07:00	*	674	607	669	795	686	647	558	658
08:00	*	518	516	549	529	528	538	442	515
09:00	*	329	322	357	478	372	392	274	359
10:00	*	175	160	212	308	214	269	164	215
11:00	*	109	107	154	199	142	195	68	139
Day Total	0	8521	11769	12183	13307	12320	11934	10011	11809
% Avg. WkDay	0.0%	69.2%	95.5%	98.9%	108.0%				
% Avg. Week	0.0%	72.2%	99.7%	103.2%	112.7%	104.3%	101.1%	84.8%	
AM Peak	-	11:00	11:00	07:00	11:00	07:00	11:00	11:00	11:00
Vol.	-	613	665	703	725	695	928	769	723
PM Peak	-	17:00	17:00	16:00	16:00	17:00	14:00	12:00	17:00
Vol.	-	1047	1036	1015	1072	1038	984	907	956

Southern New Hampshire Planning Commission

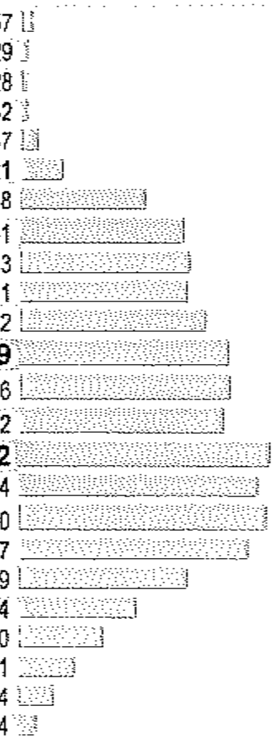
438 Dubuque Street, Manchester, NH 03102
Tel: 603-669-4664 Fax:603-669-4350
Web: www.snhpc.org

DERRY
TSIENNETO RD
EAST OF PINKERTON ST
STATE COUNT

Site Code: 82119078
Station ID:

Latitude: 0' 0.0000 Undefined

Start Time	Mon 02-May-16	Tue 03-May-16	Wed 04-May-16	Thu 05-May-16	Fri 06-May-16		Average Day		Sat 07-May-16	Sun 08-May-16		Week Average		
12:00 AM	*	*	31	35	47		38		85	85		57		
01:00	*	*	26	25	24		25		37	32		29		
02:00	*	*	27	27	20		25		35	29		28		
03:00	*	*	37	42	40		40		28	15		32		
04:00	*	*	127	119	109		118		51	29		87		
05:00	*	*	309	320	308		312		112	56		221		
06:00	*	*	938	959	909		935		301	132		648		
07:00	*	*	**1097**	**1159**	1084		**1113**		561	353		851		
08:00	*	*	1021	1102	1042		1055		788	461		883		
09:00	*	*	873	931	946		917		929	676		871		
10:00	*	*	985	950	995		977		1106	822		972		
11:00	*	**1034**	1001	1131	**1202**		1092		**1286**	**879**		**1089**		
12:00 PM	*	1087	1110	1101	1248		1136		1047	**983**		1096		
01:00	*	1085	1083	1010	1309		1122		**1142**	745		1062		
02:00	*	1446	1410	**1505**	1496		1464		1134	821		**1302**		
03:00	*	1441	1382	1363	1495		1420		977	806		1244		
04:00	*	**1457**	**1540**	1476	**1523**		**1499**		1005	741		1290		
05:00	*	1395	1355	1346	1415		1378		886	784		1197		
06:00	*	1050	885	934	998		967		767	640		879		
07:00	*	594	618	666	720		650		572	515		614		
08:00	*	467	393	429	526		454		466	361		440		
09:00	*	247	236	277	417		294		352	218		291		
10:00	*	119	119	166	306		178		241	153		184		
11:00	*	80	89	95	128		98		126	47		94		
Day Total	0	11502	16692	17168	18307		17307		14034	10383		15461		
% Avg. WkDay	0.0%	66.5%	96.4%	99.2%	105.8%									
% Avg. Week	0.0%	74.4%	108.0%	111.0%	118.4%		111.9%		90.8%	67.2%				
AM Peak	-	11:00	07:00	07:00	11:00	-	07:00	-	11:00	11:00	-	11:00	-	-
Vol.	-	1034	1097	1159	1202	-	1113	-	1286	879	-	1089	-	-
PM Peak	-	16:00	16:00	14:00	16:00	-	16:00	-	13:00	12:00	-	14:00	-	-
Vol.	-	1457	1540	1505	1523	-	1499	-	1142	983	-	1302	-	-



DERRY
CHESTER RD
EAST OF SILVESTRI CIR
STATE COUNT

Southern New Hampshire Planning Commission

438 Dubuque Street, Manchester, NH 03102
Tel: 603-669-4664 Fax:603-669-4350
Web: www.snhpc.org

Site Code: 82119064
Station ID:

Latitude: 0' 0.0000 Undefined

Start Time	Mon 02-May-16	Tue 03-May-16	Wed 04-May-16	Thu 05-May-16	Fri 06-May-16	Average Day	Sat 07-May-16	Sun 08-May-16	Week Average
12:00 AM	*	*	35	36	39	37	72	82	53
01:00	*	*	24	34	40	33	34	49	36
02:00	*	*	28	24	34	29	29	25	28
03:00	*	*	43	47	45	45	28	16	36
04:00	*	*	139	140	146	142	53	35	103
05:00	*	*	316	299	304	306	91	70	216
06:00	*	*	519	499	532	517	215	132	379
07:00	*	*	**605**	**588**	**592**	**595**	396	251	**486**
08:00	*	*	581	506	545	544	459	307	480
09:00	*	*	367	396	390	384	562	418	427
10:00	*	369	353	400	407	382	581	551	444
11:00	*	**379**	392	390	417	394	**626**	**605**	468
12:00 PM	*	377	402	432	505	429	638	585	490
01:00	*	478	468	460	531	484	599	**620**	526
02:00	*	491	545	544	595	544	**648**	519	557
03:00	*	636	606	**647**	702	648	570	543	617
04:00	*	**663**	**697**	618	665	**661**	539	526	**618**
05:00	*	633	597	632	**714**	644	556	526	610
06:00	*	574	529	498	649	562	486	496	539
07:00	*	410	383	401	512	426	415	431	425
08:00	*	313	310	305	362	322	344	297	322
09:00	*	220	234	232	284	242	282	182	239
10:00	*	143	139	154	216	163	211	116	163
11:00	*	82	76	93	136	97	157	62	101
Day Total	0	5768	8388	8375	9362	8630	8591	7444	8363
% Avg. WkDay	0.0%	66.8%	97.2%	97.0%	108.5%				
% Avg. Week	0.0%	69.0%	100.3%	100.1%	111.9%	103.2%	102.7%	89.0%	
AM Peak	-	11:00	07:00	07:00	07:00	07:00	11:00	11:00	07:00
Vol.	-	379	605	588	592	595	626	605	486
PM Peak	-	16:00	16:00	15:00	17:00	16:00	14:00	13:00	16:00
Vol.	-	663	697	647	714	661	648	620	618

Southern New Hampshire Planning Commission
438 Dubuque Street, Manchester, NH 03102
Tel: 603-669-4664 Fax:603-669-4350
Web: www.snhpc.org

DERRY
NO. MAIN ST
NO OF ACADEMY DR
STATE COUNT

Site Code: 82119052
Station ID:

Latitude: 0' 0.0000 Undefined

Start Time	Mon 02-May-16	Tue 03-May-16	Wed 04-May-16	Thu 05-May-16	Fri 06-May-16	Average Day	Sat 07-May-16	Sun 08-May-16	Week Average
12:00 AM	*	*	21	23	39	28	45	74	40
01:00	*	*	14	13	20	16	23	41	22
02:00	*	*	11	12	20	14	20	12	15
03:00	*	*	8	7	12	9	8	12	9
04:00	*	*	37	39	39	38	19	14	30
05:00	*	*	111	100	104	105	33	32	76
06:00	*	*	695	688	644	676	146	62	447
07:00	*	*	**759**	**752**	**757**	**756**	393	203	**573**
08:00	*	*	650	679	640	656	390	259	524
09:00	*	*	459	449	449	452	462	349	434
10:00	*	*	448	487	497	477	558	442	486
11:00	*	*	455	467	520	481	**671**	**509**	524
12:00 PM	*	449	501	493	582	506	654	**646**	554
01:00	*	512	558	512	652	558	**702**	499	572
02:00	*	785	782	**850**	834	813	689	568	751
03:00	*	798	807	798	858	815	663	512	739
04:00	*	804	**904**	825	**990**	**881**	559	503	**764**
05:00	*	**833**	856	738	918	836	541	530	736
06:00	*	588	573	667	694	630	551	428	584
07:00	*	445	405	356	512	430	380	324	404
08:00	*	292	254	386	335	317	279	233	296
09:00	*	154	129	171	213	167	308	177	192
10:00	*	79	92	129	229	132	163	148	140
11:00	*	44	54	50	106	64	143	36	72
Day Total	0	5783	9583	9691	10664	9857	8400	6613	8984
% Avg. WkDay	0.0%	58.7%	97.2%	98.3%	108.2%				
% Avg. Week	0.0%	64.4%	106.7%	107.9%	118.7%	109.7%	93.5%	73.6%	
AM Peak	-	-	07:00	07:00	07:00	07:00	11:00	11:00	07:00
Vol.	-	-	759	752	757	756	671	509	573
PM Peak	-	17:00	16:00	14:00	16:00	16:00	13:00	12:00	16:00
Vol.	-	833	904	850	990	881	702	646	764

DERRY
NO. MAIN ST
NO OF TSIENNETO RD
STATE COUNT

Southern New Hampshire Planning Commission

438 Dubuque Street, Manchester, NH 03102
Tel: 603-669-4664 Fax:603-669-4350
Web: www.snhpc.org

Site Code: 82119062
Station ID:

Latitude: 0' 0.0000 Undefined

Start Time	Mon 02-May-16	Tue 03-May-16	Wed 04-May-16	Thu 05-May-16	Fri 06-May-16		Average Day		Sat 07-May-16	Sun 08-May-16		Week Average		
12:00 AM	*	*	67	73	81		74		127	143		98		
01:00	*	*	22	21	44		29		61	81		46		
02:00	*	*	19	26	25		23		40	34		29		
03:00	*	*	31	24	27		27		29	27		28		
04:00	*	*	57	55	56		56		35	14		43		
05:00	*	*	205	186	168		186		64	45		134		
06:00	*	*	456	490	438		461		154	80		324		
07:00	*	*	**1005**	991	**996**		997		349	188		706		
08:00	*	*	996	**1014**	994		**1001**		578	369		**790**		
09:00	*	*	739	727	781		749		709	507		693		
10:00	*	*	568	576	662		602		795	721		664		
11:00	*	*	591	617	702		637		**896**	**764**		714		
12:00 PM	*	672	747	710	774		726		**1015**	**912**		805		
01:00	*	668	708	676	861		728		986	836		789		
02:00	*	826	829	803	959		854		942	765		854		
03:00	*	1065	1042	1145	1215		1117		957	815		1040		
04:00	*	1163	1196	1134	1311		1201		845	793		1074		
05:00	*	**1253**	**1299**	**1199**	**1377**		**1282**		827	799		**1126**		
06:00	*	1102	1094	1102	1149		1112		756	696		983		
07:00	*	758	734	724	835		763		673	657		730		
08:00	*	574	556	575	627		583		522	488		557		
09:00	*	397	342	362	517		404		471	349		406		
10:00	*	224	226	309	392		288		327	233		285		
11:00	*	116	113	141	256		156		238	94		160		
Day Total	0	8818	13642	13680	15247		14056		12396	10410		13078		
% Avg. WkDay	0.0%	62.7%	97.1%	97.3%	108.5%									
% Avg. Week	0.0%	67.4%	104.3%	104.6%	116.6%		107.5%		94.8%	79.6%				
AM Peak	-	-	07:00	08:00	07:00	-	08:00	-	11:00	11:00	-	08:00	-	-
Vol.	-	-	1005	1014	996	-	1001	-	896	764	-	790	-	-
PM Peak	-	17:00	17:00	17:00	17:00	-	17:00	-	12:00	12:00	-	17:00	-	-
Vol.	-	1253	1299	1199	1377	-	1282	-	1015	912	-	1126	-	-

Southern New Hampshire Planning Commission

438 Dubuque Street, Manchester, NH 03102
Tel: 603-669-4664 Fax:603-669-4350
Web: www.snhpc.org

DERRY
SO. MAIN ST
SO OF THORTON ST
STATE COUNT

Site Code: 82119054
Station ID:

Latitude: 0' 0.0000 Undefined

Start Time	Mon 02-May-16	Tue 03-May-16	Wed 04-May-16	Thu 05-May-16	Fri 06-May-16	Average Day	Sat 07-May-16	Sun 08-May-16	Week Average
12:00 AM	*	*	48	57	85	63	112	133	87
01:00	*	*	35	30	43	36	53	67	46
02:00	*	*	24	26	35	28	39	40	33
03:00	*	*	33	34	37	35	24	36	33
04:00	*	*	73	84	81	79	39	23	60
05:00	*	*	230	209	219	219	82	62	160
06:00	*	*	962	946	943	950	273	154	656
07:00	*	*	**1095**	**1105**	**1129**	**1110**	623	374	865
08:00	*	*	1038	1010	1004	1017	640	548	848
09:00	*	*	797	777	842	805	882	728	805
10:00	*	*	734	860	859	818	1070	945	894
11:00	*	*	833	805	921	853	**1244**	**1020**	**965**
12:00 PM	*	810	896	909	979	898	1209	**1184**	998
01:00	*	934	890	886	1083	948	1237	980	1002
02:00	*	1002	1002	1063	1044	1028	**1285**	1085	1080
03:00	*	1221	1273	1243	1383	1280	1181	980	1214
04:00	*	1340	1352	**1418**	**1459**	1392	1143	971	**1280**
05:00	*	**1407**	**1390**	1340	1454	**1398**	1092	989	1279
06:00	*	1161	1144	1114	1295	1178	1074	806	1099
07:00	*	898	812	774	992	869	843	660	830
08:00	*	616	569	695	623	626	617	538	610
09:00	*	383	357	419	526	421	563	315	427
10:00	*	189	197	258	429	268	383	264	287
11:00	*	108	120	162	242	158	295	80	168
Day Total	0	10069	15904	16224	17707	16477	16003	12982	15726
% Avg. WkDay	0.0%	61.1%	96.5%	98.5%	107.5%				
% Avg. Week	0.0%	64.0%	101.1%	103.2%	112.6%	104.8%	101.8%	82.6%	
AM Peak	-	-	07:00	07:00	07:00	07:00	11:00	11:00	11:00
Vol.	-	-	1095	1105	1129	1110	1244	1020	965
PM Peak	-	17:00	17:00	16:00	16:00	17:00	14:00	12:00	16:00
Vol.	-	1407	1390	1418	1459	1398	1285	1184	1280

Southern New Hampshire Planning Commission
438 Dubuque Street, Manchester, NH 03102
Tel: 603-669-4664 Fax:603-669-4350
Web: www.snhpc.org

DERRY
TSIENNETO RD
WEST OF CHESTER RD
STATE COUNT

Site Code: 82119021
Station ID:

Latitude: 0' 0.0000 Undefined

Start Time	Mon 02-May-16	Tue 03-May-16	Wed 04-May-16	Thu 05-May-16	Fri 06-May-16	Average Day	Sat 07-May-16	Sun 08-May-16	Week Average
12:00 AM	*	*	21	23	27	24	37	49	31
01:00	*	*	16	10	15	14	15	19	15
02:00	*	*	12	10	8	10	20	23	15
03:00	*	*	15	18	11	15	12	7	13
04:00	*	*	28	29	31	29	20	13	24
05:00	*	*	122	118	108	116	35	16	80
06:00	*	*	412	421	417	417	114	37	280
07:00	*	*	**503**	**495**	**452**	**483**	259	111	**364**
08:00	*	*	429	433	415	426	297	204	356
09:00	*	*	301	316	286	301	374	312	318
10:00	*	*	311	292	323	309	441	382	350
11:00	*	**330**	330	298	342	325	**497**	**386**	364
12:00 PM	*	351	296	298	364	327	444	**394**	358
01:00	*	299	320	336	398	338	459	372	364
02:00	*	450	493	**507**	502	488	446	373	462
03:00	*	469	441	461	502	468	**483**	382	456
04:00	*	501	**499**	485	**559**	**511**	425	366	**472**
05:00	*	**508**	477	490	503	494	394	357	455
06:00	*	440	382	441	442	426	388	301	399
07:00	*	311	279	275	339	301	280	237	287
08:00	*	216	207	261	295	245	242	171	232
09:00	*	128	120	135	228	153	189	101	150
10:00	*	68	58	104	154	96	115	84	97
11:00	*	31	39	58	78	52	90	29	54
Day Total	0	4102	6111	6314	6799	6368	6076	4726	5996
% Avg. WkDay	0.0%	64.4%	96.0%	99.2%	106.8%				
% Avg. Week	0.0%	68.4%	101.9%	105.3%	113.4%	106.2%	101.3%	78.8%	
AM Peak	-	11:00	07:00	07:00	07:00	07:00	11:00	11:00	07:00
Vol.	-	330	503	495	452	483	497	386	364
PM Peak	-	17:00	16:00	14:00	16:00	16:00	15:00	12:00	16:00
Vol.	-	508	499	507	559	511	483	394	472

Southern New Hampshire Planning Commission

438 Dubuque Street, Manchester, NH 03102
Tel: 603-669-4664 Fax:603-669-4350
Web: www.snhpc.org

LONDERRY
NH 102 (NASHUA RD)
@ DERRY T/L
STAATE COUNT

Site Code: 82269058
Station ID:

Latitude: 0' 0.0000 Undefined

Start Time	Mon 02-May-16	Tue 03-May-16	Wed 04-May-16	Thu 05-May-16	Fri 06-May-16	Average Day	Sat 07-May-16	Sun 08-May-16	Week Average
12:00 AM	*	*	140	164	194	166	234	260	198
01:00	*	*	80	81	136	99	171	223	138
02:00	*	*	86	74	103	88	101	98	92
03:00	*	*	107	122	111	113	94	66	100
04:00	*	*	309	347	324	327	124	76	236
05:00	*	*	858	824	816	833	278	143	584
06:00	*	*	1327	1280	1244	1284	563	335	950
07:00	*	*	**1761**	**1750**	**1642**	**1718**	932	599	1337
08:00	*	*	1596	1665	1605	1622	1275	865	1401
09:00	*	1376	1337	1502	1404	1405	1549	1223	1398
10:00	*	1358	1408	1362	1511	1410	1761	1629	1505
11:00	*	**1411**	1448	1473	1517	1462	**1946**	**1751**	**1591**
12:00 PM	*	1489	1515	1615	1698	1579	1973	**1777**	1678
01:00	*	1507	1482	1508	1668	1541	**2014**	1761	1657
02:00	*	1587	1631	1766	1864	1712	1915	1680	1740
03:00	*	**1839**	1737	**1846**	**1915**	**1834**	1859	1559	**1792**
04:00	*	1820	1733	1731	1901	1796	1751	1507	1740
05:00	*	1730	**1773**	1737	1764	1751	1678	1482	1694
06:00	*	1616	1567	1633	1766	1646	1581	1269	1572
07:00	*	1118	1197	1253	1406	1244	1319	1133	1238
08:00	*	927	873	1021	1037	964	1095	875	971
09:00	*	691	673	777	869	752	816	580	734
10:00	*	422	429	540	691	520	631	372	514
11:00	*	252	256	340	459	327	504	231	340
Day Total	0	19143	25323	26411	27645	26193	26164	21494	25200
% Avg. WkDay	0.0%	73.1%	96.7%	100.8%	105.5%				
% Avg. Week	0.0%	76.0%	100.5%	104.8%	109.7%	103.9%	103.8%	85.3%	
AM Peak	-	11:00	07:00	07:00	07:00	07:00	11:00	11:00	11:00
Vol.	-	1411	1761	1750	1642	1718	1946	1751	1591
PM Peak	-	15:00	17:00	15:00	15:00	15:00	13:00	12:00	15:00
Vol.	-	1839	1773	1846	1915	1834	2014	1777	1792

Southern New Hampshire Planning Commission

438 Dubuque Street, Manchester, NH 03102
Tel: 603-669-4664 Fax:603-669-4350
Web: www.snhpc.org

LONDONDERRY
NH 28 (ROCKINGHAM RD)
@ DERRY T/L
STATE COUNT

Site Code: 62269053
Station ID:

Latitude: 0' 0.0000 Undefined

Start Time	Mon 02-May-16	Tue 03-May-16	Wed 04-May-16	Thu 05-May-16	Fri 06-May-16		Average Day		Sat 07-May-16	Sun 08-May-16		Week Average		
12:00 AM	*	*	88	85	158		110		164	148		129		
01:00	*	*	61	57	76		65		72	92		72		
02:00	*	*	46	54	58		53		54	76		58		
03:00	*	*	45	61	67		58		50	49		54		
04:00	*	*	110	110	139		120		61	34		91		
05:00	*	*	344	304	279		309		132	64		225		
06:00	*	*	826	838	807		824		266	149		577		
07:00	*	*	**1287**	1309	1240		1279		609	338		957		
08:00	*	*	1268	**1397**	**1252**		**1306**		753	446		1023		
09:00	*	*	932	1005	1061		999		1008	776		956		
10:00	*	881	956	918	1009		941		1167	977		985		
11:00	*	**975**	986	994	1105		1015		**1271**	**1157**		**1081**		
12:00 PM	*	1075	1184	1146	1263		1167		1340	**1290**		1216		
01:00	*	1024	1112	1116	1259		1128		1376	1144		1172		
02:00	*	1207	1241	1229	1435		1278		**1471**	1175		1293		
03:00	*	1433	1359	1549	1562		1476		1353	1050		1384		
04:00	*	1563	1732	1682	1751		1682		1328	1060		1519		
05:00	*	**1775**	**1916**	**1811**	**1956**		**1864**		1206	959		**1604**		
06:00	*	1246	1226	1346	1424		1310		1052	812		1184		
07:00	*	871	820	979	1102		943		925	735		905		
08:00	*	641	630	703	823		699		720	565		680		
09:00	*	457	439	583	656		534		497	331		494		
10:00	*	271	277	353	492		348		396	267		343		
11:00	*	182	184	237	296		225		322	130		225		
Day Total	0	13601	19069	19866	21270		19733		17593	13824		18227		
% Avg. WkDay	0.0%	68.9%	96.6%	100.7%	107.8%									
% Avg. Week	0.0%	74.6%	104.6%	109.0%	116.7%		108.3%		96.5%	75.8%				
AM Peak	-	11:00	07:00	08:00	08:00	-	08:00	-	11:00	11:00	-	11:00	-	-
Vol.	-	975	1287	1397	1252	-	1306	-	1271	1157	-	1081	-	-
PM Peak	-	17:00	17:00	17:00	17:00	-	17:00	-	14:00	12:00	-	17:00	-	-
Vol.	-	1775	1916	1811	1956	-	1864	-	1471	1290	-	1604	-	-

Southern New Hampshire Planning Commission

438 Dubuque Street, Manchester, NH 03102
Tel: 603-669-4664 Fax:603-669-4350
Web: www.snhpc.org

LONDONDERRY
GILCREST RD
NO OF NH 102
STATE COUNT

Site Code: 82269082
Station ID:

Latitude: 0' 0.0000 Undefined

Start Time	Mon 02-May-16	Tue 03-May-16	Wed 04-May-16	Thu 05-May-16	Fri 06-May-16	Average Day	Sat 07-May-16	Sun 08-May-16	Week Average
12:00 AM	*	*	22	26	36	28	51	51	37
01:00	*	*	14	21	18	18	39	51	29
02:00	*	*	17	15	19	17	20	11	16
03:00	*	*	11	15	22	16	18	6	14
04:00	*	*	53	52	38	48	17	15	35
05:00	*	*	209	218	184	204	63	36	142
06:00	*	*	443	417	384	415	117	75	287
07:00	*	*	690	724	678	697	311	216	524
08:00	*	**703**	**702**	**858**	**763**	**756**	509	370	651
09:00	*	554	631	618	618	605	676	563	610
10:00	*	565	584	561	608	580	677	689	647
11:00	*	566	627	593	710	624	**991**	**736**	**704**
12:00 PM	*	701	697	708	806	728	900	**884**	783
01:00	*	648	678	653	775	688	911	794	743
02:00	*	708	753	800	836	774	912	738	791
03:00	*	867	886	938	978	917	**938**	718	888
04:00	*	946	**1054**	994	1040	1008	877	720	938
05:00	*	**1113**	1026	**1030**	**1044**	**1053**	777	666	**943**
06:00	*	892	732	844	896	841	655	563	764
07:00	*	528	524	537	640	557	510	447	531
08:00	*	360	365	389	432	386	424	315	381
09:00	*	212	210	228	308	240	291	144	232
10:00	*	116	120	122	210	142	174	83	138
11:00	*	58	67	75	119	80	119	43	80
Day Total	0	9537	11115	11436	12162	11422	11177	8934	10908
% Avg. WkDay	0.0%	83.5%	97.3%	100.1%	106.5%				
% Avg. Week	0.0%	87.4%	101.9%	104.8%	111.5%	104.7%	102.5%	81.9%	
AM Peak	-	08:00	08:00	08:00	08:00	08:00	11:00	11:00	11:00
Vol.	-	703	702	858	763	756	991	736	704
PM Peak	-	17:00	16:00	17:00	17:00	17:00	15:00	12:00	17:00
Vol.	-	1113	1054	1030	1044	1053	938	884	943

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC
IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF APRIL 2014

2/22/2016

82 119071 DERRY- NH 102 (EAST BROADWAY) WEST OF ABBOT ST

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
4	20	1	153	103	64	35	34	85	168	343	438	641	792	931	1073	840	737	669	751	786	878	710	555	326	178	132	11422
4	15	3	64	44	47	48	180	426	861	1021	904	798	745	811	817	824	1008	1096	1031	1048	976	769	608	343	221	165	14855
4	16	4	66	47	49	65	142	420	811	1002	903	717	698	760	735	813	1026	1014	1052	1107	1052	805	652	409	269	139	14753
4	17	5	89	49	44	49	175	458	884	1025	955	741	704	779	821	853	912	1122	1141	1192	1042	856	630	514	273	176	15484
4	18	6	76	59	50	54	155	379	832	1031	941	845	800	893	926	1015	1154	1147	1169	1198	1103	798	563	526	417	311	16442
4	19	7	149	99	47	29	73	145	323	677	780	1060	1081	1131	1136	1092	1153	1049	997	965	867	725	585	507	393	231	15294

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
82	119071	2014	April	6	11422	15384	15294	14843	445301		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	641	1073	878
WEEKDAY	1020	876	1148
SATURDAY	1060	1136	1153

AM - 6 AM TO 10 AM
MIDDAY - 10 AM TO 2 PM
PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC 2/22/2016
IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF APRIL 2014

82 119011 DERRY- NH 102 (BROADWAY) EAST OF GRIFFIN ST

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
4	20	1	175	119	63	49	47	77	151	304	437	665	832	989	1216	941	781	718	809	862	883	742	582	364	221	135	12162
4	15	3	80	65	56	71	202	544	772	1033	1020	976	983	1017	1091	1050	1083	1136	1137	1128	1034	742	645	432	271	210	16778
4	16	4	91	55	50	78	163	519	779	972	1024	970	1054	1073	1007	1030	1207	1229	1155	1150	1103	889	697	536	335	189	17355
4	17	5	112	68	58	76	197	560	794	1065	1056	933	1027	1061	1056	1096	1117	1243	1149	1190	1173	936	844	611	360	234	18016
4	18	6	135	90	73	75	187	483	751	1006	1062	1094	1067	1150	1211	1183	1259	1258	1285	1262	1157	946	735	590	448	354	18861
4	19	7	182	112	75	41	84	165	337	638	868	1073	1251	1289	1359	1344	1302	1245	1121	1090	998	833	699	567	446	283	17402

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
82	119011	2014	April	6	12162	17752	17402	16960	508811		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:	
SUNDAY	665	1216	883	AM - 6 AM TO 10 AM
WEEKDAY	1054	1118	1224	MIDDAY - 10 AM TO 2 PM
SATURDAY	1073	1359	1302	PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC
IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF APRIL 2014

2/22/2016

82 119091 DERRY- FORDWAY ST OVER BEAVER BROOK

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
4	20	1	51	37	22	10	12	17	38	93	102	215	229	325	335	315	240	214	264	237	295	257	181	125	56	33	3703
4	15	3	37	18	13	12	45	112	283	422	442	350	305	289	364	327	364	357	434	432	319	230	168	111	66	54	5554
4	16	4	28	12	14	13	49	98	228	357	375	284	308	298	297	343	386	412	414	448	374	229	177	129	79	59	5411
4	17	5	32	8	14	13	51	117	258	427	393	295	295	349	359	352	410	431	414	504	406	315	203	149	96	72	5963
4	18	6	37	19	11	7	33	116	253	345	398	356	379	393	419	420	487	539	513	493	412	279	211	167	124	86	6497
4	19	7	48	35	12	14	19	37	94	222	368	492	468	570	548	534	589	492	370	352	280	237	169	160	118	73	6301

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
82	119091	2014	April	6	3703	5856	6301	5628	168854		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	215	335	295
WEEKDAY	410	372	481
SATURDAY	492	570	589

AM - 6 AM TO 10 AM
MIDDAY - 10 AM TO 2 PM
PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC 2/22/2016

IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF APRIL 2014

82 119060 DERRY- FRANKLIN ST EXT NORTH OF FOLSOM RD

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
4	27	1	15	2	4	4	3	2	15	47	49	76	97	103	128	119	107	104	79	84	66	51	61	27	35	10	1288
4	23	4	16	4	5	5	10	30	78	86	99	87	103	102	130	100	135	158	162	158	123	90	69	51	32	7	1840
4	24	5	6	9	1	4	7	37	90	97	78	49	87	76	132	101	127	166	175	172	149	128	95	62	28	13	1889
4	25	6	11	10	3	3	10	30	74	101	99	90	94	127	171	143	130	170	175	151	125	101	77	60	34	25	2014
4	26	7	9	7	3	1	3	8	17	51	59	101	109	117	127	129	136	88	89	100	96	67	32	36	32	20	1439

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
82	119060	2014	April	5	1288	1914	1439	1767	53023		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	76	128	107
WEEKDAY	99	144	171
SATURDAY	101	129	138

AM - 6 AM TO 10 AM

MIDDAY - 10 AM TO 2 PM

PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC
IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF JULY 2014

62 269054 LONDONDERRY- NH 28 (ROCKINGHAM RD) EAST OF PERKINS RD

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
7	20	1	182	77	44	58	65	98	143	281	576	631	811	975	896	1014	994	931	1054	1034	853	769	576	392	249	151	12854
7	16	4	163	96	116	114	233	663	1009	1361	1432	1071	958	1031	1005	1072	1094	1457	1593	1607	1139	818	729	462	334	223	19780
7	17	5	171	105	98	118	257	640	1065	1409	1401	1107	1004	1022	1108	1134	1198	1504	1623	1757	1253	909	752	527	387	240	20789
7	18	6	206	132	103	117	196	564	1003	1289	1376	1141	1060	1006	1143	1147	1455	1605	1758	1721	1312	1090	723	493	452	339	21431
7	19	7	257	132	101	104	117	202	277	435	598	751	902	951	1078	993	1056	975	933	790	686	599	494	453	322	258	13464

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
62	269054	2014	July	5	12854	20667	13464	18729	580605		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	631	1014	1054
WEEKDAY	1406	1118	1707
SATURDAY	751	1078	1056

AM - 6 AM TO 10 AM
MIDDAY - 10 AM TO 2 PM
PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC

2/22/2016

IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF JUNE 2015

82 119070 DERRY- NH 28 (CRYSTAL AVE) SOUTH OF ROLLINS ST

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
6	28	1	135	69	39	24	31	52	105	249	313	556	693	809	932	952	875	861	808	789	741	678	456	342	217	101	10827
6	24	4	118	62	26	31	80	185	374	627	771	804	905	973	1040	1028	1040	1011	1137	1161	1012	892	810	576	336	203	15202
6	25	5	117	54	38	29	74	181	392	642	823	816	862	1068	1110	1071	1079	1050	1094	1130	966	854	773	572	394	205	15394
6	26	6	119	59	39	28	75	194	370	620	727	829	867	1036	1125	1144	1127	1081	1139	1230	1137	955	779	694	436	297	16107
6	27	7	178	80	55	41	56	110	207	402	574	842	1051	1061	1128	1054	1018	1003	882	894	815	759	618	529	331	163	13861

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
82	119070	2015	June	5	10827	15568	13861	14708	441241		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	556	952	875
WEEKDAY	819	1098	1174
SATURDAY	842	1128	1018

AM - 6 AM TO 10 AM
MIDDAY - 10 AM TO 2 PM
PM - 2 PM TO 6 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC 2/22/2016

IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF APRIL 2014

82 119059 DERRY- ASH ST AT LONDONDERRY TL

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
4	20	1	25	16	7	10	11	39	51	102	154	224	292	324	404	284	226	235	205	271	249	207	139	68	43	23	3609
4	15	3	12	5	8	5	39	100	306	405	382	331	354	411	488	417	454	551	665	608	461	314	203	107	54	43	6723
4	16	4	15	14	9	4	29	106	281	386	357	369	404	471	463	428	496	603	619	678	561	366	218	108	61	34	7100
4	17	5	18	11	9	8	34	125	327	419	424	345	408	456	548	483	576	613	768	753	556	382	254	182	71	60	7830
4	18	6	21	17	6	6	31	98	255	380	419	427	438	568	559	512	651	724	777	707	574	419	257	196	94	67	8203
4	19	7	24	14	13	9	17	40	89	226	345	457	563	636	662	599	629	613	516	468	449	290	259	146	95	53	7212

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
82	119059	2014	April	6	3609	7464	7212	6916	207492		

PEAK HOUR VOLUMES:	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:	
SUNDAY	224	404	271	AM - 6 AM TO 10 AM
WEEKDAY	410	522	722	MIDDAY - 10 AM TO 2 PM
SATURDAY	457	662	629	PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC
IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF JUNE 2015

2/22/2016

82 269015 LONDONDERRY- ASH ST EAST OF LONDONDERRY RD

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
6	28	1	40	22	11	12	15	23	58	87	166	273	394	446	468	490	471	441	396	334	259	212	128	119	59	34	4958
6	24	4	28	12	13	15	50	107	282	402	431	400	420	460	544	474	530	627	665	689	555	418	309	158	87	45	7721
6	25	5	29	16	20	18	43	103	276	364	431	386	423	420	444	475	483	636	693	716	523	402	302	169	90	67	7529
6	26	6	37	13	14	11	36	104	233	360	390	419	478	539	567	535	626	667	752	765	564	398	303	201	107	67	8186
6	27	7	25	40	18	13	29	49	103	216	357	524	595	628	630	502	566	495	475	399	336	275	227	138	88	54	6782

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
82	269015	2015	June	5	4958	7812	6782	7294	218824		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	273	490	471
WEEKDAY	427	529	723
SATURDAY	524	630	566

AM - 6 AM TO 10 AM
MIDDAY - 10 AM TO 2 PM
PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC 2/22/2016

IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF SEPTEMBER 2015

82 269046 LONDONDERRY- NH 28 (ROCKINGHAM RD) NORTH OF LIBERTY DR

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
9	6	1	81	54	47	36	56	86	180	260	371	619	663	657	768	749	623	546	499	516	552	470	424	334	207	177	8975
9	7	2	60	55	36	30	50	109	200	248	382	486	583	642	577	564	467	474	450	434	429	410	311	255	132	101	7485
9	2	4	99	70	57	70	179	469	1026	1402	1136	872	906	862	891	874	946	1107	1169	1172	836	761	582	423	266	192	16367
9	3	5	113	80	71	73	203	480	1045	1471	1208	917	863	922	895	895	1058	1140	1301	1292	908	819	693	410	301	179	17337
9	4	6	104	80	54	64	198	446	1011	1347	1111	984	953	1018	1093	1003	1154	1235	1267	1223	993	780	586	522	340	231	17817
9	5	7	147	91	61	50	82	159	330	544	709	757	886	954	881	852	795	733	663	673	651	573	489	417	286	165	11948

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
82	269046	2015	September	6	8975	14752	11948	13608	406225		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	619	768	623
WEEKDAY	1176	891	1054
SATURDAY	757	954	795

AM - 6 AM TO 10 AM

MIDDAY - 10 AM TO 2 PM

PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC
IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF JULY 2015

2/22/2016

82 269048 LONDONDERRY- NH 102 (NASHUA RD) EAST OF HAMPTON DR

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
7	29	4	195	137	109	154	379	1069	1737	2502	2383	2009	1875	1962	2127	2054	2213	2535	2739	2915	2197	1551	1368	692	554	360	36016
7	30	5	215	132	104	155	399	1039	1761	2560	2453	2022	2032	2258	2418	2347	2404	2731	2885	2876	2233	1546	1202	882	541	331	37526
7	31	6	186	136	115	148	391	958	1615	2332	2371	2294	2266	2343	2501	2454	2476	2686	2725	2690	2179	1622	1390	966	653	469	37966

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
82	269048	2015	July	3	0	37169	0	*	*		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	*	*	*
WEEKDAY	2478	2349	2842
SATURDAY	*	*	*

AM - 6 AM TO 10 AM
MIDDAY - 10 AM TO 2 PM
PM - 2 PM TO 6 PM

Project: Exit 4a SOEIS

Loc: 1 Location: Exit 4 NB ramps

Growth rates:

Annual	2014->2015	1.025
	2016->2015	0.975
Seasonal		

	AM Peak	PM Peak
May-16 Adj Factor=	0.96	0.98

Total Adjustments:		AM Peak	PM Peak
	2014->2015	0.984	1.0045
	2016->2015	0.936	0.9555

		2016- Raw		2016 - AADT				2015 - AADT				2015 - AWDT- Balanced from TMC and ATRs			
		AM Peak (730-830)	PM Peak (445-545)	AM Peak (730-830)	Approach Totals	PM Peak (445-545)	Approach Totals	AM Peak (730-830)	Approach Totals	PM Peak (445-545)	Approach Totals	AM Peak (730-830)	Approach Totals	PM Peak (445-545)	Approach Totals
EB	LT	562	536	540	1085	525	1343	527	1058	512	1310	585	1175	475	1215
	Thru	568	835	545		818		531		798		590		740	
	RT	0	0	0		0		0		0		0		0	
WB	LT	0	0	0	1240	0	877	0	1209	0	855	0	1350	0	800
	Thru	836	542	803		531		783		518		875		485	
	RT	455	353	437		346		426		337		475		315	
NB	LT	219	535	210	412	524	1071	205	402	511	1044	210	410	580	1185
	Thru	0	0	0		0		0		0		0		0	
	RT	210	558	202		547		197		533		200		605	
SB	LT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thru	0	0	0		0		0		0		0		0	
	RT	0	0	0		0		0		0		0		0	
	total	2850	3359	2737	2737	3291	3291	2669	2669	3209	3209	2935	2935	3200	3200

Use Seasonal Factor

Use Annual Factor

Balance to SB ramp

	WB		NB		EB		
	RT	TH	RT	LT	TH	LT	Total
700-800	518	813	188	187	505	527	2738
715-815	520	803	199	207	534	562	2825
730-830	455	836	210	219	568	562	**2850**
745-845	399	856	217	233	577	540	2820
800-900	346	847	202	223	573	514	2705

		Southbound		Westbound (NH 102)					Northbound (Exit 4 NB Ramp)					Eastbound (NH 102)					
Time Period	**Class.**	I	O	R	T	U	I	O	R	T	L	I	O	T	L	U	I	O	**Total**
Peak 1	Lights	0	983	441	816	0	1257	737	200	0	196	396	0	537	542	1	1080	1013	2733
Specified Period	%	0%	97%	97%	98%	0%	97%	95%	95%	0%	89%	92%	0%	95%	96%	100%	95%	96%	96%
7:00 AM - 9:15 AM	Other Vehicles	0	34	14	20	0	34	41	10	0	23	33	0	31	20	0	51	43	118
One Hour Peak	%	0%	3%	3%	2%	0%	3%	5%	5%	0%	11%	8%	0%	5%	4%	0%	5%	4%	4%
7:30 AM - 8:30 AM	**Total**	0	1017	455	836	0	1291	778	210	0	219	429	0	568	562	1	1131	1056	2851
	PHF	0	0.9	0.84	0.82	0	0.97	0.9	0.85	0	0.84	0.88	0	0.93	0.88	0.25	0.94	0.85	0.94
	Approach %	0%	36%				45%	27%				15%	0%				40%	37%	

	WB		NB		EB		
	RT	TH	RT	LT	TH	LT	Total
400-500	303	622	533	530	725	537	3230
415-515	357	597	543	524	743	520	3284
430-530	367	560	538	532	801	525	3323
445-545	353	542	556	535	835	536	**3359**
500-600	314	516	591	570	823	508	3322

		Southbound		Westbound (NH 102)					Northbound (Exit 4 NB off ramp)					Eastbound (NH 102)					
Time Period	**Class.**	I	O	R	T	U	I	O	R	T	L	I	O	T	L	U	I	O	**Total**
Peak 1	Lights	0	867	342	536	0	878	1369	552	0	527	1079	0	817	525	0	1342	1063	3299
Specified Period	%	0%	98%	97%	99%	0%	98%	98%	99%	0%	99%	99%	0%	98%	98%	0%	98%	99%	98%
4:00 PM - 6:15 PM	Other Vehicles	0	22	11	6	0	17	24	6	0	8	14	0	18	11	0	29	14	60
One Hour Peak	%	0%	2%	3%	1%	0%	2%	2%	1%	0%	1%	1%	0%	2%	2%	0%	2%	1%	2%
4:45 PM - 5:45 PM	**Total**	0	889	353	542	0	895	1393	558	0	535	1093	0	835	536	0	1371	1077	3359
	PHF	0	0.87	0.77	0.95	0	0.87	0.98	0.93	0	0.92	0.92	0	0.92	0.95	0	0.96	0.96	0.96
	Approach %	0%	26%				27%	41%				33%	0%				41%	32%	

Project: Exit 4a SDEIS

Loc **2** Location: **Exit 4 SB ramps**

Growth rates:

Annual	2014->2015	1.025
	2016->2015	0.975
Seasonal		

	AM Peak	PM Peak
May-16 Adj Factor=	0.96	0.98

		AM Peak	PM Peak
Total Adjustments	2014->2015	0.984	1.0045
	2016->2015	0.936	0.9555

		2016- Raw		2016 - AADT				2015 - AADT				2015 - AWDT- Balanced from TMC and ATRs			
		AM Peak (730-830)	PM Peak (445-545)	AM Peak (730-830)	Approach Totals	PM Peak (445-545)	Approach Totals	AM Peak (730-830)	Approach Totals	PM Peak (445-545)	Approach Totals	AM Peak (730-830)	Approach Totals	PM Peak (445-545)	Approach Totals
EB	LT	0	0	0	1475	0	1336	0	1439	0	1302	0	1580	0	1235
	Thru	849	1052	815		1031		795		1005		915		935	
	RT	687	311	660		305		544		297		665		300	
WB	LT	0	0	0	1078	0	1138	0	1051	0	1110	0	1085	0	1065
	Thru	589	917	565		899		551		877		565		850	
	RT	534	244	513		239		500		233		520		215	
NB	LT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thru	0	0	0		0		0		0		0		0	
	RT	0	0	0		0		0		0				0	
SB	LT	246	300	236	777	294	963	230	757	287	939	260	755	280	925
	Thru	0	0	0		0		0		0		0		0	
	RT	564	683	541		669		527		652		495		645	
	total	3469	3507	3330	3330	3437	3437	3247	3247	3351	3351	3420	3420	3225	3225

Use Seasonal Factor

Use Annual Factor

Balance to NS ramp

	SB RT	LT	WB T	EB T	Total
700-800	532	219	517	832	2100
715-815	535	240	552	846	2174
730-830	504	246	589	849	**2188**
745-845	503	267	608	816	2194
800-900	510	266	610	794	2180

		Southbound (Ex 4 SB Off)				Westbound (NH 102)				Eastbound (NH 102)				
Time Period	**Class.**	R	L	I	O	T	U	I	O	T	U	I	O	**Total**
Peak 1	Lights	474	251	725	0	570	0	570	1035	784	0	784	1044	2079
Specified Period	%	94%	94%	95%	0%	94%	0%	94%	96%	95%	0%	96%	94%	95%
7:00 AM - 9:15 AM	Other Vehicles	29	16	45	0	38	0	38	48	32	0	32	67	115
One Hour Peak	%	6%	6%	6%	0%	6%	0%	6%	4%	4%	0%	4%	6%	5%
7:45 AM - 8:45 AM	**Total**	**503**	**267**	**770**	**0**	**608**	**0**	**608**	**1083**	**816**	**0**	**816**	**1111**	**2194**
	PHF	0.89	0.89	0.89	0	0.88	0	0.86	0.95	0.95	0	0.93	0.92	0.94
	Approach %			35%	0%			28%	49%			37%	51%	

	SB RT	LT	WB Th	EB TH	LT	Total
400-500	560	247	1013	1014	0	2834
415-515	597	260	973	998	0	2828
430-530	637	286	939	1051	0	2913
445-545	683	300	917	1052	0	2952
500-600	665	307	911	1006	0	2689

		Southbound (Exit 4 SB off)					Westbound (NH 102)					Eastbound (NH 102)					
Time Period	**Class.**	R	L	U	I	O	R	T	U	I	O	T	L	U	I	O	**Total**
Peak 1	Lights	669	286	0	955	0	0	907	0	907	1325	1039	0	0	1039	1576	2901
Specified Period	%	98%	95%	0%	97%	0%	0%	99%	0%	99%	98%	99%	0%	0%	99%	99%	98%
4:00 PM - 6:15 PM	Other Vehicles	14	14	0	28	0	0	10	0	10	27	13	0	0	13	24	51
One Hour Peak	%	2%	5%	0%	3%	0%	0%	1%	0%	1%	2%	1%	0%	0%	1%	2%	2%
4:45 PM - 5:45 PM	**Total**	**683**	**300**	**0**	**983**	**0**	**0**	**917**	**0**	**917**	**1357**	**1052**	**0**	**0**	**1052**	**1600**	**2952**
	PHF	0.92	0.91	0	0.92	0	0	0.89	0	0.89	0.92	0.92	0	0	0.92	0.96	0.95
	Approach %				33%	0%				41%	46%				35%	54%	

Project Exit 4a SDEIS

Loc: 3 Location: Exit 5 NB ramps

Growth rates:

Annual	2014->2015	1.025
	2016->2015	0.975
Seasonal		

	AM Peak	PM Peak
May-16 Adj Factor=	0.96	0.98

		AM Peak	PM Peak
Total Adjustments:	2014->2015	0.984	1.0045
	2016->2015	0.936	0.9555

		2016- Raw		2016 - AADT				2015 - AADT				2015 - AWDT- Balanced from TMC and ATRs			
		AM Peak (730-830)	PM Peak (445-545)	AM Peak (730-830)	Approach Totals	PM Peak (445-545)	Approach Totals	AM Peak (730-830)	Approach Totals	PM Peak (445-545)	Approach Totals	AM Peak (730-830)	Approach Totals	PM Peak (445-545)	Approach Totals
EB	LT	216	228	207	913	223	1310	202	890	217	1277	240	980	235	1295
	Thru	735	1109	706		1087		688		1060		740		1060	
	RT	0	0	0		0		0		0		0		0	
WB	LT	0	0	0	1191	0	898	0	1161	0	875	0	1280	0	960
	Thru	569	401	546		393		537		383		540		425	
	RT	672	515	645		505		629		492		740		535	
NB	LT	273	210	262	358	206	425	255	349	201	415	300	410	220	460
	Thru	0	0	0		0		0		0		0		0	
	RT	100	223	96		219		94		214		110		240	
SB	LT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thru	0	0	0		0		0		0		0		0	
	RT	0	0	0		0		0		0		0		0	
	total	2565	2686	2462	2462	2633	2633	2400	2400	2567	2567	2670	2670	2715	2715

Use Seasonal Factor

Use Annual Factor

Balance to SB ramp

	WB		NB		EB		
	RT	TH	RT	LT	TH	LT	Total
700-800	774	607	97	281	573	232	2514
715-815	710	588	96	289	674	221	2578
730-830	672	569	100	273	735	216	**2565**
745-845	592	531	94	244	796	186	2443
800-900	530	470	98	199	788	176	2261

		Southbound		Westbound (NH 28)					Northbound (Ex. 5 NB Off-Ramp)					Eastbound (NH 28)					
Time Period	**Class.**	I	O	R	T	U	I	O	R	T	L	I	O	T	L	U	I	O	Total
Peak 1	Lights	0	875	682	554	0	1236	698	82	0	269	351	0	616	193	0	809	873	2396
Specified Period	%	0%	94%	96%	94%	0%	95%	91%	85%	0%	93%	91%	0%	91%	87%	0%	90%	94%	93%
7:00 AM - 9:00 AM	Other Vehicles	0	56	28	34	0	62	72	14	0	20	34	0	58	28	0	86	54	182
One Hour Peak	%	0%	6%	4%	6%	0%	5%	9%	15%	0%	7%	9%	0%	9%	13%	0%	10%	6%	7%
7:15 AM - 8:15 AM	Total	0	931	710	588	0	1298	770	96	0	289	385	0	674	221	0	895	877	2578
	PHF	0	0.87	0.89	0.85	0	0.9	0.78	0.86	0	0.73	0.78	0	0.76	0.8	0	0.87	0.81	0.89
	Approach %	0%	35%				50%	50%				15%	0%				35%	34%	

	WB		NB		EB		
	RT	TH	RT	LT	TH	LT	Total
400-500	500	449	143	143	985	209	2429
415-515	500	425	130	118	1037	232	2426
430-530	514	415	168	161	1066	231	2555
445-545	515	401	223	210	1109	228	**2686**
500-600	507	363	252	247	1055	224	2648

		Southbound		Westbound (NH 28)					Northbound (Ex 5 NB Off-Ramp)					Eastbound (NH 28)					
Time Period	**Class.**	I	O	R	T	U	I	O	R	T	L	I	O	T	L	U	I	O	Total
Peak 1	Lights	0	715	498	388	0	886	1295	211	0	194	405	0	1084	217	0	1301	587	2592
Specified Period	%	0%	96%	97%	97%	0%	97%	97%	95%	0%	92%	94%	0%	98%	95%	0%	97%	95%	97%
4:00 PM - 6:00 PM	Other Vehicles	0	28	17	13	0	30	37	12	0	16	28	0	25	11	0	36	25	94
One Hour Peak	%	0%	4%	3%	3%	0%	3%	3%	5%	0%	8%	6%	0%	2%	5%	0%	3%	5%	3%
4:45 PM - 5:45 PM	Total	0	743	515	401	0	916	1332	223	0	210	433	0	1109	228	0	1337	611	2686
	PHF	0	0.85	0.93	0.9	0	0.91	0.91	0.66	0	0.67	0.67	0	0.93	0.84	0	0.92	0.88	0.94
	Approach %	0%	38%				34%	57%				10%	0%				50%	31%	

Project	Exit 4a SDEIS
Loc 4 Location:	Exit 5 SB ramps

Growth rates:

Annual	2014->2015	1.025
	2016->2015	0.975

Seasonal

	AM Peak	PM Peak
May-16 Adj Factors	0.96	0.98

		AM Peak	PM Peak
Total Adjustments:	2014->2015	0.984	1.0045
	2016->2015	0.936	0.9555

		2016- Raw		2016 - AADT				2015 - AADT				2015 - AWDT- Balanced from TMC and ATRs			
		AM Peak (730-830)	PM Peak (445-545)	AM Peak (730-830)	Approach Totals	PM Peak (445-545)	Approach Totals	AM Peak (730-830)	Approach Totals	PM Peak (445-545)	Approach Totals	AM Peak (730-830)	Approach Totals	PM Peak (445-545)	Approach Totals
EB	LT	0	0	0	661	0	870	0	645	0	848	0	795	0	930
	Thru	463	641	444		628		433		612		515		650	
	RT	226	247	217		242		212		236		280		280	
WB	LT	192	116	184	796	314	586	179	776	311	571	235	840	335	625
	Thru	638	482	612		472		597		460		605		490	
	RT	0	0	0		0		0		0		0		0	
NB	LT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thru	0	0	0		0		0		0		0		0	
	RT	0	0	0		0		0		0		0		0	
SB	LT	496	690	475	782	676	957	464	762	659	933	465	760	645	910
	Thru	0	0	0		0		0		0		0		0	
	RT	319	287	306		281		298		274		295		265	
	total	2334	2463	2239	2239	2413	2413	2183	2183	2352	2352	2395	2395	2465	2465

Use Seasonal Factor

Use Annual Factor
Balance to NB ramp

		ramp total		SB RT	LT	WB TH	LT	EB RT	TH	Total
0.41	0.59	595	700-800	242	353	660	235	225	325	2160
0.4	0.6	726	715-815	287	459	673	211	223	359	2298
0.39	0.61	815	730-830	319	496	638	192	226	351	2334
0.38	0.62	885	745-845	333	552	604	155	206	463	2288
0.38	0.62	870	800-900	329	541	534	126	198	438	2167

Time Period	Class.	Southbound (Ex 5 SB Off-Ramp) R	T	L	I	O	Westbound (NH 28) T	L	U	I	O	Northbound I	O	Eastbound (NH 28) R	T	U	I	O	Total
Peak 1	Lights	301	0	467	768	0	589	179	0	768	863	0	377	198	396	0	594	890	2130
Specified Period	%	94%	0%	94%	94%	0%	92%	93%	0%	93%	90%	0%	90%	88%	86%	0%	86%	93%	91%
7:00 AM - 9:15 AM	Other Vehicles	18	0	29	47	0	49	13	0	62	96	0	41	28	67	0	95	67	204
One Hour Peak	%	6%	0%	6%	6%	0%	8%	7%	0%	7%	10%	0%	10%	12%	14%	0%	14%	7%	9%
7:30 AM - 8:30 AM	Total	319	0	496	815	0	638	192	0	830	959	0	418	226	463	0	689	957	2334
	PHF	0.72	0	0.76	0.74	0	0.72	0.76	0	0.73	0.89	0	0.84	0.9	0.95	0	0.92	0.82	0.89
	Approach %				35%	0%				36%	41%	0%	18%				40%	41%	

	SB RT	LT	WB TH	LT	EB RT	TH	Total
400-500	237	579	459	125	248	443	2233
415-515	262	597	424	119	275	458	2306
430-530	284	650	440	116	271	470	2409
445-545	287	690	482	116	247	645	2463
500-600	266	625	499	114	236	641	2390

Time Period	Class.	Southbound (Ex 5 SB Off-Ramp) R	T	L	I	O	Westbound (NH 28) T	L	U	I	O	Northbound I	O	Eastbound (NH 28) R	T	U	I	O	Total
Peak 1	Lights	267	2	672	941	0	452	115	0	567	1293	0	349	232	621	0	853	719	2361
Specified Period	%	93%	100%	97%	96%	0%	94%	99%	0%	95%	97%	0%	96%	94%	97%	0%	96%	93%	96%
4:00 PM - 6:15 PM	Other Vehicles	20	0	18	38	0	30	1	0	31	38	0	16	15	20	0	35	50	104
One Hour Peak	%	7%	0%	3%	4%	0%	6%	1%	0%	5%	3%	0%	4%	6%	3%	0%	4%	7%	4%
4:45 PM - 5:45 PM	Total	287	2	690	979	0	482	116	0	598	1331	0	365	247	641	0	888	769	2465
	PHF	0.91	0.5	0.91	0.93	0	0.87	0.83	0	0.86	0.9	0	0.81	0.74	0.9	0	0.87	0.9	0.91
	Approach %				40%	0%				24%	54%	0%	15%				55%	31%	

Project 13/14a SDEIS
Loc 5 Location NH 102-Londonderry Rd

Growth rates

Annual	2014->2015	1.025
	2016->2015	0.975

Seasonal
Intersection Turning Movement Counts

		AM Peak	PM Peak
May-16	Adj Factors	0.96	0.98

		2016 - Raw		2016 - AADT				2015 - AADT				2015 - AADT - Rounded			
		AM Peak (715-815)	PM Peak (445-545)	AM Peak (730-830)	Approach Totals	PM Peak (430-530)	Approach Totals	AM Peak (715-815)	Approach Totals	PM Peak (430-530)	Approach Totals	AM Peak (715-815)	Approach Totals	PM Peak (430-530)	Approach Totals
EB	LT	80	298	77	612	292	1392	75	597	285	1358	75	600	285	1355
	Thru	556	996	534		976		521		952		520		950	
	RT	1	127	1		124		1		121		5		120	
WB	LT	1	1	1	1148	1	776	1	1119	1	757	5	1120	5	760
	Thru	1167	757	1120		737		1092		719		1090		720	
	RT	28	39	27		38		26		37		25		35	
NB	LT	0	3	0	1	3	7	0	1	3	7	0	1	5	10
	Thru	0	1	0		1		0		1		0		0	
	RT	1	3	1		3		1		3		1		5	
SB	LT	12	9	12	119	9	143	12	116	9	140	10	115	10	145
	Thru	0	1	0		1		0		1		0		5	
	RT	111	136	107		133		104		130		105		130	
	Total	1957	2366	1880	1880	2318	2318	1833	1833	2262	2262	1836	1836	2270	2270

Use Seasonal Factor

Use Annual Factor
Balance to SB ramp

	WB RT	WB TH	WB LT	NB RT	NB TH	NB LT	EB RT	EB TH	EB LT	SB RT	SB TH	SB LT	Total
700-800													2738
715-815	28	1167	1	1	0	0	1	556	80	111	0	12	1957
730-830													2650
745-845													2820
800-900													2705

Time Period	Class.	Southbound (Londonderry Rd.) R	T	L	U	I	O	Westbound (NH 102) R	T	L	U	I	O	Northbound (St. Charles St.) R	T	L	U	I	O	Eastbound (NH 102) R	T	L	U	I	O	Total
Peak 1	Lights	105	0	11	0	116	96	27	1119	1	0	1147	523	1	0	0	0	1	2	1	511	69	0	581	1224	1845
Specified Period	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7:00 AM - 9:15 AM	Other Vehicles	6	0	1	0	7	12	1	48	0	0	49	46	0	0	0	0	0	0	0	45	11	0	56	54	112
One Hour Peak	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7:15 AM - 8:15 AM	Total	111	0	12	0	123	108	28	1167	1	0	1195	569	1	0	0	0	1	2	1	556	80	0	637	1278	1957
	PHF	0.9	0	0.75	0	0.86	0.82	0.78	0.89	0.25	0	0.93	0.89	0.25	0	0	0	0.25	0.5	0.25	0.9	0.83	0	0.89	0.9	0.95
	Approach %					[illegible]	[illegible]					[illegible]	[illegible]					[illegible]	[illegible]					[illegible]	[illegible]	

	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	EB LT	EB TH	EB RT	SB LT	SB TH	SB RT	Total
400-500													0
415-515													0
430-530													0
445-545	1	757	39	3	1	3	298	996	127	9	1	136	2366
500-600													0

Time Period	Class.	Southbound (Londonderry Rd.) R	T	L	U	I	O	Westbound (NH 102) R	T	L	U	I	O	Northbound (St. Charles St.) R	T	L	U	I	O	Eastbound (NH 102) R	T	L	U	I	O	Total
Peak 1	Lights	134	1	8	0	143	330	38	739	1	0	778	995	3	1	3	0	7	127	125	984	291	0	1400	878	2328
Specified Period	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4:00 PM - 6:15 PM	Other Vehicles	2	0	1	0	3	8	1	13	0	0	14	13	0	0	0	0	0	2	2	12	7	0	21	15	38
One Hour Peak	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4:45 PM - 5:45 PM	Total	136	1	9	0	146	339	39	752	1	0	792	1008	3	1	3	0	7	129	127	996	298	0	1421	891	2366
	PHF	0.83	0.25	0.75	0	0.83	0.9	0.89	0.94	0.75	0	0.95	0.96	0.38	0.25	0.75	0	0.58	0.81	0.79	0.96	0.88	0	0.97	0.94	0.97
	Approach %					[illegible]	[illegible]					[illegible]	[illegible]					[illegible]	[illegible]					[illegible]	[illegible]	

Project Exit 6a SDEIS

Loc 6 Location NH 102-Fordway - High St

Growth rates:

Annual	2014->2015	1.025
	2016->2015	0.975

Seasonal:

Intersection Turning Movement Counts

		AM Peak	PM Peak
May-16	Adj Factor=	0.96	0.98

		2016 - Raw		2016 - AADT				2015 - AADT				2015 - AADT - Rounded				
		AM Peak (715-815)	PM Peak (430-530)	AM Peak (715-815)	Approach Totals	PM Peak (430-530)	Approach Totals	AM Peak (715-815)	Approach Totals	PM Peak (430-530)	Approach Totals	AM Peak (715-815)	Approach Totals	PM Peak (430-530)	Approach Totals	
EB	LT	6	0	6	539	0	533	0	526	0	910	0	525	0	910	EB
	Thru	476	795	411		779		401		760		400		760		
	RT	133	157	128		154		125		150		125		150		
WB	LT	14	14	13	622	14	440	13	607	14	429	15	610	15	430	WB
	Thru	634	435	609		426		594		415		595		415		
	RT	0	0	0		0		0		0		0		0		
NB	LT	369	241	354	428	236	337	345	417	230	328	345	415	230	330	NB
	Thru	0	0	0		0		0		0		0		0		
	RT	77	103	74		101		72		98		70		100		
SB	LT	7	15	7	42	15	69	7	41	15	68	5	40	15	70	SB
	Thru	28	52	27		51		26		50		25		50		
	RT	8	3	8		3		8		3		10		5		
	total	1698	1815	1631	1631	1779	1779	1591	1591	1735	1735	1590	1590	1740	1740	

Use Seasonal Factor

Use Annual Factor

Balance to NB ramp

CHECK E-W APPROACHES =

2015 Peak Hour Link Volumes based on TMC

Approach		AM Peak Inbound	AM Peak Outbound	Total	PM Peak Inbound	PM Peak Outbound	Total	2015 AADT	Adjusted 2015 AM Pk	Adjusted 2015 PM Pk	% AADT in AM Pk	% AADT in PM Pk
North	High St N of Broadway	40	0	40	70	0	70	15568	784	1104	0.26%	0.45%
South	Fordway S of 102	415	165	580	330	215	545	7576			5.46%	7.19%
East	NH 102 WB, E of Fordway	610	950	1560	430	650	1080	15012			5.45%	7.19%
West	NH 102 EB, W of Fordway	525	475	1000	910	875	1785	24817			5.46%	7.19%
		1590	1590	3180	1740	1740	3480					

Notes: Adjusted 2015 AADT based on ATR counts for comparison purposes

Calculated 2015 AADT based on AM/PM k factors in red

k factors based on ratio of TMC volumes compared to adjusted 2015 AADT from ATR data

	SB LT	TH	RT	WB LT	TH	NB LT	TH	RT	EB TH	RT	Total
700-800											0
715-815	7	28	8	14	634	369	0	77	428	133	3995
730-830											0
745-845											0
800-900											0

Time Period	Class.	SB (Madden Hill Rd.) R	T	L	I	O	WB (NH 102) T	L	U	I	O	NB (Fordway) R	L	U	I	O	EB (NH 102) R	T	U	I	O	Total		Crosswalk Pedestrians	Total
Peak 1	Lights	8	27	7	42	0	605	13	0	518	467	71	352	4	433	465	325	389	0	512	975	1507	SB	0	0
Specified Period	%	100%	96%	100%	98%	0%	95%	93%	0%	95%	93%	92%	98%	80%	97%	96%	94%	91%	0%	92%	95%	95%		0%	
7:00 AM - 9:15 AM	Other Vehicles	0	1	0	1	0	29	1	0	30	45	6	7	0	13	18	8	39	0	47	38	91	WB	0	0
One Hour Peak	%	0%	4%	0%	2%	0%	5%	7%	0%	5%	8%	8%	2%	0%	3%	4%	6%	9%	0%	8%	4%	5%		0%	
7:15 AM - 8:15 AM	Total	8	28	7	43	0	634	14	0	648	512	77	359	4	446	475	133	428	0	561	1013	1598	NB	0	0
	PHF	0.67	0.58	0.44	0.6	0	0.87	0.58	0	0.76	0.85	0.80	0.92	0	0.95	0.84	0.9	0.89	0	0.93	0.85	0.95		0%	
	Approach %				3%	0%				38%	32%				28%	30%				35%	63%		EB	0	0
																								0%	
																								0	0

	SB LT	TH	RT	WB LT	TH	NB LT	RT	EB TH	RT	Total
400-500										0
415-515										0
430-530	15	52	3	14	435	241	103	795	157	1815
445-545										0
500-600										0

Time Period	Class.	SB (Madden Hill Rd.) R	T	L	I	O	WB (NH 102) T	L	U	I	O	NB (Fordway) R	L	U	I	O	EB (NH 102) R	T	U	I	O	Total		Crosswalk Pedestrians	Total
Peak 1	Lights	3	51	15	69	0	427	14	0	436	898	102	239	0	341	270	155	751	0	938	664	1782	SB	0	0
Specified Period	%	100%	98%	100%	99%	0%	97%	100%	0%	97%	96%	99%	99%	0%	99%	99%	99%	95%	0%	98%	98%	98%		0%	
4:00 PM - 6:15 PM	Other Vehicles	0	1	0	1	0	13	0	0	13	35	1	2	0	3	3	2	44	0	15	15	35	WB	0	0
One Hour Peak	%	0%	2%	0%	1%	0%	3%	0%	0%	3%	4%	1%	1%	0%	1%	1%	1%	5%	0%	2%	2%	2%		0%	
4:30 PM - 5:30 PM	Total	3	52	15	70	0	435	14	0	449	933	103	241	0	344	273	157	795	0	952	679	1815	NB	1	1
	PHF	0.38	0.76	0.62	0.83	0	0.89	0.88	0	0.89	0.95	0.92	0.9	0	0.98	0.83	0.73	0.87	0	0.95	0.95	0.97		100%	
	Approach %				4%	1%				25%	51%				19%	15%				53%	37%		EB	0	0
																								0%	
																								1	1

Project Exit 4a SDEIS
7 Location NH 102 NH 28

Growth rates:

Annual	2014->2015	1.015
	2016->2015	0.975

Seasonal
Intersection Turning Movement Counts

			AM Peak	PM Peak
May-16		Adj Factor=	0.96	0.98

		2016 Raw AM Peak (745 845)	2016 Raw PM Peak (445 545)	2016 - AADT AM Peak (745 845)	Approach Totals	PM Peak (445 545)	Approach Totals	2015 - AADT AM Peak (745 845)	Approach Totals	PM Peak (445 545)	Approach Totals	2015 - AADT - Rounded AM Peak (745 845)	Approach Totals	PM Peak (445 545)	Approach Totals	
EB	LT	110	142	106	374	139	558	104	365	136	584	105	370	135	585	EB
	Thru	218	429	209		420		204		410		205		410		
	RT	61	40	59		39		58		38		60		40		
WB	LT	40	81	38	518	79	404	37	505	77	394	35	500	75	390	WB
	Thru	412	262	396		257		386		253		385		250		
	RT	87	69	84		68		82		66		80		65		
NB	LT	62	75	60	370	74	411	58	361	72	400	60	360	70	400	NB
	Thru	280	307	269		301		262		293		260		295		
	RT	45	37	41		36		40		35		40		35		
SB	LT	76	344	73	416	341	645	71	405	337	628	70	405	335	625	SB
	Thru	246	358	236		351		230		342		230		340		
	RT	111	156	107		153		104		149		105		150		
Total		1746	2106	1676	1678	2056	2056	1636	1636	2006	2005	1635	1635	2000	2000	

Use Seasonal Factor

Use Annual Factor
Balance to SB ramp

2015 Peak Hour Link Volumes based on TMC

Approach		AM Peak Inbound	AM Peak Outbound	Total	PM Peak Inbound	PM Peak Outbound	Total	2015 AADT	Adjusted 2015 AM Pk	Adjusted 2015 PM Pk	% AADT in AM Pk	% AADT in PM Pk
North	Crystal N of Broadway	405	445	850	625	495	1120	15368	750	1104	5.46%	7.19%
South	Birch S of Broadway	160	325	485	400	455	855	11885			5.46%	7.19%
East	NH 102 WB, E. of NH 28	500	550	1050	390	470	860	11554			5.46%	7.19%
West	NH 102 EB, W of NH 28	170	315	485	555	580	1135	15154			5.46%	7.19%
		1635	1635	3270	2000	2000	4000					

Notes: Adjusted 2015 AADT based on ATR counts for comparison purposes
Calculated 2015 AADT based on AM/PM k factors in red
k factors based on ratio of TMC volumes compared to adjusted 2015 AADT from ATR data

	SB LT	TH	RT	WB LT	TH	RT	NB LT	TH	RT	EB LT	TH	RT	Total
700 800													0
715 815													0
730 830													0
745-845	76	246	111	40	412	87	62	280	45	110	218	61	1746
800 900													0

Time Period	Class.	Southbound (NH 28) R	T	L	U	I	O	Westbound (NH 102) R	T	L	U	I	O	Northbound (NH 28) R	T	L	U	I	O	Eastbound (NH 102) R	T	L	U	I	O	Total
Peak 1	Lights	105	276	73	0	407	353	85	391	32	0	508	316	41	265	58	0	364	315	59	392	103	0	554	555	1633
Specified Period	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7:00 AM - 9:15 AM	Other Vehicle	5	15	5	0	26	24	2	21	8	0	31	31	2	15	4	0	25	26	2	12	7	0	35	56	113
One Hour Peak	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7:45 AM - 8:45 AM	Total	111	246	78	0	433	477	87	412	40	0	539	337	43	280	62	0	385	347	61	216	110	0	385	585	1746
	PHF	0.92	0.87	0.86	0	0.91	0.95	0.84	0.91	0.77	0	0.94	0.89	0.67	0.87	0.87	0	0.98	0.85	0.85	0.94	0.79	0	0.96	0.84	0.96

Crosswalk	Pedestrians	Total
SB	0	1
WB	0	0
NB	1	1
EB	0	0
	1	1

	SB LT	TH	RT	WB LT	TH	RT	NB LT	TH	RT	EB LT	TH	RT	Total
400 500													0
415 515													0
430 530													0
445-545	344	358	156	81	262	69	75	307	37	142	429	40	2100
500 600													0

Time Period	Class.	Southbound (NH 28) R	T	L	U	I	O	Westbound (NH 102) R	T	L	U	I	O	Northbound (NH 28) R	T	L	U	I	O	Eastbound (NH 102) R	T	L	U	I	O	Total
Peak 1	Lights	335	356	144	0	655	504	69	258	79	0	405	505	35	350	74	0	405	471	38	426	139	0	603	487	2089
Specified Period	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4:00 PM - 6:15 PM	Other Vehicle	3	2	0	0	3	14	0	4	2	0	6	5	2	11	1	0	14	8	2	3	3	0	2	6	11
One Hour Peak	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4:45 PM - 5:45 PM	Total	356	358	144	0	658	518	69	262	81	0	412	510	37	307	75	0	419	479	40	429	142	0	611	493	2100
	PHF	0.93	0.86	0.78	0	0.93	0.86	0.75	0.55	0.81	0	0.94	0.91	0.64	0.51	0.75	0	0.92	0.97	0.77	0.95	0.93	0	0.95	0.93	0.97

Crosswalk	Pedestrians	Total
SB	5	5
WB	0	0
NB	2	2
EB	3	3
	10	10

Loc B

Project: Exit 4a SDEIS
Location: **North High St at Ash St Ext**

Growth rates:

Annual	2014->2015	**1.025**
	2016->2015	**0.975**

Seasonal:
Intersection Turning Movement Counts

		AM Peak	PM Peak
May-16	Adj Factor=	**0.96**	**0.98**

		2016- Raw		**2016 - AADT**				**2015 - AADT**				**2015 - AADT- Rounded**			
		AM Peak (730-830)	PM Peak (500-600)	AM Peak (730-830)	Approach Totals	PM Peak (500-600)	Approach Totals	AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals	AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals
EB	LT	190	442	182	191	433	439	177	186	422	428	180	190	420	425
	Thru	0	0	0		0		0		0		0		0	
	RT	9	6	9		6		9		6		10		5	
WB	LT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thru	0	0	0		0		0		0		0		0	
	RT	0	0	0		0		0		0		0		0	
NB	LT	3	2	3	129	2	298	3	126	2	291	5	130	5	295
	Thru	131	302	126		296		123		289		125		290	
	RT	0	0	0		0		0		0		0		0	
SB	LT	0	0	0	414	0	442	0	404	0	431	0	405	0	435
	Thru	184	375	177		172		173		168		175		170	
	RT	247	276	237		270		231		263		230		265	
	Total	764	1203	734	734	1179	1179	716	716	1150	1150	725	725	1155	1155

Use Seasonal Factor

Use Annual Factor
Balance to NB ramp

	SB		NB		EB		
	TH	RT	TH	LT	RT	LT	Total
700-800							0
715-815							0
730-830	184	247	131	3	9	190	**764**
745-845							0
800-900							0

		Southbound (N. High St.)					Northbound (N. High St.)					Eastbound (Ash St. Ext.)					
Time Period	**Class.**	**R**	**T**	**U**	**I**	**O**	**T**	**L**	**U**	**I**	**O**	**R**	**L**	**U**	**I**	**O**	**Total**
Peak 1	Lights	244	177	0	421	307	126	2	0	128	186	9	181	0	190	246	739
Specified Perio	%	99%	96%	0%	98%	96%	96%	67%	0%	96%	96%	100%	95%	0%	95%	98%	97%
7:00 AM - 9:15 A	Other Vehicles	3	7	0	10	14	5	1	0	6	7	0	9	0	9	4	25
One Hour Peal	%	1%	4%	0%	2%	4%	4%	33%	0%	4%	4%	0%	5%	0%	5%	2%	3%
7:30 AM - 8:30 A	**Total**	**247**	**184**	**0**	**431**	**321**	**131**	**3**	**0**	**134**	**193**	**9**	**190**	**0**	**199**	**250**	**764**
	PHF	0.76	0.82	0	0.93	0.89	0.89	0.75	0	0.91	0.85	0.38	0.86	0	0.89	0.76	0.92
	Approach %				56%	42%				18%	25%				26%	33%	

	SB		NB		EB		
	TH	RT	LT	TH	LT	RT	Total
400-500							0
415-515							0
430-530							0
445-545							0
500-600	175	276	2	302	442	6	**1203**

Loc **8** Location: **North High St at Ash St Ext**

		Southbound (N. High St.)					Northbound (N. High St.)					Eastbound (Ash St. Ext.)					
Time Period	**Class.**	**R**	**T**	**U**	**I**	**O**	**T**	**L**	**U**	**I**	**O**	**R**	**L**	**U**	**I**	**O**	**Total**
Peak 1	Lights	273	173	0	446	735	296	2	0	298	179	6	439	0	445	275	1189
Specified Period	%	99%	99%	0%	99%	99%	98%	100%	0%	98%	99%	100%	99%	0%	99%	99%	99%
4:00 PM - 6:15 PN	Other Vehicles	3	2	0	5	9	6	0	0	6	2	0	3	0	3	3	14
One Hour Peak	%	1%	1%	0%	1%	1%	2%	0%	0%	2%	1%	0%	1%	0%	1%	1%	1%
5:00 PM - 6:00 PN	**Total**	**276**	**175**	**0**	**451**	**744**	**302**	**2**	**0**	**304**	**181**	**6**	**442**	**0**	**448**	**278**	**1203**
	PHF	0.9	0.74	0	0.87	0.94	0.87	0.5	0	0.87	0.75	0.5	0.9	0	0.9	0.89	0.93
	Approach %				37%	67%				25%	15%				37%	23%	

Project: Exit 4a SDEIS

Loc 9 Location: **High St at Madden Rd**

Growth rates:

Annual	2014->2015	**1.025**
	2016->2015	**0.975**

Seasonal:

Intersection Turning Movement Counts

		AM Peak	PM Peak
May-16	Adj Factor=	**0.96**	**0.98**

		2016- Raw		**2016 - AADT**				**2015 - AADT**				**2015 - AADT- Rounded**			
		AM Peak (730-830)	PM Peak (500-600)	AM Peak (730-830)	Approach Totals	PM Peak (500-600)	Approach Totals	AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals	AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals
EB	LT	12	12	12	14	12	16	12	14	12	16	10	10	10	10
	Thru	0	0	0		0		0		0		0		0	
	RT	2	4	2		4		2		4		0		0	
WB	LT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thru	0	0	0		0		0		0		0		0	
	RT	0	0	0		0		0		0		0		0	
NB	LT	0	3	0	313	3	725	0	305	3	707	0	310	0	700
	Thru	326	737	313		722		305		704		310		700	
	RT	0	0	0		0		0		0		0		0	
SB	LT	0	0	0	428	0	456	0	418	0	445	0	420	0	450
	Thru	428	460	411		451		401		440		400		440	
	RT	18	5	17		5		17		5		20		10	
	total	786	1221	755	755	1197	1197	737	737	1168	1168	740	740	1160	1160

Use Seasonal Factor

Use Annual Factor

Balance to NB ramp

	SB TH	RT	NB TH	LT	EB RT	LT	Total
700-800							0
715-815							0
730-830	**428**	**18**	**326**	**0**	**2**	**12**	**786**
745-845							0
800-900							0

		Southbound (N. High St.)						**Northbound (N. High St.)**					**Eastbound (Madden Rd.)**				
Time Period	**Class.**	**R**	**T**	**U**	**I**	**O**	**T**	**L**	**U**	**I**	**O**	**R**	**L**	**U**	**I**	**O**	**Total**
Peak 1	Lights	4	417	0	421	314	313	0	0	313	419	2	1	0	3	4	737
Specified Period	%	22%	97%	0%	94%	93%	96%	0%	0%	56%	97%	100%	8%	0%	71%	22%	94%
7:00 AM - 9:00 AM	Other Vehicles	14	11	0	25	24	13	0	0	13	11	0	11	0	11	14	49
One Hour Peak	%	78%	3%	0%	6%	7%	4%	0%	0%	4%	3%	0%	92%	0%	79%	78%	6%
7:30 AM - 8:30 AM	**Total**	**18**	**428**	**0**	**446**	**338**	**326**	**0**	**0**	**326**	**430**	**2**	**12**	**0**	**14**	**18**	**786**
	PHF	0.56	0.95	0	0.96	0.9	0.95	0	0	0.95	0.95	0.5	0.38	0	0.44	0.56	0.94
	Approach %				57%	43%				41%	55%				2%	2%	

Loc 9 Location: **High St at Madden Rd**

	SB		NB		EB		
	TH	RT	TH	LT	RT	LT	Total
400-500							0
415-515							0
430-530							0
445-545							0
500-600	**460**	**5**	**737**	**3**	**4**	**12**	**1221**

		Southbound (N. High St.)					Northbound (N. High St.)					Eastbound (Madden Rd.)					
Time Period	**Class.**	**R**	**T**	**U**	**I**	**O**	**T**	**L**	**U**	**I**	**O**	**R**	**L**	**U**	**I**	**O**	**Total**
Peak 1	Lights	5	454	0	459	738	727	3	0	730	458	4	11	0	15	8	1704
Specified Period	%	100%	99%	0%	99%	99%	99%	100%	0%	99%	99%	100%	92%	0%	94%	100%	99%
4:00 PM - 6:15 PM	Other Vehicles	0	6	0	6	11	10	0	0	10	6	0	1	0	1	0	17
One Hour Peak	%	0%	1%	0%	1%	1%	1%	0%	0%	1%	1%	0%	8%	0%	6%	0%	1%
5:00 PM - 6:00 PM	**Total**	**5**	**460**	**0**	**465**	**749**	**737**	**3**	**0**	**740**	**464**	**4**	**12**	**0**	**16**	**8**	**1221**
	PHF	0.62	0.85	0	0.86	0.93	0.94	0.38	0	0.93	0.86	0.33	0.6	0	0.5	0.5	0.94
	Approach %				38%	61%				61%	38%				1%	1%	

Project: Exit 4a SDT15

Loc 10 Location: N High St -Folsom Rd-Franklin St

Growth rates

Annual	2014->2015	1.025
	2016->2015	0.975

Seasonal

Intersection Turning Movement Counts

		AM Peak	PM Peak
May-16	Adj Factors	0.96	0.98

		2016- Raw AM Peak (730-830)	2016- Raw PM Peak (500-600)	2016 - AADT AM Peak (730-830)	Approach Totals	PM Peak (500-600)	Approach Totals	2015 - AADT AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals	2015 - AADT- Rounded AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals
EB	LT	38	46	36	371	45	735	35	313	44	713	35	310	45	735
	Thru	291	696	279		682		272		665		270		665	
	RT	6	4	6		4		6		4		5		5	
WB	LT	31	33	30	436	32	437	29	425	33	426	30	425	30	425
	Thru	413	393	395		385		385		375		385		375	
	RT	11	20	11		20		11		20		10		20	
NB	LT	7	4	7	47	4	65	7	46	4	64	10	50	5	65
	Thru	5	10	5		10		5		10		5		10	
	RT	36	52	35		51		34		50		35		50	
SB	LT	12	18	12	46	18	98	12	45	18	95	10	45	20	100
	Thru	4	10	4		10		4		10		5		10	
	RT	31	71	30		70		29		68		30		70	
	total	883	1357	850	850	1331	1331	829	829	1299	1299	830	830	1305	1305

Use Seasonal Factor

Use Annual Factor

Balance to NB ramp

	SB LT	TH	RT	WB LT	TH	RT	NB LT	TH	RT	EB LT	TH	RT	Total
700-800													
715-815													
730-830	12	4	31	31	411	11	7	5	36	38	291	6	883
745-845													
800-900													

Time Period	Class.	Southbound (Franklin St. Ext.) R	T	L	U	I	O	Westbound (Folsom Rd.) R	T	L	U	I	O	Northbound (Franklin St.) R	T	L	U	I	O	Eastbound (N. High St.) R	T	L	U	I	O	Total
Peak 1	Lights	30	4	12	0	46	52	10	389	30	0	429	319	36	5	7	0	48	38	4	271	37	0	312	426	835
Specified Period	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7:00 AM - 9:15 AM	Other Vehicles	1	0	0	0	1	2	1	22	1	0	24	20	0	0	0	0	0	3	2	20	1	0	23	23	48
One Hour Peak	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7:30 AM - 8:30 AM	Total	31	4	12	0	47	54	11	411	31	0	453	339	36	5	7	0	48	41	6	291	38	0	335	449	883
	PHF	0.78	0.5	0.5	0	0.65	0.68	0.34	0.97	0.7	0	0.96	0.85	0.69	0.31	0.44	0	0.67	0.85	0.38	0.9	0.79	0	0.89	0.96	0.89
	Approach %					[illegible]	[illegible]					[illegible]	[illegible]					[illegible]	[illegible]					[illegible]	[illegible]	

	SB LT	TH	RT	WB LT	TH	RT	NB LT	TH	RT	EB LT	TH	RT	Total
400-500													0
415-515													0
430-530													0
445-545													0
500-600	18	10	71	33	393	20	4	10	52	46	696	4	1357

Time Period	Class.	Southbound (Franklin St. Ext.) R	T	L	U	I	O	Westbound (Folsom Rd.) R	T	L	U	I	O	Northbound (Franklin St.) R	T	L	U	I	O	Eastbound (N. High St.) R	T	L	U	I	O	Total
Peak 1	Lights	71	10	18	0	99	73	19	387	33	0	439	760	52	10	4	0	66	47	4	690	44	0	738	462	1342
Specified Period	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4:00 PM - 6:15 PM	Other Vehicles	0	0	0	0	0	3	1	6	0	0	7	6	0	0	0	0	0	0	0	6	2	0	8	6	15
One Hour Peak	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5:00 PM - 6:00 PM	Total	73	10	18	0	99	76	20	395	33	0	446	766	52	10	4	0	66	47	4	696	46	0	746	468	1357
	PHF	0.66	0.62	0.64	0	0.67	0.73	0.67	0.89	0.59	0	0.88	0.92	0.72	0.42	0.5	0	0.82	0.65	0.33	0.93	0.77	0	0.94	0.85	0.94
	Approach %					[illegible]	[illegible]					[illegible]	[illegible]					[illegible]	[illegible]					[illegible]	[illegible]	

Loc 11

Project: Exit 4a SDEIS
Location: Folsom Rd-NH 28 (Ross' Corner)

Growth rates
Annual 2014 >2015 1.025
2016 >2015 0.975

Seasonal
Intersection Turning Movement Counts

		AM Peak	PM Peak
May 16	Adj Factor=	0.96	0.98

		2016 - Raw		2016 - AADT				2015 - AADT				2015 - AADT - Rounded			
		AM Peak (745 845)	PM Peak (400 500)	AM Peak (745 845)	Approach Totals	PM Peak (500 600)	Approach Totals	AM Peak (745 845)	Approach Totals	PM Peak (445 545)	Approach Totals	AM Peak (745 845)	Approach Totals	PM Peak (445 545)	Approach Totals
Folsom EB	LT	140	535	134	325	528	993	131	317	515	968	135	325	520	965
	Thru	177	399	170		393		166		383		170		375	
	RT	22	75	21		74		70		72		20		70	
Tsienneto WB	LT	130	250	125	809	247	767	122	789	243	742	175	785	145	745
	Thru	312	391	300		383		293		173		240		370	
	RT	400	237	364		232		374		226		370		230	
NH 28 S NB	LT	35	235	16	387	228	830	18	375	222	809	20	385	220	800
	Thru	242	461	232		393		226		383		230		380	
	RT	143	215	137		209		134		204		135		200	
NH 28 N SB	LT	327	561	314	679	550	1176	306	661	536	1146	310	635	535	1135
	Thru	230	230	221		225		215		219		220		220	
	RT	150	409	144		401		140		391		145		390	
	Total	2292	3839	2200	2200	3761	3761	2145	2145	3665	3665	2170	2170	3640	3640

Use Seasonal Factor

Use Annual Factor
distance to NB ramp

2015 Peak Hour Link Volumes based on TMC

Approach		AM Peak Inbound	AM Peak Outbound	PM Peak Inbound	PM Peak Outbound	2015 AADT	% AADT in AM Pk	% AADT in PM Pk
North	NH 28 N of Folsom	675	735	1135	1130			
South	NH 28 S of Folsom	385	365	800	430			
East	Tsienneto E of 28	785	615	745	1160			
West	Folsom W of NH 28	325	455	965	580			
		2170	2170	3640	3640			

	SB				WB				NB			EB	Total
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	
700-800	346	215	333	381	323	116	241	237	29	30	169	376	2245
715-815	359	385	327	399	306	117	376	234	20	21	155	323	2169
730-830	351	231	315	406	302	125	125	227	15	25	158	137	2240
745-845	330	230	327	400	317	130	343	242	19	22	177	140	2291
800-900	346	220	326	401	287	144	340	245	14	17	157	165	2235

Time Period	Class	Southbound (NH 28) R	T	L	U	I	O	Westbound (Tsienneto Rd.) R	T	L	U	I	O	Northbound (NH 28) R	T	L	U	I	O	Eastbound (Folsom Rd.) R	T	L	U	I	O	Total		Crosswalk Pedestrian	Total
Peak 1	Lights	141	216	309	0	670	755	391	299	335	0	819	625	142	276	17	0	387	305	21	177	236	0	329	452	2205	SB	0	0
Specified Period	%	95%	93%	95%	[illegible]	95%	97%	96%	95%	96%	[illegible]	97%	95%	99%	93%	89%	[illegible]	96%	96%	95%	96%	97%	[illegible]	97%	98%	96%		0%	
7:00 AM - 9:00 AM	Other Vehicle	8	16	18	0	37	27	9	13	15	0	23	21	1	14	2	0	17	17	1	5	4	0	10	11	87	WB	3	3
One Hour Peak	%	5%	7%	5%	[illegible]	5%	3%	2%	4%	4%	[illegible]	3%	3%	1%	7%	11%	[illegible]	4%	4%	5%	4%	3%	[illegible]	3%	2%	4%		100%	
7:45 AM - 8:45 AM	Total	150	232	327	0	707	782	400	312	350	0	842	647	143	242	19	0	404	382	22	177	140	0	339	461	2292	NB	3	3
	PHF	0.77	0.81	0.77	0	0.79	0.95	0.96	0.96	0.91	0	0.99	0.85	0.85	0.86	0.53	0	0.84	0.85	0.55	0.86	0.9	0	0.86	0.88	0.9		100%	
	Approach %					31%	34%					33%	28%					18%	17%					15%	20%		EB	1	1
																												100%	
																												[illegible]	[illegible]

	SB				WB				NB			EB	Total
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	
400-500	409	230	554	230	379	146	211	401	233	76	394	339	3804
415-515	392	246	583	208	376	155	209	418	225	77	354	526	3800
430-530	359	251	553	204	381	160	202	395	228	72	411	537	3770
445-545	345	235	548	207	372	157	222	372	247	83	397	516	3691
500-600	327	223	584	201	374	167	157	375	242	88	393	541	3720

Time Period	Class	Southbound (NH 28) R	T	L	U	I	O	Westbound (Tsienneto Rd) R	T	L	U	I	O	Northbound (NH 28) R	T	L	U	I	O	Eastbound (Folsom Rd) R	T	L	U	I	O	Total		Crosswalk Pedestrian	Total
Peak 1	Lights	398	220	550	0	1168	1151	229	372	142	0	743	1257	212	397	223	0	833	479	75	360	537	0	972	1000	3344	SB	6	6
Specified Period	%	97%	96%	99%	[illegible]	98%	99%	100%	98%	97%	0%	98%	99%	100%	99%	98%	0%	98%	98%	99%	99%	99%	100%	99%	98%	99%		100%	
4:00 PM - 6:00 PM	Other Vehicle	11	10	4	0	25	18	1	7	4	1	12	15	1	4	4	0	14	13	1	4	1	0	11	22	56	WB	3	3
One Hour Peak	%	3%	4%	1%	0%	2%	1%	0%	2%	3%	0%	2%	1%	0%	1%	2%	0%	2%	3%	1%	1%	1%	0%	1%	2%	1%		100%	
4:00 PM - 5:00 PM	Total	409	230	554	0	1193	1169	230	379	146	0	755	1272	213	401	227	0	847	492	76	364	538	1	1003	1022	3804	NB	1	1
	PHF	0.95	0.85	0.87	0	0.94	0.93	0.64	0.9	0.73	0	0.95	0.94	0.78	0.84	0.75	0	0.92	0.80	0.76	0.94	0.95	0.75	0.97	0.9	0.92		100%	
	Approach %					31%	31%					20%	33%					22%	13%					26%	27%		EB	0	0
																												0%	
																												8	8

Loc 12

Project: Exit 4a SDEIS
Location: Tsienneto Rd-Pinkerton St

Growth rates:

Annual	2014->2015	1.025
	2016->2015	0.975

Seasonal:
Intersection Turning Movement Counts

		AM Peak	PM Peak
May-16	Adj Factor=	0.96	0.98

		2016- Raw		2016 - AADT				2015 - AADT				2015 - AWDT- Rounded			
		AM Peak (700-800)	PM Peak (400-500)	AM Peak (700-800)	Approach Totals	PM Peak (500-600)	Approach Totals	AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals	AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals
EB	LT	0	0	0	635	0	1151	0	629	0	1122	0	620	0	1125
	Thru	399	690	383		676		373		659		375		660	
	RT	263	485	252		475		246		463		245		465	
WB	LT	84	118	81	661	116	693	79	645	113	676	80	645	115	680
	Thru	604	589	580		577		566		563		565		565	
	RT	0	0	0		0		0		0		0		0	
NB	LT	231	189	222	303	185	307	216	295	180	299	215	295	180	300
	Thru	0	0	0		0		0		0		0		0	
	RT	84	124	81		122		79		119		80		120	
SB	LT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thru	0	0	0		0		0		0		0		0	
	RT	0	0	0		0		0		0		0		0	
	total	1665	2195	1599	1599	2151	2151	1559	1559	2097	2097	1560	1560	2105	2105

Use Seasonal Factor

Use Annual Factor
Balance to NB ramp

	WB		NB		EB		
	TH	LT	LT	RT	TH	RT	Total
700-800	**578**	**98**	**237**	**105**	**432**	**248**	**1698**
715-815	565	73	235	81	414	231	1599
730-830	595	79	237	74	417	231	1633
745-845	604	84	231	84	399	263	1665
800-900	574	90	243	75	387	254	1623

		Westbound (Tsienneto Rd.)					Northbound (Pinkerton St.)					Eastbound (Tsienneto Rd.)					
Time Period	**Class.**	**T**	**L**	**U**	**I**	**O**	**R**	**L**	**U**	**I**	**O**	**R**	**T**	**U**	**I**	**O**	**Total**
Peak 1	Lights	568	95	0	663	527	104	232	0	336	334	239	423	0	662	800	1661
Specified Period	%	98%	97%	0%	98%	98%	99%	95%	0%	98%	97%	96%	98%	0%	97%	98%	98%
7:00 AM - 9:15 AM	Other Vehicles	10	3	0	13	10	1	5	0	6	12	9	9	0	18	15	37
One Hour Peak	%	2%	3%	0%	2%	2%	1%	2%	0%	2%	3%	4%	2%	0%	3%	2%	2%
7:00 AM - 8:00 AM	**Total**	**578**	**98**	**0**	**676**	**537**	**105**	**237**	**0**	**342**	**346**	**248**	**432**	**0**	**680**	**815**	**1698**
	PHF	0.9	0.49	0	0.83	0.88	0.58	0.85	0	0.83	0.71	0.82	0.89	0	0.86	0.94	0.87
	Approach %				40%	33%				20%	20%				40%	48%	

Loc **12** Location: **Tsienneto Rd-Pinkerton St**

	WB		NB		EB		
	LT	TH	LT	RT	TH	RT	Total
400-500	**589**	**118**	**189**	**124**	**690**	**485**	**2195**
415-515	592	118	190	113	675	494	2182
430-530	601	119	189	101	674	495	2179
445-545	564	105	195	107	661	502	2134
500-600	552	101	196	96	686	502	2133

		Westbound (Tsienneto Rd)					Northbound (Pinkerton St)					Eastbound (Tsienneto Rd)					
Time Period	**Class.**	**T**	**L**	**U**	**I**	**O**	**R**	**L**	**U**	**I**	**O**	**R**	**T**	**U**	**I**	**O**	**Total**
Peak 1	Lights	581	117	0	698	808	124	186	0	310	598	481	684	0	1165	767	2173
Specified Period	%	99%	99%	0%	99%	99%	100%	98%	0%	99%	99%	99%	99%	0%	99%	99%	99%
4:00 PM - 6:15 PM	Other Vehicles	8	1	0	9	6	0	3	0	3	5	4	6	0	10	11	22
One Hour Peak	%	1%	1%	0%	1%	1%	0%	2%	0%	1%	1%	1%	1%	0%	1%	1%	1%
4:00 PM - 5:00 PM	**Total**	**589**	**118**	**0**	**707**	**814**	**124**	**189**	**0**	**313**	**603**	**485**	**690**	**0**	**1175**	**778**	**2195**
	PHF	0.86	0.78	0	0.85	0.93	0.78	0.93	0	0.86	0.9	0.89	0.96	0	0.96	0.9	0.96
	Approach %				32%	37%				14%	27%				54%	35%	

Loc 33

Project: Exit 4a SDEIS
Location: NH 28-Unlew Drive

Growth rates

Annual	2014->2015	1.025
	2016->2015	0.975

Seasonal
Intersection Turning Movement Counts

		AM Peak	PM Peak
May-16	Adj Factors	0.96	0.98

		2016 - Raw AM Peak (745-845)	2016 - Raw PM Peak (445-545)	2016 - AADT AM Peak (745-845)	2016 - AADT Approach Totals	2016 - AADT PM Peak (500-600)	2016 - AADT Approach Totals	2015 - AADT AM Peak (745-845)	2015 - AADT Approach Totals	2015 - AADT PM Peak (445-545)	2015 - AADT Approach Totals	2015 - AADT Rounded AM Peak (745-845)	2015 - AADT Rounded Approach Totals	2015 - AADT Rounded PM Peak (445-545)	2015 - AADT Rounded Approach Totals
EB	LT	55	177	53	864	173	1610	52	845	159	1570	50	840	170	1575
	Thru	835	1464	811		1435		791		1399		790		1400	
	RT	0	2	0		2		0		2		0		5	
WB	LT	0	16	0	703	16	538	0	684	16	854	0	685	20	955
	Thru	699	697	672		679		654		857		655		855	
	RT	32	83	31		81		30		79		30		60	
NB	LT	2	13	2	3	13	36	2	3	13	35	5	10	15	60
	Thru	0	9	0		9		0		9		0		20	
	RT	1	14	1		14		1		14		5		25	
SB	LT	54	49	52	309	48	277	51	297	47	270	50	295	45	270
	Thru	0	8	0		8		0		8		0		10	
	RT	262	226	257		221		246		215		245		215	
	Total	1950	2960	1873	1873	2901	2901	1827	1827	2830	2830	1830	1830	2840	2840

Use Seasonal Factor

Use Annual Factor
Balance to NB ramp

2015 Peak Hour Link Volumes based on TMC

Approach		AM Peak Inbound	AM Peak Outbound	PM Peak Inbound	PM Peak Outbound	2015 AADT	% AADT in AM Pk	% AADT in PM Pk
North	NH 28 N of Unlew	840	905	1575	1095			
South	NH 28 S of Unlew	685	845	955	1455			
East	Unlew E of NH 28	295	80	270	250			
West	Applebees	10	0	40	35			
		1830	1830	2840	2840			

NOTE: EB = NH 28 SB
WB = NH 28 NB
SB = Unlew
NB = Applebees

	SB LT	SB TH	SB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	EB LT	EB TH	EB RT	Total
700-800													2160
715-815													2295
730-830													0
745-845	54	0	262	0	699	32	2	0	1	55	845	0	1950
800-900													2180

Time Period	Class	Southbound (Unlew Dr.) R	T	L	U	I	O	Westbound (NH 28) R	T	L	U	I	O	Northbound (Applebees Driveway) R	T	L	U	I	O	Eastbound (NH 28) R	T	L	U	I	O	Total	Crosswalk Pedestrians	Total
Peak 1	Lights	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Specified Period	%	[illegible]																											
7:00 AM - 9:00 AM	Other Vehicles	[illegible]																											
One Hour Peak	%	[illegible]																											
7:45 AM - 8:45 AM	Total	262	0	54	0	116	83	37	699	0	0	711	900	1	0	[illegible]	[illegible]	4	3	0	782	55	2	502	555	1953		
	PHF	[illegible]																											
	Approach %	[illegible]																											

	SB LT	SB TH	SB RT	WB LT	WB TH	WB RT	NB LT	NB TH	NB RT	EB LT	EB TH	EB RT	Total
400-500													0
415-515													0
430-530													0
445-545	49	8	226	16	697	83	13	9	14	177	1464	2	2960
500-600													0

Time Period	Class	Southbound (Unlew Dr.) R	T	L	U	I	O	Westbound (NH 28) R	T	L	U	I	O	Northbound (Applebees Driveway) R	T	L	U	I	O	Eastbound (NH 28) R	T	L	U	I	O	Total	Crosswalk Pedestrians	Total
Peak 1	Lights	[illegible]																											
Specified Period	%	[illegible]																											
4:00 PM - 6:00 PM	Other Vehicles	[illegible]																											
One Hour Peak	%	[illegible]																											
4:45 PM - 5:45 PM	Total	226	8	43	6	281	269	83	693	18	1	795	1526	14	[illegible]	[illegible]	0	36	33	2	1464	177	2	1644	1137	2962		
	PHF	[illegible]																											
	Approach %	[illegible]																											

Loc 14 Project Exit 4a SDEIS
Location NH 28-Ashleigh Dr

Growth rates
Annual 2014->2015 1.025
2016->2015 0.975

Seasonal
Intersection Turning Movement Counts

		AM Peak	PM Peak
May-16	Adj Factors	0.96	0.98

		2016 - Raw		2016 - AADT				2015 - AADT				2015 - AADT - Rounded			
		AM Peak (745-845)	PM Peak (430-530)	AM Peak (745-845)	Approach Totals	PM Peak (500-600)	Approach Totals	AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals	AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals
EB	LT	105	113	101	751	111	1237	99	732	108	1206	100	735	110	1210
	Thru	671	1147	644		1124		628		1096		630		1095	
	RT	6	2	6		2		6		2		5		5	
WB	LT	6	3	6	859	3	1089	6	837	3	1061	5	835	5	1065
	Thru	652	838	626		821		610		800		610		800	
	RT	236	270	227		265		221		258		220		260	
NB	LT	8	40	8	16	39	55	8	16	38	54	10	20	40	60
	Thru	6	8	6		8		5		8		5		10	
	RT	2	8	2		8		2		8		5		10	
SB	LT	194	359	186	291	352	490	181	284	343	478	180	285	345	485
	Thru	5	1	5		1		5		1		5		5	
	RT	104	140	100		137		98		134		100		135	
	total	1995	2929	1917	1917	2871	2871	1869	1865	2799	2799	1875	1875	2820	2820

Use Seasonal Factor — Use Annual Factor — Use these in Synchro Existing Cond analyses

NOTE: EB = NH 28 SB
WB = NH 28 NB
SB = Ashleigh Dr
NB = VIP Driveway

	SB LT	TH	RT	WB LT	TH	RT	NB LT	TH	RT	EB LT	TH	RT	Total
700-800													0
715-815													0
730-830													0
745-845	194	5	104	6	652	236	8	6	2	105	671	6	1995
800-900													0

Time Period	Class.	Southbound (Ashleigh Dr.) R	T	L	U	I	O	Westbound (NH 28) R	T	L	U	I	O	Northbound (VIP Driveway) R	T	L	U	I	O	Eastbound (NH 28) R	T	L	U	I	O	Total		Crosswalk Pedestrians	Total
Peak 1	Lights	101	4	186	0	291	333	225	625	6	3	859	816	2	6	8	0	16	35	6	625	102	0	733	736	1901	SB	1	1
Specified Period	%	97%	80%	96%	0%	97%	96%	95%	96%	100%	100%	96%	94%	100%	100%	100%	0%	100%	95%	100%	93%	97%	0%	94%	96%	95%		100%	
7:00 AM - 9:15 AM	Other Vehicles	3	1	8	0	12	14	11	27	0	0	38	54	0	0	0	0	0	2	0	46	3	0	49	28	97	WB	0	0
One Hour Peak	%	3%	20%	4%	0%	4%	4%	5%	4%	0%	0%	4%	6%	0%	0%	0%	0%	0%	5%	0%	7%	3%	0%	6%	4%	5%		0%	
7:45 AM - 8:45 AM	Total	104	5	194	0	303	347	236	652	6	3	897	870	2	6	8	0	16	37	6	671	105	0	782	764	1998	NB	0	0
	PHF	0.79	0.42	0.9	0	0.9	0.92	0.92	0.96	0.75	0.75	0.97	0.85	0.5	0.38	0.5	0	0.67	0.53	0.5	0.81	0.77	0	0.83	0.86	0.91		0%	
	Approach %					15%	17%					45%	44%					1%	2%					39%	38%		EB	1	1
																												100%	
																												2	2

	SB LT	TH	RT	WB LT	TH	RT	NB LT	TH	RT	EB LT	TH	RT	Total
400-500													0
415-515													0
430-530	359	1	140	3	838	270	40	8	8	113	1147	2	2929
445-545													0
500-600													0

Time Period	Class.	Southbound (Ashleigh Dr.) R	T	L	U	I	O	Westbound (NH 28) R	T	L	U	I	O	Northbound (VIP Driveway) R	T	L	U	I	O	Eastbound (NH 28) R	T	L	U	I	O	Total		Crosswalk Pedestrians	Total
Peak 1	Lights	135	1	356	0	492	388	269	819	3	13	1104	1511	8	8	40	0	56	6	2	1132	111	1	1146	999	2904	SB	1	1
Specified Period	%	96%	100%	99%	0%	100%	99%	100%	98%	100%	100%	98%	99%	100%	100%	100%	0%	100%	100%	100%	99%	98%	100%	99%	98%	99%		100%	
4:00 PM - 6:15 PM	Other Vehicles	5	0	3	0	2	3	1	19	0	0	20	16	0	0	0	0	0	0	0	15	2	0	17	20	39	WB	0	0
One Hour Peak	%	4%	0%	1%	0%	0%	1%	0%	2%	0%	0%	2%	1%	0%	0%	0%	0%	0%	0%	0%	1%	2%	0%	1%	2%	1%		0%	
4:30 PM - 5:30 PM	Total	140	1	359	0	500	391	270	838	3	13	1124	1527	8	8	40	0	56	6	2	1147	113	1	1263	1019	[illegible]	NB	0	0
	PHF	0.83	0.25	0.87	0	0.86	0.97	0.95	0.89	0.38	0.65	0.6	0.93	0.5	0.5	0.77	0	0.75	0.5	0.5	0.81	0.91	0.25	0.84	0.91	0.86		0%	
	Approach %					17%	13%					40%	52%					2%	0%					43%	35%		EB	3	3
																												0%	
																												4	4

Loc **15** Project: Exit 4a SDEIS
Location: **NH 28-Scobie Pond Rd**

Growth rates:

Annual	2014->2015	**1.025**
	2016->2015	**0.975**

Seasonal:
Intersection Turning Movement Counts

		AM Peak	PM Peak
May-15	Adj Factor=	**0.96**	**0.98**

		2016- Raw		**2016 - AADT**				**2015 - AADT**				**2015 - AADT- Rounded**			
		AM Peak (730-830)	PM Peak (430-530)	AM Peak (730-830)	Approach Totals	PM Peak (500-600)	Approach Totals	AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals	AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals
EB	LT	17	42	16	752	41	1193	16	734	40	1163	15	735	40	1165
	Thru	767	1175	736		1152		718		1123		720		1125	
	RT	0	0	0		0		0		0		0		0	
WB	LT	0	0	0	701	0	880	0	683	0	858	0	685	0	860
	Thru	689	733	661		718		644		700		645		700	
	RT	42	165	40		162		39		158		40		160	
NB	LT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thru	0	0	0		0		0		0		0		0	
	RT	0	0	0		0		0		0		0		0	
SB	LT	83	74	80	116	73	103	78	113	71	100	80	115	70	100
	Thru	0	0	0		0		0		0		0		0	
	RT	37	31	36		30		35		29		35		30	
	total	1635	2220	1569	1569	2176	2176	1530	1530	2121	2121	1535	1535	2125	2125

Use Seasonal Factor Use Annual Factor Use these in Synchro Existing Cond analyses

	SB LT	RT	WB TH	RT	EB LT	TH	Total
700-800							0
715-815							0
730-830	**83**	**37**	**689**	**42**	**17**	**767**	**1635**
745-845							0
800-900							0

		Southbound (Scobie Pond Rd.)					Westbound (NH 28)					Eastbound (NH 28)					
Time Period	**Class.**	**R**	**L**	**U**	**I**	**O**	**R**	**T**	**U**	**I**	**O**	**T**	**L**	**U**	**I**	**O**	**Total**
Peak 1	Lights	36	77	0	113	47	37	668	0	705	796	719	10	0	729	704	1547
Specified Period	%	97%	93%	0%	94%	80%	88%	97%	0%	96%	94%	94%	59%	0%	93%	97%	95%
7:00 AM - 9:15 AM	Other Vehicles	1	6	0	7	12	5	21	0	26	54	48	7	0	55	27	88
One Hour Peak	%	3%	7%	0%	6%	20%	12%	3%	0%	4%	6%	6%	41%	0%	7%	3%	5%
7:30 AM - 8:30 AM	**Total**	**37**	**83**	**0**	**120**	**59**	**42**	**689**	**0**	**731**	**850**	**767**	**17**	**0**	**784**	**726**	**1635**
	PHF	0.84	0.83	0	0.83	0.82	0.88	0.89	0	0.89	0.85	0.85	0.53	0	0.84	0.89	0.9
	Approach %				7%	4%				45%	52%				48%	44%	

Loc 15 Location: **NH 28-Scobie Pond Rd**

	SB LT	RT	WB TH	RT	EB LT	TH	Total
400-500							0
415-515							0
430-530	**74**	**31**	**733**	**165**	**42**	**1175**	**2220**
445-545							0
500-600							0

Time Period	Class.	Southbound (Scobie Pond Rd.) R	L	U	I	O	Westbound (NH 28) R	T	U	I	O	Eastbound (NH 28) T	L	U	I	O	Total
Peak 1	Lights	28	74	0	102	205	164	717	1	682	1232	1157	41	1	1199	746	2183
Specified Period	%	90%	100%	0%	97%	99%	99%	98%	100%	98%	99%	98%	98%	100%	98%	98%	98%
4:00 PM - 6:15 PM	Other Vehicles	3	0	0	3	2	1	16	0	17	18	18	1	0	19	19	39
One Hour Peak	%	10%	0%	0%	3%	1%	1%	2%	0%	2%	1%	2%	2%	0%	2%	2%	2%
4:30 PM - 5:30 PM	**Total**	**31**	**74**	**0**	**105**	**207**	**165**	**733**	**1**	**699**	**1250**	**1175**	**42**	**1**	**1218**	**765**	**2222**
	PHF	0.78	0.74	0	0.75	0.94	0.9	0.9	0.25	0.9	0.91	0.9	0.81	0.25	0.91	0.92	0.96
	Approach %				5%	9%				40%	56%				55%	34%	

Project [illegible]
3.6 Location NH 102-NH 28 Bypass (Rotary)

Growth rates
Annual 2015 → 2015 1.005
2016 → 2015 0.975

Assumptions
Intersection Turning Movement Counts

		AM Peak	PM Peak
May 16	Adj Factors	0.96	0.98

		2016 Raw AM Peak (700-800)	2016 Raw PM Peak (500-600)	2015 AADT AM Peak (710-810)	Approach Totals	PM Peak (445-545)	Approach Totals	2015 - AADT AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals	2015 AADT Rounded AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals
SB	LT	64	35	61	316	35	635	56	361	37	624	66	370	40	630
	Thru	322	258	322		249		115		245		120		245	
	RT	58	295	54		270		53		263		50		265	
	RT	103	74	95		73		31		71		100		70	
WB	LT	3	9	3	330	9	240	1	327	9	354	5	330	10	240
	LT	79	67	76		65		74		55		75		60	
	Thru	251	159	243		151		255		149		260		150	
	RT	12	17	12		17		12		17		10		20	
NB	LT	35	45	35	350	44	442	73	371	47	431	75	375	40	475
	Thru	265	380	252		374		246		367		245		365	
	RT	51	50	49		65		48		55		50		45	
	RT	4	6	5		6		4		6		5		5	
SB	LT	37	43	36	451	35	754	35	443	13	755	35	445	15	750
	LT	128	391	123		385		120		375		120		375	
	Thru	266	328	257		374		249		315		250		315	
	RT	61	36	56		35		58		34		60		35	
NWB	LT	8	32	8	479	33	297	6	466	47	494	10	470	10	495
	LT	176	202	169		199		165		155		165		195	
	RT	302	282	289		278		282		219		285		270	
	RT	18	30	11		30		11		32		15		30	
	Total	2182	2524	2015	2015	2572	2256	1971	1971	2448	2303	1990	1990	2370	2320

180 Seasonal Factor — Use Annual Factor — Use these to Synchro Existing Conditions analyses

	SB LT (NH 102 EB)	LT (to Derry Rd)	Thru (Byp 28)	RT (NH 102 WB)	SE LT (Byp 28 NB)	Thru (NH 102)	RT (to Derry Rd)	RT (Byp 28 S)	NB LT (NH 102 WB)	Thru (Byp 28)	RT (NH 102 E)	RT (to Derry Rd)	NWB (Derry Rd) LT (Byp 28 S)	LT (NH 102 W)	RT (Byp 28 N)	RT (NH 102 E)	WB LT (to Derry Rd)	LT (Byp 28 S)	Thru (NH 102 W)	RT (Byp 28 N)	Total
700-800	37	338	266	181	64	127	57	103	76	283	51	2	6	176	305	16	2	75	251	37	2182
715-815																					0
730-830																					0
745-845																					0
800-900																					0

Time Period	Class	Southbound (NH 28 Byp.) R	T	BL	L	U	I	O	Westbound (NH 102) R	T	L	HL	U	I	O	Northwestbound (East Derry Rd.) HR	BR	BL	HL	U	I	O	Northbound (NH 28 Byp.) HR	R	T	L	U	I	O	Eastbound (NH 102) R	BR	T	L	U	I	O	Total
Peak 1	Lights	51	355	154	8	3	441	325	51	212	74	1	0	309	611	11	264	170	8	1	441	728	1	45	262	76	0	461	415	58	54	100	11	1	461	517	2101
Specified Period	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7:00 AM - 9:15 AM	Other Vehicles	0	19	6	9	1	33	16	1	16	5	0	1	35	17	1	11	6	0	0	14	30	0	6	3	3	5	19	30	5	4	15	5	0	32	32	115
One Hour Peak	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7:00 AM - 8:00 AM	Total	51	366	158	17	3	474	441	51	251	76	1	1	344	652	14	281	176	8	1	500	758	1	51	263	78	0	336	456	63	58	107	16	1	331	561	2182
	PHF	0.71	0.85	0.84	0.50	0.5	0.8	0.81	0.71	0.82	0.79	0.25	0.25	0.83	0.77	0.83	0.83	0.89	0.40	0.25	0.91	0.88	0.25	0.71	0.81	0.79	0	0.81	0.77	0.66	0.72	0.74	0.80	0.25	0.8	0.9	0.81
	Approach %						[illegible]	[illegible]						[illegible]	[illegible]						[illegible]	[illegible]						[illegible]	[illegible]						[illegible]	[illegible]	

	SB LT (NH 102 E)	RT (to Derry Rd)	Thru (Byp 28)	RT (NH 102 W)	SE LT (Byp 28 N)	Thru (NH 102)	RT (Derry Rd)	RT (Byp 28 S)	NB LT (NH 102 W)	Thru (Byp 28)	RT (NH 102 E)	RT (Derry Rd)	NWB (Derry Rd) LT (Byp 28 S)	LT (NH 102 W)	RT (Byp 28 N)	RT (NH 102 E)	WB RT (Derry Rd)	LT (Byp 28 S)	LT (NH 102 W)	RT (Byp 28 N)	Total
400-500																					0
415-515																					0
430-530																					0
445-545																					0
500-600	33	393	328	36	35	254	275	74	70	280	90	6	32	202	282	30	8	62	356	37	2615

Time Period	Class	Southbound (NH 28 Bypass) R	T	BL	L	U	I	O	Westbound (NH 102) R	T	L	HL	U	I	O	Northwestbound (East Derry Rd.) HR	BR	BL	HL	U	I	O	Northbound (NH 28 Bypass) HR	R	T	L	U	I	O	Eastbound (NH 102) R	BR	T	L	U	I	O	Total
Peak 1	Lights	35	317	387	31	1	760	457	17	151	65	9	6	153	372	29	279	200	17	0	516	677	6	89	276	75	0	447	458	75	271	253	33	1	443	464	2551
Specified Period	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4:00 PM - 6:15 PM	Other Vehicles	0	15	6	0	0	11	9	0	3	7	0	0	5	5	1	3	7	0	0	6	7	0	1	6	0	0	7	8	1	6	3	6	0	5	5	64
One Hour Peak	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5:00 PM - 6:00 PM	Total	36	328	393	33	1	771	819	37	156	80	9	6	244	377	30	282	202	18	0	536	684	6	90	282	76	0	452	476	74	276	254	35	5	448	471	2615
	PHF	0.75	0.95	0.94	0.65	0.25	0.92	0.93	0.71	0.91	0.87	0.55	[illegible]	0.92	0.94	0.81	0.93	0.9	0.45	0	0.91	0.97	0.5	0.75	0.91	0.76	0	0.81	0.94	0.57	0.9	0.81	0.80	0.75	0.9	0.91	0.97
	Approach %						[illegible]	[illegible]						[illegible]	[illegible]						[illegible]	[illegible]						[illegible]	[illegible]						[illegible]	[illegible]	

Project: Exit 4a SDEIS

Loc. 17 Location: NH 28 Bypass-Pinkerton St - Nesmith Rd

Growth rates

Annual	2014->2015	1.025
	2016->2015	0.975

Seasonal:

Intersection Turning Movement Counts

		AM Peak	PM Peak
May-16	Adj Factor=	0.96	0.98

		2016- Raw		2016 - AADT				2015 - AADT				2015 - AADT- Rounded			
		AM Peak (700-800)	PM Peak (400-500)	AM Peak (730-830)	Approach Totals	PM Peak (500-600)	Approach Totals	AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals	AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals
EB	LT	12	9	12	217	9	494	12	212	9	482	10	210	10	485
	Thru	15	42	14		41		14		40		15		40	
	RT	199	453	191		444		186		433		185		435	
WB	LT	6	1	6	98	1	55	6	96	1	53	5	95	5	55
	Thru	43	33	41		32		40		31		40		30	
	RT	53	22	51		22		50		21		50		20	
NB	LT	262	210	252	656	205	659	245	640	201	643	245	640	200	645
	Thru	418	455	401		446		391		435		390		435	
	RT	3	7	3		7		3		7		5		10	
SB	LT	11	24	11	320	24	335	11	312	23	327	10	310	25	330
	Thru	273	304	262		298		255		291		255		290	
	RT	49	13	47		13		46		13		45		15	
Total		1344	1573	1291	1291	1543	1543	1260	1260	1505	1505	1255	1255	1515	1515

Use Seasonal Factor — Use Annual Factor — Use these in Synchro Existing Cond analyses

	SB LT	TH	RT	WB LT	TH	RT	NB LT	TH	RT	EB LT	TH	RT	Total
700-800	11	273	49	6	43	53	262	418	3	12	15	199	1344
715-815													0
730-830													0
745-845													0
800-900													0

Time Period	Class.	Southbound (NH 28 Byp.) R	T	L	U	I	O	Westbound (Nesmith St.) R	T	L	U	I	O	Northbound (NH 28 Byp.) R	T	L	U	I	O	Eastbound (Pinkerton St.) R	T	L	U	I	O	Total
Peak 1	Lights	49	261	10	0	320	468	57	41	4	0	97	75	3	404	254	0	661	449	184	12	12	0	708	344	1286
Specified Period	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7:00 AM - 8:15 AM	Other Vehicles	0	12	1	0	13	15	1	2	2	0	5	4	0	14	8	0	22	29	15	3	0	0	18	10	58
One Hour Peak	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7:00 AM - 8:00 AM	Total	49	273	11	0	333	451	53	43	6	0	102	29	3	418	262	0	683	478	199	15	12	0	726	354	1344
	PHF	0.31	0.59	0.69	0	0.52	0.84	0.34	0.63	0.75	0	0.45	0.81	0.38	0.72	0.81	0	0.75	0.67	0.6	0.62	0.75	0	0.82	0.64	0.65
	Approach %					[illegible]	[illegible]					[illegible]	[illegible]					[illegible]	[illegible]					[illegible]	[illegible]	

	SB LT	TH	RT	WB LT	TH	RT	NB LT	TH	RT	EB LT	TH	RT	Total
400-500	24	304	13	1	33	22	210	455	7	9	42	453	1573
415-515													0
430-530													0
445-545													0
500-600													0

Time Period	Class.	Southbound (NH 28 Bypass) R	T	L	U	I	O	Westbound (Nesmith St.) R	T	L	U	I	O	Northbound (NH 28 Bypass) R	T	L	U	I	O	Eastbound (Pinkerton St.) R	T	L	U	I	O	Total
Peak 1	Lights	13	299	24	0	336	477	22	33	1	0	56	73	7	446	209	0	662	744	444	42	9	0	495	255	1549
Specified Period	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4:00 PM - 6:15 PM	Other Vehicles	0	5	0	0	5	5	0	0	0	0	0	0	0	9	1	0	10	14	9	0	0	0	9	1	24
One Hour Peak	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4:00 PM - 5:00 PM	Total	13	304	24	0	341	486	22	33	1	0	56	73	7	455	210	0	672	758	453	42	9	0	504	256	1573
	PHF	0.65	0.86	0.75	0	0.93	0.95	0.69	0.92	0.25	0	0.82	0.83	0.58	0.91	0.52	0	0.93	0.93	0.83	0.88	0.56	0	0.88	0.94	0.95
	Approach %					[illegible]	[illegible]					[illegible]	[illegible]					[illegible]	[illegible]					[illegible]	[illegible]	

Loc 28 Project Exit 4a SDEIS
Location NH 28 Bypass-Tsienneto Rd

Growth rates

Annual	2014->2015	1.025
	2016->2015	0.975

Seasonal
Intersection Turning Movement Counts

		AM Peak	PM Peak
May-16	Adj Factor=	0.96	0.98

		2016 Raw AM Peak (700-800)	PM Peak (500-600)	2016 - AADT AM Peak (730-830)	Approach Totals	PM Peak (500-600)	Approach Totals	2015 - AADT AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals	2015 - AADT Rounded AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals
EB	LT	123	294	116	303	288	757	115	295	281	699	120	300	280	700
	Thru	105	359	101		352		95		343		100		345	
	RT	88	79	84		77		82		75		80		75	
WB	LT	66	79	64	453	78	272	62	442	77	271	60	440	75	270
	Thru	287	184	275		180		269		176		270		175	
	RT	97	71	93		70		91		68		90		70	
NB	LT	104	303	100	346	301	451	98	338	296	439	100	340	300	445
	Thru	238	333	228		326		222		318		220		320	
	RT	19	24	18		24		18		23		20		25	
SB	LT	27	79	26	504	77	457	25	493	75	445	25	490	75	445
	Thru	223	194	214		190		209		185		210		185	
	RT	275	194	264		190		257		185		255		185	
	Total	1674	1943	1606	1606	1903	1903	1566	1566	1854	1854	1570	1570	1860	1860

Use Seasonal Factor — Use Annual Factor — Use These in Synchro Existing Cond analyses

	SB LT	TH	RT	WB LT	TH	RT	NB LT	TH	RT	EB LT	TH	RT	Total
700-800	27	223	275	66	287	97	104	238	19	123	105	88	1674
715-815													0
730-830													0
745-845													0
800-900													0

Time Period	Class.	Southbound (NH 28 Bypass) R	T	L	U	I	O	Westbound (Tsienneto Rd.) R	T	L	U	I	O	Northbound (NH 28 Bypass) R	T	L	U	I	O	Eastbound (Tsienneto Rd.) R	T	L	U	I	O	Total		Crosswalk Pedestrian	Total
Peak 1	Lights	266	211	97	0	504	442	97	286	86	1	470	342	18	232	99	0	349	385	88	102	119	0	309	651	1632	SB	0	0
Specified Period	%	97%	95%	100%	0%	96%	96%	100%	100%	98%	100%	98%	97%	95%	97%	95%	0%	97%	96%	100%	97%	97%	0%	98%	95%	97%		0%	
7:00 AM - 8:15 AM	Other Vehicles	9	12	0	0	21	10	0	1	2	0	3	8	1	6	5	0	12	14	0	3	4	0	7	35	43	WB	0	0
One Hour Peak	%	3%	5%	0%	0%	4%	2%	0%	0%	2%	0%	1%	3%	5%	3%	5%	0%	3%	4%	0%	3%	3%	0%	2%	5%	3%		0%	
7:00 AM - 8:00 AM	Total	275	223	97	0	525	458	97	287	88	1	473	352	19	238	104	0	361	399	88	105	123	0	316	686	1675	NB	0	0
	PHF	0.82	0.87	0.76	0	0.81	0.85	0.93	0.69	0.37	0.25	0.78	0.66	0.59	0.82	0.81	0	0.82	0.81	0.41	0.94	0.83	0	0.82	0.9	0.81		0%	
	Approach %					32%	27%					29%	21%					22%	24%					19%	40%		EB	0	0
																												100%	
																												0	0

	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	Total
400-500	79	194	194	29	184	71	303	333	24	294	359	79	1943
415-515													0
430-530													0
445-545													0
500-600													0

Time Period	Class.	Southbound (NH 28 Bypass) R	T	L	U	I	O	Westbound (Tsienneto) R	T	L	U	I	O	Northbound (NH 28 Bypass) R	T	L	U	I	O	Eastbound (Tsienneto) R	T	L	U	I	O	Total		Crosswalk Pedestrian	Total
Peak 1	Lights	191	191	79	0	461	692	71	183	29	0	283	460	24	323	102	0	453	389	79	357	294	0	730	476	1927	SB	0	0
Specified Period	%	98%	98%	100%	0%	99%	99%	100%	99%	100%	0%	99%	100%	100%	98%	99%	0%	98%	99%	100%	99%	100%	0%	100%	99%	99%		0%	
4:00 PM - 6:15 PM	Other Vehicles	3	3	0	0	6	6	0	1	0	0	1	2	0	0	1	0	7	2	0	2	0	0	2	5	16	WB	0	0
One Hour Peak	%	2%	2%	0%	0%	1%	1%	0%	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%	1%	0%	0%	0%	1%	1%		0%	
5:00 PM - 6:00 PM	Total	194	194	79	0	467	698	71	184	29	0	284	462	24	333	103	0	460	397	79	359	294	0	732	481	1943	NB	0	0
	PHF	0.88	0.87	0.85	0	0.95	0.95	0.93	0.86	0.86	0	0.93	0.9	0.67	0.95	0.89	0	0.89	0.89	0.76	0.86	0.87	0	0.89	0.89	0.96		0%	
	Approach %					24%	36%					15%	24%					24%	21%					38%	25%		EB	0	0
																												0%	
																												0	0

Int. 39 Project: Exit 4a SDEIS
Location: NH 102 -Tsienneto Rd

Growth rates

Annual	2014->2015	1.025
	2016->2015	0.975

Seasonal
Intersection Turning Movement Counts

		AM Peak	PM Peak
May-16	Adj Factor	0.96	0.98

		2016 - Raw AM Peak (700-800)	PM Peak (415-515)	2016 - AADT AM Peak (730-830)	Approach Totals	PM Peak (500-600)	Approach Totals	2015 - AADT AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals	2015 - AADT- Rounded AM Peak (745-845)	Approach Totals	PM Peak (445-545)	Approach Totals	
EB	LT	14	17	13	182	17	387	13	178	17	378	15	180	15	375	EB
	Thru	176	378	169		370		165		361		165		360		
	RT	0	0	0		0		0		0		0		0		
WB	LT	0	0	0	634	0	435	0	616	0	424	0	620	0	425	WB
	Thru	340	247	326		242		318		236		320		235		
	RT	321	197	308		193		300		188		300		190		
NB	LT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NB
	Thru	0	0	0		0		0		0		0		0		
	RT	0	0	0		0		0		0		0		0		
SB	LT	102	283	98	98	277	284	95	96	270	277	95	95	270	275	SB
	Thru	0	7	0		7		0		7		0		5		
	RT	0	0	0		0		0		0		0		0		
	Total	953	1129	914	914	1106	1106	892	892	1079	1079	895	895	1075	1075	

Use Seasonal Factor — Use Annual Factor — Use these in Synchro Existing Cond analyses

2015 Peak Hour Link Volumes based on TMC

Approach		AM Peak Inbound	AM Peak Outbound	Total	PM Peak Inbound	PM Peak Outbound	Total	2015 AADT	Adjusted 2015 AM Pk	Adjusted 2015 PM Pk	% AADT in AM Pk	% AADT in PM Pk
North	Tsienneto Rd SB	95	315	410	275	205	480	6209	464	501	6.60%	7.73%
South		0	0	0	0	0	0					
East	NH 102 WB, E of Ts	620	260	880	425	630	1055	13647			6.60%	7.73%
West	NH 102 EB, W of Ts	180	320	500	375	240	615	7955			6.60%	7.73%
		895	895	1790	1075	1075	2150					

Notes: Adjusted 2015 AADT based on ATR counts for comparison purposes
Calculated 2015 AADT based on AM/PM k factors in red
k factors based on ratio of TMC volumes compared to adjusted 2015 AADT from ATR data

	SB LT	RT	WB TH	RT	EB LT	TH	Total
700-800	102	0	340	321	14	176	953
715-815							0
730-830							0
745-845							0
800-900							0

Time Period	Class.	Southbound (NH 102) R	T	U	I	O	Northbound (NH 102) T	L	U	I	O	Eastbound (Tsienneto Rd.) R	L	U	I	O	Total
Peak 1	Lights	318	332	0	650	258	158	12	0	170	332	0	100	0	100	330	920
Specified Period	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7:00 AM - 9:15 AM	Other Vehicles	3	8	0	11	20	18	2	0	20	8	0	2	0	2	5	33
One Hour Peak	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7:00 AM - 8:00 AM	Total	321	340	0	661	278	176	14	0	190	340	0	102	0	102	335	953
	PHF	0.75	0.85	0	0.83	0.57	0.92	0.58	0	0.91	0.85	0	0.94	0	0.54	0.81	0.9
	Approach %				[illegible]	[illegible]				[illegible]	[illegible]				[illegible]	[illegible]	

	LT	RT	TH	RT	LT	TH	Total
400-500							0
415-515	283	7	247	197	17	378	1129
430-530							0
445-545							0
500-600							0

Time Period	Class.	Southbound (NH 102) R	T	U	I	O	Northbound (NH 102) T	L	U	I	O	Eastbound (Tsienneto Rd.) R	L	U	I	O	Total
Peak 1	Lights	194	237	0	431	650	371	12	0	388	244	7	275	0	286	211	1105
Specified Period	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4:00 PM - 6:15 PM	Other Vehicles	3	10	0	13	11	7	5	0	7	10	0	8	0	4	3	24
One Hour Peak	%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4:15 PM - 5:15 PM	Total	197	247	0	444	661	378	17	0	395	254	7	283	0	290	214	1129
	PHF	0.93	0.86	0	0.89	0.91	0.83	0.71	0	0.87	0.88	0.88	0.9	0	0.9	0.93	0.91
	Approach %				[illegible]	[illegible]				[illegible]	[illegible]				[illegible]	[illegible]	

CLD/Fuss & O'Neill Inc.

540 Commercial Street
Manchester, NH 03101

File Name : NShorePM
Site Code : 00777777
Start Date : 5/30/2017
Page No : 1

Groups Printed- CARS - Trucks

	From North					RT 102 From East					North Shore Rd From South					RT 102 From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	4	88	0	0	92	21	0	6	0	27	0	110	14	0	124	243
04:15 PM	0	0	0	0	0	6	84	0	0	90	7	0	4	0	11	0	100	10	0	110	211
04:30 PM	0	0	0	0	0	10	99	2	0	111	17	0	7	0	24	0	93	15	0	108	243
04:45 PM	0	0	0	0	0	5	107	0	0	112	18	0	3	0	21	0	106	16	0	122	255
Total	0	0	0	0	0	25	378	2	0	405	63	0	20	0	83	0	409	55	0	464	952
05:00 PM	0	0	0	0	0	5	113	0	0	118	27	0	1	0	28	0	140	20	0	160	306
05:15 PM	0	0	0	0	0	11	107	0	0	118	16	0	3	0	19	0	145	22	0	167	304
05:30 PM	0	0	0	0	0	12	114	0	0	126	24	0	2	0	26	0	124	24	0	148	300
05:45 PM	0	0	0	0	0	7	103	0	0	110	27	0	2	0	29	0	143	15	0	158	297
Total	0	0	0	0	0	35	437	0	0	472	94	0	8	0	102	0	552	81	0	633	1207
Grand Total	0	0	0	0	0	60	815	2	0	877	157	0	28	0	185	0	961	136	0	1097	2159
Apprch %	0	0	0	0		6.8	92.9	0.2	0		84.9	0	15.1	0		0	87.6	12.4	0		
Total %	0	0	0	0	0	2.8	37.7	0.1	0	40.6	7.3	0	1.3	0	8.6	0	44.5	6.3	0	50.8	
CARS	0	0	0	0	0	60	815	2	0	877	156	0	28	0	184	0	961	136	0	1097	2158
% CARS	0	0	0	0	0	100	100	100	0	100	99.4	0	100	0	99.5	0	100	100	0	100	100
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	0.6	0	0	0	0.5	0	0	0	0	0	0

	From North					RT 102 From East					North Shore Rd From South					RT 102 From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 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	5	113	0	0	118	27	0	1	0	28	0	140	20	0	160	306
05:15 PM	0	0	0	0	0	11	107	0	0	118	16	0	3	0	19	0	145	22	0	167	304
05:30 PM	0	0	0	0	0	12	114	0	0	126	24	0	2	0	26	0	124	24	0	148	300
05:45 PM	0	0	0	0	0	7	103	0	0	110	27	0	2	0	29	0	143	15	0	158	297
Total Volume	0	0	0	0	0	35	437	0	0	472	94	0	8	0	102	0	552	81	0	633	1207
% App. Total	0	0	0	0		7.4	92.6	0	0		92.2	0	7.8	0		0	87.2	12.8	0		
PHF	.000	.000	.000	.000	.000	.729	.958	.000	.000	.937	.870	.000	.667	.000	.879	.000	.952	.844	.000	.948	.986

CLD/Fuss & O'Neill Inc.

540 Commercial Street
Manchester, NH 03101

File Name : dshore
Site Code : 33333333
Start Date : 5/30/2017
Page No : 1

Groups Printed- Cars - Trucks

	From North					Rt 102 From East					North Shore RD From South					Rt 102 From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	2	142	0	0	144	25	0	4	0	29	0	73	5	0	78	251
07:15 AM	0	0	0	0	0	3	133	0	0	136	16	0	3	0	19	0	68	3	0	71	226
07:30 AM	0	0	0	0	0	4	155	0	0	159	22	0	4	0	26	0	52	7	0	59	244
07:45 AM	0	0	0	0	0	1	161	0	0	162	18	0	5	0	23	0	65	2	0	67	252
Total	0	0	0	0	0	10	591	0	0	601	81	0	16	0	97	0	258	17	0	275	973
08:00 AM	0	0	0	0	0	2	138	0	0	140	20	0	3	0	23	0	53	1	0	54	217
08:15 AM	0	0	0	0	0	3	158	0	0	161	17	0	2	0	19	0	64	4	0	68	248
08:30 AM	0	0	0	0	0	2	131	0	0	133	15	0	1	0	16	0	23	1	0	24	173
08:45 AM	0	0	0	0	0	1	95	0	0	96	12	0	3	0	15	0	39	1	0	40	151
Total	0	0	0	0	0	8	522	0	0	530	64	0	9	0	73	0	179	7	0	186	789
Grand Total	0	0	0	0	0	18	1113	0	0	1131	145	0	25	0	170	0	437	24	0	461	1762
Apprch %	0	0	0	0		1.6	98.4	0	0		85.3	0	14.7	0		0	94.8	5.2	0		
Total %	0	0	0	0	0	1	63.2	0	0	64.2	8.2	0	1.4	0	9.6	0	24.8	1.4	0	26.2	
Cars	0	0	0	0	0	18	1109	0	0	1127	145	0	25	0	170	0	431	24	0	455	1752
% Cars	0	0	0	0	0	100	99.6	0	0	99.6	100	0	100	0	100	0	98.6	100	0	98.7	99.4
Trucks	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	6	0	0	6	10
% Trucks	0	0	0	0	0	0	0.4	0	0	0.4	0	0	0	0	0	0	1.4	0	0	1.3	0.6

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:00 AM

	From North					Rt 102 From East					North Shore RD From South					Rt 102 From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	2	142	0	0	144	25	0	4	0	29	0	73	5	0	78	251
07:15 AM	0	0	0	0	0	3	133	0	0	136	16	0	3	0	19	0	68	3	0	71	226
07:30 AM	0	0	0	0	0	4	155	0	0	159	22	0	4	0	26	0	52	7	0	59	244
07:45 AM	0	0	0	0	0	1	161	0	0	162	18	0	5	0	23	0	65	2	0	67	252
Total Volume	0	0	0	0	0	10	591	0	0	601	81	0	16	0	97	0	258	17	0	275	973
% App. Total	0	0	0	0		1.7	98.3	0	0		83.5	0	16.5	0		0	93.8	6.2	0		
PHF	.000	.000	.000	.000	.000	.625	.918	.000	.000	.927	.810	.000	.800	.000	.836	.000	.884	.607	.000	.881	.965

CLD/Fuss & O'Neill Inc.

540 Commercial Street
Manchester, NH 03101

File Name : englisham
Site Code : 00666666
Start Date : 5/31/2017
Page No : 1

Groups Printed- Cars - Trucks

	English Range RD From North					Rt 102 From East					From South					Rt 102 From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	4	0	23	0	27	0	121	8	0	129	0	0	0	0	0	10	67	0	0	77	233
07:15 AM	2	0	17	0	19	0	140	4	0	144	0	0	0	0	0	20	49	0	0	69	232
07:30 AM	3	0	16	0	19	0	137	1	0	138	0	0	0	0	0	13	56	1	0	70	227
07:45 AM	1	0	19	0	20	0	152	3	0	155	0	0	0	0	0	11	49	0	0	60	235
Total	10	0	75	0	85	0	550	16	0	566	0	0	0	0	0	54	221	1	0	276	927
08:00 AM	3	0	17	0	20	0	92	3	0	95	0	0	0	0	0	9	48	0	0	57	172
08:15 AM	2	0	14	0	16	0	111	1	0	112	0	0	0	0	0	7	45	0	0	52	180
08:30 AM	2	0	7	0	9	0	107	2	0	109	0	0	0	0	0	11	38	0	0	49	167
08:45 AM	1	0	5	0	6	0	76	1	0	77	0	0	0	0	0	6	32	0	0	38	121
Total	8	0	43	0	51	0	386	7	0	393	0	0	0	0	0	33	163	0	0	196	640
Grand Total	18	0	118	0	136	0	936	23	0	959	0	0	0	0	0	87	384	1	0	472	1567
Apprch %	13.2	0	86.8	0		0	97.6	2.4	0		0	0	0	0		18.4	81.4	0.2	0		
Total %	1.1	0	7.5	0	8.7	0	59.7	1.5	0	61.2	0	0	0	0	0	5.6	24.5	0.1	0	30.1	
Cars	17	0	118	0	135	0	922	23	0	945	0	0	0	0	0	85	376	1	0	462	1542
% Cars	94.4	0	100	0	99.3	0	98.5	100	0	98.5	0	0	0	0	0	97.7	97.9	100	0	97.9	98.4
Trucks	1	0	0	0	1	0	14	0	0	14	0	0	0	0	0	2	8	0	0	10	25
% Trucks	5.6	0	0	0	0.7	0	1.5	0	0	1.5	0	0	0	0	0	2.3	2.1	0	0	2.1	1.6

	English Range RD From North					Rt 102 From East					From South					Rt 102 From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	4	0	23	0	27	0	121	8	0	129	0	0	0	0	0	10	67	0	0	77	233
07:15 AM	2	0	17	0	19	0	140	4	0	144	0	0	0	0	0	20	49	0	0	69	232
07:30 AM	3	0	16	0	19	0	137	1	0	138	0	0	0	0	0	13	56	1	0	70	227
07:45 AM	1	0	19	0	20	0	152	3	0	155	0	0	0	0	0	11	49	0	0	60	235
Total Volume	10	0	75	0	85	0	550	16	0	566	0	0	0	0	0	54	221	1	0	276	927
% App. Total	11.8	0	88.2	0		0	97.2	2.8	0		0	0	0	0		19.6	80.1	0.4	0		
PHF	.625	.000	.815	.000	.787	.000	.905	.500	.000	.913	.000	.000	.000	.000	.000	.675	.825	.250	.000	.896	.986

CLD/Fuss & O'Neill Inc.

540 Commercial Street
Manchester, NH 03101

File Name : EnglishPM
Site Code : 00888877
Start Date : 6/5/2017
Page No : 1

Groups Printed- Cars - Trucks

	English range RD. From North					Rt 102 From East					From South					Rt 102 From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	1	0	5	0	6	1	87	4	0	92	0	0	0	0	0	17	129	0	0	146	244
04:15 PM	4	0	12	0	16	0	82	1	1	84	0	0	0	0	0	8	115	0	0	123	223
04:30 PM	4	0	11	0	15	0	91	3	0	94	0	0	0	0	0	14	150	0	0	164	273
04:45 PM	3	0	10	0	13	0	129	1	0	130	0	0	0	0	0	9	130	0	0	139	282
Total	12	0	38	0	50	1	389	9	1	400	0	0	0	0	0	48	524	0	0	572	1022
05:00 PM	7	0	14	0	21	0	84	2	0	86	0	0	0	0	0	12	136	0	0	148	255
05:15 PM	4	0	8	0	12	0	81	5	0	86	0	0	0	0	0	5	123	0	0	128	226
05:30 PM	0	0	0	0	0	0	115	3	0	118	0	0	0	0	0	2	115	0	0	117	235
05:45 PM	3	0	3	0	6	0	103	1	0	104	0	0	0	0	0	3	119	0	0	122	232
Total	14	0	25	0	39	0	383	11	0	394	0	0	0	0	0	22	493	0	0	515	948
Grand Total	26	0	63	0	89	1	772	20	1	794	0	0	0	0	0	70	1017	0	0	1087	1970
Apprch %	29.2	0	70.8	0		0.1	97.2	2.5	0.1		0	0	0	0		6.4	93.6	0	0		
Total %	1.3	0	3.2	0	4.5	0.1	39.2	1	0.1	40.3	0	0	0	0	0	3.6	51.6	0	0	55.2	
Cars	26	0	63	0	89	0	764	20	1	785	0	0	0	0	0	69	1015	0	0	1084	1958
% Cars	100	0	100	0	100	0	99	100	100	98.9	0	0	0	0	0	98.6	99.8	0	0	99.7	99.4
Trucks	0	0	0	0	0	1	8	0	0	9	0	0	0	0	0	1	2	0	0	3	12
% Trucks	0	0	0	0	0	100	1	0	0	1.1	0	0	0	0	0	1.4	0.2	0	0	0.3	0.6

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 04:30 PM

	English range RD. From North					Rt 102 From East					From South					Rt 102 From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:30 PM	4	0	11	0	15	0	91	3	0	94	0	0	0	0	0	14	150	0	0	164	273
04:45 PM	3	0	10	0	13	0	129	1	0	130	0	0	0	0	0	9	130	0	0	139	282
05:00 PM	7	0	14	0	21	0	84	2	0	86	0	0	0	0	0	12	136	0	0	148	255
05:15 PM	4	0	8	0	12	0	81	5	0	86	0	0	0	0	0	5	123	0	0	128	226
Total Volume	18	0	43	0	61	0	385	11	0	396	0	0	0	0	0	40	539	0	0	579	1036
% App. Total	29.5	0	70.5	0		0	97.2	2.8	0		0	0	0	0		6.9	93.1	0	0		
PHF	.643	.000	.768	.000	.726	.000	.746	.550	.000	.762	.000	.000	.000	.000	.000	.714	.898	.000	.000	.883	.918

APPENDIX B: SEASONAL, ANNUAL AND AXLE CORRECTION FACTORS

Year 2015 Monthly Data

Peak Hour Data
Group 4 Averages Urban Highways

	Data				Factors			
Month	AM	Mid	PM	Sat Mid	AM	Mid	PM	Sat Mid
Jan	17267	13564	20154	15524	1.11	1.14	1.11	1.17
Feb	17366	13436	20253	17441	1.10	1.16	1.11	1.05
Mar	19827	14389	22267	16671	0.97	1.08	1.01	1.09
Apr	19924	15214	22733	18484	**0.96**	1.02	**0.99**	0.99
May	20046	16198	23476	18916	$\boxed{\mathbf{0.96}}$	0.96	$\boxed{\mathbf{0.96}}$	0.96
Jun	19952	16451	23779	19485	0.96	0.94	0.94	0.94
Jul	18444	17126	23314	18349	1.04	0.91	0.96	0.99
Aug	18720	16672	23360	19436	1.02	0.93	0.96	0.94
Sep	20260	16000	23092	19374	0.95	0.97	0.97	0.94
Oct	20391	15823	23465	18951	0.94	0.98	0.96	0.96
Nov	19208	15635	21905	17902	1.00	0.99	1.02	1.02
Dec	18348	15787	21589	18339	1.04	0.98	1.04	0.99
Average	19146	15525	22449	18239				

Factors are based on Average Month.

NHDOT Seasonal Adjustment Factors by Roadway Group - 2015

		Group1	Group2	Group3	Group4	Group5	Group6
StartDate	FinDate	Rural Interstate	Rural Highways	Urban Interstate	Urban Highways	Recreational Highways	Other Recr Highways
1/1/2015	1/2/2015	1.18	1.35	1.24	1.32	1.21	1.35
1/1/2015	1/9/2015	1.35	1.16	1.10	1.02	1.31	1.83
1/12/2015	1/16/2015	1.23	1.12	1.05	1.00	1.21	1.82
1/19/2015	1/23/2015	1.15	1.07	1.02	0.99	1.19	1.59
1/26/2015	1/30/2015	1.67	1.34	1.39	1.27	1.59	2.24
2/2/2015	2/6/2015	1.43	1.20	1.21	1.13	1.40	2.18
2/9/2015	2/13/2015	1.37	1.18	1.17	1.09	1.33	2.10
2/16/2015	2/20/2015	1.11	1.09	1.01	1.01	1.15	1.42
2/23/2015	2/27/2015	1.17	1.10	1.04	1.02	1.17	1.50
3/2/2015	3/6/2015	1.20	1.10	1.04	0.99	1.21	1.50
3/9/2015	3/13/2015	1.14	1.06	0.99	0.96	1.15	1.45
3/16/2015	3/20/2015	1.17	1.09	1.02	0.99	1.20	1.45
3/23/2015	3/27/2015	1.20	1.07	1.02	0.96	1.22	1.55
3/30/2015	4/3/2015	1.15	1.04	0.99	0.94	1.19	1.49
4/6/2015	4/10/2015	1.21	1.07	1.01	0.96	1.25	1.67
4/13/2015	4/17/2015	1.18	1.02	0.99	0.92	1.16	1.52
4/20/2015	4/24/2015	1.11	1.03	0.97	0.93	1.13	1.53
4/27/2015	5/1/2015	1.18	1.01	1.00	0.95	1.15	1.57
5/4/2015	5/8/2015	1.10	0.93	$\boxed{0.95}$	$\boxed{0.88}$	1.02	1.32
5/11/2015	5/15/2015	1.07	0.93	0.94	0.89	1.01	1.36
5/18/2015	5/22/2015	0.98	0.91	0.91	0.88	0.93	1.23
5/25/2015	5/29/2015	0.98	0.93	$\boxed{0.96}$	0.93	0.93	1.08
6/1/2015	6/5/2015	1.07	0.94	0.94	0.89	0.98	1.29
6/8/2015	6/12/2015	1.00	0.90	0.92	0.87	0.92	1.08
6/15/2015	6/19/2015	0.92	0.87	0.89	0.87	0.75	0.85
6/22/2015	6/26/2015	0.90	0.88	0.88	0.88	0.86	0.83
6/29/2015	7/3/2015	0.83	0.86	0.89	0.90	0.77	0.73
7/6/2015	7/10/2015	0.83	0.85	0.87	0.89	0.74	0.73
7/13/2015	7/17/2015	0.83	0.85	0.86	0.88	0.77	0.73
7/20/2015	7/24/2015	0.80	0.84	0.85	0.87	0.73	0.68
7/27/2015	7/31/2015	0.80	0.83	0.85	0.88	0.75	0.66
8/3/2015	8/7/2015	0.78	0.83	0.84	0.88	0.73	0.64
8/10/2015	8/14/2015	0.78	0.86	0.84	0.89	0.75	0.65
8/17/2015	8/21/2015	0.80	0.85	0.85	0.89	0.76	0.67
8/24/2015	8/28/2015	0.85	0.88	0.88	0.89	0.82	0.79
8/31/2015	9/4/2015	0.88	0.87	0.90	0.88	0.86	0.90
9/7/2015	9/11/2015	0.88	0.89	0.92	0.94	0.87	0.92
9/14/2015	9/18/2015	0.96	0.91	0.91	0.90	0.92	0.94
9/21/2015	9/25/2015	0.97	0.91	0.91	0.89	0.94	1.05
9/28/2015	10/2/2015	1.02	0.93	0.93	0.91	0.98	1.08
10/5/2015	10/9/2015	0.92	0.89	0.90	0.90	0.85	0.91
10/12/2015	10/16/2015	0.88	0.89	0.89	0.90	0.87	0.92
10/19/2015	10/23/2015	1.06	0.95	0.94	0.92	1.04	1.29
10/26/2015	10/30/2015	1.12	0.98	0.96	0.92	1.11	1.49
11/2/2015	11/6/2015	1.13	0.97	0.96	0.92	1.11	1.49
11/9/2015	11/13/2015	1.15	1.01	0.98	0.94	1.16	1.68
11/16/2015	11/20/2015	1.16	1.01	0.96	0.93	1.16	1.71
11/23/2015	11/27/2015	1.03	1.05	1.01	1.06	1.15	1.46
11/30/2015	12/4/2015	1.20	1.03	0.97	0.94	1.21	1.79
12/7/2015	12/11/2015	1.18	1.03	0.96	0.93	1.19	1.69
12/14/2015	12/18/2015	1.13	0.99	0.94	0.92	1.17	1.69
12/21/2015	12/25/2015	1.17	1.12	1.05	1.05	1.26	1.56
1/1/2016	1/1/2016	1.10	1.19	1.09	1.14	1.22	1.23

NHDOT Axle Correction Factors
by Functional Classification - 2015

	AcfYear	FC	Description	Factor
Rural	2015	01		0.908
	2015	02		0.962
	2015	06		0.967
	2015	07		0.959
	2015	08		0.993
	2015	09		0.997
Urban	2015	11	Interstate	0.953
	2015	12	Freeways/ Expressways	0.956
	2015	14	Principle Arterial:	0.973
	2015	16	Minor Arterials	0.981
	2015	17	Collectors	0.989
	2015	19	Local Streets	0.987
	2015	00		1.000

APPENDIX C: INTERSTATE COUNTS AND BALANCING CALCULATIONS AT RAMP TERMINALS

I-93 Interstate Balancing based on ATR and TMC counts - 2015 and 2016

Last revision Date: 7/29/2016

	Using May 2015 counts	AWDT =	7-8 AM	% AWDT	5-6 PM	% AWDT
Total	AVG Weekday	76490	5533	7.23%	5997	7.84%
NB	AVG Weekday	38078	2021	5.31%	3483	9.15%
SB	AVG Weekday	38417	3512	9.14%	2515	6.55%

Seasonal Adjustment factor to 2015 AADT= 0.98

2015 adj AAWDT - I-93 South of Exit 4 at Windham TL

	7-8 AM	5-6 PM
Total	5420	5880
NB	1980	3410
SB	3440	2460

	Using May 2016 counts	7-8 AM	5-6 PM
Total	AVG Weekday	5567	6113
NB	AVG Weekday	2246	3601
SB	AVG Weekday	3321	2512

Ann/Seasonal Adjustment factor to 2015 AADT= 0.9702

0.99 2016->2015
0.98 May->AADT

2015 AAWDT - I-93 South of Exit 4 at Windham TL

	7-8 AM	5-6 PM
Total	5400	5930
NB	2180	3490
SB	3220	2440

Ramp counts			May-16 AWDT	7-8 AM	% AWDT	5-6 PM	% AWDT	2015 AWDT (adj) 7-8 AM	2015 AWDT (adj) 5-6 PM
May-16	Exit 4	NB Off	11321	422	3.73%	1223	10.80%	409	1187
		NB on	11380	1091	9.59%	812	7.14%	1058	788
		SB off	10893	776	7.12%	952	8.74%	753	924
		SB on E-S	5865	687	11.71%	311	5.30%	667	302
		SB on W-S	5265	534	10.14%	244	4.63%	518	237
	Exit 5	NB Off	6251	422	6.75%	472	7.55%	409	458
		NB on	10663	1008	9.46%	793	7.44%	978	769
		SB off	10574	781	7.39%	939	8.88%	758	911
		SB on	6233	532	8.54%	427	6.85%	516	414

SB off vol fr/7-8 on 5/24 appears inconsistent - use AWDT for that hour

NOTE: Peak Hr Vol either day of TMC or AWDT from May count

2015 AWDT - Mainline I-93
AM Peak

	START I93 S of E4	SUBTRACT E4 NB off	ADD E4 NB on		I93 NB N of E4	SUBTRACT E5 NB off	ADD E5 NB on	I93 NB N of E5	
NB	1980	409	1058		2629	409	978	3198	
	1980	410	1060		2630	410	980	3200	rounded
	START I93 S of E4	**SUBTRACT E4 SB on E-S**	**SUBTRACT E4 SB on W-S**	**ADD E4 SB off**	**I93 SB N of E4**	**SUBTRACT E5 SB on**	**ADD E5 SB off**	**I93 SB N of E5**	
SB	3440	667	518	753	3008	516	758	3250	
	3440	665	520	755	3010	515	760	3255	rounded

2015 AWDT - Mainline I-93
PM Peak

	START I93 S of E4	SUBTRACT E4 NB off	ADD E4 NB on		I93 NB N of E4	SUBTRACT E5 NB off	ADD E5 NB on	I93 NB N of E5	
NB	3410	1187	788		3011	458	769	3322	
	3410	1185	790		3015	460	770	3325	rounded
	START I93 S of E4	**SUBTRACT E4 SB on E-S**	**SUBTRACT E4 SB on W-**	**ADD E4 SB off**	**I93 SB N of E4**	**SUBTRACT E5 SB on**	**ADD E5 SB off**	**I93 SB N of E5**	
SB	2460	302	237	924	2845	414	911	3342	
	2460	300	235	925	2870	415	910	3365	rounded

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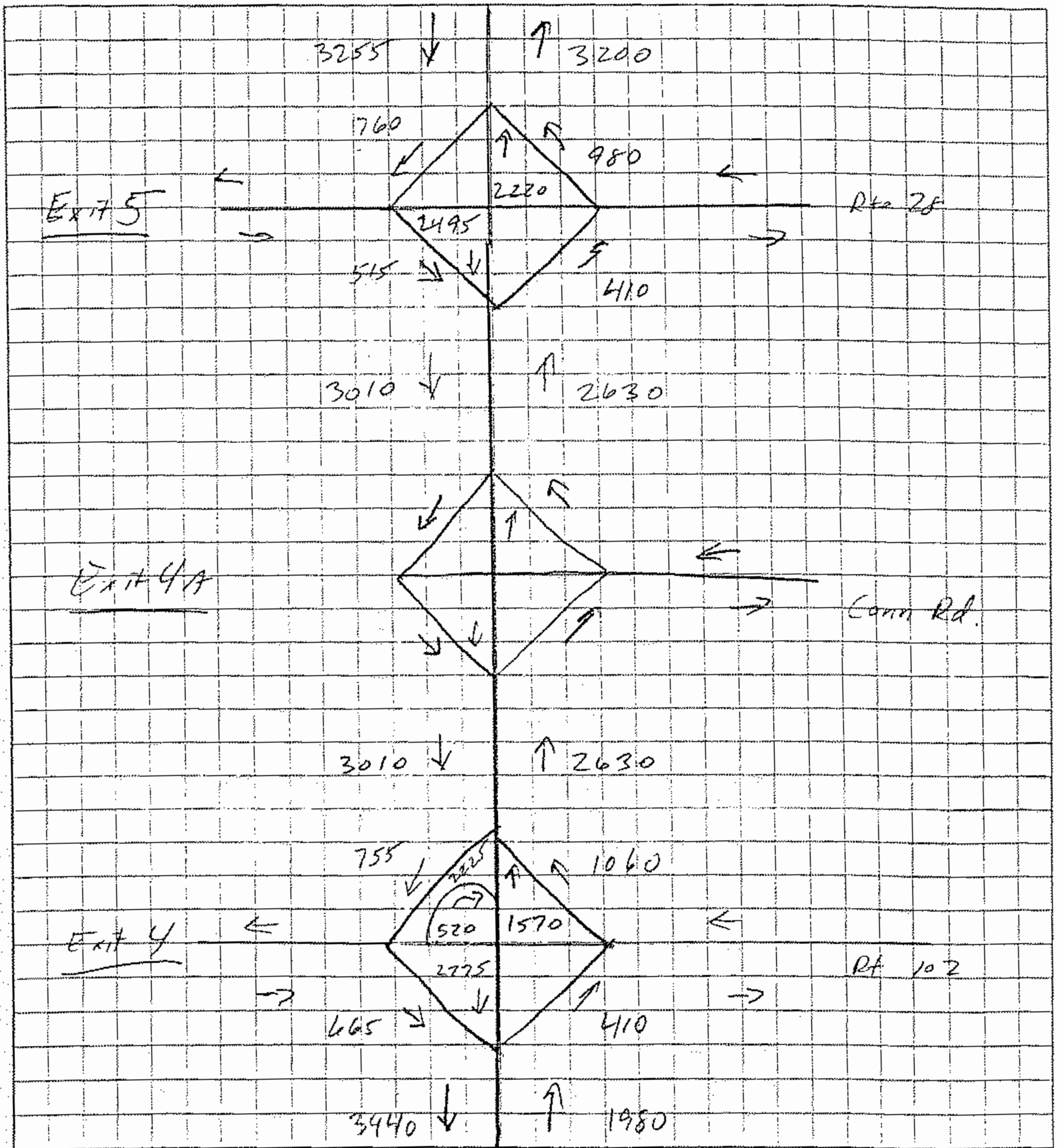
JOB Exit 4A SDEIS JOB NO 05-0244
SHEET NO OF
CALCULATED BY PK DATE 7-22-16
CHECKED BY CCG DATE 8/7/16
SUBJECT 2015 AM Peak - Exist. w/ ATRs SCALE AWDT



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cld@cldengineers.com • www.cldengineers.com
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JOB: Exit 4A

JOB NO:

SHEET NO:

OF:

CALCULATED BY: PK

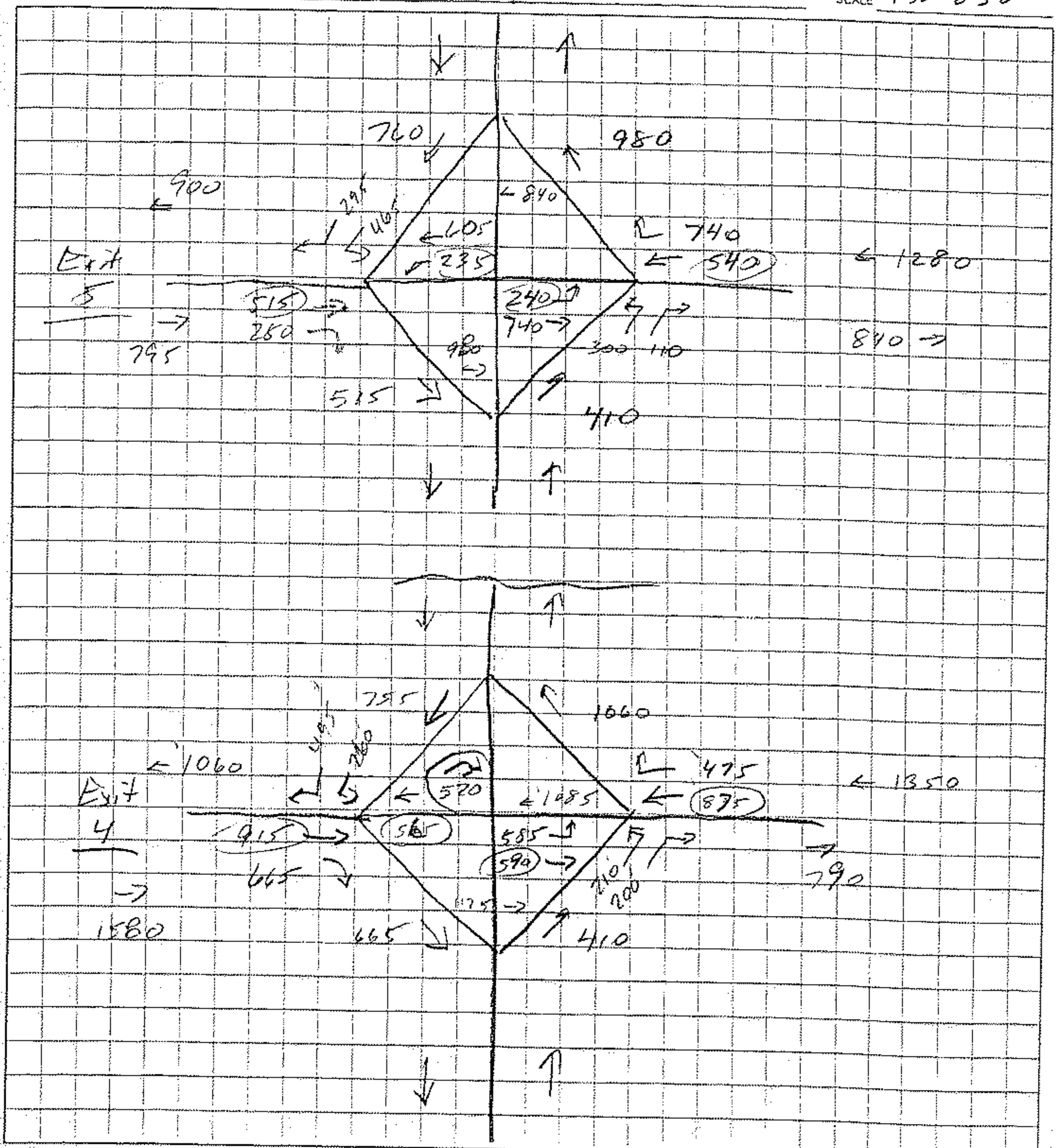
DATE: 7-27-16

CHECKED BY: LCG

DATE: 8/7/16

SUBJECT: 2015 Am Peak - Balanced

SCALE: 730-830



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JOB Exit 4A traffic JOB NO. 05-244
SHEET NO ____ OF ____
CALCULATED BY PK DATE 7-27-16
CHECKED BY LCG DATE 8/7/16
730-830 SUBJECT Balance of Exit 4 volumes SCALE AM PK

1) Start @ NB off ramp intx — NB off = 410
NB on = 1060

NB off fr/TMC LT = 219 → 210
RT = 210 → 200
429 → 410 (x .9557)

NB on fr/TMC LT on = 562 → 585
RT on = 455 → 475
1017 → 1060 (x 1.0423)

2) SB off/on ramps SB on (W-S) = 520 ✓
SB on (E-S) = 665 ✓
SB off = 755

SB off fr/TMC LT = 267 → 260
RT = 503 → 495
770 → 755 (x 0.9805)

3) EB traffic – Start @ NB ramps – Proportional growth

LT 562 → 585 (x 1.0409)
EB Th 568 → 590
1130 → 1175 – 260 (LT fr/ SB off) = 915 EB Thru @ SB ramp.

4) WB traffic – Start @ NB ramp

WB Th 836 → 875 + 210 (LT off) = 1085 – 520 (RT on)
WB RT 455 → 475 = 565 WB Thru @ SB ramp.
1291 → 1350
(x 1.0437)

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JOB: Exit 4a | JOB NO: 05-244
SHEET NO: | OF:
CALCULATED BY: PK | DATE: 7-27-16
CHECKED BY: LCG | DATE: 8/7/16
SUBJECT: Balanced Exit 5 volumes - AM | SCALE: 730-830 TMC

1) Balance exit volumes between ramps + counts are close -

EB - 959 dep @ SB, 951 arr @ NB   959/951 = 1.008

f/tmc @ NB ramp   EB LT = 216   218   (220) check
EB Th = 735   741   740
951 → 959 → 960 rounded

WB - 842 dep fr/NB, 830 arr @ SB   842/830 = 1.0145

@/tmc @ SB ramp   WB LT = 192   195   195
WB Th = 638   647   645
830 → 842 → 840 rounded

2) NB off ramp   LT off - 273   300   840 - 300 = 540 WB rt.
f/TMC   RT off - 100   110
373 → 410 (~1.0992)

NB on ramp   LT on 216 (.24)   (240)
fr TMC   RT on 672 (.76)   740
888 → 980 (~1.1036)

3) SB off ramp   LT off 496   465
@/tmc   RT off 319   295
815 → 760 (~.9325)

4) SB on ramp   LT on 192   235
(fr/TMC)   RT on 226   280
418 → 515 (~1.232)

EB thru   (240 + 740) = 980 - 465 = 515 EB rt
LT

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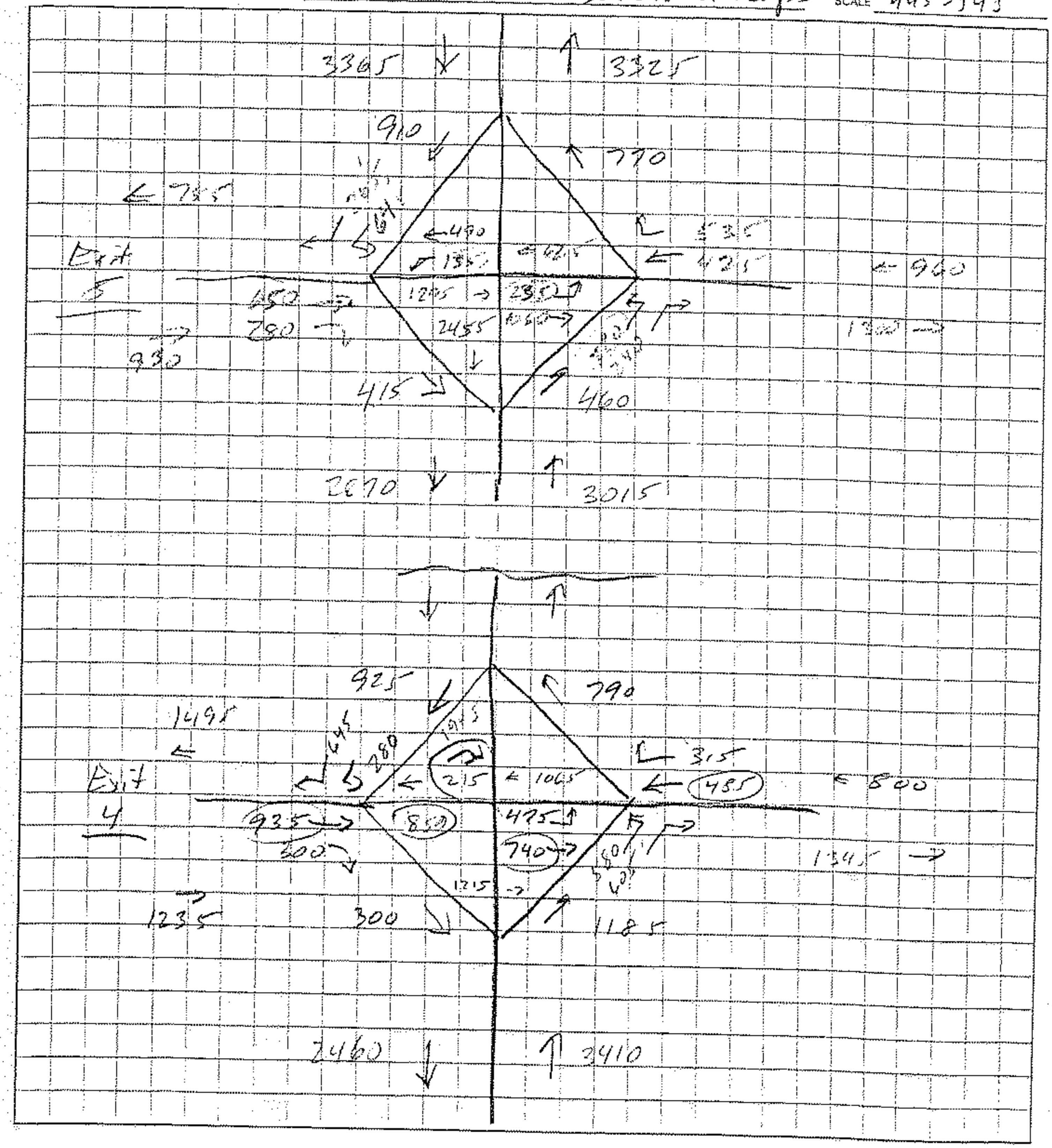
JOB Exit 4A JOB NO 05-244
SHEET NO 1 OF 1
CALCULATED BY PK DATE 7-27-16
CHECKED BY LCG DATE 8/7/16
SUBJECT 2015 PM Peak - Balanced ramps SCALE 445-545



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JOB: Exit 4A JOB NO: 05-244
SHEET NO: ______ OF ______
CALCULATED BY: PK DATE: 7-27-16
CHECKED BY: LCG DATE: 8/7/16
445-545 SUBJECT: Balanced Exit 4 volumes SCALE: PM Pk

1) Start @ NB off ramp NB off = 1185
NB on = 790

NB off (w/ TMC) LT = 535 (.49) 580
RT = 558 (.51) 605
1093 → 1185 (× 1.084)

NB on (w/ TMC) LT on 536 (.60) 475
RT on 353 (.40) 315
889 → 790 (× .8886)

2) SB on/off ramps w/ ATR SB on (W-S) = 215
SB on (E-S) = 300
SB off = 925

SB off (w/ TMC) LT 300 (.31) 280
RT 683 (.69) 645
983 → 925 (× 0.941)

3) EB traffic – Start at NB ramp TMC – apply background growth

LT = 536 → 475 (× 0.886)
EB Th = 835 740
1371 1215 – 280 (SB LT off) = 935

4) WB traffic – Start @ NB ramp TMC

WB Th = 542 485 + 580 (NB LT) = 1065 – 215 (SB on)
WB RT = 353 → 315 (× 0.8924) = 850 WB Thr. @ SB ramp
895 800

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JOB [illegible] JOB NO [illegible]
SHEET NO. 1 OF 2
CALCULATED BY [illegible] DATE 7-29-10
CHECKED BY LCG DATE 8/7/10
SUBJECT Balanced Traffic Volumes - PM SCALE 445 545 TMC

1) Balance with TMC [illegible] + [illegible]

EB = 1331 [illegible] SB ramp → 1337 [illegible] NB [illegible]

A/TMC	17 [illegible]	690		693		695
+ SB [illegible]	[illegible]	641		644		645
		1331	→	1337	→	1340
				(×1.0045)		

WB – 611 [illegible] NB ramp → 548 [illegible] SB [illegible]

A/TMC	[illegible]	116		119		17
+ SB [illegible]	[illegible]	482		492		490
		598	→	611	→	610
				(×1.0217)		

2) NB off ramp	17 [illegible]	210		218		220
(A/TMC)	07 [illegible]	233		242		240
		443	→	460		460
				(×1.0384)		

NB on ramp	17 [illegible]	158		236		235	+ [illegible]
(A/TMC)	07 [illegible]	585		534	→	535	
		743	→	770		770	
				(×1.0363)			

3) SB off ramp	17 [illegible]	640		643		645	– [illegible]
(A/TMC)	07 [illegible]	287		267		265	
		927	→	910		910	
				(×0.9816)			

SB on ramp	17 [illegible]	116		153		155	+ 15
(A/TMC)	07 [illegible]	297		282	→	280	
		413	→	435		435	
				(×1.1[illegible])			

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JOB [illegible] JOB NO [illegible]
SHEET NO. 2 OF 2
CALCULATED BY [illegible] DATE [illegible]
CHECKED BY LCG DATE 8/7/16
SUBJECT [illegible] SCALE

4) [illegible] [illegible] vol. [illegible] 1000 @ ramp

EB [illegible] LT [illegible] 235
EB [illegible] 1110 (base) - 50 = 1060
1345 1295

EB [illegible] 645 [illegible] 645
605 EB [illegible] 650
1250 1295

[illegible] SB [illegible]

LT [illegible] 765 [illegible]
[illegible] 1140
[illegible] - 770 [illegible] = 475 WB [illegible]
@ WB ramp

APPENDIX D: TRAVEL DEMAND FORECAST MODEL DEVELOPMENT AND CALIBRATION REPORT – SOUTHERN NH PLANNING COMMISSION, JANUARY 2018

Travel Demand Forecast Model Development and Calibration Report for I-93 Exit 4A Supplemental Draft Environmental Impact Statement

Prepared by the Southern NH Planning Commission and CLD/Fuss & O'Neill

January, 2018

Table of Contents

1.INTRODUCTION

The report serves the purpose of documenting the methodology for development and calibration of the travel demand model for the update of I-93 Exit 4A SDEIS. The report includes development and calibration for the 2015 24-hour base year model, and development for 2040 No-Build 24-hour model. This report doesn't include detailed network and land use description for 2040 build scenarios, alternative A, B, C, D, E and F, because this information is included in the traffic and land use reports prepared by CLD|Fuss & O'Neill and Louis Berger.

2. 2015 BASE YEAR MODEL

2.1 Network

The updated 2015 base year regional travel demand model was built based on the 2010 base year SNHPC regional model. The 2010 Travel Demand Forecast Model Development and Calibration Report [1] detailed development and calibration of the 2010 model. The model covers fifteen communities: Auburn, Bedford, Candia, Chester, Deerfield, Derry, Francestown, Goffstown, Hooksett, Londonderry, Manchester, New Boston, Raymond, Weare, and Windham. The change to the functional classification system for roadway system was incorporated into the 2015 base year model due to changes to the urbanized area from the 2010 U.S. Census. In addition, projects completed between 2010 and 2015, the Manchester Airport Access Road, Pettengill Road in Londonderry, NH 28 Manchester Road improvement in Derry, Hooksett Open Road Tolling, I-93 Exit 5 reconstruction, US 3/NH 28 widening in Hooksett, I-93 Exit 3 area reconstruction, were added to the 2015 model.

2.2 Traffic Analysis Zone (TAZ) System

The fifteen communities in the model area were disaggregated into 306 internal TAZs in the 2010 model. To better reflect traffic patterns around the I-93 Exit 4A study area, TAZs 69 in Londonderry, 123, 124, 125 and 133 in Derry were split into additional smaller TAZs indicated in Table 1. Layouts of these TAZs are displayed in Appendix A.

Table 1 TAZ Splits

TAZ 2010	TAZ 2015 for I-93 Exit 4A
69	69A, 69B and 69C
123	123A and 123B
124	124A, 124B, and 124C
125	125A and 125B
133	133A and 133B

2.3 Population and Households

Population estimates from 2015 Population Estimates of New Hampshire Cities and Towns prepared by the New Hampshire Office of Strategic Initiatives (NHOSI) [2] were used for the 2015 base year model. A summary table including 2015 population estimates for communities within the model area from the NHOSI estimates is presented in Appendix D. Dwelling units collected by SNHPC annually that were issued Certification of Occupancy between 2010 and 2015 by communities were used in allocating change in population into TAZs, and calculating number of households in a TAZ.

The formula used for calculating dwelling unit increases between April 2010 (Census day on April 1) and December 31, 2015 is shown below.

$$\Delta \boldsymbol{D_{TAZ}} = \Delta \boldsymbol{D_{2015TAZ}} + \Delta \boldsymbol{D_{2014TAZ}} + \Delta \boldsymbol{D_{2013TAZ}} + \Delta \boldsymbol{D_{2012TAZ}} + \Delta \boldsymbol{D_{2011TAZ}} + \frac{\mathbf{3}}{\mathbf{4}} \Delta \boldsymbol{D_{2010TAZ}})$$

Where:

ΔD_{TAZ}=Increase of dwelling units in a TAZ between April 1, 2010 and December 31, 2015

$\Delta D_{2015TAZ}$= Increase of dwelling units in a TAZ in 2015

$\Delta D_{2014TAZ}$= Increase of dwelling units in a TAZ in 2014

$\Delta D_{2013TAZ}$= Increase of dwelling units in a TAZ in 2013

$\Delta D_{2012TAZ}$= Increase of dwelling units in a TAZ in 2012

$\Delta D_{2011TAZ}$= Increase of dwelling units in a TAZ in 2011

$\Delta D_{2010TAZ}$= Increase of dwelling units in a TAZ in 2010

2015 dwelling units were calculated as follows:

$$\boldsymbol{D_{2015TAZ}} = \boldsymbol{D_{2010TAZ}} + \Delta \boldsymbol{D_{TAZ}}$$

The 2015 population in TAZs were calculated by allocating the difference in population between 2010 and 2015 in a community. If the population increased during 2010-2015, the following formula was used.

$$\boldsymbol{P_{2015TAZ}} = \boldsymbol{P_{2010TAZ}} + (\boldsymbol{P_{2015com}} - \boldsymbol{P_{2010com}}) * \frac{\Delta \boldsymbol{D_{TAZ}}}{\Delta \boldsymbol{D_{com}}}$$

Where:

$P_{2015TAZ}$=2015 population in a TAZ

$P_{2010TAZ}$=2010 population in a TAZ

$P_{2015com}$=2015 population in the community (NHOEP estimates) in which the TAZ located

$P_{2010com}$=2010 population in the community (2010 US Census) in which the TAZ located

ΔD_{TAZ}=Increase of dwelling units in a TAZ between April 1, 2010 and December 31, 2015

ΔD_{com}=Increase of dwelling units in the community in which the TAZ located between April 1, 2010 and December 31, 2015

The 2015 population in TAZs were calculated by allocating the difference of population between 2010 and 2015 in a community. If the population decreased during 2010-2015, the following formula was used.

$$\boldsymbol{P_{2015TAZ}} = \boldsymbol{P_{2010TAZ}} + \Delta \boldsymbol{P_{DWTAZ}} + (\boldsymbol{P_{2015com}} - \boldsymbol{P_{2010com}} - \Delta \boldsymbol{P_{DWcom}}) * \frac{\boldsymbol{D_{2015TAZ}}}{\boldsymbol{D_{2015com}}}$$

Where:

$P_{2015TAZ}$=2015 population in a TAZ

$P_{2010TAZ}$=2010 population in a TAZ

$P_{2015com}$=2015 population in the community (NHOEP estimates) in which the TAZ located

$\Delta P_{DWTAZ} = \frac{P_{2010TAZ}}{HH_{2010TAZ}} * \Delta D_{TAZ}$ – Assume population change in a TAZ due to dwelling units change between 2010 and 2015

$HH_{2010TAZ}$=2010 number of households in a TAZ

$\Delta P_{DWcom} = \sum \Delta P_{TAZ}$ – Assume population change in the community in which the TAZ located due to dwelling units change between 2010 and 2015

$P_{2010com}$=2010 population in the community (2010 US Census) in which the TAZ located

$D_{2015TAZ}$=2015 dwelling units in a TAZ

$D_{2015com}$=2015 dwelling units in the community in which the TAZ located

Number of households in a TAZ was calculated as follows.

$$HH_{2015TAZ} = D_{2015TAZ} * OR_{2010TAZ}$$

Where:

$HH_{2015TAZ}$=2015 number of households in a TAZ

$D_{2015TAZ}$=2015 dwelling units in a TAZ

$OR_{2010TAZ}$=2010 Occupancy rate in a TAZ

2.4 Student Enrollment

School enrollments for 2014-2015 for all elementary, middle and high schools in the region were collected from the New Hampshire Department of Education. College enrollments were collected by contacting colleges in the region.

2.5 Employment

The quarterly employment of 2015 for each community in the region including first, second, third and fourth quarters was downloaded from the New Hampshire Employment Security (NHES) website. A Summary table containing these data is shown in Appendix E.

The average annual employment for communities was calculated by averaging the four quarters of employment. Considering that the 2010 SNHPC employment for model input calculated directly from the employer database is slightly higher than NHES's annual average, the 2015 annual employment was adjusted to reflect the difference between the two data sets. The adjustment was made according to the following equation.

$$E_{2015comadjusted} = E_{2015comNHES} + (E_{2010comSNHPC} - E_{2010comNHES})$$

Where:

$E_{2015comadjusted}$ =Adjusted 2015 employment in a community

$E_{2015comNHES}$ =2015 employment average in a community based on NHES data

$E_{2010comNHES}$ =2010 employment average in a community based on NHES data

$E_{2010comSNHPC}$ =2015 employment average in a community based on SNHPC employment database

Building permits issued 2011-2015 were used to identify new businesses in a TAZ. Employment in a new building was estimated based on a similar business type in 2010 employment database obtained from NHES. Employment in businesses we were aware closed during 2011-2015 was estimated based on the 2010 employment database.

To allocate the difference between 2010 and 2015 to TAZs by employment category, the following formula was used.

$$E_{2015TAZ-EC} = E_{2010TAZ-EC} + \Delta E_{DWTAZ-EC} + (E_{Ann2015} - E_{Ann2010} - \Delta E_{DW2011-2015}) * (E_{2010TAZ-EC}/E_{Ann2010})$$

Where:

$E_{2015TAZ-EC}$=2015 Employment in a TAZ by employment category group

$E_{2010TAZ-EC}$=2010 Employment in a TAZ by employment category group

$\Delta E_{DWTAZ-EC}$=Assumed Change of Employment in a TAZ by employment category group due to number of building permits change between 2010 and 2015

$E_{Ann2015}$=2015 Annual employment in the community in which TAZ located

$E_{Ann2010}$=2010 Annual employment in the community in which TAZ located

$\Delta E_{DW2011-2015}$ = Change of employment in the community due to number building permits change between 2010 and 2015

2.6. Base Year Model Calibration and Validation

Highway assignment is crucial for models to produce traffic volume estimates within acceptable ranges of tolerance compared to actual ground counts. For detailed model calibration and validation methodology information, refer to 2010 Travel Demand Forecast Model Development and Calibration Report for the Southern New Hampshire Planning Commission [1]. Model calibration and validation results for the 2015 base year are as follows.

- The difference of Vehicle Mile Traveled (VMT) estimates between the model and the Highway Performance Monitoring System (HPMS) is 1.28%, which is acceptable according to the Model Validation and Reasonableness Checking Manual [3], which is allowed a 3% difference by Environmental Protection Agency (EPA).

- The Coefficient of Determination (R^2) region wide equals 0.91 which is greater than the Model Validation and Reasonableness Checking Manual [3] recommended, which is 0.88 for all roadways with functional class collector and higher. Percent Root Mean Square of the Error (% RMSE) equals 27.28 for all roadways with functional class collector and higher which is less than the commonly accepted standard of 30 [3].
- Absolute percentage differences of total observed versus model estimated volumes at a Merrimack River screen line crossing and external station cordon line crossings are less than 2%.
- Absolute percentage differences of observed versus model estimated volumes at locations within I-93 Exit 4A area shown in Appendix C are within acceptable ranges of tolerance based on FHWA targets [3].

3. FUTURE YEAR 2040 NO-BUILD MODEL

3.1 Network

2040 No-Build model network was built by adding projects documented in Regional Transportation Plan 2017-2040 for the SNHPC Region [6] to the 2015 base year model except I-93 Exit 4A project. The list of the projects is shown in Appendix B.

3.2 Population and Households

Population projections used in the 2040 No-Build model were based on the State of New Hampshire County Population Projections 2015-2040 By Municipality [5] prepared by New Hampshire Office of Strategic Initiatives (NHOSI) in partnership with the state's Regional Planning Commissions and additional adjustments to NHOSI projections were made according to the final numbers in the Land Use Scenarios Report [4] to reflect additional population and households for relevant 2040 No-Build development projects. The population projections from 2015 through 2040 for each community in the region from the NHOSI projections are presented in Appendix D.

Due to the fact that numbers of dwelling units changes in five-year increments was used in distributing population changes to TAZs, and calculating numbers of households in a TAZ, SNHPC dwelling unit projections for 2010 through 2040 (Completed 2012) were adjusted for 2020 through 2040 to reflect number of dwelling units change between 2010 and 2015. An assumption was made that numbers of dwelling unit growth rates 2015-2040 were kept the same as the 2012 Southern NH Planning Commission dwelling unit projection for 2010-2040, which were reviewed by corresponding communities in the region. Two conditions were considered as the population was allocated to TAZs: 1) population increase in a five-year period; 2) Population decrease in a five-year period.

Condition one

When the population increases during a five-year period, the allocation is calculated using the following formula.

$$\Delta \boldsymbol{P}_{\boldsymbol{TAZ}} = \frac{\Delta \boldsymbol{P}_{\boldsymbol{com}}}{\Delta \boldsymbol{D}_{\boldsymbol{com}}} * \Delta \boldsymbol{D}_{\boldsymbol{TAZ}}$$

Where:

ΔP_{TAZ}= population change in a TAZ during a five-year period

ΔP_{com}=Population change in the community in which the TAZ located during the five-year period

ΔD_{TAZ}=Number of dwelling units change in a TAZ during the five-year period

ΔD_{com}= Number of dwelling units change in the community in which the TAZ located during the five-year period

Condition two

When the population decreases during a five-year period, the allocation is calculated using the following formula.

$$\Delta \boldsymbol{P_{TAZ}} = \Delta \boldsymbol{P_{DWTAZ}} + (\Delta \boldsymbol{P_{com}} - \Delta \boldsymbol{P_{DWcom}}) * \frac{\boldsymbol{D_{TAZ}}}{\boldsymbol{D_{com}}}$$

Where:

ΔP_{TAZ}= Population change in a TAZ during a five-year period

$\Delta P_{DWTAZ} = HHS_{2015TAZ} * \Delta D_{TAZ}$ =Assume population change in a TAZ during a five-year period due to number of dwelling units change

$HHS_{2015TAZ}$= 2015 household size within the TAZ

ΔP_{com}= Change of population in the community in which the TAZ located during the 5-year period

$\Delta P_{dwcom} = \sum \Delta P_{dwTAZ}$= Population change in the community in which the TAZ located during the five-year period due to number of dwelling units change

D_{TAZ}=Number of dwelling units in the TAZ at the end of the five-year period

$D_{com} = \text{Number of dwelling units in the cummunity in which the TAZ located at end of the five} - \text{year period}$

Population within a TAZ at end of a five-year period was calculated as follows.

$$\boldsymbol{P_{TAZ}} = \boldsymbol{P_{TAZ-1}} + \Delta \boldsymbol{P_{TAZ}}$$

Where:

$\mathrm{P_{TAZ}}$ =Population in the TAZ at end of the five-year period

$\mathrm{P_{TAZ-1}}$ =Population in the TAZ at end of the prior five-year period

Number of Households Calculation

Numbers of households for TAZs were calculated using the following formula.

$$\boldsymbol{HH_{TAZ} = (P_{TAZ} - P_{specialTAZ})/HHS_{2015}}$$

Where:

HH_{TAZ} = Number of households in a TAZ

$P_{specialTAZ}$ = Special population such population in nursing homes, jails, etc. in the TAZ

$HHS_{2015TAZ}$ = Household size in the TAZ

<u>3.3 Employment</u>

In order to reflect changes in employment between 2010 and 2015, the original SNHPC employment projection for 2010 through 2040 (completed in 2012) was adjusted for 2020 through 2040. Three steps are followed in calculating the 2015-2040 employment projection. Additional adjustments were made to the final numbers based on the Land Use Scenarios Report [4] to account for additional employment for relevant 2040 No-Build development projects.

Step 1: Growth rates

The study assumes that employment growth rates by employment category group for 2015-2040 were kept the same as the 2012 Southern NH Planning Commission employment projection for 2010-2040, which were reviewed by corresponding communities in the region. The following formula was used in calculating growth rates over a five-year interval.

$$GR_{Com\ EC\ i} = (E_{2012\ Com\ EC\ i} - E_{2012\ Com\ EC\ i-1})/E_{2012\ Com\ EC\ i-1}$$

Where:

i = projection years 2015, 2020, 2025, 2030, 2035 and 2040

$GR_{Com\ EC\ i}$ = Growth rate by employment category group over i to i-1 five-year interval

$E_{2012\ com\ EC\ i}$ = Total employment for an employment category group in a community at projection year i in 2012 projection

$E_{2012\ com\ EC\ i-1}$ = Total employment for the employment category group in community at projection year i-1 in 2012 projection

Step 2: Total employment projection for an employment category group in a community 2020 through 2040

The 2015 total employment estimate for an employment category group in a community was considered as base. Total employment projections for the employment category group in the community 2020 through 2040 were calculated as follows:

$$E_{2016\ Com\ EC\ i} = E_{2016\ Com\ EC\ i-1} * (1 + GR_{Com\ EC\ i})$$

Where:

i = projection years 2020,2025,2030,2035 and 2040

$E_{2016\ com\ EC\ i}$ = Total employment for an employment category group in the community at projection year i in the 2016 projection

$E_{2016\ com\ EC\ i-1}$ = Total employment for the employment category group in the community at projection year i-1 in the 2016 projection

Step 3: Total employment for an employment category group in the community for 2020-2040 projection distributed to TAZs

Two conditions were used as total projected employment for an employment category group in the community was allocated into TAZs.

Condition one

When the data for developable land for a land use category is available and appropriate to use in a community, employment is distributed based on percentage of developable land in a TAZ in total of developable land in the community.

$$E_{2016\ TAZ\ EC\ i} = E_{2016\ TAZ\ EC\ i-1} + (E_{2016\ Com\ EC\ i} - E_{2016\ Com\ EC\ i-1}) * Percentage$$

Where:

$E_{2016\ TAZ\ EC\ i}$ = 2016 Employment projection in a TAZ for an employment category group at projection year i

$E_{2016\ TAZ\ EC\ i-1}$ = 2016 Employment projection in a TAZ for the employment category group at projection year i-1 in the 2016 projection

$E_{2016\ com\ EC\ i}$ = Total employment for the employment category group in the community at projection year i in the 2016 projection

$E_{2016\ com\ EC\ i-1}$ = Total employment for the employment category group in the community at projection year i-1 in the 2016 projection

Condition two

When the data for developable land for the land use category is not available or not appropriate to use in a community, employment in a TAZ is calculated using the same growth rate as that of employment of the employment category.

$$E_{2016\ TAZ\ EC\ i} = E_{2016\ TAZ\ EC\ i-1} * (1 + GR_{2016\ Com\ EC\ i})$$

Where:

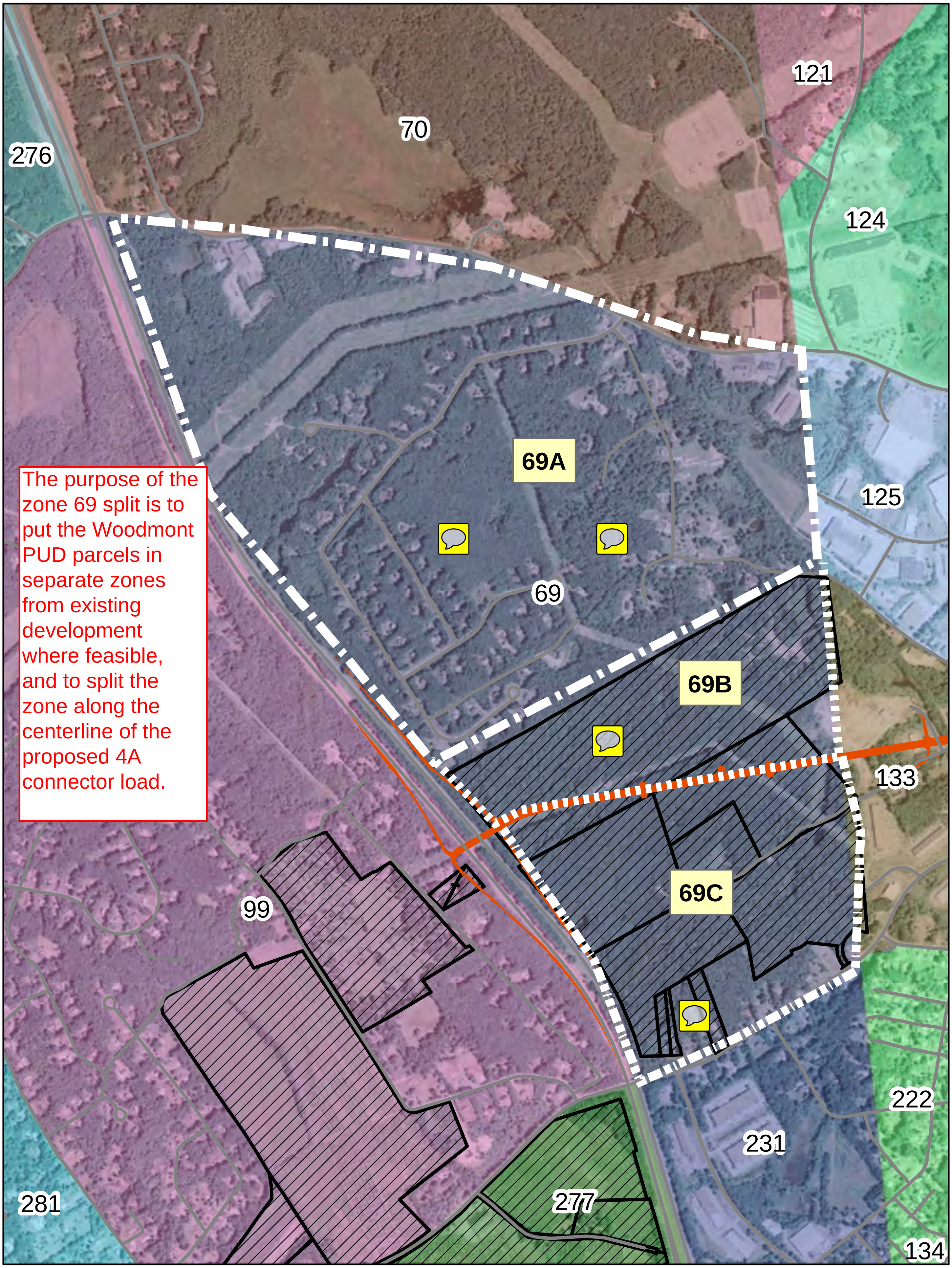
$E_{2016\ TAZ\ EC\ i}$ = 2016 Employment projection in a TAZ for an employment category group at projection year i

$E_{2016\ TAZ\ EC\ i-1}$ = 2016 Employment projection in a TAZ for the employment category group at projection year i-1 in the 2016 projection

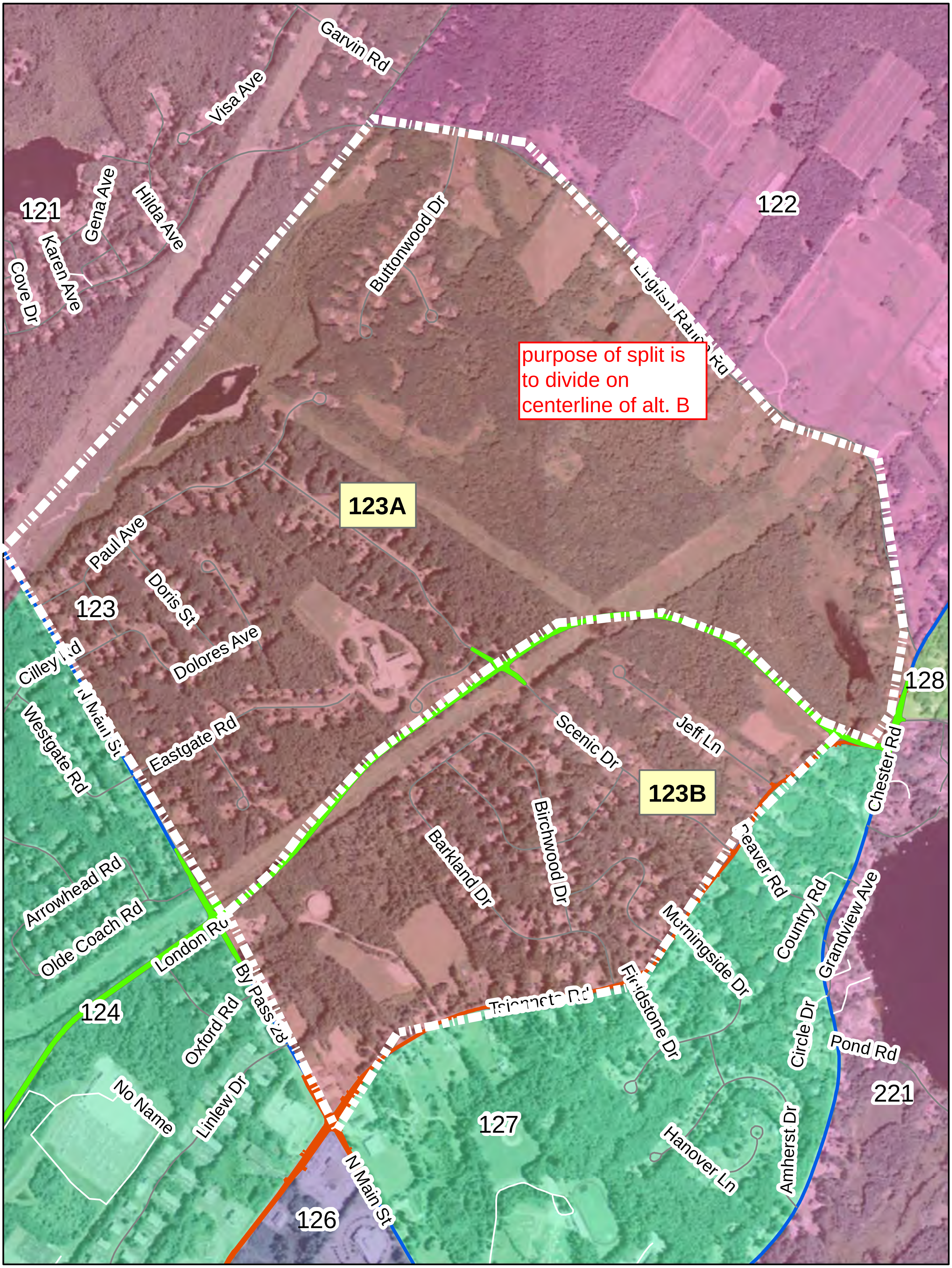
4. REFERENCES

1. 2010 Travel Demand Forecast Model Development and Calibration Report, Southern New Hampshire Planning Commission, 2012.
2. 2015 Population Estimates of New Hampshire Cities and Towns, The New Hampshire Office of Strategic Initiatives (NHOSI), 2016.
3. Model Validation and Reasonableness Checking Manual, Travel Model Improvement Program, 2001.
4. I-93 Exit 4A Supplemental Draft Environmental Impact Statement Land Use Scenarios Report, Louis Berger, 2017.
5. State of New Hampshire County Population Projections, By Municipality, The New Hampshire Office of Strategic Initiatives (NHOSI) in Partnership with the State's Regional Planning Commissions , 2016
6. FY 2017 – FY 2040 Regional Transportation Plan for the Southern NH Planning Commission, Southern New Hampshire Planning Commission, 2017.

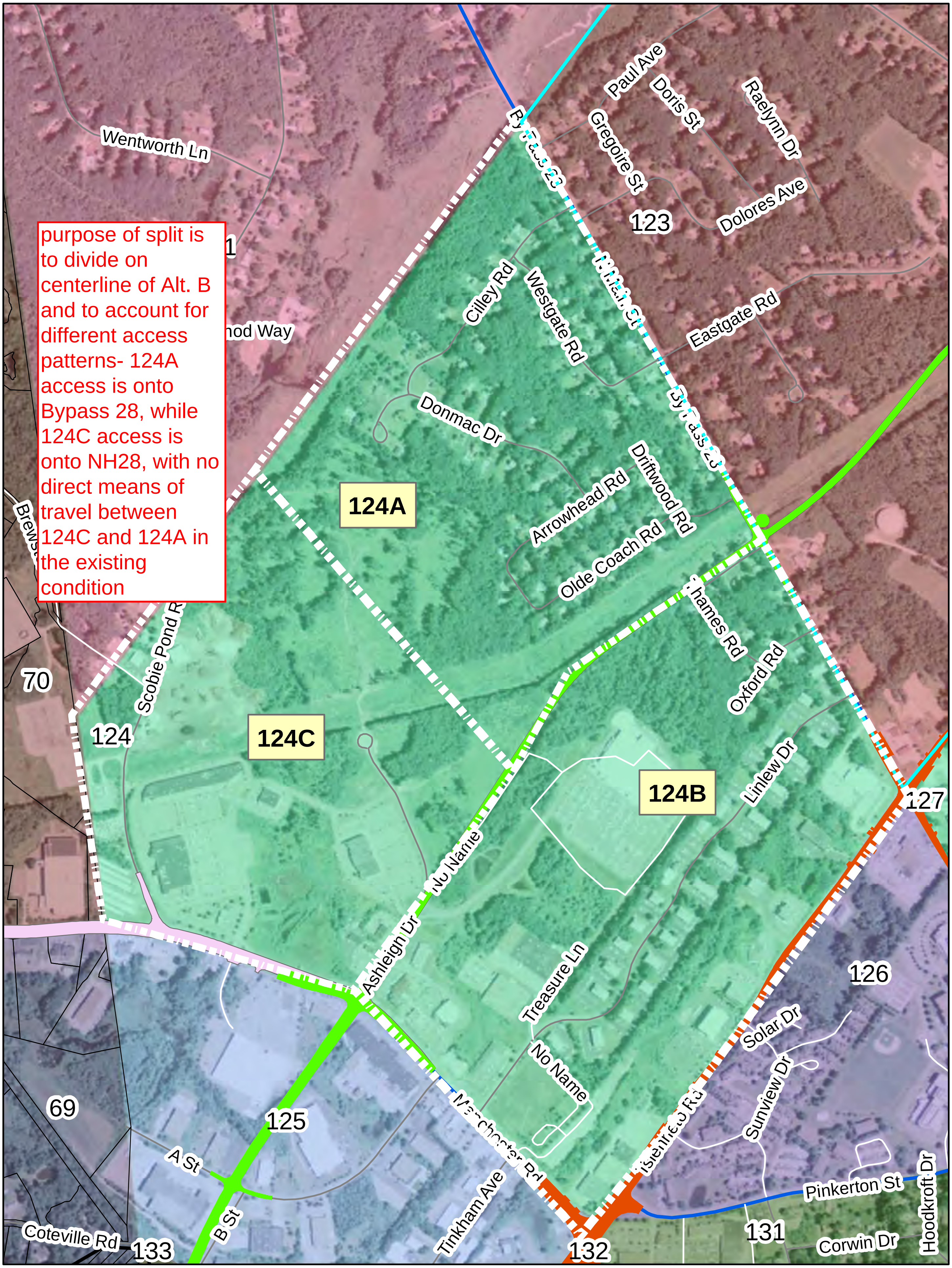
APPENDIX A STUDY AREA TAZ SPLIT

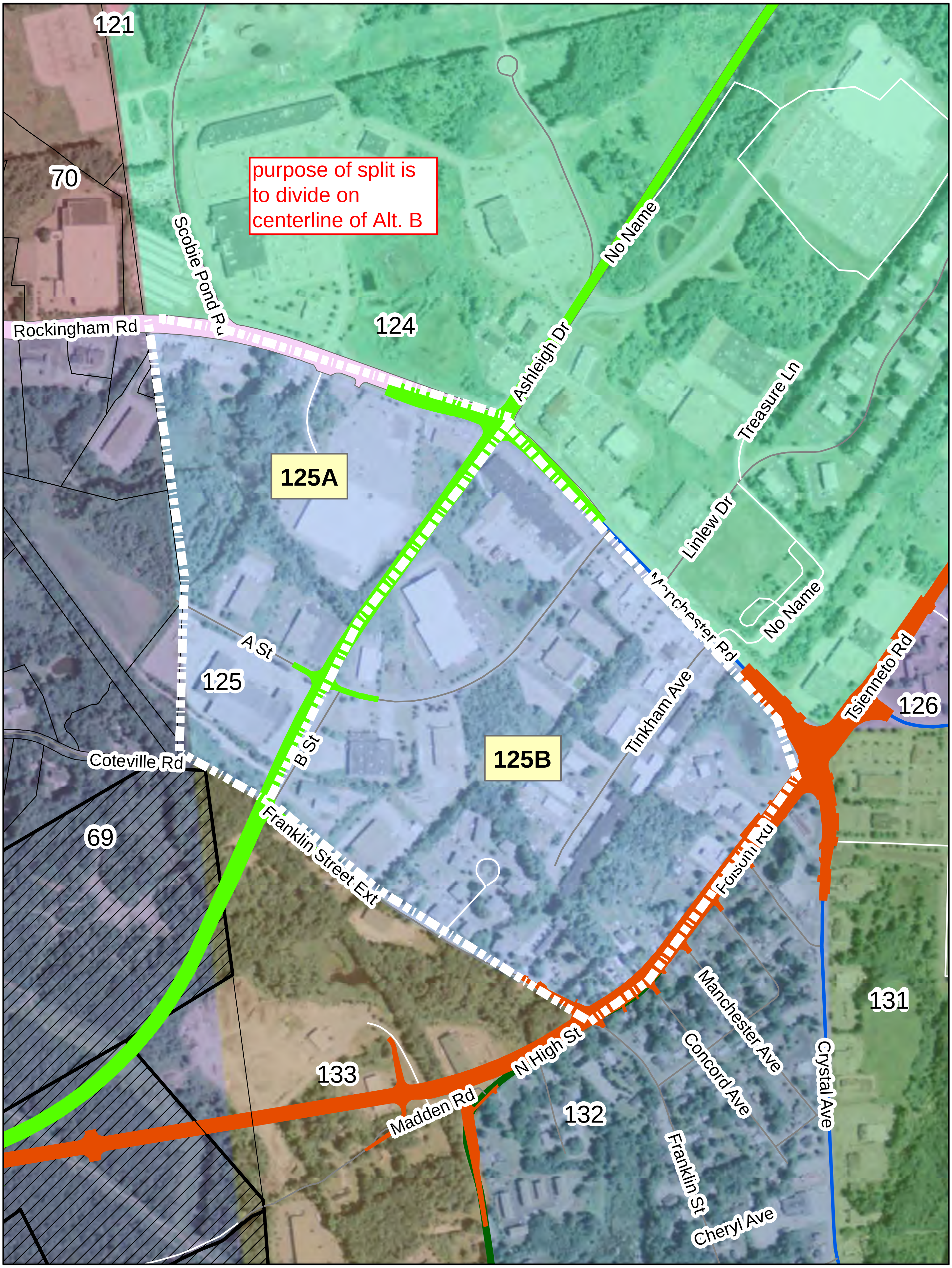


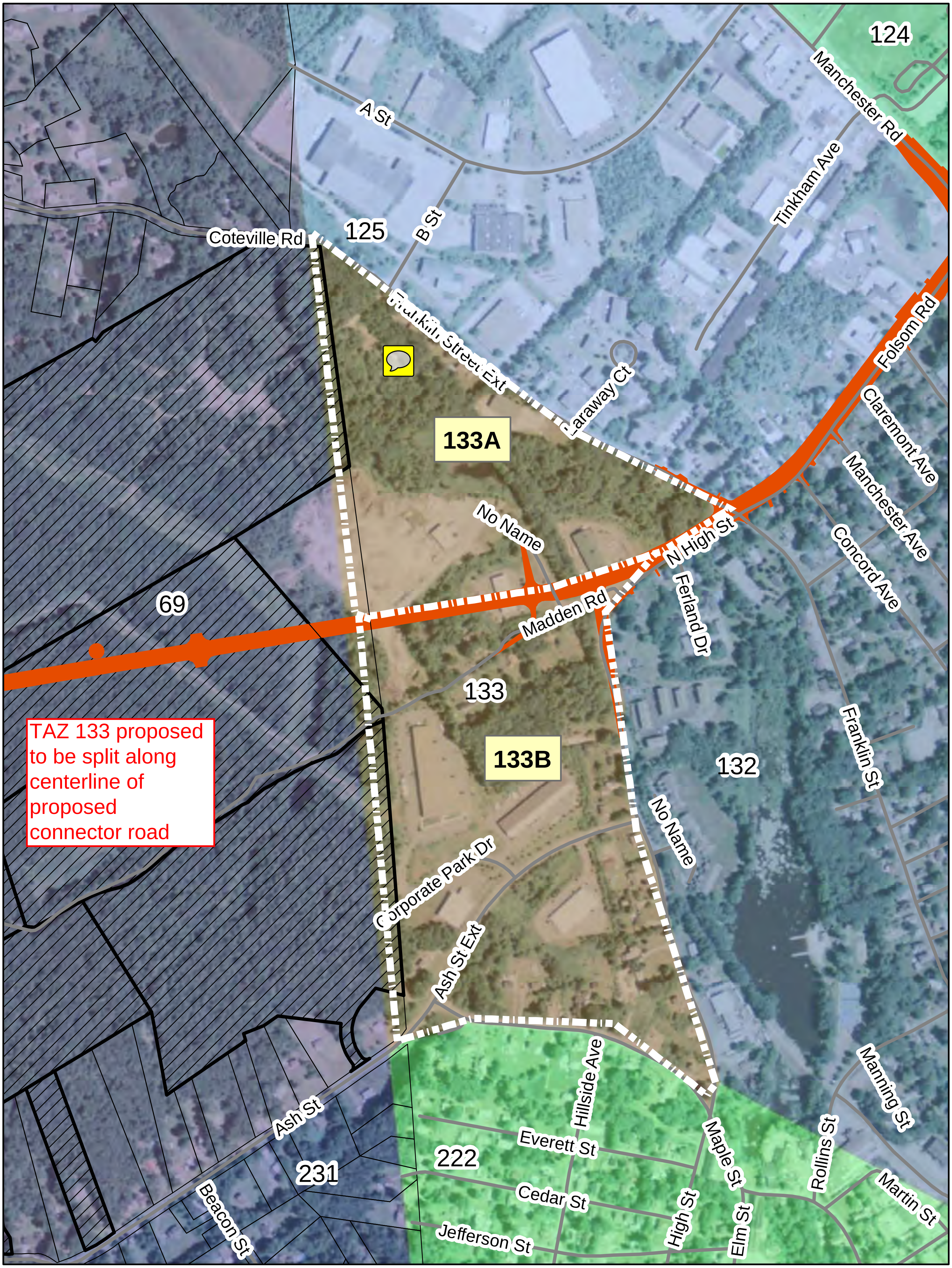
276
70
121
124
125
69A
69
69B
133
69C
99
222
231
277
281
134
The purpose of the zone 69 split is to put the Woodmont PUD parcels in separate zones from existing development where feasible, and to split the zone along the centerline of the proposed 4A connector load.



purpose of split is to divide on centerline of alt. B
123A
123B
121
122
123
124
126
127
128
221
Garvin Rd
Visa Ave
Gena Ave
Hilda Ave
Karen Ave
Cove Dr
Buttonwood Dr
Paul Ave
Doris St
Dolores Ave
Cilley Rd
N Main St
Westgate Rd
Eastgate Rd
Scenic Dr
Jeff Ln
Chester Rd
Barkland Dr
Birchwood Dr
Arrowhead Rd
Olde Coach Rd
London Rd
By Pass 28
Oxford Rd
Morningside Dr
Country Rd
Grandview Ave
Fieldstone Dr
Circle Dr
Pond Rd
No Name
Linlew Dr
Hanover Ln
Amherst Dr


purpose of split is to divide on centerline of Alt. B and to account for different access patterns- 124A access is onto Bypass 28, while 124C access is onto NH28, with no direct means of travel between 124C and 124A in the existing condition
124A
124B
124C
123
124
125
126
127
131
132
133
69
70
Wentworth Ln
Paul Ave
Doris St
Raelynn Dr
Gregoire St
Dolores Ave
Eastgate Rd
Cilley Rd
Westgate Rd
Donmac Dr
Arrowhead Rd
Driftwood Rd
Olde Coach Rd
Thames Rd
Oxford Rd
Linlew Dr
Scobie Pond Rd
No Name
Ashleigh Dr
Treasure Ln
A St
B St
Coteville Rd
Tinkham Ave
Solar Dr
Sunview Dr
Pinkerton St
Corwin Dr
Hoodkroft Dr


purpose of split is to divide on centerline of Alt. B
121
70
124
125A
125
125B
126
69
133
132
131
Rockingham Rd
Scobie Pond Rd
No Name
Ashleigh Dr
Treasure Ln
Linlew Dr
Manchester Rd
No Name
Tsienneto Rd
A St
B St
Coteville Rd
Tinkham Ave
Franklin Street Ext
Folsom Rd
Manchester Ave
Concord Ave
Crystal Ave
N High St
Madden Rd
Franklin St
Cheryl Ave



124
125
132
133
133A
133B
69
222
231
A St
B St
Coteville Rd
Manchester Rd
Tinkham Ave
Folsom Rd
Franklin Street Ext
Laraway Ct
Claremont Ave
Manchester Ave
Concord Ave
No Name
N High St
Ferland Dr
Madden Rd
Franklin St
No Name
Corporate Park Dr
Ash St Ext
Ash St
Beacon St
Hillside Ave
Everett St
Cedar St
Jefferson St
High St
Maple St
Elm St
Rollins St
Manning St
Martin St
TAZ 133 proposed to be split along centerline of proposed connector road

APPENDIX B PROJECT LIST

Projects Coded in the 2040 No-Build Model

Community[1]	Project	Project #
BE	NH 101 - Widen NH 101 to 5 Lanes from NH 114 up to Wallace Rd	13953
BE	NH 101 - Widen NH 101 to 5 Lanes from Wallace Rd up to Amherst TL[2]	
BE	US 3 - Widen US 3 to 5 Lanes from Hawthorne Drive North to Manchester Airport Access Road	40664
BE-ME	F.E.E Turnpike - Improvement to Bedford Mainline Toll Plaza to Institute Open Road Tolling	16100
NA-ME-BE	F.E.E.Turnpike - Widen existing 2-Lane Sections of the Turnpike to a 3-Lane Typical From Exit 8 in Nashua to I-293 in Bedford	13761
CH	NH 102 - NH 102/North Pond Road Intersection Improvements.	
DE-LO	I-93 - Construction of I-93 Exit 4A	13065
HO	US 3/NH 28 - Widen US 3/NH 28 to 5 Lanes from Martins Ferry Rd to West Alice Ave	29611
HO	US 3/NH 28 - Construct Southern Segment of US 3/NH 28 Alternate Bypass[2]	
HO	US 3/NH 28 - Construct Northern Segment of US3/NH28 Alternate Bypass[2]	
HO	Widen US3/NH28 to 5 Lanes from Legends Dr to Hunt Street[2]	
HO	Hackett Hill Road - Reconstruction intersection of NH 3A/Hackett Hill Road	14950
HO	NH 3A - Reconstruct and Widen from Commerce Road North to Goonan Rd.	24862
LO	NH 28 - Widening NH 28 from NH 128 to Page Rd.	
LO	NH 102 - Widen NH 102 to 4 Lanes from Hudson Town Line to NH 128[2] - Lower Corridor	
LO	NH 102 - Widen NH 102 to 5 Lanes from I-93 East to Londonderry Road[2] - Upper Corridor	
LO	NH 102 - Widen NH 102 to 6 Lanes from I-93 to NH 128[2] - Central Corridor	
LO	Intersection Improvements at NH28/NH128 for Safety and Traffic Flow	
MA	I-293 - Reconstruction of Exit 4 on I-293	
MA	I-293 - Reconstruct and Widening of Exit 6 (Amoskeag)	16099A
MA	I-293 - Reconstruct Exit 7	16099B
SA-MA	I-93- Reconstruct and Widen Mainline, Environmental Impact Study and Final Design From Mass S/L in Salem to I-293 in Manchester. Capacity Improvements, Reconstruction, and Widening from North of Exit 3 to I-293	10418C
SA-MA	I-93 - NB & SB Mainline Weigh Station to Kendall	14633B
SA-MA	I-93 - Exit 4 Ramps, NB & SB Mainline, NH 102 Approach Work	14633D
SA-MA	I-93- NB & SB Mainline, Exit 5 to I-293 Split (Londonderry & Manchester)	14633H
SA-MA	I-93- NB & SB Mainline, Exit 4 and 5 (Londonderry)	14633I
SA-MA	I-93 - Exit 1 to Exit 5 - Construct 4th Lane Northbound and Southbound	14633J
SA-MA	I-93 - Final Design (PE) and ROW for I-93 Salem to Manchester	10418X
Windham	NH 111 - Corridor Improvements Within Town Center (Construction not in TYP)	40663
Windham	NH 28 - Intersection NH 28/Roulston Road Improvements	40665

Source: FY 2017 - 2020 Transportation Improvement Program, FY 2017-2026 Ten-Year Transportation Improvement Plan, and 2017-2040 SNHPC Regional Transportation Plan.

[1] BE=Bedford, CH=Chester, DE=Derry, HO=Hooksett, LO=Londonderry, MA=Manchester, NB=New Boston, RA=Raymond, SA=Salem, NA=Nashua

[2] These projects are taken from various studies and are part of the Regional Transportation Plan

Updated 10/21/2016

APPENDIX C 2015 BASE YEAR MODEL STUDY AREA CALIBRATION RESULTS

2015 Base Year Model Study Area Calibration Results

Location	A	B	Assign	Count	% Diff
NH 28 N. of Liberty Dr.	589	3645	15,406	13,000	18.51
NH 102 at Derry Town line	594	3556	20,817	22,270	-6.52
NH 28 at Derry Town line	793	1621	19,392	17,454	11.10
Exit 5 SB Off ramp	999	3650	9,234	9,282	-0.52
Exit 4 SB On ramp	1003	1764	8,157	9,615	-15.16
Exit 4 NB Off ramp	1006	6519	10,389	9,843	5.55
Exit 5 NB Off ramp	1010	3652	4,430	5,601	-20.91
Gilcreast Rd. N. of NH 102	1334	3557	9,397	10,000	-6.03
Ash St. E. of Londonderry Rd.	1348	3555	5,950	6,900	-13.77
Ash St. at Londonderry Town line	1349	2125	5,936	6,765	-12.25
Exit 4 SB On ramp EB to SB	1767	1005	4,907	5,010	-2.06
Exit 4 SB On ramp WB to SB	1770	1004	3,637	4,648	-21.75
NH28 Bypass N. of Tsienneto Rd.	1838	1839	9,377	11,943	-21.49
NH28 Bypass N. of Academy Dr.	1839	3532	7,318	7,329	-0.15
NH28 Bypass S. of Thornton Rd.	1840	2143	12,015	13,981	-14.06
NH102 E. of NH 28 Bypass	1841	1878	7,017	7,329	-4.26
Crystal Ave. NH 28 S of Rollins	1860	1861	13,215	13,000	1.65
Crystal Ave. NH 28 S of Tsienneto	1862	1863	13,407	15,193	-11.76
Folsom Rd. W. of NH 28	1863	3483	8,960	11,672	-23.24
NH 102 E. of Griffin St.	1870	1871	18,002	16,400	9.77
NH 102 W. of Abbot St.	1876	1877	11,128	14,350	-22.45
Tsienneto Rd. W. of NH 102	1883	2082	5,666	5,393	5.06
Franklin St. Ext N. of Folsom Rd.	2106	3484	1,255	1,845	-31.98
Tsienneto Rd. E. of Pinkerton	2107	2108	14,200	14,636	-2.98
Pinkerton St. E. of Tsienneto	2107	2109	8,776	11,672	-24.81
Fordway over Beaver Brook	2135	2136	5,114	5,330	-4.05
NH102 E. of Hampton Dr.	3234	1766	30,419	32,000	-4.94
Exit 5 NB On ramp	3651	1011	9,101	9,341	-2.57
Exit 5 SB On ramp	3653	1000	3,919	5,503	-28.78
Exit 4 NB On ramp	6518	1007	9,550	10,045	-4.93

FHWA Targets

Upper Limit	Lower Limit
25	-25
25	-25
25	-25
29	-29
29	-29
29	-29
29	-29
25	-25
29	-29
29	-29
29	-29
36	-36
25	-25
29	-29
25	-25
29	-29
25	-25
25	-25
25	-25
25	-25
25	-25
29	-29
47	-47
25	-25
25	-25
29	-29
22	-22
29	-29
29	-29
25	-25

Note: Traffic volumes were taken from NHDOT traffic count program, SNHPC traffic count program, and CLD|Fuss & O'Neil traffic counts for the project.

APPENDIX D POPULATION PROJECTION [2] [5]

Population Projection 2015-2040

Town	2015	2020	2025	2030	2035	2040
Auburn	5,315	5,560	5,828	5,959	6,033	6,048
Bedford	22,236	23,451	24,797	25,276	25,576	25,680
Candia	3,909	3,891	3,880	3,967	4,016	4,026
Chester	4,887	5,199	5,536	5,660	5,731	5,744
Deerfield	4,413	4,631	4,869	4,978	5,040	5,052
Derry	32,948	32,459	32,018	32,733	33,144	33,222
Francestown	1,562	1,576	1,597	1,628	1,647	1,654
Goffstown	17,846	18,051	18,335	18,689	18,911	18,988
Hooksett	14,473	15,403	16,508	17,089	17,532	17,823
Londonderry	24,891	25,434	26,057	26,639	26,973	27,036
Manchester	109,419	109,469	109,963	112,087	113,420	113,881
New Boston	5,457	5,818	6,214	6,334	6,409	6,435
Raymond	10,257	10,403	10,577	10,814	10,949	10,975
Weare	8,811	9,051	9,334	9,514	9,627	9,667
Windham	14,301	15,414	16,612	16,983	17,196	17,237
Total	**280,725**	**285,810**	**292,125**	**298,350**	**302,204**	**303,468**

Source: New Hampshire Office of Strategic Initiatives.

APPENDIX E 2015 EMPLOYMENT AVERAGE

2015 Employment Average

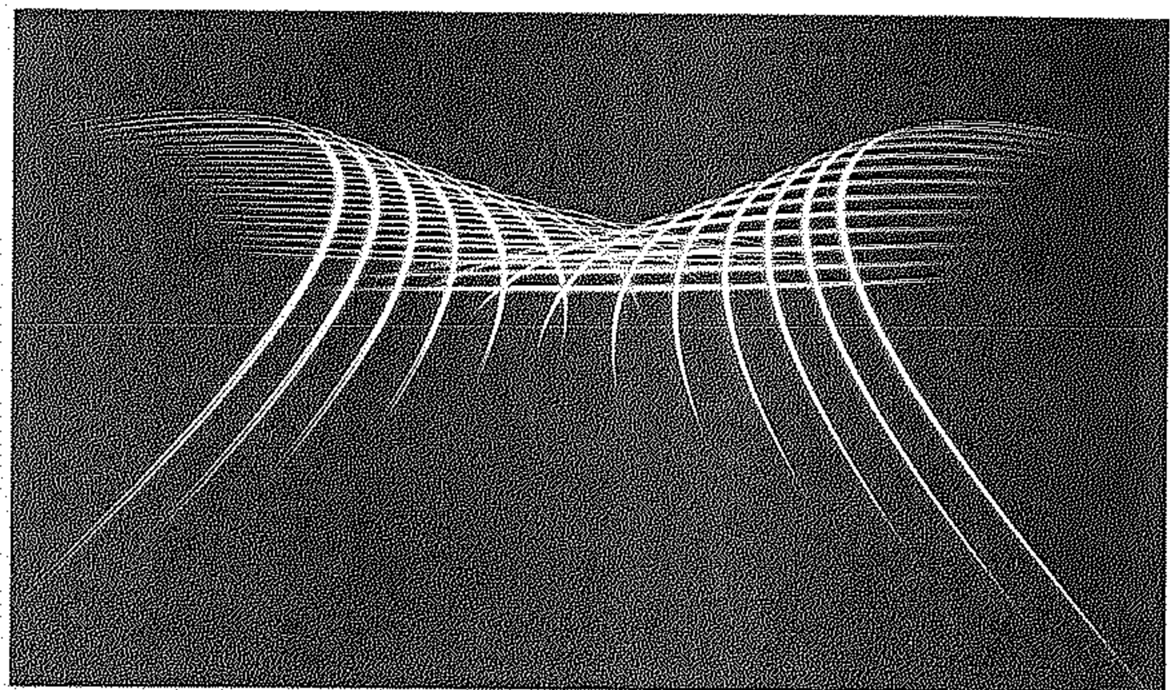
Town	Q1	Q2	Q3	Q4	Average
Auburn	1,706	1,766	1,806	1,852	1,783
Bedford	15,223	15,487	15,446	15,617	15,443
Candia	673	820	865	818	794
Chester	364	371	349	376	365
Deerfield	384	454	437	411	422
Derry	8,123	8,240	7,806	8,251	8,105
Francestown	94	125	136	117	118
Goffstown	3,129	3,304	3,159	3,235	3,207
Hooksett	9,275	9,496	9,591	9,700	9,516
Londonderry	12,812	13,345	13,185	13,454	13,199
Manchester	67,548	68,384	68,349	69,812	68,523
New Boston	727	756	732	794	752
Raymond	2,965	3,051	2,902	3,074	2,998
Weare	1,764	1,852	1,762	1,836	1,804
Windham	3,428	3,534	3,463	3,689	3,529

Source: New Hampshire Department of Employment Security.

APPENDIX E: HCM 2010 LOS CRITERIA

HCM2010

HIGHWAY CAPACITY MANUAL



VOLUME 3: INTERRUPTED FLOW

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leaving basic freeway segments. Thus, the impact on the capacity of the mainline freeway most often is negligible.

This does not mean, however, that the capacity of each component segment of a facility is the same. Each segment has its own demand and demand characteristics. Demand flow rate can change at every entry and exit point along the freeway, and the percent of heavy vehicles can change too. Terrain also can change at various points along the freeway.

Changes in heavy vehicle presence can change the capacity of individual segments within a defined facility. Changes in the split of movements in a weaving segment can change its capacity. In the same way, changes in the relative demand flows at on- and off-ramps can change the location of the critical segment within a defined facility and its capacity.

As noted previously, the capacity of a freeway facility is defined as the capacity of its critical segment.

LOS: COMPONENT SEGMENTS AND THE FREEWAY FACILITY

LOS of Component Segments

Chapters 11, 12, and 13 provide methodologies to determine the LOS in basic, weaving, merge, and diverge segments. In all cases, LOS F is identified when v_d/c is greater than 1.00. Such breakdowns are easily identified, and users are referred to this chapter.

This chapter's methodology provides an analysis of breakdown conditions, including the spatial and time impacts of a breakdown. Thus, in the performance of a facility-level analysis, LOS F in a component segment can be identified (*a*) when the segment v_d/c is greater than 1.00 and (*b*) when a queue from a downstream breakdown extends into an upstream segment. The latter cannot be done by using the individual segment analysis procedures of Chapters 11, 12, and 13.

Thus, when facility-level analysis is undertaken by using the methodology of this chapter, LOS F for a component segment will be identified in two different ways:

- When v_d/c is greater than 1.00, or
- When the density is greater than 45 pc/mi/ln for basic freeway segments or 43 pc/mi/ln for weaving, merge, or diverge segments.

The latter identifies segments in which queues have formed as a result of downstream breakdowns.

LOS for a Freeway Facility

Because LOS for basic, weaving, merge, and diverge segments on a freeway is defined in terms of density, LOS for a freeway facility is also defined on the basis of density.

A facility analysis will result in a density determination and LOS for each component segment. The facility LOS will be based on the weighted average density for all segments within the defined facility. Weighting is done on the basis of segment length and the number of lanes in each segment, as shown in Equation 10-2:

Equation 10-2

$$D_F = \frac{\sum_{i=1}^{n} D_i \times L_i \times N_i}{\sum_{i=1}^{n} L_i \times N_i}$$

where

D_F = average density for the facility (pc/mi/ln),

D_i = density for segment i (pc/mi/ln),

L_i = length of segment i (ft),

N_i = number of lanes in segment i, and

n = number of segments in the defined facility.

The LOS criteria for a freeway facility are shown in Exhibit 10-7. They are the same criteria used for basic freeway segments.

Exhibit 10-7
LOS Criteria for Freeway Facilities

Level of Service	Density (pc/mi/ln)
A	≤11
B	>11–18
C	>18–26
D	>26–35
E	>35–45
F	>45 or any component v/c ratio > 1.00

Use of a LOS descriptor for the overall freeway facility must be done with care. It is critical that the LOS for individual segments composing the facility also be reported. Because the overall LOS is an average, it may mask serious problems in individual segments of the facility.

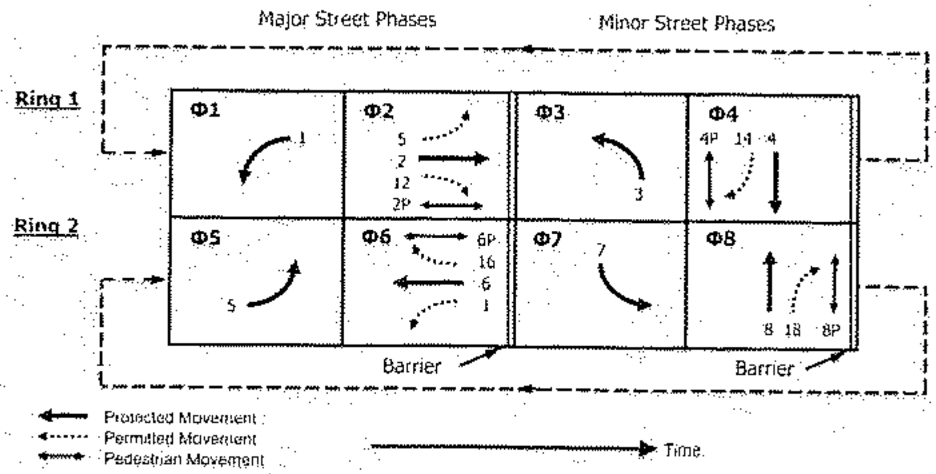
This is particularly important if one or more of the component segments are operating at LOS F. As described in this chapter's methodology section, the freeway facility methodology applies models to estimate the propagation of the effects of a breakdown in time and space. Where breakdowns exist in one or more segments of a facility, the average LOS is of limited use. The average LOS applies to a specific time period, usually 15 min.

While LOS A through D are defined by using the same densities that apply to basic freeway segments, LOS F for a facility is defined as a case in which any component segment of the freeway exceeds a v/c ratio of 1.00 or the average density over the defined facility exceeds 45 pc/mi/ln. In such a case, this chapter's methodology allows the analyst to map the impacts of this breakdown in time and space, and close attention to the individual LOS of component segments is necessary.

18-3. The symbol Φ shown in this exhibit represents the word "phase," and the number following the symbol represents the phase number.

Exhibit 18-3 shows one way that traffic movements can be assigned to each of the eight phases. These assignments are illustrative, but they are not uncommon. Each left-turn movement is assigned to an exclusive phase. During this phase, the left-turn movement is "protected" so that it receives a green arrow indication. Each through, right-turn, and pedestrian movement combination is also assigned to an exclusive phase. The dashed arrows indicate turn movements that are served in a "permitted" manner so that the turn can be completed only after yielding the right-of-way to conflicting movements. Additional information about traffic signal controller operation is provided in Chapter 31, Signalized Intersections: Supplemental.

Exhibit 18-3
Dual-Ring Structure with Illustrative Movement Assignments



LOS CRITERIA

This subsection describes the LOS criteria for the automobile, pedestrian, and bicycle modes. The criteria for the automobile mode are different from those for the nonautomobile modes. Specifically, the automobile-mode criteria are based on performance measures that are field measurable and perceivable by travelers. The criteria for the nonautomobile modes are based on scores reported by travelers indicating their perception of service quality.

Automobile Mode

All uses of the word "volume" or the phrase "volume-to-capacity ratio" in this chapter refer to demand volume or demand-volume-to-capacity ratio.

LOS can be characterized for the entire intersection, each intersection approach, and each lane group. Control delay alone is used to characterize LOS for the entire intersection or an approach. Control delay *and* volume-to-capacity ratio are used to characterize LOS for a lane group. Delay quantifies the increase in travel time due to traffic signal control. It is also a surrogate measure of driver discomfort and fuel consumption. The volume-to-capacity ratio quantifies the degree to which a phase's capacity is utilized by a lane group. The following paragraphs describe each LOS.

LOS A describes operations with a control delay of 10 s/veh or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.

LOS B describes operations with control delay between 10 and 20 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

LOS C describes operations with control delay between 20 and 35 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.

LOS D describes operations with control delay between 35 and 55 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

LOS E describes operations with control delay between 55 and 80 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

LOS F describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

A lane group can incur a delay less than 80 s/veh when the volume-to-capacity ratio exceeds 1.0. This condition typically occurs when the cycle length is short, the signal progression is favorable, or both. As a result, both the delay and volume-to-capacity ratio are considered when lane group LOS is established. A ratio of 1.0 or more indicates that cycle capacity is fully utilized and represents failure from a capacity perspective (just as delay in excess of 80 s/veh represents failure from a delay perspective).

Exhibit 18-4 lists the LOS thresholds established for the automobile mode at a signalized intersection.

Exhibit 18-4
LOS Criteria: Automobile Mode

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio[a] ≤1.0	>1.0
≤10	A	F
>10–20	B	F
>20–35	C	F
>35–55	D	F
>55–80	E	F
>80	F	F

Note: [a] For approach-based and intersectionwide assessments, LOS is defined solely by control delay.

1. INTRODUCTION

19. TWSC Intersections

Two-way STOP-controlled (TWSC) intersections are common in the United States. One typical configuration is a four-leg intersection, where one street—the *major street*—is uncontrolled, while the other street—the *minor street*—is controlled by STOP signs. The other typical configuration is a three-leg intersection, where the single minor-street approach (i.e., the stem of the T configuration) is controlled by a STOP sign. Minor street approaches can be public streets or private driveways. **Chapter 19, Two-Way STOP-Controlled Intersections**, presents concepts and procedures for analyzing these types of intersections. Chapter 9 provides a glossary and list of symbols, including those used for TWSC intersections.

Three-leg intersections are considered a standard type of TWSC intersection, when the stem of the T is controlled by a STOP sign.

Capacity analysis of TWSC intersections requires a clear description and understanding of the interaction between travelers on the minor, or STOP-controlled, approach with travelers on the major street. Both gap acceptance and empirical models have been developed to describe this interaction. Procedures described in this chapter rely primarily on field measurements of TWSC performance in the United States (*1*) that have been applied to a gap acceptance model developed and refined in Germany (*2*).

INTERSECTION ANALYSIS BOUNDARIES AND TRAVEL MODES

The intersection boundaries for a TWSC intersection analysis are assumed to be those of an isolated intersection (i.e., not affected by upstream or downstream intersections), with the exception of TWSC intersections that are located within 0.25 mi of a signalized intersection (for the major-street approaches). This chapter presents methodologies to assess TWSC intersections for both pedestrians and motor vehicles. A discussion of how the procedures for motor vehicles could potentially apply to an analysis of bicycle movements is also provided.

LEVEL-OF-SERVICE CRITERIA

Level of service (LOS) for a TWSC intersection is determined by the computed or measured control delay. For motor vehicles, LOS is determined for each minor-street movement (or shared movement) as well as major-street left turns by using criteria given in Exhibit 19-1. LOS is not defined for the intersection as a whole or for major-street approaches for three primary reasons: (*a*) major-street through vehicles are assumed to experience zero delay; (*b*) the disproportionate number of major-street through vehicles at a typical TWSC intersection skews the weighted average of all movements, resulting in a very low overall average delay for all vehicles; and (*c*) the resulting low delay can mask important LOS deficiencies for minor movements. As Exhibit 19-1 notes, LOS F is assigned to the movement if the volume-to-capacity ratio for the movement exceeds 1.0, regardless of the control delay.

LOS is not defined for the major-street approaches or for the overall intersection, as major-street through vehicles are assumed to experience no delay.

The LOS criteria for TWSC intersections are somewhat different from the criteria used in Chapter 18 for signalized intersections, primarily because user perceptions differ among transportation facility types. The expectation is that a signalized intersection is designed to carry higher traffic volumes and will present greater delay than an unsignalized intersection. Unsignalized intersections are also associated with more uncertainty for users, as delays are less predictable than they are at signals, which can reduce users' delay tolerance.

Exhibit 19-1
Level-of-Service Criteria: Automobile Mode

Control Delay (s/vehicle)	LOS by Volume-to-Capacity Ratio $v/c \leq 1.0$	$v/c > 1.0$
0–10	A	F
>10–15	B	F
>15–25	C	F
>25–35	D	F
>35–50	E	F
>50	F	F

Note: The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole.

Pedestrian LOS at TWSC intersections is defined for pedestrians crossing a traffic stream not controlled by a STOP sign; it also applies to midblock pedestrian crossings. LOS criteria for pedestrians are given in Exhibit 19-2.

Exhibit 19-2
Level-of-Service Criteria: Pedestrian Mode

LOS	Control Delay (s/pedestrian)	Comments
A	0–5	Usually no conflicting traffic
B	5–10	Occasionally some delay due to conflicting traffic
C	10–20	Delay noticeable to pedestrians, but not inconveniencing
D	20–30	Delay noticeable and irritating, increased likelihood of risk taking
E	30–45	Delay approaches tolerance level, risk-taking behavior likely
F	>45	Delay exceeds tolerance level, high likelihood of pedestrian risk taking

Note: Control delay may be interpreted as s/pedestrian group if groups of pedestrians were counted as opposed to individual pedestrians.

LOS F for pedestrians occurs when there are not enough gaps of suitable size to allow waiting pedestrians to cross through traffic on the major street safely. This situation is typically evident from extremely long control delays. The method is based on a constant critical headway. In the field, however, LOS F may also appear in the form of crossing pedestrians selecting smaller-than-usual gaps. In such cases, safety could be a concern that warrants further study.

REQUIRED INPUT DATA

Analysis of a TWSC intersection requires the following data:

1. Number and configuration of lanes on each approach;
2. Percentage of heavy vehicles for each movement;
3. Either of the following:
   a. Demand flow rate for each entering vehicular movement and each pedestrian crossing movement during the peak 15 min, or
   b. Demand flow rate for each entering vehicular movement and each pedestrian crossing movement during the peak hour and a peak hour factor for the hour;
4. Special geometric factors such as
   a. Unique channelization aspects,
   b. Existence of a two-way left-turn lane or raised or striped median storage (or both),

1. INTRODUCTION

Roundabouts are intersections with a generally circular shape, characterized by yield on entry and circulation around a central island (counterclockwise in the United States). Roundabouts have been used successfully throughout the world and are being used increasingly in the United States, especially since 1990.

Chapter 21, Roundabouts, presents concepts and procedures for analyzing these intersections. National Cooperative Highway Research Program Project 3-65 (*1*) provided a comprehensive database of roundabout operations for U.S. conditions on the basis of a study of 31 sites. The procedures that follow are largely founded on that study's recommendations. These procedures allow the analyst to assess the operational performance of an existing or planned one-lane or two-lane roundabout given traffic demand levels.

INTERSECTION ANALYSIS BOUNDARIES AND TRAVEL MODES

The analytical procedure presented in this chapter assumes that the analysis boundaries are the roundabout itself, including associated pedestrian crosswalks. Alternative tools discussed in this chapter can, in some cases, expand the analysis boundaries to include adjacent intersections. The methodology presented here includes discussion of motor vehicles, pedestrians, and bicycles.

LEVEL OF SERVICE CRITERIA

The level of service (LOS) criteria for automobiles in roundabouts are given in Exhibit 21-1. As the table notes, LOS F is assigned if the volume-to-capacity ratio of a lane exceeds 1.0 regardless of the control delay. For assessment of LOS at the approach and intersection levels, LOS is based solely on control delay.

The thresholds in Exhibit 21-1 are based on the considered judgment of the Transportation Research Board Committee on Highway Capacity and Quality of Service. As discussed later in this chapter, roundabouts share the same basic control delay formulation with two-way and all-way STOP-controlled intersections, adjusting for the effect of YIELD control. However, at the time of publication of this edition of the *Highway Capacity Manual* (HCM), no research was available on traveler perception of quality of service at roundabouts. In the absence of such research, the service measure and thresholds have been made consistent with those for other unsignalized intersections, primarily on the basis of this similar control delay formulation.

Exhibit 21-1
LOS Criteria: Automobile Mode

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio[a]	
	v/c ≤ 1.0	v/c >1.0
0–10	A	F
>10–15	B	F
>15–25	C	F
>25–35	D	F
>35–50	E	F
>50	F	F

Note: [a] For approaches and intersectionwide assessment, LOS is defined solely by control delay.

APPENDIX F: HCS 2010 FREEWAY FACILITY ANALYSES – 2015 BASE

Segment Identification Listing

Northbound Direction
Segment 1 – Basic – I-93 Mainline south of Exit 4
Segment 2 – Diverge – Exit 4 NB off-ramp
Segment 3 – Basic – I-93 Mainline between Exit 4 ramps
Segment 4 – Merge – Exit 4 NB on-ramp
Segment 5 – Basic – I-93 Mainline between Exit 4 NB on- and Exit 5 NB off-ramps
Segment 6 – Diverge – Exit 5 NB off-ramp
Segment 7 – Basic – I-93 Mainline between Exit 5 ramps
Segment 8 – Merge – Exit 5 NB on-ramp
Segment 9 – Basic – I-93 Mainline north of Exit 5

Southbound Direction
Segment 1 – Basic – I-93 Mainline north of Exit 5
Segment 2 – Diverge – Exit 5 SB off-ramp
Segment 3 – Basic – I-93 Mainline between Exit 5 ramps
Segment 4 – Merge – Exit 5 SB on-ramp
Segment 5 – Basic – I-93 Mainline between Exit 5 SB on- and Exit 4 SB off-ramps
Segment 6 – Diverge – Exit 4 SB off-ramp
Segment 7 – Basic – I-93 Mainline between Exit 4 SB off- and SB on ramp from east
Segment 8 – Merge – Exit 4 SB on-ramp from east
Segment 9 – Basic – I-93 Mainline between Exit 4 SB on-ramps
Segment 10 – Merge – Exit 4 SB on-ramp from west
Segment 11 – Basic – I-93 Mainline south of Exit 4

HCS 2010 Facilities Report

Project Information

Analyst	PK/LCG	Agency	
Jurisdiction		Time Period Analyzed	AM Peak - NB
Analysis Year	2015 Base - AM	Date	5/1/2017
Project Description	I-93 - from S. of Exit 4 to N of Exit 5		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	4	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	a->b	5280	2
2	Diverge	Diverge	b.->c	1500	2
3	Basic	Basic	c->d	2575	2
4	Merge	Merge	d->e	1500	2
5	Basic	Basic	e->f	13225	2
6	Diverge	Diverge	f->g	1500	2
7	Basic	Basic	g->h	4100	2
8	Merge	Merge	h->i	1500	2
9	Basic	Basic	i->j	5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.979	2022	4700	0.43	65.0	15.6	B
2	1.00	0.979	2022	4700	0.43	65.0	15.6	B
3	1.00	0.979	2022	4700	0.43	65.0	15.6	B
4	1.00	0.979	2022	4700	0.43	65.0	15.6	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.979	0.962	2022	426	4700	1900	0.43	0.22	51.3	51.3	19.7	14.3	B
2	1.00	1.00	0.979	0.962	2022	426	4700	1900	0.43	0.22	51.3	51.3	19.7	14.3	B
3	1.00	1.00	0.979	0.962	2022	426	4700	1900	0.43	0.22	51.3	51.3	19.7	14.3	B
4	1.00	1.00	0.979	0.962	2022	426	4700	1900	0.43	0.22	51.3	51.3	19.7	14.3	B

Segment 3: Basic

2015 - AM - NG

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.984	1596	4700	0.34	65.0	12.3	B
2	1.00	0.984	1596	4700	0.34	65.0	12.3	B
3	1.00	0.984	1596	4700	0.34	65.0	12.3	B
4	1.00	0.984	1596	4700	0.34	65.0	12.3	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.973	0.984	2691	1077	4700	2100	0.57	0.51	59.2	59.2	22.7	17.2	B
2	1.00	1.00	0.973	0.984	2691	1077	4700	2100	0.57	0.51	59.2	59.2	22.7	17.2	B
3	1.00	1.00	0.973	0.984	2691	1077	4700	2100	0.57	0.51	59.2	59.2	22.7	17.2	B
4	1.00	1.00	0.973	0.984	2691	1077	4700	2100	0.57	0.51	59.2	59.2	22.7	17.2	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.973	2703	4700	0.58	65.0	20.8	C
2	1.00	0.973	2703	4700	0.58	65.0	20.8	C
3	1.00	0.973	2703	4700	0.58	65.0	20.8	C
4	1.00	0.973	2703	4700	0.58	65.0	20.8	C

Segment 6: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.973	0.957	2703	428	4700	2000	0.58	0.21	54.3	54.3	24.9	23.2	C
2	1.00	1.00	0.973	0.957	2703	428	4700	2000	0.58	0.21	54.3	54.3	24.9	23.2	C
3	1.00	1.00	0.973	0.957	2703	428	4700	2000	0.58	0.21	54.3	54.3	24.9	23.2	C
4	1.00	1.00	0.973	0.957	2703	428	4700	2000	0.58	0.21	54.3	54.3	24.9	23.2	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.976	2275	4700	0.48	65.0	17.5	B
2	1.00	0.976	2275	4700	0.48	65.0	17.5	B
3	1.00	0.976	2275	4700	0.48	65.0	17.5	B
4	1.00	0.976	2275	4700	0.48	65.0	17.5	B

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.983	0.971	3267	1009	4700	2100	0.70	0.48	56.8	56.8	28.8	25.8	C
2	1.00	1.00	0.983	0.971	3267	1009	4700	2100	0.70	0.48	56.8	56.8	28.8	25.8	C

3	1.00	1.00	0.983	0.971	3267	1009	4700	2100	0.70	0.48	56.8	56.8	28.8	25.8	C
4	1.00	1.00	0.983	0.971	3267	1009	4700	2100	0.70	0.48	56.8	56.8	28.8	25.8	C

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.983	3255	4700	0.69	64.3	25.3	C
2	1.00	0.983	3255	4700	0.69	64.3	25.3	C
3	1.00	0.983	3255	4700	0.69	64.3	25.3	C
4	1.00	0.983	3255	4700	0.69	64.3	25.3	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	63.2	20.3	19.8	6.6	C
2	63.2	20.3	19.8	6.6	C
3	63.2	20.3	19.8	6.6	C
4	63.2	20.3	19.8	6.6	C

Facility Overall Results

Space Mean Speed, mi/h	63.2	Density, veh/mi/ln	19.8
Average Travel Time, min	6.6		

HCS 2010 Facilities Report

Project Information

Analyst	PK/LCG	Agency	
Jurisdiction		Time Period Analyzed	AM Peak - SB
Analysis Year	2015 - Base AM (3 pgs)	Date	5/1/2017
Project Description	I-93 SB - from N of Exit 5 to S of Exit 4		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	11
Total Time Periods	4	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	a->b	5280	2
2	Diverge	Diverge	b->c	1500	2
3	Basic	Basic	c->d	3920	2
4	Merge	Merge	d->e	1500	2
5	Basic	Basic	e->f	11980	2
6	Diverge	Diverge	f->g	1500	2
7	Basic	Basic	g->h	1600	2
8	Merge	Merge	h->i	1500	2
9	Basic	Basic	i->j	900	2
10	Merge	Merge	j->k	1500	2
11	Basic	Basic	l->m	5230	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.980	3321	4700	0.71	64.0	25.9	C
2	1.00	0.980	3321	4700	0.71	64.0	25.9	C
3	1.00	0.980	3321	4700	0.71	64.0	25.9	C
4	1.00	0.980	3321	4700	0.71	64.0	25.9	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.980	0.971	3321	783	4700	2000	0.71	0.39	53.5	53.5	31.0	28.1	D
2	1.00	1.00	0.980	0.971	3321	783	4700	2000	0.71	0.39	53.5	53.5	31.0	28.1	D
3	1.00	1.00	0.980	0.971	3321	783	4700	2000	0.71	0.39	53.5	53.5	31.0	28.1	D

4	1.00	1.00	0.980	0.971	3321	783	4700	2000	0.71	0.39	53.5	53.5	31.0	28.1	D

Segment 3: Basic

2015 AM-SB

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.983	2538	4700	0.54	65.0	19.5	C
2	1.00	0.983	2538	4700	0.54	65.0	19.5	C
3	1.00	0.983	2538	4700	0.54	65.0	19.5	C
4	1.00	0.983	2538	4700	0.54	65.0	19.5	C

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.983	0.952	3079	541	4700	2100	0.66	0.26	57.5	57.5	26.8	23.7	C
2	1.00	1.00	0.983	0.952	3079	541	4700	2100	0.66	0.26	57.5	57.5	26.8	23.7	C
3	1.00	1.00	0.983	0.952	3079	541	4700	2100	0.66	0.26	57.5	57.5	26.8	23.7	C
4	1.00	1.00	0.983	0.952	3079	541	4700	2100	0.66	0.26	57.5	57.5	26.8	23.7	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.983	3062	4700	0.65	64.8	23.6	C
2	1.00	0.983	3062	4700	0.65	64.8	23.6	C
3	1.00	0.983	3062	4700	0.65	64.8	23.6	C
4	1.00	0.983	3062	4700	0.65	64.8	23.6	C

Segment 6: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.983	0.971	3062	778	4700	1900	0.65	0.41	50.6	50.6	30.3	23.9	C
2	1.00	1.00	0.983	0.971	3062	778	4700	1900	0.65	0.41	50.6	50.6	30.3	23.9	C
3	1.00	1.00	0.983	0.971	3062	778	4700	1900	0.65	0.41	50.6	50.6	30.3	23.9	C
4	1.00	1.00	0.983	0.971	3062	778	4700	1900	0.65	0.41	50.6	50.6	30.3	23.9	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.987	2285	4700	0.49	65.0	17.6	B
2	1.00	0.987	2285	4700	0.49	65.0	17.6	B
3	1.00	0.987	2285	4700	0.49	65.0	17.6	B
4	1.00	0.987	2285	4700	0.49	65.0	17.6	B

Segment 8: Merge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.985	0.980	2820	531	4700	2000	0.60	0.27	58.2	58.2	24.2	17.8	B
2	1.00	1.00	0.985	0.980	2820	531	4700	2000	0.60	0.27	58.2	58.2	24.2	17.8	B
3	1.00	1.00	0.985	0.980	2820	531	4700	2000	0.60	0.27	58.2	58.2	24.2	17.8	B
4	1.00	1.00	0.985	0.980	2820	531	4700	2000	0.60	0.27	58.2	58.2	24.2	17.8	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.985	2817	4700	0.60	65.0	21.7	C
2	1.00	0.985	2817	4700	0.60	65.0	21.7	C
3	1.00	0.985	2817	4700	0.60	65.0	21.7	C
4	1.00	0.985	2817	4700	0.60	65.0	21.7	C

Segment 10: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.984	0.980	3499	679	4700	2100	0.74	0.32	57.2	57.2	30.6	23.7	C
2	1.00	1.00	0.984	0.980	3499	679	4700	2100	0.74	0.32	57.2	57.2	30.6	23.7	C
3	1.00	1.00	0.984	0.980	3499	679	4700	2100	0.74	0.32	57.2	57.2	30.6	23.7	C
4	1.00	1.00	0.984	0.980	3499	679	4700	2100	0.74	0.32	57.2	57.2	30.6	23.7	C

Segment 11: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.984	3496	4700	0.74	63.3	27.6	D
2	1.00	0.984	3496	4700	0.74	63.3	27.6	D
3	1.00	0.984	3496	4700	0.74	63.3	27.6	D
4	1.00	0.984	3496	4700	0.74	63.3	27.6	D

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	62.5	24.8	24.4	6.6	C
2	62.5	24.8	24.4	6.6	C
3	62.5	24.8	24.4	6.6	C
4	62.5	24.8	24.4	6.6	C

Facility Overall Results

Space Mean Speed, mi/h	62.5	Density, veh/mi/ln	24.4
Average Travel Time, min	6.6		

HCS 2010 Facilities Report

Project Information

Analyst	PK/LCG	Agency	
Jurisdiction		Time Period Analyzed	2015 PM Peak - NB
Analysis Year	2015- Base PM (3 pgs)	Date	5/1/2017
Project Description			

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	9
Total Time Periods	4	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	a->b	5280	2
2	Diverge	Diverge	b.->c	1500	2
3	Basic	Basic	c->d	2575	2
4	Merge	Merge	d->e	1500	2
5	Basic	Basic	e->f	13225	2
6	Diverge	Diverge	f->g	1500	2
7	Basic	Basic	g->h	4100	2
8	Merge	Merge	h->i	1500	2
9	Basic	Basic	i->j	5280	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.979	3483	4700	0.74	63.3	27.5	D
2	1.00	0.979	3483	4700	0.74	63.3	27.5	D
3	1.00	0.979	3483	4700	0.74	63.3	27.5	D
4	1.00	0.979	3483	4700	0.74	63.3	27.5	D

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.979	0.995	3483	1191	4700	1900	0.74	0.63	49.7	49.7	35.0	26.9	C
2	1.00	1.00	0.979	0.995	3483	1191	4700	1900	0.74	0.63	49.7	49.7	35.0	26.9	C
3	1.00	1.00	0.979	0.995	3483	1191	4700	1900	0.74	0.63	49.7	49.7	35.0	26.9	C
4	1.00	1.00	0.979	0.995	3483	1191	4700	1900	0.74	0.63	49.7	49.7	35.0	26.9	C

Segment 3: Basic

2015 PM-NB 1

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.971	2291	4700	0.49	65.0	17.6	B
2	1.00	0.971	2291	4700	0.49	65.0	17.6	B
3	1.00	0.971	2291	4700	0.49	65.0	17.6	B
4	1.00	0.971	2291	4700	0.49	65.0	17.6	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.977	0.988	3077	800	4700	2100	0.65	0.38	58.6	58.6	26.3	20.3	C
2	1.00	1.00	0.977	0.988	3077	800	4700	2100	0.65	0.38	58.6	58.6	26.3	20.3	C
3	1.00	1.00	0.977	0.988	3077	800	4700	2100	0.65	0.38	58.6	58.6	26.3	20.3	C
4	1.00	1.00	0.977	0.988	3077	800	4700	2100	0.65	0.38	58.6	58.6	26.3	20.3	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.977	3086	4700	0.66	64.7	23.8	C
2	1.00	0.977	3086	4700	0.66	64.7	23.8	C
3	1.00	0.977	3086	4700	0.66	64.7	23.8	C
4	1.00	0.977	3086	4700	0.66	64.7	23.8	C

Segment 6: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.977	0.971	3086	474	4700	2000	0.66	0.24	54.2	54.2	28.5	26.5	C
2	1.00	1.00	0.977	0.971	3086	474	4700	2000	0.66	0.24	54.2	54.2	28.5	26.5	C
3	1.00	1.00	0.977	0.971	3086	474	4700	2000	0.66	0.24	54.2	54.2	28.5	26.5	C
4	1.00	1.00	0.977	0.971	3086	474	4700	2000	0.66	0.24	54.2	54.2	28.5	26.5	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.978	2612	4700	0.56	65.0	20.1	C
2	1.00	0.978	2612	4700	0.56	65.0	20.1	C
3	1.00	0.978	2612	4700	0.56	65.0	20.1	C
4	1.00	0.978	2612	4700	0.56	65.0	20.1	C

Segment 8: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.983	0.981	3384	785	4700	2100	0.72	0.37	56.5	56.5	29.9	26.8	C

2	1.00	1.00	0.983	0.981	3384	785	4700	2100	0.72	0.37	56.5	56.5	29.9	26.8	C
3	1.00	1.00	0.983	0.981	3384	785	4700	2100	0.72	0.37	56.5	56.5	29.9	26.8	C
4	1.00	1.00	0.983	0.981	3384	785	4700	2100	0.72	0.37	56.5	56.5	29.9	26.8	C

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.983	3383	4700	0.72	63.8	26.5	D
2	1.00	0.983	3383	4700	0.72	63.8	26.5	D
3	1.00	0.983	3383	4700	0.72	63.8	26.5	D
4	1.00	0.983	3383	4700	0.72	63.8	26.5	D

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	62.7	24.9	24.4	6.6	C
2	62.7	24.9	24.4	6.6	C
3	62.7	24.9	24.4	6.6	C
4	62.7	24.9	24.4	6.6	C

Facility Overall Results

Space Mean Speed, mi/h	62.7	Density, veh/mi/ln	24.4
Average Travel Time, min	6.6		

HCS 2010 Facilities Report

Project Information

Analyst	PK/LCG	Agency	
Jurisdiction		Time Period Analyzed	2015 PM Peak - SB
Analysis Year	2015 Base - PM (3 pgs)	Date	5/1/2017
Project Description	I93 SB - from N of Exit 5 to S of Exit 4		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	11
Total Time Periods	4	Time Period Duration, min	15

Segment Geometric Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	a->b	5280	2
2	Diverge	Diverge	b->c	1500	2
3	Basic	Basic	c->d	3920	2
4	Merge	Merge	d->e	1500	2
5	Basic	Basic	e->f	11980	2
6	Diverge	Diverge	f->g	1500	2
7	Basic	Basic	g->h	1600	2
8	Merge	Merge	h->i	1500	2
9	Basic	Basic	i->j	900	2
10	Merge	Merge	j->k	1500	2
11	Basic	Basic	l->m	5230	2

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.980	3434	4700	0.73	63.6	27.0	D
2	1.00	0.980	3434	4700	0.73	63.6	27.0	D
3	1.00	0.980	3434	4700	0.73	63.6	27.0	D
4	1.00	0.980	3434	4700	0.73	63.6	27.0	D

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.980	0.980	3434	929	4700	2000	0.73	0.46	53.2	53.2	32.3	29.1	D
2	1.00	1.00	0.980	0.980	3434	929	4700	2000	0.73	0.46	53.2	53.2	32.3	29.1	D
3	1.00	1.00	0.980	0.980	3434	929	4700	2000	0.73	0.46	53.2	53.2	32.3	29.1	D

4	1.00	1.00	0.980	0.980	3434	929	4700	2000	0.73	0.46	53.2	53.2	32.3	29.1	D

Segment 3: Basic

2015 PM-5B

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.980	2505	4700	0.53	65.0	19.3	C
2	1.00	0.980	2505	4700	0.53	65.0	19.3	C
3	1.00	0.980	2505	4700	0.53	65.0	19.3	C
4	1.00	0.980	2505	4700	0.53	65.0	19.3	C

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.980	0.977	2930	425	4700	2100	0.62	0.20	57.8	57.8	25.3	22.6	C
2	1.00	1.00	0.980	0.977	2930	425	4700	2100	0.62	0.20	57.8	57.8	25.3	22.6	C
3	1.00	1.00	0.980	0.819	3012	507	4700	2100	0.64	0.24	57.6	57.6	26.1	23.2	C
4	1.00	1.00	0.980	0.977	2930	425	4700	2100	0.62	0.20	57.8	57.8	25.3	22.6	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.980	2929	4700	0.62	64.9	22.6	C
2	1.00	0.980	2929	4700	0.62	64.9	22.6	C
3	1.00	0.980	2929	4700	0.62	64.9	22.6	C
4	1.00	0.980	2929	4700	0.62	64.9	22.6	C

Segment 6: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.980	0.985	2929	939	4700	1900	0.62	0.49	50.2	50.2	29.2	22.8	C
2	1.00	1.00	0.980	0.985	2929	939	4700	1900	0.62	0.49	50.2	50.2	29.2	22.8	C
3	1.00	1.00	0.980	0.985	2929	939	4700	1900	0.62	0.49	50.2	50.2	29.2	22.8	C
4	1.00	1.00	0.980	0.985	2929	939	4700	1900	0.62	0.49	50.2	50.2	29.2	22.8	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.978	1989	4700	0.42	65.0	15.3	B
2	1.00	0.978	1989	4700	0.42	65.0	15.3	B
3	1.00	0.978	1989	4700	0.42	65.0	15.3	B
4	1.00	0.978	1989	4700	0.42	65.0	15.3	B

Segment 8: Merge

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.978	0.980	2208	219	4700	2000	0.47	0.11	58.9	58.9	18.7	13.2	B
2	1.00	1.00	0.978	0.980	2208	219	4700	2000	0.47	0.11	58.9	58.9	18.7	13.2	B
3	1.00	1.00	0.978	0.980	2208	219	4700	2000	0.47	0.11	58.9	58.9	18.7	13.2	B
4	1.00	1.00	0.978	0.980	2208	219	4700	2000	0.47	0.11	58.9	58.9	18.7	13.2	B

Segment 9: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.978	2209	4700	0.47	65.0	17.0	B
2	1.00	0.978	2209	4700	0.47	65.0	17.0	B
3	1.00	0.978	2209	4700	0.47	65.0	17.0	B
4	1.00	0.978	2209	4700	0.47	65.0	17.0	B

Segment 10: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.978	0.980	2515	306	4700	2100	0.54	0.15	59.1	59.1	21.3	16.2	B
2	1.00	1.00	0.978	0.980	2515	306	4700	2100	0.54	0.15	59.1	59.1	21.3	16.2	B
3	1.00	1.00	0.978	0.980	2515	306	4700	2100	0.54	0.15	59.1	59.1	21.3	16.2	B
4	1.00	1.00	0.978	0.980	2515	306	4700	2100	0.54	0.15	59.1	59.1	21.3	16.2	B

Segment 11: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.978	2515	4700	0.54	65.0	19.4	C
2	1.00	0.978	2515	4700	0.54	65.0	19.4	C
3	1.00	0.978	2515	4700	0.54	65.0	19.4	C
4	1.00	0.978	2515	4700	0.54	65.0	19.4	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	62.8	22.5	22.1	6.6	C
2	62.8	22.5	22.1	6.6	C
3	62.8	22.6	22.1	6.6	C
4	62.8	22.5	22.1	6.6	C

Facility Overall Results

Space Mean Speed, mi/h	62.8	Density, veh/mi/ln	22.1
Average Travel Time, min	6.6		

APPENDIX G-1: HCM AND SYNCHRO PRINTOUTS – SIGNALIZED INTERSECTION CAPACITY ANALYSES – 2015 AM PEAK HOURS – SYNCHRO PRINTOUTS

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø9
Lane Configurations		↑↑	↑↑		↰	↱	
Traffic Volume (vph)	0	915	565	0	260	495	
Future Volume (vph)	0	915	565	0	260	495	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	
Frt						0.850	
Flt Protected					0.950		
Satd. Flow (prot)	0	3471	3406	0	1703	1524	
Flt Permitted					0.950		
Satd. Flow (perm)	0	3471	3406	0	1703	1524	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)						458	
Link Speed (mph)		30	30		25		
Link Distance (ft)		317	266		752		
Travel Time (s)		7.2	6.0		20.5		
Peak Hour Factor	0.93	0.93	0.88	0.88	0.89	0.89	
Heavy Vehicles (%)	4%	4%	6%	6%	6%	6%	
Adj. Flow (vph)	0	984	642	0	292	556	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	984	642	0	292	556	
Turn Type		NA	NA		Prot	Perm	
Protected Phases		2	2		7		9
Permitted Phases						7	
Detector Phase		2	2		7	7	
Switch Phase							
Minimum Initial (s)		10.0	10.0		7.0	7.0	4.0
Minimum Split (s)		41.0	41.0		33.0	33.0	14.0
Total Split (s)		41.0	41.0		33.0	33.0	26.0
Total Split (%)		41.0%	41.0%		33.0%	33.0%	26%
Maximum Green (s)		35.0	35.0		27.0	27.0	20.0
Yellow Time (s)		4.0	4.0		4.0	4.0	3.0
All-Red Time (s)		2.0	2.0		2.0	2.0	3.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max	None
Walk Time (s)		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0	0		0	0	
Act Effct Green (s)		61.0	61.0		27.0	27.0	
Actuated g/C Ratio		0.61	0.61		0.27	0.27	
v/c Ratio		0.46	0.31		0.64	0.75	
Control Delay		11.5	1.9		39.5	13.6	
Queue Delay		0.0	0.0		0.0	0.0	
Total Delay		11.5	1.9		39.5	13.6	
LOS		B	A		D	B	
Approach Delay		11.5	1.9		22.5		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø9
Approach LOS		B	A		C		
Queue Length 50th (ft)		165	17		164	49	
Queue Length 95th (ft)		212	m18		251	176	
Internal Link Dist (ft)		237	186		672		
Turn Bay Length (ft)							
Base Capacity (vph)		2117	2077		459	745	
Starvation Cap Reductn		0	0		0	0	
Spillback Cap Reductn		0	0		0	0	
Storage Cap Reductn		0	0		0	0	
Reduced v/c Ratio		0.46	0.31		0.64	0.75	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 12.8 Intersection LOS: B
Intersection Capacity Utilization 58.3% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Exit 4 SB Off

2.

Lane Group	NBL	NBR	SEL	SER	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰↰	↱			↰	↑↑			↑↑	↱
Traffic Volume (vph)	210	200	0	0	585	590	0	0	875	0
Future Volume (vph)	210	200	0	0	585	590	0	0	875	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	350		0	0		0
Storage Lanes	2	1	0	0	1		0	0		1
Taper Length (ft)	25		25		25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.850								
Flt Protected	0.950				0.950					
Satd. Flow (prot)	3242	1495	0	0	1719	3438	0	0	3505	1845
Flt Permitted	0.950				0.950					
Satd. Flow (perm)	3242	1495	0	0	1719	3438	0	0	3505	1845
Right Turn on Red		Yes					Yes			Yes
Satd. Flow (RTOR)		227								
Link Speed (mph)	25		30			30			30	
Link Distance (ft)	347		390			494			346	
Travel Time (s)	9.5		8.9			11.2			7.9	
Peak Hour Factor	0.88	0.88	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	2%	2%	5%	5%	5%	3%	3%	3%
Adj. Flow (vph)	239	227	0	0	622	628	0	0	951	0
Shared Lane Traffic (%)										
Lane Group Flow (vph)	239	227	0	0	622	628	0	0	951	0
Turn Type	Prot	Free			Prot	NA			NA	Free
Protected Phases	2				7	4			8	
Permitted Phases		Free								Free
Detector Phase	2				7	4			8	
Switch Phase										
Minimum Initial (s)	10.0				5.0	10.0			10.0	
Minimum Split (s)	46.0				11.0	46.0			46.0	
Total Split (s)	31.0				35.0	69.0			34.0	
Total Split (%)	31.0%				35.0%	69.0%			34.0%	
Maximum Green (s)	25.0				29.0	63.0			28.0	
Yellow Time (s)	4.0				4.0	4.0			4.0	
All-Red Time (s)	2.0				2.0	2.0			2.0	
Lost Time Adjust (s)	0.0				0.0	0.0			0.0	
Total Lost Time (s)	6.0				6.0	6.0			6.0	
Lead/Lag					Lead				Lag	
Lead-Lag Optimize?										
Vehicle Extension (s)	3.0				3.0	3.0			3.0	
Recall Mode	C-Min				None	Min			Min	
Walk Time (s)	7.0					7.0			7.0	
Flash Dont Walk (s)	11.0					11.0			11.0	
Pedestrian Calls (#/hr)	0					0			0	
Act Effct Green (s)	12.9	100.0			41.1	75.1			28.0	
Actuated g/C Ratio	0.13	1.00			0.41	0.75			0.28	
v/c Ratio	0.57	0.15			0.88	0.24			0.97	
Control Delay	46.2	0.2			43.8	4.3			58.7	
Queue Delay	0.0	0.0			0.0	0.0			0.0	

Lane Group	NBL	NBR	SEL	SER	NEL	NET	NER	SWL	SWT	SWR
Total Delay	46.2	0.2			43.8	4.3			58.7	
LOS	D	A			D	A			E	
Approach Delay	23.8					23.9			58.7	
Approach LOS	C					C			E	
Queue Length 50th (ft)	75	0			357	52			315	
Queue Length 95th (ft)	107	0			#610	83			#448	
Internal Link Dist (ft)	267		310			414			266	
Turn Bay Length (ft)					350					
Base Capacity (vph)	810	1495			706	2582			981	
Starvation Cap Reductn	0	0			0	0			0	
Spillback Cap Reductn	0	0			0	0			0	
Storage Cap Reductn	0	0			0	0			0	
Reduced v/c Ratio	0.30	0.15			0.88	0.24			0.97	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
Natural Cycle: 145
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 36.3 — Intersection LOS: D
Intersection Capacity Utilization 84.6% — ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Exit 4 NB Off & NH 102

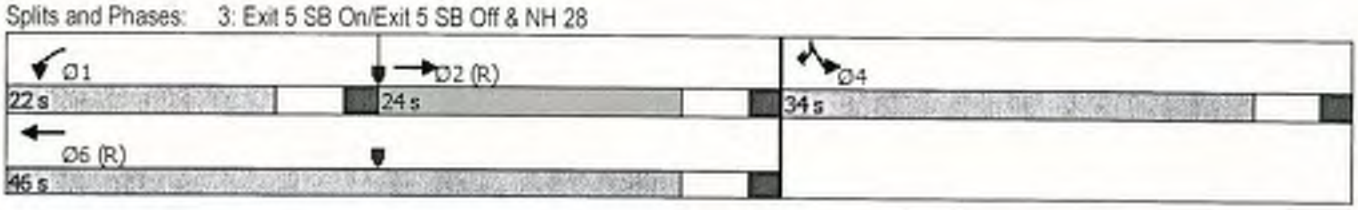
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱	↰	↑↑					↰↰		↱
Traffic Volume (vph)	0	515	280	235	605	0	0	0	0	465	0	295
Future Volume (vph)	0	515	280	235	605	0	0	0	0	465	0	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3167	1417	1687	3374	0	0	0	0	3303	0	1524
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3167	1417	1687	3374	0	0	0	0	3303	0	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			304									123
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		410			242			486			444	
Travel Time (s)		9.3			5.5			11.0			8.6	
Peak Hour Factor	0.92	0.92	0.92	0.73	0.73	0.73	0.92	0.92	0.92	0.74	0.74	0.74
Heavy Vehicles (%)	14%	14%	14%	7%	7%	7%	2%	2%	2%	6%	6%	6%
Adj. Flow (vph)	0	560	304	322	829	0	0	0	0	628	0	399
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	560	304	322	829	0	0	0	0	628	0	399
Turn Type		NA	Free	Prot	NA					Prot		Prot
Protected Phases		2		1	6					4		4
Permitted Phases			Free									
Detector Phase		2		1	6					4		4
Switch Phase												
Minimum Initial (s)		5.0		4.0	5.0					3.0		3.0
Minimum Split (s)		26.0		24.0	26.0					36.0		36.0
Total Split (s)		24.0		22.0	46.0					34.0		34.0
Total Split (%)		30.0%		27.5%	57.5%					42.5%		42.5%
Maximum Green (s)		18.0		16.0	40.0					28.0		28.0
Yellow Time (s)		4.0		4.0	4.0					4.0		4.0
All-Red Time (s)		2.0		2.0	2.0					2.0		2.0
Lost Time Adjust (s)		0.0		0.0	0.0					0.0		0.0
Total Lost Time (s)		6.0		6.0	6.0					6.0		6.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Recall Mode		C-Max		None	C-Max					None		None
Walk Time (s)		7.0		7.0	7.0					7.0		7.0
Flash Dont Walk (s)		11.0		11.0	11.0					11.0		11.0
Pedestrian Calls (#/hr)		0		0	0					0		0
Act Effct Green (s)		20.9	80.0	18.8	45.7					22.3		22.3
Actuated g/C Ratio		0.26	1.00	0.24	0.57					0.28		0.28
v/c Ratio		0.68	0.21	0.81	0.43					0.68		0.78
Control Delay		32.7	0.3	40.0	7.0					29.2		28.7
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		32.7	0.3	40.0	7.0					29.2		28.7
LOS		C	A	D	A					C		C
Approach Delay		21.3			16.3						29.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B						C	
Queue Length 50th (ft)		139	0	87	46					142		127
Queue Length 95th (ft)		#212	0	#211	59					138		146
Internal Link Dist (ft)		330			162			406			364	
Turn Bay Length (ft)												
Base Capacity (vph)		828	1417	396	1929					1156		613
Starvation Cap Reductn		0	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.68	0.21	0.81	0.43					0.54		0.65

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 38 (48%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 22.0 — Intersection LOS: C
Intersection Capacity Utilization 65.7% — ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Exit 5 SB On/Exit 5 SB Off & NH 28



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↑	↱	↰		↱			
Traffic Volume (vph)	240	740	0	0	540	740	300	0	110	0	0	0
Future Volume (vph)	240	740	0	0	540	740	300	0	110	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1641	3282	0	0	3438	1538	1656	0	1482	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1641	3282	0	0	3438	1538	1656	0	1482	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						822			205			
Link Speed (mph)		30			30			35			30	
Link Distance (ft)		196			451			450			368	
Travel Time (s)		4.5			10.3			8.8			8.4	
Peak Hour Factor	0.87	0.87	0.87	0.90	0.90	0.90	0.78	0.78	0.78	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	10%	5%	5%	5%	9%	9%	9%	2%	2%	2%
Adj. Flow (vph)	276	851	0	0	600	822	385	0	141	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	276	851	0	0	600	822	385	0	141	0	0	0
Turn Type	Prot	NA			NA	Free	Prot		Free			
Protected Phases	5	2			6		8					
Permitted Phases		2			6	Free			Free			
Detector Phase	5	2			6		8					
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0		5.0					
Minimum Split (s)	24.0	24.0			24.0		11.0					
Total Split (s)	22.0	51.0			29.0		29.0					
Total Split (%)	27.5%	63.8%			36.3%		36.3%					
Maximum Green (s)	16.0	45.0			23.0		23.0					
Yellow Time (s)	4.0	4.0			4.0		4.0					
All-Red Time (s)	2.0	2.0			2.0		2.0					
Lost Time Adjust (s)	0.0	0.0			0.0		0.0					
Total Lost Time (s)	6.0	6.0			6.0		6.0					
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0					
Recall Mode	None	C-Max			C-Max		None					
Walk Time (s)	7.0	7.0			7.0							
Flash Dont Walk (s)	11.0	11.0			11.0							
Pedestrian Calls (#/hr)	0	0			0							
Act Effct Green (s)	15.7	46.6			24.9	80.0	21.4		80.0			
Actuated g/C Ratio	0.20	0.58			0.31	1.00	0.27		1.00			
v/c Ratio	0.86	0.44			0.56	0.53	0.87		0.10			
Control Delay	55.0	2.2			26.1	1.3	49.4		0.1			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	55.0	2.2			26.1	1.3	49.4		0.1			
LOS	D	A			C	A	D		A			
Approach Delay		15.1			11.8			36.2				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			D				
Queue Length 50th (ft)	130	0			135	0	178		0			
Queue Length 95th (ft)	#251	5			189	0	233		0			
Internal Link Dist (ft)		116			371			370			288	
Turn Bay Length (ft)												
Base Capacity (vph)	333	1913			1071	1538	476		1482			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.83	0.44			0.56	0.53	0.81		0.10			

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 17.2 Intersection LOS: B
Intersection Capacity Utilization 65.7% ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Exit 5 NB Off & NH 28

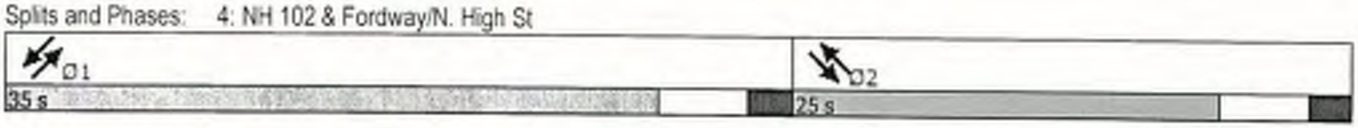
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	5	25	10	345	0	70	0	400	125	15	595	0
Future Volume (vph)	5	25	10	345	0	70	0	400	125	15	595	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.966			0.977			0.968				
Flt Protected		0.994			0.960						0.999	
Satd. Flow (prot)	0	1789	0	0	1730	0	0	1703	0	0	1808	0
Flt Permitted		0.937			0.716						0.981	
Satd. Flow (perm)	0	1686	0	0	1290	0	0	1703	0	0	1775	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			55			36				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		285			644			243			338	
Travel Time (s)		6.5			14.6			5.5			7.7	
Peak Hour Factor	0.60	0.60	0.60	0.96	0.96	0.96	0.89	0.89	0.89	0.86	0.86	0.86
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	8%	8%	8%	5%	5%	5%
Adj. Flow (vph)	8	42	17	359	0	73	0	449	140	17	692	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	67	0	0	432	0	0	589	0	0	709	0
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		2			2			1			1	
Permitted Phases	2			2						1		
Detector Phase	2	2		2	2			1		1	1	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0			24.0		24.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0			35.0		35.0	35.0	
Total Split (%)	41.7%	41.7%		41.7%	41.7%			58.3%		58.3%	58.3%	
Maximum Green (s)	19.0	19.0		19.0	19.0			29.0		29.0	29.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag	Lag	Lag		Lag	Lag			Lead		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes			Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Recall Mode	None	None		None	None			Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	
Act Effct Green (s)		19.1			19.1			27.3			27.3	
Actuated g/C Ratio		0.33			0.33			0.47			0.47	
v/c Ratio		0.12			0.94			0.72			0.86	
Control Delay		12.4			51.7			17.7			26.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.4			51.7			17.7			26.4	
LOS		B			D			B			C	
Approach Delay		12.4			51.7			17.7			26.4	

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Approach LOS		B			D			B			C	
Queue Length 50th (ft)		13			135			145			206	
Queue Length 95th (ft)		22			#304			247			#368	
Internal Link Dist (ft)		205			564			163			258	
Turn Bay Length (ft)												
Base Capacity (vph)		562			458			866			884	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.12			0.94			0.68			0.80	

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 58.4
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 29.1 Intersection LOS: C
Intersection Capacity Utilization 83.4% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: NH 102 & Fordway/N. High St



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	205	60	35	385	80	60	260	40	70	230	105
Future Volume (vph)	105	205	60	35	385	80	60	260	40	70	230	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.966			0.974			0.980				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1656	1684	0	1703	1746	0	1719	1773	0	1703	1792	1524
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1656	1684	0	1703	1746	0	1719	1773	0	1703	1792	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			14			9				205
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			530			361			411	
Travel Time (s)		11.5			12.0			8.2			9.3	
Peak Hour Factor	0.96	0.96	0.96	0.94	0.94	0.94	0.85	0.85	0.85	0.91	0.91	0.91
Heavy Vehicles (%)	9%	9%	9%	6%	6%	6%	5%	5%	5%	6%	6%	6%
Parking (#/hr)			0									
Adj. Flow (vph)	109	214	63	37	410	85	71	306	47	77	253	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	109	277	0	37	495	0	71	353	0	77	253	115
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	10.0		4.0	10.0		4.0	9.0	9.0
Minimum Split (s)	10.0	30.0		10.0	30.0		10.0	25.0		10.0	25.0	25.0
Total Split (s)	12.0	33.0		12.0	33.0		10.0	25.0		10.0	25.0	25.0
Total Split (%)	15.0%	41.3%		15.0%	41.3%		12.5%	31.3%		12.5%	31.3%	31.3%
Maximum Green (s)	6.0	27.0		6.0	27.0		4.0	19.0		4.0	19.0	19.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		Min	None		Min	None	None
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		10			10			0			10	10
Act Effct Green (s)	6.0	29.4		5.9	24.1		4.0	17.5		4.0	17.5	17.5
Actuated g/C Ratio	0.08	0.39		0.08	0.32		0.05	0.23		0.05	0.23	0.23
v/c Ratio	0.83	0.42		0.28	0.88		0.79	0.85		0.86	0.61	0.23
Control Delay	83.0	20.1		40.6	42.7		90.6	48.3		103.4	33.9	1.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	83.0	20.1		40.6	42.7		90.6	48.3		103.4	33.9	1.1
LOS	F	C		D	D		F	D		F	C	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		37.8			42.6			55.4			37.4	
Approach LOS		D			D			E			D	
Queue Length 50th (ft)	55	99		18	218		36	164		39	113	0
Queue Length 95th (ft)	#148	170		47	#385		#101	#274		#121	188	2
Internal Link Dist (ft)		425			450			281			331	
Turn Bay Length (ft)												
Base Capacity (vph)	132	663		135	634		90	453		90	452	537
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.83	0.42		0.27	0.78		0.79	0.78		0.86	0.56	0.21

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 75.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 43.3 — Intersection LOS: D
Intersection Capacity Utilization 70.9% — ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 23: Birch St/Crystal Ave & NH 102 (E Broadway)

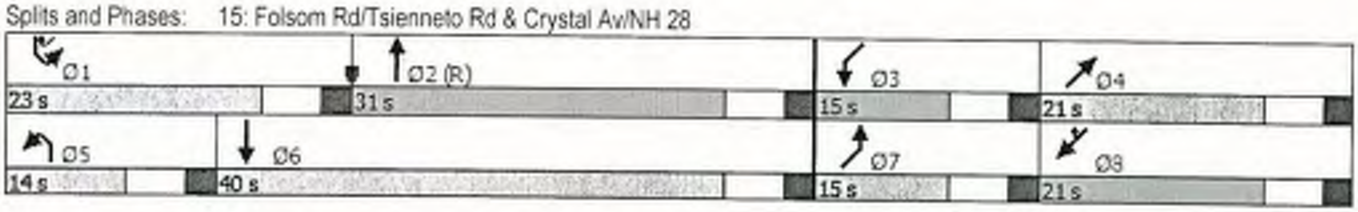
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰	↑↑	↱	↰↰	↑↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	20	230	135	310	220	145	135	170	20	125	290	370
Future Volume (vph)	20	230	135	310	220	145	135	170	20	125	290	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	0		0	0		0	0		0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	3471	1553	3335	3438	1538	1752	1845	1568	1752	1845	1568
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1736	3471	1553	3335	3438	1538	1752	1845	1568	1752	1845	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			255			184			327			259
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		639			394			532			387	
Travel Time (s)		14.5			9.0			12.1			8.8	
Peak Hour Factor	0.84	0.84	0.84	0.79	0.79	0.79	0.86	0.86	0.86	0.99	0.99	0.99
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	24	274	161	392	278	184	157	198	23	126	293	374
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	274	161	392	278	184	157	198	23	126	293	374
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Free	Prot	NA	pt+ov
Protected Phases	5	2		1	6		7	4		3	8	8 1
Permitted Phases		2	2		6	6		4	Free		8	
Detector Phase	5	2	2	1	6	6	7	4		3	8	8 1
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0		7.0	8.0	
Minimum Split (s)	14.0	31.0	31.0	14.0	40.0	40.0	12.0	21.0		13.0	21.0	
Total Split (s)	14.0	31.0	31.0	23.0	40.0	40.0	15.0	21.0		15.0	21.0	
Total Split (%)	15.6%	34.4%	34.4%	25.6%	44.4%	44.4%	16.7%	23.3%		16.7%	23.3%	
Maximum Green (s)	8.0	25.0	25.0	17.0	34.0	34.0	9.0	15.0		9.0	15.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	Max	C-Max	C-Max	None	Max	Max	None	None		None	None	
Walk Time (s)	5.0	5.0	5.0		5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0	11.0		11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0	0		0	0		0			0	
Act Effct Green (s)	8.0	26.8	26.8	15.2	34.0	34.0	9.0	15.3	90.0	8.7	15.0	36.2
Actuated g/C Ratio	0.09	0.30	0.30	0.17	0.38	0.38	0.10	0.17	1.00	0.10	0.17	0.40
v/c Ratio	0.16	0.27	0.25	0.70	0.21	0.26	0.90	0.63	0.01	0.74	0.95	0.48
Control Delay	40.5	25.5	1.2	42.0	19.5	4.1	88.0	45.1	0.0	66.1	80.3	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Total Delay	40.5	25.5	1.2	42.0	19.5	4.1	88.0	45.1	0.0	66.1	80.3	8.0
LOS	D	C	A	D	B	A	F	D	A	E	F	A
Approach Delay		17.8			26.5			60.2			44.0	
Approach LOS		B			C			E			D	
Queue Length 50th (ft)	13	63	0	107	55	0	90	106	0	71	167	40
Queue Length 95th (ft)	35	90	0	131	72	27	#191	169	0	#157	#323	108
Internal Link Dist (ft)		559			314			452			307	
Turn Bay Length (ft)	150		150									
Base Capacity (vph)	154	1032	641	629	1298	695	175	312	1568	175	307	811
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.27	0.25	0.62	0.21	0.26	0.90	0.63	0.01	0.72	0.95	0.46

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 35.6 — Intersection LOS: D
Intersection Capacity Utilization 58.3% — ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 15: Folsom Rd/Tsienneto Rd & Crystal Av/NH 28



	SB			NB			EB			WB		
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			↰↑	↱		↰↑	↱
Traffic Volume (vph)	50	790	0	0	655	30	5	0	5	50	0	245
Future Volume (vph)	50	790	0	0	655	30	5	0	5	50	0	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	150		150	0		0	0		0
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	50			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.993				0.850			0.850
Flt Protected	0.950							0.950			0.950	
Satd. Flow (prot)	1687	3374	0	1863	3514	0	0	1805	1615	0	1787	1599
Flt Permitted	0.950							0.720			0.751	
Satd. Flow (perm)	1687	3374	0	1863	3514	0	0	1368	1615	0	1413	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					6				109			227
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		277			755			218			433	
Travel Time (s)		6.3			17.2			5.0			9.8	
Peak Hour Factor	0.83	0.83	0.83	0.92	0.92	0.92	0.50	0.50	0.50	0.90	0.90	0.90
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Adj. Flow (vph)	60	952	0	0	712	33	10	0	10	56	0	272
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	952	0	0	745	0	0	10	10	0	56	272
Turn Type	Prot	NA		Prot	NA		custom	NA	custom	Perm	NA	Perm
Protected Phases	5	2		1	6						4	
Permitted Phases					6		8	8	8	4		4
Detector Phase	5	2		1	6		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	8.0		5.0	8.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	14.0	46.0		11.0	43.0		33.0	33.0	33.0	33.0	33.0	33.0
Total Split (s)	14.0	46.0		11.0	43.0		33.0	33.0	33.0	33.0	33.0	33.0
Total Split (%)	15.6%	51.1%		12.2%	47.8%		36.7%	36.7%	36.7%	36.7%	36.7%	36.7%
Maximum Green (s)	8.0	40.0		5.0	37.0		27.0	27.0	27.0	27.0	27.0	27.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	None		None	None	None	None	None	None
Act Effct Green (s)	9.2	67.7			55.2			10.3	10.3		10.3	10.3
Actuated g/C Ratio	0.10	0.75			0.61			0.11	0.11		0.11	0.11
v/c Ratio	0.35	0.38			0.35			0.06	0.04		0.35	0.71
Control Delay	42.8	4.9			12.9			33.0	0.2		40.6	18.9
Queue Delay	0.0	0.0			0.0			0.0	0.0		0.0	0.0
Total Delay	42.8	4.9			12.9			33.0	0.2		40.6	18.9
LOS	D	A			B			C	A		D	B
Approach Delay		7.1			12.9			16.6			22.6	

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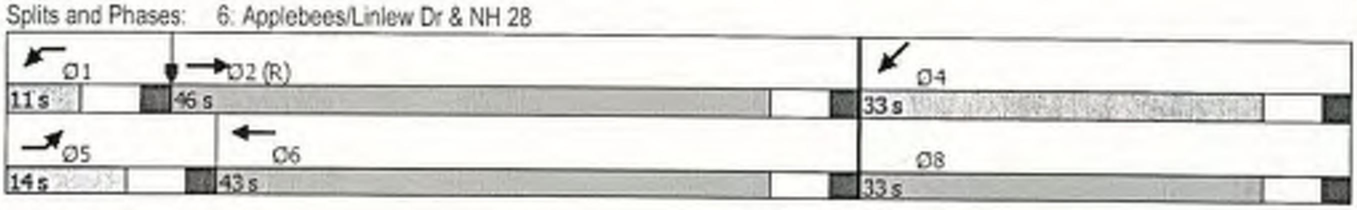
		SB			NB			EB			WB	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Approach LOS		A			B			B			C	
Queue Length 50th (ft)	33	72			119			5	0		30	24
Queue Length 95th (ft)	63	134			m208			10	0		61	93
Internal Link Dist (ft)		197			675			138			353	
Turn Bay Length (ft)	75											
Base Capacity (vph)	173	2537			2159			410	560		423	638
Starvation Cap Reductn	0	0			0			0	0		0	0
Spillback Cap Reductn	0	0			0			0	0		0	0
Storage Cap Reductn	0	0			0			0	0		0	0
Reduced v/c Ratio	0.35	0.38			0.35			0.02	0.02		0.13	0.43

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 63 (70%), Referenced to phase 2:EBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 11.7 Intersection LOS: B
Intersection Capacity Utilization 53.4% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Applebees/Linlew Dr & NH 28



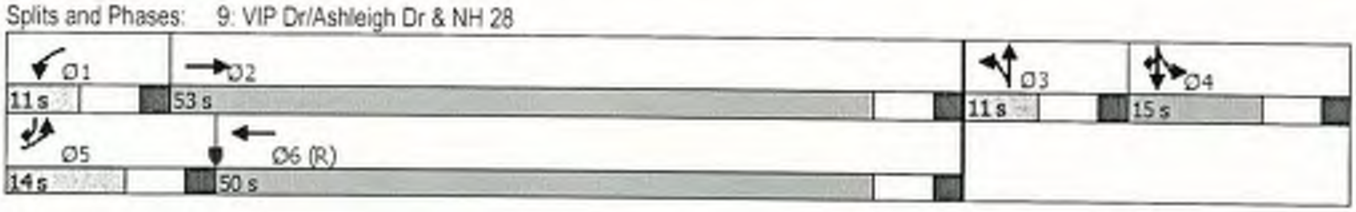
		SB			NB			EB			WB	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↱		↰	↑↱		↰	↱		↰	↰↑	↱
Traffic Volume (vph)	100	630	5	5	610	220	10	5	5	180	5	100
Future Volume (vph)	100	630	5	5	610	220	10	5	5	180	5	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	150		150	0		0	0		0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	200			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.999			0.960			0.925				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.955	
Satd. Flow (prot)	3303	3402	0	1736	3332	0	1805	1758	0	1665	1674	1568
Flt Permitted	0.950			0.950			0.950			0.950	0.955	
Satd. Flow (perm)	3303	3402	0	1736	3332	0	1805	1758	0	1665	1674	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			79			7				111
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		412			486			151			343	
Travel Time (s)		9.4			11.0			3.4			7.8	
Peak Hour Factor	0.83	0.83	0.83	0.97	0.97	0.97	0.67	0.67	0.67	0.90	0.90	0.90
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	0%	0%	0%	3%	3%	3%
Adj. Flow (vph)	120	759	6	5	629	227	15	7	7	200	6	111
Shared Lane Traffic (%)										49%		
Lane Group Flow (vph)	120	765	0	5	856	0	15	14	0	102	104	111
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3		4	4	4 5
Permitted Phases								3				
Detector Phase	5	2		1	6		3	3		4	4	4 5
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	5.0		8.0	8.0	
Minimum Split (s)	14.0	53.0		11.0	50.0		11.0	11.0		15.0	15.0	
Total Split (s)	14.0	53.0		11.0	50.0		11.0	11.0		15.0	15.0	
Total Split (%)	15.6%	58.9%		12.2%	55.6%		12.2%	12.2%		16.7%	16.7%	
Maximum Green (s)	8.0	47.0		5.0	44.0		5.0	5.0		9.0	9.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Min		None	C-Min		None	None		None	None	
Walk Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	8.0	57.4		5.6	45.5		6.3	6.3		10.7	10.7	24.7
Actuated g/C Ratio	0.09	0.64		0.06	0.51		0.07	0.07		0.12	0.12	0.27
v/c Ratio	0.41	0.35		0.05	0.50		0.12	0.11		0.52	0.53	0.22
Control Delay	42.9	10.3		61.6	10.1		40.8	30.0		46.5	46.7	6.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0

		SB			NB			EB			WB	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	42.9	10.3		61.6	10.1		40.8	30.0		46.5	46.7	6.0
LOS	D	B		E	B		D	C		D	D	A
Approach Delay		14.7			10.4			35.6			32.4	
Approach LOS		B			B			D			C	
Queue Length 50th (ft)	33	105		3	94		8	4		57	58	0
Queue Length 95th (ft)	56	183		m8	285		20	16		110	111	38
Internal Link Dist (ft)		332			406			71			263	
Turn Bay Length (ft)	150			150								
Base Capacity (vph)	309	2212		107	1847		127	130		201	202	501
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.39	0.35		0.05	0.46		0.12	0.11		0.51	0.51	0.22

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.53
Intersection Signal Delay: 15.9 Intersection LOS: B
Intersection Capacity Utilization 54.8% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: VIP Dr/Ashleigh Dr & NH 28



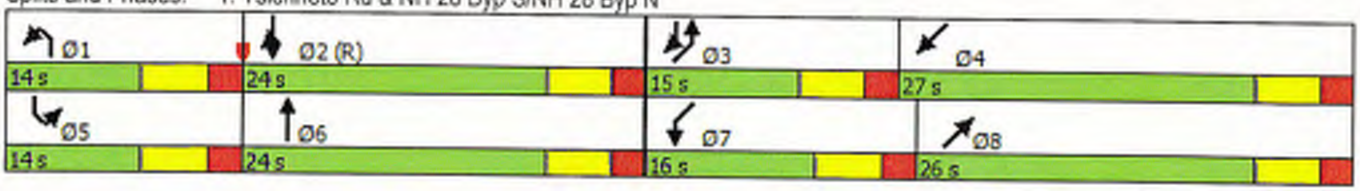
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
							EB			WB		
Lane Configurations												
Traffic Volume (vph)	100	220	20	25	210	255	120	100	80	80	270	90
Future Volume (vph)	100	220	20	25	210	255	120	100	80	80	270	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988				0.850		0.933			0.963	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1823	0	1736	1827	1553	1770	1738	0	1787	1812	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1752	1823	0	1736	1827	1553	1770	1738	0	1787	1812	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				202		48			20	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		481			347			479			371	
Travel Time (s)		10.9			7.9			10.9			8.4	
Peak Hour Factor	0.82	0.82	0.82	0.81	0.81	0.81	0.68	0.68	0.68	0.78	0.78	0.78
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	2%	2%	2%	1%	1%	1%
Adj. Flow (vph)	122	268	24	31	259	315	176	147	118	103	346	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	122	292	0	31	259	315	176	265	0	103	461	0
Turn Type	Prot	NA		Prot	NA	pt+ov	Prot	NA		Prot	NA	
Protected Phases	1	6		5	2	2 3	3	8		7	4	
Permitted Phases												
Detector Phase	1	6		5	2	2 3	3	8		7	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	14.0	20.0		14.0	20.0		14.0	20.0		14.0	20.0	
Total Split (s)	14.0	24.0		14.0	24.0		15.0	26.0		16.0	27.0	
Total Split (%)	17.5%	30.0%		17.5%	30.0%		18.8%	32.5%		20.0%	33.8%	
Maximum Green (s)	8.0	18.0		8.0	18.0		9.0	20.0		10.0	21.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	C-Max		None	None		None	None	
Act Effct Green (s)	8.0	26.5		8.0	18.1	33.1	9.0	23.4		9.2	20.9	
Actuated g/C Ratio	0.10	0.33		0.10	0.23	0.41	0.11	0.29		0.12	0.26	
v/c Ratio	0.70	0.48		0.18	0.63	0.41	0.88	0.49		0.50	0.95	
Control Delay	57.5	26.8		35.8	35.7	7.9	77.5	24.2		41.9	59.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	57.5	26.8		35.8	35.7	7.9	77.5	24.2		41.9	59.4	
LOS	E	C		D	D	A	E	C		D	E	
Approach Delay		35.9			21.2			45.5			56.2	

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Approach LOS		D			C			D			E	
Queue Length 50th (ft)	60	99		15	117	35	88	94		49	217	
Queue Length 95th (ft)	#119	193		36	171	71	#126	114		82	#309	
Internal Link Dist (ft)		401			267			399			291	
Turn Bay Length (ft)	150			150		150	150			150		
Base Capacity (vph)	175	607		173	414	761	199	543		223	490	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.70	0.48		0.18	0.63	0.41	0.88	0.49		0.46	0.94	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:SBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 39.2 Intersection LOS: D
Intersection Capacity Utilization 65.8% ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Tsienneto Rd & NH 28 Byp S/NH 28 Byp N



APPENDIX G-2: HCM AND SYNCHRO PRINTOUTS – SIGNALIZED INTERSECTION CAPACITY ANALYSES – 2015 PM PEAK HOURS – SYNCHRO PRINTOUTS

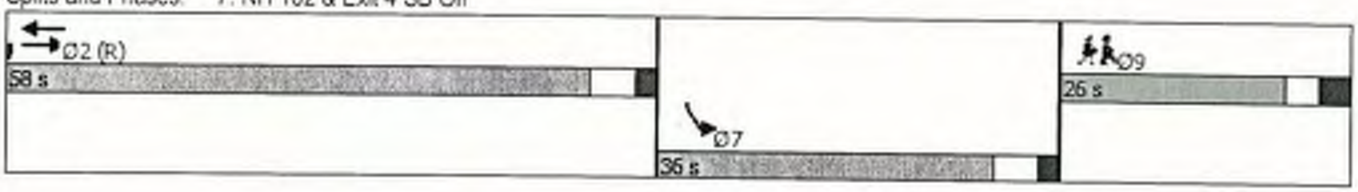
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø9
Lane Configurations		↑↑	↑↑		↰	↱	
Traffic Volume (vph)	0	935	850	0	280	645	
Future Volume (vph)	0	935	850	0	280	645	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	
Frt						0.850	
Flt Protected					0.950		
Satd. Flow (prot)	0	3574	3574	0	1752	1568	
Flt Permitted					0.950		
Satd. Flow (perm)	0	3574	3574	0	1752	1568	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)						344	
Link Speed (mph)		30	30		25		
Link Distance (ft)		317	266		431		
Travel Time (s)		7.2	6.0		11.8		
Peak Hour Factor	0.92	0.92	0.89	0.89	0.92	0.92	
Heavy Vehicles (%)	1%	1%	1%	1%	3%	3%	
Adj. Flow (vph)	0	1016	955	0	304	701	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	1016	955	0	304	701	
Turn Type		NA	NA		Prot	Perm	
Protected Phases		2	2		7		9
Permitted Phases						7	
Detector Phase		2	2		7	7	
Switch Phase							
Minimum Initial (s)		10.0	10.0		7.0	7.0	4.0
Minimum Split (s)		40.0	40.0		29.0	29.0	22.0
Total Split (s)		58.0	58.0		36.0	36.0	26.0
Total Split (%)		48.3%	48.3%		30.0%	30.0%	22%
Maximum Green (s)		52.0	52.0		30.0	30.0	20.0
Yellow Time (s)		4.0	4.0		4.0	4.0	3.0
All-Red Time (s)		2.0	2.0		2.0	2.0	3.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0
Recall Mode		C-Max	C-Max		Max	Max	None
Walk Time (s)		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0	0		0	0	
Act Effct Green (s)		78.0	78.0		30.0	30.0	
Actuated g/C Ratio		0.65	0.65		0.25	0.25	
v/c Ratio		0.44	0.41		0.69	1.08	
Control Delay		11.0	1.8		50.4	80.9	
Queue Delay		0.0	0.0		0.0	0.0	
Total Delay		11.0	1.8		50.4	80.9	
LOS		B	A		D	F	
Approach Delay		11.0	1.8		71.7		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø9
Approach LOS		B	A		E		
Queue Length 50th (ft)		186	15		214	~392	
Queue Length 95th (ft)		230	18		317	#630	
Internal Link Dist (ft)		237	186		351		
Turn Bay Length (ft)							
Base Capacity (vph)		2323	2323		438	650	
Starvation Cap Reductn		0	0		0	0	
Spillback Cap Reductn		0	0		0	0	
Storage Cap Reductn		0	0		0	0	
Reduced v/c Ratio		0.44	0.41		0.69	1.08	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.08
Intersection Signal Delay: 28.5 — Intersection LOS: C
Intersection Capacity Utilization 73.4% — ICU Level of Service D
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: NH 102 & Exit 4 SB Off



Lane Group	NBL2	NBL	NBR	SEL	SER	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰↰		↱			↰	↑↑			↑↑	↱
Traffic Volume (vph)	580	0	605	0	0	475	740	0	0	485	0
Future Volume (vph)	580	0	605	0	0	475	740	0	0	485	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850								
Flt Protected	0.950					0.950					
Satd. Flow (prot)	3467	0	1599	0	0	1770	3539	0	0	3539	1863
Flt Permitted	0.950					0.950					
Satd. Flow (perm)	3467	0	1599	0	0	1770	3539	0	0	3539	1863
Right Turn on Red			Yes					Yes			Yes
Satd. Flow (RTOR)			499								
Link Speed (mph)		25		30			30			30	
Link Distance (ft)		347		390			361			346	
Travel Time (s)		9.5		8.9			8.2			7.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96	0.87	0.87	0.87
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	630	0	658	0	0	495	771	0	0	557	0
Shared Lane Traffic (%)											
Lane Group Flow (vph)	630	0	658	0	0	495	771	0	0	557	0
Turn Type	Prot		Free			Prot	NA			NA	Free
Protected Phases	2					7	4			8	
Permitted Phases			Free				7				Free
Detector Phase	2					7	4			8	
Switch Phase											
Minimum Initial (s)	5.0					5.0	10.0			10.0	
Minimum Split (s)	9.5					9.5	66.0			66.0	
Total Split (s)	38.0					44.0	82.0			38.0	
Total Split (%)	31.7%					36.7%	68.3%			31.7%	
Maximum Green (s)	33.5					39.5	76.0			32.0	
Yellow Time (s)	3.5					3.5	4.0			4.0	
All-Red Time (s)	1.0					1.0	2.0			2.0	
Lost Time Adjust (s)	0.0					0.0	0.0			0.0	
Total Lost Time (s)	4.5					4.5	6.0			6.0	
Lead/Lag						Lead				Lag	
Lead-Lag Optimize?						Yes				Yes	
Vehicle Extension (s)	3.0					3.0	3.0			3.0	
Recall Mode	C-Max					None	None			None	
Walk Time (s)							7.0			7.0	
Flash Dont Walk (s)							11.0			11.0	
Pedestrian Calls (#/hr)							0			0	
Act Effct Green (s)	43.4		120.0			36.7	66.1			24.9	
Actuated g/C Ratio	0.36		1.00			0.31	0.55			0.21	
v/c Ratio	0.50		0.41			0.91	0.40			0.76	
Control Delay	33.3		0.8			62.3	19.5			51.5	
Queue Delay	0.0		0.0			0.0	0.0			0.0	
Total Delay	33.3		0.8			62.3	19.5			51.5	
LOS	C		A			E	B			D	
Approach Delay		16.7					36.2			51.5	

Lane Group	NBL2	NBL	NBR	SEL	SER	NEL	NET	NER	SWL	SWT	SWR
Approach LOS		B					D			D	
Queue Length 50th (ft)	202		0			374	200			215	
Queue Length 95th (ft)	281		0			#548	242			250	
Internal Link Dist (ft)		267		310			281			266	
Turn Bay Length (ft)											
Base Capacity (vph)	1253		1599			582	2241			943	
Starvation Cap Reductn	0		0			0	0			0	
Spillback Cap Reductn	0		0			0	0			0	
Storage Cap Reductn	0		0			0	0			0	
Reduced v/c Ratio	0.50		0.41			0.85	0.34			0.59	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green

Natural Cycle: 135

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

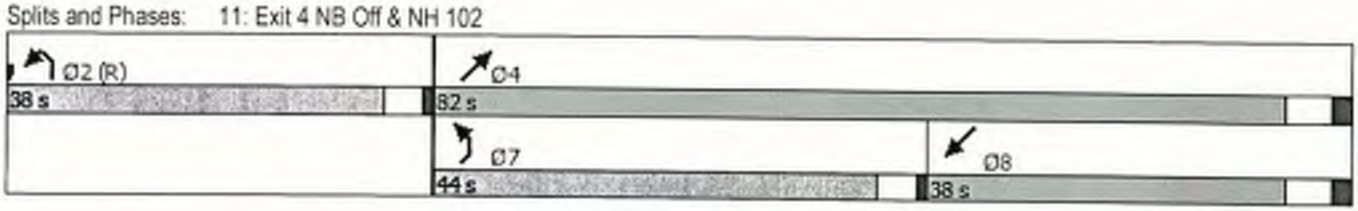
Intersection Signal Delay: 30.9 — Intersection LOS: C

Intersection Capacity Utilization 68.4% — ICU Level of Service C

Analysis Period (min) 15

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

Splits and Phases: 11: Exit 4 NB Off & NH 102



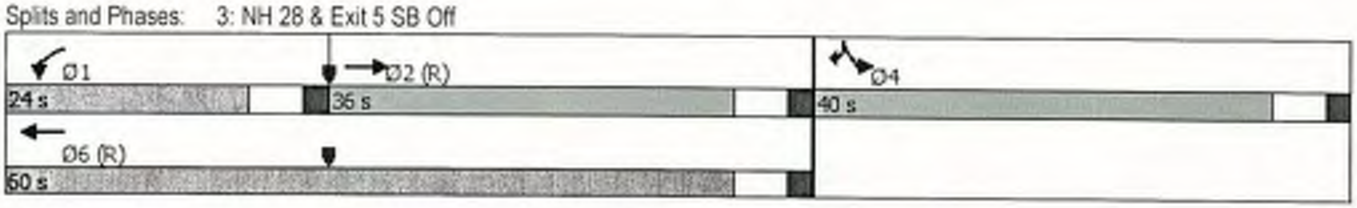
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱	↰	↑↑					↰↰		↱
Traffic Volume (vph)	0	650	280	135	490	0	0	0	0	645	0	265
Future Volume (vph)	0	650	280	135	490	0	0	0	0	645	0	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	500		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	2		1
Taper Length (ft)	25			30			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3471	1553	1719	3438	0	0	0	0	3367	0	1553
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3471	1553	1719	3438	0	0	0	0	3367	0	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			322									276
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		410			699			486			444	
Travel Time (s)		9.3			15.9			11.0			8.6	
Peak Hour Factor	0.87	0.87	0.87	0.86	0.86	0.86	0.92	0.92	0.92	0.91	0.91	0.91
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	2%	2%	2%	4%	4%	4%
Adj. Flow (vph)	0	747	322	157	570	0	0	0	0	709	0	291
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	747	322	157	570	0	0	0	0	709	0	291
Turn Type		NA	Free	Prot	NA					Prot		Prot
Protected Phases		2		1	6					4		4
Permitted Phases			Free		1							
Detector Phase		2		1	6					4		4
Switch Phase												
Minimum Initial (s)		5.0		4.0	5.0					3.0		3.0
Minimum Split (s)		41.0		10.0	41.0					36.0		36.0
Total Split (s)		36.0		24.0	60.0					40.0		40.0
Total Split (%)		36.0%		24.0%	60.0%					40.0%		40.0%
Maximum Green (s)		30.0		18.0	54.0					34.0		34.0
Yellow Time (s)		4.0		4.0	4.0					4.0		4.0
All-Red Time (s)		2.0		2.0	2.0					2.0		2.0
Lost Time Adjust (s)		0.0		0.0	0.0					0.0		0.0
Total Lost Time (s)		6.0		6.0	6.0					6.0		6.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		4.0		4.0	4.0					4.0		4.0
Recall Mode		C-Min		None	C-Min					None		None
Walk Time (s)		7.0			7.0					7.0		7.0
Flash Dont Walk (s)		11.0			11.0					11.0		11.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		38.4	100.0	14.7	59.2					28.8		28.8
Actuated g/C Ratio		0.38	1.00	0.15	0.59					0.29		0.29
v/c Ratio		0.56	0.21	0.62	0.28					0.73		0.45
Control Delay		27.8	0.3	45.3	4.8					36.5		6.2
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		27.8	0.3	45.3	4.8					36.5		6.2
LOS		C	A	D	A					D		A
Approach Delay		19.5			13.5						27.7	
Approach LOS		B			B						C	
Queue Length 50th (ft)		197	0	101	97					207		7
Queue Length 95th (ft)		277	0	151	52					254		63
Internal Link Dist (ft)		330			619			406			364	
Turn Bay Length (ft)				500								
Base Capacity (vph)		1334	1553	309	2034					1144		710
Starvation Cap Reductn		0	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.56	0.21	0.51	0.28					0.62		0.41

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 48 (48%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 20.9 — Intersection LOS: C
Intersection Capacity Utilization 58.8% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 3: NH 28 & Exit 5 SB Off



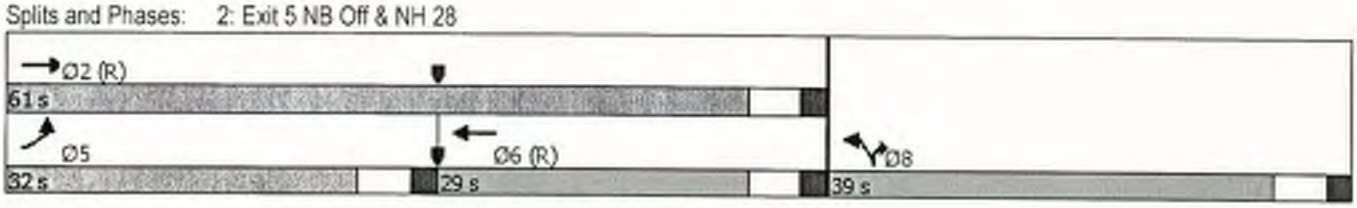
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↑	↱	↰		↱			
Traffic Volume (vph)	235	1060	0	0	425	535	220	0	240	0	0	0
Future Volume (vph)	235	1060	0	0	425	535	220	0	240	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		0	0		0	0		0	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1752	3505	0	0	3505	1568	1703	0	1524	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1752	3505	0	0	3505	1568	1703	0	1524	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						588			98			
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		699			492			450			828	
Travel Time (s)		15.9			11.2			8.8			16.1	
Peak Hour Factor	0.92	0.92	0.92	0.91	0.91	0.91	0.67	0.67	0.67	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	6%	6%	6%	2%	2%	2%
Adj. Flow (vph)	255	1152	0	0	467	588	328	0	358	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	255	1152	0	0	467	588	328	0	358	0	0	0
Turn Type	Prot	NA			NA	Free	Prot		Prot			
Protected Phases	5	2			6		8		8			
Permitted Phases		5 2				Free						
Detector Phase	5	2			6		8		8			
Switch Phase												
Minimum Initial (s)	4.0	16.0			16.0		4.0		4.0			
Minimum Split (s)	26.0	55.0			24.0		33.0		33.0			
Total Split (s)	32.0	61.0			29.0		39.0		39.0			
Total Split (%)	32.0%	61.0%			29.0%		39.0%		39.0%			
Maximum Green (s)	26.0	55.0			23.0		33.0		33.0			
Yellow Time (s)	4.0	4.0			4.0		4.0		4.0			
All-Red Time (s)	2.0	2.0			2.0		2.0		2.0			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0		0.0			
Total Lost Time (s)	6.0	6.0			6.0		6.0		6.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	4.0	4.0			4.0		4.0		4.0			
Recall Mode	None	C-Max			C-Max		None		None			
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		11.0			11.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)	20.3	62.1			35.8	100.0	25.9		25.9			
Actuated g/C Ratio	0.20	0.62			0.36	1.00	0.26		0.26			
v/c Ratio	0.72	0.53			0.37	0.38	0.75		0.77			
Control Delay	48.4	12.7			27.4	0.7	44.1		35.2			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	48.4	12.7			27.4	0.7	44.1		35.2			
LOS	D	B			C	A	D		D			
Approach Delay		19.2			12.5			39.5				
Approach LOS		B			B			D				
Queue Length 50th (ft)	152	202			115	0	191		155			
Queue Length 95th (ft)	223	308			192	0	180		143			
Internal Link Dist (ft)		619			412			370			748	
Turn Bay Length (ft)	500											
Base Capacity (vph)	455	2176			1254	1568	561		568			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.56	0.53			0.37	0.38	0.58		0.63			

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 21.4 Intersection LOS: C
Intersection Capacity Utilization 58.8% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Exit 5 NB Off & NH 28



	SB			NB			EB			WB		
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		✥			✥			↱			↰	
Traffic Volume (vph)	15	50	5	230	0	100	0	760	150	15	415	0
Future Volume (vph)	15	50	5	230	0	100	0	760	150	15	415	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990			0.959			0.978				
Flt Protected		0.989			0.966						0.998	
Satd. Flow (prot)	0	1842	0	0	1743	0	0	1822	0	0	1841	0
Flt Permitted		0.902			0.740						0.620	
Satd. Flow (perm)	0	1680	0	0	1335	0	0	1822	0	0	1144	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			55			24				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		170			373			245			336	
Travel Time (s)		3.9			8.5			5.6			7.6	
Peak Hour Factor	0.83	0.83	0.83	0.98	0.98	0.98	0.95	0.95	0.95	0.89	0.89	0.89
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	18	60	6	235	0	102	0	800	158	17	466	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	84	0	0	337	0	0	958	0	0	483	0
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		2			2			1			1	
Permitted Phases	2			2						1		
Detector Phase	2	2		2	2			1		1	1	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0			5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0			24.0		24.0	24.0	
Total Split (s)	24.0	24.0		24.0	24.0			36.0		36.0	36.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%			60.0%		60.0%	60.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0			30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag	Lag	Lag		Lag	Lag			Lead		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes			Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min			None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	
Act Effct Green (s)		15.8			15.8			30.1			30.1	
Actuated g/C Ratio		0.27			0.27			0.52			0.52	
v/c Ratio		0.18			0.84			1.00			0.81	
Control Delay		15.9			36.6			47.1			26.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		15.9			36.6			47.1			26.8	
LOS		B			D			D			C	
Approach Delay		15.9			36.6			47.1			26.8	

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Approach LOS		B			D			D			C	
Queue Length 50th (ft)		21			91			~382			140	
Queue Length 95th (ft)		45			#215			#591			#306	
Internal Link Dist (ft)		90			293			165			256	
Turn Bay Length (ft)												
Base Capacity (vph)		528			454			959			595	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.16			0.74			1.00			0.81	

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 57.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 38.5 Intersection LOS: D
Intersection Capacity Utilization 95.4% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: NH 102 & Fordway/N. High St

EB W/B

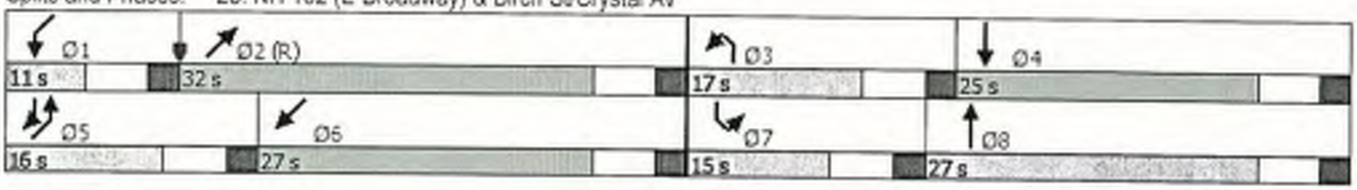
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	70	295	35	135	340	150	135	410	40	75	250	65
Future Volume (vph)	70	295	35	135	340	150	135	410	40	75	250	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984				0.850		0.987			0.969	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1815	0	1752	1845	1568	1787	1857	0	1787	1823	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1752	1815	0	1752	1845	1568	1787	1857	0	1787	1823	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				161		6			15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		361			411			477			530	
Travel Time (s)		8.2			9.3			10.8			12.0	
Peak Hour Factor	0.91	0.91	0.91	0.93	0.93	0.93	0.95	0.95	0.95	0.94	0.94	0.94
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	77	324	38	145	366	161	142	432	42	80	266	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	362	0	145	366	161	142	474	0	80	335	0
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	3	8		7	4	5	5	2		1	6	
Permitted Phases						4						
Detector Phase	3	8		7	4	5	5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	10.0	4.0	4.0	10.0		4.0	9.0	
Minimum Split (s)	17.0	24.0		11.0	24.0	16.0	16.0	24.0		11.0	24.0	
Total Split (s)	17.0	27.0		15.0	25.0	16.0	16.0	32.0		11.0	27.0	
Total Split (%)	20.0%	31.8%		17.6%	29.4%	18.8%	18.8%	37.6%		12.9%	31.8%	
Maximum Green (s)	11.0	21.0		9.0	19.0	10.0	10.0	26.0		5.0	21.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	C-Max		None	None	
Act Effct Green (s)	8.8	19.5		8.9	22.0	37.6	9.7	29.5		5.6	22.9	
Actuated g/C Ratio	0.10	0.23		0.10	0.26	0.44	0.11	0.35		0.07	0.27	
v/c Ratio	0.43	0.86		0.79	0.77	0.21	0.70	0.73		0.68	0.67	
Control Delay	42.5	51.3		67.9	43.3	3.5	55.8	34.2		69.5	35.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	42.5	51.3		67.9	43.3	3.5	55.8	34.2		69.5	35.1	
LOS	D	D		E	D	A	E	C		E	D	
Approach Delay		49.7			39.1			39.1			41.7	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	39	178		77	184	0	74	231		43	157	
Queue Length 95th (ft)	80	#316		#174	#346	35	#155	#393		#119	#272	

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Internal Link Dist (ft)		281			331			397			450	
Turn Bay Length (ft)												
Base Capacity (vph)	226	453		185	477	791	212	647		118	501	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.34	0.80		0.78	0.77	0.20	0.67	0.73		0.68	0.67	

Intersection Summary

Area Type: Other
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 2:NET, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 41.8
Intersection LOS: D
Intersection Capacity Utilization 87.5%
ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 23: NH 102 (E Broadway) & Birch St/Crystal Av



							EB			WB		
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰	↑↑	↱	↰↰	↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	80	360	150	520	430	190	240	320	90	150	220	380
Future Volume (vph)	80	360	150	520	430	190	240	320	90	150	220	380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	0		0	0		0	0		0
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	3433	1863	1583	1770	1863	1583	1787	1881	1599
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	3433	1863	1583	1770	1863	1583	1787	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			256			202			199			142
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		639			394			532			387	
Travel Time (s)		14.5			9.0			12.1			8.8	
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.96	0.96	0.96	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%	1%
Adj. Flow (vph)	87	391	163	553	457	202	250	333	94	158	232	400
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	391	163	553	457	202	250	333	94	158	232	400
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	5	2		1	6		7	4		3	8	1
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	1
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	15.0	25.0	25.0	35.0	45.0	45.0	14.0	40.0	40.0	15.0	25.0	35.0
Total Split (s)	15.0	25.0	25.0	35.0	45.0	45.0	25.0	40.0	40.0	15.0	25.0	35.0
Total Split (%)	13.0%	21.7%	21.7%	30.4%	39.1%	39.1%	21.7%	34.8%	34.8%	13.0%	21.7%	30.4%
Maximum Green (s)	9.0	19.0	19.0	29.0	39.0	39.0	19.0	34.0	34.0	9.0	19.0	29.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Walk Time (s)		5.0	5.0		5.0	5.0		5.0	5.0		5.0	
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	9.8	29.4	29.4	24.3	44.0	44.0	18.4	28.3	28.3	9.0	18.9	49.2
Actuated g/C Ratio	0.09	0.26	0.26	0.21	0.38	0.38	0.16	0.25	0.25	0.08	0.16	0.43
v/c Ratio	0.58	0.43	0.27	0.76	0.64	0.28	0.89	0.73	0.17	1.14	0.75	0.52
Control Delay	66.6	40.0	1.1	49.7	35.6	4.8	78.7	49.0	0.7	165.5	60.7	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Total Delay	66.6	40.0	1.1	49.7	35.6	4.8	78.7	49.0	0.7	165.5	60.7	16.4
LOS	E	D	A	D	D	A	E	D	A	F	E	B
Approach Delay		33.7			36.9			53.3			59.2	
Approach LOS		C			D			D			E	
Queue Length 50th (ft)	62	130	0	199	284	0	182	224	0	~136	165	134
Queue Length 95th (ft)	#134	198	0	248	419	51	#324	310	0	#273	241	190
Internal Link Dist (ft)		559			314			452			307	
Turn Bay Length (ft)	150		150									
Base Capacity (vph)	153	905	595	865	712	730	292	550	608	139	392	824
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.43	0.27	0.64	0.64	0.28	0.86	0.61	0.15	1.14	0.59	0.49

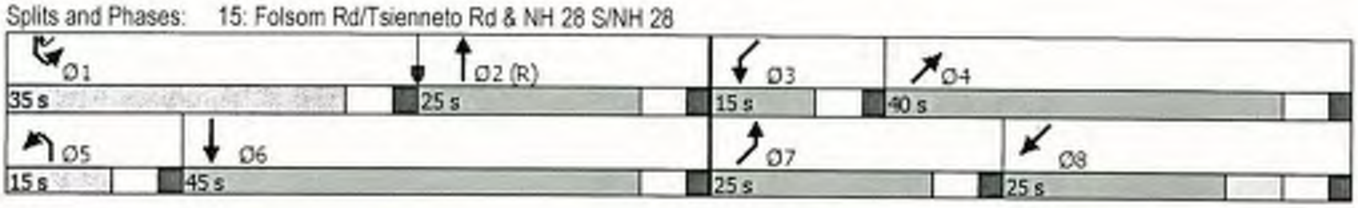
Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 115
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.14
Intersection Signal Delay: 44.9 Intersection LOS: D
Intersection Capacity Utilization 74.5% ICU Level of Service D
Analysis Period (min) 15

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

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

Splits and Phases: 15: Folsom Rd/Tsienneto Rd & NH 28 S/NH 28



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Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET (EB)	NER	SWL	SWT (W/B)	SWR
Lane Configurations	↰	↑↱		↰	↑↱			↰↑	↱		↰↑	↱
Traffic Volume (vph)	170	1400	5	20	855	80	15	10	15	45	10	215
Future Volume (vph)	170	1400	5	20	855	80	15	10	15	45	10	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.987				0.850			0.850
Flt Protected	0.950			0.950				0.971			0.961	
Satd. Flow (prot)	1787	3571	0	1787	3528	0	0	1845	1615	0	1808	1599
Flt Permitted	0.950			0.950				0.774			0.747	
Satd. Flow (perm)	1787	3571	0	1787	3528	0	0	1471	1615	0	1405	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			13				172			269
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		277			755			230			387	
Travel Time (s)		6.3			17.2			5.2			8.8	
Peak Hour Factor	0.97	0.97	0.97	0.95	0.95	0.95	0.90	0.90	0.90	0.80	0.80	0.80
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Adj. Flow (vph)	175	1443	5	21	900	84	17	11	17	56	13	269
Shared Lane Traffic (%)												
Lane Group Flow (vph)	175	1448	0	21	984	0	0	28	17	0	69	269
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4	4	4
Detector Phase	5	2		1	6		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	26.0	63.0		11.0	48.0		21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	26.0	63.0		11.0	48.0		21.0	21.0	21.0	21.0	21.0	21.0
Total Split (%)	27.4%	66.3%		11.6%	50.5%		22.1%	22.1%	22.1%	22.1%	22.1%	22.1%
Maximum Green (s)	20.0	57.0		5.0	42.0		15.0	15.0	15.0	15.0	15.0	15.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	None
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effct Green (s)	14.5	68.0		6.0	52.4			10.1	10.1		10.1	10.1
Actuated g/C Ratio	0.15	0.72		0.06	0.55			0.11	0.11		0.11	0.11
v/c Ratio	0.64	0.57		0.19	0.50			0.18	0.05		0.46	0.66
Control Delay	37.4	14.3		46.3	15.5			39.4	0.3		48.8	13.0
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	37.4	14.3		46.3	15.5			39.4	0.3		48.8	13.0
LOS	D	B		D	B			D	A		D	B
Approach Delay		16.8			16.2			24.7			20.3	

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Approach LOS		B			B			C			C	
Queue Length 50th (ft)	104	284		12	179			16	0		40	0
Queue Length 95th (ft)	m125	437		36	296			40	0		69	43
Internal Link Dist (ft)		197			675			150			307	
Turn Bay Length (ft)												
Base Capacity (vph)	376	2557		113	1951			232	399		221	479
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.47	0.57		0.19	0.50			0.12	0.04		0.31	0.56

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 69 (73%), Referenced to phase 2:SET and 6:NWT, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 17.1 Intersection LOS: B
Intersection Capacity Utilization 67.7% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Applebee's/Linlew Dr & NH 28

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
		SB			NB			EB			WB	
Lane Configurations	↰↰	↑↱		↰	↑↱		↰	↱		↰	↰	↱
Traffic Volume (vph)	110	1095	5	5	800	260	40	10	10	345	5	135
Future Volume (vph)	110	1095	5	5	800	260	40	10	10	345	5	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	150		150	0		0	0		0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	150			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.999			0.963			0.925				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.954	
Satd. Flow (prot)	3467	3571	0	1770	3408	0	1805	1758	0	1715	1722	1615
Flt Permitted	0.950			0.950			0.950			0.950	0.954	
Satd. Flow (perm)	3467	3571	0	1770	3408	0	1805	1758	0	1715	1722	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			62			13				108
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		877			261			151			343	
Travel Time (s)		19.9			5.9			3.4			7.8	
Peak Hour Factor	0.84	0.84	0.84	0.90	0.90	0.90	0.78	0.78	0.78	0.86	0.86	0.86
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	131	1304	6	6	889	289	51	13	13	401	6	157
Shared Lane Traffic (%)										49%		
Lane Group Flow (vph)	131	1310	0	6	1178	0	51	26	0	205	202	157
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3		4	4	4 5
Permitted Phases		2			6							
Detector Phase	5	2		1	6		3	3		4	4	4 5
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	5.0		8.0	8.0	
Minimum Split (s)	11.0	53.0		11.0	50.0		11.0	11.0		20.0	20.0	
Total Split (s)	14.0	53.0		11.0	50.0		11.0	11.0		20.0	20.0	
Total Split (%)	14.7%	55.8%		11.6%	52.6%		11.6%	11.6%		21.1%	21.1%	
Maximum Green (s)	8.0	47.0		5.0	44.0		5.0	5.0		14.0	14.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	None		None	None		None	None	
Walk Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)		11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	7.7	58.5		5.1	47.0		5.0	5.0		13.5	13.5	27.2
Actuated g/C Ratio	0.08	0.62		0.05	0.49		0.05	0.05		0.14	0.14	0.29
v/c Ratio	0.47	0.60		0.06	0.69		0.54	0.25		0.84	0.83	0.29
Control Delay	47.4	14.0		65.0	14.8		65.2	34.5		69.2	67.0	10.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
		SB			NB			EB			WB	
Total Delay	47.4	14.0		65.0	14.8		65.2	34.5		69.2	67.0	10.9
LOS	D	B		E	B		E	C		E	E	B
Approach Delay		17.1			15.0			54.8			52.2	
Approach LOS		B			B			D			D	
Queue Length 50th (ft)	39	234		3	311		31	8		127	125	21
Queue Length 95th (ft)	63	356		m7	408		#60	29		#232	#227	63
Internal Link Dist (ft)		797			181			71			263	
Turn Bay Length (ft)	150			150								
Base Capacity (vph)	291	2198		95	1717		95	104		252	253	533
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.45	0.60		0.06	0.69		0.54	0.25		0.81	0.80	0.29

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 0 (0%), Referenced to phase 2:EBT, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 23.3 Intersection LOS: C
Intersection Capacity Utilization 65.9% ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: VIP Dr/Ashleigh Dr & NH 28

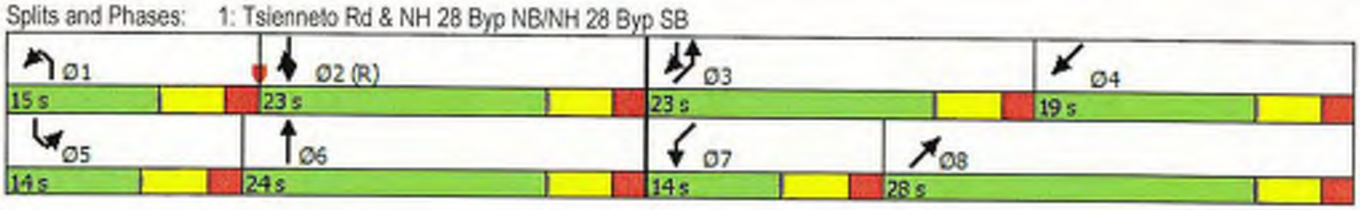
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
							EB			WB		
Lane Configurations												
Traffic Volume (vph)	100	320	25	75	185	185	280	345	75	25	175	70
Future Volume (vph)	100	320	25	75	185	185	280	345	75	25	175	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989				0.850		0.973			0.957	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1842	0	1787	1881	1599	1805	1849	0	1805	1818	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1842	0	1787	1881	1599	1805	1849	0	1805	1818	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				195		13			21	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		481			347			479			371	
Travel Time (s)		10.9			7.9			10.9			8.4	
Peak Hour Factor	0.99	0.99	0.99	0.95	0.95	0.95	0.89	0.89	0.89	0.93	0.93	0.93
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	101	323	25	79	195	195	315	388	84	27	188	75
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	348	0	79	195	195	315	472	0	27	263	0
Turn Type	Prot	NA		Prot	NA	pt+ov	Prot	NA		Prot	NA	
Protected Phases	1	6		5	2	2 3	3	8		7	4	
Permitted Phases		6			2							
Detector Phase	1	6		5	2	2 3	3	8		7	4	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	14.0	20.0		14.0	20.0		14.0	28.0		14.0	14.0	
Total Split (s)	15.0	24.0		14.0	23.0		23.0	28.0		14.0	19.0	
Total Split (%)	18.8%	30.0%		17.5%	28.8%		28.8%	35.0%		17.5%	23.8%	
Maximum Green (s)	9.0	18.0		8.0	17.0		17.0	22.0		8.0	13.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	C-Max		None	None		None	None	
Walk Time (s)								7.0				
Flash Dont Walk (s)								15.0				
Pedestrian Calls (#/hr)								0				
Act Effct Green (s)	8.7	21.8		8.0	21.2	43.5	16.3	29.4		8.0	12.7	
Actuated g/C Ratio	0.11	0.27		0.10	0.26	0.54	0.20	0.37		0.10	0.16	
v/c Ratio	0.53	0.69		0.44	0.39	0.20	0.86	0.69		0.15	0.86	
Control Delay	44.2	37.0		42.4	29.4	2.3	54.0	30.0		35.1	58.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Total Delay	44.2	37.0		42.4	29.4	2.3	54.0	30.0		35.1	58.0	
LOS	D	D		D	C	A	D	C		D	E	
Approach Delay		38.6			20.4			39.6			55.9	
Approach LOS		D			C			D			E	
Queue Length 50th (ft)	48	165		38	86	0	151	162		13	119	
Queue Length 95th (ft)	97	#307		80	149	30	#278	#394		36	#248	
Internal Link Dist (ft)		401			267			399			291	
Turn Bay Length (ft)	150			150		150	150			150		
Base Capacity (vph)	199	505		178	497	970	383	687		180	313	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.51	0.69		0.44	0.39	0.20	0.82	0.69		0.15	0.84	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:SBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 37.2 — Intersection LOS: D
Intersection Capacity Utilization 74.4% — ICU Level of Service D
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Tsienneto Rd & NH 28 Byp NB/NH 28 Byp SB



APPENDIX G-3: HCM PRINTOUTS – SIGNALIZED INTERSECTION CAPACITY ANALYSES – 2015 AM AND PM PEAK HOURS

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↰	↱
Traffic Volume (vph)	0	915	565	0	260	495
Future Volume (vph)	0	915	565	0	260	495
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3471	3406		1703	1524
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3471	3406		1703	1524
Peak-hour factor, PHF	0.93	0.93	0.88	0.88	0.89	0.89
Adj. Flow (vph)	0	984	642	0	292	556
RTOR Reduction (vph)	0	0	0	0	0	334
Lane Group Flow (vph)	0	984	642	0	292	222
Heavy Vehicles (%)	4%	4%	6%	6%	6%	6%
Turn Type		NA	NA		Prot	Perm
Protected Phases		2	2		7	
Permitted Phases						7
Actuated Green, G (s)		61.0	61.0		27.0	27.0
Effective Green, g (s)		61.0	61.0		27.0	27.0
Actuated g/C Ratio		0.61	0.61		0.27	0.27
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		2117	2077		459	411
v/s Ratio Prot		c0.28	0.19		c0.17	
v/s Ratio Perm						0.15
v/c Ratio		0.46	0.31		0.64	0.54
Uniform Delay, d1		10.6	9.4		32.2	31.2
Progression Factor		1.00	0.18		1.00	1.00
Incremental Delay, d2		0.7	0.2		6.6	5.0
Delay (s)		11.4	1.9		38.8	36.2
Level of Service		B	A		D	D
Approach Delay (s)		11.4	1.9		37.1	
Approach LOS		B	A		D	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

2,

Movement	NBL	NBR	SEL	SER	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰↰	↱			↰	↑↑			↑↑	↱
Traffic Volume (vph)	210	200	0	0	585	590	0	0	875	0
Future Volume (vph)	210	200	0	0	585	590	0	0	875	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	4.0			6.0	6.0			6.0	
Lane Util. Factor	0.97	1.00			1.00	0.95			0.95	
Frt	1.00	0.85			1.00	1.00			1.00	
Flt Protected	0.95	1.00			0.95	1.00			1.00	
Satd. Flow (prot)	3242	1495			1719	3438			3505	
Flt Permitted	0.95	1.00			0.95	1.00			1.00	
Satd. Flow (perm)	3242	1495			1719	3438			3505	
Peak-hour factor, PHF	0.88	0.88	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92
Adj. Flow (vph)	239	227	0	0	622	628	0	0	951	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	239	227	0	0	622	628	0	0	951	0
Heavy Vehicles (%)	8%	8%	2%	2%	5%	5%	5%	3%	3%	3%
Turn Type	Prot	Free			Prot	NA			NA	Free
Protected Phases	2				7	4			8	
Permitted Phases		Free								Free
Actuated Green, G (s)	12.9	100.0			41.1	75.1			28.0	
Effective Green, g (s)	12.9	100.0			41.1	75.1			28.0	
Actuated g/C Ratio	0.13	1.00			0.41	0.75			0.28	
Clearance Time (s)	6.0				6.0	6.0			6.0	
Vehicle Extension (s)	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)	418	1495			706	2581			981	
v/s Ratio Prot	c0.07				c0.36	0.18			c0.27	
v/s Ratio Perm		0.15								
v/c Ratio	0.57	0.15			0.88	0.24			0.97	
Uniform Delay, d1	41.0	0.0			27.2	3.8			35.6	
Progression Factor	1.00	1.00			1.00	1.00			1.00	
Incremental Delay, d2	5.6	0.2			12.4	0.0			21.3	
Delay (s)	46.5	0.2			39.6	3.8			56.9	
Level of Service	D	A			D	A			E	
Approach Delay (s)	24.0		0.0			21.6			56.9	
Approach LOS	C		A			C			E	

Intersection Summary			
HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱	↰	↑↑					↰↰		↱
Traffic Volume (vph)	0	515	280	235	605	0	0	0	0	465	0	295
Future Volume (vph)	0	515	280	235	605	0	0	0	0	465	0	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.0	6.0	6.0					6.0		6.0
Lane Util. Factor		0.95	1.00	1.00	0.95					0.97		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		3167	1417	1687	3374					3303		1524
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		3167	1417	1687	3374					3303		1524
Peak-hour factor, PHF	0.92	0.92	0.92	0.73	0.73	0.73	0.92	0.92	0.92	0.74	0.74	0.74
Adj. Flow (vph)	0	560	304	322	829	0	0	0	0	628	0	399
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	89
Lane Group Flow (vph)	0	560	304	322	829	0	0	0	0	628	0	310
Heavy Vehicles (%)	14%	14%	14%	7%	7%	7%	2%	2%	2%	6%	6%	6%
Turn Type		NA	Free	Prot	NA					Prot		Prot
Protected Phases		2		1	6					4		4
Permitted Phases			Free									
Actuated Green, G (s)		20.9	80.0	18.8	45.7					22.3		22.3
Effective Green, g (s)		20.9	80.0	18.8	45.7					22.3		22.3
Actuated g/C Ratio		0.26	1.00	0.24	0.57					0.28		0.28
Clearance Time (s)		6.0		6.0	6.0					6.0		6.0
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		827	1417	396	1927					920		424
v/s Ratio Prot		c0.18		c0.19	0.25					0.19		c0.20
v/s Ratio Perm			0.21									
v/c Ratio		0.68	0.21	0.81	0.43					0.68		0.73
Uniform Delay, d1		26.5	0.0	28.9	9.7					25.7		26.1
Progression Factor		1.00	1.00	0.78	0.60					1.00		1.00
Incremental Delay, d2		4.4	0.3	10.2	0.6					2.1		6.4
Delay (s)		31.0	0.3	32.7	6.4					27.8		32.5
Level of Service		C	A	C	A					C		C
Approach Delay (s)		20.2			13.8			0.0			29.6	
Approach LOS		C			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↑	↱	↰		↱			
Traffic Volume (vph)	240	740	0	0	540	740	300	0	110	0	0	0
Future Volume (vph)	240	740	0	0	540	740	300	0	110	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	4.0	6.0		4.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1641	3282			3438	1538	1656		1482			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1641	3282			3438	1538	1656		1482			
Peak-hour factor, PHF	0.87	0.87	0.87	0.90	0.90	0.90	0.78	0.78	0.78	0.92	0.92	0.92
Adj. Flow (vph)	276	851	0	0	600	822	385	0	141	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	276	851	0	0	600	822	385	0	141	0	0	0
Heavy Vehicles (%)	10%	10%	10%	5%	5%	5%	9%	9%	9%	2%	2%	2%
Turn Type	Prot	NA			NA	Free	Prot		Free			
Protected Phases	5	2			6		8					
Permitted Phases		2			6	Free			Free			
Actuated Green, G (s)	15.7	46.6			24.9	80.0	21.4		80.0			
Effective Green, g (s)	15.7	46.6			24.9	80.0	21.4		80.0			
Actuated g/C Ratio	0.20	0.58			0.31	1.00	0.27		1.00			
Clearance Time (s)	6.0	6.0			6.0		6.0					
Vehicle Extension (s)	3.0	3.0			3.0		3.0					
Lane Grp Cap (vph)	322	1911			1070	1538	442		1482			
v/s Ratio Prot	c0.17	0.26			0.17		c0.23					
v/s Ratio Perm						c0.53			0.10			
v/c Ratio	0.86	0.45			0.56	0.53	0.87		0.10			
Uniform Delay, d1	31.1	9.4			23.0	0.0	28.0		0.0			
Progression Factor	1.05	0.16			1.00	1.00	1.00		1.00			
Incremental Delay, d2	16.2	0.6			2.1	1.3	16.9		0.1			
Delay (s)	49.0	2.1			25.1	1.3	44.9		0.1			
Level of Service	D	A			C	A	D		A			
Approach Delay (s)		13.6			11.4			32.9			0.0	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	5	25	10	345	0	70	0	400	125	15	595	0
Future Volume (vph)	5	25	10	345	0	70	0	400	125	15	595	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			0.98			0.97			1.00	
Flt Protected		0.99			0.96			1.00			1.00	
Satd. Flow (prot)		1788			1731			1703			1807	
Flt Permitted		0.94			0.72			1.00			0.98	
Satd. Flow (perm)		1685			1291			1703			1776	
Peak-hour factor, PHF	0.60	0.60	0.60	0.96	0.96	0.96	0.89	0.89	0.89	0.86	0.86	0.86
Adj. Flow (vph)	8	42	17	359	0	73	0	449	140	17	692	0
RTOR Reduction (vph)	0	11	0	0	37	0	0	19	0	0	0	0
Lane Group Flow (vph)	0	56	0	0	395	0	0	570	0	0	709	0
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	8%	8%	8%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		2			2			1			1	
Permitted Phases	2			2						1		
Actuated Green, G (s)		19.1			19.1			27.3			27.3	
Effective Green, g (s)		19.1			19.1			27.3			27.3	
Actuated g/C Ratio		0.33			0.33			0.47			0.47	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		551			422			796			830	
v/s Ratio Prot								0.33				
v/s Ratio Perm		0.03			c0.31						c0.40	
v/c Ratio		0.10			0.94			0.72			0.85	
Uniform Delay, d1		13.7			19.1			12.4			13.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			28.1			3.1			8.5	
Delay (s)		13.8			47.1			15.5			22.3	
Level of Service		B			D			B			C	
Approach Delay (s)		13.8			47.1			15.5			22.3	
Approach LOS		B			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	25.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	58.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑	↱
Traffic Volume (vph)	105	205	60	35	385	80	60	260	40	70	230	105
Future Volume (vph)	105	205	60	35	385	80	60	260	40	70	230	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1656	1684		1703	1746		1719	1773		1703	1792	1524
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1656	1684		1703	1746		1719	1773		1703	1792	1524
Peak-hour factor, PHF	0.96	0.96	0.96	0.94	0.94	0.94	0.85	0.85	0.85	0.91	0.91	0.91
Adj. Flow (vph)	109	214	62	37	410	85	71	306	47	77	253	115
RTOR Reduction (vph)	0	13	0	0	9	0	0	7	0	0	0	89
Lane Group Flow (vph)	109	264	0	37	486	0	71	346	0	77	253	26
Heavy Vehicles (%)	9%	9%	9%	6%	6%	6%	5%	5%	5%	6%	6%	6%
Parking (#/hr)			0									
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												4
Actuated Green, G (s)	6.0	29.3		3.4	26.7		4.0	17.5		4.0	17.5	17.5
Effective Green, g (s)	6.0	29.3		3.4	26.7		4.0	17.5		4.0	17.5	17.5
Actuated g/C Ratio	0.08	0.37		0.04	0.34		0.05	0.22		0.05	0.22	0.22
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	127	630		74	596		87	396		87	401	341
v/s Ratio Prot	c0.07	c0.16		0.02	c0.28		0.04	c0.20		c0.05	0.14	
v/s Ratio Perm												0.02
v/c Ratio	0.86	0.42		0.50	0.82		0.82	0.87		0.89	0.63	0.08
Uniform Delay, d1	35.7	18.1		36.6	23.5		36.7	29.3		36.9	27.4	24.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	40.1	0.5		5.2	8.4		42.3	18.7		59.7	3.2	0.1
Delay (s)	75.7	18.6		41.8	31.9		79.0	48.0		96.6	30.7	24.1
Level of Service	E	B		D	C		E	D		F	C	C
Approach Delay (s)		34.7			32.6			53.2			40.4	
Approach LOS		C			C			D			D	

Intersection Summary

HCM 2000 Control Delay	39.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	78.2	Sum of lost time (s)	24.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰	↑↑	↱	↰↰	↑↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	20	230	135	310	220	145	135	170	20	125	290	370
Future Volume (vph)	20	230	135	310	220	145	135	170	20	125	290	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	3471	1553	3335	3438	1538	1752	1845	1568	1752	1845	1568
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1736	3471	1553	3335	3438	1538	1752	1845	1568	1752	1845	1568
Peak-hour factor, PHF	0.84	0.84	0.84	0.79	0.79	0.79	0.86	0.86	0.86	0.99	0.99	0.99
Adj. Flow (vph)	24	274	161	392	278	184	157	198	23	126	293	374
RTOR Reduction (vph)	0	0	113	0	0	114	0	0	0	0	0	155
Lane Group Flow (vph)	24	274	48	392	278	70	157	198	23	126	293	219
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Free	Prot	NA	pt+ov
Protected Phases	5	2		1	6		7	4		3	8	8 1
Permitted Phases		2	2		6	6		4	Free		8	
Actuated Green, G (s)	8.0	26.8	26.8	15.2	34.0	34.0	9.0	15.3	90.0	8.7	15.0	36.2
Effective Green, g (s)	8.0	26.8	26.8	15.2	34.0	34.0	9.0	15.3	90.0	8.7	15.0	36.2
Actuated g/C Ratio	0.09	0.30	0.30	0.17	0.38	0.38	0.10	0.17	1.00	0.10	0.17	0.40
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	154	1033	462	563	1298	581	175	313	1568	169	307	630
v/s Ratio Prot	0.01	c0.08		c0.12	0.08		c0.09	0.11		0.07	c0.16	0.14
v/s Ratio Perm			0.03			0.05			c0.01			
v/c Ratio	0.16	0.27	0.10	0.70	0.21	0.12	0.90	0.63	0.01	0.75	0.95	0.35
Uniform Delay, d1	37.9	24.1	22.9	35.2	19.0	18.2	40.0	34.7	0.0	39.6	37.2	18.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	0.6	0.5	3.7	0.4	0.4	39.8	4.1	0.0	16.3	39.0	0.3
Delay (s)	40.0	24.7	23.3	39.0	19.3	18.7	79.8	38.9	0.0	55.9	76.1	19.0
Level of Service	D	C	C	D	B	B	E	D	A	E	E	B
Approach Delay (s)		25.0			28.2			53.5			46.0	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	37.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰	↑↱		↰	↑↱			↰	↱		↰	↱
Traffic Volume (vph)	50	790	0	0	655	30	5	0	5	50	0	245
Future Volume (vph)	50	790	0	0	655	30	5	0	5	50	0	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0			6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95			0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00			0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00			1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1687	3374			3516			1805	1615		1787	1599
Flt Permitted	0.95	1.00			1.00			0.72	1.00		0.75	1.00
Satd. Flow (perm)	1687	3374			3516			1369	1615		1413	1599
Peak-hour factor, PHF	0.83	0.83	0.83	0.92	0.92	0.92	0.50	0.50	0.50	0.90	0.90	0.90
Adj. Flow (vph)	60	952	0	0	712	33	10	0	10	56	0	272
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	9	0	0	201
Lane Group Flow (vph)	60	952	0	0	743	0	0	10	1	0	56	71
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA		custom	NA	custom	Perm	NA	Perm
Protected Phases	5	2		1	6						4	
Permitted Phases					6		8	8	8	4		4
Actuated Green, G (s)	7.6	67.7			54.1			10.3	10.3		10.3	10.3
Effective Green, g (s)	7.6	67.7			54.1			10.3	10.3		10.3	10.3
Actuated g/C Ratio	0.08	0.75			0.60			0.11	0.11		0.11	0.11
Clearance Time (s)	6.0	6.0			6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	142	2537			2113			156	184		161	182
v/s Ratio Prot	0.04	c0.28			0.21							
v/s Ratio Perm								0.01	0.00		0.04	c0.04
v/c Ratio	0.42	0.38			0.35			0.06	0.01		0.35	0.39
Uniform Delay, d1	39.1	3.8			9.1			35.6	35.3		36.8	36.9
Progression Factor	1.00	1.00			1.20			1.00	1.00		1.00	1.00
Incremental Delay, d2	2.0	0.4			0.1			0.2	0.0		1.3	1.4
Delay (s)	41.1	4.3			11.0			35.7	35.3		38.1	38.3
Level of Service	D	A			B			D	D		D	D
Approach Delay (s)		6.5			11.0			35.5			38.3	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

14

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	630	5	5	610	220	10	5	5	180	5	100
Future Volume (vph)	100	630	5	5	610	220	10	5	5	180	5	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	1.00		0.95	0.95	1.00
Frt	1.00	1.00		1.00	0.96		1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.96	1.00
Satd. Flow (prot)	3303	3402		1736	3333		1805	1758		1665	1674	1568
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.96	1.00
Satd. Flow (perm)	3303	3402		1736	3333		1805	1758		1665	1674	1568
Peak-hour factor, PHF	0.83	0.83	0.83	0.97	0.97	0.97	0.67	0.67	0.67	0.90	0.90	0.90
Adj. Flow (vph)	120	759	6	5	629	227	15	7	7	200	6	111
RTOR Reduction (vph)	0	0	0	0	41	0	0	7	0	0	0	81
Lane Group Flow (vph)	120	765	0	5	815	0	15	7	0	102	104	30
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	0%	0%	0%	3%	3%	3%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3		4	4	4 5
Permitted Phases								3				
Actuated Green, G (s)	8.0	50.2		1.0	43.2		4.1	4.1		10.7	10.7	24.7
Effective Green, g (s)	8.0	50.2		1.0	43.2		4.1	4.1		10.7	10.7	24.7
Actuated g/C Ratio	0.09	0.56		0.01	0.48		0.05	0.05		0.12	0.12	0.27
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	293	1897		19	1599		82	80		197	199	430
v/s Ratio Prot	c0.04	c0.22		0.00	c0.24		c0.01	0.00		0.06	c0.06	0.02
v/s Ratio Perm												
v/c Ratio	0.41	0.40		0.26	0.51		0.18	0.09		0.52	0.52	0.07
Uniform Delay, d1	38.8	11.4		44.1	16.1		41.3	41.2		37.2	37.3	24.2
Progression Factor	1.00	1.00		1.52	0.60		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	0.1		6.9	1.1		1.1	0.5		2.3	2.5	0.1
Delay (s)	39.7	11.5		73.9	10.8		42.4	41.7		39.5	39.7	24.2
Level of Service	D	B		E	B		D	D		D	D	C
Approach Delay (s)		15.3			11.2			42.1			34.2	
Approach LOS		B			B			D			C	

Intersection Summary

HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	100	220	20	25	210	255	120	100	80	80	270	90
Future Volume (vph)	100	220	20	25	210	255	120	100	80	80	270	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1822		1736	1827	1553	1770	1738		1787	1811	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1752	1822		1736	1827	1553	1770	1738		1787	1811	
Peak-hour factor, PHF	0.82	0.82	0.82	0.81	0.81	0.81	0.68	0.68	0.68	0.78	0.78	0.78
Adj. Flow (vph)	122	268	24	31	259	315	176	147	118	103	346	115
RTOR Reduction (vph)	0	4	0	0	0	121	0	34	0	0	15	0
Lane Group Flow (vph)	122	288	0	31	259	194	176	231	0	103	447	0
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	2%	2%	2%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA	pt+ov	Prot	NA		Prot	NA	
Protected Phases	1	6		5	2	2 3	3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	8.0	21.8		3.2	17.0	32.0	9.0	23.4		7.6	22.0	
Effective Green, g (s)	8.0	21.8		3.2	17.0	32.0	9.0	23.4		7.6	22.0	
Actuated g/C Ratio	0.10	0.27		0.04	0.21	0.40	0.11	0.29		0.09	0.28	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	175	496		69	388	621	199	508		169	498	
v/s Ratio Prot	c0.07	c0.16		0.02	c0.14	0.12	c0.10	0.13		0.06	c0.25	
v/s Ratio Perm												
v/c Ratio	0.70	0.58		0.45	0.67	0.31	0.88	0.45		0.61	0.90	
Uniform Delay, d1	34.8	25.2		37.5	28.9	16.5	35.0	23.1		34.8	27.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.4	1.7		4.6	8.8	0.3	33.9	0.6		6.1	18.5	
Delay (s)	46.3	26.9		42.1	37.7	16.7	68.9	23.7		40.9	46.4	
Level of Service	D	C		D	D	B	E	C		D	D	
Approach Delay (s)		32.6			27.0			41.7			45.4	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	36.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↰	↱
Traffic Volume (vph)	0	935	850	0	280	645
Future Volume (vph)	0	935	850	0	280	645
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3574	3574		1752	1568
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3574	3574		1752	1568
Peak-hour factor, PHF	0.92	0.92	0.89	0.89	0.92	0.92
Adj. Flow (vph)	0	1016	955	0	304	701
RTOR Reduction (vph)	0	0	0	0	0	258
Lane Group Flow (vph)	0	1016	955	0	304	443
Heavy Vehicles (%)	1%	1%	1%	1%	3%	3%
Turn Type		NA	NA		Prot	Perm
Protected Phases		2	2		7	
Permitted Phases						7
Actuated Green, G (s)		78.0	78.0		30.0	30.0
Effective Green, g (s)		78.0	78.0		30.0	30.0
Actuated g/C Ratio		0.65	0.65		0.25	0.25
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		2323	2323		438	392
v/s Ratio Prot		c0.28	0.27		0.17	
v/s Ratio Perm						c0.28
v/c Ratio		0.44	0.41		0.69	1.13
Uniform Delay, d1		10.3	10.0		40.8	45.0
Progression Factor		1.00	0.13		1.00	1.00
Incremental Delay, d2		0.6	0.5		8.8	85.8
Delay (s)		10.9	1.8		49.6	130.8
Level of Service		B	A		D	F
Approach Delay (s)		10.9	1.8		106.2	
Approach LOS		B	A		F	

Intersection Summary			
HCM 2000 Control Delay	40.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NBL2	NBL	NBR	SEL	SER	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰↰		↱			↰	↑↑			↑↑	↱
Traffic Volume (vph)	580	0	605	0	0	475	740	0	0	485	0
Future Volume (vph)	580	0	605	0	0	475	740	0	0	485	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0			4.5	6.0			6.0	
Lane Util. Factor	0.97		1.00			1.00	0.95			0.95	
Frt	1.00		0.85			1.00	1.00			1.00	
Flt Protected	0.95		1.00			0.95	1.00			1.00	
Satd. Flow (prot)	3467		1599			1770	3539			3539	
Flt Permitted	0.95		1.00			0.95	1.00			1.00	
Satd. Flow (perm)	3467		1599			1770	3539			3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96	0.87	0.87	0.87
Adj. Flow (vph)	630	0	658	0	0	495	771	0	0	557	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	630	0	658	0	0	495	771	0	0	557	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Free			Prot	NA			NA	Free
Protected Phases	2					7	4			8	
Permitted Phases			Free				7				Free
Actuated Green, G (s)	43.4		120.0			36.7	66.1			24.9	
Effective Green, g (s)	43.4		120.0			36.7	66.1			24.9	
Actuated g/C Ratio	0.36		1.00			0.31	0.55			0.21	
Clearance Time (s)	4.5					4.5	6.0			6.0	
Vehicle Extension (s)	3.0					3.0	3.0			3.0	
Lane Grp Cap (vph)	1253		1599			541	1949			734	
v/s Ratio Prot	c0.18					c0.28	0.22			c0.16	
v/s Ratio Perm			0.41								
v/c Ratio	0.50		0.41			0.91	0.40			0.76	
Uniform Delay, d1	29.9		0.0			40.1	15.5			44.7	
Progression Factor	1.00		1.00			1.04	1.26			1.00	
Incremental Delay, d2	1.4		0.8			18.3	0.1			4.5	
Delay (s)	31.3		0.8			60.2	19.7			49.2	
Level of Service	C		A			E	B			D	
Approach Delay (s)		15.7		0.0			35.5			49.2	
Approach LOS		B		A			D			D	

Intersection Summary			
HCM 2000 Control Delay	29.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱	↰	↑↑					↰↰		↱
Traffic Volume (vph)	0	650	280	135	490	0	0	0	0	645	0	265
Future Volume (vph)	0	650	280	135	490	0	0	0	0	645	0	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.0	6.0	6.0					6.0		6.0
Lane Util. Factor		0.95	1.00	1.00	0.95					0.97		1.00
Frt		1.00	0.85	1.00	1.00					1.00		0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (prot)		3471	1553	1719	3438					3367		1553
Flt Permitted		1.00	1.00	0.95	1.00					0.95		1.00
Satd. Flow (perm)		3471	1553	1719	3438					3367		1553
Peak-hour factor, PHF	0.87	0.87	0.87	0.86	0.86	0.86	0.92	0.92	0.92	0.91	0.91	0.91
Adj. Flow (vph)	0	747	322	157	570	0	0	0	0	709	0	291
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	197
Lane Group Flow (vph)	0	747	322	157	570	0	0	0	0	709	0	94
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	2%	2%	2%	4%	4%	4%
Turn Type		NA	Free	Prot	NA					Prot		Prot
Protected Phases		2		1	6					4		4
Permitted Phases			Free		1							
Actuated Green, G (s)		38.5	100.0	14.7	59.2					28.8		28.8
Effective Green, g (s)		38.5	100.0	14.7	59.2					28.8		28.8
Actuated g/C Ratio		0.38	1.00	0.15	0.59					0.29		0.29
Clearance Time (s)		6.0		6.0	6.0					6.0		6.0
Vehicle Extension (s)		4.0		4.0	4.0					4.0		4.0
Lane Grp Cap (vph)		1336	1553	252	2035					969		447
v/s Ratio Prot		c0.22		c0.09	0.17					c0.21		0.06
v/s Ratio Perm			0.21									
v/c Ratio		0.56	0.21	0.62	0.28					0.73		0.21
Uniform Delay, d1		24.1	0.0	40.0	10.0					32.1		27.0
Progression Factor		1.00	1.00	0.90	0.42					1.00		1.00
Incremental Delay, d2		1.7	0.3	4.9	0.1					3.1		0.3
Delay (s)		25.8	0.3	40.7	4.3					35.2		27.3
Level of Service		C	A	D	A					D		C
Approach Delay (s)		18.1			12.1			0.0			32.9	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↑	↱	↰		↱			
Traffic Volume (vph)	235	1060	0	0	425	535	220	0	240	0	0	0
Future Volume (vph)	235	1060	0	0	425	535	220	0	240	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	4.0	6.0		6.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1752	3505			3505	1568	1703		1524			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1752	3505			3505	1568	1703		1524			
Peak-hour factor, PHF	0.92	0.92	0.92	0.91	0.91	0.91	0.67	0.67	0.67	0.92	0.92	0.92
Adj. Flow (vph)	255	1152	0	0	467	588	328	0	358	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	73	0	0	0
Lane Group Flow (vph)	255	1152	0	0	467	588	328	0	285	0	0	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	6%	6%	6%	2%	2%	2%
Turn Type	Prot	NA			NA	Free	Prot		Prot			
Protected Phases	5	2			6		8		8			
Permitted Phases		5 2				Free						
Actuated Green, G (s)	20.3	62.1			35.8	100.0	25.9		25.9			
Effective Green, g (s)	20.3	62.1			35.8	100.0	25.9		25.9			
Actuated g/C Ratio	0.20	0.62			0.36	1.00	0.26		0.26			
Clearance Time (s)	6.0	6.0			6.0		6.0		6.0			
Vehicle Extension (s)	4.0	4.0			4.0		4.0		4.0			
Lane Grp Cap (vph)	355	2176			1254	1568	441		394			
v/s Ratio Prot	c0.15	c0.33			0.13		c0.19		0.19			
v/s Ratio Perm						0.38						
v/c Ratio	0.72	0.53			0.37	0.38	0.74		0.72			
Uniform Delay, d1	37.2	10.7			23.8	0.0	34.0		33.8			
Progression Factor	1.00	1.00			1.00	1.00	1.00		1.00			
Incremental Delay, d2	7.3	0.3			0.8	0.7	7.1		6.9			
Delay (s)	44.4	11.0			24.6	0.7	41.1		40.7			
Level of Service	D	B			C	A	D		D			
Approach Delay (s)		17.1			11.3			40.9			0.0	
Approach LOS		B			B			D			A	

Intersection Summary

HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

6

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	15	50	5	230	0	100	0	760	150	15	415	0
Future Volume (vph)	15	50	5	230	0	100	0	760	150	15	415	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.96			0.98			1.00	
Flt Protected		0.99			0.97			1.00			1.00	
Satd. Flow (prot)		1843			1744			1821			1841	
Flt Permitted		0.90			0.74			1.00			0.62	
Satd. Flow (perm)		1681			1335			1821			1144	
Peak-hour factor, PHF	0.83	0.83	0.83	0.98	0.98	0.98	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	18	60	6	235	0	102	0	800	158	17	466	0
RTOR Reduction (vph)	0	4	0	0	40	0	0	12	0	0	0	0
Lane Group Flow (vph)	0	80	0	0	297	0	0	946	0	0	483	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		2			2			1			1	
Permitted Phases	2			2						1		
Actuated Green, G (s)		15.8			15.8			30.1			30.1	
Effective Green, g (s)		15.8			15.8			30.1			30.1	
Actuated g/C Ratio		0.27			0.27			0.52			0.52	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		458			364			946			594	
v/s Ratio Prot								c0.52				
v/s Ratio Perm		0.05			c0.22						0.42	
v/c Ratio		0.17			0.82			1.00			0.81	
Uniform Delay, d1		16.1			19.7			13.9			11.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			13.2			29.4			8.3	
Delay (s)		16.3			32.9			43.3			19.9	
Level of Service		B			C			D			B	
Approach Delay (s)		16.3			32.9			43.3			19.9	
Approach LOS		B			C			D			B	

Intersection Summary

HCM 2000 Control Delay	34.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	57.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

7

HCM Signalized Intersection Capacity Analysis
23: NH 102 (E Broadway) & Birch St/Crystal Av

Existing 2015 PM Peak
12/23/2016

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰	↑↱		↰	↑	↱	↰	↑↱		↰	↑↱	
Traffic Volume (vph)	70	295	35	135	340	150	135	410	40	75	250	65
Future Volume (vph)	70	295	35	135	340	150	135	410	40	75	250	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1816		1752	1845	1568	1787	1856		1787	1823	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1752	1816		1752	1845	1568	1787	1856		1787	1823	
Peak-hour factor, PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.95	0.95	0.95	0.94	0.94	0.94
Adj. Flow (vph)	77	324	38	145	366	161	142	432	42	80	266	69
RTOR Reduction (vph)	0	5	0	0	0	101	0	4	0	0	11	0
Lane Group Flow (vph)	77	357	0	145	366	60	142	470	0	80	324	0
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	3	8		7	4	5	5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)	7.7	20.8		8.9	22.0	31.7	9.7	27.0		4.3	21.6	
Effective Green, g (s)	7.7	20.8		8.9	22.0	31.7	9.7	27.0		4.3	21.6	
Actuated g/C Ratio	0.09	0.24		0.10	0.26	0.37	0.11	0.32		0.05	0.25	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	158	444		183	477	695	203	589		90	463	
v/s Ratio Prot	0.04	0.20		c0.08	c0.20	0.01	c0.08	c0.25		0.04	0.18	
v/s Ratio Perm						0.03						
v/c Ratio	0.49	0.80		0.79	0.77	0.09	0.70	0.80		0.89	0.70	
Uniform Delay, d1	36.8	30.2		37.1	29.1	17.3	36.2	26.5		40.1	28.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	10.1		20.5	7.3	0.1	10.1	10.8		59.2	4.6	
Delay (s)	39.1	40.3		57.6	36.4	17.3	46.3	37.3		99.3	33.3	
Level of Service	D	D		E	D	B	D	D		F	C	
Approach Delay (s)		40.1			36.4			39.4			46.1	
Approach LOS		D			D			D			D	

Intersection Summary

HCM 2000 Control Delay	39.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰	↑↑	↱	↰↰	↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	80	360	150	520	430	190	240	320	90	150	220	380
Future Volume (vph)	80	360	150	520	430	190	240	320	90	150	220	380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	1863	1583	1770	1863	1583	1787	1881	1599
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	1863	1583	1770	1863	1583	1787	1881	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.96	0.96	0.96	0.95	0.95	0.95
Adj. Flow (vph)	87	391	163	553	457	202	250	333	94	158	232	400
RTOR Reduction (vph)	0	0	121	0	0	125	0	0	71	0	0	89
Lane Group Flow (vph)	87	391	42	553	457	77	250	333	23	158	232	311
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%	1%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	5	2		1	6		7	4		3	8	1
Permitted Phases			2			6			4			8
Actuated Green, G (s)	9.8	29.4	29.4	24.3	43.9	43.9	18.4	28.3	28.3	9.0	18.9	43.2
Effective Green, g (s)	9.8	29.4	29.4	24.3	43.9	43.9	18.4	28.3	28.3	9.0	18.9	43.2
Actuated g/C Ratio	0.09	0.26	0.26	0.21	0.38	0.38	0.16	0.25	0.25	0.08	0.16	0.38
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	150	904	404	725	711	604	283	458	389	139	309	684
v/s Ratio Prot	0.05	0.11		c0.16	c0.25		c0.14	c0.18		0.09	0.12	0.10
v/s Ratio Perm			0.03			0.05			0.01			0.10
v/c Ratio	0.58	0.43	0.10	0.76	0.64	0.13	0.88	0.73	0.06	1.14	0.75	0.46
Uniform Delay, d1	50.6	35.8	32.7	42.6	29.1	23.1	47.3	39.8	33.2	53.0	45.8	27.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.4	1.5	0.5	4.8	2.0	0.1	26.0	5.7	0.1	117.8	9.8	0.5
Delay (s)	56.0	37.3	33.2	47.4	31.1	23.2	73.3	45.5	33.2	170.8	55.6	27.5
Level of Service	E	D	C	D	C	C	E	D	C	F	E	C
Approach Delay (s)		38.8			37.2			54.0			64.4	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	47.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰	↑↱		↰	↑↱			↰↑	↱		↰↑	↱
Traffic Volume (vph)	170	1400	5	20	855	80	15	10	15	45	10	215
Future Volume (vph)	170	1400	5	20	855	80	15	10	15	45	10	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00		0.96	1.00
Satd. Flow (prot)	1787	3572		1787	3528			1844	1615		1808	1599
Flt Permitted	0.95	1.00		0.95	1.00			0.77	1.00		0.75	1.00
Satd. Flow (perm)	1787	3572		1787	3528			1471	1615		1405	1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.95	0.95	0.95	0.90	0.90	0.90	0.80	0.80	0.80
Adj. Flow (vph)	175	1443	5	21	900	84	17	11	17	56	12	269
RTOR Reduction (vph)	0	0	0	0	6	0	0	0	15	0	0	240
Lane Group Flow (vph)	175	1448	0	21	978	0	0	28	2	0	69	29
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4	4	4
Actuated Green, G (s)	14.5	64.4		2.5	52.4			10.1	10.1		10.1	10.1
Effective Green, g (s)	14.5	64.4		2.5	52.4			10.1	10.1		10.1	10.1
Actuated g/C Ratio	0.15	0.68		0.03	0.55			0.11	0.11		0.11	0.11
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	272	2421		47	1945			156	171		149	169
v/s Ratio Prot	c0.10	c0.41		0.01	0.28							
v/s Ratio Perm								0.02	0.00		c0.05	0.02
v/c Ratio	0.64	0.60		0.45	0.50			0.18	0.01		0.46	0.17
Uniform Delay, d1	37.8	8.3		45.6	13.2			38.7	38.0		39.9	38.6
Progression Factor	0.77	1.64		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	4.0	0.8		6.6	0.9			0.6	0.0		2.3	0.5
Delay (s)	33.3	14.5		52.2	14.2			39.2	38.0		42.2	39.1
Level of Service	C	B		D	B			D	D		D	D
Approach Delay (s)		16.5			14.9			38.8			39.7	
Approach LOS		B			B			D			D	

Intersection Summary

HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↱		↰	↑↱		↰	↱		↰	↰↑	↱
Traffic Volume (vph)	110	1095	5	5	800	260	40	10	10	345	5	135
Future Volume (vph)	110	1095	5	5	800	260	40	10	10	345	5	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	1.00		0.95	0.95	1.00
Frt	1.00	1.00		1.00	0.96		1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.95	1.00
Satd. Flow (prot)	3467	3572		1770	3409		1805	1758		1715	1721	1615
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.95	1.00
Satd. Flow (perm)	3467	3572		1770	3409		1805	1758		1715	1721	1615
Peak-hour factor, PHF	0.84	0.84	0.84	0.90	0.90	0.90	0.78	0.78	0.78	0.86	0.86	0.86
Adj. Flow (vph)	131	1304	6	6	889	289	51	13	13	401	6	157
RTOR Reduction (vph)	0	0	0	0	32	0	0	12	0	0	0	77
Lane Group Flow (vph)	131	1310	0	6	1146	0	51	14	0	205	202	80
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3		4	4	4 5
Permitted Phases		2			6							
Actuated Green, G (s)	7.7	52.5		1.0	45.8		4.0	4.0		13.5	13.5	27.2
Effective Green, g (s)	7.7	52.5		1.0	45.8		4.0	4.0		13.5	13.5	27.2
Actuated g/C Ratio	0.08	0.55		0.01	0.48		0.04	0.04		0.14	0.14	0.29
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	281	1974		18	1643		76	74		243	244	462
v/s Ratio Prot	c0.04	c0.37		0.00	0.34		c0.03	0.01		c0.12	0.12	0.05
v/s Ratio Perm												
v/c Ratio	0.47	0.66		0.33	0.70		0.67	0.18		0.84	0.83	0.17
Uniform Delay, d1	41.7	15.0		46.7	19.2		44.9	43.9		39.7	39.6	25.5
Progression Factor	1.00	1.00		1.48	0.69		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.2	1.8		9.3	1.1		20.8	1.2		22.5	20.1	0.2
Delay (s)	42.9	16.8		78.4	14.4		65.7	45.1		62.2	59.7	25.6
Level of Service	D	B		E	B		E	D		E	E	C
Approach Delay (s)		19.2			14.7			58.7			51.1	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

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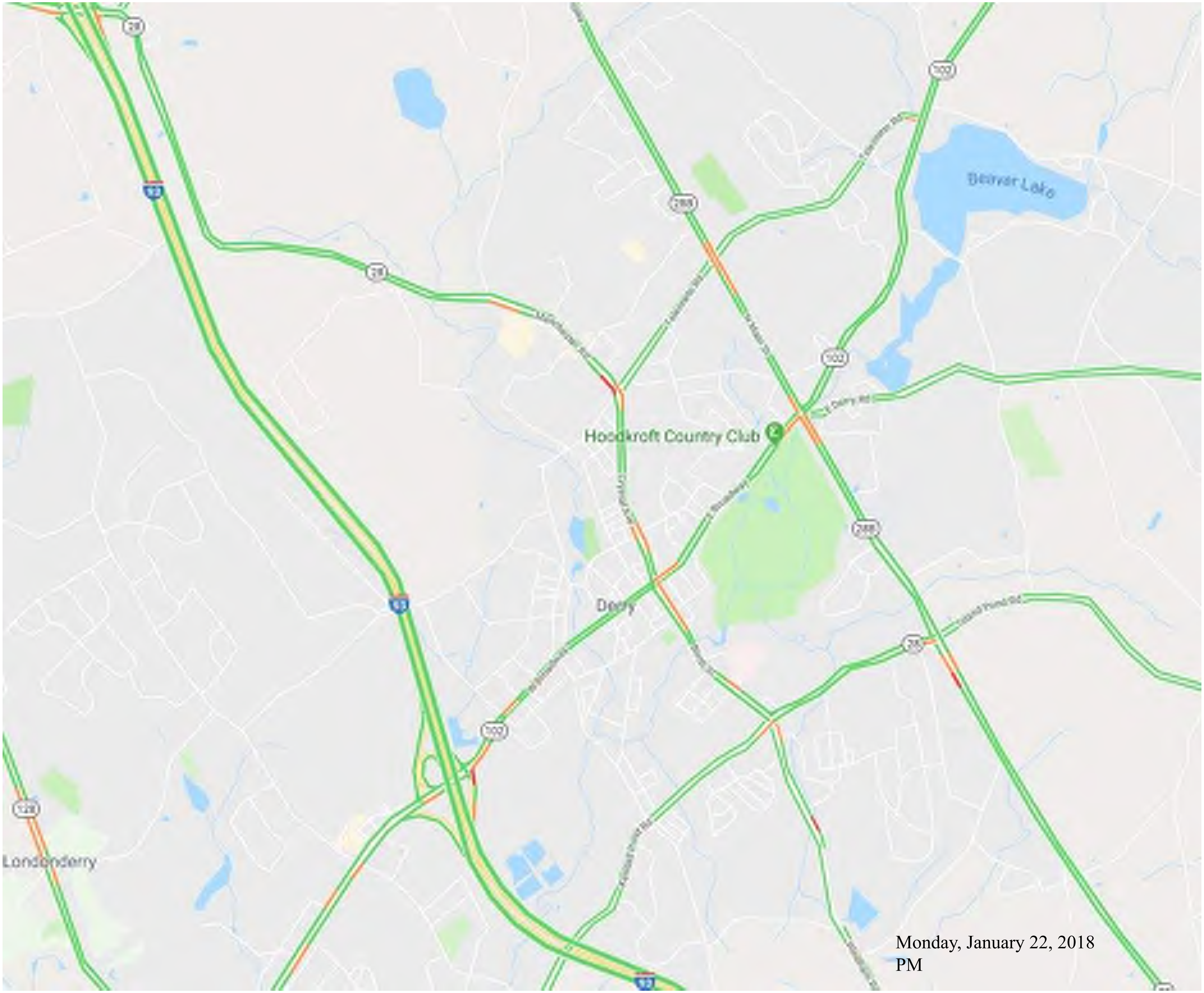
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	100	320	25	75	185	185	280	345	75	25	175	70
Future Volume (vph)	100	320	25	75	185	185	280	345	75	25	175	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1843		1787	1881	1599	1805	1849		1805	1819	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1843		1787	1881	1599	1805	1849		1805	1819	
Peak-hour factor, PHF	0.99	0.99	0.99	0.95	0.95	0.95	0.89	0.89	0.89	0.93	0.93	0.93
Adj. Flow (vph)	101	323	25	79	195	195	315	388	84	27	188	75
RTOR Reduction (vph)	0	3	0	0	0	101	0	8	0	0	17	0
Lane Group Flow (vph)	101	345	0	79	195	94	315	464	0	27	246	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA	pt+ov	Prot	NA		Prot	NA	
Protected Phases	1	6		5	2	2 3	3	8		7	4	
Permitted Phases		6			2							
Actuated Green, G (s)	7.1	17.0		6.4	16.3	38.6	16.3	29.4		3.2	16.3	
Effective Green, g (s)	7.1	17.0		6.4	16.3	38.6	16.3	29.4		3.2	16.3	
Actuated g/C Ratio	0.09	0.21		0.08	0.20	0.48	0.20	0.37		0.04	0.20	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	157	391		142	383	771	367	679		72	370	
v/s Ratio Prot	c0.06	c0.19		0.04	0.10	0.06	c0.17	c0.25		0.01	0.14	
v/s Ratio Perm												
v/c Ratio	0.64	0.88		0.56	0.51	0.12	0.86	0.68		0.38	0.67	
Uniform Delay, d1	35.2	30.5		35.4	28.3	11.4	30.7	21.4		37.4	29.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.7	20.2		4.7	4.8	0.1	17.7	2.8		3.3	4.5	
Delay (s)	43.9	50.7		40.1	33.1	11.5	48.4	24.2		40.7	33.8	
Level of Service	D	D		D	C	B	D	C		D	C	
Approach Delay (s)		49.2			25.3			33.9			34.5	
Approach LOS		D			C			C			C	

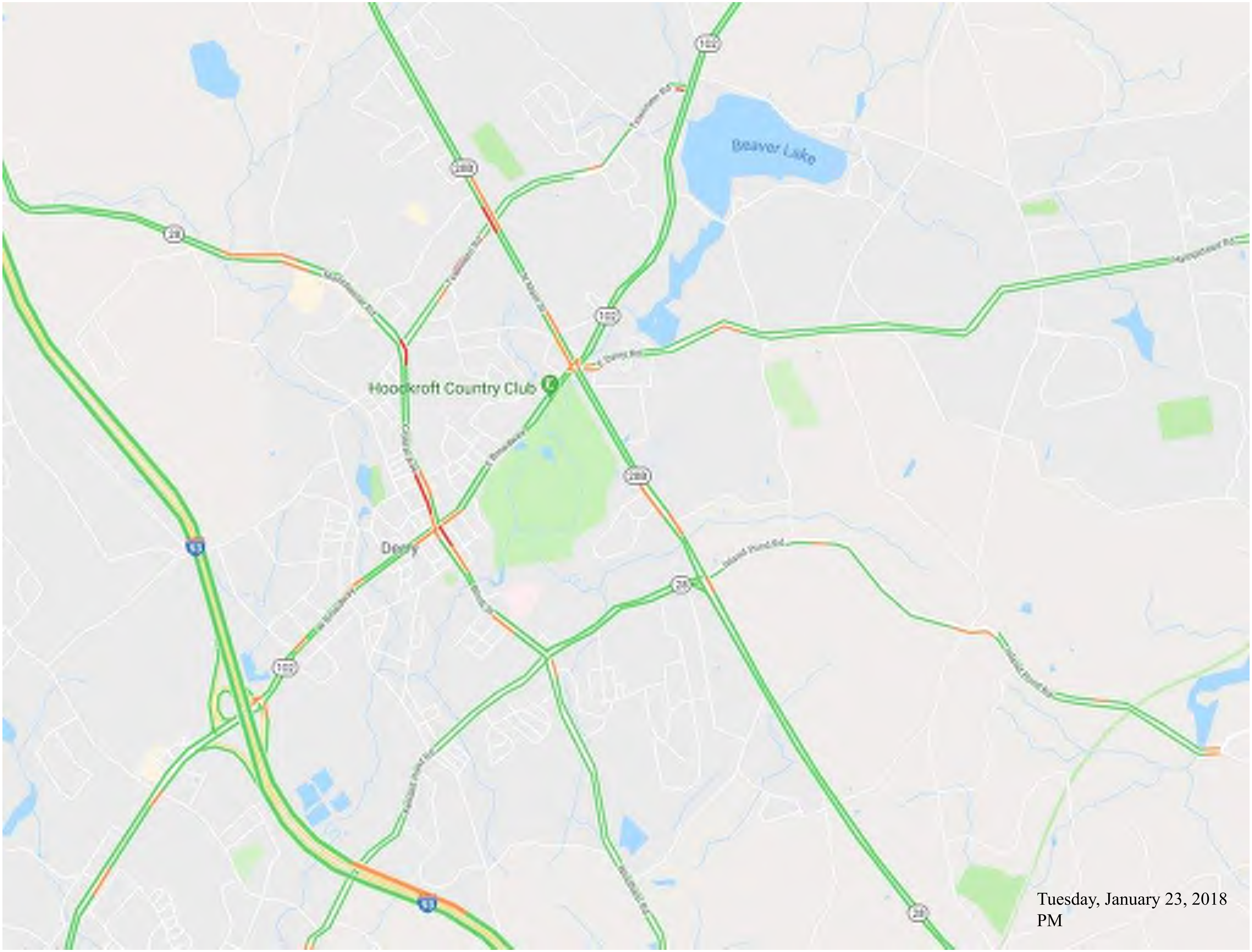
Intersection Summary			
HCM 2000 Control Delay	35.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX H: GOOGLE MAPS PRINTOUT OF TRAFFIC CONDITIONS – DERRY AREA – JANUARY 2018

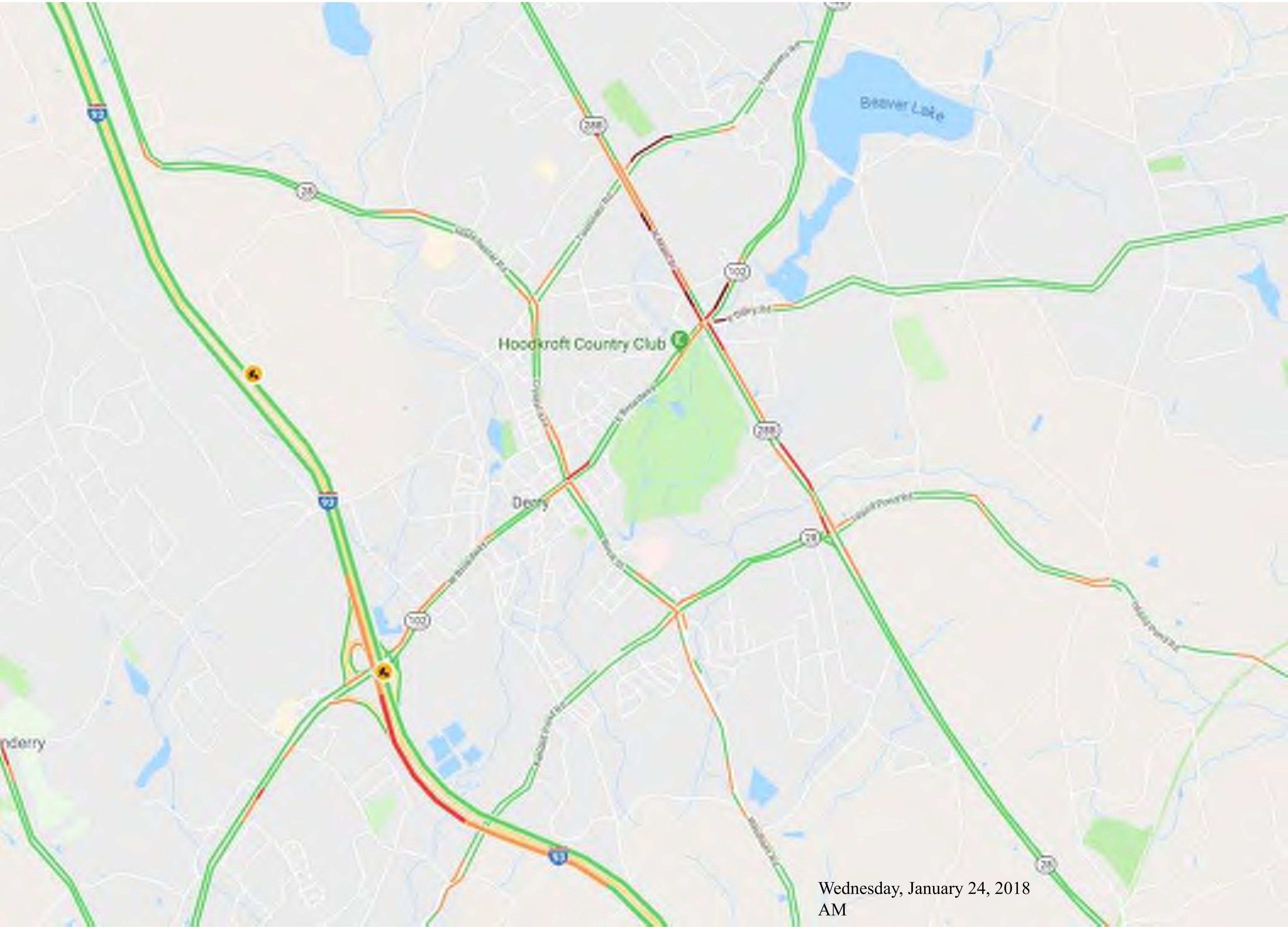


Monday, January 22, 2018
PM

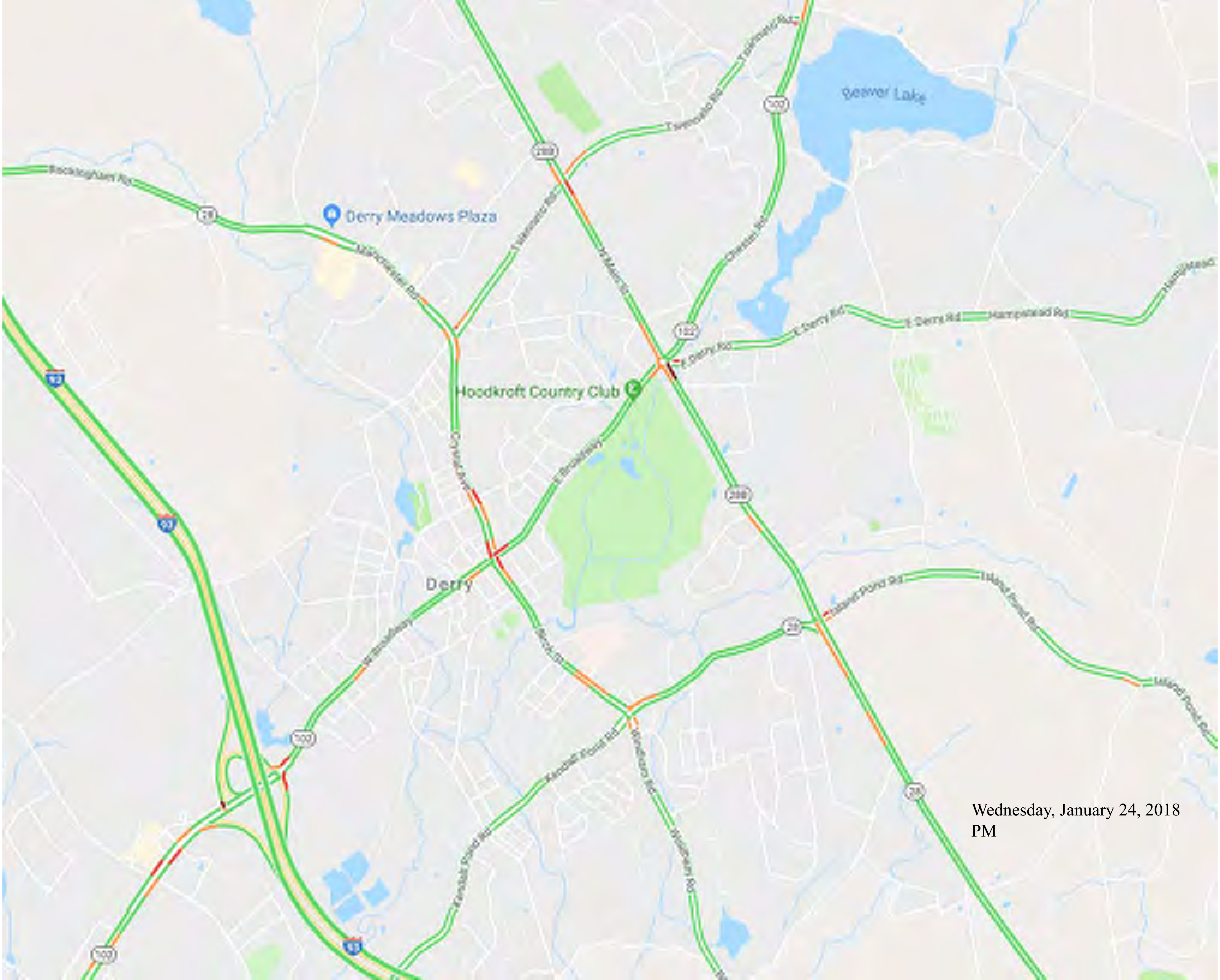
Tuesday, January 23, 2018
AM



Tuesday, January 23, 2018
PM



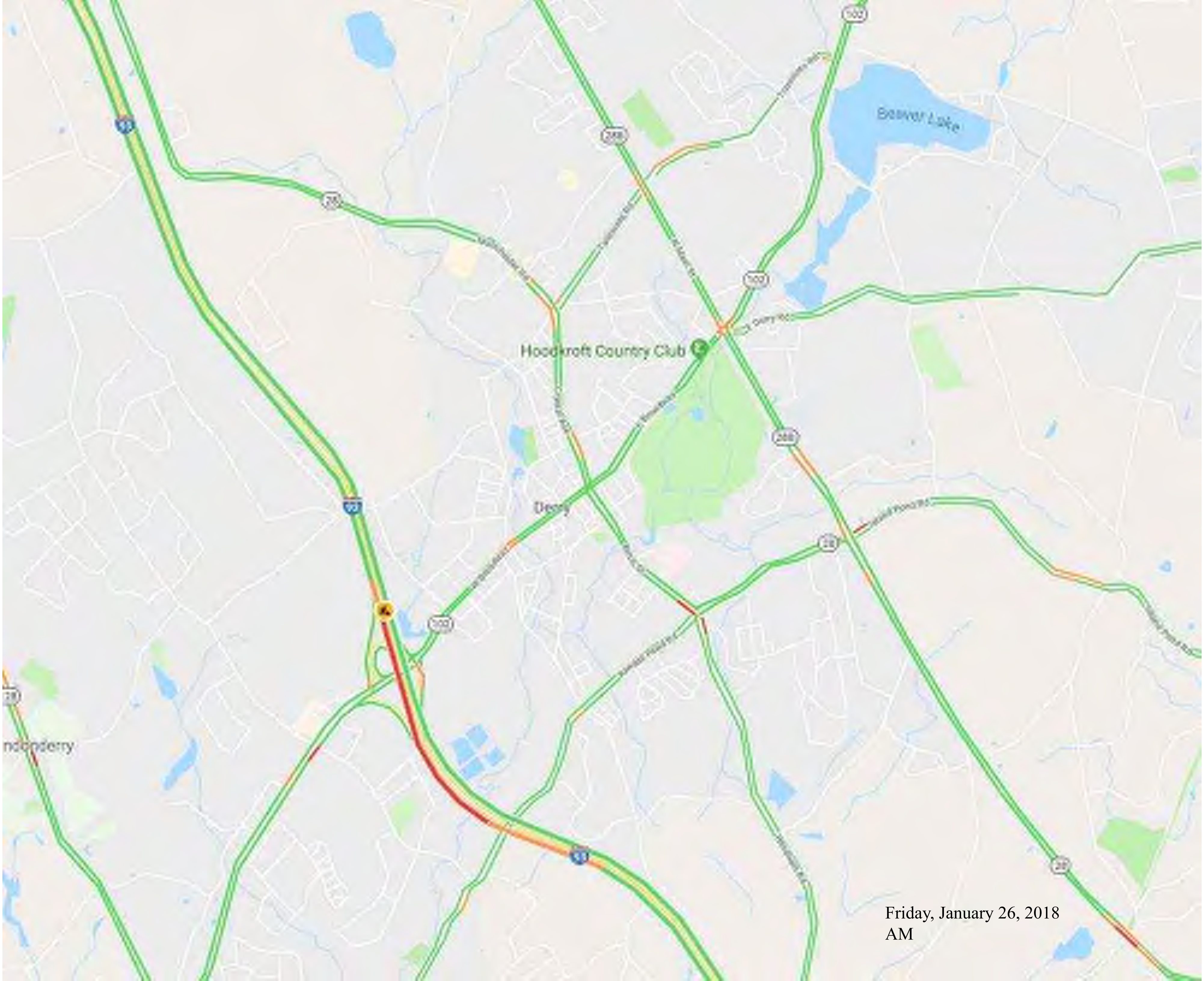
Wednesday, January 24, 2018
AM



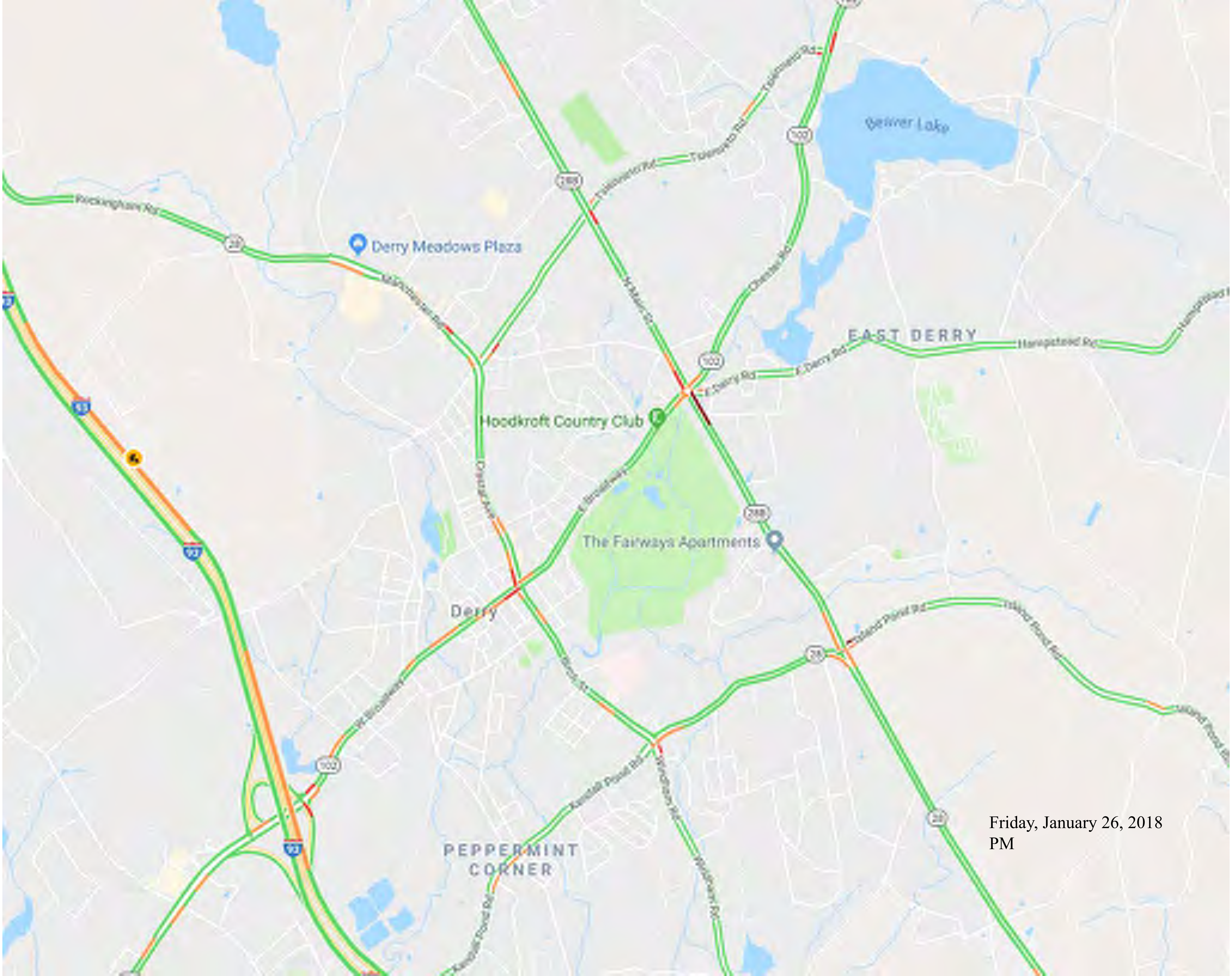
Wednesday, January 24, 2018
PM

Thursday, January 25, 2018
AM

Thursday, January 25, 2018
PM



Friday, January 26, 2018
AM



Friday, January 26, 2018
PM

APPENDIX I: HCM PRINTOUTS – UNSIGNALIZED INTERSECTION CAPACITY ANALYSES – 2015 AM AND PM PEAK HCM PRINTOUTS

Intersection												
Int Delay, s/veh	3.2											

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	10	0	105	0	0	1	75	520	5	5	1090	25
Future Vol, veh/h	10	0	105	0	0	1	75	520	5	5	1090	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	25	25	25	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	0	0	0	2	2	2	2	2	2
Mvmt Flow	11	0	114	0	0	4	82	565	5	5	1185	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1942	1943	1198	1940	1954	568	1212	0	0	571	0	0
Stage 1	1209	1209	-	731	731	-	-	-	-	-	-	-
Stage 2	733	734	-	1209	1223	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.1	6.5	6.2	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.5	4	3.3	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	49	65	226	50	65	526	576	-	-	1002	-	-
Stage 1	223	256	-	416	430	-	-	-	-	-	-	-
Stage 2	412	426	-	225	254	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	43	55	226	22	55	526	576	-	-	1002	-	-
Mov Cap-2 Maneuver	43	55	-	22	55	-	-	-	-	-	-	-
Stage 1	191	252	-	357	369	-	-	-	-	-	-	-
Stage 2	351	365	-	110	250	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	43	11.9	1.5	0
HCM LOS	E	B		

	EB			NB	SB		WB		
Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	SELn1	SELn2	SWL	SWT	SWR
Capacity (veh/h)	576	-	-	526	43	226	1002	-	-
HCM Lane V/C Ratio	0.142	-	-	0.008	0.253	0.505	0.005	-	-
HCM Control Delay (s)	12.3	-	-	11.9	115	36.1	8.6	0	-
HCM Lane LOS	B	-	-	B	F	E	A	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0	0.8	2.6	0	-	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	180	10	5	125	175	230
Future Vol, veh/h	180	10	5	125	175	230
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	91	91	93	93
Heavy Vehicles, %	5	5	4	4	2	2
Mvmt Flow	202	11	5	137	188	247

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	460	312	435	0	-	0
Stage 1	312	-	-	-	-	-
Stage 2	148	-	-	-	-	-
Critical Hdwy	6.45	6.25	4.14	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	2.236	-	-	-
Pot Cap-1 Maneuver	554	721	1114	-	-	-
Stage 1	735	-	-	-	-	-
Stage 2	872	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	551	721	1114	-	-	-
Mov Cap-2 Maneuver	551	-	-	-	-	-
Stage 1	735	-	-	-	-	-
Stage 2	868	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.4	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1114	-	558	-	-
HCM Lane V/C Ratio	0.005	-	0.383	-	-
HCM Control Delay (s)	8.2	0	15.4	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	1.8	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	0	0	310	400	20
Future Vol, veh/h	10	0	0	310	400	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	44	44	95	95	96	96
Heavy Vehicles, %	79	79	4	4	6	6
Mvmt Flow	23	0	0	326	417	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	753	427	438	0	-	0
Stage 1	427	-	-	-	-	-
Stage 2	326	-	-	-	-	-
Critical Hdwy	7.19	6.99	4.14	-	-	-
Critical Hdwy Stg 1	6.19	-	-	-	-	-
Critical Hdwy Stg 2	6.19	-	-	-	-	-
Follow-up Hdwy	4.211	4.011	2.236	-	-	-
Pot Cap-1 Maneuver	286	492	1111	-	-	-
Stage 1	521	-	-	-	-	-
Stage 2	587	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	286	492	1111	-	-	-
Mov Cap-2 Maneuver	286	-	-	-	-	-
Stage 1	521	-	-	-	-	-
Stage 2	587	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.7	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1111	-	286	-	-
HCM Lane V/C Ratio	-	-	0.079	-	-
HCM Control Delay (s)	0	-	18.7	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↰			✥			✥			✥	
Traffic Vol, veh/h	35	270	5	30	385	10	10	5	30	10	5	35
Future Vol, veh/h	35	270	5	30	385	10	10	5	30	10	5	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	96	96	96	65	65	65	67	67	67
Heavy Vehicles, %	7	7	7	5	5	5	2	2	2	0	0	0
Mvmt Flow	39	303	6	31	401	10	15	8	46	15	7	52

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	411	0	0	309	0	0	884	857	406	858	859	306
Stage 1	-	-	-	-	-	-	469	469	-	385	385	-
Stage 2	-	-	-	-	-	-	415	388	-	473	474	-
Critical Hdwy	4.17	-	-	4.15	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.263	-	-	2.245	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	1121	-	-	1235	-	-	266	295	645	279	296	739
Stage 1	-	-	-	-	-	-	575	561	-	642	614	-
Stage 2	-	-	-	-	-	-	615	609	-	576	561	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1121	-	-	1235	-	-	228	273	645	239	274	739
Mov Cap-2 Maneuver	-	-	-	-	-	-	228	273	-	239	274	-
Stage 1	-	-	-	-	-	-	551	542	-	615	588	-
Stage 2	-	-	-	-	-	-	541	583	-	510	542	-

Approach	EB	WB	SE	NW
HCM Control Delay, s	0.9	0.6	10.5	14.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NWLn1	EBL	EBT	EBR	WBL	WBT	WBR	SELn1
Capacity (veh/h)	465	1121	-	-	1235	-	-	724
HCM Lane V/C Ratio	0.16	0.035	-	-	0.025	-	-	0.096
HCM Control Delay (s)	14.2	8.3	-	-	8	0	-	10.5
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0.1	-	-	0.3

12

Intersection	
Int Delay, s/veh	22.6

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations	↰	↱	↑	↱		↰↑
Traffic Vol, veh/h	215	80	370	245	80	570
Future Vol, veh/h	215	80	370	245	80	570
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Yield	-	None
Storage Length	-	150	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	86	86	81	81
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	259	96	430	285	99	704

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	979	430	0	0	430	0
Stage 1	430	-	-	-	-	-
Stage 2	549	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	262	624	-	-	1128	-
Stage 1	655	-	-	-	-	-
Stage 2	543	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 224	624	-	-	1128	-
Mov Cap-2 Maneuver	~ 224	-	-	-	-	-
Stage 1	655	-	-	-	-	-
Stage 2	465	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	115.7	0	1.5
HCM LOS	F		

Minor Lane/Major Mvmt	NET	NER	NWLn1	NWLn2	SWL	SWT
Capacity (veh/h)	-	-	224	624	1128	-
HCM Lane V/C Ratio	-	-	1.156	0.154	0.088	-
HCM Control Delay (s)	-	-	154.3	11.8	8.5	0.5
HCM Lane LOS	-	-	F	B	A	A
HCM 95th %tile Q(veh)	-	-	12.3	0.5	0.3	-

Notes

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

Intersection	
Int Delay, s/veh	11.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑	↱		Y	
Traffic Vol, veh/h	15	720	645	40	80	35
Future Vol, veh/h	15	720	645	40	80	35
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	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	89	89	83	83
Heavy Vehicles, %	7	7	4	4	6	6
Mvmt Flow	18	857	725	45	96	42

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	770	0	-	0	1640	747
Stage 1	-	-	-	-	747	-
Stage 2	-	-	-	-	893	-
Critical Hdwy	4.17	-	-	-	6.46	6.26
Critical Hdwy Stg 1	-	-	-	-	5.46	-
Critical Hdwy Stg 2	-	-	-	-	5.46	-
Follow-up Hdwy	2.263	-	-	-	3.554	3.354
Pot Cap-1 Maneuver	823	-	-	-	108	406
Stage 1	-	-	-	-	461	-
Stage 2	-	-	-	-	393	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	823	-	-	-	106	406
Mov Cap-2 Maneuver	-	-	-	-	106	-
Stage 1	-	-	-	-	461	-
Stage 2	-	-	-	-	384	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	143.2
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	823	-	-	-	137
HCM Lane V/C Ratio	0.022	-	-	-	1.011
HCM Control Delay (s)	9.5	-	-	-	143.2
HCM Lane LOS	A	-	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	7.3

Intersection					
Intersection Delay, s/veh	76.6				
Intersection LOS	F	EDR	Byp 28	Byp 28	102 EB	102 WB

Approach	WB	NB	SB	NE	SW
Entry Lanes	1	1	1	1	1
Conflicting Circle Lanes	1	1	1	1	1
Adj Approach Flow, veh/h	516	436	557	617	397
Demand Flow Rate, veh/h	530	450	595	666	424
Vehicles Circulating, veh/h	788	673	698	629	1006
Vehicles Exiting, veh/h	335	622	732	665	312
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000
Approach Delay, s/veh	77.5	29.5	83.5	96.6	86.1
Approach LOS	F	D	F	F	F

Lane	Left	Left	Left	Left	Left
Designated Moves	LR	LTR	LTR	LTR	LTR
Assumed Moves	LR	LTR	LTR	LTR	LTR
RT Channelized					
Lane Util	1.000	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193	5.193
Entry Flow, veh/h	530	450	595	666	424
Cap Entry Lane, veh/h	514	576	562	602	413
Entry HV Adj Factor	0.973	0.970	0.936	0.926	0.935
Flow Entry, veh/h	516	436	557	617	396
Cap Entry, veh/h	500	559	526	558	386
V/C Ratio	1.031	0.781	1.058	1.106	1.026
Control Delay, s/veh	77.5	29.5	83.5	96.6	86.1
LOS	F	D	F	F	F
95th %tile Queue, veh	15	7	16	19	13

Intersection	
Int Delay, s/veh	61.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	15	185	5	40	50	245	390	5	10	255	45
Future Vol, veh/h	10	15	185	5	40	50	245	390	5	10	255	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	30	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	70	70	70	75	75	75	71	71	71
Heavy Vehicles, %	8	8	8	5	5	5	3	3	3	4	4	4
Mvmt Flow	12	18	226	7	57	71	327	520	7	14	359	63

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1660	1599	391	1605	1628	523	423	0	0	527	0	0
Stage 1	419	419	-	1177	1177	-	-	-	-	-	-	-
Stage 2	1241	1180	-	428	451	-	-	-	-	-	-	-
Critical Hdwy	7.18	6.58	6.28	7.15	6.55	6.25	4.13	-	-	4.14	-	-
Critical Hdwy Stg 1	6.18	5.58	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.18	5.58	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.572	4.072	3.372	3.545	4.045	3.345	2.227	-	-	2.236	-	-
Pot Cap-1 Maneuver	75	103	645	83	100	548	1131	-	-	1030	-	-
Stage 1	600	580	-	230	261	-	-	-	-	-	-	-
Stage 2	208	257	-	599	566	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 4	60	645	28	58	548	1131	-	-	1030	-	-
Mov Cap-2 Maneuver	~ 4	60	-	28	58	-	-	-	-	-	-	-
Stage 1	355	570	-	136	154	-	-	-	-	-	-	-
Stage 2	67	152	-	370	556	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	237	296.3	3.6	0.3
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1131	-	-	9	645	99	1030	-	-
HCM Lane V/C Ratio	0.289	-	-	3.388	0.35	1.371	0.014	-	-
HCM Control Delay (s)	9.5	0	-	$ 1890	13.6	296.3	8.5	0	-
HCM Lane LOS	A	A	-	F	B	F	A	A	-
HCM 95th %tile Q(veh)	1.2	-	-	5	1.6	9.8	0	-	-

Notes

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

19

HCM 2010 TWSC
20: NH 102 EB/NH 102 WB & Tsienneto Rd

Existing 2015 AM Peak
12/30/2016

Intersection						
Int Delay, s/veh	2 EB		NB		SB	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	95	0	15	165	320	300
Future Vol, veh/h	95	0	15	165	320	300
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	91	91	82	82
Heavy Vehicles, %	2	2	11	11	2	2
Mvmt Flow	101	0	16	181	390	366

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	787	573	756	0	-	0
Stage 1	573	-	-	-	-	-
Stage 2	214	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.21	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.299	-	-	-
Pot Cap-1 Maneuver	360	519	816	-	-	-
Stage 1	564	-	-	-	-	-
Stage 2	822	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	352	519	816	-	-	-
Mov Cap-2 Maneuver	352	-	-	-	-	-
Stage 1	564	-	-	-	-	-
Stage 2	804	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.3	0.8	0
HCM LOS	C		

		EB	SB		
Minor Lane/Major Mvmt	**NBL**	**NBT**	**EBLn1**	**SBT**	**SBR**
Capacity (veh/h)	816	-	352	-	-
HCM Lane V/C Ratio	0.02	-	0.287	-	-
HCM Control Delay (s)	9.5	0	19.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1.2	-	-

5,

Intersection	
Int Delay, s/veh	11.5

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	10	5	130	5	0	5	285	950	120	5	720	35
Future Vol, veh/h	10	5	130	5	0	5	285	950	120	5	720	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	150	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	58	58	58	97	97	97	95	95	95
Heavy Vehicles, %	2	2	2	0	0	0	1	1	1	2	2	2
Mvmt Flow	12	6	157	9	0	9	294	979	124	5	758	37

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2420	2478	776	2419	2434	1041	795	0	0	1103	0	0
Stage 1	787	787	-	1629	1629	-	-	-	-	-	-	-
Stage 2	1633	1691	-	790	805	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.1	6.5	6.2	4.11	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.5	4	3.3	2.209	-	-	2.218	-	-
Pot Cap-1 Maneuver	22	30	397	23	32	282	831	-	-	633	-	-
Stage 1	385	403	-	130	162	-	-	-	-	-	-	-
Stage 2	128	149	-	386	398	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	15	19	397	~ 8	20	282	831	-	-	633	-	-
Mov Cap-2 Maneuver	15	19	-	~ 8	20	-	-	-	-	-	-	-
Stage 1	249	397	-	84	105	-	-	-	-	-	-	-
Stage 2	80	96	-	227	392	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	79.8	$ 578.2	2.5	0.1
HCM LOS	F	F		

	EB			NB	SB		WB		
Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	SELn1	SELn2	SWL	SWT	SWR
Capacity (veh/h)	831	-	-	16	16	397	633	-	-
HCM Lane V/C Ratio	0.354	-	-	1.078	1.13	0.395	0.008	-	-
HCM Control Delay (s)	11.7	-	-	$ 578.2	$ 598.6	19.9	10.7	0	-
HCM Lane LOS	B	-	-	F	F	C	B	A	-
HCM 95th %tile Q(veh)	1.6	-	-	2.6	2.7	1.8	0	-	-

Notes

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

Intersection	
Int Delay, s/veh	44.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	420	5	5	290	170	265
Future Vol, veh/h	420	5	5	290	170	265
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	87	87	87	87
Heavy Vehicles, %	1	1	2	2	1	1
Mvmt Flow	467	6	6	333	195	305

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	693	348	500	0	-	0
Stage 1	348	-	-	-	-	-
Stage 2	345	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.12	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.218	-	-	-
Pot Cap-1 Maneuver	~ 411	697	1064	-	-	-
Stage 1	717	-	-	-	-	-
Stage 2	719	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 408	697	1064	-	-	-
Mov Cap-2 Maneuver	~ 408	-	-	-	-	-
Stage 1	717	-	-	-	-	-
Stage 2	714	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	123.5	0.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1064	-	410	-	-
HCM Lane V/C Ratio	0.005	-	1.152	-	-
HCM Control Delay (s)	8.4	0	123.5	-	-
HCM Lane LOS	A	A	F	-	-
HCM 95th %tile Q(veh)	0	-	17.8	-	-

Notes

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

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	0	0	700	440	10
Future Vol, veh/h	10	0	0	700	440	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	50	50	93	93	86	86
Heavy Vehicles, %	6	6	1	1	1	1
Mvmt Flow	20	0	0	753	512	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1270	517	523	0	-	0
Stage 1	517	-	-	-	-	-
Stage 2	753	-	-	-	-	-
Critical Hdwy	6.46	6.26	4.11	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	2.209	-	-	-
Pot Cap-1 Maneuver	182	550	1049	-	-	-
Stage 1	590	-	-	-	-	-
Stage 2	458	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	182	550	1049	-	-	-
Mov Cap-2 Maneuver	182	-	-	-	-	-
Stage 1	590	-	-	-	-	-
Stage 2	458	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	27.2	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1049	-	182	-	-
HCM Lane V/C Ratio	-	-	0.11	-	-
HCM Control Delay (s)	0	-	27.2	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	45	665	5	30	375	20	20	10	70	5	10	50
Future Vol, veh/h	45	665	5	30	375	20	20	10	70	5	10	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	88	88	88	67	67	67	82	82	82
Heavy Vehicles, %	1	1	1	2	2	2	0	0	0	0	0	0
Mvmt Flow	48	707	5	34	426	23	30	15	104	6	12	61

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	449	0	0	713	0	0	1348	1315	438	1319	1323	710
Stage 1	-	-	-	-	-	-	506	506	-	806	806	-
Stage 2	-	-	-	-	-	-	842	809	-	513	517	-
Critical Hdwy	4.11	-	-	4.12	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.218	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1117	-	-	887	-	-	129	159	623	135	158	437
Stage 1	-	-	-	-	-	-	552	543	-	379	398	-
Stage 2	-	-	-	-	-	-	362	396	-	548	537	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1117	-	-	887	-	-	94	140	623	94	139	437
Mov Cap-2 Maneuver	-	-	-	-	-	-	94	140	-	94	139	-
Stage 1	-	-	-	-	-	-	513	515	-	352	370	-
Stage 2	-	-	-	-	-	-	280	368	-	420	510	-

Approach	EB	WB	SE	NW
HCM Control Delay, s	0.5	0.7	22.5	23.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NWLn1	EBL	EBT	EBR	WBL	WBT	WBR	SELn1
Capacity (veh/h)	271	1117	-	-	887	-	-	352
HCM Lane V/C Ratio	0.293	0.043	-	-	0.038	-	-	0.424
HCM Control Delay (s)	23.7	8.4	0	-	9.2	0	-	22.5
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.2	0.1	-	-	0.1	-	-	2

Intersection	
Int Delay, s/veh	28.8

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations	↰	↱	↑	↱		↰↑
Traffic Vol, veh/h	180	120	580	410	115	570
Future Vol, veh/h	180	120	580	410	115	570
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Yield	-	None
Storage Length	-	150	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	96	96	85	85
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	209	140	604	427	135	671

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1210	604	0	0	604	0
Stage 1	604	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Critical Hdwy	6.615	6.215	-	-	4.115	-
Critical Hdwy Stg 1	5.415	-	-	-	-	-
Critical Hdwy Stg 2	5.815	-	-	-	-	-
Follow-up Hdwy	3.5095	3.3095	-	-	2.2095	-
Pot Cap-1 Maneuver	~ 189	500	-	-	978	-
Stage 1	547	-	-	-	-	-
Stage 2	510	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 147	500	-	-	978	-
Mov Cap-2 Maneuver	~ 147	-	-	-	-	-
Stage 1	547	-	-	-	-	-
Stage 2	398	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	175.4	0	2.1
HCM LOS	F		

Minor Lane/Major Mvmt	NET	NER	NWLn1	NWLn2	SWL	SWT
Capacity (veh/h)	-	-	147	500	978	-
HCM Lane V/C Ratio	-	-	1.424	0.279	0.138	-
HCM Control Delay (s)	-	-	282.3	15	9.3	0.7
HCM Lane LOS	-	-	F	C	A	A
HCM 95th %tile Q(veh)	-	-	13.6	1.1	0.5	-

Notes

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

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Intersection	
Int Delay, s/veh	37.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	40	1125	700	160	70	30
Future Vol, veh/h	40	1125	700	160	70	30
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	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	90	90	75	75
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	44	1236	778	178	93	40

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	956	0	-	0	2191	867
Stage 1	-	-	-	-	867	-
Stage 2	-	-	-	-	1324	-
Critical Hdwy	4.12	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.218	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	719	-	-	-	~ 50	351
Stage 1	-	-	-	-	410	-
Stage 2	-	-	-	-	247	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	719	-	-	-	~ 47	351
Mov Cap-2 Maneuver	-	-	-	-	~ 47	-
Stage 1	-	-	-	-	410	-
Stage 2	-	-	-	-	232	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	$ 656.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	719	-	-	-	63
HCM Lane V/C Ratio	0.061	-	-	-	2.116
HCM Control Delay (s)	10.3	-	-	-	$ 656.1
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	12.7

Notes

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

Intersection					
Intersection Delay, s/veh	153.6				
Intersection LOS	F				
	EDR	Byp 28	Byp 28	102 EB	102 WB
Approach	**WB**	**NB**	**SB**	**NE**	**SW**
Entry Lanes	1	1	1	1	1
Conflicting Circle Lanes	1	1	1	1	1
Adj Approach Flow, veh/h	544	489	804	688	264
Demand Flow Rate, veh/h	549	499	811	695	268
Vehicles Circulating, veh/h	828	1065	555	862	964
Vehicles Exiting, veh/h	726	502	677	504	413
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000
Approach Delay, s/veh	103.3	169.4	146.4	240.0	24.6
Approach LOS	F	F	F	F	C
Lane	**Left**	**Left**	**Left**	**Left**	**Left**
Designated Moves	LR	LTR	LTR	LTR	LTR
Assumed Moves	LR	LTR	LTR	LTR	LTR
RT Channelized					
Lane Util	1.000	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193	5.193
Entry Flow, veh/h	549	499	811	695	268
Cap Entry Lane, veh/h	494	393	649	477	431
Entry HV Adj Factor	0.991	0.980	0.991	0.990	0.983
Flow Entry, veh/h	544	489	803	688	263
Cap Entry, veh/h	489	385	643	473	424
V/C Ratio	1.112	1.268	1.250	1.456	0.622
Control Delay, s/veh	103.3	169.4	146.4	240.0	24.6
LOS	F	F	F	F	C
95th %tile Queue, veh	18	21	30	34	4

Intersection	
Int Delay, s/veh	12.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	40	435	5	30	20	200	435	10	25	290	15
Future Vol, veh/h	10	40	435	5	30	20	200	435	10	25	290	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	82	82	82	93	93	93	91	91	91
Heavy Vehicles, %	2	2	2	0	0	0	1	1	1	1	1	1
Mvmt Flow	11	45	494	6	37	24	215	468	11	27	319	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1316	1291	327	1308	1293	473	335	0	0	478	0	0
Stage 1	382	382	-	903	903	-	-	-	-	-	-	-
Stage 2	934	909	-	405	390	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.1	6.5	6.2	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.5	4	3.3	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	135	163	714	138	164	595	1230	-	-	1090	-	-
Stage 1	640	613	-	335	359	-	-	-	-	-	-	-
Stage 2	319	354	-	626	611	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	80	120	714	24	121	595	1230	-	-	1090	-	-
Mov Cap-2 Maneuver	80	120	-	24	121	-	-	-	-	-	-	-
Stage 1	488	594	-	255	274	-	-	-	-	-	-	-
Stage 2	202	270	-	172	592	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.6	76.5	2.6	0.6
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1230	-	-	109	714	112	1090	-	-
HCM Lane V/C Ratio	0.175	-	-	0.521	0.692	0.599	0.025	-	-
HCM Control Delay (s)	8.5	0	-	69.4	20.6	76.5	8.4	0	-
HCM Lane LOS	A	A	-	F	C	F	A	A	-
HCM 95th %tile Q(veh)	0.6	-	-	2.4	5.6	2.9	0.1	-	-

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Intersection	
Int Delay, s/veh	15.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	270	5	15	360	235	190
Future Vol, veh/h	270	5	15	360	235	190
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	87	87	89	89
Heavy Vehicles, %	1	1	2	2	3	3
Mvmt Flow	300	6	17	414	264	213

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	819	371	478	0	-	0
Stage 1	371	-	-	-	-	-
Stage 2	448	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.12	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.218	-	-	-
Pot Cap-1 Maneuver	346	677	1084	-	-	-
Stage 1	700	-	-	-	-	-
Stage 2	646	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	339	677	1084	-	-	-
Mov Cap-2 Maneuver	339	-	-	-	-	-
Stage 1	700	-	-	-	-	-
Stage 2	633	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	60.9	0.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1084	-	342	-	-
HCM Lane V/C Ratio	0.016	-	0.893	-	-
HCM Control Delay (s)	8.4	0	60.9	-	-
HCM Lane LOS	A	A	F	-	-
HCM 95th %tile Q(veh)	0	-	8.7	-	-

APPENDIX J: 2040 AWDT PEAK HOUR VOLUMES

11-Apr-17

rev 5-17-17

rev 9-14-17

TABLE I-1

Adjusted 2040 AAWDT and Peak Hour No-Build volumes based on 2015 counts

Annual Growth rates:	
2014->2015	1.025
2015->2015	1.000
2016->2015	0.975

Seasonal: Use Urban Highway Group 4 adjustment factors

Intersection Turning Movement Counts		AM Peak	PM Peak
April	Adj Factor=	0.96	0.99
May		0.96	0.98
June		0.96	0.94
July		1.04	0.96
Sept		0.95	0.97

	Count Location	Count Month/Yr	Raw AAWDT	Adj 2015 AAWDT	Counted AM Peak Volume	Adj 2015 AM Peak Volume	AM Pk as % of AAWDT	Counted PM Peak Volume	Adj 2015 PM Peak Volume	PM Pk as % of AAWDT	2015 AWDT Base Model Assigns	2040 AAWDT No-Build Assigns	% Growth 2015-40	(Apply % to 2015 adj AAWDT) 2040 NB AAWDT	2040 NoBd AM Pk	2040 NoBd PM Pk
Derry	Crystal Av (NH 28), S of Tsienneto	May-16	15,585	15,195	836	803	5.28%	1418	1390	9.15%	13,406	10,220	-23.77%	11,584	612	1060
	Folsom Rd W of NH 28	May-16	12,070	11,768	778	747	6.35%	1199	1175	9.98%	8,960	10,537	17.60%	13,839	878	1382
	Pinkerton St E of Tsienneto	May-16	10,722	10,454	695	667	6.38%	1017	997	9.54%	8,776	6,396	-27.12%	7,619	486	727
	Tsiennto Rd, W of NH 102	May-16	5,532	5,394	483	464	8.60%	511	501	9.29%	5,666	9,072	60.11%	8,636	743	802
	Tsienneto Rd E of Pinkerton	May-16	15,012	14,637	1113	1068	7.30%	1499	1469	10.04%	14,200	18,876	32.93%	19,457	1420	1953
	NH 102, E of NH 28 Bypass	May-16	7,456	7,270	595	571	7.85%	661	648	8.91%	7,016	6,126	-12.69%	6,348	499	566
	NH 28 Byp, N of Academy Dr	May-16	8,615	8,400	756	726	8.64%	881	863	10.27%	7,318	2,853	-61.01%	3,275	283	336
	NH 28 Byp, N of Tsienneto Rd	May-16	12,250	11,944	997	957	8.02%	1201	1177	9.85%	9,377	4,072	-56.57%	5,187	416	511
	NH 28 Byp, S of Thornton Rd (south)	May-16	14,341	13,982	1110	1066	7.62%	1392	1364	9.76%	12,227	7,327	-40.08%	8,379	639	817
	NH 102 E of Griffin St	Apr-14	16,410	16,820	1080	1037	6.17%	1224	1212	7.21%	18,002	20,810	15.60%	19,444	1199	1401
	NH 102 W of Abbot St	Apr-14	14,220	14,576	1020	979	6.72%	1148	1137	7.80%	11,128	14,902	33.91%	19,519	1311	1523
	Fordway over Beaver Brook	Apr-14	5,500	5,638	411	395	7.01%	481	476	8.44%	5,114	3,511	-31.35%	3,871	271	327
	Franklin St Ext, N. of Folsom Rd	Apr-14	1,795	1,840	109	105	5.71%	171	169	9.18%	1,254	1,959	56.22%	2,874	164	264
	Ash St at Londonderry town line	Apr-14	6,956	7,130	477	458	6.42%	722	715	10.03%	5,936	13,790	132.31%	16,564	1064	1661
	Crystal Av (NH 28), S of Rollins	Jun-15	13,134	13,134	1026	985	7.50%	1174	1104	8.41%	13,215	10,463	-20.82%	10,399	780	874
	NH 102, at Derry/Chester town line	Jul-15	8,200	8,200	644	670	8.17%	841	807	9.84%	10,839	12,783	17.94%	9,671	790	952
	average						7.11%			9.23%						
L-derry	NH 102, E of Hampton Dr	Jul-15	31,102	31,102	2478	2577	8.29%	2842	2728	8.77%	30,418	51,401	68.98%	52,557	4355	4610
	NH 102, E of Exit 4			26,800	2140		7.99%	2145		8.00%	20,818	32,410	55.68%	41,723	3332	3339
	NH 102 at Derry Town line	May-16	22,656	22,090	1718	1649	7.46%	1796	1760	7.97%	22,983	29,904	30.11%	28,742	2146	2290
	NH 28 at Derry Town line	May-16	17,324	16,891	1279	1228	7.27%	1682	1648	9.76%	19,392	15,688	-19.10%	13,621	990	1329
	NH 28 N of Liberty Dr	Sep-15	14,994	14,994	1407	1337	8.92%	1247	1210	8.07%	15,406	14,733	-4.37%	14,339	1279	1157
	Gilcreast Rd N of NH 102	May-16	10,070	9,818	697	669	6.81%	1008	988	10.06%	9,397	16,438	74.93%	17,174	1170	1728
	Londonderry Rd, N of NH 102			4,622	215	215	4.65%	465	465	10.06%	4,742	4,823	1.71%	4,701	219	473
	Ash St E of Londonderry Rd	Jun-15	6,591	6,591	477	458	6.95%	723	680	10.32%	5,949	14,001	135.35%	15,512	1078	1600
	average						7.29%			9.13%						
	Exit 4 NB Off-ramp	May-16	10,249	9,993	435	418	4.18%	1223	1199	12.00%	10,389	20,215	94.58%	19,444	813	2333
	Exit 4 NB On-ramp	May-16	10,303	10,045	1079	1036	10.31%	812	796	7.92%	9,550	21,343	123.49%	22,449	2315	1779
	Exit 4 SB Off-ramp	May-16	9,862	9,615	753	723	7.52%	952	933	9.70%	8,157	18,349	124.95%	21,629	1626	2099
	Exit 4 SB On-ramp - EB to SB	May-16	5,310	5,177	673	646	12.48%	311	305	5.89%	4,907	10,778	119.65%	11,371	1419	670
	Exit 4 SB On-ramp - WB to SB	May-16	4,767	4,648	537	516	11.10%	244	239	5.14%	3,637	7,402	103.52%	9,460	1050	486
	average						9.12%			8.13%						
	Exit 5 NB Off-ramp	May-16	5,745	5,601	400	384	6.86%	472	463	8.27%	4,430	6,401	44.49%	8,093	555	669
	Exit 5 NB On-ramp	May-16	9,580	9,341	992	952	10.19%	793	777	8.32%	9,101	13,499	48.32%	13,855	1412	1152
	Exit 5 SB Off-ramp	May-16	9,520	9,282	781	750	8.08%	939	920	9.91%	9,234	13,577	47.03%	13,648	1108	1353
	Exit 5 SB On-ramp	May-16	5,645	5,504	519	498	9.05%	427	418	7.59%	3,919	5,884	50.14%	8,264	748	628
	average						8.54%			8.52%						
	I-93, south of Exit 4 (DOT PATR)			71,060		5420	7.63%		5870	8.26%	72,378	118,908	64.29%	116,743	8,904	9,644
	NB			35,740		1980	36.5%		3410	58.1%	36,417	59,234	62.65%	58,133	3,253	5,602
	SB			35,320		3440	63.5%		2460	41.9%	35,961	59,674	65.94%	58,610	5,651	4,042
	I-93, between Exits 4 and 5			71,000		5640	7.94%		5885	8.29%	71,152	120,205	68.94%	119,948	9,528	9,942
	NB					2630	46.6%		3015	51.2%	35,578	60,363	69.66%	-	4,443	5,093
	SB					3010	53.4%		2870	48.8%	35,574	59,842	68.22%	-	5,085	4,849
	I-93, north of Exit 5			76,000		6425	8.45%		6690	8.80%	81,139	134,995	66.37%	126,445	10,690	11,130
	NB					3200	49.8%		3325	49.7%	40,250	67,460	67.60%	-	5,324	5,532
	SB					3225	50.2%		3365	50.3%	40,889	67,535	65.17%	-	5,366	5,598
				Adj 2015 AAWDT	Counted AM Peak Volume	Adj 2015 AM Peak Volume	AM Pk as % of AAWDT	Counted PM Peak Volume	Adj 2015 PM Peak Volume	PM Pk as % of AAWDT	2015 AWDT Base Model Assigns	2040 AWDT No-Build Assigns	% Growth 2015-40	AAWDT) 2040 NB AAWDT	2040 NoBd AM Pk	2040 NoBd PM Pk

Note - Exit 5 SB off ramp AM peak volume does not include one count that appears anomalous when compared to other counts in same hour

Red counts are from NHDOT Town summary data - 2014 or 2015

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TABLE J-1

Adjusted 2040 AAWDT and Peak Hour No-Build volumes based on 2015 counts

Annual Growth rates:	
2014->2015	1.025
2015->2015	1.000
2016->2015	0.975

Seasonal: Use Urban Highway Group 4 adjustment factors
Intersection Turning Movement Counts

		AM Peak	PM Peak
April	Adj Factor=	0.96	0.99
May		0.96	0.98
June		0.96	0.94
July		1.04	0.96
Sept		0.95	0.97

	Count Location	Count Month/Yr	Raw AAWDT	Adj 2015 AAWDT	Counted AM Peak Volume	Adj 2015 AM Peak Volume	AM Pk as % of AAWDT	Counted PM Peak Volume	Adj 2015 PM Peak Volume	PM Pk as % of AAWDT	2015 AWDT Base Model Assigns	2040 AAWDT No-Build Assigns	% Growth 2015-40	(Apply % to 2015 adj AAWDT) 2040 NB AAWDT	2040 NoBd AM Pk	2040 NoBd PM Pk
Derry	Crystal Av (NH 28), S of Tsienneto	May-16	15,585	15,195	836	803	5.28%	1418	1390	9.15%	13,406	10,220	-23.77%	11,584	612	1060
	Folsom Rd W of NH 28	May-16	12,070	11,768	778	747	6.35%	1199	1175	9.98%	8,960	10,537	17.60%	13,839	878	1382
	Pinkerton St E of Tsienneto	May-16	10,722	10,454	695	667	6.38%	1017	997	9.54%	8,776	6,396	-27.12%	7,619	486	727
	Tsienneto Rd, W of NH 102	May-16	5,532	5,394	483	464	8.60%	511	501	9.29%	5,666	9,072	60.11%	8,636	743	802
	Tsienneto Rd E of Pinkerton	May-16	15,012	14,637	1113	1068	7.30%	1499	1469	10.04%	14,200	18,876	32.93%	19,457	1420	1953
	NH 102, E of NH 28 Bypass	May-16	7,456	7,270	595	571	7.85%	661	648	8.91%	7,016	6,126	-12.69%	6,348	499	566
	NH 28 Byp, N of Academy Dr	May-16	8,615	8,400	756	726	8.64%	881	863	10.27%	7,318	2,853	-61.02%	3,275	283	336
	NH 28 Byp, N of Tsienneto Rd	May-16	12,250	11,944	997	957	8.01%	1201	1177	9.85%	9,377	4,072	-56.57%	5,187	416	511
	NH 28 Byp, S of Thornton Rd (south)	May-16	14,341	13,982	1110	1066	7.62%	1392	1364	9.76%	12,227	7,327	-40.08%	8,379	639	817
	NH 102 E of Griffin St	Apr-14	16,410	16,820	1080	1037	6.17%	1224	1212	7.21%	18,002	20,810	15.60%	19,444	1199	1401
	NH 102 W of Abbot St	Apr-14	14,220	14,576	1020	979	6.72%	1148	1137	7.80%	11,128	14,902	33.91%	19,519	1311	1523
	Fordway over Beaver Brook	Apr-14	5,500	5,638	411	395	7.01%	481	476	8.44%	5,114	3,511	-31.35%	3,871	271	327
	Franklin St Ext, N. of Folsom Rd	Apr-14	1,795	1,840	109	105	5.71%	171	169	9.18%	1,254	1,959	56.22%	2,874	164	264
	Ash St at Londonderry town line	Apr-14	6,956	7,130	477	458	6.42%	722	715	10.03%	5,936	13,790	132.31%	16,564	1064	1661
	Crystal Av (NH 28), S of Rollins	Jun-15	13,134	13,134	1026	985	7.50%	1174	1104	8.41%	13,215	10,463	-20.82%	10,399	780	874
	NH 102, at Derry/Chester town line	Jul-15	8,200	8,200	644	670	8.17%	841	807	9.84%	10,839	12,783	17.94%	9,671	790	952
	average						7.11%			9.21%						
L-derry	NH 102, E of Hampton Dr	Jul-15	31,102	31,102	2478	2577	8.29%	2842	2728	8.77%	30,418	51,401	68.98%	52,557	4355	4613
	NH 102, E of Exit 4			26,800	2140		7.99%	2145		8.00%	20,818	32,430	55.68%	41,723	3332	3339
	NH 102 at Derry Town line	May-16	22,656	22,090	1718	1649	7.46%	1796	1760	7.97%	22,983	29,904	30.11%	28,742	2146	2290
	NH 28 at Derry Town line	May-16	17,324	16,891	1279	1228	7.27%	1682	1648	9.76%	19,392	15,638	-19.36%	13,621	990	1329
	NH 28 N of Liberty Dr	Sep-15	14,994	14,994	1407	1337	8.92%	1247	1210	8.07%	15,406	14,733	-4.37%	14,339	1279	1157
	Gilcreast Rd N of NH 102	May-16	10,070	9,818	697	669	6.81%	1008	988	10.06%	9,397	15,438	74.93%	17,174	1170	1728
	Londonderry Rd, N of NH 102			4,622	215	215	4.65%	465	465	10.06%	4,742	4,823	1.71%	4,701	219	473
	Ash St E of Londonderry Rd	Jun-15	6,591	6,591	477	458	6.95%	723	680	10.32%	5,949	14,001	135.35%	15,512	1078	1600
	average						7.29%			9.13%						
	Exit 4 NB Off-ramp	May-16	10,249	9,993	435	418	4.18%	1223	1199	12.00%	10,389	20,215	94.58%	19,444	813	2333
	Exit 4 NB On-ramp	May-16	10,303	10,045	1079	1036	10.31%	812	796	7.92%	9,550	21,343	123.49%	22,449	2315	1779
	Exit 4 SB Off-ramp	May-16	9,862	9,615	753	723	7.52%	952	933	9.70%	8,157	18,349	124.95%	21,629	1626	2099
	Exit 4 SB On-ramp - EB to SB	May-16	5,310	5,177	673	646	12.48%	311	305	5.89%	4,907	10,778	119.65%	11,371	1419	670
	Exit 4 SB On-ramp - WB to SB	May-16	4,767	4,648	537	516	11.10%	244	239	5.14%	3,637	7,402	103.52%	9,460	1050	486
	average						9.12%			8.13%						
	Exit 5 NB Off-ramp	May-16	5,745	5,601	400	384	6.86%	472	463	8.27%	4,430	6,401	44.49%	8,093	555	669
	Exit 5 NB On-ramp	May-16	9,580	9,341	992	952	10.19%	793	777	8.32%	9,101	13,499	48.32%	13,855	1412	1152
	Exit 5 SB Off-ramp	May-16	9,520	9,282	781	750	8.08%	939	920	9.91%	9,234	13,577	47.03%	13,648	1103	1353
	Exit 5 SB On-ramp	May-16	5,645	5,504	519	498	9.05%	427	418	7.59%	3,919	5,884	50.14%	8,264	748	628
	average						8.54%			8.52%						
	I-93, south of Exit 4 (DOT PATR)			71,060		5420	7.63%		5870	8.26%	72,378	118,908	64.29%	116,743	8,904	9,644
	NB			35,740		1980	36.5%		3410	58.1%	36,417	59,234	62.65%	58,133	3,253	5,602
	SB			35,320		3440	63.5%		2460	41.9%	35,961	59,674	65.94%	58,610	5,651	4,042
	I-93, between Exits 4 and 5			71,000		5640	7.94%		5885	8.29%	71,152	120,205	68.94%	119,948	9,528	9,942
	NB					2630	46.6%		3015	51.2%	35,578	60,363	69.66%	-	4,443	5,093
	SB					3010	53.4%		2870	48.8%	35,574	59,842	68.22%	-	5,085	4,849
	I-93, north of Exit 5			76,000		6425	8.45%		6690	8.80%	81,139	134,995	66.37%	126,445	10,690	11,130
	NB					3200	49.8%		3325	49.7%	40,250	67,460	67.60%	-	5,324	5,532
	SB					3225	50.2%		3365	50.3%	40,889	67,535	65.17%	-	5,366	5,598
				Adj 2015 AAWDT	Counted AM Peak Volume	Adj 2015 AM Peak Volume	AM Pk as % of AAWDT	Counted PM Peak Volume	Adj 2015 PM Peak Volume	PM Pk as % of AAWDT	2015 AWDT Base Model Assigns	2040 AAWDT No-Build Assigns	% Growth 2015-40	AAWDT) 2040 NB AAWDT	2040 NoBd AM Pk	2040 NoBd PM Pk

Note - Exit 5 SB off ramp AM peak volume does not include one count that appears anomalous when compared to other counts in same hour
Red counts are from NHDOT Town summary data - 2014 or 2015

11-Apr-17

rev 5-17-17

rev 9-14-17

TABLE J-2

Adjusted 2040 AAWDT and Peak Hour <u>Alternative A volumes</u> based on 2015 counts

Annual Growth rates:	
2014->2015	1.025
2015->2015	1.000
2016->2015	0.975

Seasonal: Use Urban Highway Group 4 adjustment factors

Intersection Turning Movement Counts		AM Peak	PM Peak
April	Adj Factor=	0.96	0.99
May		0.96	0.98
June		0.96	0.94
July		1.04	0.96
Sept		0.95	0.97

	Count Location	Count Month/Yr	Raw AAWDT	Adj 2015 AAWDT	Counted AM Peak Volume	Adj 2015 AM Peak Volume	AM Pk as % of AAWDT	Counted PM Peak Volume	Adj 2015 PM Peak Volume	PM Pk as % of AAWDT	2015 AAWDT Base Model Assigns	2040 AAWDT Alt A Assigns	% Growth 2015-40	(Apply % to Adj 2015 AAWDT) 2040 Alt A AAWDT	2040 NB AAWDT	%Difference 2040 Alt A to 2040 NB	2040 Alt A AM Pk	2040 Alt A PM Pk
Derry	Crystal Av (NH 28), S of Tsienneto	May-16	15,585	15,195	836	803	5.28%	1418	1390	9.15%	13,406	7,242	-45.98%	8,208	11,584	-41.13%	434	751
	Folsom Rd W of NH 28	May-16	12,070	11,768	778	747	6.35%	1199	1175	9.98%	8,960	29,612	230.49%	38,892	13,839	64.42%	2,469	3,883
	Pinkerton St E of Tsienneto	May-16	10,722	10,454	695	667	6.38%	1017	997	9.54%	8,776	9,059	3.22%	10,790	7,619	29.39%	689	1,029
	Tsienneto Rd, W of NH 102	May-16	5,532	5,394	483	464	8.60%	511	501	9.29%	5,666	10,824	91.03%	10,304	8,636	16.19%	886	957
	Tsienneto Rd E of Pinkerton	May-16	15,012	14,637	1113	1068	7.30%	1499	1469	10.04%	14,200	22,226	56.52%	22,918	19,457	15.07%	1,672	2,299
	NH 102, E of NH 28 Bypass	May-16	7,456	7,270	595	571	7.85%	661	648	8.91%	7,016	6,924	-1.31%	7,175	6,348	11.53%	564	640
	NH 28 Byp, N of Academy Dr	May-16	8,615	8,400	756	726	8.64%	881	863	10.27%	7,308	2,333	-68.12%	2,678	3,275	-22.29%	231	275
	NH 28 Byp, N of Tsienneto Rd	May-16	12,250	11,944	997	957	8.01%	1201	1177	9.85%	9,377	4,229	-54.90%	5,587	5,387	3.71%	432	531
	NH 28 Byp, S of Thornton Rd (south)	May-16	14,341	13,982	1110	1066	7.62%	1392	1364	9.76%	12,227	7,652	-37.42%	8,750	8,379	4.24%	667	854
	NH 102 E of Griffin St	Apr-14	16,410	16,820	1080	1037	6.17%	1224	1212	7.21%	18,002	16,885	-6.20%	15,776	19,444	-23.25%	973	1,137
	NH 102 W of Abbot St	Apr-14	14,220	14,576	1020	979	6.72%	1148	1137	7.80%	11,128	15,442	38.77%	20,227	19,529	3.50%	1,359	1,578
	Fordway over Beaver Brook	Apr-14	5,500	5,638	411	395	7.01%	481	476	8.44%	5,114	4,748	-7.16%	5,234	3,871	26.04%	367	442
	Franklin St Ext, N. of Folsom Rd	Apr-14	1,795	1,840	109	105	5.71%	171	169	9.18%	1,254	1,367	9.01%	2,006	2,874	-43.27%	114	184
	Ash St at Londonderry town line	Apr-14	6,956	7,130	477	458	6.42%	722	715	10.03%	5,936	6,065	2.17%	7,285	16,564	-127.37%	468	731
	Crystal Av (NH 28), S of Rollins	Jun-15	13,134	13,134	1026	985	7.50%	1174	1104	8.41%	13,215	11,087	-16.10%	11,019	10,399	5.63%	826	926
	NH 102, at Derry/Chester town line	Jul-15	8,200	8,200	644	670	8.17%	841	807	9.84%	10,839	14,181	30.83%	10,728	9,671	9.85%	877	1,056
	average						7.34%			9.19%								
I-derry	NH 102, E of Hampton Dr	Jul-15	31,102	31,102	2478	2577	8.29%	2842	2728	8.77%	30,418	56,306	85.11%	57,572	52,557	8.71%	4,770	5,050
	NH 102, E of Exit 4			26,800	2140		7.99%	2145		8.00%	20,818	15,723	-24.47%	20,241	41,729	-106.13%	1,636	1,620
	NH 102 at Derry Town line	May-16	22,656	22,090	1718	1649	7.46%	1796	1760	7.97%	22,983	20,413	-11.18%	19,620	28,742	-46.49%	1,465	1,563
	NH 28 at Derry Town line	May-16	17,324	16,891	1279	1228	7.27%	1682	1648	9.76%	19,392	9,440	-51.32%	8,229	13,621	-65.55%	598	802
	NH 28 N of Liberty Dr	Sep-15	14,994	14,994	1407	1337	8.92%	1247	1210	8.07%	15,406	9,984	-35.19%	9,717	14,339	-47.57%	866	784
	Gilcreast Rd N of NH 102	May-16	10,070	9,818	697	669	6.81%	1008	988	10.06%	9,397	15,318	63.01%	16,004	17,174	-7.31%	1,091	1,611
	Londonderry Rd, N of NH 102			4,622	215	215	4.65%	465	465	10.06%	4,742	6,536	37.83%	6,171	4,701	26.21%	296	641
	Ash St E of Londonderry Rd	Jun-15	6,590	6,590	477	458	6.95%	723	680	10.32%	5,949	6,065	1.95%	6,720	15,512	-130.83%	467	693
	average						7.29%			9.12%								
	Connector Rd, E. of Exit 4A						7.46%			7.97%		53,730					4,010	4,280
	Connector Rd, W. of N High St						7.46%			7.97%		40,974					3,059	3,265
	Exit 4 NB Off-ramp	May-16	10,249	9,993	435	418	4.18%	1223	1199	12.00%	10,389	18,073	73.96%	17,384	19,444	-11.85%	727	2,086
	Exit 4 NB On-ramp	May-16	10,303	10,045	1079	1036	10.31%	812	796	7.92%	9,550	15,150	58.64%	15,935	22,449	-40.88%	1,643	1,263
	Exit 4 SB Off-ramp	May-16	9,862	9,615	753	723	7.52%	952	933	9.70%	8,157	13,795	69.12%	16,261	21,629	-33.02%	1,233	1,578
	Exit 4 SB On-ramp - EB to SB	May-16	5,310	5,177	673	646	12.48%	311	305	5.89%	4,907	11,836	141.21%	12,487	11,371	8.94%	1,558	736
	Exit 4 SB On-ramp - WB to SB	May-16	4,767	4,648	537	516	11.10%	244	239	5.14%	3,637	3,879	6.65%	4,957	9,460	-90.84%	550	255
	average						9.12%			8.13%								
	Exit 4A NB Off-ramp											8,792		8,792			796	710
	Exit 4A NB On-ramp											15,240		15,240			1,390	1,259
	Exit 4A SB Off-ramp											18,996		18,996			1,792	1,545
	Exit 4A SB On-ramp											10,752		10,752			980	874
	Exit 5 NB Off-ramp	May-16	5,745	5,601	400	384	6.86%	472	463	8.27%	4,430	7,521	69.77%	9,509	8,093	14.89%	652	786
	Exit 5 NB On-ramp	May-16	9,580	9,341	992	952	10.19%	793	777	8.32%	9,101	10,863	19.36%	11,349	13,855	-24.27%	1,136	927
	Exit 5 SB Off-ramp	May-16	9,520	9,282	781	750	8.08%	939	920	9.91%	9,234	7,670	-16.94%	7,730	13,648	-77.02%	623	764
	Exit 5 SB On-ramp	May-16	5,645	5,504	519	498	9.05%	427	418	7.59%	3,919	6,879	75.53%	9,661	8,264	14.46%	874	734
	average						8.54%			8.52%								
	I-93, south of Exit 4 (DOT PATR)			71,060		5420	7.63%		5870	8.26%	72,378	123,109	70.09%	120,867	116,743	3.41%	9,219	9,984
	NB			35,740		1980	36.5%		3410	58.1%	36,417	61,455	68.75%	60,313	58,133	3.61%	3,368	5,800
	SB			35,320		3440	63.5%		2460	41.9%	35,961	61,654	71.45%	60,555	58,610	3.21%	5,851	4,184
	I-93, between Exits 4 and 4A			71,000		5640	7.94%		5885	8.29%	71,152	118,266	66.22%	118,013			9,375	9,782
	NB					2630	46.6%		3015	51.2%	35,578	58,532	64.52%	-			4,372	5,012
	SB					3010	53.4%		2870	48.8%	35,574	59,734	67.92%	-			5,003	4,770
	I-93, between Exits 4A and 5			71,000			7.94%			8.29%	71,152	133,018	86.95%	132,734	119,948	9.63%	10,544	11,002
	NB						46.63%			51.23%	35,578	65,040	82.81%		-		4,907	5,637
	SB						53.37%			48.77%	35,574	67,978	91.09%				5,627	5,365
	I-93, north of Exit 5			76,000		6425	8.45%		6690	8.80%	81,139	137,153	69.03%	128,466	126,445	1.57%	10,860	11,308
	NB					3200	49.8%		3325	49.7%	40,250	68,383	69.90%	-	-		5,409	5,620
	SB					3225	50.2%		3365	50.3%	40,889	68,770	68.19%	-	-		5,451	5,688
				Adj 2015 AAWDT	Counted AM Peak Volume	Adj 2015 AM Peak Volume	AM Pk as % of AAWDT	Counted PM Peak Volume	Adj 2015 PM Peak Volume	PM Pk as % of AAWDT	2015 AAWDT Base Model Assigns	2040 AAWDT Alt A Assigns	% Growth 2015-40	2040 Alt A AAWDT	2040 NB AAWDT	%Difference 2040 Alt A to 2040 NB	2040 Alt A AM Pk	2040 Alt A PM Pk

Note - Exit 5 SB off ramp AM peak volume does not include one count that appears anomalous when compared to other counts in same hour

Red counts are from NHDOT Town summary data - 2014 or 2015

11-Apr-17
rev 5-17-17
rev 9-14-17

TABLE J-3

Adjusted 2040 AAWDT and Peak Hour Alternative B volumes based on 2015 counts

Annual Growth rates:	
2014->2015	1.025
2015->2015	1.000
2016->2015	0.975

Seasonal: Use Urban Highway Group 4 adjustment factors
Intersection Turning Movement Counts

		AM Peak	PM Peak
April	Adj Factor=	0.96	0.99
May		0.96	0.98
June		0.96	0.94
July		1.04	0.96
Sept		0.95	0.97

	Count Location	Count Month/Yr	Raw AAWDT	Adj 2015 AAWDT	Counted AM Peak Volume	Adj 2015 AM Peak Volume	AM Pk as % of AAWDT	Counted PM Peak Volume	Adj 2015 PM Peak Volume	PM Pk as % of AAWDT	2015 AWDT Base Model Assigns	2040 AWDT Alt B Assigns	% Growth 2015-40	(Apply % to Adj 2015 AAWDT) 2040 Alt B AAWDT	2040 NB AAWDT	%Difference 2040 Alt B to 2040 NB	2040 Alt B AM Pk	2040 Alt B PM Pk
Derry	Crystal Av (NH 28), S of Tsienneto	May-16	15,585	15,195	836	803	5.28%	1418	1390	9.15%	13,406	10,565	-21.19%	11,975	11,584	3.27%	611	1095
	Folsom Rd W of NH 28	May-16	12,070	11,768	778	747	6.35%	1199	1175	9.98%	8,960	4,730	-47.21%	6,212	11,839	-122.78%	394	620
	Pinkerton St E of Tsienneto	May-16	10,722	10,454	695	667	6.38%	1017	997	9.54%	8,776	9,178	4.58%	10,933	7,619	30.31%	698	1043
	Tsienneto Rd, W of NH 102	May-16	5,532	5,394	483	464	8.60%	511	501	9.29%	5,666	16,182	185.60%	15,405	8,636	43.94%	1325	1430
	Tsienneto Rd E of Pinkerton	May-16	15,012	14,637	1113	1068	7.30%	1499	1469	10.04%	14,200	15,241	7.33%	15,710	19,457	-19.85%	1146	1577
	NH 102, E of NH 28 Bypass	May-16	7,456	7,270	595	571	7.85%	661	648	8.91%	7,016	4,277	-39.04%	4,432	6,348	-43.23%	348	395
	NH 28 Byp, N of Academy Dr	May-16	8,615	8,400	756	726	8.64%	881	863	10.27%	7,318	2,375	-67.55%	2,726	3,275	-20.14%	236	283
	NH 28 Byp, N of Tsienneto Rd	May-16	12,250	11,944	997	957	8.01%	1201	1177	9.85%	9,377	2,696	-71.25%	3,434	5,187	-51.05%	275	338
	NH 28 Byp, S of Thornton Rd (south)	May-16	14,341	13,982	1110	1066	7.62%	1392	1364	9.76%	12,227	7,791	-36.28%	8,909	8,379	5.95%	679	869
	NH 102 E of Griffin St	Apr-14	16,410	16,820	1080	1037	6.17%	1224	1212	7.21%	18,002	16,759	-6.90%	15,659	19,444	-24.17%	965	2128
	NH 102 W of Abbot St	Apr-14	14,220	14,576	1020	979	6.72%	1148	1137	7.80%	11,128	11,283	1.39%	14,779	19,519	-32.07%	993	2151
	Fordway over Beaver Brook	Apr-14	5,500	5,638	411	395	7.01%	481	476	8.44%	5,114	4,270	-16.45%	4,711	3,871	17.83%	330	398
	Franklin St Ext, N. of Folsom Rd	Apr-14	1,795	1,840	109	105	5.71%	171	169	9.18%	1,254	4,736	277.67%	6,949	2,874	58.64%	397	618
	Ash St at Londonderry town line	Apr-14	6,956	7,130	477	458	6.42%	722	715	10.03%	5,986	5,973	-0.22%	7,114	16,564	-132.84%	457	713
	Crystal Av (NH 28), S of Rollins	Jun-15	13,134	13,134	1026	985	7.50%	1174	1104	8.41%	13,215	11,110	-15.93%	11,042	10,399	5.82%	828	928
	NH 102, at Derry/Chester town line	Jul-15	8,200	8,200	644	670	8.17%	841	807	9.84%	10,839	14,668	35.33%	11,097	9,671	12.85%	907	1082
	average						7.11%			9.23%								
L-derry	NH 102, E of Hampton Dr	Jul-15	31,102	31,102	2478	2577	8.29%	2842	2728	8.77%	30,418	56,263	84.97%	57,538	52,557	8.64%	4767	5046
	NH 102, E of Exit 4			26,800	2140		7.99%	2145		8.00%	20,818	16,852	-19.05%	21,694	41,723	-92.33%	1732	1756
	NH 102 at Derry Town line	May 16	22,656	22,090	1718	1649	7.46%	1796	1760	7.97%	22,983	20,908	-9.03%	20,096	28,742	-43.02%	1500	1600
	NH 28 at Derry Town line	May 16	17,324	16,891	1279	1228	7.27%	1682	1648	9.76%	19,392	8,125	-58.10%	7,077	13,621	-92.47%	515	690
	NH 28 N of Liberty Dr	Sep-15	14,994	14,994	1407	1337	8.92%	1054	1002	6.82%	15,406	8,697	-43.55%	8,464	14,339	-69.41%	755	577
	Gilcreast Rd N of NH 102	May-16	10,070	9,818	697	669	6.81%	1008	988	10.06%	9,397	15,005	60.00%	15,709	17,174	-9.33%	1070	1581
	Londonderry Rd, N of NH 102			4,622	215	215	4.65%	446	465	10.06%	4,742	6,034	27.25%	5,881	4,701	20.06%	274	592
	Ash St E of Londonderry Rd	Jun-15	6,591	6,591	477	458	6.95%	723	680	10.32%	5,949	5,923	-0.44%	6,562	15,512	-136.39%	456	677
	average						7.29%			8.57%								
	Connector Rd, E. of Exit 4A											54,523					3,830	4,900
	Connector Rd, W. of NH 28											35,965					2,490	3,200
	Connector Rd, E. of NH 28											16,399					1,130	1,460
	Exit 4 NB Off-ramp	May-16	10,249	9,990	435	418	4.18%	1223	1199	12.00%	10,389	18,135	74.56%	17,444	19,444	-11.47%	730	2093
	Exit 4 NB On-ramp	May-16	10,303	10,045	1079	1036	10.31%	812	796	7.92%	9,550	17,638	84.69%	18,552	22,449	-21.01%	1913	1470
	Exit 4 SB Off-ramp	May-16	9,862	9,615	753	723	7.52%	952	933	9.70%	8,157	14,795	81.38%	17,439	21,629	-24.03%	1311	1692
	Exit 4 SB On-ramp - EB to SB	May 16	5,310	5,177	673	646	12.48%	311	305	5.89%	4,907	11,659	137.60%	12,301	11,371	7.56%	1535	715
	Exit 4 SB On-ramp - WB to SB	May 16	4,767	4,648	537	516	11.10%	244	239	5.14%	3,637	4,125	13.42%	5,272	9,460	-79.44%	585	271
	average						9.12%			8.13%								
	Exit 4A NB Off-ramp											9,488		9,488			865	772
	Exit 4A NB On-ramp											11,208		11,208			1,204	1,074
	Exit 4A SB Off-ramp											19,376		19,376			1,767	1,576
	Exit 4A SB On-ramp											12,450		12,450			1,135	1,012
	Exit 5 NB Off-ramp	May-16	5,745	5,601	400	384	6.86%	472	463	8.27%	4,430	7,036	58.83%	8,896	8,093	9.03%	610	735
	Exit 5 NB On-ramp	May-16	9,580	9,341	992	952	10.19%	793	777	8.32%	9,101	10,468	15.02%	10,744	13,855	-28.96%	1095	894
	Exit 5 SB Off-ramp	May-16	9,520	9,282	781	750	8.08%	939	920	9.91%	9,234	6,036	-34.63%	6,067	13,648	-124.95%	490	601
	Exit 5 SB On-ramp	May 16	5,645	5,504	519	498	9.05%	427	418	7.59%	3,919	5,355	36.64%	7,521	8,264	-9.88%	680	571
	average						8.54%			8.52%								
	I-93, south of Exit 4 (DOT PATR)			71,060		5420	7.63%		5870	8.26%	72,378	123,558	70.71%	121,308	116,743	3.76%	9,253	10,021
	NB			35,740		1980	36.53%		3410	58.1%	36,417	61,615	69.19%	60,470	58,133	3.86%	3,380	5,821
	SB			35,330		3440	63.47%		2460	41.9%	35,961	61,943	72.25%	60,839	58,610	3.66%	5,873	4,200
	I-93, between Exits 4 and 4A			71,000		5640	7.94%		5885	8.29%	71,152	122,072	71.57%	121,811			9,676	10,097
	NB					2630	46.63%		3015	51.2%	35,578	61,119	71.79%	-			4,512	5,173
	SB					3010	53.37%		2870	48.8%	35,574	60,953	71.34%	-			5,164	4,924
	I-93, between Exits 4A and 5			71,000			7.94%			8.29%	71,152	132,718	86.53%	132,434	119,948	9.43%	10,530	10,977
	NB						46.63%			51.2%	35,578	64,839	82.24%		-		4,906	5,624
	SB						53.37%			48.8%	35,574	67,879	90.81%				5,634	5,353
	I-93, north of Exit 5			76,000		6425	8.45%		6690	8.80%	81,139	136,851	68.66%	128,183	126,445	1.36%	10,837	11,283
	NB					3200	49.82%		3325	49.7%	40,250	68,290	69.66%	-	-		5,397	5,608
	SB					3225	50.19%		3365	50.3%	40,889	68,561	67.68%	-			5,440	5,675
				Adj 2015 AAWDT	Counted AM Peak Volume	Adj 2015 AM Peak Volume	AM Pk as % of AAWDT	Counted PM Peak Volume	Adj 2015 PM Peak Volume	PM Pk as % of AAWDT	2015 AWDT Base Model Assigns	2040 AWDT Alt B Assigns	% Growth 2015-40	AAWDT) 2040 Alt B AAWDT	2040 NB AAWDT	%Difference 2040 Alt B to 2040 NB	2040 Alt B AM Pk	2040 Alt B PM Pk

Note - Exit 5 SB off ramp AM peak volume does not include one count that appears anomalous when compared to other counts in same hour

Red counts are from NHDOT Town summary data - 2014 or 2015

11-Apr-17
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rev 9-14-17

TABLE I-4

Adjusted 2040 AAWDT and Peak Hour Alternative C volumes based on 2015 counts

Annual Growth rates:	
2014->2015	1.025
2015->2015	1.000
2016->2015	0.975

Seasonal: Use Urban Highway Group 4 adjustment factors
Intersection Turning Movement Counts

		AM Peak	PM Peak
April	Adj Factor=	0.96	0.99
May		0.96	0.98
June		0.96	0.94
July		1.04	0.96
Sept		0.95	0.97

	Count Location	Count Month/Yr	Raw AAWDT	Adj 2015 AAWDT	Counted AM Peak Volume	Adj 2015 AM Peak Volume	AM Pk as % of AAWDT	Counted PM Peak Volume	Adj 2015 PM Peak Volume	PM Pk as % of AAWDT	2015 AAWDT Base Model Assigns	2040 AAWDT Alt C Assigns	% Growth 2015-40	Apply % to Adj 2015 AAWDT) 2040 Alt C AAWDT	2040 NB AAWDT	%Difference 2040 Alt C to 2040 NB	2040 Alt C AM Pk	2040 Alt C PM Pk
Derry	Crystal Av (NH 28), S of Tsienneto	May-16	15,585	15,195	836	803	5.28%	1418	1390	9.15%	13,406	12,279	-8.41%	13,908	11,584	16.77%	736	1273
	Folsom Rd W of NH 28	May-16	12,070	11,768	778	747	6.35%	1199	1175	9.98%	8,960	9,494	5.96%	12,468	13,839	-10.99%	791	1245
	Pinkerton St E of Tsienneto	May-16	10,722	10,454	695	667	6.38%	1017	997	9.54%	8,776	11,138	26.91%	13,268	7,619	42.58%	847	1265
	Tsienneto Rd, W of NH 102	May-16	5,532	5,394	483	464	8.60%	511	501	9.29%	5,666	6,156	8.65%	5,860	8,636	-47.37%	504	544
	Tsienneto Rd E of Pinkerton	May-16	15,012	14,637	1113	1068	7.30%	1499	1469	10.04%	14,200	15,644	10.17%	16,125	19,457	-20.66%	1177	1618
	NH 102, E of NH 28 Bypass	May-16	7,456	7,270	595	571	7.85%	661	648	8.91%	7,006	3,324	-52.62%	3,444	6,348	-84.32%	270	307
	NH 28 Byp, N of Academy Dr	May-16	8,615	8,400	756	726	8.64%	881	863	10.27%	7,318	2,436	-66.71%	2,796	3,275	-17.13%	242	287
	NH 28 Byp, N of Tsienneto Rd	May-16	12,250	11,944	997	957	8.02%	1201	1177	9.85%	9,377	2,290	-75.58%	2,917	5,187	-77.82%	234	297
	NH 28 Byp, S of Thornton Rd (south)	May-16	14,341	13,982	1110	1066	7.62%	1392	1364	9.76%	12,227	8,741	-28.51%	9,996	8,379	16.18%	762	975
	NH 102 E of Griffin St	Apr-14	16,410	16,820	1080	1037	6.17%	1224	1212	7.21%	18,002	16,330	-9.29%	15,258	19,444	-27.43%	941	1099
	NH 102 W of Abbot St	Apr-14	14,220	14,576	1020	979	6.72%	1148	1137	7.80%	11,128	9,968	-10.42%	13,057	19,525	-49.49%	877	1019
	Fordway over Beaver Brook	Apr-14	5,500	5,638	411	395	7.01%	481	476	8.44%	5,114	4,206	-17.76%	4,637	3,871	16.52%	325	391
	Franklin St Ext, N. of Folsom Rd	Apr-14	1,795	1,840	109	105	5.71%	171	169	9.18%	1,254	2,081	66.11%	3,056	2,874	5.96%	174	281
	Ash St at Londonderry town line	Apr-14	6,956	7,130	477	458	6.42%	712	715	10.03%	5,936	8,843	48.97%	10,622	16,564	-55.94%	682	1001
	Crystal Av (NH 28), S of Rollins	Jun-15	13,134	13,134	1026	985	7.50%	1174	1104	8.41%	13,215	11,753	-11.06%	6,341	10,399	-64.00%	407	636
	NH 102, at Derry/Chester town line	Jul-15	8,200	8,200	644	670	8.17%	841	807	9.84%	10,839	14,002	29.18%	16,967	9,671	43.00%	1272	1426
	average						7.11%			9.19%								
L-derry	NH 102, E of Hampton Dr	Jul-15	31,102	31,102	2678	2577	8.29%	2842	2728	8.77%	30,418	50,680	66.61%	51,820	52,557	-1.42%	4294	4545
	NH 102, E of Exit 4			26,800	2140		7.99%	2145		8.00%	20,818	38,986	-8.80%	24,442	41,723	-70.70%	1953	1956
	NH 102 at Derry Town line	May-16	22,656	22,090	1718	1649	7.46%	1796	1760	7.97%	22,983	21,661	-5.75%	20,819	28,742	-38.06%	1554	1659
	NH 28 at Derry Town line	May-16	17,324	16,890	1279	1228	7.27%	1682	1648	9.76%	19,392	42,458	118.95%	36,982	13,621	63.17%	2689	3608
	NH 28 N of Liberty Dr	Sep-15	14,994	14,994	1407	1337	8.52%	1247	1210	8.07%	15,406	4,904	-68.17%	4,773	14,339	-200.42%	426	385
	Gilcreast Rd N of NH 102	May-16	10,070	9,818	697	669	6.82%	1008	988	10.06%	9,397	15,112	60.82%	15,789	17,174	-8.77%	1076	1589
	Londonderry Rd, N of NH 102			4,622	215	215	4.65%	465	465	10.06%	4,742	7,633	60.97%	7,440	4,701	36.81%	346	349
	Ash St E of Londonderry Rd	Jun-15	6,991	6,991	477	458	6.95%	729	680	10.32%	5,949	8,682	45.94%	9,619	15,512	-61.26%	668	992
	average						7.29%			9.13%								
	Connector Rd, E. of Exit 4A											38,516					2,700	3,470
	Connector Rd, E. of NH 28											13,888					970	1,250
	Connector Rd, N. of NH 102											15,529					1,090	1,400
	Exit 4 NB Off-ramp	May-16	10,249	9,993	435	418	4.18%	1223	1199	12.00%	10,389	18,728	80.27%	18,014	19,444	-7.94%	754	2161
	Exit 4 NB On-ramp	May-16	10,303	10,045	1079	1036	10.31%	812	796	7.92%	9,550	15,903	66.52%	16,727	22,449	-34.21%	1725	1326
	Exit 4 SB Off-ramp	May-16	9,862	9,615	753	723	7.52%	952	933	9.70%	8,157	12,694	55.62%	14,963	21,629	-44.55%	1125	1452
	Exit 4 SB On-ramp - EB to SB	May-16	5,310	5,177	673	646	12.48%	311	305	5.89%	4,907	10,850	121.11%	11,447	11,371	0.66%	1428	674
	Exit 4 SB On-ramp - WB to SB	May-16	4,767	4,648	537	516	11.10%	244	239	5.14%	3,637	5,140	41.33%	6,569	9,460	-44.01%	729	338
	average						9.12%			8.11%								
	Exit 4A NB Off-ramp											2,795		2,795			255	227
	Exit 4A NB On-ramp											13,410		13,410			1,223	1,090
	Exit 4A SB Off-ramp											17,290		17,290			1,577	1,406
	Exit 4A SB On-ramp											5,021		5,021			458	408
	Exit 5 NB Off-ramp	May 16	5,745	5,601	400	384	6.86%	472	463	8.27%	4,430	6,626	49.57%	8,307	8,093	3.39%	576	692
	Exit 5 NB On-ramp	May 16	9,580	9,341	992	952	10.19%	793	777	8.32%	9,101	7,829	-13.98%	8,035	13,855	-72.43%	819	668
	Exit 5 SB Off-ramp	May-16	9,520	9,282	781	750	8.08%	939	920	9.91%	9,234	5,728	-37.97%	5,758	13,648	-137.03%	465	571
	Exit 5 SB On-ramp	May-16	5,645	5,504	519	498	9.05%	427	418	7.59%	3,929	5,906	50.96%	8,309	8,264	0.54%	752	631
	average						8.54%			8.52%								
	I-93, south of Exit 4 (DOT PATR)			71,060		5430	7.63%		5870	8.26%	72,378	119,322	64.86%	117,149	116,743	0.35%	8,935	9,677
	NB				1980	36.53%		3410	58.1%		36,417	59,601	63.66%	-	58,133		3,264	5,612
	SB				3440	63.47%		2460	41.9%		35,961	59,721	66.07%	-	58,610		5,671	4,095
	I-93, between Exits 4 and 4A			71,000		5640	7.94%		5885	8.29%	71,152	113,200	59.10%	112,958			8,973	9,363
	NB				2630	46.63%		3015	51.2%		35,578	56,776	59.58%	-			4,184	4,797
	SB				3010	53.37%		2870	48.8%		35,574	56,424	58.61%	-			4,789	4,566
	I-93, between Exits 4A and 5			71,000			7.90%			8.29%	71,152	136,083	91.26%	135,792	119,948	11.67%	10,787	11,255
	NB					46.63%			51.2%		35,578	67,390	89.41%		-		5,030	5,766
	SB					53.37%			48.8%		35,574	68,693	93.10%		-		5,757	5,489
	I-93, north of Exit 5			76,000		6425	8.45%		6690	8.80%	81,139	137,099	68.97%	128,416	126,445	1.53%	10,856	11,304
	NB				3200	49.81%		3325	49.7%		40,250	68,593	70.42%	-			5,407	5,618
	SB				3225	50.19%		3365	50.3%		40,889	68,506	67.54%	-			5,449	5,686
				Adj 2015 AAWDT	Counted AM Peak Volume	Adj 2015 AM Peak Volume	AM Pk as % of AAWDT	Counted PM Peak Volume	Adj 2015 PM Peak Volume	PM Pk as % of AAWDT	2015 AAWDT Base Model Assigns	2040 AAWDT Alt C Assigns	% Growth 2015-40	AAWDT) 2040 Alt C AAWDT	AAWDT) 2040 NB AAWDT	%Difference 2040 Alt C to 2040 NB	2040 Alt C AM Pk	2040 Alt C PM Pk

Note - Exit 5 SB off ramp AM peak volume does not include one count that appears anomalous when compared to other counts in same hour

Red counts are from NHDOT Town summary data - 2014 or 2015

11-Apr-17

rev 5-17-17

rev 9-14-17

TABLE J-5

Adjusted 2040 AAWDT and Peak Hour Alternative D volumes based on 2015 counts

Annual Growth rates:	
2014->2015	1.025
2015->2015	1.000
2016->2015	0.975

Seasonal: Use Urban Highway Group 4 adjustment factors

Intersection Turning Movement Counts

		AM Peak	PM Peak
April	Adj Factor=	0.96	0.99
May		0.96	0.98
June		0.96	0.94
July		1.04	0.96
Sept		0.95	0.97

	Count location	Count Month/Yr	Raw AAWDT	Adj 2015 AAWDT	Counted AM Peak Volume	Adj 2015 AM Peak Volume	AM Pk as % of AAWDT	Counted PM Peak Volume	Adj 2015 PM Peak Volume	PM Pk as % of AAWDT	2015 AAWDT Base Model Assigns	2040 AAWDT Alt D Assigns	% Growth 2015-40	(Apply % to Adj 2015 AAWDT) 2040 Alt D AAWDT	2040 NB AAWDT	%Difference 2040 Alt D to 2040 NB	2040 Alt D AM Pk	2040 Alt D PM Pk
Derry	Crystal Av (NH 28), S of Tsienneto	May-16	15,585	15,195	836	803	5.28%	1418	1390	9.15%	13,406	13,225	-1.35%	14,990	11,584	22.72%	792	1371
	Folsom Rd W of NH 28	May-16	12,070	11,768	778	747	6.35%	1199	1175	9.98%	8,960	8,646	-3.50%	11,356	13,839	-21.87%	721	1134
	Pinkerton St E of Tsienneto	May 15	10,722	10,454	695	667	6.38%	1017	997	9.54%	8,776	11,608	32.27%	13,827	7,619	44.90%	882	1319
	Tsienneto Rd, W of NH 102	May 16	5,532	5,394	483	464	8.60%	511	501	9.29%	5,666	11,363	100.55%	10,818	8,606	20.17%	931	1005
	Tsienneto Rd E of Pinkerton	May-16	15,012	14,637	1113	1068	7.30%	1499	1469	10.04%	14,200	20,041	41.13%	20,658	19,457	5.81%	1507	2073
	NH 102, E of NH 28 Bypass	May-16	7,456	7,270	595	571	7.85%	661	648	8.91%	7,016	5,942	-15.31%	6,157	6,348	-3.10%	484	549
	NH 28 Byp., N of Academy Dr	May-16	8,615	8,400	756	726	8.64%	881	863	10.27%	7,318	2,420	-66.93%	2,778	3,275	-17.89%	240	285
	NH 28 Byp., N of Tsienneto Rd	May-16	12,250	11,944	997	957	8.01%	1201	1177	9.85%	9,377	4,218	-55.02%	5,373	5,187	3.46%	431	529
	NH 28 Byp., S of Thornton Rd (south)	May-16	14,341	13,982	1110	1066	7.62%	1392	1364	9.76%	12,227	8,136	-33.46%	9,304	8,379	9.94%	709	908
	NH 102 E of Griffin St	Apr-14	16,410	16,820	1080	1037	6.17%	1224	1212	7.21%	18,002	18,591	3.27%	17,370	19,444	-11.94%	1071	1252
	NH 102 W of Abbot St	Apr-14	14,220	14,576	1020	979	6.72%	1148	1137	7.80%	11,128	11,885	6.80%	15,568	19,519	-25.38%	1046	1214
	Fordway over Beaver Brook	Apr-14	5,500	5,638	411	395	7.01%	481	476	8.44%	5,114	3,926	-23.23%	4,328	3,871	10.56%	303	365
	Franklin St Ext, N. of Folsom Rd	Apr-14	1,795	1,840	109	105	5.71%	171	169	9.18%	1,254	2,019	61.00%	2,962	2,874	2.97%	169	272
	Ash St at Londonderry town line	Apr-14	6,956	7,130	477	458	6.42%	722	715	10.03%	5,936	8,511	43.38%	10,223	16,564	-62.03%	657	1025
	Crystal Av (NH 28), S of Rollins	Jun-15	13,134	13,134	1026	985	7.50%	1174	1104	8.41%	13,215	11,998	-9.21%	11,924	10,399	12.79%	894	1002
	NH 102, at Derry/Chester town line	Jul-15	8,200	8,200	644	670	8.17%	841	807	9.84%	10,839	14,138	30.44%	10,696	9,671	9.58%	874	1053
	average						7.11%			9.23%								
L-derry	NH 102, E of Hampton Dr	Jul-15	30,102	30,102	2478	2577	8.29%	2842	2728	8.77%	30,418	51,066	67.88%	52,204	52,557	-0.66%	4326	4580
	NH 102, E of Exit 4			26,800	2140		7.99%	2145		8.00%	20,818	20,775	-0.21%	26,745	41,729	-56.00%	2136	2041
	NH 102 at Derry Town line	May-16	22,656	22,090	1718	1649	7.46%	1796	1760	7.97%	22,981	23,215	1.02%	22,313	28,742	-28.81%	1666	1778
	NH 28 at Derry Town line	May-16	17,324	16,891	1279	1228	7.27%	1682	1648	9.76%	19,392	40,462	108.65%	35,244	13,621	61.35%	2562	3439
	NH 28 N of Liberty Dr	Sep-15	14,994	14,994	1407	1337	8.92%	1247	1210	8.07%	15,406	4,757	-69.12%	4,630	14,339	-209.70%	413	374
	Gilcreast Rd N of NH 102	May-16	10,070	9,818	697	669	6.81%	1008	988	10.06%	9,287	14,742	56.88%	15,402	17,174	-11.50%	1049	1550
	Londonderry Rd, N of NH 102			4,622	215	215	4.65%	465	465	10.06%	4,742	7,354	55.08%	7,168	4,701	34.42%	333	721
	Ash St E of Londonderry Rd	Jun-15	6,590	6,590	477	458	6.95%	723	680	10.32%	5,949	8,457	42.16%	9,370	15,512	-65.55%	651	967
	average						7.29%			9.13%								
	Connector Rd, E. of Exit 4A											36,728					2,570	3,310
	Exit 4 NB Off-ramp	May 16	10,249	9,993	435	418	4.18%	1223	1199	12.00%	10,389	19,497	87.67%	18,754	19,444	-3.68%	784	2250
	Exit 4 NB On-ramp	May 16	10,303	10,045	1079	1036	10.31%	812	796	7.92%	9,550	15,411	61.37%	16,210	22,449	-38.49%	1672	1285
	Exit 4 SB Off-ramp	May 16	9,862	9,615	753	723	7.52%	952	933	9.70%	8,257	12,431	52.40%	14,653	21,629	-47.61%	1102	1422
	Exit 4 SB On-ramp - EB to SB	May 16	5,310	5,177	673	646	12.48%	311	305	5.89%	4,907	10,881	121.74%	11,480	11,371	0.95%	1433	676
	Exit 4 SB On-ramp - WB to SB	May-16	4,767	4,648	537	516	11.10%	244	239	5.14%	3,637	5,152	41.66%	6,584	9,460	-43.68%	731	339
	average						9.12%			8.13%								
	Exit 4A NB Off-ramp											1,506		1,506			137	122
	Exit 4A NB On-ramp											13,630		13,630			1,243	1,108
	Exit 4A SB Off-ramp											16,972		16,972			1,548	1,380
	Exit 4A SB On-ramp											4,621		4,621			421	376
	Exit 5 NB Off-ramp	May-16	5,745	5,601	400	384	6.86%	472	463	8.27%	4,430	7,054	59.23%	8,919	8,093	9.26%	612	737
	Exit 5 NB On-ramp	May-16	9,580	9,341	992	952	10.19%	793	777	8.32%	9,101	7,985	-11.26%	8,196	13,855	-69.05%	835	682
	Exit 5 SB Off-ramp	May-16	9,520	9,282	781	750	8.08%	939	920	9.91%	9,234	5,790	-37.30%	5,820	13,648	-134.50%	470	577
	Exit 5 SB On-ramp	May-16	5,645	5,504	519	498	9.05%	427	418	7.59%	3,919	5,879	50.01%	8,257	8,264	-0.08%	747	627
	average						8.54%			8.52%								
	I-93, south of Exit 4 (DOT PKTR)			71,080		5420	7.63%		5870	8.26%	72,378	119,380	64.94%	117,206	116,743	0.40%	8,940	9,682
	NB					1980	36.53%		3410	58.1%	36,417	59,527	63.46%	-	58,133		3,266	5,624
	SB					3440	63.47%		2460	41.9%	35,961	59,853	66.44%	-	58,610		5,674	4,058
	I-93, between Exits 4 and 4A			71,000		5640	7.94%		5885	8.29%	71,152	111,729	57.02%	111,484			8,856	9,241
	NB					2630	46.63%		3015	51.2%	35,578	55,441	55.83%	-			4,130	4,734
	SB					3010	53.37%		2870	48.8%	35,574	56,382	58.21%	-			4,726	4,907
	I-93, between Exits 4A and 5			71,000			7.94%			8.29%	71,152	136,300	91.42%	135,909	119,948	11.74%	10,796	10,265
	NB						46.63%			51.2%	35,578	67,567	89.91%		-		5,034	5,771
	SB						53.37%			48.8%	35,574	68,633	92.93%		-		5,762	5,494
	I-93, north of Exit 5			76,000		6425	8.45%		6690	8.80%	81,139	137,042	68.90%	128,362	126,445	1.49%	10,852	11,299
	NB					3200	49.81%		3325	49.7%	40,250	68,497	70.18%	-	-		5,405	5,616
	SB					3225	50.19%		3365	50.3%	40,889	68,545	67.64%	-	-		5,447	5,683
				Adj 2015 AAWDT	Counted AM Peak Volume	Adj 2015 AM Peak Volume	AM Pk as % of AAWDT	Counted PM Peak Volume	Adj 2015 PM Peak Volume	PM Pk as % of AAWDT	2015 AAWDT Base Model Assigns	2040 AAWDT Alt D Assigns	% Growth 2015-40	AAWDT) 2040 Alt D AAWDT	AAWDT) 2040 NB AAWDT	%Difference 2040 Alt D to 2040 NB	2040 Alt D AM Pk	2040 Alt D PM Pk

Note - Exit 5 SB off ramp AM peak volume does not include one count that appears anomalous when compared to other counts in same hour

Red counts are from NHDOT Town summary data - 2014 or 2015

11-Apr-17
rev 5-17-17
rev 9-14-17

TABLE J-6

Adjusted 2040 AAWDT and Peak Hour Alternative F volumes based on 2015 counts

Annual Growth rates:		Seasonal: Use Urban Highway Group 4 adjustment factors Intersection Turning Movement Counts		AM Peak	PM Peak
2014->2015	1.025	April	Adj Factor=	0.96	0.99
2015->2015	1.000	May		0.96	0.98
2016->2015	0.975	June		0.96	0.94
		July		1.04	0.96
		Sept		0.95	0.97

	Count Location	Count Month/Yr	Raw AAWDT	Adj 2015 AAWDT	Counted AM Peak Volume	Adj 2015 AM Peak Volume	AM Pk as % of AAWDT	Counted PM Peak Volume	Adj 2015 PM Peak Volume	PM Pk as % of AAWDT	2015 AWDT Base Model Assigns	2040 AWDT Alt F Assigns	% Growth 2015-40	(Apply % to Adj 2015 AAWDT) 2040 Alt F AAWDT	2040 NB AAWDT	%Difference 2040 Alt F to 2040 NB	2040 Alt F AM Pk	2040 Alt F PM Pk
Derry	Crystal Av (NH 28), S of Tsienneto	May-15	15,585	15,195	836	803	5.28%	1418	1390	9.15%	13,406	10,313	-23.07%	11,689	11,584	0.90%	618	1069
	Folsom Rd W of NH 28	May-15	12,070	11,768	778	747	6.35%	1199	1175	9.98%	8,960	9,223	2.94%	12,113	13,839	-14.25%	769	1209
	Pinkerton St E of Tsienneto	May-15	10,722	10,454	695	667	6.38%	1017	997	9.54%	8,776	6,356	-27.58%	7,571	7,619	-0.63%	483	722
	Tsiennto Rd, W of NH 102	May-16	5,532	5,394	483	464	8.60%	511	501	9.29%	5,666	9,191	62.21%	8,750	8,636	1.30%	753	813
	Tsienneto Rd E of Pinkerton	May-16	15,012	14,637	1113	1068	7.30%	1499	1469	10.04%	14,200	18,976	33.63%	19,560	19,457	0.53%	1427	1963
	NH 102, E of NH 28 Bypass	May-16	7,456	7,270	595	571	7.85%	661	648	8.91%	7,016	6,450	-8.07%	6,684	6,348	5.03%	525	596
	NH 28 Byp, N of Academy Dr	May-16	8,615	8,400	756	726	8.64%	881	863	10.27%	7,318	2,785	-61.94%	3,197	3,275	-2.44%	276	328
	NH 28 Byp, N of Tsienneto Rd	May-16	12,250	11,944	997	957	8.01%	1201	1177	9.85%	9,377	4,145	-55.80%	5,280	5,187	1.75%	423	520
	NH 28 Byp, S of Thornton Rd (south)	May-16	14,341	13,982	1110	1066	7.62%	1392	1364	9.76%	12,227	7,191	-41.19%	8,223	8,379	-1.90%	627	802
	NH 102 E of Griffin St	Apr-14	16,410	16,820	1080	1037	6.17%	1224	1212	7.21%	18,002	24,147	34.14%	22,562	19,444	13.82%	1391	1626
	NH 102 W of Abbot St	Apr-14	14,220	14,576	1020	979	6.72%	1148	1137	7.80%	11,128	15,829	42.24%	20,734	19,519	5.86%	1393	1617
	Fordway over Beaver Brook	Apr-14	5,500	5,638	411	395	7.01%	481	476	8.44%	5,114	3,595	-29.70%	3,963	3,871	2.32%	278	335
	Franklin St Ext, N. of Folsom Rd	Apr-14	1,795	1,840	109	105	5.71%	171	169	9.18%	1,254	1,783	42.19%	2,616	2,874	-9.86%	149	240
	Ash St at Londonderry town line	Apr-14	6,956	7,130	477	458	6.42%	722	715	10.03%	5,936	12,825	116.05%	15,405	16,564	-7.52%	990	1545
	Crystal Av (NH 28), S of Rollins	Jun-15	13,334	13,134	1026	985	7.50%	1174	1104	8.41%	13,215	11,022	-16.59%	10,954	10,399	5.07%	822	921
	NH 102, at Derry/Chester town line	Jul-15	8,200	8,200	644	670	8.17%	841	807	9.84%	10,839	12,808	18.17%	9,690	9,671	0.20%	792	954
	average						7.11%			9.23%								
L-derry	NH 102, E of Hampton Dr	Jul-15	31,102	31,102	2478	2577	8.29%	2842	2728	8.77%	30,418	52,565	72.81%	53,747	52,557	2.21%	4455	4714
	NH 102, E of Exit 4			26,800	2140		7.99%	2145		8.00%	20,818	34,151	64.05%	43,964	41,723	5.10%	3511	3519
	NH 102 at Derry Town line	May-16	22,656	22,090	1718	1649	7.46%	1796	1760	7.97%	22,983	32,520	41.50%	31,256	28,742	8.04%	2333	2490
	NH 28 at Derry Town line	May-15	17,324	16,891	1279	1228	7.27%	1682	1648	9.76%	19,392	15,477	-20.19%	13,481	13,621	-1.04%	980	1315
	NH 28 N of Liberty Dr	Sep-15	14,994	14,994	1407	1337	8.92%	1247	1210	8.07%	15,406	14,584	-5.34%	14,194	14,339	-1.02%	1266	1145
	Gilcreast Rd N of NH 102	May-16	10,070	9,838	697	669	6.82%	1008	988	10.06%	9,397	16,006	70.33%	16,723	17,174	-2.70%	1140	1683
	Londonderry Rd, N of NH 102			4,622	215	215	4.65%	465	465	10.06%	4,743	4,521	-4.68%	4,407	4,701	-6.67%	205	443
	Ash St E of Londonderry Rd	Jun-15	6,591	6,591	477	458	6.95%	723	680	10.32%	5,949	13,023	118.91%	14,428	15,512	-7.52%	1009	1489
	average						7.29%			9.13%								
	Exit 4 NB Off-ramp	May-16	10,249	9,993	435	418	4.18%	1223	1199	12.00%	10,389	20,417	96.53%	19,639	19,444	0.99%	821	2356
	Exit 4 NB On-ramp	May-15	10,303	10,045	1079	1036	10.31%	812	796	7.92%	9,550	21,378	123.85%	22,486	22,449	0.16%	2319	1782
	Exit 4 SB Off-ramp	May-15	9,862	9,615	753	723	7.52%	952	933	9.70%	8,157	18,730	129.62%	22,078	21,629	2.03%	1660	2142
	Exit 4 SB On-ramp - EB to SB	May-16	5,310	5,177	673	646	12.48%	311	305	5.89%	4,907	10,705	118.16%	11,294	11,371	-0.68%	1409	665
	Exit 4 SB On-ramp - WB to SB	May-16	4,767	4,648	537	515	11.10%	244	239	5.14%	3,637	7,494	106.05%	9,577	9,460	1.22%	1063	492
	average						9.12%			8.13%								
	Exit 5 NB Off-ramp	May-16	5,745	5,601	400	384	6.86%	472	463	8.27%	4,430	6,256	41.22%	7,910	8,093	-2.31%	542	654
	Exit 5 NB On-ramp	May-16	9,580	9,341	992	952	10.19%	793	777	8.32%	9,101	13,329	46.46%	13,680	13,855	-1.28%	1394	1138
	Exit 5 SB Off-ramp	May-16	9,520	9,282	781	750	8.08%	939	920	9.91%	9,234	12,248	32.65%	12,313	13,648	-10.84%	995	1220
	Exit 5 SB On-ramp	May-16	5,645	5,504	519	498	9.05%	427	418	7.59%	3,919	5,882	50.09%	8,261	8,264	-0.04%	747	627
	average						8.54%			8.52%								
	I-93, south of Exit 4 (DOT PATR)			71,060		5420	7.63%		5870	8.26%	72,378	119,129	64.59%	116,960	116,743	0.19%	8,921	9,662
	NB					1980	36.53%		3430	58.09%	36,417	59,424	63.18%	-	58,133		3,259	5,613
	SB					3440	63.47%		2460	41.51%	35,961	59,705	66.03%	-	58,610		5,662	4,049
	I-93, between Exits 4 and 5			71,000		5640	7.94%		5885	8.29%	71,152	120,621	69.53%	120,363	115,948	0.34%	9,561	9,977
	NB					2630	46.63%		3015	51.23%	35,578	60,385	69.73%	-	-		4,458	5,111
	SB					3000	53.17%		2870	48.77%	35,574	60,236	69.33%	-	-		5,103	4,866
	I-93, north of Exit 5			76,000		6425	8.45%		6690	8.80%	81,139	135,061	66.46%	126,507	126,445	0.05%	10,695	11,136
	NB					3200	49.81%		3325	49.7%	40,250	67,458	67.60%	-	-		5,327	5,535
	SB					3225	50.19%		3365	50.3%	40,889	67,603	65.33%	-	-		5,368	5,601
				Adj 2015 AAWDT	Counted AM Peak Volume	Adj 2015 AM Peak Volume	AM Pk as % of AAWDT	Counted PM Peak Volume	Adj 2015 PM Peak Volume	PM Pk as % of AAWDT	2015 AWDT Base Model Assigns	2040 AWDT Alt F Assigns	% Growth 2015-40	AAWDT) 2040 Alt F AAWDT	AAWDT) 2040 NB AAWDT	%Difference 2040 Alt F to 2040 NB	2040 Alt F AM Pk	2040 Alt F PM Pk

Note - Exit 5 SB off ramp AM peak volume does not include one count that appears anomalous when compared to other counts in same hour

Red counts are from NHDOT Town summary data - 2014 or 2015