CHITTENDEN COUNTY RPC
Communities Planning Together

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MEMORANDUM

TO:	Chapin Spencer, Nicole Losch; Burlington Department of Public Works
FROM:	CCRPC Transportation Staff
DATE:	October 13, 2016
RE:	North Avenue Pilot Project Data Collection

Transportation staff from the Chittenden County Regional Planning Commission (CCRPC) have been assisting the City of Burlington with data collection to evaluate the implementation of the North Avenue Pilot Project. The CCRPC collected bicycle, pedestrian and vehicular traffic data as part of the quantitative metrics for this project. The initial phase of this process involved pre-pilot conditions data collection. Once the pilot was installed, the CCRPC replicated the data collection process that was used during the first phase to collect data during the pilot. The following paragraphs provide an overview of the data that were collected before and during the pilot.

Travel Times

The CCRPC collected travel time data before and during the pilot project. The data was collected from 7:00 - 8:30 AM and 4:30 - 6:00 PM for respective AM and PM peak travel times in June and November 2015 (before the pilot) and August and September 2016 (during the pilot). This was conducted by traveling the corridor in a vehicle and recording the time in which it took to traverse the section of North Avenue between the VT 127 and Shore/Heineberg intersections. Drivers were instructed to keep pace with traffic and not to exceed 35 miles per hour (mph). Before the pilot, drivers did pass vehicles on rare occasions such as a bus stopping or if a vehicle traveling below the posted speed limit of 30 mph was impeding normal traffic flow. During the pilot, drivers passed stopped busses when safe to do so. Time spent waiting at a red light or in a queue upon entering the corridor was included as part of the travel time. It is important to note that the northbound signal detection at the Ethan Allen Parkway intersection was not operating correctly when the August 2016 data was collected and resulted in some extensive traffic backups in the PM Peak. As a point of reference, if a vehicle were to travel the 0.8 mile section of roadway at 30 mph unimpeded (i.e. all green lights and no delays due to traffic) it would take 1 minute and 36 seconds.

Prior to implementing the pilot the expectation was set that, on average, drivers could see their travel times increase by 1 to 2 minutes. During the pilot, the largest increase in average travel time was observed during the PM peak when the Ethan Allen Parkway signal detection was not operating properly and was 1 minute, 28 seconds. Since the detection was fixed, this has been reduced to 1 minute, 10 seconds. The next largest increase in average travel times was for southbound travel during the AM peak with school in session. This was 33 seconds. These

increases are either consistent or less than the expectations that were set in advance of the pilot. Tables 1 and 2 display AM and PM peak travel times respectively.

Table 1: AM Peak Travel Times

		AM Peak Travel Times (minutes : seconds)			
		Before Pilot		During Pilot	
		6/17/2015	11/4/2015	8/4/2016	9/21/2016
Northbound	Average	01:53	01:55	02:01	02:16
	Max	02:32	02:27	03:26	03:18
Southbound	Average	01:59	02:06	02:04	02:38
	Max	03:06	02:59	03:14	05:32

Table 2: PM Peak Travel Times

		PM Peak Travel Times (minutes : seconds)			
		Before Pilot		During Pilot	
		6/16/2015	11/4/2015	8/3/2016	9/20/2016
Northbound	Average	02:01	02:01	03:29	03:11
	Max	02:54	02:24	07:10*	06:01
Southbound	Average	02:11	02:25	02:33	02:38
	Max	03:09	03:58	03:22	04:56

*Ethan Allen Parkway signal detection issue – since resolved

Side Street Delay

Side street delay (i.e. the time in which it takes a vehicle to enter the corridor from a side street) were measured at four unsignalized North Avenue intersections (Village Green, Killarney Dr, Lakewood Pkwy and Saratoga Ave). This was done through the use of counting software where an individual records the time in which each vehicle stops at a stop sign (or in a queue if there are multiple vehicles waiting to turn) and the time in which they enter the corridor. Data collection occurred from 7:00 - 8:30 AM and 4:30 - 6:00 PM for respective AM and PM peak travel times.

Increases in side street delay are a known trade off in 4 to 3 lane conversions and it was important to monitor this to determine how greatly the side streets were impacted. The side streets evaluated are concentrated towards the southern end of the corridor as this is where traffic is heaviest and would offer fewer gaps in traffic to turn onto North Avenue. The largest increases in delay were observed at Village Green for both the AM and PM peaks. This has not been reevaluated in the PM peak since the Ethan Allen Parkway signal detection has been fixed. It is anticipated that the delay will have decreased. Interestingly, Saratoga Drive did not experience as much of an impact. The greater impacts to Village Green is therefore most likely related to its close proximity to the Ethan Allen Parkway signal and its associated signal cycle

length changes as a result of the pilot's implementation. Tables 3 and 4 below display AM and PM peak side street delay respectively.

Table 3: AM Peak Side Street Delay (seconds)

	Before Pilot	During Pilot	Delay Increase
Killarney	10.6	19.1	8.5
Lakewood	6.8	9.3	2.5
Saratoga	12.6	16.2	3.6
Village Green	8.6	17.8	9.2
Weighted Average	9.3	15.4	6.1

Table 4: PM Peak Side Street Delay (seconds)

	Before Pilot	During Pilot	Delay Increase
Killarney	19.2	26.7	7.5
Lakewood	8.9	19.4	10.5
Saratoga	17.5	24.3*	6.8
Village Green	15.0	36.5*	21.6
Weighted Average	14.0	26.4	12.3

*Ethan Allen Parkway signal detection issue – since resolved

Speed and Volume Metrics

Speed and volume data were collected using Automated Traffic Recorders (ATRs). These devices measure speed, volume and vehicle type, and collect data 24 hours per day. Data were collected at various sites and various times throughout both pre-pilot and during pilot.

The data indicate that speeds have remained relatively constant with minor reductions in the percent of vehicles exceeding the posted speed limit. A concern prior to implementing the pilot was whether or not traffic would choose to take VT 127 and avoid the corridor. Based on the data this has not been shown to have happened with the volumes remaining relatively constant in both the northern and southern sections. All data at respective sites were aggregated and are presented in Table 5 on the following page.

Table 5: North Ave Speed and Volume Data

		Speed and Volume	
		Before Pilot	During Pilot
Saratoga	85th Percentile	38 mph	39 mph
	Average	34 mph	34 mph
	Percent exceeding posted speed limit (30 mph)	86%	84%
	Volume (AADT)	16,200	16,900
Shore	85th Percentile	34 mph	33 mph
	Average	29 mph	29 mph
	Percent exceeding posted speed limit (30 mph)	46%	42%
	Volume (AADT)	14,500	14,200

AADT - Annual Average Daily Traffic

85th percentile - The speed at which 85% of the vehicles are travelling at or below.

Bicyclist and Pedestrian Counts

A snapshot of bicyclist and pedestrian travel was extracted from turning movement counts, which included these modes in addition to vehicles. These data represent average per intersection totals at peak hours. The four intersections counted were North Ave/VT 127, North Ave/Ethan Allen Pkwy, North Ave/Ethan Allen Shopping Center and North Ave/Shore Rd. The peak hours for these data sets were from 7:00 - 9:00 AM in the morning and from 4:00 - 6:00 PM in the afternoon (Note: the VT 127 intersection also contained data from 2:00 - 4:00 PM). Counts were conducted for one midweek day (Tuesday – Thursday) before and during the pilot under favorable weather conditions (i.e. no rain, comfortable temperatures).

The data indicates an increase in the number of on road bicyclists, a decrease in bicyclists using the sidewalk, and an increase in pedestrian travel.

		Average Volumes by mode*	
		Before Pilot	During Pilot
Bicycles	On road	36	69
	On sidewalk	33	13
Pedestrians		77	85

*Averages were derived from both the AM and PM peak, totaling 4 hours per day (6 for VT 127 intersection) and were aggregated from all four intersections listed above.