



MEMORANDUM

November 7, 2014

**TO:** Public Works Commission, City Councilors, and Residents

**FROM:** Laura Wheelock, Public Works Engineer

**CC:** Norman Baldwin, City Engineer

**RE:** North Champlain Street Speed Study

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**Background:** Shortly after the speed humps were completed on North Champlain Street during the FY15 Street Paving Contract; residents contacted DPW with concerns over vehicle speeds with regards to the speed humps. DPW through the Chittenden County Regional Planning Commission (CCRPC), conducted a speed study at two location along North Champlain Street to address the concerns of residents regarding vehicular speeds.

**Observations:** The CCRPC started the speed study and traffic volume count on October 21, 2014. The first location on North Champlain Street between Monroe and North Street located approximately 10 feet following the speed hump near the Sustainability Academy entrance on North Champlain Street. Data collection at this location will measure the speed vehicles are traveling over the speed humps.

The second data collection location on North Champlain Street was between North Street and Manhattan Drive. This count location was midway between the speed humps in the vicinity of Cedar Street. The data collected at this location should show the highest speeds along the roadway between the traffic calming devices.

Data at each location was collected for a full 7 days, from this data DPW is able to determine the average speed of vehicles, design speed referred to as 85<sup>th</sup> percentile, and the pace of the majority of vehicles traveling on the street. Data is also collected for the full range of vehicle types from bicycles to commercial trucks.

The posted speed limit on North Champlain Street is 25 MPH

**Conclusion:** The results of the speed study on North Champlain Street is summarized in the table below.

	Location 1 – Between Monroe St. & North St.	Location 2 – Between North St. & Manhattan Dr.
50 <sup>th</sup> Percentile – Average Speed	19 MPH	23 MPH
85 <sup>th</sup> Percentile – Design Speed	24 MPH	27 MPH
Pace Speed (represents speed of 70% of all vehicle speeds observed)	16-25 MPH	21-30 MPH

Explanation of the 85<sup>th</sup> percentile speed and Pace Speed are taken from the Federal Highway Administration (FHWA), Transportation Research Board (TRB), and Manual on Uniform Traffic Control Devices (MUTCD).

**“85th Percentile Speed**

The *Manual on Uniform Traffic Control Devices* (MUTCD) lists the current speed distribution of free-flowing vehicles as a primary factor to consider when establishing speed limits. The MUTCD also states that the speed limit should be within 5 mph (8 km/h) of the 85th percentile speed.

The 85th percentile speed is the speed at or below which 85 percent of the free-flowing vehicles travel, and has traditionally been considered in an engineering study to establish a speed limit. Traffic engineers have assumed that this high percentage of drivers will select a safe speed on the basis of the conditions at the site. The 85th percentile speed is considered the first approximation for the speed limit.”

**“10 mph (16 km/h) Pace**

The speeds of individual vehicles on a highway vary. Speed dispersion refers to this spread in vehicle speeds. The 10 mph (16 km/h) pace is the ten mile-per-hour range of speeds containing the greatest number of observed speeds and is a measure of speed dispersion. It is described by both the speed value at the lower end of the range and the percentage of all vehicles that are within the range; and, thus, is an indicator of speed dispersion.

A normal speed distribution contains approximately 70 percent of the vehicles within the pace, with approximately 15 percent of the vehicles below and 15 percent above the limits of the pace speed. The upper limit of the 10 mph (16 km/h) pace speed is therefore approximately the 85th percentile speed in most cases. However, the upper limit of the pace speed may vary from the 85th percentile speed, depending on the distribution curve of the vehicle speeds.”

**22’ Arterial Speed Hump – As constructed on North Champlain Street**

The geometry of this speed hump is designed to accommodate traffic and vehicles that are common on residential collector roads, emergency travel ways, or bus routes. Speed studies of the 22’ Arterial Speed Hump have shown that the expected 85<sup>th</sup> percentile speed of passenger vehicles is approximately 27 MPH; and should be used on roads where the posted speed limit is less than 35 MPH

**Recommendation:** Review of the speed study conducted by the CCRPC and the design and functionality of the 22' Arterial Speed Hump; the DPW has concluded that they are functioning according to their intended design. Vehicle speeds over the speed humps aligns with the design goals of the traffic calming device.

In addition, the collected vehicle speeds were considered against the posted speed limit on North Champlain Street. In our review we considered that a 70% or higher percentage of vehicles was achieved in designation of the pace speed. This highlights that the flow of traffic is moving together in a uniform manor; and is centered around the posted speed limit. The 85<sup>th</sup> percentile speeds for each location show that a majority of cars are traveling within 2 MPH of the posted speed limit; this is another indication that the speed limit on this street is posted correctly and being achieved through use of our traffic calming measures.

Based on these findings and the data collected the DPW does not believe any changes or modifications are needed to the speed humps for their functionality or management of vehicular speeds along North Champlain Street.