Technical Memorandum

To:	Whitney Schroeder, Carver County Charles Howley, City of Chanhassen
From:	Scott Poska, PE, PTOE
Date:	2/13/2025
Subject:	CSAH 17 (Powers Boulevard) at W 78th Street Signal Timing Cost-Benefit Analysis

Six traffic signals along West 78th Street in Chanhassen, MN were retimed in December 2024 as part of the CSAH 17 (Powers Boulevard) at West 78th Street improvements project. A benefit/cost analysis was completed to establish the annual economic savings incurred as a result of the signal timing. Typical Measures of Effectiveness (MOEs) used in estimating the benefit of signal optimization projects include total intersection delay, vehicle stops, fuel consumption and air quality emissions (CO). **Table 1** and **Figure 1** illustrate the overall daily and annual "before" and "after" network MOE comparison and percent improvement. The measures of effectiveness analysis for the various timing plans are shown in **Figure 2**. The figures also show general volume levels during the corresponding time of day segment.

Table 1: Daily Network MOE Comparison

MOE	Existing	Optimized	Net Reduction	Percent Improvement	Annual Reduction
Stops (no. of veh)	61,230	54,413	6,817	11.1%	1,711,067
Delay (hr)	508	494	14	2.8%	3,548
Fuel Consumption (gal)	1,498	1,443	55	3.7%	13,868
Emission (CO)	105	101	4	3.7%	969

Figure 1: Daily Network MOE Comparison

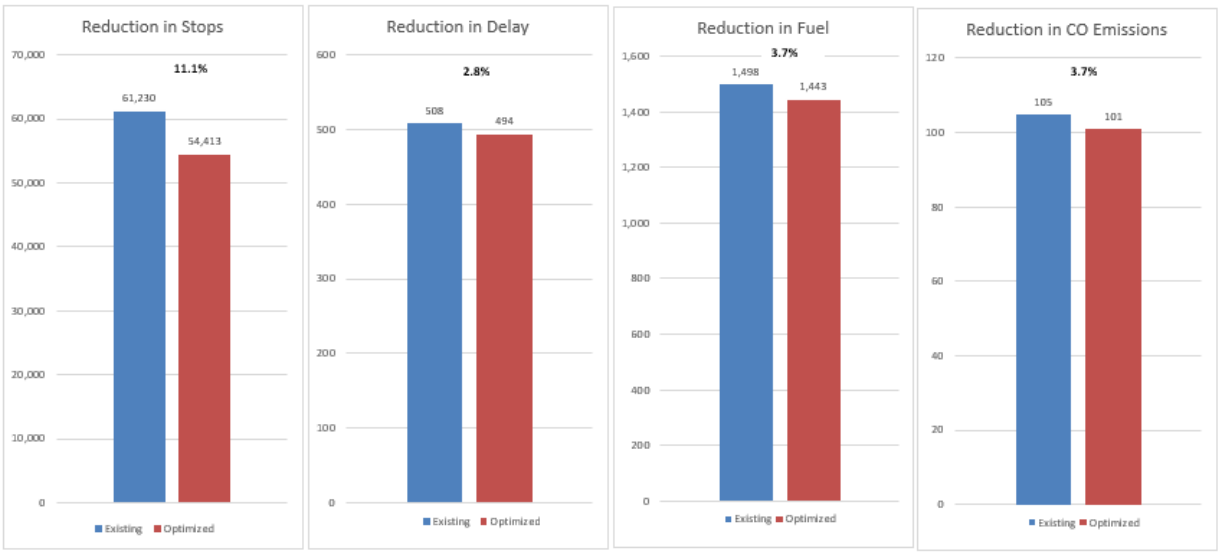


Figure 2: Network Delay by Plan

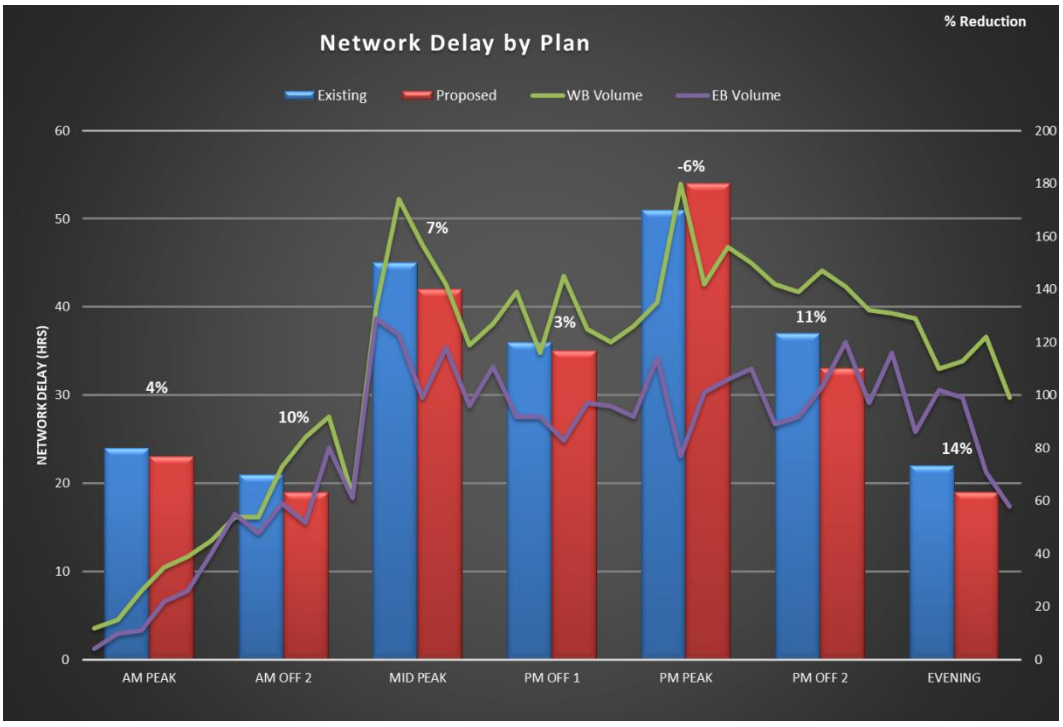


Figure 3: Fuel Consumption by Plan

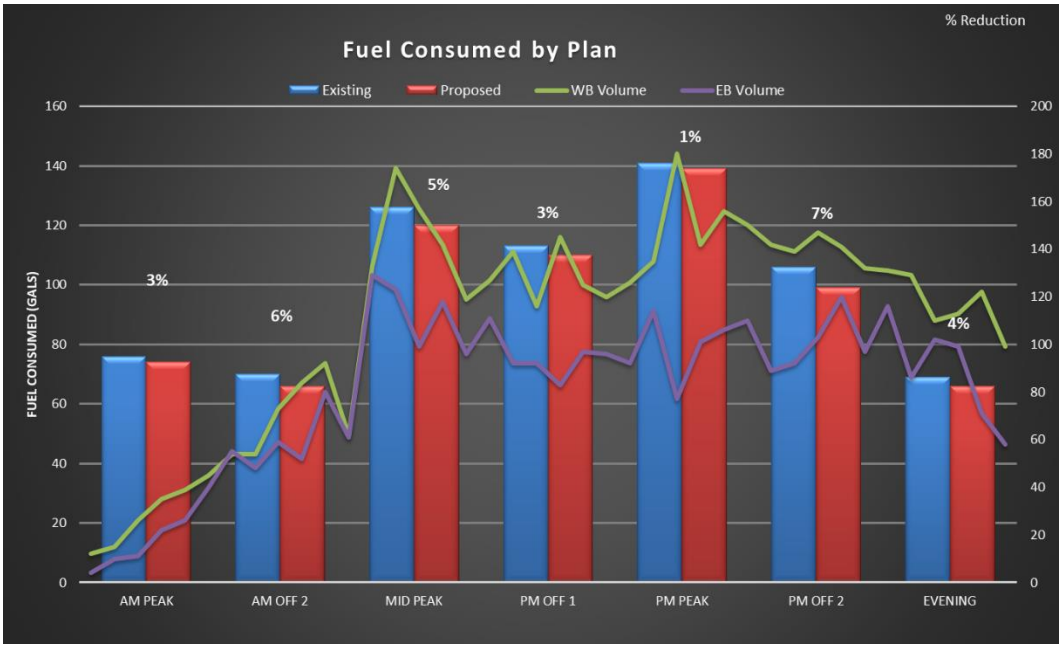


Figure 4: Total Stops by Plan



A cost benefit analysis was completed to establish the annual economic savings incurred as a result of the project. The benefit/cost ratio is computed based on the comparison between the annual net benefit and the total project cost.

Based on the analysis results, an annual benefit is estimated at approximately $261,273, which includes an estimated annual savings of 13,868 gallons of gasoline, 3,548 hours of delay and 969 kilograms of CO emission output. The estimated project cost to develop and implement the optimized signal timing plans was $12,500, including consulting fees.

As shown in **Table 2**, the project resulted in a total system benefit/cost ratio of approximately **21:1** considering only one year of benefit.

Table 2: Annual Benefit-Cost

Intersections	Cost ($)	Benefit ($)	Benefit-Cost Ratio
6	$12,500	$261,273	21:1