Move MINNESOTA
2446 University Ave W, Suite 170
Saint Paul, MN 55114
651-767-0298
MOVEMN.ORG

What Do Signal Priority and Bus Lanes Actually Accomplish?

Boost the Bus, a campaign and workgroup at Move Minnesota, is advocating for signal priority and bus lanes across the High Frequency Network of buses in the Twin Cities metro area. This technical fact sheet analyzes the potential impacts and costs of providing these service and infrastructure upgrades.

I. CONTEXT: THE HIGH FREQUENCY NETWORK

The High Frequency Network consists of segments of ten local bus lines, along with light rail and bus rapid transit lines. The analyses on this fact sheet only address the impacts of signal priority and bus lanes on the local bus lines—signal priority already exists on the light rail and bus rapid transit lines.[1] The bus High Frequency Network is 66.4 miles long and hosts more than 9.7 million trips per year. Service on the lines comes every fifteen minutes or better throughout the day.

The #18 bus is a High Frequency Network bus that runs down Nicollet Avenue in Minneapolis. The section of the #18 bus route between 46th Street South and 15th Street South is 3.5 miles long and has 14 signalized intersections, for an average of four intersections per mile. This analysis uses this average for purposes of calculating the impacts of signal priority across the network.

Across several High Frequency Network line segments of two to four miles in length, the average speed of High Frequency Network buses during rush hour is 7.45 miles per hour.[2]

I. SIGNAL PRIORITY: IMPACTS AND COSTS

Signal priority extends how long a stoplight stays green for a transit vehicle—the transit vehicle sends a signal to the light that either turns the light green earlier than it otherwise would turn, or extends the green light cycle longer than the standard cycle length. Signal priority can be calibrated to provide a greater or lesser amount of priority for transit vehicles (e.g., a stoplight can stay green a small amount of time or a large amount of time past its usual green cycle, depending on how the locality designs the priority program). Thus there is no one answer to how much signal priority can speed up a trip. Real life examples provide some context for the range of possible outcomes, however:

- In New York City, signal priority sped up a bus 19% over its old travel time.[3]
- Chicago buses experienced a 6-20% reduction in travel time.[4]

---

[1] This analysis includes the #21 and #5 buses, which are funded to become bus rapid transit lines.
[2] Average calculated from published timetables for the #2, #6, #11, and #64.
[3] Higashide, *Better Buses Better Cities* (2019), p. 43.
[4] Janice Daniel et al, *Assess Impacts and Benefits of Traffic Signal Priority for Buses*, NJDOT and FHWA (2005) p. 9. http://www.utrc2.org/sites/default/files/pubs/impacts-benefits-buses-final_0.pdf

MOVE MINNESOTA
2446 University Ave W, Suite 170
Saint Paul, MN 55114
651-767-0298
MOVEMN.ORG

- Minneapolis buses experienced a 0-38% reduction in travel time, depending on the signal priority design.[5]
- Los Angeles transit signal priority sped up buses 25%.[6]

This analysis assumes that signal priority will increase transit speeds ten percent—this is a reasonable and conservative estimate based on experiences in Minneapolis and other cities.

According to a discussion with City of Minneapolis Public Works staff, signal priority costs approximately $10-$15K per signalized intersection. This analysis uses $15K per intersection.

II. BUS LANES: IMPACTS AND COSTS

Bus lanes are lanes in which only buses are allowed to travel.

There are a range of per-mile cost examples—which vary from $100K to $500K per mile, depending primarily on whether lanes are painted red or merely striped—and potential speed increases—which range from 5% to 25%.[7] This analysis uses $150K per mile for cost estimates and a 10% increase in speed for speed estimates.

III. SO… WHAT'S THE POTENTIAL?

Using the conservative assumptions described above:

- The cost of adding bus lanes to 50% of the High Frequency Network would be $5M.[8]
- The cost of adding signal priority across the full High Frequency Network would be $4M.[9]
- The estimated time savings per rider per three-mile trip would be 4.83 minutes.[10]
- Time savings across total ridership per year would be 46.9M minutes, or 780,850 hours, or 89.12 years.[11]
- The increase in bus frequency (assuming no reduction in the number of buses per route) would be 3 minutes, which also translates to shorter transfers.[12]

---

[5] Janice Daniel et al., *Id*.
[6] U.S. DOT (2001). https://www.itskrs.its.dot.gov/its/benecost.nsf/ID/111fcd5a4e264420852573e200623854?OpenDocument&Query=BOTM
[7] *Best Practices in Implementing Tactical Transit Lanes*, UCLA ITS (2019). See p. 9 for speed estimates; see tables on p. 14-15 for cost estimates; https://www.its.ucla.edu/wp-content/uploads/sites/6/2019/02/Best-Practices-in-Implementing-Tactical-Transit-Lanes-1.pdf. Angie Schmitt, *Boston Makes Its Bus Lanes Permanent*, Streetsblog (June 8, 2018) (bus speeds increased 20-25% due to bus lanes); https://usa.streetsblog.org/2018/06/08/boston-makes-its-bus-lane-experiment-permanent/.
[8] $150K X 66.4 / 2 = $5M
[9] 4 intersections per mile X 66.4 miles X $15K per mile = $4M
[10] 3 mile trip at 7.45 miles per hour = 24.16 minutes. 24.16 minutes X 0.2 = 4.83 minutes.
[11] 4.83 minutes X 9.7M = 46.9M minutes per year.
[12] 15 minutes X 0.2 = 3.