Barriers to Basic Needs:
Bus Access

Bus Service Frequency Methodology

As part of our Barriers to Basic Needs section, we relied on various data sources to develop a geographic understanding of bus frequency and route access across the county. We used available data on roads, bus routes and schedules, and population, in two steps:

- **Step 1:** Starting with our roads layer, we selected only road segments with fixed-route transit service. We exported this selection as a separate GIS layer for further analysis. Next, we used published bus schedules to assign a frequency for each road segment along each route, combining them to give us the total number of buses a day on each road segment. We also created a column for the number of different routes that use each segment. Given the mix of small urban, suburban, and rural land types in our county, **we defined 'frequent' service as at least one weekday bus for every half hour, 'somewhat frequent' service as at least a bus every hour, and 'infrequent' service as less than a bus an hour**. Our buses run for about 15 hours/day (roughly 6 am to 9 pm), so we labeled any road segment with 30 or more buses/day as frequent, 15-29 buses as somewhat frequent, and 1-14 buses as infrequent.

- **Step 2:** We then created a half mile road network buffer along all roads with transit. Using a structures layer with assigned population estimates (calculated simply by dividing 2020 census block population among the block's buildings), we selected all the structures within this buffer and used that selection to estimate the population within a half mile of a bus route. We repeated that analysis for all the segments marked frequent, somewhat frequent, and infrequent service to estimate the population with access to each level of service.

There are several ways we would like to improve on this method. Our current delineation of service frequencies means that buses may be grouped instead of spread throughout the day. We would like to develop a more sophisticated frequency measure that accounts for the distribution of bus arrivals. In addition, our method of assessing population access may slightly underestimate the number of people with frequent and somewhat frequent service, since it does not take into account people who could access lower-frequency segments at multiple locations (e.g., if 10 buses a day pass by a block east of you and 10 a block west of you, you will be considered to have infrequent service even though you could access 20 buses). However, this seems rare, as most people who could access a bus at multiple points are in urban areas with frequent service.