

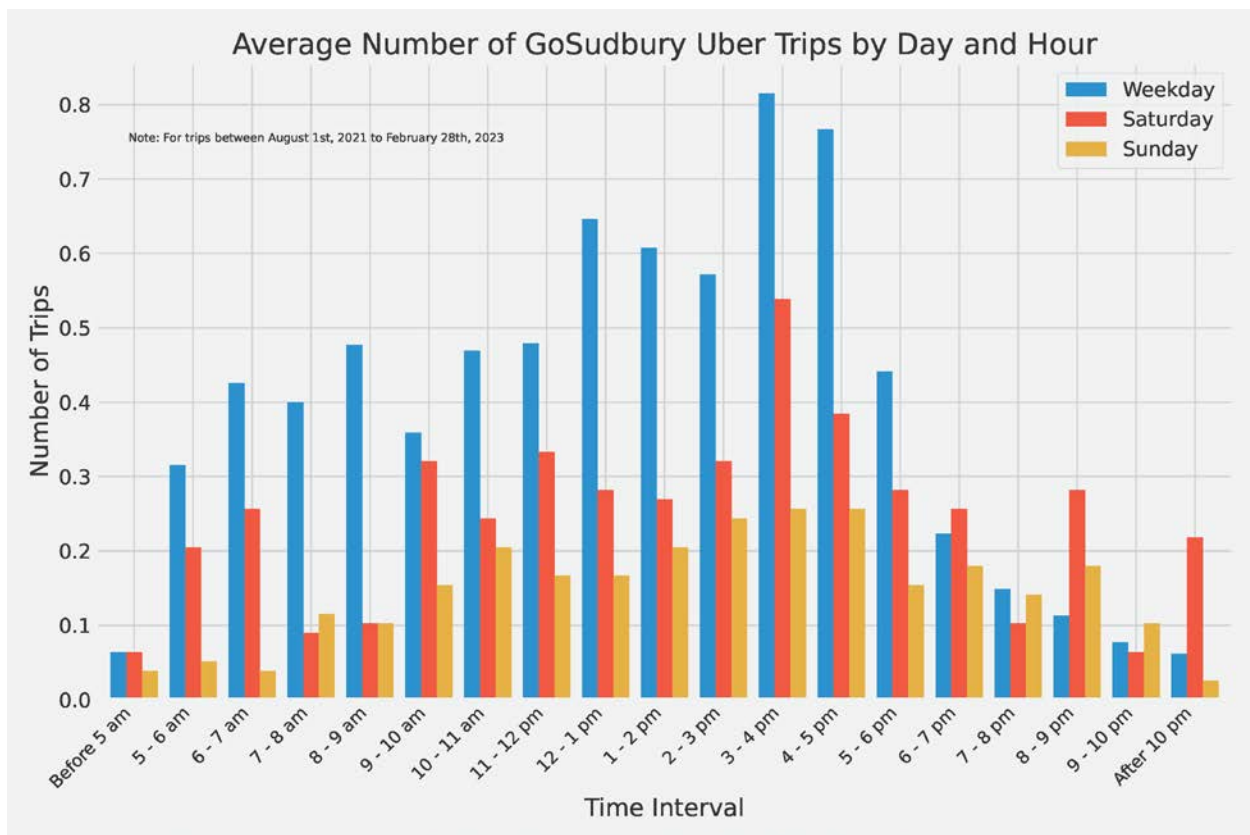
## ANALYSES AND RECOMMENDATIONS re: GOSUDBURY AND FUTURE TRANSPORTATION PROGRAMS

### MPO Central Transportation Planning Staff Analyses (Blake Acton)

The following write up reflects GoSudbury Uber data from August 1st, 2021 to February 28th, 2023. I excluded data prior to August, since ridership was much lower than the following months as potential riders were still learning about the new service. To provide some context, we observe from the files 3,472 total trips across 546 days of operation.

**Overall Travel Patterns:** The average Uber trip length is 7.7 miles. In terms of riders, 44% of travelers are over the age of 60, 27% have financial need, and 37% have a disability.

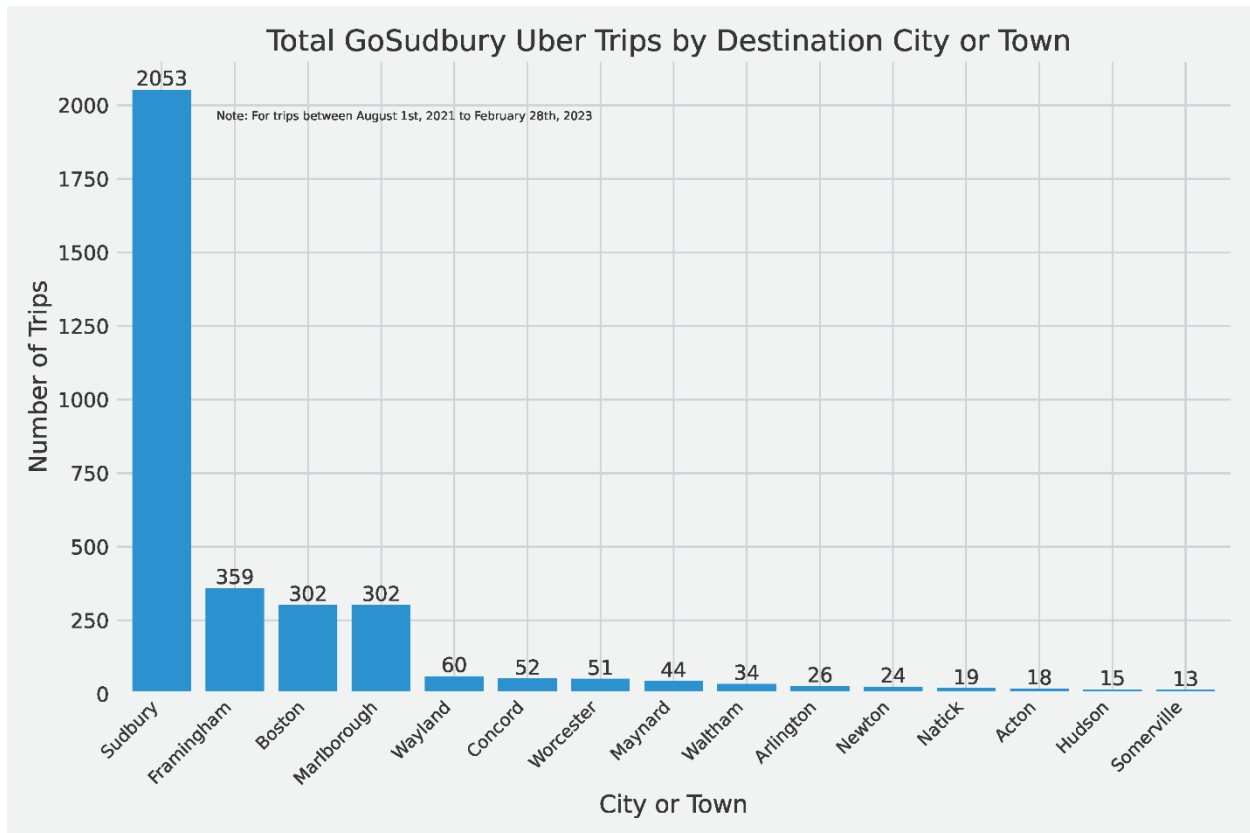
**Travel by Time and Day:** Figure 1 shows the average number of Uber trips in the GoSudbury program by time of day and day of the week.



Across all days the average number of trips per day is about 6.4, with more trips per hour occurring on weekdays followed by Saturdays (4.6 per day) and then Sundays (2.8 per day). The period with the most trips is on weekdays between 12pm and 5pm, when there is about an average

of 0.68 trips per hour compared to an average 0.39 trips per hour across all hours of the weekday. There are considerably fewer trips per hour on weekends compared to weekdays, with 0.24 per hour on Saturdays and 0.15 on Sundays. Following the recommendation by MWRTA that 3 to 4 passengers per hour is the ideal maximum for each vehicle, the data shows that one CatchConnect van is likely sufficient to support an on-demand service in Sudbury.

**Travel by Destination City or Town:** Figure 2 sorts all trips by the destination city or town.



These data show that 2,053 of the 3,472 trips (59% of total trips) travel to a destination inside of Sudbury. The remaining 1,419 trips (41% of total) travel to destinations outside of Sudbury. Among these, trips to Framingham, Boston, Marlborough are the most common destinations and combined represent approximately 28% of total trip destinations.

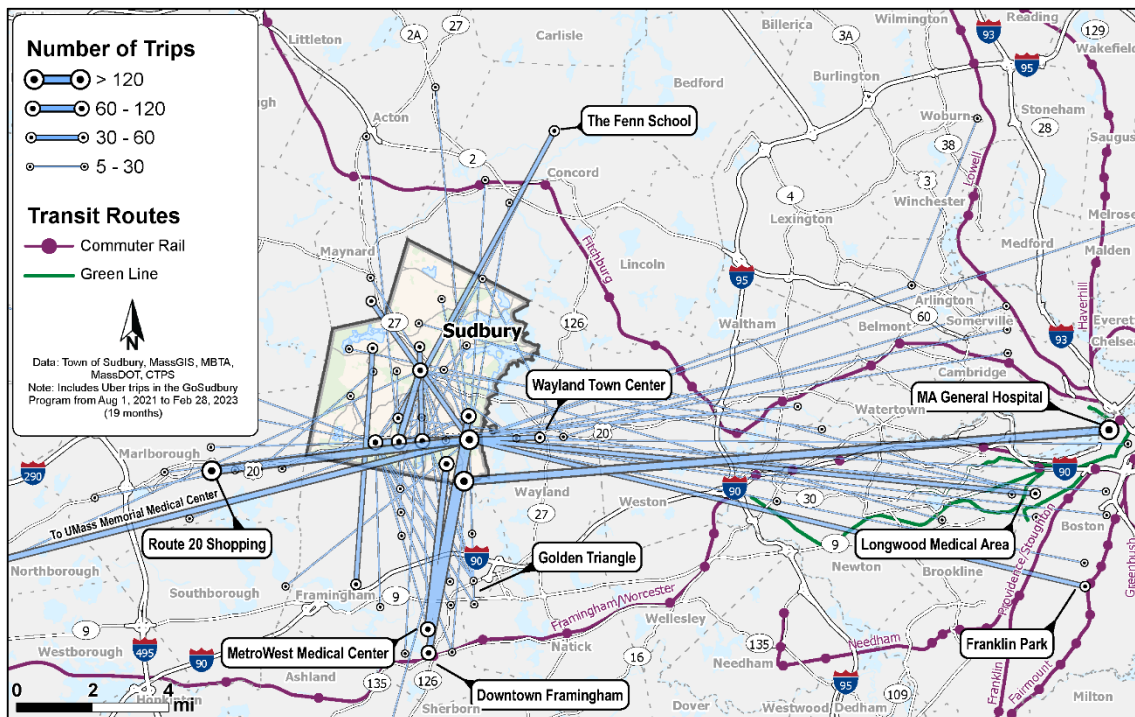
It is likely that a demonstration of on-demand transit service in Sudbury will be limited to Sudbury and its neighboring cities and towns. The following represents the number of square miles a service would need to cover and the proportion of travel the service would serve. The list below shows that there is a diminishing proportion of trips covered as the size of the service area increases. If Sudbury wishes to allow trips to travel to nearby towns, CTPS recommends limiting destinations to Framingham, Marlborough, and Wayland as the most cost-efficient option. While Wayland only represents about 2% of travel demand, all trips into Wayland are concentrated along the Route 20 corridor within 2 miles of the Sudbury border, so including Wayland should

not significantly increase costs or delay. Sudbury officials may also consider allowing trips into Maynard as most trips into this town are to the Market Basket which is less than a mile from the Sudbury border on Route 27.

Potential service area sizes and the proportion of trips within them would be as follows:

1. Sudbury - 25 sq mi - 59% of trips
2. Sudbury/Framingham - 50 sq mi - 70% of trips
3. Sudbury/Framingham/Marlborough - 71 sq mi - 78% of trips
4. Sudbury/Framingham/Marlborough/Wayland - 87 sq mi - 80% of trips
5. Sudbury/Framingham/Marlborough/Wayland/Concord/Maynard/Acton/Hudson - 153 sq mi - 84% of trips

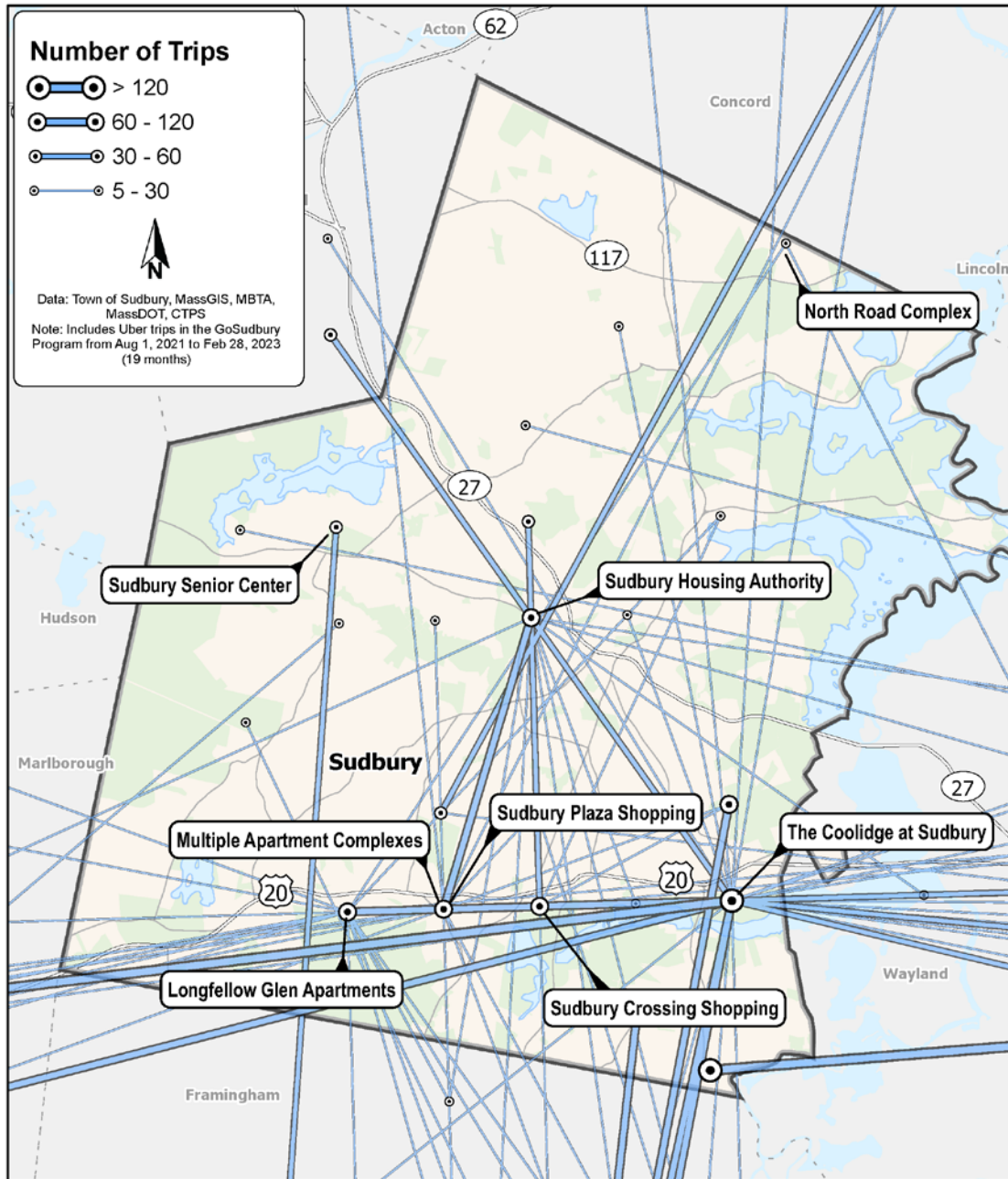
**Local and Regional Travel Patterns:** Figures 3 and 4 are similar maps with Figure 3 showing regional travel and points of interest and Figure 4 focusing on travel within and immediately around Sudbury.



**FIGURE 3**  
Total Uber Trips Between Top 100 Origin-Destinations in the GoSudbury Program from Aug 2021 to Feb 2023

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**CTPS** **FIGURE 4** *Technical Assistance for Sudbury Transit*  
**Top Local Origins and Destinations in the GoSudbury Program from August 2021 to February 2023**

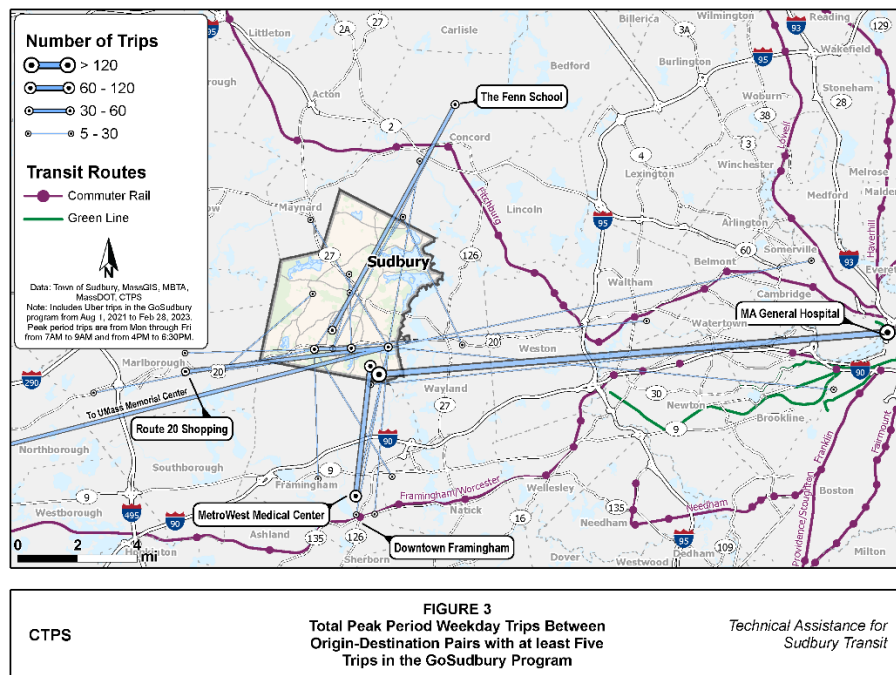
These maps show the top 100 origin destination travel pairs in 546 days of travel, data accounting for approximately 76% of all travel. Thicker lines represent more travel between both ends of

the line and thinner lines represent fewer trips. Evaluating travel patterns in Figure 3 show that much of the travel outside of Sudbury is to medical campuses. Examples include Massachusetts General Hospital and the Longwood Medical Area in Boston and UMass Memorial Medical Center in Worcester. Other top regional destinations include shopping along Route 20 in Marlborough and downtown Framingham.

Figures 3 and 4 show that much of the travel within and around Sudbury is highly concentrated along the Route 20 corridor. In fact, about 48% of all trips originate within a quarter of a mile of Route 20. Top destinations along the Route 20 corridor include the Post Road Plaza in Marlborough (7% of trips) and the Sudbury Plaza shopping center (4% of trips) which represent about 13% and 6% of travel along the corridor respectively. Locations with high concentrations of travel demand include:

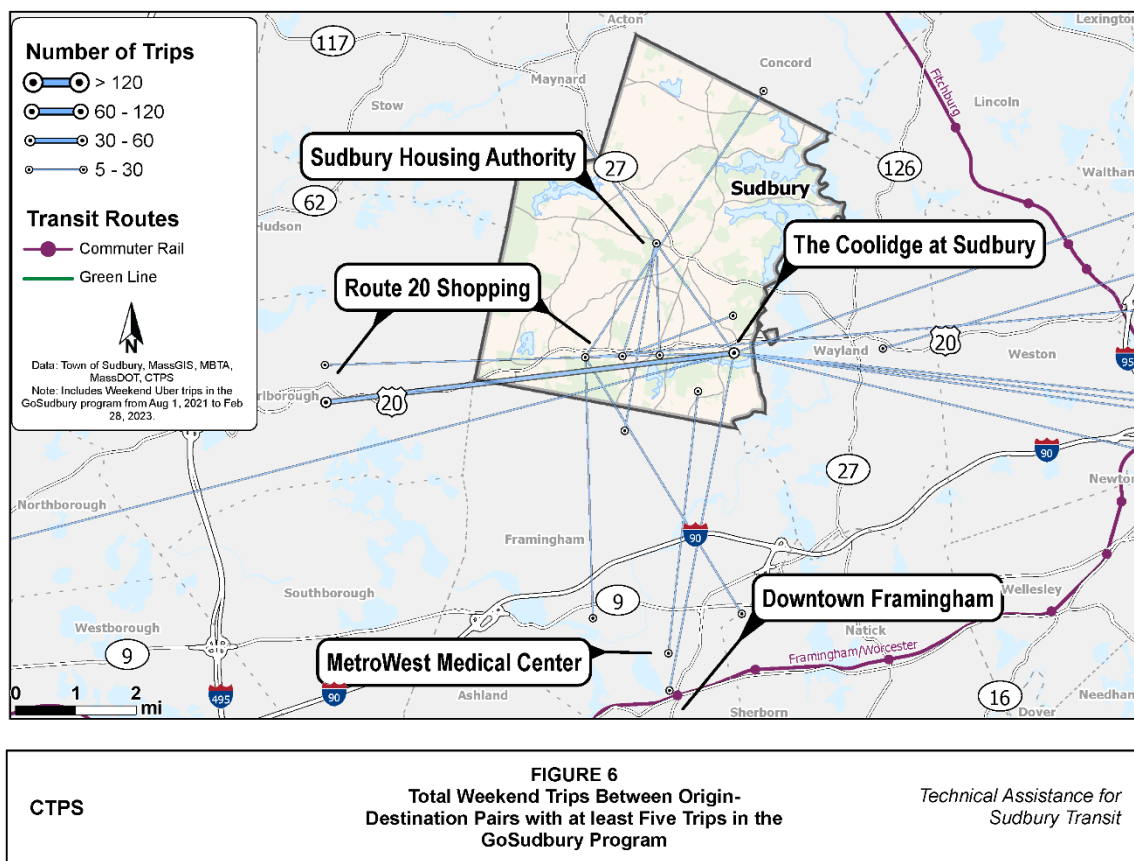
1. Coolidge at Sudbury apartment complex on Route 20: 19% of trips.
2. Longfellow Glen Apartments along Route 20: 7% of trips.
3. Multiple complexes near the Whole Foods on Route 20: 7% of trips.
4. Sudbury Housing Authority: 4% of trips.
5. North Road complexes: 1% (Frost Farm and Cold Brook developments)

**Peak Period Travel Patterns:** Figure 5 shows trips that occurred on weekdays from 7am to 9am and from 4pm to 6:30pm.



Approximately 25% of trips (878 total) occur within these time periods. Compared to other time periods, the riders using Uber during peak periods are less likely to be over 60 years old (32% peak period vs. 44% overall), more likely to be disabled (54% peak period vs. 37% overall), and more likely to be traveling to a medical complex (18% peak period vs. 8% overall). Average travel length also tends to be somewhat farther (8.9 miles peak period vs. 7.7 miles overall). Additionally, only 1% of peak period travel is to a commuter rail station. Based on these travel patterns it is unlikely that travel during peak periods represents people accessing jobs within traditional working hours. Compared to overall, the purpose of travel during peak periods is more likely to reach medical appointments by people with disabilities.

**Weekend Travel Patterns:** Figure 6 shows weekend travel, which represents 17% of trips (575 total).



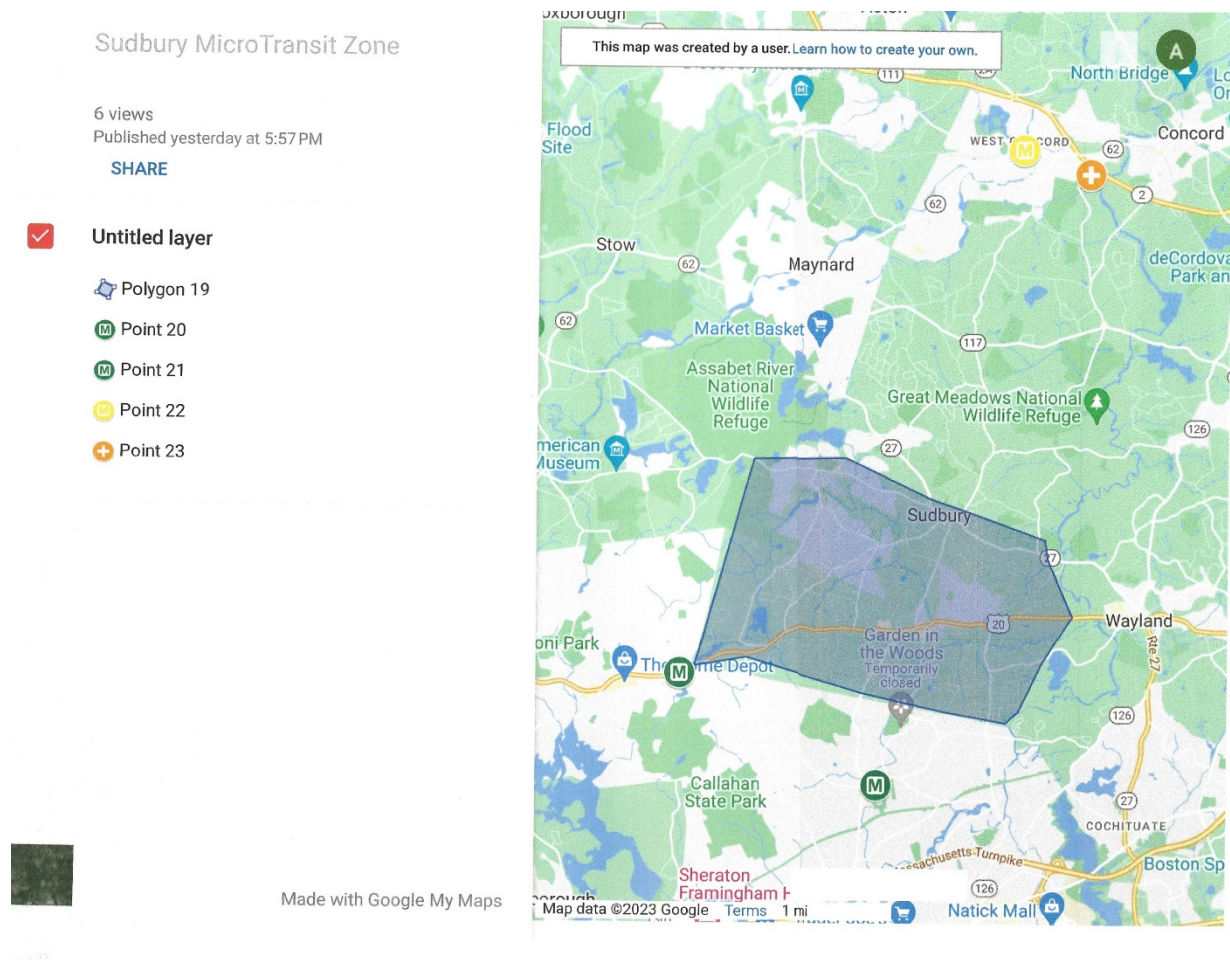
Compared to peak period travel there are fewer differences between weekend and overall travel patterns. A slightly greater proportion of weekend travel is accounted for by riders over 60 years old (46% weekend vs. 44% overall), slightly fewer have disabilities (32% weekend vs. 37% overall) and fewer trips are to medical centers (3% weekend vs. 8% overall). These differences

indicate that weekend travel is slightly more likely to be by older individuals to access shopping, leisure, and social destinations compared to overall travel.

### **MetroWest Regional Transit Authority Input and Recommendations (Jim Nee, Administrator)**

**Geographic Zone for CatchConnect Service.** I don't think we should aim for a specific mile barrier from a central location or a corridor. I think considering where demand currently exists, coupled with travel times, is the way we should conceptualize. Although it may sound similar, the difference can have moderate to large impacts.

Also, categorizing by ride origins vs. destinations is not a differentiation under this service model that is easy to explain. Instead, I believe a generalized service area could be applied. I've drawn a rough service area polygon that I would recommend using for this:



This map roughly corresponds to the lower two-thirds of Sudbury. I have excluded the northern portion of Sudbury, including 117. As you noted, this is quite a distance from Route 20, and the majority of the trips that were shown in the other dataset were not from that area. Until we know actual demand, it is best to keep a tighter zone to avoid extreme wait times.

It is far easier to add a region, if it turns out demand is low enough to support an expanded geographic area, than to take something away. If we launch with a large zone, become overwhelmed, and decide to reduce the zone to compensate, that is far harder from a PR perspective than adding onto a smaller zone as resources permit.

In the event that more or all of Sudbury can be serviced, we may consider adding additional geographic areas, and perhaps pinpoint locations for specific needs. I included possible points on the same map above (Green M's are MWRTA transfer points for the 7C & 2 & 3, the Yellow M is West Concord MBTA, and of course Emerson Hospital). The additional points to the north might be a stretch, but I didn't want to avoid acknowledging them as a possibility in the event of very low initial demand.

**CatchConnect Cost:** MWRTA cost for CatchConnect (on-demand) service, including driver and vehicle, is \$70 per hour plus 15% for prepping and bringing the van to Sudbury from the Framingham hub (Blandin Ave.). The \$70 per hour cost is our operating expenses per hour provided, approximately (not including capital). The 15% accounts for essentially the time required to operate a bus that is not in service. This includes the driver getting their vehicle, pre-tripping the vehicle, driving to the starting point of the service, and then returning from the service area at the end of the shift. This time needs to be accounted for in the cost. Distance from the vehicle storage location to the service area plays a large role in determining deadhead.

The simplest calculation for estimating CatchConnect cost would be:

- $\$70 \times \text{hours of service} \times 1.15 = \text{daily cost}$
- $\text{daily cost} \times \# \text{ of days of service offered} = \text{program cost}.$

For Sudbury's demonstration option (four days per week, 6 hours per day, over a 6-month grant period), that becomes:

- $\$70 \times (5 \text{ hours/day}) \times 1.15 = \$403 \text{ daily cost}$
- $\$403 \text{ (daily cost)} \times 124 \text{ days of service offered} = \$49,972 \text{ Sudbury approximate program cost (assuming \$50,000 for 6 months of funding).}$