

# ALL-DOOR BOARDING YEAR 1 PERFORMANCE

## SUMMARY

The first-year performance of the All-door Boarding Pilot is determined by evaluating the program across a number of categories of metrics. These categories include:

- 1) Compliance with Procedures
- 2) Ridership and Revenue
- 3) Reliability and Dwell

The program has been in effect since March 1, 2021, and this analysis covers the first year of the program's performance – from March 1, 2021, to February 28, 2022. Overall, compliance with the program's standard operating procedures was challenging in the early months of the program but has improved as the District has become more accustomed to the new procedures.

The program is having positive impacts on operations and while there are some minor issues identified in this report, staff is already working to address them.

## COMPLIANCE WITH PROCEDURES

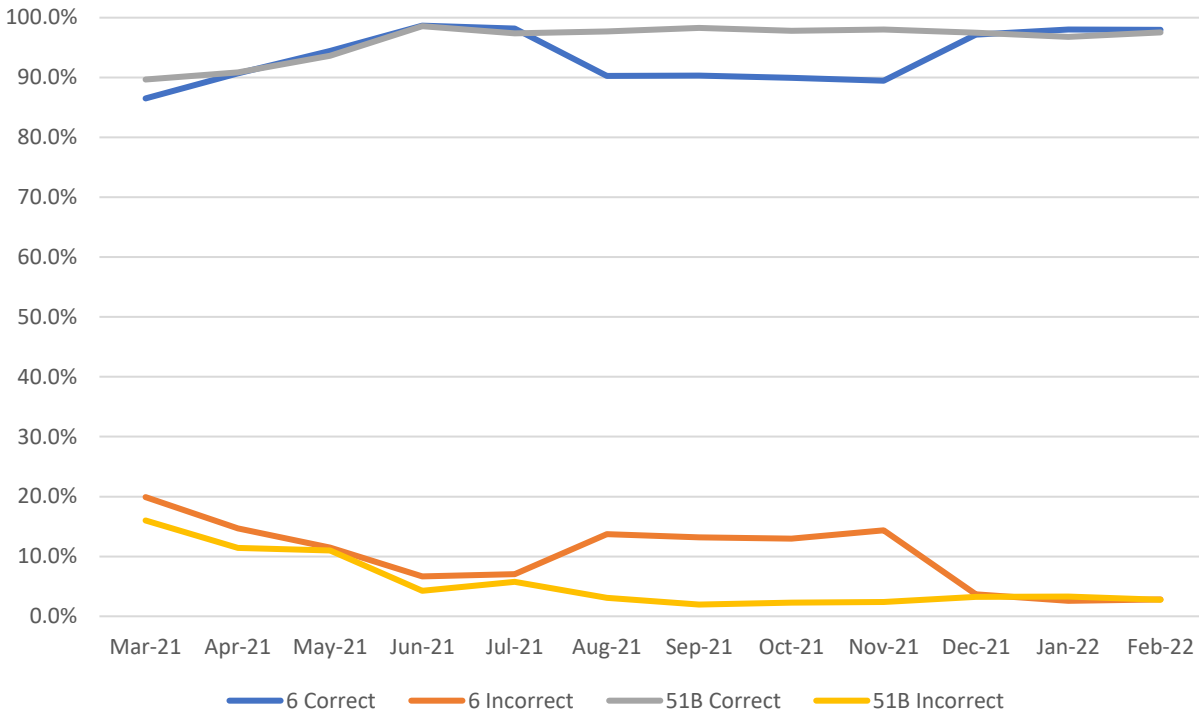
Compliance with the Standard Operating Procedures (SOP) for the All-door Boarding Pilot is crucial to the success of the program. In particular, ensuring the correct vehicles – those with rear-door Clipper readers – are assigned to lines 6 and 51B and ensuring the rear doors are actually opened so customers may board through them.

There are 25 vehicles at Division 2 in Emeryville that have been equipped with rear-door Clipper readers: Gillig Hybrid Buses numbered 1561 through 1580 and New Flyer Fuel Cell buses 7022 through 7026. Staff reviewed vehicle assignment data for those buses from March 1, 2021, to February 28, 2022 the latest date available for this report.

Beginning with the August 2021 Sign-up, the Service Development & Planning Department worked to reduce the overall system-wide bus count and in doing so increased the number of interlines at Division 2. This led to the Pilot lines being interlined with other lines not in the Pilot and making it very challenging for the Division to have “clean” (i.e., only 6 or 51B assignments) for the Pilot.

This interlining is evident in Exhibit 1 between August and December 2021 when compliance on Line 6 gets worse. It's also clear the issue is limited to interlining because the vehicle assignment rate remains steady on Line 51B, which was not interlined at the same time. Since the interlining was fixed in December 2021, Line 6 compliance has matched that of Line 51B and its clear Division 2 is doing an excellent job ensuring the correct buses are on the pilot lines.

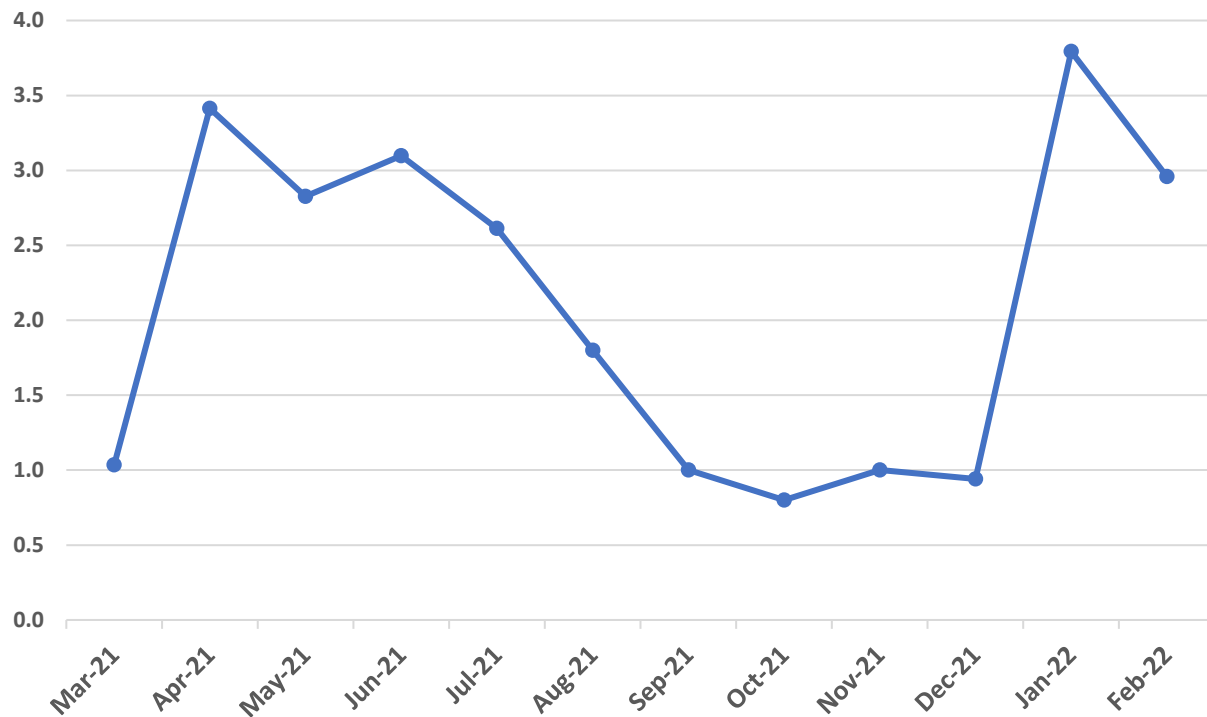
**Exhibit 1 – Percent of Dedicated Fleet Assigned to Pilot Lines**



Another contributor to challenges in vehicle assignment at times has been vehicle availability. Between March 1, 2021, and February 28, 2022, an average of two of the vehicles in the rear-door Clipper subfleet were out of service for one or more maintenance issues on each weekday.

Exhibit 2 below illustrates the breakdown of vehicles unavailable due to maintenance work. With about 25 total buses in the subfleet, and five of which are spare buses needed each day for regular preventative maintenance, between March and August there was only wiggle room for a single bus to be misassigned or down for warranty work or other reasons. This improved significantly over the fall and winter months but spiked again to more than 3.5 buses unavailable each weekday in January 2022.

Service Planning staff is looking at the viability of expanding the size of the subfleet to include more vehicles and a larger pool of lines at Division 2 so there is more flexibility for the Maintenance and Transportation teams at Division 2. These challenges highlight the issues with sub-fleets and the importance of standardizing equipment across all revenue vehicles.

**Exhibit 2 – Average Daily Vehicle Unavailability**

The next critical SOP compliance measure is how often the rear doors of the buses are opened. The SOP says the following in section I.A.:

*Open all doors on the bus at each stop where passengers are present and waiting for the bus.*

To evaluate compliance with this section, staff reviewed data from the Automatic Passenger Counter (APC) system about whether the rear doors were opened whenever the front doors were opened. The SOP doesn't leave room for operators to make a decision about whether to only open the front doors if there is only a single customer standing near the front door of the bus, for example. Rather, the procedure is more similar to that of the TEMPO BRT system where operators are required to open all doors of the bus at every station or stop. The key difference is the all-door boarding pilot doesn't require the buses to stop at every stop even if no passengers are waiting.

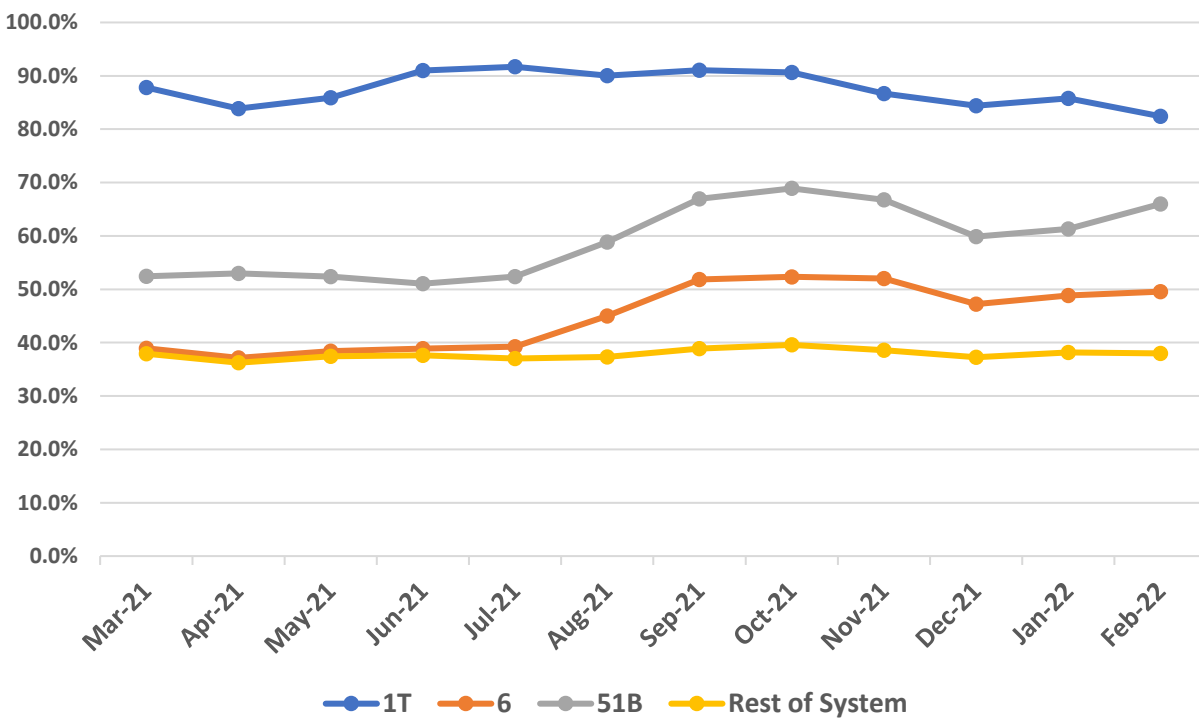
Staff first broke down the percentage of time when the rear doors were opened in conjunction with the front doors opening. Staff compared lines 6 and 51B to the system as a whole and broke out the TEMPO Line 1T separately to see what full compliance looks like and to ensure the data source was an accurate means of evaluating this compliance measure.

Exhibit 3 shows the two pilot lines and how they compare with 1T and the system as a whole. Line 1T had better than 90 percent compliance across most of the period covered by the dataset; however,

compliance has dipped to only 80 percent in recent months, which should be investigated separately as the procedure for that line is to open all doors 100 percent of the time.

Line 51B generally had the rear door opened at stops more than 50 percent of time until July 2021 when the percentage improved to almost 70 percent in the fall before dipping in winter then climbing again in February. This is above the system as a whole (just under 40 percent) but well below the 90-100 percent level that should be expected given the language in the SOP. Compliance was lower on Line 6, with it lagging the system as a whole in some cases until July 2021 when it too made significant improvement and climbed to more than 50 percent. There is still room to grow but it's clear the efforts of Transportation and Training staff are paying off with growing compliance regarding opening the rear doors.

**Exhibit 3 – Rear-Door Openings by Line**

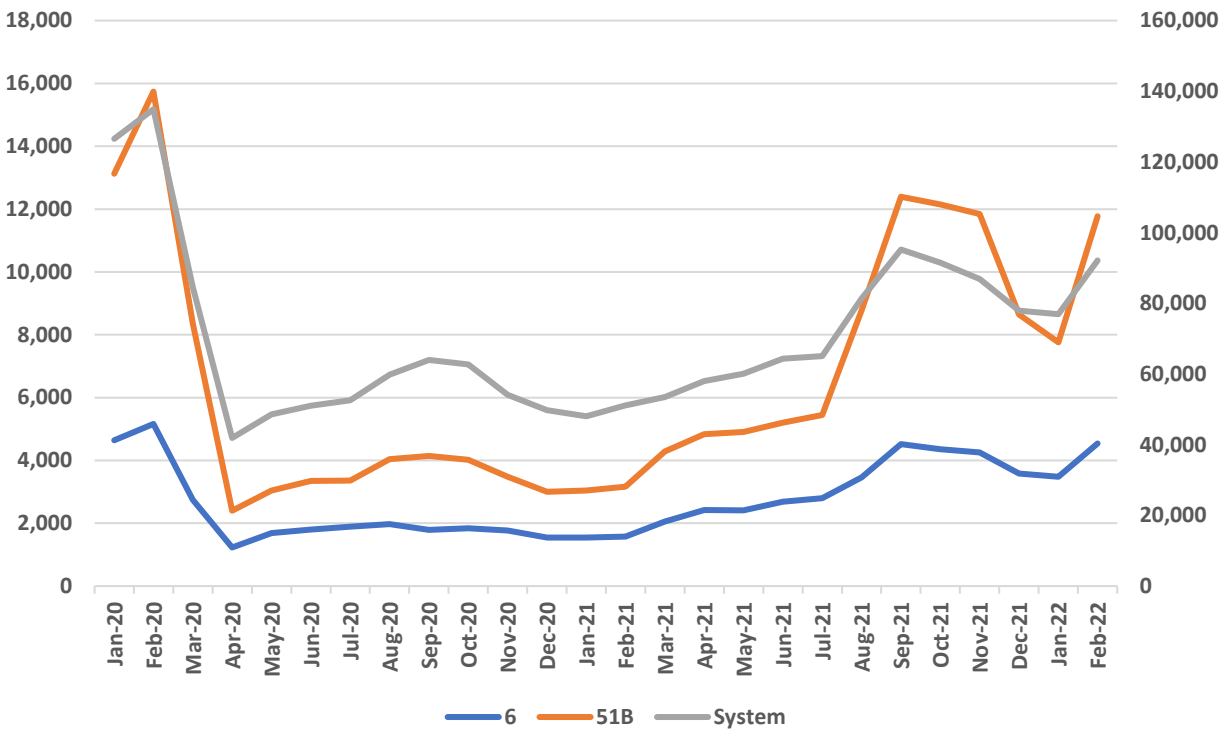


## RIDERSHIP AND REVENUE

Impacts on ridership – positive or negative – can be challenging to parse in a short period of time and in the middle of a pandemic. Staff evaluated ridership on all service days on lines 6 and 51B and both went up on weekdays as seen in Exhibit 4 below and tracked on the left-side Y axis. Average weekday ridership dropped dramatically at the beginning of the pandemic and then increased from around 1,500 riders on each line at the beginning of 2021 to nearly 5,000 riders on Line 6 and 12,000 riders on line 51B by the end of February 2022 (they carried 6,000 and 11,000 riders, respectively each weekday pre-COVID). Meanwhile, system-wide ridership (seen in Exhibit 4 below and tracked on the right-side Y axis) followed a similar trend. The significant jump in ridership across these two lines as well as the system is attributable to reopening of the region in part, but primarily to the return of in-person schooling. Lines 6 and 51B are

critical services for UC Berkeley students and faculty, and their ridership growth reflects that. These two lines also play a significant role in the overall increase in system-wide ridership (along with other major trunk lines like 1T, 40, 51A, and the 72s) This is beneficial to the performance of the pilot as the more boardings that occur at each stop, the greater the discrepancy between all-door boarding lines and non-pilot lines.

**Exhibit 4 – Weekday Ridership by Line**



Ridership on Saturday and Sunday (Exhibits 5 and 6) followed the same trend but with a much more pronounced increase on Line 51B when compared to the rest of the system, which has been steadily increasing since the beginning of 2021. The overall drop in March 2020 was less pronounced on weekends as a higher proportion of essential workers worked on weekends than those who had the privilege to work from home.

Exhibit 5 – Saturday Ridership by Line

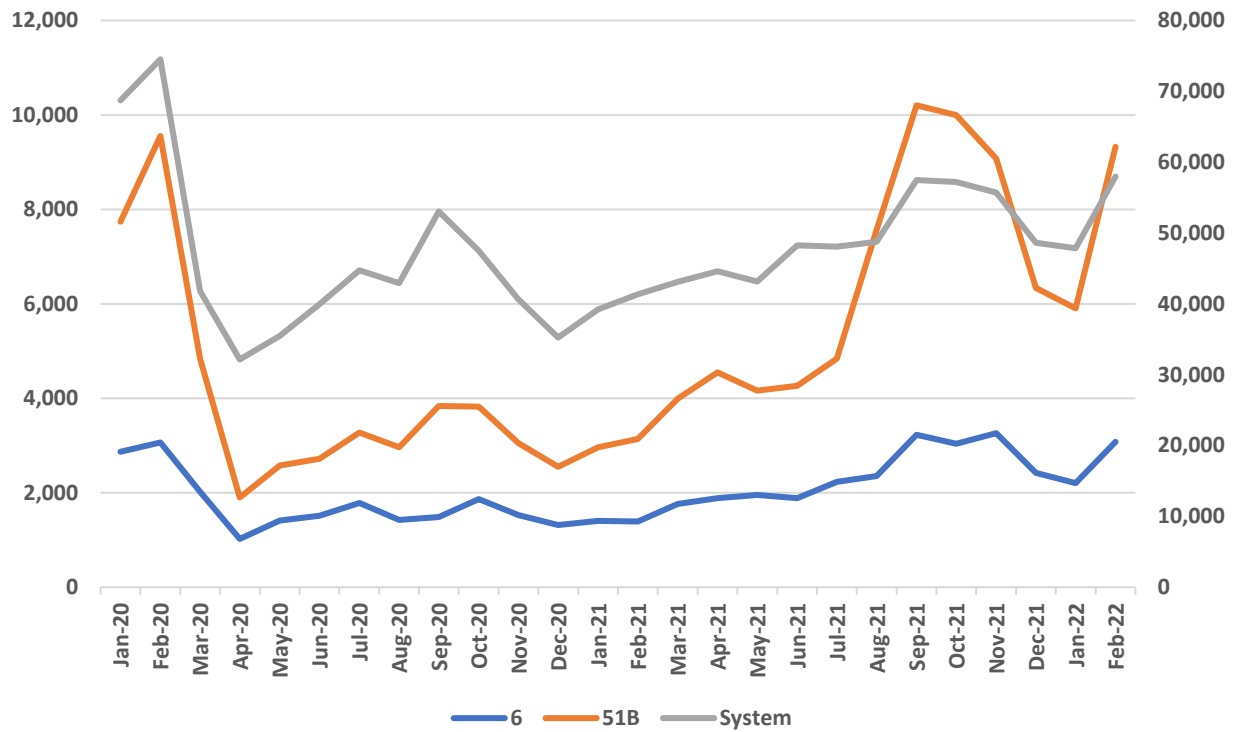
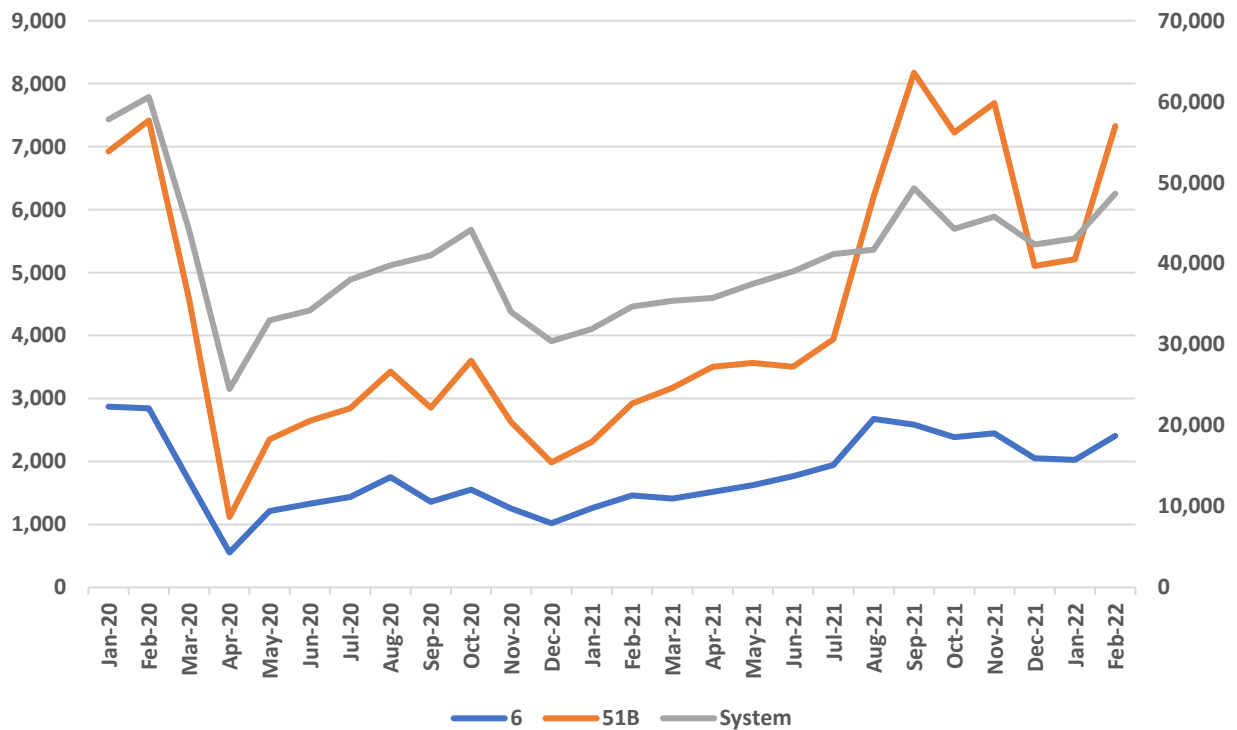


Exhibit 6 – Sunday Ridership by Line

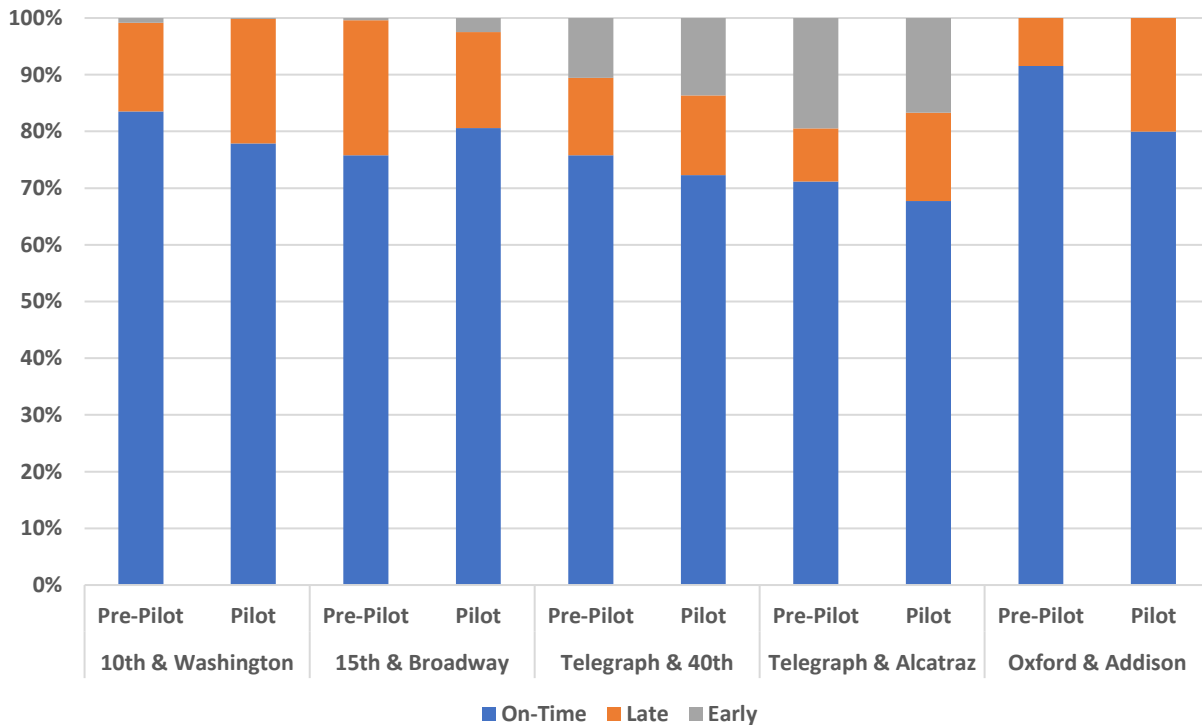


No revenue data were available at the time this report was developed as they rely on data from Cubic regarding rear-door Clipper tags. Staff is actively working to get high-quality data from Cubic about how many tags on each door happened during the pilot program to compare that to tags at the front door pre-pilot and to understand revenue impacts, if any.

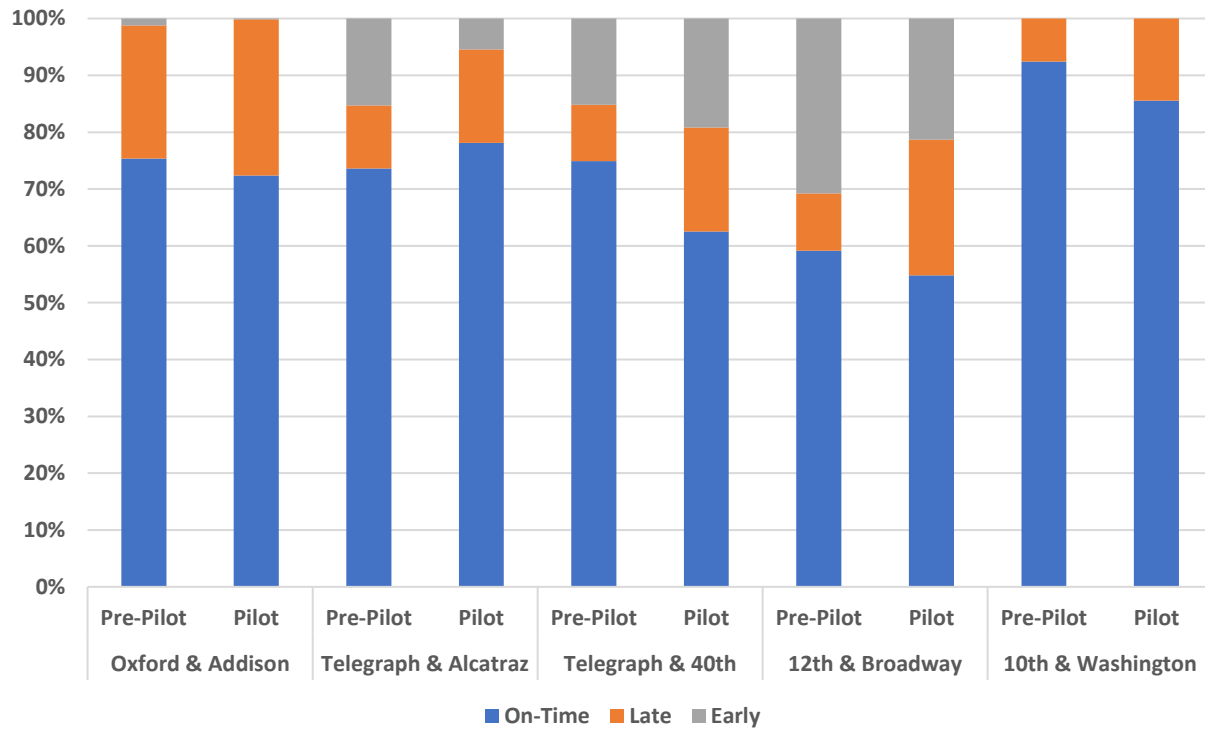
## RELIABILITY AND DWELL

Reliability is a core goal of the program because allowing multiple avenues for riders to board can speed the boarding process and allow the bus to spend more time moving and less time stopped. The primary means of determining reliability is on-time performance (OTP). Exhibits 7 and 8 illustrate Line 6 OTP by timepoint and direction. Looking at OTP in these charts, it is difficult to parse out any real impact on reliability from the Pilot, positive or negative as there have been several schedule changes and congestion has been increasing as the region slowly recovers from the depths of the pandemic.

**Exhibit 7 – Line 6 Northbound On-time Performance by Timepoint**



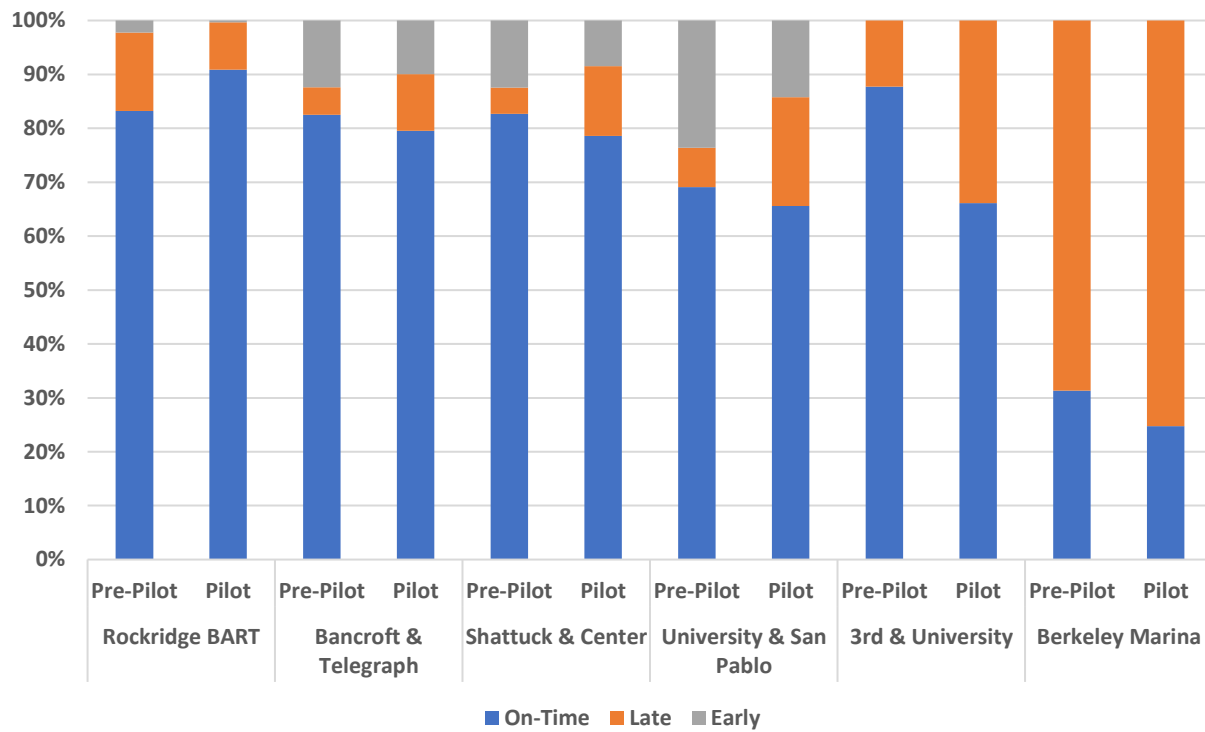
**Exhibit 8 – Line 6 Southbound On-time Performance by Timepoint**



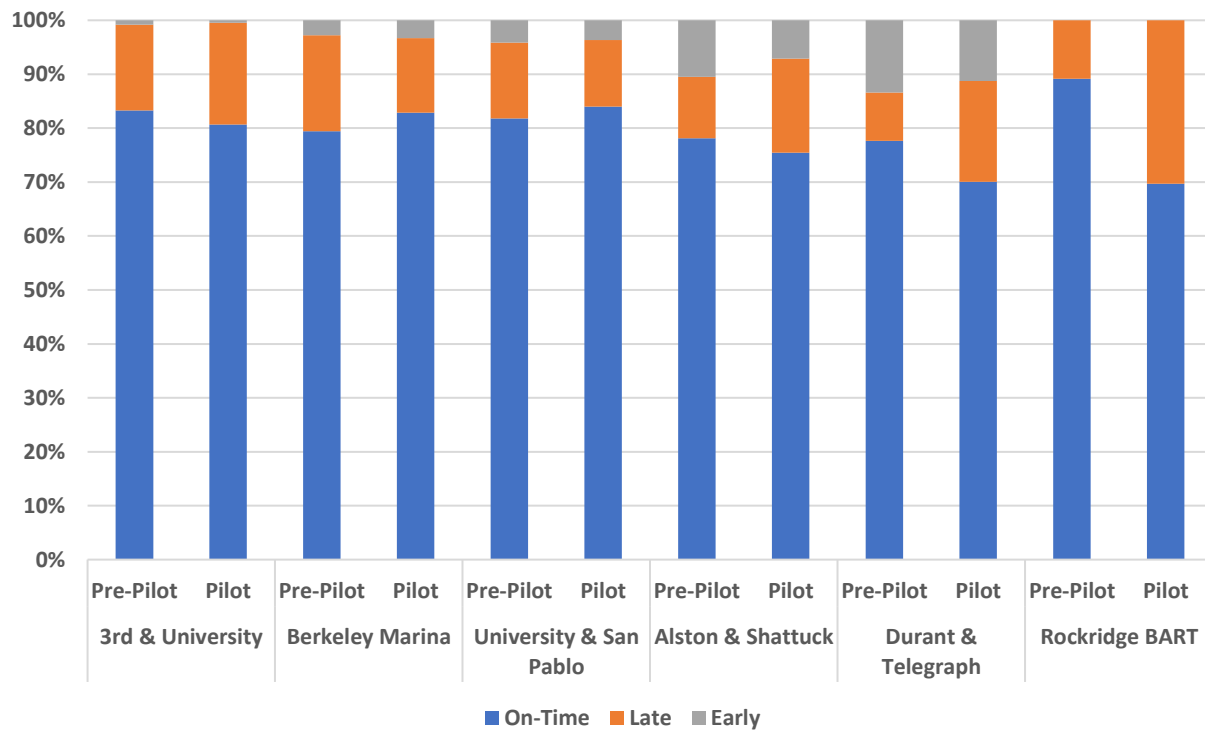
The same conclusions can be drawn for Line 51B in Exhibits 9 and 10. It is key to note that early departures did increase slightly on both lines, possibly due to reduced dwell per passenger.



**Exhibit 9 – Line 51B Northbound On-time Performance by Timepoint**



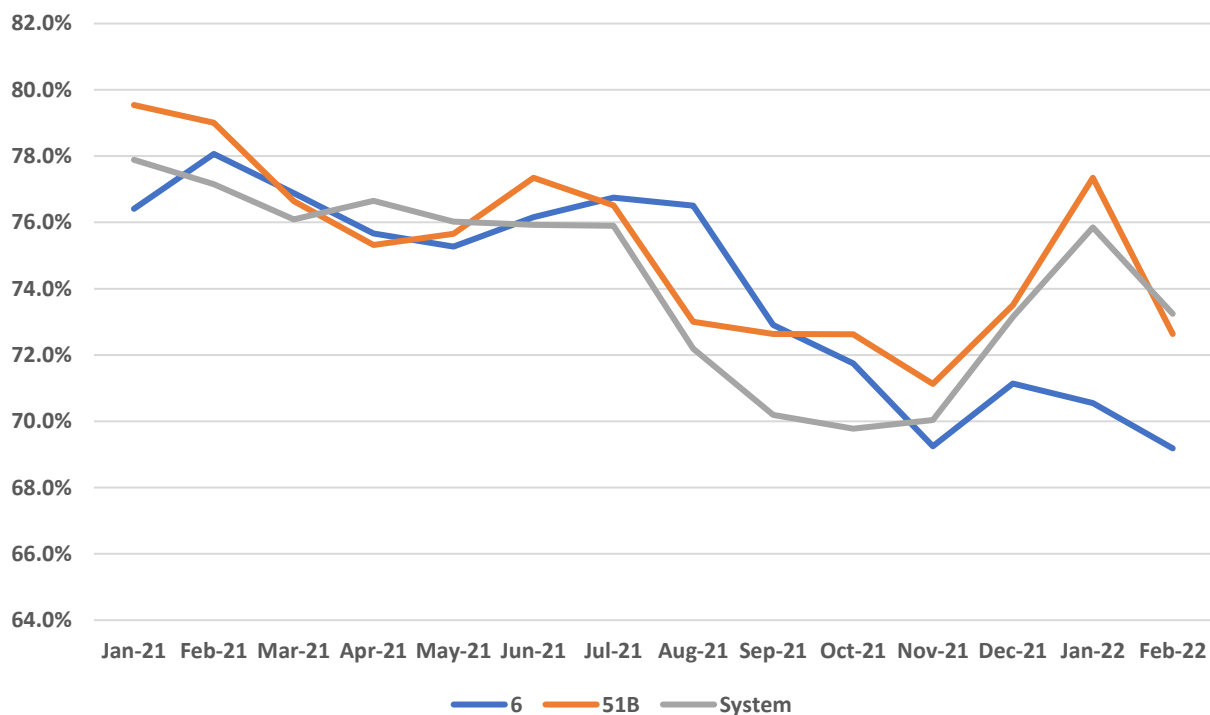
**Exhibit 10 – Line 51B Southbound On-time Performance by Timepoint**



Staff then looked at OTP over time to gauge whether there has been an impact on reliability relative to the rest of the system. System-wide OTP was around 78 percent in January 2021 and has been declining steadily with some improvements since then as illustrated in Exhibit 11.

The Pilot was launched in March 2021 and didn't have an immediate impact. In fact, OTP on the pilot lines was worse than the system until June 2021 when the Pilot lines performed better than the system. This marks the beginning of a period when the Pilot lines began outperforming the system. OTP on Line 6 dropped below the system in November 2021 and has continued to decline due to significant construction activity along the Telegraph corridor while Line 51B has generally been tracking the system as a whole. Staff attributes the period of improvement to the fact the all-door boarding procedure allows these lines to board riders more quickly and move faster through the corridor. While other lines get slower as more boardings occur, opening all the doors mitigates dwell-time issues so it's conceivable their OTP would be even worse without the Pilot. In addition, with increased congestion, getting the buses moving faster means that the overall congestion issues affecting the whole system are not able to affect the Pilot lines to the same extent. However, these lines have seen riders return at a faster rate than the system as a whole and that has led to more delay overall.

**Exhibit 11 – On-time Performance by Line**



One of the clearest positive signs of success for the program is the amount of time the bus spends dwelling at the bus stop for every passenger that boards the bus – dwell per passenger. This metric is measured in seconds and staff looked at lines 1/1T, 6, 51B, and the rest of the system across four key time periods:

- 1) The period in the months leading up to the pandemic.

- 2) The no-fare rear-door-only boarding period from March to October 2020 (or November for the 1/1T),
- 3) The period between October 2020 and March 2021 when fares were back in effect, and
- 4) The period from March 1 to February 28, 2022, covered by this report when the all-door boarding pilot was in effect on lines 6 and 51B.

Dwell per passenger experienced wildly different changes per line with the pandemic. For Line 1 – which had a significant share of essential workers and converted to 1T BRT with all-door boarding in August 2020 – boarding times diminished significantly and even continued to drop once fare collection resumed.

All other lines saw dwell per passenger increase substantially once fare collection resumed. It has since dropped about one second per passenger for the rest of the system. The key question this pilot seeks to answer is whether the pilot had a more significant effect than what occurred naturally on the rest of the system. In this case Line 6 saw a decrease of 1.6 seconds per passenger and Line 51B had each rider board 2.4 seconds faster than before the pilot was initiated.

Staff believe these results are extremely positive and will improve as the project team continues to identify and work through issues.

**Exhibit 12 – Dwell per Boarding by Line by Time Period (seconds)**

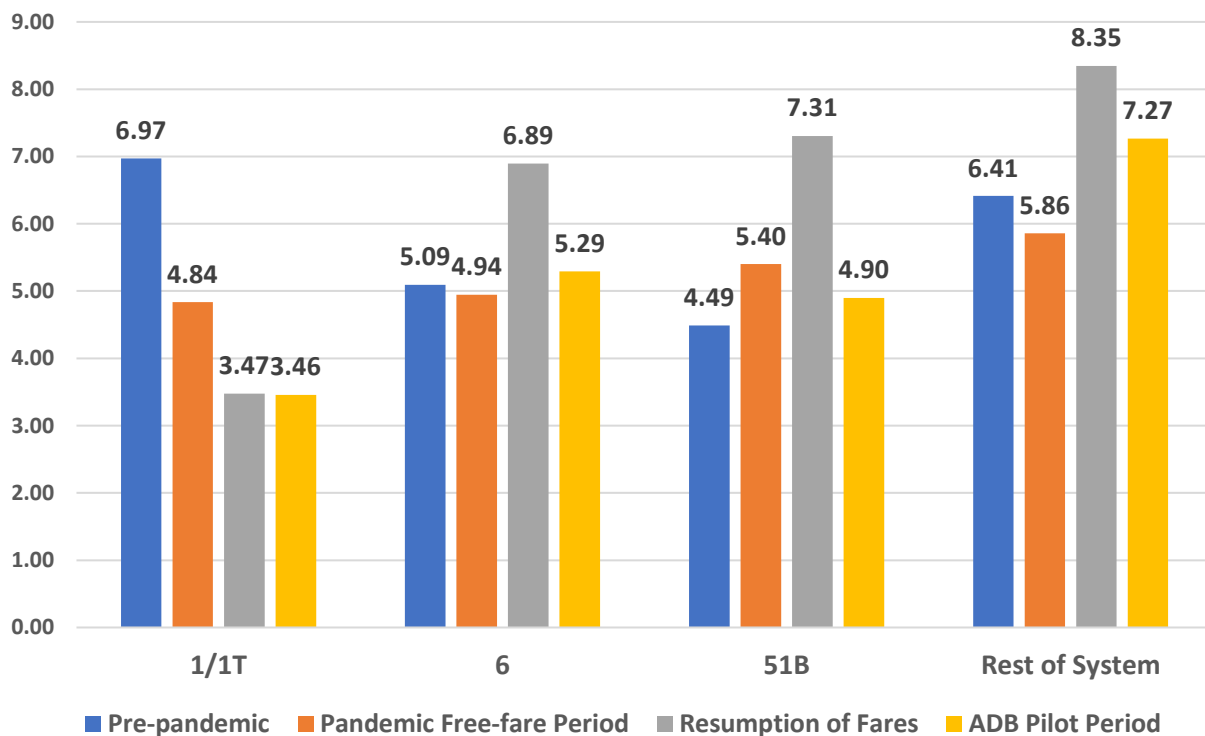


Exhibit 13 – Dwell per Boarding by Line Over Time (seconds)

