

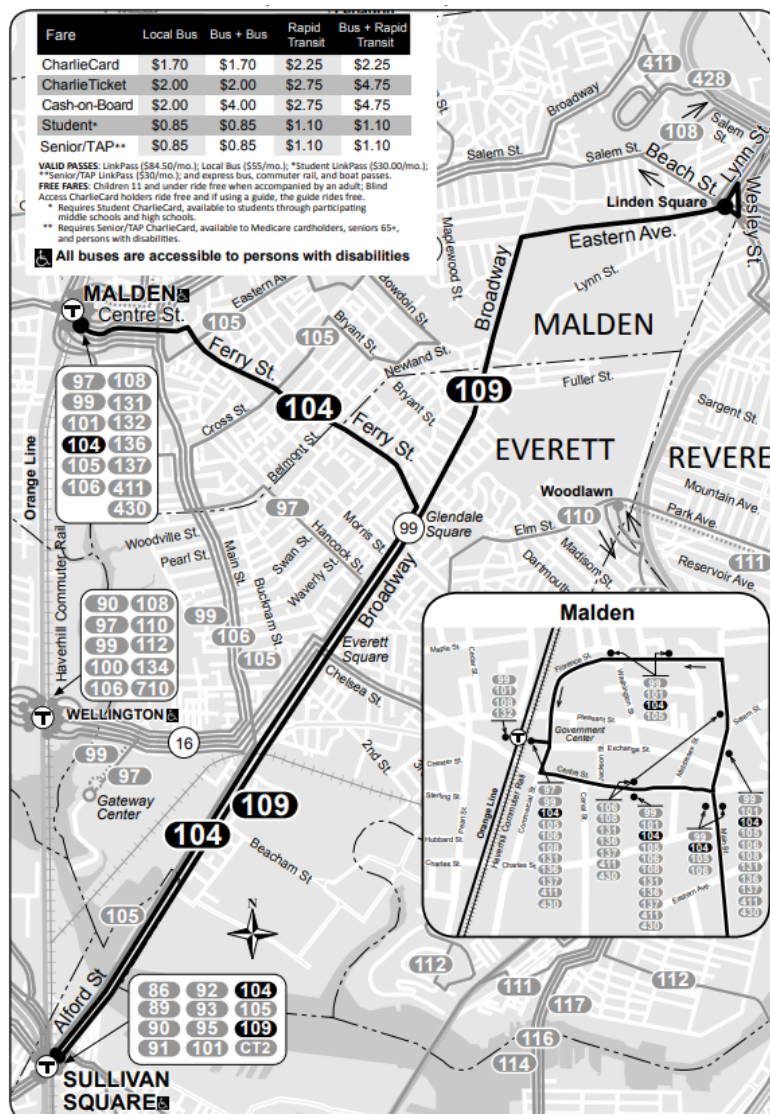
Route 109

Linden Square-Sullivan Station

Route Overview

Route 109 Linden Square-Sullivan Station is a Local route that operates between Linden Square in Malden and Sullivan Square Station along Eastern Avenue and Broadway through Everett (see Figure 1). Between Glendale Square and Sullivan Square Station (along Broadway), it operates along the same alignment as Route 104 Malden Center Station-Sullivan Square Station.

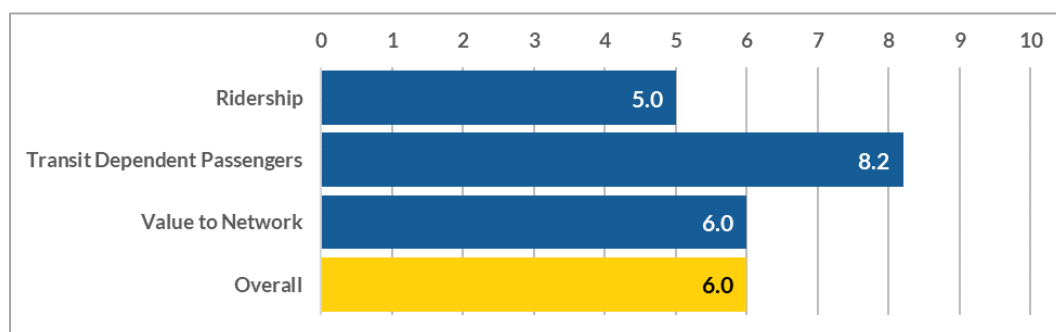
Figure 1 | Service Map



Network Importance

Route 109 is moderately important within the MBTA bus network. On a relative scale of 0 to 10, the route rates 5.0 in terms of ridership, 8.2 in terms of transit dependent ridership, and 6.0 in terms of its value to the network (which reflects the number of people who are uniquely served, the number of jobs and other important destination, and the number of transferring passengers). Its overall score, which gives a 70% weighting to overall ridership and a 15% weight to both other measures, is 6.0 (see Figure 2). Its score would be higher without the duplication with 104 Malden Center Station-Sullivan Square Station

Figure 2 | Relative Importance within MBTA Bus Network (on a scale of 0 to 10)



Service Overview

Schedule

On weekdays, Route 109 generally provides fairly frequent service during peak periods, moderate service during the shoulders of the peaks, and infrequent service during other periods (see Table 1). On weekends, it provides infrequent service.

In more detail, on weekdays, service operates from 4:43 AM to 1:05 AM. The first two trips begin in Glendale Square, at 4:43 AM and 5:00 AM, and the first trip from Linden Square departs at 4:57 AM. Service then operates:

- Every 16 minutes until approximately 9:00 AM.
- Every 23 to 25 minutes until approximately 10:30 AM.
- Every 37 to 40 minutes until 1:40 PM.
- Every 20 to 27 minutes (not including the school trip at 2:30 PM) until 5:40 PM, but mostly every 20 minutes.
- Every 17 to 25 minutes until 7:30 PM.

After 7:30, inbound and outbound service patterns become very different:

Inbound

- All service operates from Linden Square to Sullivan Station.

- Service operates every 20 to 25 minutes until 8:10 PM.
- Service then operates every 55 to 60 minutes until the last trip at 12:05 AM.

Outbound

- Two of every three trips only operate to Glendale Square.
- Service between Sullivan Station and Glendale Square operates every five to 30 minutes.
- Service to Linden Square operates every 56 to 60 minutes, except for the last trip at 1:05 AM, which is 90 minutes after the previous trip.

Table 1 | Schedule Statistics

SERVICE DAY	SPAN OF SERVICE	FREQUENCY (RANGE)	FREQUENCY (AVERAGE)	DAILY TRIPS (INBOUND/OUTBOUND)
Monday-Friday	4:43 AM to 1:05 AM			48/52
Sunrise	4:43 AM to 5:59 AM	3 - 21	16	6/3
Early AM	6:00 AM to 6:59 AM	16	16	3/3
AM Peak	7:00 AM to 8:59 AM	16 - 23	16	8/8
Midday Base	9:00 AM to 1:29 PM	23 - 40	37	7/8
Midday School	1:30 PM to 3:59 PM	10 - 40	23	6/5
PM Peak	4:00 PM to 6:29 PM	17 - 26	18	8/8
Evening	6:30 PM to 9:59 PM	17 - 60	31	7/10
Late Evening	10:00 PM to 11:59 PM	55 - 60	57	2/6
Night	12:00 AM to 1:05AM	60	60	1/1
Saturday	5:00 AM to 12:55 AM	15 - 60	40	29/31
Sunday	5:45 AM to 1:00 AM	20 - 60	50	22/21

Note: Span of service reflects the time the first bus begins service until the time the last bus finishes service.

Saturday service operates from 5:00 AM until 12:55 AM, with infrequent service all day. It begins from Glendale Square at 5:00 AM and from Linden Square at 5:15 AM. Service then operates:

- Every 35 to 40 minutes from 5:15 AM until 7:50 AM.
- Every 55 to 60 minutes from 7:50 AM until 9:45 AM.
- Every 32 to 40 minutes until 8:05 PM, but mostly every 40 minutes.
- Every 45 to 50 minutes until the end of service.

Sunday service operates from 5:45 AM to 1:00 AM, also infrequently all day. It begins from Glendale Square at 5:45 AM and from Linden Square at 6:05 AM. Service operates with 60 minute frequencies until 12:05, then 55 minute frequencies until 7:15 PM, and 50 minute frequencies until 11:25 PM, and finally with a last trip at 12:10 AM.

Route 109 meets the span of service and the service frequency standards for local routes during all service days and periods.

Since the development of this document the MBTA has added additional earlier and late evening service to meet customer demands.

Table 2 | Service Patterns

PATTERN	ORIGIN	DESTINATION	UNIQUE FEATURE	TRIPS PER WKD	TRIPS PER SAT	TRIPS PER SUN
INBOUND				48	29	22
109.0	Linden Square	Sullivan Station	Regular route	46	28	21
109.1	Glendale Square	Sullivan Station	Early morning service from Glendale Square	2	1	1
OUTBOUND				52	31	21
109.0	Sullivan Station	Linden Square	Regular route	44	31	21
109.1	Sullivan Station	Glendale Square	Evening and night short-turn service to Glendale Square	8	-	-

Service Patterns

- Pattern 109.0 makes up the large majority of service, and operates the full length of the route as indicated in Figure 1.
- Pattern 109.1 makes the first two inbound trips on weekdays and the first trip on Saturdays and Sundays beginning service in Glendale Square in Everett; and makes eight of the last 13 weekday outbound trips, only operating to Glendale Square. Since the development of this document, additional Route 109.1 service has been added on Sunday mornings.

Ridership

Route 109 carries 3,210 passengers per weekday, 1,900 per Saturday, and 1,510 per Sunday. It is the MBTA’s 37th highest ridership route on weekdays, 29th highest on Saturdays, and 23rd highest on Sundays.

Ridership by Stop

The large majority of all Route 109 passengers travel to and from Sullivan Square Station. On weekday inbound trips (see Figure 3):

- 160 passengers board at the first stop in Linden Square. This is the highest ridership boarding stop on the route.
- Relatively few passengers use the five stops along Eastern Avenue, which have a total of 40 boardings and fewer than five alightings.
- 480 passengers board and 50 alight along Broadway north of Glendale Square. The largest stops on this segment include:
 - Broadway Plaza, with 90 boardings and 10 alightings.

- Cameron Street (at the Pope John XXIII High School), with 100 boardings and 10 alightings.
- In total, 640 passengers, or 40% of all inbound riders, board between Linden Square and Glendale Square.
- 130 passengers board and 30 alight in Glendale Square.
- 410 passengers board and 90 alight between Glendale Square and Everett Square.
- 140 passengers board and 50 alight in Everett Square.
- 230 passengers board and 90 alight between Everett Square and Sullivan Square Station.
- 1,270 passengers, or nearly 80% of all inbound riders, alight at Sullivan Square Station.

Outbound ridership is the similar to the reverse inbound patterns, with the overwhelming majority of boardings at Sullivan Station and moderate activity near Everett Square and along Broadway before Ferry Street.

Figure 3 | Weekday Inbound Ridership by Stop Map



Ridership by Trip

On weekdays, Route 109 has high ridership per trip until 5:00 PM inbound and after 12:00 PM outbound. On inbound trips (see Figure 4):

- There are 23 passengers on the first trip at 4:43 AM that departs from Glendale Square.
- Between 5:00 AM and close to 8:00 AM, most trips carry over 50 passengers and have loads that exceed the MBTA's crowding/comfort standards.
- Between 7:48 AM and slightly after 1:00 PM, most trips carry 40 to 50 passengers. However, none are overcrowded.
- From 1:30 PM to 2:30 PM, two trips carry 60 passengers, and one is overcrowded with a maximum load of 49.
- Ridership then generally declines from just over 40 passengers per trip around 3:00 PM to less than 15 by 6:30 PM. However, there is one trip (at 4:40 PM) that carries 47 passengers.
- After 6:30 PM, ridership per trip increases slightly to 19 passengers at 9:10 PM and then declines to five on the last trip at 12:05 AM.

On weekday outbound trips (see Figure 5):

- Ridership grows from fewer than 10 boardings on the first trip at 5:10 AM to more than 40 on the 7:21 AM trip and then falls back to less than 10 on most trips between 8:00 AM and 9:30 AM.
- Ridership ranges from 30 to over 60 between 3:00 PM and 8:00 PM.
- It then grows steadily from 9:30 AM until 1:00 PM to 45 passengers per trip.
- The two trips between 2:00 PM and 3:00 PM both carry over 60 total passengers, and one has loads that just exceed loading standards.
- Ridership is often above 40 passengers per trip from 3:00 PM until 8:00 PM.
- After 8:00 PM, trips to Linden Square generally carry over 30 passengers while trips to Glendale Square carry closer to 20 passengers. One trip to Linden Square at 11:00 PM carries 51 passengers and is overcrowded with a maximum load of 49 passengers.

On Saturdays, most inbound trips from the beginning of service until 4:00 PM carry 30 to over 50 passengers (see Figure 6). Outbound trips are heavily utilized between approximately 1:00 PM to nearly midnight, with some evening trips carrying loads that exceed loading standards (see Figure 7).

On Sundays, the first two inbound trips at 5:45 AM from Glendale Square and 6:05 AM from Linden Square carry 68 and 74 passengers, which is higher than any weekday trips (see Figure 8). Both are overcrowded with maximum loads that are close to 70 passengers.

Figure 4 | Weekday Ridership by Trip: Inbound

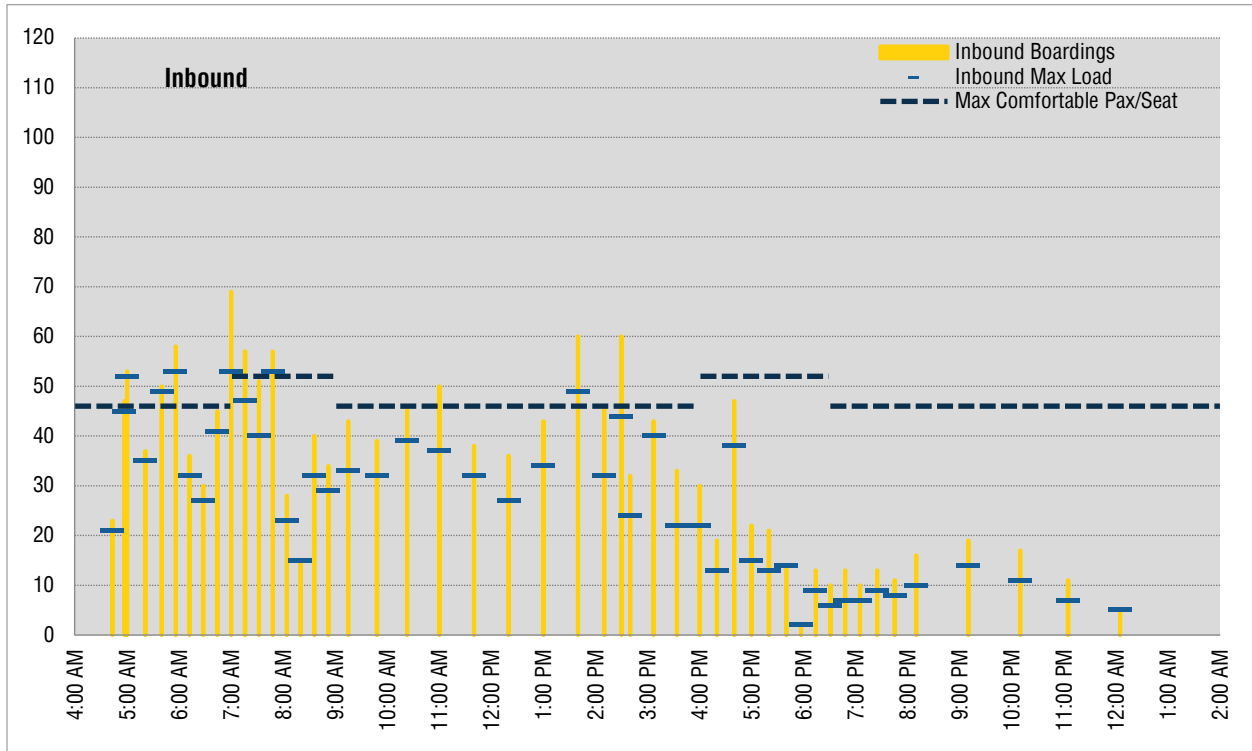


Figure 5 | Weekday Ridership by Trip: Outbound

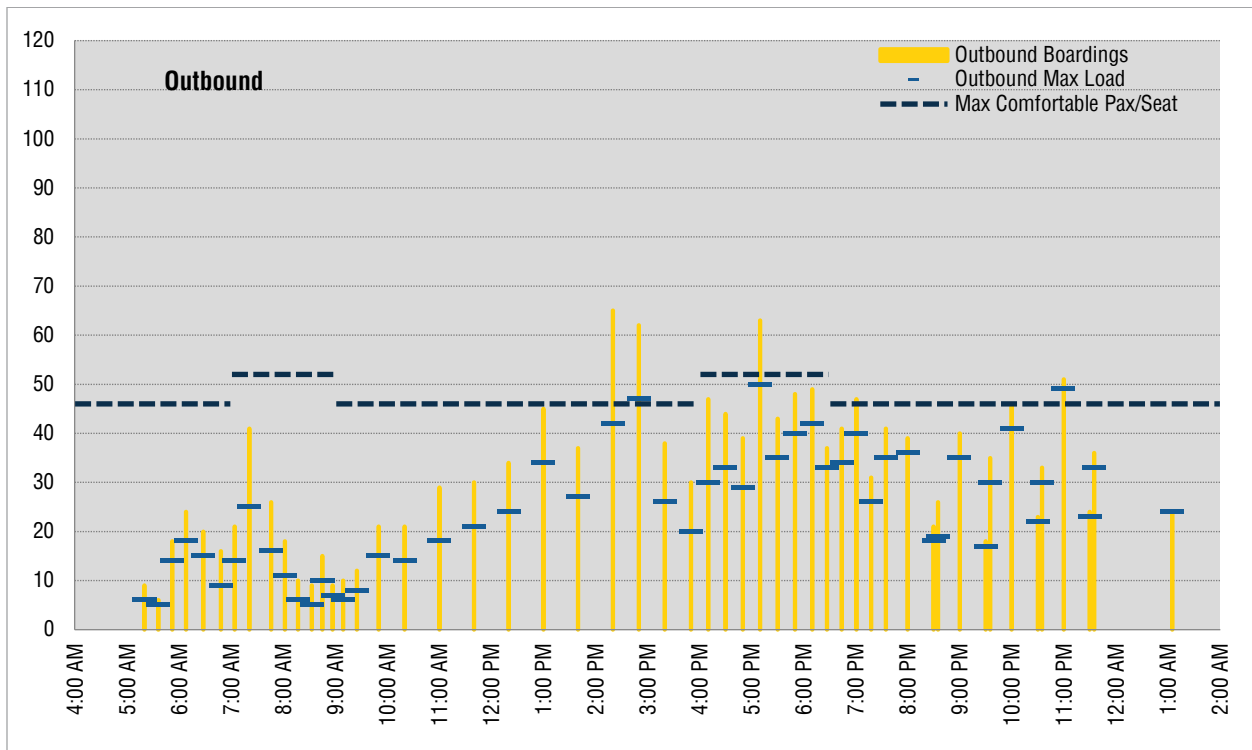


Figure 6 | Saturday Ridership by Trip: Inbound

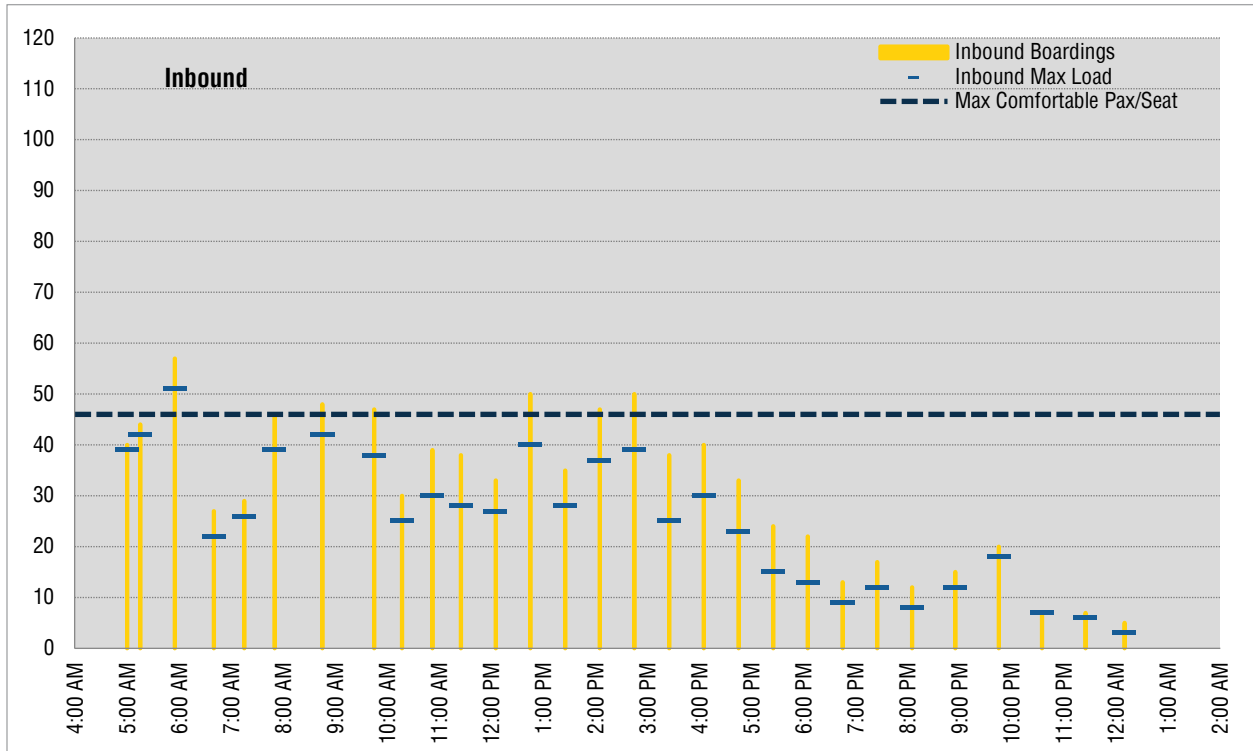


Figure 7 | Saturday Ridership by Trip: Outbound

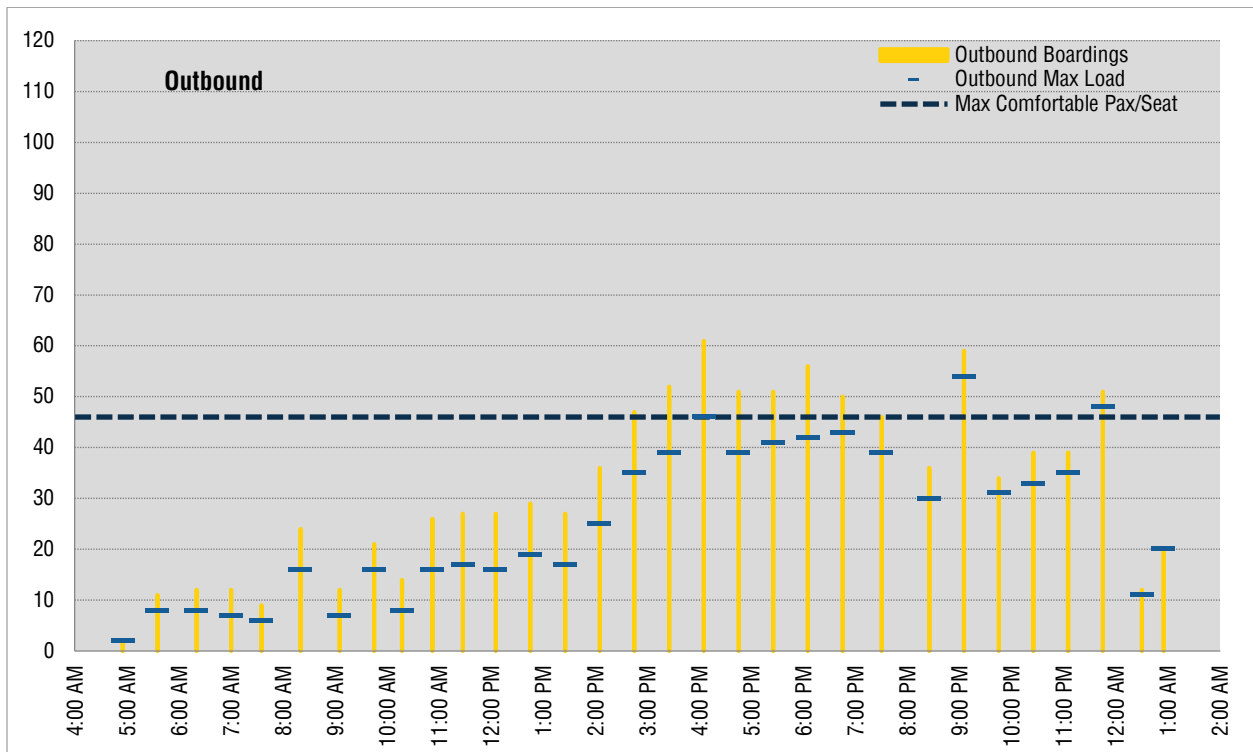


Figure 8 | Sunday Ridership by Trip: Inbound

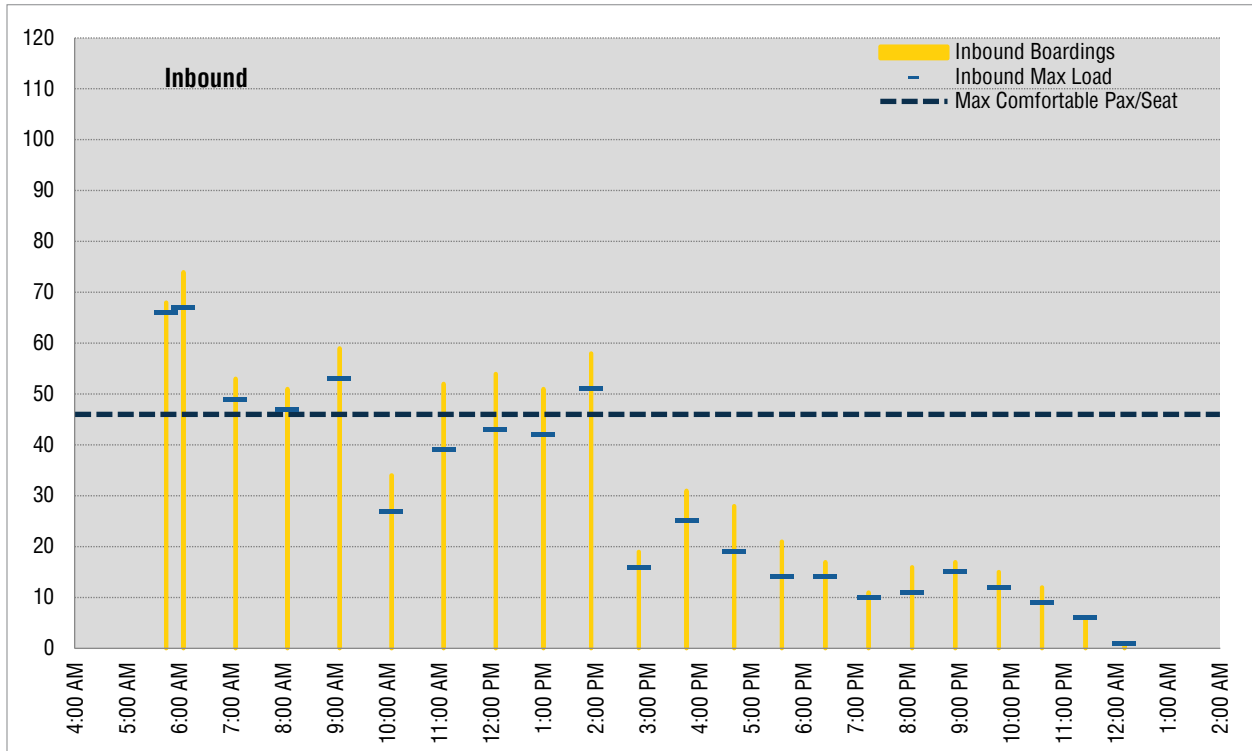
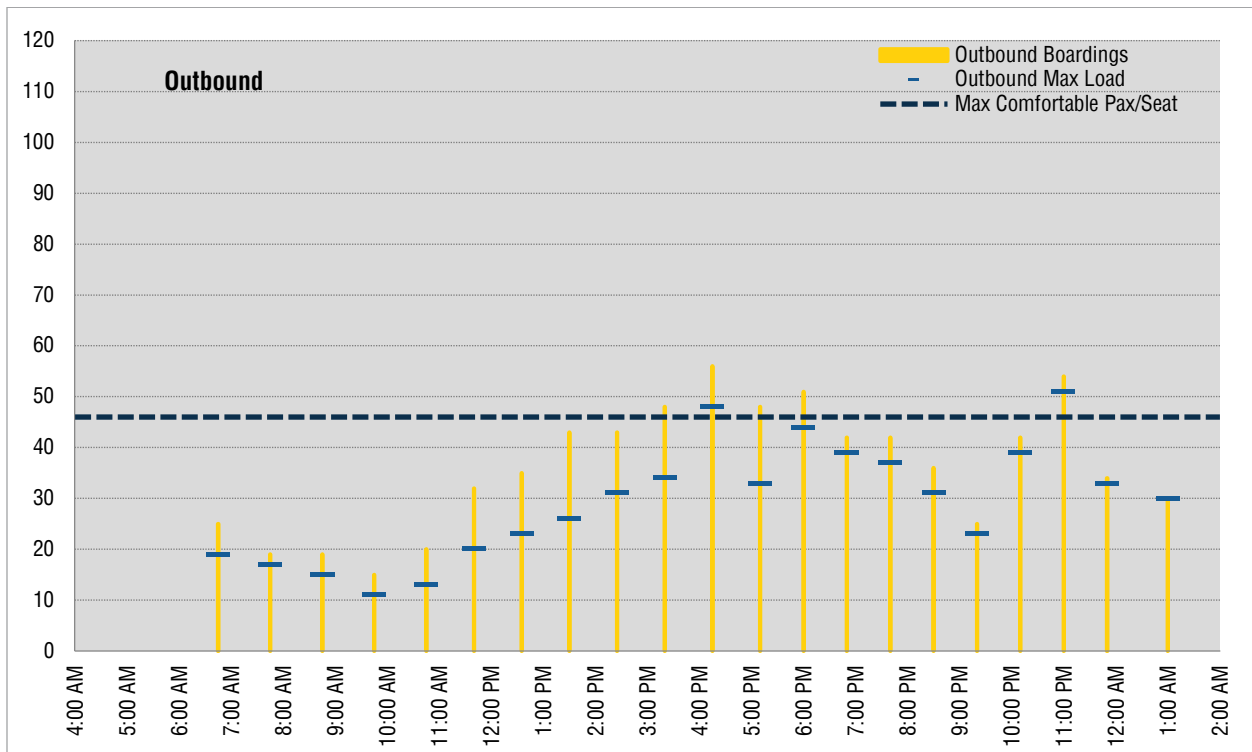


Figure 9 | Sunday Ridership by Trip: Outbound



Inbound ridership per trip stays at over 50 passengers on all trips except one. After 2:30 PM, it is significantly lower at less than 20 passengers on most trips. Outbound, ridership per trip is 20 or less before 11:00 AM (see Figure 9, above). It then increases to over 40 by 1:30 PM and then ranges from 30 to over 50 on most trips through 11:30 PM. The last two trips carry over 30 passengers.

Passenger Comfort

On Route 109, 84% of passenger minutes are in comfortable conditions, which is well below the minimum standard (see Table 3). This is largely due to the overcrowding described above and dropped trips (described below).

Table 3 | Passenger Time Spent Traveling in Comfortable Conditions

	WEEKDAYS	SATURDAYS	SUNDAYS
Minimum Standard	92%	92%	92%
Target	96%	96%	96%
Actual	83.8%	88.7%	83.6%

Reliability and Speed

Reliability

Route 109’s reliability is very poor, at 51% on weekdays, 56% on Saturdays, and 44% on Sundays (see Table 4). Poor on-time performance is due to actual running times that are longer than scheduled times and dropped trips (1.3% in the fall of 2017).

Table 4 | Reliability

SERVICE DAY	ORIGIN/MID-ROUTE ON-TIME PERFORMANCE	DESTINATION ON-TIME PERFORMANCE	OVERALL RELIABILITY	DROPPED TRIPS
Monday-Friday	49%	58%	51%	1.3%
Saturday	55%	60%	56%	
Sunday	42%	53%	44%	

Running Times

Actual running times for most Route 109 trips are longer than scheduled, with differences as high as 12 minutes during the midday on inbound trips and 16 minutes on outbound trips during evening periods (see Figure 10 and Figure 11). These differences are the major cause of very poor on-time performance.

The MBTA has updated the schedules since the development of this document.

Figure 10 | Scheduled & Median Travel Time by Trip: Route 109 Inbound

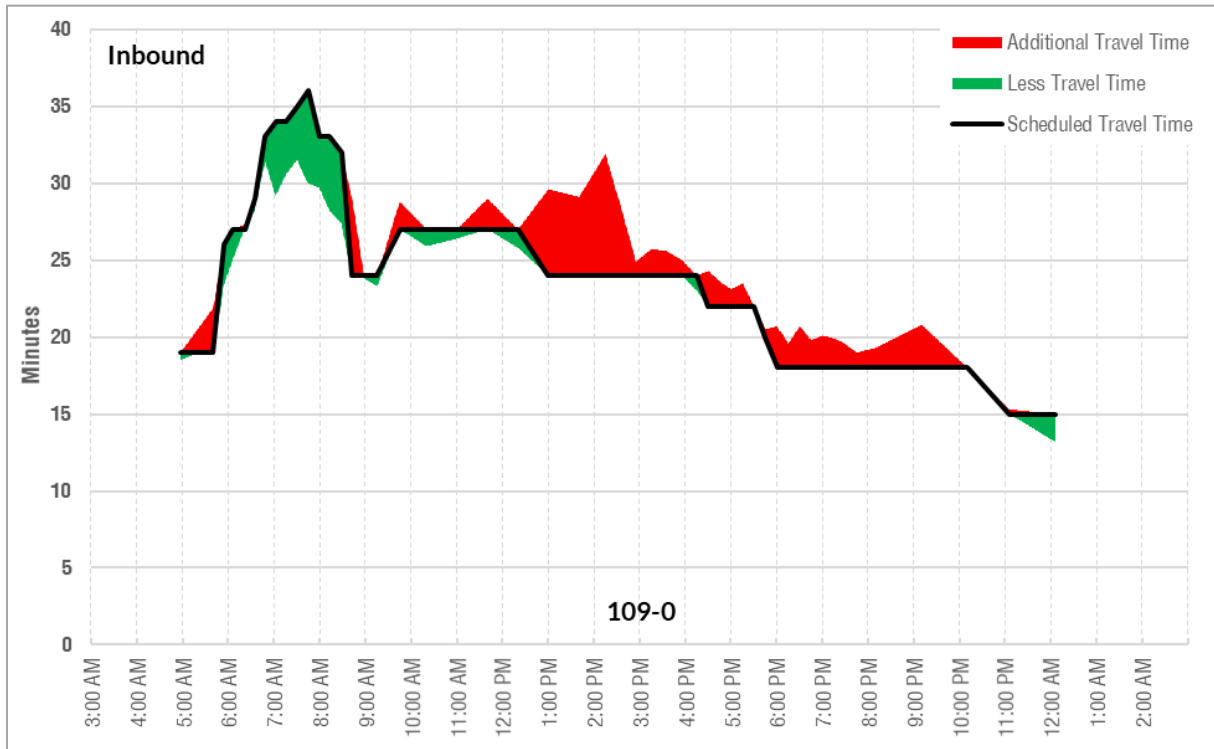
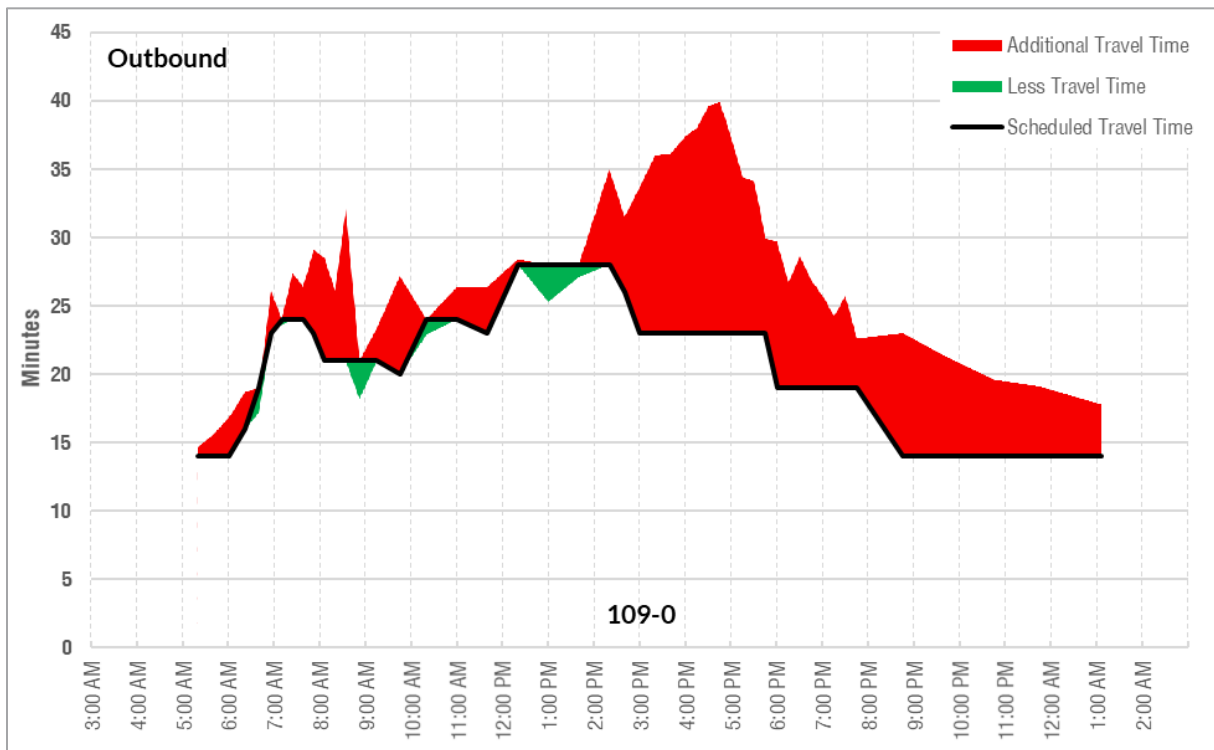


Figure 11 | Scheduled & Median Travel Time by Trip: Route 109 Outbound



Stop Spacing

Route 109 has an average of 7.2 stops per mile, which is slightly above the MBTA's stop spacing guidelines of four to seven stops per mile. Stop consolidation would make service faster and improve reliability.

Summary

Route 109 is a high ridership route that, most of the time, provides infrequent service. Passenger loads on most trips are high, and many trips, including on weekends, are overcrowded. Route 109's on-time performance is also extremely poor.