2021 Title VI Service Monitoring Study

In Compliance with FTA Circular 4702.1B

Adopted December 8, 2021

Prepared for:

Metro Transit

Prepared by:

SRF

EXECUTIVE SUMMARY

This report satisfies the Federal Transit Administration (FTA) Title VI requirement to monitor transit system performance relative to system-wide service standards and policies at least once every three years. FTA requires recipients of federal funding who provide fixed route service, including Metro Transit, to **develop and monitor quantitative system standards and policies to guard against discrimination toward racial and ethnic minorities and low-income communities related to the quality of and access to fixed route public transit service and facilities.**

While Metro Transit continually monitors its route and system-wide performance using a variety of measures (including incorporation of racial and socioeconomic equity), formal Title VI service monitoring to meet FTA requirements last occurred in fall 2018.

This Title VI Service Monitoring Study is one element of Metropolitan Council and Metro Transit's ongoing Title VI work. Further, Title VI compliance is one component of the broader equity and inclusion framework that Metro Transit uses to foster a community that thrives because each individual has access to their destination and feels welcomed.

Title VI and Environmental Justice

Title VI of the Civil Rights Act of 1964 prohibits discrimination on the basis of race, color, or national origin in programs receiving federal financial assistance. *Executive Order 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, extends these protections to low-income communities as well. **Title VI was identified as one of several Federal laws that should be applied "to prevent minority communities and low-income communities from being subject to disproportionately high and adverse environmental effects."**[1]

Purpose

The purpose of the Title VI service monitoring requirement is to ensure that prior decisions related to the distribution of fixed route transit service and facilities have not resulted in a disparate impact on the basis of race, color, or national origin. If such is found, "the transit provider shall take corrective action to remedy the disparities to the greatest extent possible."[2]

While not specifically required by FTA, Metro Transit expands its service monitoring to include assessment of disproportionate burden on low-income populations, a protected class under the Environmental Justice executive order.

To meet the Title VI service monitoring requirement, Metro Transit fixed route service and facilities data from fall 2019 and fall 2020, and the latest residential and rider demographic data are compiled and analyzed relative to Metro Transit's established service standards and policies. Documented in

[1] Federal Transit Administration, *Circular 4702.1B Title VI Requirements and Guidelines for Federal Transit Administration Recipients*, October 1, 2012, page I-6, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Title_VI_FINAL.pdf.
[2] FTA, *Circular 4702.1B,* page IV-10.

the Metropolitan Council's current Title VI Program (adopted in early 2020), Metro Transit's service standards and policies address the following:

- Vehicle load: To prevent overcrowding
- Vehicle headway: How often service comes
- On-time performance: To prevent early and late service
- Service availability: Through route spacing, midday service, and stop spacing
- Distribution of transit amenities: To ensure fair access to bus shelters, customer information, and other facility amenities
- Vehicle assignment: To ensure access to newer vehicles is fairly distributed

To meet the Title VI service monitoring requirement, service outcomes and compliance rates for each of these standards and policies are compared between routes (or stops or areas) designated as Black, Indigenous, and People of Color (BIPOC) and those designated as non-BIPOC, and similarly between low-income routes (or stops or areas) and those designated as non-low-income.

Extent of Analysis

This analysis includes all regular fixed routes directly operated by Metro Transit and those operated under contract to the Metropolitan Council (including METRO Red Line) under the Metro Transit brand in either fall 2019 or fall 2020. Metro Transit historically uses data from the most recent fall schedule for service monitoring and broader analysis performed throughout the agency, as this time of year is most representative of transit demand and typical service levels.

A Note on COVID-19 and its Impacts on Transit

While the long-term ridership impacts of the COVID-19 pandemic are not known, the short-term effects have been significant. Metro Transit modified its service levels and schedules throughout spring and summer 2020 as part of the ongoing, shared effort to respond to the COVID-19 pandemic. Service changes were made within the Governor's Peacetime Emergency declaration and in response to public health guidance and changes in travel demand, operations, and resources. In light of these factors, this study monitors service from fall 2019 and, where practical, fall 2020. Four local and 51 commuter and express routes regularly provided by Metro Transit remained suspended in Fall 2020; these routes are represented by fall 2019 service data in this analysis.

Title VI Definitions and Concepts

Racial and Ethnic Minorities

FTA defines a "minority" person as one who self-identifies as American Indian/Alaska Native, Asian, Black or African American, Hispanic or Latino, and/or Native Hawaiian/Pacific Islander. However, as part of efforts to use respectful and inclusive language, **Metro Transit and the Metropolitan Council prefer to use the term Black, Indigenous, and People of Color (BIPOC) rather than "minority" when referring to people who identify as one or more of the above racial or ethnic groups.** As such, references to BIPOC in this report should be interpreted to mean the same thing as "minority".

For the purposes of this evaluation, "non-minority" or "non-BIPOC" persons are defined as those who self-identify as non-Hispanic white. All other persons, including those identifying as two or more races and/or ethnicities, are defined as BIPOC.

Low-Income Population

This Title VI service monitoring analysis uses 185% of the 2019 U.S. Census Bureau poverty thresholds to determine low-income status. The Council uses 185% of poverty thresholds to define poverty in its place-based equity research, regional policies, and other initiatives, and this Title VI analysis mirrors that approach.

Discrimination, Disparate Impact, and Disproportionate Burden

In *Circular 4702.1B*, FTA defines **discrimination** as referring to:

> any action or inaction, whether intentional or unintentional, in any program or activity of a federal aid recipient, subrecipient, or contractor that results in disparate treatment, disparate impact, or perpetuating the effects of prior discrimination based on race, color, or national origin.[3]

Disparate impact, a key concept for understanding Title VI regulations, is defined in the *Circular* as:

> a facially neutral policy or practice that disproportionately affects members of a group identified by race, color, or national origin, where the recipient's policy or practice lacks a substantial legitimate justification and where there exists one or more alternatives that would serve the same legitimate objectives but with less disproportionate effect on the basis of race, color, or national origin.[4]

Similarly, FTA defines **disproportionate burden** as:

> a neutral policy or practice that disproportionately affects low-income populations more than non-low-income populations.[5]

Per FTA guidance, Metro Transit uses its disparate impact and disproportionate burden thresholds as evidence of impacts severe enough to meet the definition of disparate impact or disproportionate burden.

Metro Transit has defined its disparate impact and disproportionate burden policies and thresholds using the "80% rule," which states that there may be evidence of disparate impacts/disproportionate burden if:

- *Benefits* are being provided to *BIPOC/low-income* populations at a rate less than 80% of the benefits being provided to *non-BIPOC/non-low-income* populations, or
- *Adverse effects* are being borne by *non-BIPOC/non-low-income* populations at a rate less than 80% of the adverse effects being borne by *BIPOC/low-income* populations.

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[3] Federal Transit Administration, *Circular 4702.1B Title VI Requirements and Guidelines for Federal Transit Administration Recipients,* October 1, 2012, page I-2, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Title_VI_FINAL.pdf.
[4] FTA, *Circular 4702.1B*, page I-2
[5] FTA, *Circular 4702.1B*, page I-2

The 80% rule originates from employment law but is applied in this setting to compare the distribution of benefits and/or adverse impacts among various population groups.[6] Metro Transit's decision to use the 80% rule for its disparate impact and disproportionate burden thresholds was subject to a formal public outreach process before being adopted by the Metropolitan Council in 2013.

In this analysis, **if the quantitative results indicate that service standard/policy compliance for BIPOC/ low-income routes (or stops or areas) is less than 80 percent of the compliance rate for non-BIPOC/ non-low-income routes (or stops or areas), this could be evidence of disparate impact/ disproportionate burden.** In these cases, additional analysis will be conducted, and potential mitigation measures will be identified if necessary.

Route, Stop, and Area Designations

This analysis uses U.S. Census Bureau 2015-2019 American Community Survey 5-year estimates and the Metropolitan Council's Travel Behavior Inventory On-Board Survey to designate:

- each route as either BIPOC or non-BIPOC and either low-income or non-low-income;
- each stop as either BIPOC or non-BIPOC and either low-income or non-low-income; and
- each census block group within the Metro Transit service area as either BIPOC areas or non-BIPOC areas and either low-income areas or non-low-income areas.

Doing so enables comparison of service outcomes and service standard and policy compliance rates between BIPOC and non-BIPOC routes/stops/areas and between low-income and non-low-income routes/stops/areas and subsequent determination of disparate impact and disproportionate burden.

Service Standards and Policies: Analysis Results

The following summarizes the service standards and policies Metro Transit uses to meet FTA requirements and the high-level results of the evaluations completed in this report.

[6] Section 60-3.4(D), *Uniform Guidelines on Employee Selection Procedure* (1978); 43 FR 38295, August 25, 1978, https://www.ecfr.gov/current/title-41/subtitle-B/chapter-60/part-60-3.

Table i. Summary of Service Standards and Policies and their Analysis Results

Standard/Policy	What does it address?	What are the results?
Vehicle Load	Metro Transit's standards for what constitutes and "overloaded" (too crowded) vehicle accounts for seated and standing passengers and differs by route type and vehicle type	In fall 2019, trips scheduled on BIPOC routes were less likely to be overloaded (1.30% of observed trips) than those on non-BIPOC routes (2.12%). Therefore, this analysis identifies **no disparate impact based on vehicle loads.** Trips scheduled on low-income routes were less likely to be overloaded (1.21%) than those on non-low-income routes (2.98%) in fall 2019. Therefore, this analysis identifies **no disproportionate burden based on vehicle loads.**
Vehicle Headway	Metro Transit is required to set standards for how frequent service should be, given certain parameters, to ensure frequent service is not benefitting only certain people. Metro Transit's vehicle headway standards are based on the route type, day period, and Transit Market Area.	BIPOC routes had higher vehicle headway compliance rates than non-BIPOC routes in both fall 2019 and fall 2020. Therefore, this analysis identifies **no disparate impact based on vehicle headways.** Low-income routes had higher vehicle headway compliance rates than non-low-income routes in both fall 2019 and fall 2020. Therefore, this analysis identifies **no disproportionate burden based on vehicle headways.**
On-Time Performance	Metro Transit measures whether a bus or train was on time for each instance it serves or passes a route's scheduled timepoint by comparing the arrival time to that in the schedule. Bus service is considered "on-time" if it arrives at scheduled timepoints between 1 minute early and 5 minutes late. Light rail and commuter rail service is considered on-time if it arrives at stations between 1 minute early and 4 minutes late.	BIPOC routes had higher on-time performance (85%) than non-BIPOC routes (81%) in fall 2019. Therefore, this analysis identifies **no disparate impact based on on-time performance.** In fall 2019, low-income routes had higher on-time performance (84%) than non-low-income routes (82%). Therefore, this analysis identifies **no disproportionate burden based on on-time performance.**

Standard/Policy	What does it address?	What are the results?
Service Availability: Route Spacing	Route spacing guidelines seek to balance service coverage with route productivity and transit demand. Routes spaced too closely together will have overlapping service areas and compete for riders, reducing the productivity of both routes. Routes spaced too far apart will lead to coverage gaps. Are BIPOC areas well-covered by routes, or are there large gaps in service? How does this coverage compare to that of non-BIPOC areas? How does this differ between low-income areas and non-low-income areas, if at all?	In both fall 2019 and fall 2020, route spacing results varied depending on route type and Transit Market Area. Generally, BIPOC areas and low-income areas experienced greater service coverage in Market Area I, but slightly worse service coverage (by two percent) in Market Area II, compared to non-BIPOC areas and non-low-income areas, respectively. However, all route spacing results are within the minimum threshold for avoiding disparate impact and disproportionate burden. Therefore, this analysis identifies **no disparate impact nor disproportionate burden based on route spacing.**
Service Availability: Midday Service	Midday service that operates frequently enough to meet the demand is crucial to developing a network that supports a transit-oriented lifestyle – one where transit is useful for more than the typical 9-to-5 work commute. Are BIPOC areas and low-income areas well-covered by midday service that meets vehicle headway standards? How does this coverage compare to that of non-BIPOC areas and non-low-income areas, respectively?	In both fall 2019 and fall 2020, BIPOC areas had greater midday service coverage than non-BIPOC areas, and low-income areas had greater midday service coverage than non-low-income areas. Therefore, this analysis identifies **no disparate impact nor disproportionate burden based on midday service availability.**

Standard/Policy	What does it address?	What are the results?
Service Availability: Stop Spacing	Stop spacing standards must balance the competing goals of providing greater access to service with faster travel speeds. More stops spaced closer together reduce walking distance and improve access to transit but tend to increase on-board travel time. What percentage of stops along BIPOC routes have stops spaced too closely or too far apart, relative to the applicable standard range? How does this compare to stops along non-BIPOC routes? What are the dynamics based on income status?	In fall 2019, BIPOC routes had more instances of stops spaced within the standard ranges than non-BIPOC routes. Similarly, low-income routes performed better than non-low-income routes. Results were nearly identical using fall 2020 service. Therefore, this analysis identifies **no disparate impact nor disproportionate burden based on stop spacing.**
Distribution of Amenities: At Bus Stops, Transit Centers, and Stations	Metro Transit has developed policies for the distribution of customer information, seating, shelter, shelter lighting and heaters, and trash receptacles at the stops it serves. These policies differ by stop type, with standard and optional features varying for bus stops, stops at transit centers, and stops (platforms) at light rail, BRT, and commuter rail stations.	For all amenity types, at all stop types, amenity placement rates at BIPOC stops were greater than or equal to those at non-BIPOC stops; and amenity placement rates at low-income stops were greater than or equal to those at non-low-income stops. Therefore, this analysis identifies **no disparate impact nor disproportionate burden based on the distribution of amenities at bus stops.**
Vehicle Assignment	Metro Transit maintains a fleet of about 1,000 vehicles across five bus garages and two light rail and one commuter rail depots. Vehicle age is used as the standard measure for determining equitable vehicle assignment. Are newer and older vehicles distributed equitably throughout the system? Are newer vehicles assigned to non-BIPOC routes more often than BIPOC routes? Are low-income routes assigned older vehicles than non-low-income routes?	In fall 2019, BIPOC route trips were assigned newer vehicles than non-BIPOC route trips, at 6.72 years and 7.01 years, respectively, on average. Therefore, this analysis identifies **no disparate impact based on vehicle assignment.** On average, low-income route trips were assigned vehicles approximately one year newer than those assigned to non-low-income route trips, at 6.62 years versus 7.64 years, respectively, in fall 2019. Therefore, this analysis identifies **no disproportionate burden based on vehicle assignment.**

Conclusions

This analysis identifies no disparate impact on BIPOC populations nor disproportionate burden on low-income populations based on Metro Transit's Title VI standards and policies.

Most measures of compliance with Metro Transit's service standards and policies showed that BIPOC and low-income populations received better outcomes, on average, compared to non-BIPOC and non-low-income populations. The few exceptions to this are instances where compliance rates for BIPOC or low-income populations were within one to eight percent of those for non-BIPOC or non-low-income populations – well within the allowable difference of 20 percent established in Metro Transit's disparate impact and disproportionate burden thresholds.

Table ii. Disparate Impact and Disproportionate Burden Results Summary

Standard/Policy	Disparate Impact on BIPOC Population	Disproportionate Burden on Low-Income Population
Vehicle Load	No	No
Vehicle Headway	No	No
On-Time Performance	No	No
Service Availability	No	No
Route Spacing	No	No
Midday Service	No	No
Stop Spacing	No	No
Distribution of Amenities	No	No
At Bus Stops	No	No
At Transit Centers	No	No
At Stations	No	No
Vehicle Assignment	No	No

Title VI is one piece of the broader strategic framework that Metro Transit uses to meaningfully advance equity in the region. Broader equity work, including additional quantitative analysis, is ongoing and continuous at Metro Transit. Equity is not achieved through one sole program, project, policy, or procedure, but in the integration of equity work throughout the agency.

Despite the lack of actionable Title VI findings from this study, Metro Transit continues to evaluate its service and improve equity of inputs and outcomes and will continue to evaluate service for disparate impact and disproportionate burden outside of triennial FTA Title VI service monitoring.

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Metropolitan Council

The Metropolitan Council (The Council) is the regional policy-making body, metropolitan planning organization (MPO), and provider of essential services for the Twin Cities metropolitan region. The Council's mission is to foster efficient and economic growth for a prosperous region.

The 17-member Metropolitan Council is a policy board, which has guided and coordinated the strategic growth of the metro area and achieved regional goals for more than 50 years. The Council also provides essential services and infrastructure – Metro Transit's bus and rail system, Metro Mobility, Transit Link, wastewater treatment services, regional parks, planning, affordable housing, and more – that support communities and businesses and ensure a high quality of life for residents.

Metro Transit

Metro Transit offers an integrated network of buses, light rail transit, and commuter trains, as well as resources for those who carpool, vanpool, walk, or bike. The largest public transit operator in the region, Metro Transit served nearly 78 million bus and rail passengers in 2019 with award-winning, energy-efficient fleets.

Title VI Commitment

The Metropolitan Council pledges that the public will have access to all its programs, services, and benefits without regard to race, color, or national origin, in accordance with Title VI of the Civil Rights Act of 1964. This pledge applies to Metro Transit, an operating division of the Metropolitan Council.

CHAPTER 1: INTRODUCTION

Title VI of the Civil Rights Act of 1964 prohibits discrimination on the basis of race, color, or national origin in programs receiving federal financial assistance. This report satisfies the Federal Transit Administration (FTA) Title VI requirement to monitor transit system performance relative to system-wide service standards and policies at least once every three years. This report, and Title VI compliance more generally, is one component of the broader equity and inclusion framework that Metro Transit uses to achieve its goals.

Purpose

The purpose of the Title VI service monitoring requirement is to **ensure that prior decisions related to the distribution of fixed route public transit service and facilities have not resulted in discrimination and a disparate impact on the basis of race, color, or national origin.** If such is found, "the transit provider shall take corrective action to remedy the disparities to the greatest extent possible, and shall discuss in the Title VI Program these disparate impacts and actions taken to remedy the disparities."[7]

While not specifically required by FTA, Metro Transit expands its service monitoring to include assessment of disproportionate burden on low-income populations, a protected class under the Environmental Justice executive order.

To meet the Title VI service monitoring requirement, **service and facilities data from fall 2019 and fall 2020, and the latest residential and rider demographic data are compiled and analyzed relative to Metro Transit's established service standards and policies.** Documented in its current Title VI Program (adopted in early 2020), Metro Transit's service standards and policies relate to:

- Vehicle load: To prevent overcrowding
- Vehicle headway: How often service comes
- On-time performance: To prevent early and late service
- Service availability: Through route spacing, midday service, and stop spacing
- Distribution of transit amenities: To ensure fair access to bus shelters, customer information, and other facility amenities
- Vehicle assignment: To ensure access to newer vehicles is fairly distributed[8]

To meet the Title VI service monitoring requirement, service outcomes and compliance rates for each of these standards and policies are compared between routes (or stops or areas) designated as Black,

[7] Federal Transit Administration, *Circular 4702.1B Title VI Requirements and Guidelines for Federal Transit Administration Recipients,* October 1, 2012, page IV-10, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Title_VI_FINAL.pdf.

[8] In its capacity as regional policy-making body and metropolitan planning organization (MPO), the Metropolitan Council has established a set of service standards and policies to guide the provision of transit service in the region. Many of these standards and policies are outlined in Appendix G of the Metropolitan Council's 2040 Transportation Policy Plan. In most instances, Metro Transit maintains the same service standards and policies established by the Metropolitan Council for the region's multiple transit providers. However, Metro Transit has set and monitors additional standards and policies that are specific to its service delivery and requirements as a large urban transit provider. Metro Transit's service standards and policies have the approval of the Metropolitan Council.

Indigenous, and People of Color (BIPOC) and those designated as non-BIPOC, and similarly between low-income and non-low-income routes (or stops or areas).

The following report addresses Title VI legislation; FTA requirements to meet Title VI obligations; the Council's Title VI Program, including its service standards and policies; recent performance relative to service standards and policies; and determinations of whether there is disparate impact to BIPOC populations and/or disproportionate burden to low-income populations based on service monitoring results.

Extent of Analysis

This analysis includes all regular fixed routes directly operated by Metro Transit and those operated under contract to the Metropolitan Council under the Metro Transit brand in either fall 2019 or fall 2020. Metro Transit historically uses data from the most recent fall schedule for service monitoring and broader analysis performed throughout the agency, as this time of year is most representative of transit demand and typical service levels. In light of COVID-19, service and ridership data analyzed in this report represent conditions from fall 2019 and/or fall 2020, depending on which data is more relevant.

The Metro Transit/Metropolitan Council service area (the outlined area in Figure 1) is defined as the Transit Capital Levy Communities, minus the communities served by the region's suburban transit providers: Minnesota Valley Transit Authority (MVTA), SouthWest Transit, and the cities of Maple Grove and Plymouth. Transit Capital Levy Communities are those within the seven-county region where a property tax is levied to pay for transit capital needs. The Transit Capital Levy Communities are established in state law but have changed in response to the growing region.

A Note on COVID-19 and its Impacts on Transit

While the long-term ridership impacts of the COVID-19 pandemic are not known, the short-term effects have been significant. Metro Transit modified its service levels and schedules throughout spring and summer 2020 as part of the ongoing, shared effort to respond to the COVID-19 pandemic. Service changes were made within the Governor's Peacetime Emergency declaration and in response to public health guidance and changes in travel demand, operations, and resources.

Service changes included suspension of some routes and reduced schedules on others. Vehicle capacity restrictions were put in place to allow adequate social distancing. Vehicle assignment was modified in some cases, resulting in the use of more articulated (60-foot) buses than typical.

In light of these factors, this study monitors service from fall 2019 and, where practical, fall 2020. Four local and 51 commuter and express routes regularly provided by Metro Transit remained suspended in Fall 2020; these routes are represented by fall 2019 service data in this analysis.

Equity and Inclusion

Title VI is one piece of the broader strategic framework that Metro Transit uses to define the goals and core elements that characterize our work. The number one core element that drives our strategic framework is meaningfully advancing equity inside our organization and in the region and one of the ways we do this is through evaluating our performance and fostering innovation for continuous

improvement. Equity is not achieved through one sole program, project, policy, or procedure, but in the integration of equity work throughout our agency.

Evaluation of Title VI Policies and Practices

Metro Transit and the Metropolitan Council continually seek ways to improve their Title VI policies, processes, and methods, including those related to service and fare equity analyses. For example, a multi-disciplinary work group of Metro Transit and Metropolitan Council staff recently completed a review of the agencies' current approach to Title VI service equity analyses and developed subsequent recommendations to improve existing practices. The goal of this effort was to discover opportunities to improve coordination and consistency across departments, and incorporate new dataset, methods, and other national best practices and innovations. The effort included a review of academic research and the Title VI policies and practices of about 30 transit agencies across the nation. Recommendations resulting from this effort included:

- The use of more inclusive language, such as "communities of color" or "Black, Indigenous, and people of color" (BIPOC) in Title VI reports and documents, rather than "minority," the term used by FTA.
- The use of 185% poverty thresholds, rather than 100% poverty thresholds, to define "low-income" populations. This better aligns with other policies and practices of the Council and Metro Transit and is more reflective of conditions in the region.
- Where feasible, use of the street network to create more realistic distance/time-based service areas around bus stops and transit stations (e.g., 10-minute walk/roll from stops/stations), rather than using simplified straight line radial buffers that reflect distance/time "as the crow flies."
- Where appropriate, incorporation of demographic data reflective of riders, from on-board surveys, to supplement or replace demographic data reflective of where folks live.

Each of these recommendations is reflected in this 2021Title VI Service Monitoring Study.

CHAPTER 2: LEGISLATION AND GUIDANCE

Title VI of the Civil Rights Act of 1964 prohibits discrimination on the basis of race, color, or national origin in programs receiving federal financial assistance. Title VI states, "no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance."[9]

Moreover, FTA guidance recognizes the inherent overlap between Title VI and environmental justice principles, which extend protections to low-income populations. In 1994, President Clinton issued *Executive Order 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, which states that each federal agency

> "shall make achieving environmental justice part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."[10]

Title VI was identified as one of several Federal laws that should be applied "to prevent minority communities and low-income communities from being subject to disproportionately high and adverse environmental effects."[11]

To provide direction to recipients of federal funding, FTA issued *Circular 4702.1B Title VI Requirements and Guidelines for Federal Transit Administration Recipients* in 2012.[12] FTA *Circular 4702.1B* outlines Title VI evaluation procedures for recipients of FTA-administered transit program funds and includes guidance for a variety of equity evaluations, including service monitoring.

Requirement to Conduct Service Monitoring

FTA requires recipients of federal funding who provide fixed route service, including Metro Transit, to **develop quantitative system standards and policies to guard against discrimination toward racial and ethnic minorities related to the quality of and access to transit service and facilities.**

FTA *Circular 4702.1B* provides the following as basis for the requirement:

> Appendix C to 49 CFR part 21 provides in Section (3)(iii) that '[n]o person or group of persons shall be discriminated against with regard to the routing, scheduling, or quality of service of transportation service furnished as a part of the project on the basis of race, color, or national origin. Frequency of service, age and quality of vehicles assigned to routes, quality of stations

[9] U.S. Department of Labor, *Title VI, Civil Rights Act of 1964,* https://www.dol.gov/agencies/oasam/regulatory/statutes/title-vi-civil-rights-act-of-1964.
[10] U.S. President, Proclamation, *Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations*, Feb. 11, 1994, https://www.archives.gov/files/federal-register/executive-orders/pdf/12898.pdf.
[11] Federal Transit Administration, *Circular 4702.1B Title VI Requirements and Guidelines for Federal Transit Administration Recipients,* October 1, 2012, page I-6, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Title_VI_FINAL.pdf.
[12] FTA, *Circular 4702.1B*.

> serving different routes, and location of routes may not be determined on the basis of race, color, or national origin.'[13]

In response to this directive, FTA *Circular 4702.1B* continues:

> All fixed route transit providers shall set service standards and policies for each specific fixed route mode of service they provide…. These standards and policies must address how service is distributed across the transit system, and must ensure that the manner of the distribution affords users access to these assets.[14, 15]

Further, large urban fixed route transit providers, including Metro Transit, are **required to monitor performance relative to their system-wide service standards and policies at least once every three years.** While Metro Transit continually monitors its route and system-wide performance using a variety of measures (including incorporation of racial and socioeconomic equity), formal Title VI service monitoring to meet FTA requirements last occurred in fall 2018.

Title VI Definitions of Minority and Low-Income Populations

Racial and Ethnic Minorities

FTA defines a "minority" person as one who self-identifies as American Indian/Alaska Native, Asian, Black or African American, Hispanic or Latino, and/or Native Hawaiian/Pacific Islander.[16] However, as part of efforts to use respectful and inclusive language, **Metro Transit and the Metropolitan Council prefer to use the term Black, Indigenous, and People of Color (BIPOC) rather than "minority" when referring to people who identify as one or more of the above racial or ethnic groups.** As such, references to BIPOC in this report should be interpreted to mean the same thing as "minority".

For the purposes of this evaluation, "non-minority" or "non-BIPOC" persons are defined as those who self-identify as non-Hispanic white. All other persons, including those identifying as two or more races and/or ethnicities, are defined as BIPOC (equivalent to "minority").

FTA requires transit providers to evaluate service using this dichotomy between "minority" and "non-minority" populations. Focusing on the global "minority" or BIPOC category (versus using disaggregated race and ethnicity data) obscures the racial and ethnic diversity of the many identities within it, treating BIPOC residents as interchangeable. To remedy this, Metro Transit and the Metropolitan Council are now using and providing more detail on race and ethnicity in their evaluations and data products. For example, as part of regular monitoring of route and system-wide

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[13] Federal Transit Administration, *Circular 4702.1B Title VI Requirements and Guidelines for Federal Transit Administration Recipients,* October 1, 2012, page IV-4, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Title_VI_FINAL.pdf.

[14] FTA, *Circular 4702.1B*, page IV-4

[15] Fixed route refers to public transportation service provided in vehicles operated along pre-determined, regular routes according to a fixed schedule.

[16] More specifically, Title VI *Circular 4702.1B* (page I-4) defines minority persons as including the following identities: (1) American Indian and Alaska Native, which refers to people having origins in any of the original peoples of North and South America (including Central America), and who maintain tribal affiliation or community attachment; (2) Asian, which refers to people having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent, including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam; (3) Black or African American, which refers to people having origins in any of the Black racial groups of Africa; (4) Hispanic or Latino, which includes people of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race; and (5) Native Hawaiian or Other Pacific Islander, which refers to people having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

performance (outside of the realm of Title VI), Metro Transit disaggregates transit performance by race and ethnicity for more power and knowledge by community.

Low-Income Population

While low-income populations are not an explicitly protected class under Title VI, FTA recognizes the inherent overlap between Title VI and environmental justice principles. Consequently, FTA encourages transit providers to conduct service monitoring with regard of low-income populations in addition to minority populations, and to identify any disproportionate burden placed on low-income populations.

FTA defines a low-income person as one whose household income is at or below the poverty guidelines set by the Department of Health and Human Services (HHS). HHS poverty guidelines are based on family/household size. However, FTA *Circular 4702.1B* also allows for low-income populations to be defined using other established measures that are at least as inclusive as those developed by HHS.

Correspondingly, this Title VI service monitoring analysis uses 185% of the 2019 U.S. Census Bureau poverty thresholds to determine low-income status. U.S. Census Bureau poverty thresholds use a more sophisticated measure of poverty that considers not only family/household size, but also the number of related children present, and, for one- and two-person family units, whether one is elderly or not. The U.S. Census Bureau's poverty thresholds are used for statistical purposes, while HHS's poverty guidelines are used for administrative purposes.[17]

The Metropolitan Council uses 185% of poverty thresholds to define poverty in its place-based equity research, regional policies, and other initiatives, and this Title VI analysis mirrors that approach.[18] Table 1 lists 185% of the 2019 U.S. Census Bureau poverty thresholds that are used in this analysis.

[17] The distinctions between poverty thresholds and guidelines are described further at https://aspe.hhs.gov/frequently-asked-questions-related-poverty-guidelines-and-poverty.

[18] The use of 185% poverty thresholds differs from previous service monitoring studies, which used the 100% thresholds. The decision to use 185% thresholds was a result of a recent internal review of Metro Transit and the Council's Title VI service equity analysis practices, and research on those used by other agencies nationwide. The review found that half of the 26 transit agencies reviewed used a definition of "low income" that was more inclusive than the standard definition (100%) suggested by FTA in *Circular 4702.1B*. FTA allows agencies to set their own, more tailored definitions of what constitutes "low income," as long as they are at least as inclusive.

Table 1. 2019 U.S. Census Bureau Poverty Thresholds (185%) in Dollars

by Size of Family Unit and Number of Related Children Under 18 Years of Age

Size of Family Unit	Weighted Average Poverty Thresholds ($)	None	One	Two	Three	Four	Five	Six	Seven	Eight or more
One Person (Unrelated Individual)	24,070									
Under 65 Years	24,605	24,606								
65 Years & Over	22,683	22,683								
Two People	30,564									
Householder Under 65 Years	31,813	31,671	32,600							
Householder 65 Years & Over	28,616	28,588	32,476							
Three People	37,620	36,996	38,069	38,106						
Four People	48,418	48,784	49,582	47,964	48,131					
Five People	57,389	58,831	59,686	57,858	56,444	55,581				
Six People	64,989	67,666	67,934	66,534	65,192	63,197	62,015			
Seven People	74,030	77,858	78,344	76,668	75,500	73,324	70,785	68,000		
Eight People	82,253	87,078	87,847	86,265	84,880	82,914	80,419	77,822	77,162	
Nine People or More	97,819	104,749	105,257	103,857	102,681	100,752	98,097	95,696	95,101	91,438

Source: U.S. Census Bureau; 100% of the 2019 poverty thresholds are available at https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html.

Discrimination, Disparate Impact, and Disproportionate Burden

In *Circular 4702.1B*, FTA defines **discrimination** as referring to:

> any action or inaction, whether intentional or unintentional, in any program or activity of a federal aid recipient, subrecipient, or contractor that results in disparate treatment, disparate impact, or perpetuating the effects of prior discrimination based on race, color, or national origin.[19]

Disparate impact, a key concept for understanding Title VI regulations, is defined in the *Circular* as:

> a facially neutral policy or practice that disproportionately affects members of a group identified by race, color, or national origin, where the recipient's policy or practice lacks a substantial legitimate justification and where there exists one or more alternatives that would serve the same legitimate objectives but with less disproportionate effect on the basis of race, color, or national origin.[20]

Similarly, FTA defines **disproportionate burden** as:

> a neutral policy or practice that disproportionately affects low-income populations more than non-low-income populations.[21]

[19] Federal Transit Administration, *Circular 4702.1B Title VI Requirements and Guidelines for Federal Transit Administration Recipients*, October 1, 2012, page I-2, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Title_VI_FINAL.pdf.
[20] FTA, *Circular 4702.1B*, page I-2
[21] FTA, *Circular 4702.1B*, page I-2

Per FTA guidance, Metro Transit uses its disparate impact and disproportionate burden thresholds as evidence of impacts severe enough to meet the definition of disparate impact or disproportionate burden.

Metro Transit has defined its disparate impact and disproportionate burden policies and thresholds using the "80% rule," which states that there may be evidence of disparate impacts/disproportionate burden if:

- *Benefits* are being provided to *BIPOC/low-income* populations at a rate less than 80% of the benefits being provided to *non-BIPOC/non-low-income* populations, or
- *Adverse effects* are being borne by *non-BIPOC/non-low-income* populations at a rate less than 80% of the adverse effects being borne by *BIPOC/low-income* populations.

The 80% rule originates from employment law but is applied in this setting to compare the distribution of benefits and/or adverse impacts among various population groups.[22] The 80% rule suggests that a selection rate for any racial, ethnic, or gender group that is less than 80% of the rate for the group with the highest selection rate will be regarded as evidence of adverse impact. Although it is a general principle and not a legal definition, it is a practical way for identifying adverse impacts that require mitigation or avoidance.

Metro Transit's decision to use the 80% rule for its disparate impact and disproportionate burden thresholds was subject to a formal public outreach process before being adopted by the Metropolitan Council in 2013.

In this analysis, if the quantitative results indicate that service standard/policy compliance for BIPOC/ low-income routes (or stops or areas) is less than 80 percent of the compliance rate for non-BIPOC/ non-low-income routes (or stops or areas), this could be evidence of disparate impact/ disproportionate burden. In these cases, additional analysis will be conducted, and potential mitigation measures will be identified if necessary.

Additional information about how disparate impact and disproportionate policies are applied in this study can be found on page 27.

[22] Section 60-3.4(D), *Uniform Guidelines on Employee Selection Procedure* (1978); 43 FR 38295, August 25, 1978, https://www.ecfr.gov/current/title-41/subtitle-B/chapter-60/part-60-3.

CHAPTER 3: SERVICE MONITORING CONCEPTS AND DEFINITIONS

The following section establishes concepts and definitions used to guide and evaluate transit service, including those:

- used by the Metropolitan Council to establish regional transit design guidelines and performance standards and by Metro Transit to establish Title VI service standards and policies; and those
- used by Metro Transit to evaluate compliance with its Title VI service standards and policies, following FTA guidance documented in the Title VI *Circular 4702.1B*.

These concepts and definitions are critical context for understanding Metro Transit's service standards and policies and are referenced throughout this report.

Concepts and Definitions to Establish Standards and Policies

Route Types

For the purposes of developing regional transit design guidelines and performance standards, the Metropolitan Council coordinates the classification routes in the regional transit network (including Metro Transit's) based on their mode and role within the overall network. Metro Transit incorporates these route type into several of its service standards and policies.

Route types represented among the 152 Metro Transit fixed routes evaluated in this report include:

- Core Local Bus
- Supporting Local Bus
- Suburban Local Bus
- Commuter and Express Bus
- Arterial Bus Rapid Transit
- Highway Bus Rapid Transit
- Light Rail
- Commuter Rail

Each regular fixed route is assigned one route type, though most routes serve multiple route purposes. Route types were assigned to individual routes based on their primary purpose. For example, a route assigned the commuter and express route type may have one or more segments that act more like one of the local route types (e.g., local service in a suburban neighborhood before or after serving a park & ride), but that are not reflective of the primary purpose of the route.

Appendix A: Route Types includes detailed route type definitions. A list of Metro Transit fixed routes by route type is included in Appendix B: Route Designations.

Transit Market Areas

Metro Transit's service standards related to vehicle headway and service availability differ by Transit Market Area. The Metropolitan Council and Metro Transit use Transit Market Areas as a tool used to guide transit planning decisions and help ensure that the types and levels of transit service provided, in particular fixed-route bus service, match the expected demand in a given area. Expected demand for transit service varies across the region. While this variation is driven by a number of factors, in the

Twin Cities region it is primarily due to differences in development density, urban form, and demographics. To account for these differences in the planning and evaluation of transit service, the region is divided into five distinct Transit Market Areas – I, II, III, IV, and V – representing different levels of potential transit demand.

Transit Market Area I represents urban center communities that have a more traditional urban form with a street network laid out in grid form. Market Area I has the potential transit ridership necessary to support the most intensive fixed-route transit service, typically providing higher frequencies, longer hours, and more options available outside of peak periods. At the other end of the spectrum, Transit Market Area V tends to be primarily rural communities and agricultural uses. General public dial-a-ride service may be appropriate here, but due to the very low-intensity land uses these areas are not well-suited for fixed-route transit service. All five market areas are represented in the Metro Transit service area.

More information on Transit Market Areas can be found in Appendix G of the Metropolitan Council's *2040 Transportation Policy Plan*. A map of Transit Market Areas in the region is included in Appendix C: Transit Market Areas of this report.

Concepts and Definitions to Evaluate Compliance with Standards and Policies

Demographic Area Types

FTA *Circular 4702.1B* establishes the following concept that is critical for conducting service monitoring in compliance with FTA requirements:

> *Predominantly minority area* means a geographic area, such as a neighborhood, Census tract, block or block group, or traffic analysis zone, where the proportion of minority persons residing in that area exceeds the average proportion of minority persons in the recipient's service area.[23, 24]

This "predominance" concept applies similarly to low-income areas. The concept is incorporated into the methodology for designating each Metro Transit fixed route as either BIPOC or non-BIPOC and either low-income or non-low-income (described in the following section).

To simplify terminology, **"predominantly minority areas" are herein referred to as "BIPOC areas,"** and are defined as census block groups where BIPOC residents make up at least 31.3% of residents, the average across Metro Transit's service area as a whole. BIPOC areas within the Metro Transit service area are shown in Figure 1. BIPOC areas make up 39% of census block groups and 22% of the geographic (surface) area of the Metro Transit service area and are home to 40% of the service area's total population (regardless of race and ethnicity).

Similarly, **"predominantly low-income areas" are herein referred to as "low-income areas,"** and are defined as census block groups where low-income residents make up at least 22.8% of residents, the average across Metro Transit's service area. Low-income areas within the Metro Transit service area

[23] FTA, *Circular 4702.1B*, page I-5

[24] Per *Circular 4702.1B*, service area in this context refers to the geographic area in which a transit agency is authorized by its charter to provide service to the public (page I-5).

are shown in Figure 2. Low-income areas make up 38% of census block groups and 20% of the geographic area of the Metro Transit service area and are home to 38% of the service area's total population.

This study uses U.S. Census Bureau 2015-2019 American Community Survey 5-year estimates at the block group level to determine the Metro Transit service area averages for percent BIPOC residents (31.3%) and percent low-income residents (22.8%).

Figure 1. BIPOC Areas within the Metro Transit Service Area

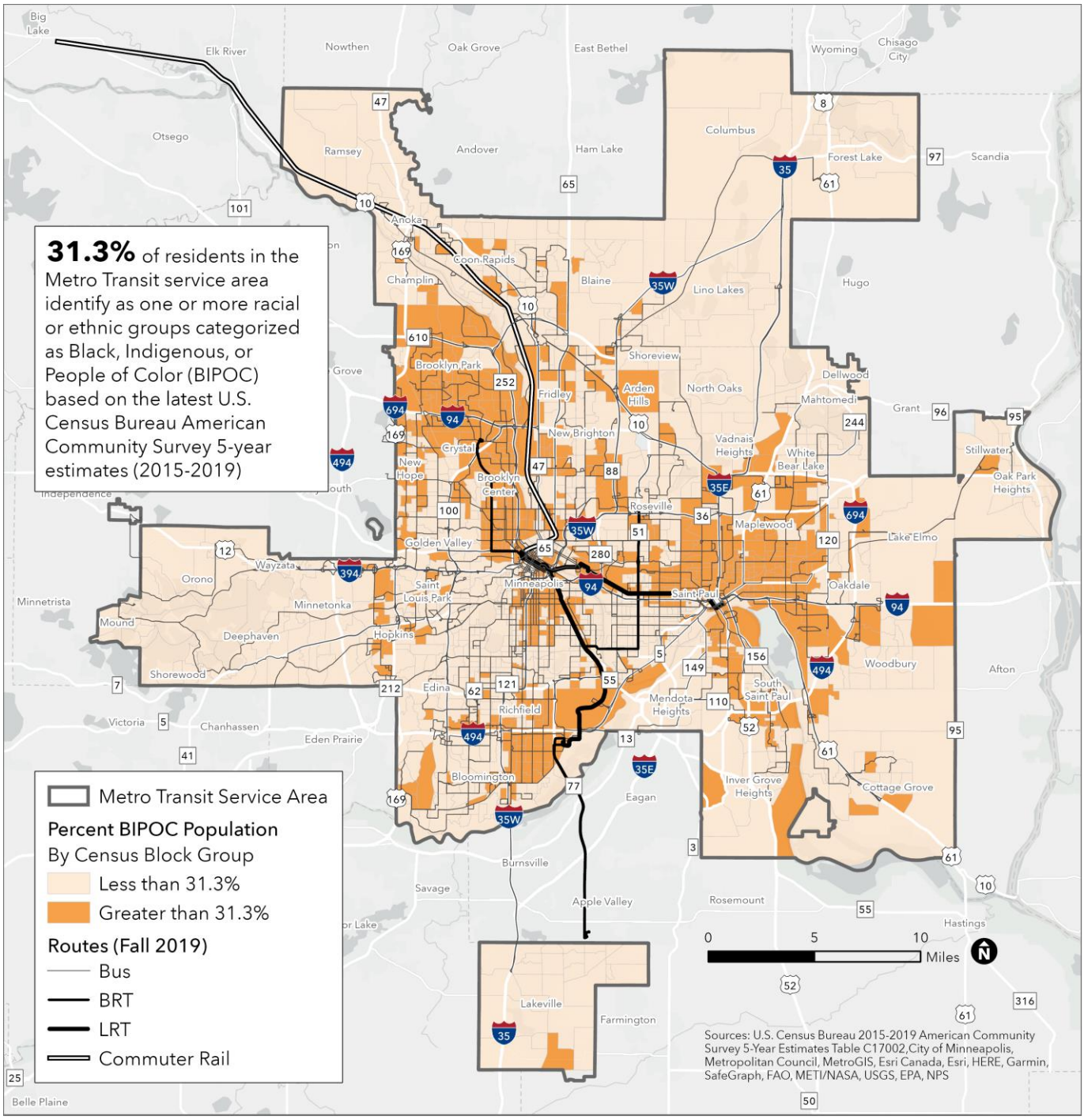
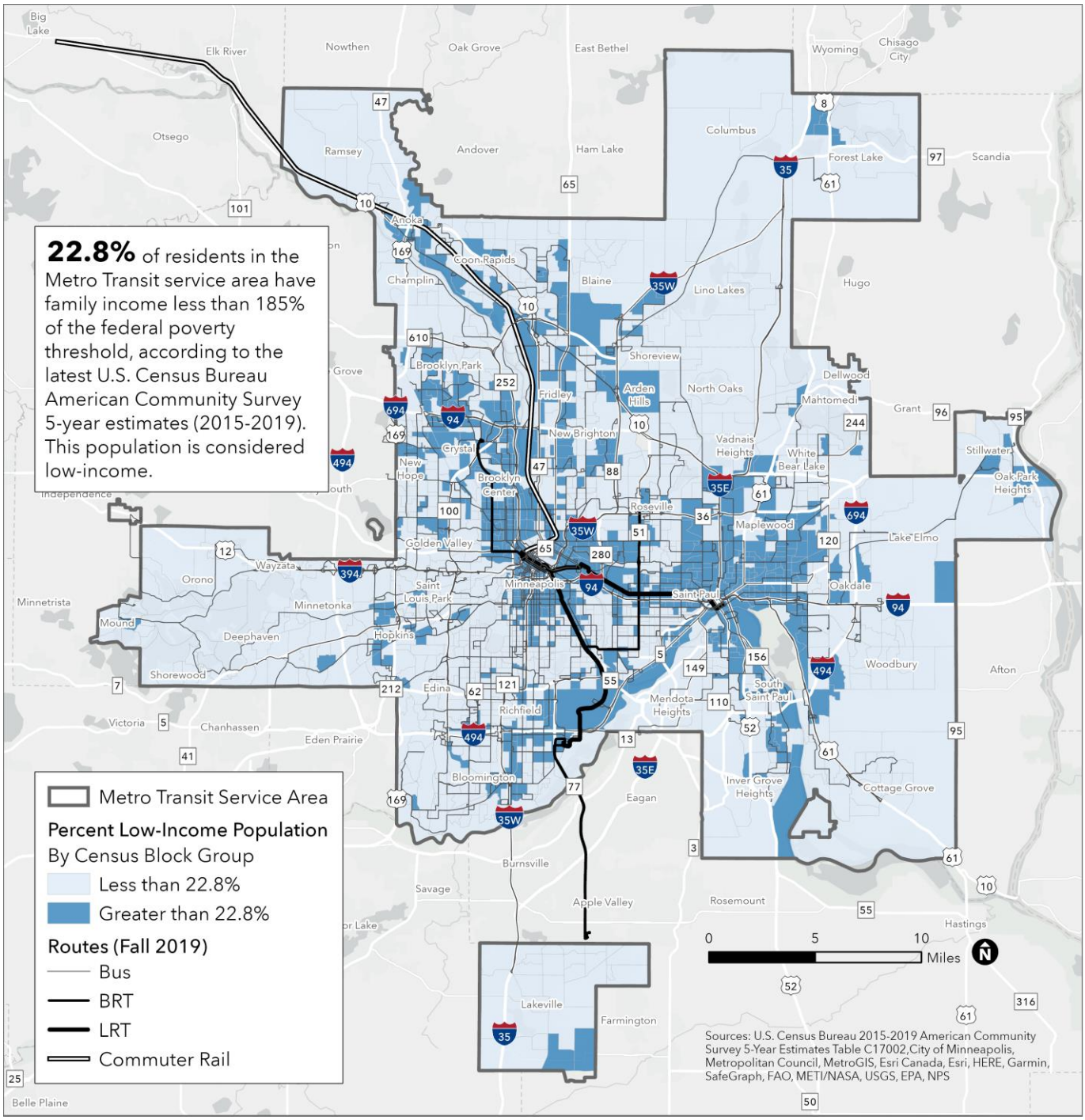


Figure 2. Low-Income Areas within the Metro Transit Service Area



Route Designations

For the purposes of this analysis, **each route is designated as either BIPOC or non-BIPOC and either low-income or non-low-income.** Doing so enables comparison of service outcomes and service standard and policy compliance rates between BIPOC and non-BIPOC routes and between low-income and non-low-income routes and subsequent determination of disparate impact and disproportionate burden. Summarized in Table 2, 55% of the 152 routes included in this study are considered BIPOC routes, while 51% are considered low-income routes. Local routes – particularly core local bus and suburban local bus route types – are more likely to be designated as either BIPOC

or low-income (73-85% of routes) compared to commuter and express routes (16-37% of routes). See Appendix B: Route Designations for a list of all 152 routes analyzed in this study alongside their designations.

Table 2. Summary of Route Designations by Route Type

Route Type	Number of Routes	BIPOC	Non-BIPOC	Low-Income	Non-Low-Income
Core Local	34	76%	24%	85%	15%
Supporting Local	13	62%	38%	77%	23%
Suburban Local	26	73%	27%	85%	15%
Commuter and Express	73	37%	63%	16%	84%
Arterial BRT	2	50%	50%	100%	0%
Highway BRT	1	0%	100%	0%	100%
Light Rail	2	100%	0%	100%	0%
Commuter Rail	1	0%	100%	0%	100%
All Routes	**152**	**55%**	**45%**	**51%**	**49%**

FTA provides guidance on how routes are to be designated for service monitoring purposes. Central to the FTA methodology is the relationship between the demographics of the population living within a route's service area and those of the population living in the system-wide service area (described in the previous section, shown in Figure 1 and Figure 2). FTA's methodology states that if one-third of a route's service area is in areas with BIPOC population greater than the system-wide service area average (31.3% in this study) then that route is to be designated as a BIPOC route. The same methodology is applied for designating routes as either low-income or non-low-income.

Further, FTA *Circular 4702.1B* states that agencies, "may supplement this service area data with route-specific ridership data in cases where ridership does not reflect the characteristics of [the service area]," and adjust route designations accordingly.[25] As such, Metro Transit used route-specific ridership data from the Metropolitan Council's Transit Behavior Inventory (TBI) On-Board Survey to refine route designations in this study. Other modifications were made to FTA's route designation methodology to more accurately reflect the population served by routes, but without deviating from the reasoning of the original methodology. These modifications include the elimination of non-stop route segments and incorporation of park & ride user data for defining a route's service area. A detailed description of the methodology used to designate routes in this study is included in Appendix D: Route Designation Methodology.

Stop Designations

Metro Transit's distribution of transit amenities policies guide the type of amenities (e.g., shelter, real-time signs, etc.) that are provided at transit stops and help the agency plan and prioritize investments. Assessment of how amenities have been distributed in light of these policies determines whether transit users have equitable access to these amenities.

[25] FTA, *Circular 4702.1B*, page I-4

Metro Transit maintains thousands of stops that are served by one or more of its fixed routes. Stops in this study are defined as permanent or semi-permanent, marked locations where passengers can get on and/or off a fixed route vehicle, according to public route schedules. Stops include both bus stops as well as station platforms served by BRT, light rail, or commuter rail lines. Further, stops can be located at various facility types, including park & rides, transit centers, and stations.

This analysis considers the **11,912 stops served by Metro Transit routes in either fall 2019, fall 2020, or both periods. Each stop is designated as either BIPOC or non-BIPOC and either low-income or non-low-income.** This enables comparison of policy compliance rates and subsequent determination of disparate impact and disproportionate burden. Forty-five percent of stops included in this study are considered BIPOC stops, while 47% are considered low-income stops.

FTA does not prescribe a method for designating stops as either BIPOC or non-BIPOC and either low-income or non-low-income. The method used in this study uses the relationship between the demographics of the population living in the system-wide service area and those of the population living within the influence area of the stop – defined as a 10-minute walk from the stop using the existing street and sidewalk network.

A stop is designated as BIPOC if the proportion of BIPOC residents within a 10-minute walk from the stop exceeds the system-wide service area average (31.3% in this study). The same approach is applied for designating stops as either low-income or non-low-income. Each stop is considered in isolation, without regard to the route(s) that serve it or nearby stops. Importantly, this approach does not account for the demographics of those for whom an area is a destination, only those living near the stop.

When the 10-minute walkshed from the stop crosses multiple census block groups, the population from those block groups is distributed to the walkshed in proportion to the block group area inside it. This mirrors the method used by Metro Transit's Strategic Initiatives division for other equity work across the agency.

CHAPTER 4: ANALYSIS METHODS AND RESULTS

The following sections describe the analysis and results for the evaluation of each of the service standard and policy types required by FTA. In light of the impact of COVID-19 on transit demand and Metro Transit's service and ridership, this study monitors service from fall 2019 and, where practical, fall 2020.[26]

The study includes all 152 fixed routes that operated in either fall 2019 or fall 2020. This includes 33 routes provided by the Metropolitan Council under the Metro Transit brand. These are contracted routes overseen by the Council's Metropolitan Transportation Services (MTS), including the METRO Red Line (highway BRT). These routes are sometimes referred to as "MTS routes," but are fully integrated into Metro Transit's service and facility planning functions.

In keeping with FTA guidance, service monitoring results are reported by mode; that is, separately for bus (all bus route types, including arterial BRT and highway BRT), light rail (METRO Blue Line and METRO Green Line), and commuter rail (Northstar).[27]

The results for light rail and Northstar are shown primarily for informational purposes and comparison with other route types. Metro Transit has only one commuter rail route, and both of the light rail lines are identified as both BIPOC and low-income routes. It is therefore impossible to make comparisons between BIPOC and non-BIPOC and low-income and non-low-income routes within the light rail and commuter rail route types.

Comparison Index

For each service standard and policy, determinations of disparate impact and disproportionate burden are made by calculating a comparison index between the BIPOC and non-BIPOC results and between the low-income and non-low-income results. **The comparison index is the tool used by Metro Transit to apply its disparate impact and disproportionate burden policies (see page 19).**

In cases where the results measure an *adverse impact* (e.g., vehicle overloads), the comparison index is measured as the ratio between the non-BIPOC/non-low-income results and the BIPOC/low-income result. A higher ratio is better and indicates relatively less negative impact on BIPOC/low-income people.

Alternatively, in cases where the results measure a *positive impact* (e.g., compliance with vehicle headway standards), the comparison index is measured as the ratio between the BIPOC/low-income results and the non-minority/non-low-income results. A higher ratio is better and indicates more benefit to BIPOC/low-income people.

In either case, **a comparison index less than 0.80 indicates the potential for disparate impact/disproportionate burden.**

[26] For example, vehicle load standards were assessed only for fall 2019, given the dramatic reduction in transit demand in fall 2020 due to COVID-19 and the presence of vehicle capacity restrictions to slow spread of the virus. Alternatively, route spacing standards were assessed for both fall 2019 and fall 2020, as Metro Transit had direct influence over how it distributed service in light of COVID-19.

[27] These mode classifications – bus, light rail, and commuter rail – mirror how Metro Transit reports to the National Transit Database (NTD).

Vehicle Load

Standards

Vehicle load refers to the number of passengers aboard an in-service transit vehicle at a given time. Metro Transit's vehicle load standards are defined by route type and vehicle type for peak (weekdays from 6:00-9:00 AM and 3:00-6:30 PM) and off-peak periods (Table 3). The numerical standards represent the maximum number of passengers (seated and standing combined) allowable before an "overload" occurs. In addition to route type, vehicle type, and day period, the standards were developed considering the average seating capacity of vehicles. In many cases, the off-peak load standard represents the number of seats available for that vehicle type (see *Vehicle Assignment* for more information on vehicle types).

While the availability of seating is a contributing factor to a pleasant transit experience, it is not always feasible during peak periods. Standing loads – that is, a vehicle load in excess of the seating capacity – are considered acceptable in some instances, such as on light rail vehicles and during peak service. The primary exception to this is peak loads on commuter and express routes with more than four miles of travel on freeways, where the load standards are equal to seating capacity regardless of time of day. This difference is due to safety needs of highway travel, as well as the relative lack of seat turn-over and greater distances traveled by passengers compared to other route types.

Table 3. Vehicle Load Standards

Load standards represent the maximum number of passengers (seated and standing combined) allowable

Route Type	Vehicle Type	Peak Load Standard	Off-Peak Load Standard
Core Local	Standard 40′ bus	48	**38**
	Articulated 60′ bus	71	**57**
Supporting Local	Standard 40′ bus	48	**38**
	Articulated 60′ bus	71	**57**
	30′ bus	35	**28**
	Cutaway	21	**21**
Arterial BRT	Arterial BRT 40′ bus	48	**38**
	Arterial BRT 60′ bus	71	**57**
Highway BRT	Standard 40′ bus	44	**38**
	Articulated 60′ bus	66	**57**
Commuter and Express (> 4 Miles on Freeway)	Standard 40′ bus	38	**38**
	Articulated 60′ bus	57	**57**
	Coach bus	57	**57**
Commuter and Express (< 4 Miles on Expressway)	Standard 40′ bus	44	**38**
	Articulated 60′ bus	66	**57**
Suburban Local	Standard 40′ bus	48	**38**
	Articulated 60′ bus	71	**57**
	30′ bus	35	**28**
	Cutaway	21	**21**
Light Rail	Light rail vehicle (per car)	132	**132**

Methods

Vehicle load data are continuously collected aboard buses using automatic passenger counter (APC) equipment. However, similar vehicle load data are not available for all light rail or Northstar commuter rail trips. Periodic in-person spot checks of the light rail system are conducted by Metro Transit staff to assess ridership and vehicle load patterns. Vehicle loads on Northstar commuter rail vehicles are monitored by conductors. No significant overload issues were identified for either route type during standard (non-event-related) service since the last service monitoring report in fall 2018.

This analysis considers weekdays from fall 2019. Weekdays are used given the reduced demand and rarity of overloads on weekend days. Fall 2020 data are not considered given the dramatic reduction in demand and vehicle capacity restrictions in place in fall 2020 to ensure social distancing in light of COVID-19.

The unit of analysis is a scheduled weekday trip. The maximum passenger load is identified for each trip observation. Overloaded trips are identified by comparing the observed maximum passenger load to the appropriate load standard (Table 3) based on the trip attributes (i.e., route type, vehicle type, and peak versus off-peak). The number of total trips and overloaded trips are then aggregated by route and scheduled trip number. On average, each scheduled trip (e.g., the weekday trip on Route 99 departing at 7:45 AM) had load observations on 55 days across fall 2019.

Occasional overloads are to be expected due to natural variations in transit demand and special events. Metro Transit considers trip overloads to be an issue needing to be addressed if they are "consistently overloaded." Individual route trips (e.g., the weekday trip on Route 99 departing at 7:45 AM) are considered to be consistently overloaded if they experience an overload on two or more days per five weekdays. Because a trip has an equal probability of being sampled on any weekday, this review considers a trip that was overloaded 40 percent or more of the time (two days per five-day week) to be consistently overloaded.

In summary, compliance with the vehicle load standards is measured in two ways:

- Percent of trips observations *overloaded*, defined as the proportion of all observed completed trips that exceed overload standards at some point during the trip; and
- Percent of scheduled trips *consistently overloaded,* defined as an individual route trip where greater than 40 percent of its observed completed trips (e.g., 23 out of 55 trip observations) are overloaded at some point during the trip.

Each of these measures is calculated by race/ethnicity and income route designations. Trips are first aggregated by route designation (e.g., total trips scheduled on BIPOC routes), then the aggregate is evaluated.

Results

Over the course of fall 2019, just 1.54% of all observed bus trips were overloaded. The analysis results by route designation are summarized in Table 4. Vehicle load results by route are included in Appendix E: Vehicle Load.

Trips scheduled on BIPOC routes were less likely to be overloaded (1.30% of observed trips) than those on non-BIPOC routes (2.12%). The resulting comparison index of 1.63 (2.12%/1.30% = 1.63) is greater than 1.00, indicating more advantageous results for BIPOC routes. Similarly, BIPOC routes

were less likely to have trips that were consistently overloaded (0.15% of schedule trips) compared to non-BIPOC routes (0.56%). The resulting comparison index of 3.73 is greater than 1.00, indicating more advantageous results for BIPOC routes. **Therefore, this analysis identifies no disparate impact based on vehicle loads.**

Table 4. Vehicle Load Standards Results

Mode	Route Designation	Percent of Weekday Trip Observations with an Overload	Percent of Scheduled Weekday Trips Consistently Overloaded
Bus	BIPOC Routes	1.30%	0.15%
	Non-BIPOC Routes	2.12%	0.56%
	DI Comparison Index	**1.63**	**3.73**
	Low-Income Routes	1.21%	0.17%
	Non-Low-Income Routes	2.98%	0.75%
	DB Comparison Index	**2.46**	**4.41**

*Both LRT lines are designated as BIPOC and low-income routes, thus, there is no comparison index
^The sole commuter rail line (Northstar) is designated as a non-BIPOC and non-low-income route, thus, there is no comparison index

Shown in Table 4, trips scheduled on low-income routes were less likely to be overloaded (1.21% of observed trips) than those on non-low-income routes (2.98%). The resulting comparison index of 2.46 is greater than 1.00, indicating more advantageous results for low-income routes. Similarly, low-income routes were less likely to have trips that were consistently overloaded (0.17% of schedule trips) compared to non-low-income routes (0.75%). The resulting comparison index of 4.41 is greater than 1.00, indicating more advantageous results for low-income routes. **Therefore, this analysis identifies no disproportionate burden based on vehicle loads.**

Vehicle Headway

Standards

Metro Transit measures the frequency of a route based on vehicle headway, which is defined as the average number of minutes between transit vehicles on a given route traveling in the same direction. A smaller headway equates to more transit vehicles, higher frequency, and a greater level of service along a corridor. Routes serving areas of higher transit demand will tend to have smaller/shorter headways (higher frequency service).

Metro Transit's vehicle headway standards represent the minimum level of service allowable to meet the standard. Shown in Table 5, vehicle headway standards differ by route type, day period (peak, off-peak, and weekend), and Transit Market Area. Peak is defined as weekday trips predominantly occurring between 6:00 and 9:00 AM or between 3:00 and 6:30 PM. Off-peak encompasses trips predominantly occurring during the remaining time during weekdays, and weekend applies to all trips throughout the day on Saturdays and Sundays.

Table 5. Vehicle Headway Standards

Route Type	Day Period	Market Area I	Market Area II	Market Area III	Market Area IV	Market Area V
Core Local	Peak	15′	30′	60′	--	--
	Off-peak	30′	60′	60′	--	--
	Weekend	30′	60′	60′	--	--
Supporting Local	Peak	30′	30′	60′	--	--
	Off-peak	30′	60′	60′	--	--
	Weekend	30′	60′	60′	--	--
Suburban Local	Peak	NA	30′	60′	--	--
	Off-peak	NA	60′	60′	--	--
	Weekend	NA	60′	60′	--	--
Arterial BRT	Peak	15′	15′	15′	--	--
	Off-peak	15′	15′	15′	--	--
	Weekend	15′	15′	15′	--	--
Highway BRT	Peak	15′	15′	15′	--	--
	Off-peak	15′	15′	15′	--	--
	Weekend	15′	15′	15′	--	--
Light Rail	Peak	15′	15′	15′	--	--
	Off-peak	15′	15′	15′	--	--
	Weekend	15′	15′	15′	--	--
Commuter and Express	Peak	30′	30′	3 Trips each peak	3 Trips each peak	--
Commuter Rail	Peak	--	--	30′	30′	30′

Methods

Calculation of vehicle headways is completed using schedules derived from generalized transit feed specification (GTFS) data from a representative week in fall 2019 and fall 2020. Trips counts are calculated for each route by stop, day type (i.e., weekday, Saturday, Sunday), and time of day (AM peak, midday, PM peak). Day type and time of day are combined to mirror the day period scheme (i.e., peak, off-peak, weekend) used in the vehicle headway standards (Table 5). Trip counts are then categorized into three representative day periods using the following parameters:

- Peak, including weekday trips at stops occurring between 6:00 and 9:00 AM or between 3:00 and 6:30 PM;
- Off-peak, including weekday trips at stops occurring between 11:00 AM and 2:00 PM; and
- Weekends, including trips at stops occurring between 11:00 AM and 2:00 PM on weekends.

Route type and Transit Market Area are then attributed to each unique route-stop-day period combination to match the scheme of Metro Transit's vehicle headway standard. Next, the scheduled headway for each route-stop-day period combination is calculating by dividing the duration of the day period (e.g., 3 hours for off-peak) by the count of schedule trips during that day period. The result is compared to the headway standard corresponding to the combination's route type, Transit Market Area, and day period. Results are then aggregated to the route level and route designation level (e.g.,

BIPOC route versus non-BIPOC route) to calculate the percent of route-stop combinations meeting the headway standard. This process is repeated for both fall 2019 and fall 2020 schedules.

This analysis evaluates the headways for each route independently of all other transit service, per Metro Transit's headway standards. A single stop or station may be used by multiple routes and have a combined headway that is much better than the headway of each individual route.

Results

Table 6 and Table 7, summarize the percent of route-stop combinations meeting the vehicle headway standards for each mode by route designation and day period in fall 2019 and fall 2020, respectively.

Table 6. Vehicle Headway Standards Results (2019)

Percent of route-stop combinations meeting headway standards

Mode	Route Designation	Peak	Off-Peak	Weekend	Total
Bus	BIPOC Routes	56%	95%	78%	72%
	Non-BIPOC Routes	61%	96%	73%	69%
	DI Comparison Index	**0.92**	**0.99**	**1.07**	**1.04**
	Low-Income Routes	59%	95%	79%	74%
	Non-Low-Income Routes	55%	92%	52%	57%
	DB Comparison Index	**1.07**	**1.03**	**1.52**	**1.30**
Light Rail*	BIPOC Routes	100%	100%	95%	98%
	Low-Income Routes	100%	100%	95%	98%
Commuter Rail^	Non-BIPOC Routes	0%	--	--	0%
	Non-Low-Income Routes	0%	--	--	0%

*Both LRT lines are designated as BIPOC and low-income routes, thus, there is no comparison index
^The sole commuter rail line (Northstar) is designated as a non-BIPOC and non-low-income route, thus, there is no comparison index

Table 7. Vehicle Headway Standards Results (2020)

Percent of route-stop combinations meeting headway standards

Mode	Route Designation	Peak	Off-Peak	Weekend	Total
Bus	BIPOC Routes	55%	95%	77%	71%
	Non-BIPOC Routes	46%	96%	72%	63%
	DI Comparison Index	**1.20**	**0.99**	**1.07**	**1.13**
	Low-Income Routes	56%	96%	78%	73%
	Non-Low-Income Routes	32%	91%	50%	45%
	DB Comparison Index	**1.75**	**1.05**	**1.56**	**1.62**
Light Rail	BIPOC Routes	100%	100%	91%	96%
	Low-Income Routes	100%	100%	91%	96%
Commuter Rail	Non-BIPOC Routes	0%	--	--	0%
	Non-Low-Income Routes	0%	--	--	0%

Regardless of day period, BIPOC routes had higher compliance rates than non-BIPOC routes in both 2019 (72% versus 69%, Table 6) and 2020 (71% versus 63%, Table 7). Compared to non-BIPOC routes, BIPOC routes had higher compliance on weekends, about the same during off-peak, and mixed results during the peak. Peak period compliance of BIPOC routes was less than that of non-BIPOC routes in 2019, though this pattern reversed in 2020.

In all day periods in both years, the BIPOC routes to non-BIPOC routes comparison indices related to vehicle headway standards are above the 0.80 minimum threshold for avoiding disparate impact. **Therefore, this analysis identifies no disparate impact based on vehicle headways.**

Low-income routes performed better in terms of vehicle headway compliance than non-low-income routes in all day periods in both years. The resulting comparison indices are all greater than 1.00, indicating more advantageous results for low-income routes. **Therefore, this analysis identifies no disproportionate burden based on vehicle headways.**

On-Time Performance

Standards

On-time performance standards are differentiated for bus and rail service.

- Bus service is considered on-time if it arrives at scheduled timepoints between 1 minute early and 5 minutes late.
- Light rail and commuter rail service is considered on-time if it arrives at stations between 1 minute early and 4 minutes late.[28]

Metro Transit's on-time performance goal for each service mode is updated quarterly to account for seasonal factors and specific construction activity.

Methods

On-time performance data for bus routes are continuously collected using automated vehicle locator (AVL) equipment aboard vehicles. The supervisory control and data acquisition (SCADA) system is the source of on-time performance data for rail service.

Data from fall 2019 are used in this analysis. Fall 2020 on-time performance data are not considered given the dramatic reduction in traffic levels and transit demand at that time due to COVID-19, and the vehicle capacity restrictions in place at that time to slow spread of the virus.

The fall 2019 dataset used for analysis includes the number of on-time timepoint crossing observations, according to the appropriate on-time definition by mode, and total timepoint crossing observations by route and day type. On-time timepoint crossings and total timepoint crossings are summed by route and route designation to determine the percentage of on-time timepoint crossings.

[28] Metro Transit recently updated the on-time definition for rail service to be between 1 minute early and 5 minutes late, matching that of bus service. This change was made following an internal review of service reliability metrics that considered processes, performance, communication with the public, and connection to agency goals. This service monitoring study continues to use the -1 minute to +4 minute on-time definition for rail service, as documented in the most recent Metropolitan Council Title VI Program. However, the next Title VI Program update will reflect the new policy and practice of using -1 minute to +5 minutes.

Results

Table 8 summarizes the percent of timepoint crossings considered on-time for each mode by route designation in fall 2019. Appendix F: On-Time Performance includes a table of on-time performance by route.

Table 8. On-Time Performance Standards Results

Percent of timepoint crossings considered on-time

Mode	BIPOC Designation	On-Time Performance
Bus	BIPOC Routes	85%
	Non-BIPOC Routes	81%
	DI Comparison Index	**1.05**
	Low-Income Routes	84%
	Non-Low-Income Routes	82%
	DB Comparison Index	**1.02**
Light Rail	BIPOC Routes	78%
	Low-Income Routes	78%
Commuter Rail	Non-BIPOC Routes	94%
	Non-Low-Income Routes	94%

Among bus routes, BIPOC routes had higher on-time performance than non-BIPOC routes in 2019, with 85% of trip timepoint crossings on time compared to 81%, respectively (Table 8). The resulting comparison index of 1.05 (85%/81% = 1.05) is greater than 1.00, indicating more advantageous results for BIPOC routes. **Therefore, this analysis identifies no disparate impact based on on-time performance.**

Low-income bus routes had higher on-time performance (84%) than non-low-income routes (82%) in 2019 (Table 8). The resulting comparison index of 1.02 (84%/82% = 1.02) is greater than 1.00, indicating more advantageous results for low-income bus routes. **Therefore, this analysis identifies no disproportionate burden based on on-time performance.**

Service Availability: Route Spacing

Standards

Route spacing refers to the distance between two parallel routes. Route spacing guidelines seek to balance service coverage with route productivity and transit demand. Routes spaced too closely together will have overlapping service areas and compete for riders, reducing the productivity of both routes. Routes spaced too far apart will lead to coverage gaps. Generally, areas with lower transit demand will have routes spaced farther apart.

Table 9 shows the route spacing standards, which differ by route type and Transit Market Area. Route spacing for commuter and express bus, highway and arterial BRT, light rail, and commuter rail routes are determined on a case-by-case basis according to specific transit market conditions.

Table 9: Route Spacing Standards

Route Type	Market Area I	Market Area II	Market Area III	Market Area IV	Market Area V
Core Local*	0.5 miles	1 mile	Specific**	n/a	n/a
Supporting Local	1 mile	1-2 miles	Specific**	n/a	n/a
Suburban Local	n/a	2 miles	Specific**	Specific**	n/a

*Local limited stop routes do not follow a route spacing standard. They will be located in high demand corridors.

** Specific means that route structure will be adapted to the demographics, geography, and land use of specific area

Metro Transit's route spacing standards are defined for core local, supporting local, and suburban local bus route types within Transit Market Areas I and II (Table 9). The function and purpose for the routes evaluated under the route spacing criteria are as follows:

- **Core local** routes typically serve the denser urban areas of Market Areas I and II, usually providing access to a downtown or major activity center along important commercial corridors. They form the base of the core bus network and are typically some of the most productive routes in the system.
- **Supporting local** routes are typically designed to provide crosstown connections within Market Areas I and II. Usually, these routes do not serve a downtown but play an important role connecting to core local routes and ensuring transit access for those not traveling downtown.
- **Suburban local** routes typically operate in Market Areas II and III in a suburban context and are often less productive that core local routes. These routes serve an important role in providing a basic-level of transit coverage throughout the region.

Appendix A: Route Types summarizes the function and purpose for all route types. Each regular fixed route is assigned one route type, though most routes serve multiple route purposes. Route types were assigned to individual routes based on their primary purpose. For example, a route assigned the commuter and express route type may have one or more segments that act more like one of the local route types (e.g., local service in a suburban area before or after serving a park & ride).

Methods

Analysis of route spacing standards compliance is completed using route lines derived from GTFS data from a representative week in fall 2019 and fall 2020. Individual analyses are conducted for core local routes in Market Area I and supporting local routes in Market Area I for both periods. To do so, buffers are created around each route line using geographic information system (GIS) software. For example, a half-mile buffer (half of the one-mile spacing standard) is created around all core local routes. Any areas left out of the buffer areas would not meet the spacing standard for core local routes in Market Area I. For each of the two analyses, the buffer coverage area is overlaid against census block groups in order to compare between demographic area types (i.e., BIPOC areas versus non-BIPOC areas; see *Demographic Area Types*). The proportion of BIPOC areas meeting the route spacing standard is compared to the proportion of non-BIPOC areas meeting the standard, and likewise for low-income versus non-low-income areas.

In Market Area II, service is provided with a mix of core local, supporting local, and suburban local routes. Their three separate standards are simplified into a consistent (and more stringent) one-mile

standard, and one analysis is conducted for all three route types. The process is otherwise identical to that used to assess compliance in Market Area I.

Results

The results of these analyses are shown in Table 10 and Table 11. Maps showing the coverage areas are included in Appendix G: Route Spacing.

Table 10: Route Spacing Results (2019)

Route Type – Market Area	BIPOC Designation	Percent of Area Served	Income Designation	Percent of Area Served
Core Local – I	BIPOC Areas	93.2%	Low-Income Areas	93.5%
	Non-BIPOC Areas	90.9%	Non-Low-Income Areas	89.1%
	DI Comparison Index	**1.03**	**DB Comparison Index**	**1.05**
Supporting Local– I	BIPOC Areas	68.5%	Low-Income Areas	69.4%
	Non-BIPOC Areas	62.0%	Non-Low-Income Areas	56.6%
	DI Comparison Index	**1.11**	**DB Comparison Index**	**1.23**
Core Local, Supporting Local, Suburban Local – II	BIPOC Areas	95.7%	Low-Income Areas	95.4%
	Non-BIPOC Areas	97.1%	Non-Low-Income Areas	97.3%
	DI Comparison Index	**0.98**	**DB Comparison Index**	**0.98**

Table 11: Route Spacing Results (2020)

Route Type – Market Area	BIPOC Designation	Percent of Area Served	Income Designation	Percent of Area Served
Core Local – I	BIPOC Areas	90.3%	Low-Income Areas	91.1%
	Non-BIPOC Areas	90.7%	Non-Low-Income Areas	88.7%
	DI Comparison Index	**1.00**	**DB Comparison Index**	**1.03**
Supporting Local– I	BIPOC Areas	56.5%	Low-Income Areas	56.3%
	Non-BIPOC Areas	52.2%	Non-Low-Income Areas	50.8%
	DI Comparison Index	**1.08**	**DB Comparison Index**	**1.11**
Core Local, Supporting Local, Suburban Local – II	BIPOC Areas	95.3%	Low-Income Areas	95.2%
	Non-BIPOC Areas	97.2%	Non-Low-Income Areas	97.1%
	DI Comparison Index	**0.98**	**DB Comparison Index**	**0.98**

In Market Area II in 2019 and 2020, BIPOC areas had slightly less coverage than non-BIPOC areas, and low-income areas had slightly less coverage than non-low-income areas, as indicated by comparison indices slightly below 1.00 (Table 10, Table 11). In Market Area I in 2019 and 2020, both core local and supporting local routes provide slightly more coverage in BIPOC and low-income areas compared to non-BIPOC and non-low-income, respectively, as indicated by comparison indices greater than 1.00. An exception to this is core local routes in Market Area I in 2020, where non-BIPOC areas had slightly higher coverage rates than BIPOC areas (90.7% versus 90.4%).

All comparison indices in Table 10 and Table 11 are above the 0.80 minimum threshold for avoiding disparate impact and disproportionate burden. **Therefore, this analysis identifies no disparate impact nor disproportionate burden based on route spacing.**

Service Availability: Midday Service

Standards

In addition to route and stop spacing standards, Metro Transit reviews service availability based on the presence of transit service that meets vehicle headway standards during the midday period. This standard is used as another means to ensure that service during the off-peak period is distributed equitably between BIPOC and non-BIPOC areas and between low-income and non-low-income areas.

As discussed previously, vehicle headway standards are defined by service type, market area, and day period (Table 5). Metro Transit uses its off-peak vehicle headway standards to assess service availability during the midday between weekday peak periods. Midday vehicle headway standards are summarized in Table 12.

Table 12: Off-Peak Vehicle Headway Standards

Route Type	Market Area I	Market Area II	Market Area III	Market Area IV	Market Area V
Core Local	30′	60′	60′	--	--
Supporting Local	30′	60′	60′	--	--
Suburban Local	--	60′	60′	--	--
Arterial BRT	15′	15′	15′	--	--
Highway BRT	15′	15′	15′	--	--
Light Rail	15′	15′	15′	--	--
Commuter and Express	--	--	--	--	--
Commuter Rail	--	--	--	--	--

Methods

Service availability is evaluated based on the presence of transit service meeting the required headway during the midday off-peak period. Mirroring the approach used to assess vehicle headway compliance, the midday period for this analysis was defined as weekdays between 11 AM and 2 PM.

Calculation of midday vehicle headways is completed using schedules derived from GTFS data from a representative week in fall 2019 and fall 2020. The average combined midday vehicle headway (from one or more routes) is calculated for each stop within Market Areas I, II, and III, and compared to the applicable standard.[29] A buffer is created around all stops meeting the relevant combined off-peak vehicle headway standard. The size of the buffer depends on the route types serving the stop: A quarter-mile is used for bus stops served by core local, supporting local, and/or suburban local routes; and a half-mile is used for stations served by arterial BRT, highway BRT, and/or light rail.

[29] Calculation of midday vehicle headway for route-stop combinations is not necessary, as standards do not differ between route types within each market area, except for between routes serving bus stops (core local, supporting local, and suburban local) and routes serving stations (arterial BRT, highway BRT, and light rail). A standard of 60 minutes is uniformly applied to suburban local route-stop combinations.

The midday service buffer coverage area is then overlaid against census block groups in order to compare between demographic area types. Finally, the proportion of BIPOC areas meeting the midday vehicle headway standard is compared to the proportion of non-BIPOC areas meeting the standard, and likewise for low-income areas versus non-low-income areas.

Results

The results of these analyses are shown in Table 13 and Table 14. Maps showing the extent of midday service availability are included in Appendix H: Midday Service Availability.

As expected, coverage was highest in Market Area I and lowest in Market Area III (Table 13, Table 14). It was most similar between area types in Market Area II and most varied in Market Area III.

In all cases, in both 2019 and 2020, BIPOC areas had greater midday service coverage than non-BIPOC areas, and low-income areas had greater midday service coverage than non-low-income areas, as indicated by comparison indices greater than 1.00 (Table 13, Table 14). **Therefore, this analysis identifies no disparate impact nor disproportionate burden based on midday service availability.**

Table 13: Midday Service Availability Results (2019)

Market Area	BIPOC Designation	Percent of Area Served and Meeting Standards	Income Designation	Percent of Area Served and Meeting Standards
I	BIPOC Areas	95.8%	Low-Income Areas	95.9%
	Non-BIPOC Areas	85.3%	Non-Low-Income Areas	80.4%
	DI Comparison Index	**1.12**	**DB Comparison Index**	**1.19**
II	BIPOC Areas	75.3%	Low-Income Areas	76.4%
	Non-BIPOC Areas	72.4%	Non-Low-Income Areas	71.5%
	DI Comparison Index	**1.04**	**DB Comparison Index**	**1.07**
III	BIPOC Areas	33.5%	Low-Income Areas	37.3%
	Non-BIPOC Areas	23.0%	Non-Low-Income Areas	23.1%
	DI Comparison Index	**1.46**	**DB Comparison Index**	**1.62**
Combined	BIPOC Areas	57.1%	Low-Income Areas	63.9%
	Non-BIPOC Areas	36.5%	Non-Low-Income Areas	34.8%
	DI Comparison Index	**1.57**	**DB Comparison Index**	**1.84**

Table 14: Midday Service Availability Results (2020)

Market Area	BIPOC Designation	Percent of Area Served and Meeting Standards	Income Designation	Percent of Area Served and Meeting Standards
I	BIPOC Areas	94.9%	Low-Income Areas	94.9%
	Non-BIPOC Areas	84.4%	Non-Low-Income Areas	79.8%
	DI Comparison Index	**1.13**	**DB Comparison Index**	**1.19**
II	BIPOC Areas	74.7%	Low-Income Areas	75.6%
	Non-BIPOC Areas	73.1%	Non-Low-Income Areas	72.4%
	DI Comparison Index	**1.02**	**DB Comparison Index**	**1.04**
III	BIPOC Areas	33.1%	Low-Income Areas	35.3%
	Non-BIPOC Areas	21.1%	Non-Low-Income Areas	21.8%
	DI Comparison Index	**1.57**	**DB Comparison Index**	**1.62**
Combined	BIPOC Areas	56.6%	Low-Income Areas	62.6%
	Non-BIPOC Areas	35.2%	Non-Low-Income Areas	34%
	DI Comparison Index	**1.61**	**DB Comparison Index**	**1.84**

Service Availability: Stop Spacing

Standards

Stop spacing standards must balance the competing goals of providing greater access to service with faster travel speeds. More stops spaced closer together reduce walking distance and improve access to transit but tend to increase in-vehicle travel time. In general, the average distance people are willing to walk to access transit services is one-quarter mile for local bus service and one-half mile for limited stop bus service and transitway service.

Table 15 shows the recommended stop spacing standards that seek to balance speed and access. An allowable exception to standards may be central business districts and major traffic generators. These guidelines are goals, not a minimum or maximum.

Table 15: Stop Spacing Standards

Route Type	Typical Stop Spacing
Core Local*	1/8 to 1/4 Mile
Supporting Local	1/8 to 1/4 Mile
Suburban Local	1/8 to 1/2 Mile
Arterial BRT	1/4 to 1/2 Mile
Highway BRT	1/2 to 2 Miles
Light Rail	1/2 to 1 Mile
Commuter and Express	Market Specific**
Commuter Rail	5 to 7 miles

*Local routes with limited stop service will have a typical stop spacing of 1/4 to 1/2 mile. ** In downtowns and local pickup areas, stop spacing will follow the standards for local routes. Along limited stop or non-stop portions of the route stop spacing will be much greater.

Methods

Analysis of stop spacing standards compliance uses stops and schedules derived from Metro Transit's HASTUS database from a representative week in fall 2019 and fall 2020. The HASTUS data include a calculation of the distance between consecutive stops along a route line, which is often defined by the street network. The route line segment between two consecutive stops in the same direction from the same route is defined in this analysis as a route-stop link.

Street networks or other geographic features may not allow for stop spacing precisely within the appropriate stop spacing standard range. Further, Metro Transit must consider site-specific characteristics before placing stops, including consideration of near-side versus far-side stop placement. To account for these real-world situations, the allowable stop spacing ranges are modified by +/-100 feet from the prescribed range for all route types. For example, core local routes have a typical stop spacing standard of 1/8 to 1/4 miles (Table 15), equal to 660 to 1,320 feet; a range of 560 to 1,420 feet is used in this analysis as evidence of meeting the stop spacing standard for stops served by core local routes.

Commuter and express routes are excluded from analysis, as this route type has no numerical stop spacing standards.

Results

Figure 3 below displays the frequency of route-stop links system-wide by stop link length relative to stop spacing standards, by mode, for fall 2020. A route-stop link is the path between two consecutive stops on a single route in one direction, following the route line. System-wide, results reflective of fall 2019 are nearly identical to those from fall 2020.

Of the nearly 10,500 bus route-stop links, 71% met the stop spacing standard in fall 2020; less than 10% were longer than the stop spacing standards, while about 20% were shorter (Figure 3). Stop spacing standards compliance is much lower for light rail and commuter rail route-stop links. Station platform placement for these modes requires many additional considerations (e.g., population and employment density, etc.), and are further informed by the Metropolitan Council's *Regional Transitway Guidelines* and Metro Transit's broader street, design, and service standards.

Figure 3. System-wide Route-Stop Link Lengths Relative to Stop Spacing Standards (2020)

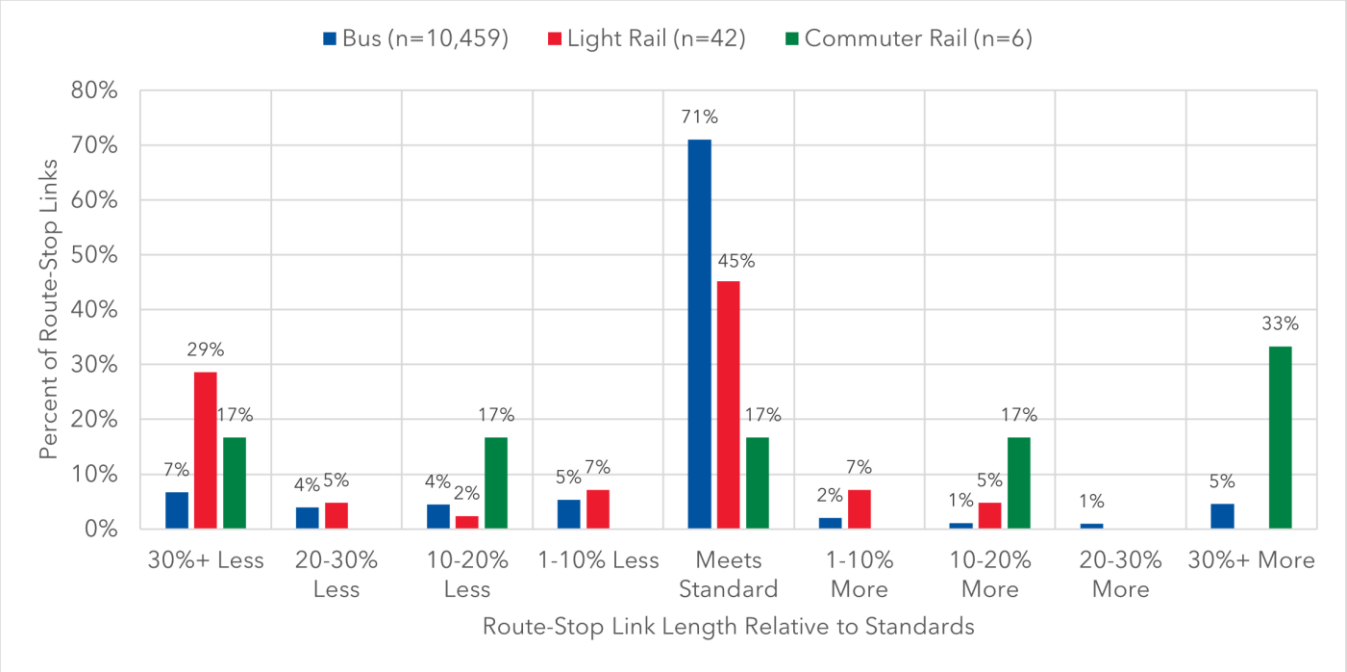


Table 16 further summarizes the results of these analyses for fall 2019 and fall 2020, incorporating route designations.

Table 16. Stop Spacing Standards Results: Route-Stop Links Meeting Standards

Mode	BIPOC Designation	Fall 2019	Fall 2020
Bus	BIPOC Routes	72.7%	72.2%
	Non-BIPOC Routes	65.4%	66.5%
	DI Comparison Index	**1.11**	**1.09**
	Low-Income Routes	72.9%	72.0%
	Non-Low-Income Routes	60.4%	60.5%
	DB Comparison Index	**1.21**	**1.19**
Light Rail	BIPOC Routes	45.2%	45.2%
	Low-Income Routes	45.2%	45.2%
Commuter Rail	Non-BIPOC Routes	16.7%	16.7%
	Non-Low-Income Routes	16.7%	16.7%

Among bus routes, BIPOC routes had a greater proportion of their route-stop links within the stop spacing standard ranges compared to non-BIPOC routes, with 73% and 65%, respectively, in 2019 (Table 16). Results were nearly identical in 2020. The resulting comparison indices are greater than 1.00, indicating more advantageous results for BIPOC routes. **Therefore, this analysis identifies no disparate impact based on stop spacing.**

Shown in Table 16, low-income bus routes had greater stop spacing compliance (73%) than non-low-income routes (60%) in 2019. Results were nearly identical in 2020. The resulting comparison indices

are greater than 1.00, indicating more advantageous results for low-income bus routes. **Therefore, this analysis identifies no disproportionate burden based on stop spacing.**

Distribution of Amenities

Policies

Metro Transit offers a range of features at customer facilities to improve the customer experience. Features include those that address pedestrian connections and accessibility, offer customer information in static and real-time signage, shelter, shelter lighting and heaters, trash and recycling receptacles, and seating, among others. With limited resources for improving the thousands of bus stops and customer facilities in the service area, Metro Transit must prioritize the locations where investments are made and the types of facilities it can install and maintain across the system.

Metro Transit has developed policies for the distribution of **customer information, seating, shelter, shelter lighting and heaters, and trash receptacles at the stops it serves with fixed routes**. Summarized in Table 17, these policies differ by stop type, with standard and optional features varying for bus stops, stops at transit centers, and stops (platforms) at light rail, BRT, and commuter rail stations.

Table 17. Customer Amenities at Transit Stops Policies

Amenity	Stop Type		
	METRO (LRT, BRT) & Commuter Rail Stations*	**Transit Centers**	**Bus Stops**
Route Description/Map	Standard feature	Standard feature	Standard feature at bus stops with 10+ daily boardings
Detailed Timetable**	Standard feature	Standard feature	Standard feature in all Metro Transit-owned shelters
Real-Time Arrival Sign	Standard feature	Optional feature	Optional feature
Seating	Standard feature	Standard feature	Standard feature in all Metro Transit-owned shelters (benches may also be provided by others)
Shelter	Standard feature	Standard feature	Optional feature, prioritized for bus stops with 30+ daily boardings
Lighting	Standard feature	Standard feature	Optional feature, prioritized for bus stops with high boardings during dark hours
Heaters	Standard feature	Standard feature	Optional feature, prioritized for bus stops with 100+ daily boardings
Trash Receptacles	Standard feature	Standard feature	Not provided at transit stop by Metro Transit (may be provided by others)

*Some arterial BRT stations, namely those near the end of the line with mostly people alighting the bus, not boarding the bus, may not have shelters or features typically provided in shelters, such as heat, route description/map, or detailed timetable.
**Timetables will be considered at bus stops that meet the shelter placement boarding warrants but where a shelter is not installed due to space constraints or other limitations.

Metro Transit provides service information to its customers through a variety of means, including route maps and descriptions, detailed timetables, and real-time arrival signs, depending on the type of stop, ridership, and availability of space and/or utility connection. All stops served by Metro Transit

include signage identifying the pick-up location, a listing of the routes serving that stop, and instructions on how to use NexTrip, Metro Transit's real-time departure feature available online, via mobile application, telephone, or text message. Enhanced information is available at transit centers, stations, and bus stops with 10 or more daily boardings (Table 17).

Sheltered waiting places for Metro Transit customers come in many forms, including an interior waiting space or alcove integrated into a building, a park & ride with a sheltered waiting area, a transit center building, a shelter at a rail or BRT station, or a shelter at a bus stop. Shelters provide a package of features for transit customers, including weather protection, detailed schedules, seating, and sometimes lighting and radiant heaters. Shelters further create an identifiable waiting place for transit customers. Shelters are typically provided by Metro Transit, though sometimes by local government or private property owners.

Metro Transit predominantly uses ridership when determining where to place shelters and shelter lighting and heaters (Table 17). Further, priority locations include areas where more households do not have cars and near hospitals, healthcare clinics, social service providers, housing for people with disabilities or older adults, and major transit transfer points. Metro Transit uses the following to prioritize the addition of new shelters:

- Highest priority: 100+ daily boardings and priority location
- High priority: 100+ daily boardings
- Medium priority: 30+ daily boardings and priority location
- Lower priority: 30+ daily boardings

Existing shelters at stops with at least 15 daily boardings are considered for replacement; shelters at stops with fewer than 15 daily boardings are eligible for removal.

Importantly, in addition to these policies for prioritization of optional features, site factors determine if certain amenities can be placed at a stop. Site factors such as available space, slope, and obstructions determine if a shelter can be located at a bus stop. Site factors related to power source and electrical connections affect placement of lighting and heaters within shelters. Additionally, personal security factors are considered when prioritizing lighting.

Methods

This analysis considers the presence of customer amenities at the 11,912 stops served by Metro Transit routes in either fall 2019, fall 2020, or both periods. Each stop is designated as either BIPOC or non-BIPOC and either low-income or non-low-income based on the demographics of those living near the stop relative to service area averages (see *Stop Designations* for additional details).

Per Metro Transit's amenities standards (Table 17), analyses are completed separately for stops at light rail, BRT, and commuter rail stations (these stops are otherwise known as platforms; n=172); stops at one of 25 transit centers (n=85 stops); and all other bus stops (n=11,655 stops).[30] Table 18 summarizes the stops considered in this analysis by stop type and by BIPOC and low-income designation.

[30] Stops that are light rail or BRT station platforms that are within a transit center (e.g., 46th Street Station, Mall of America, etc.) were subject to the more stringent amenities policies for stations, rather than the less stringent policies for stops at transit centers.

Table 18. Summary of Stops Analyzed

Stop Type	BIPOC Stops	Non-BIPOC Stops	Low-Income Stops	Non-Low-Income Stops	All Stops
LRT, BRT & Commuter Rail Stations	116	56	124	48	**172**
	67%	*33%*	*72%*	*28%*	***100%***
Transit Centers	60	25	55	30	**85**
	71%	*29%*	*65%*	*35%*	***100%***
Bus Stops	5,199	6,456	5,363	6,292	**11,655**
	45%	*55%*	*46%*	*54%*	***100%***
Total	**5,375**	**6,537**	**5,542**	**6,370**	**11,912**
	45%	***55%***	***47%***	***53%***	***100%***

For each amenity type, at each of the stop types, amenity placement rates were calculated and compared between BIPOC stops and non-BIPOC stops, and between low-income stops and non-low-income stops. For example:

- 12.7% of all low-income bus stops have shelter, compared to 3.3% of all non-low-income bus stops (Table 19);
- 88.3% of all BIPOC stops at Transit Centers have a real-time arrival sign, compared to 76.0% of all non-BIPOC stops at Transit Centers (Table 20);
- 100% of low-income stops at stations have a detailed timetable, equal the rate for non-low-income stops at stations (Table 21).

These placement rates are used to calculate a comparison index to determine if there is disparate impact or disproportionate burden in access to amenities.

For amenities with numerical warrants – such as a daily boarding threshold for placement of a shelter – analysis was conducted for warranted stops, unwarranted stops, and overall (regardless of the warrant).

Additionally, the following assumptions and methods were used in the analysis:

- Amenity warrants based on ridership (e.g., shelter) use average weekday daily boarding data from fall 2019, collected from APCs and summarized to the stop level. If the stop was not present in fall 2019, fall 2018 boarding data are used; if boarding data from neither fall 2019 nor fall 2018 are available, that from fall 2020 are used.
- Lighting at a transit stop means electrified or solar-powered lighting installed within a shelter.
- Bus stops with shelter owned by an entity other than Metro Transit and the Metropolitan Council are excluded from analysis of warranted and unwarranted placement of lighting and heaters within shelter. Metro Transit has limited influence over the placement of lighting and heaters within shelters it does not own. As such, 37 of the 896 bus stops with a stand-alone shelter were excluded, leaving 859 shelters that could have been eligible for lighting and heaters, regardless of warrants and site factors.
- FTA *Circular 4702.1B* states that the requirement to establish policies for the distribution of transit amenities, "is not intended to impact funding decisions for transit amenities. Rather, [the

policies apply] after a transit provider has decided to fund an amenity."[31] Therefore, this analysis considers only amenities that have already been distributed throughout the fixed route system. Specifically, the analysis does not address unplaced amenities that may be warranted based on the policies, except for when considering disparate impact and disproportionate burden.

Results

Table 19, Table 20, and Table 21 summarize the results of the distribution of amenities analyses for bus stops, stops at transit centers, and stops at light rail, BRT, and commuter rail stations, respectively. **The results reflect that all amenity types available at all stop types have been prioritized at stops where BIPOC and low-income residents make up a greater proportion of residents.**

Bus Stops

For all amenity types, regardless of warrants:

- amenity placement rates at BIPOC bus stops were greater than or equal to those at non-BIPOC bus stops, and;
- amenity placement rates at low-income bus stops were greater than or equal to those at non-low-income bus stops.

Placement rates for different amenity types at bus stops and their comparison indices are shown in Table 19. For all amenity types, the resulting comparison indices are greater than or equal to 1.00, indicating equal or greater placement rates at BIPOC stops and low-income stops compared to non-BIPOC stops and non-low-income stops, respectively. **Therefore, this analysis identifies no disparate impact nor disproportionate burden based on the distribution of amenities at bus stops.**

Shelter, lighting, and heaters at bus stops are among the most common amenities requested by Metro Transit customers. As indicated in Table 19, when warranted by ridership:

- Shelters are placed at BIPOC bus stops at a rate 16% greater than non-BIPOC stops (63.5% versus 54.5%)
- Shelters are placed at low-income bus stops at a rate 21% greater than non-low-income stops (63.0% versus 52.1%)
- Heaters within shelter are placed at BIPOC bus stops at a rate 130% greater than at non-BIPOC stops (39.9% versus 17.3%)
- Heaters within shelter are placed at low-income bus stops at a rate 83% greater than at non-low-income stops (36.7% versus 20.0%)

Metro Transit considers adding lighting to shelters at bus stops with high boardings during dark hours. As indicated in Table 19:

- Lighting within shelters is placed at BIPOC bus stops at a rate 12% greater than non-BIPOC stops (63.5% versus 54.5%)
- Lighting within shelters is placed at low-income bus stops at a rate 21% greater than non-non-low-income stops (43.5% versus 35.9%)

[31] FTA, *Circular 4702.1B*, page IV-6

Table 19: Customer Amenity Placement Rates at Bus Stops

Amenity	BIPOC Stops	Non-BIPOC Stops	DI Comp. Index	Low-Income Stops	Non-Low-Income Stops	DB Comp. Index
Route Description/Map (n=1,276)	67.3%	63.0%	**1.07**	67.0%	62.8%	**1.07**
Warranted (n=1,065)	69.9%	65.5%	**1.07**	69.1%	66.3%	**1.04**
Unwarranted (n=211)	57.0%	52.5%	**1.09**	58.9%	46.8%	**1.26**
Detailed Timetable within Shelter (n=844)	100.0%	100.0%	**1.00**	100.0%	100.0%	**1.00**
Real-Time Arrival Sign (n=77)	1.1%	0.3%	**4.07**	1.3%	0.1%	**8.86**
Shelter (n=889)	11.6%	4.4%	**2.63**	12.7%	3.3%	**3.87**
Warranted (n=664)	62.7%	54.3%	**1.16**	62.3%	51.7%	**1.21**
Unwarranted (n=225)	2.9%	1.5%	**1.91**	3.1%	1.4%	**2.22**
Lighting within Shelter (n=360)	43.9%	39.0%	**1.13**	44.1%	36.3%	**1.21**
Heaters within Shelter (n=127)	17.8%	8.3%	**2.16**	16.6%	8.9%	**1.86**
Warranted (n=82)	39.9%	17.3%	**2.30**	36.7%	20.0%	**1.83**
Unwarranted (n=45)	8.0%	5.9%	**1.35**	7.4%	7.1%	**1.04**

Transit Centers

The amenities placement results for stops at transit centers are similar to those at standard bus stops. For all amenity types:

- amenity placement rates at BIPOC stops at transit centers were greater than or equal to those at non-BIPOC stops at transit centers, and;
- amenity placement rates at low-income stops at transit centers were greater than or equal to those at non-low-income stops at transit centers.

Placement rates for different amenity types at transit center stops and their comparison indices are shown in Table 20. For all amenity types, the resulting comparison indices are greater than or equal to 1.00, indicating equal or greater placement rates at BIPOC stops and low-income stops compared to non-BIPOC stops and non-low-income stops, respectively. **Therefore, this analysis identifies no disparate impact nor disproportionate burden based on the distribution of amenities at transit center stops.**

Table 20: Customer Amenity Placement Rates at Stops at Transit Centers

Amenity	BIPOC Stops	Non-BIPOC Stops	DI Comp. Index	Low-Income Stops	Non-Low-Income Stops	DB Comp. Index
Route Description/Map (n=85)	100.0%	100.0%	**1.00**	100.0%	100.0%	**1.00**
Detailed Timetable (n=85)	100.0%	100.0%	**1.00**	100.0%	100.0%	**1.00**
Real-Time Arrival Sign (n=72)	88.3%	76.0%	**1.16**	87.3%	80.0%	**1.09**
Seating (n=85)	100.0%	100.0%	**1.00**	100.0%	100.0%	**1.00**
Shelter (n=85)	100.0%	100.0%	**1.00**	100.0%	100.0%	**1.00**
Lighting within Shelter (n=79)	100.0%	76.0%	**1.32**	100.0%	80.0%	**1.25**
Heaters within Shelter (n=79)	100.0%	76.0%	**1.32**	100.0%	80.0%	**1.25**
Trash Receptacle (n=85)	100.0%	100.0%	**1.00**	100.0%	100.0%	**1.00**

Light Rail, BRT, and Commuter Rail Stations

All standard amenities are present at each of Metro Transit's light rail, BRT, and commuter rail stations, per customer amenities policies (Table 17). As such, all amenities have placement rates of 100% (Table 21). For all amenity types:

- amenity placement rates at BIPOC stops at stations were equal to those at non-BIPOC stops at stations, and;
- amenity placement rates at low-income bus stops at stations were equal to those at non-low-income stops at stations.

Therefore, this analysis identifies no disparate impact nor disproportionate burden based on the distribution of amenities at light rail, BRT, and commuter rail stations.

Table 21: Customer Amenity Placement Rates at Stops at Light Rail, BRT, and Commuter Rail Stations

Amenity (Number Deployed)	BIPOC Stops	Non-BIPOC Stops	DI Comp. Index	Low-Income Stops	Non-Low-Income Stops	DB Comp. Index
Route Description/Map (n=172)	100.0%	100.0%	**1.00**	100.0%	100.0%	**1.00**
Detailed Timetable (n=171)	100.0%	100.0%	**1.00**	100.0%	100.0%	**1.00**
Real-Time Arrival Sign (n=172)	100.0%	100.0%	**1.00**	100.0%	100.0%	**1.00**
Seating (n=172)	100.0%	100.0%	**1.00**	100.0%	100.0%	**1.00**
Shelter (n=171)	100.0%	100.0%	**1.00**	100.0%	100.0%	**1.00**
Lighting within Shelter (n=171)	100.0%	100.0%	**1.00**	100.0%	100.0%	**1.00**
Heaters within Shelter (n=171)	100.0%	100.0%	**1.00**	100.0%	100.0%	**1.00**
Trash Receptacle (n=172)	100.0%	100.0%	**1.00**	100.0%	100.0%	**1.00**

One station does not have a detailed timetable, shelter, lighting, or heaters: northbound Xerxes & 56th arterial BRT station in Brooklyn Center, served by the METRO C Line. This station is the last northbound station before the end of the C Line, where most activity is from passengers getting off the bus and few passengers board the bus. Metro Transit's policies for customer amenities at arterial

BRT stations explicitly state that certain amenities are not expected in situations like this. Thus, this station is excluded from analysis of detailed timetables, shelters, lighting, and heaters.

Vehicle Assignment

Policies

The Metropolitan Council adopted *Fleet Management Procedures* in 2012. These procedures are designed to facilitate compliance with FTA and Title VI standards, assure that vehicles purchased meet minimum standards, and create efficiencies and improve flexibility in the deployment/ reassignment of vehicles to the extent feasible. In select situations, a specific bus type or size is assigned to a route or geographic area.

Metro Transit has five bus garages, along with two light rail and one commuter rail depots. Many routes are operated out of multiple garages and serve a large geographic area. For MTS contracted fixed routes, the Metropolitan Council owns the buses and leases them to the operating contractor under a master vehicle lease.

Vehicle Types

Metro Transit's primary vehicle type for fixed route bus service is a low-floor, 40-foot bus. The following is a summary of the other vehicle types used for fixed-route service, which includes vehicles operated by Metro Transit as well as vehicles operated by providers under contract to the Metropolitan Council through MTS.

Commuter Coach Buses

Coach buses may be used on express trips carrying riders on a one-way trip length of 15 miles or longer and duration of more than 30 minutes. Although coach buses are accessible and lift-equipped, an effort is made to avoid using them on trips with regular wheelchair users due to the narrow aisle configuration and length of time it takes to deploy the lift. Coach buses are assigned to specific blocks based on ridership patterns and trip distance.

Hybrid Buses

Through agreement with the City of Minneapolis, all routes operating regular schedules on Nicollet Mall in downtown Minneapolis must use hybrid buses. This includes Routes 10, 11, 17, 18, 25, and 59. Hybrid buses are also assigned to Routes 63, 64, and 68 operating in Saint Paul.

Articulated Buses

Articulated buses are used primarily on express routes during the peak period; however, they are also used on local routes with heavy ridership during off-peak times. Articulated buses are assigned to specific blocks based on ridership patterns and maximum loads. Assignments are reviewed at least once each quarter. During the response to the COVID-19 pandemic, articulated buses were assigned to core local bus routes to manage capacity under the CDC and local guidelines for public health.

Small Buses

Buses that are 30 feet or smaller (e.g., "cutaway" buses) are sometimes used by contractors to provide service on lower-ridership routes.[32]

BRT Buses

BRT buses are specially marked buses that help brand BRT routes. They are used exclusively on the METRO A and Red Lines. METRO A Line buses have no farebox. BRT buses have fewer seats to allow for better passenger circulation.

Articulated BRT Buses

Currently, the METRO C Line is the only route using articulated BRT buses. METRO C Line buses have no farebox. All BRT buses are specially marked to help brand BRT routes; they have fewer seats to allow for better passenger circulation.

Electric Articulated BRT Buses

Currently, the METRO C Line is the only route using electric articulated BRT buses. METRO C Line buses have no farebox. All BRT buses are specially marked to help brand BRT routes; they have fewer seats to allow for better passenger circulation. These buses are assigned only to the METRO C Line due to the characteristics noted above and the location of on-route charging infrastructure at the Brooklyn Center Transit Center.

Guidelines for Assigning Vehicle to Garages

Metro Transit's Bus Maintenance department has developed guidelines for assigning vehicles to garages. When service needs require adjustment of the fleet between one service garage and another, or when new vehicles are added to the fleet, the following items need to be considered:

1. Garage capacity and characteristics
2. Spare factor: Transit agencies must maintain and make available spare vehicles beyond those required to operate service at the maximum level to enable regular vehicle maintenance activities and account for unexpected repairs. A spare factor (or spare ratio) is a common transit vehicle maintenance performance measure to judge the effectiveness of fleet management while ensuring enough vehicles are available to meet scheduled service levels. Spare factor is defined as the number of spare vehicles divided by the vehicles required for maximum service.
3. Vehicle type: 40-foot or Articulated, based on ridership as assigned by Service Development department
4. Average fleet age: A fair and balanced average fleet age will be maintained throughout all garages. This ensures knowledge of new technology will be broadly distributed to all mechanics and helps keep both Operators and Mechanics system-wide sharing the benefits of new equipment.
5. Sub-fleets: A particular vehicle design or configuration should be kept together whenever possible
6. Stability: A bus is kept at the same garage its entire service life, if possible, to provide ownership and accountability to the garage.

[32] Where vehicle age is a proxy for condition, analysis is completed separately for different vehicle subtypes within the category (e.g., 30-foot buses, cutaway buses).

7. Sequential numbers: Sequentially numbered groups of buses are kept together whenever possible to ease administrative tracking
8. Propulsion: Electric buses are currently assigned to Heywood Garage because this garage is equipped with charging infrastructure

Contracted Provider Fleet Management

MTS assigns vehicles to a specific contracted provider garage as part of the contract; those buses normally do not transfer to another provider during the life of the contract. If a new provider is awarded a service contract, the buses follow the service. Buses are moved from one contract to another only occasionally as service levels are adjusted, routes are added to or eliminated from a contracted service portfolio, vehicle issues arise, etc. Buses are replaced as they reach the end of their useful life per the *Regional Vehicle Fleet Policy*, which applies to all Council-owned buses in public transit service in the region.

The contractor can assign any bus to any route as long as it is the correct size and type of bus. As a matter of practice, private providers prefer to assign the same vehicle to the same operator on a regular basis to track vehicle maintenance and condition concerns. However, because not all buses are equipped with APCs, MTS stipulates within the operating contract that vehicles must be rotated among operators and work pieces to ensure APC coverage throughout the service.

Title VI Evaluation

Bus age is used as the standard measure for determining equitable vehicle assignment. The average age of vehicles assigned to BIPOC and/or low-income routes should be approximately equal to the average age of vehicles assigned to non-BIPOC and/or non-low-income routes.

Methods

This evaluation uses vehicle age as a proxy for condition, reported two ways:

- average age of vehicles assigned to a route; and
- difference between the average age of vehicles assigned to a route and the average age of the vehicle fleet eligible for a route, where the vehicle fleet represents the universe of available vehicles that could have been assigned to a specific trip on a specific route.

Average age of vehicles assigned by route is calculated by averaging the age of vehicles that operated all trips completed for that route.

To generate a report of the average age of vehicles assigned and available (fleet age) by route, it is first necessary to determine what vehicle type was assigned and could have been assigned to each trip during the fall of 2019. This information is generated primarily using automatic vehicle locator (AVL) data. If AVL data are not available for a trip, secondary sources are used, including farebox data and dispatcher-recorded assignments. In cases where more than one vehicle was used to operate a trip, the age of the first vehicle assigned is used for analysis.[33]

Data from fall 2019 are used in this analysis. Fall 2020 data are not considered given the necessary changes in vehicle assignment in light of COVID-19. At that time, Metro Transit was assigning

[33] This will occur in cases where a garage sends out a double-header (two buses operate the same trip in tandem) or when a second bus replaces the original bus midway through the trip due to mechanical issues.

articulated buses to trips and routes that would otherwise be assigned a standard low-floor, 40-foot bus to ensure social distancing slow spread of the virus.

Vehicles operated on the METRO Blue and Green light rail lines, and Northstar commuter rail are excluded from this analysis, given their limited fleets, constraints on vehicle assignment, and route designations.[34] Both of the light rail lines are designated as minority and low-income routes, and Northstar is designated as non-BIPOC and non-low-income.

Results

Table 22 summarizes average vehicle age assigned, available (fleet), and the difference between the two, by route designation for trips operated in fall 2019. A route-by-route summary of vehicle assignment results is provided in Appendix I: Vehicle Assignment.

Among bus routes, BIPOC route trips were assigned newer vehicles than non-BIPOC route trips, at 6.72 years and 7.01 years, on average, respectively (Table 22). Further, BIPOC route trips had greater difference between the average assigned vehicle age and the average available vehicle age than non-BIPOC route trips (0.53 years newer versus 0.25 years newer). For both measures – assigned age and difference in assigned age from available age – comparison indices are greater than 1.00, indicating more advantageous results for BIPOC routes. **Therefore, this analysis identifies no disparate impact based on vehicle assignment.**

Table 22. Vehicle Assignment Policy Results, Measured by Average Vehicle Age (Years)

Mode	Route Designation	Assigned	Available	Difference
Bus	BIPOC Route Trips	6.72	7.25	-0.53
	Non-BIPOC Route Trips	7.01	7.26	-0.25
	DI Comparison Index	**1.04**	**--**	**2.12**
	Low-Income Route Trips	6.62	7.17	-0.55
	Non-Low-Income Route Trips	7.64	7.64	0
	DB Comparison Index	**1.15**	**--**	**>1.00**

Low-income route trips were assigned vehicles approximately one year newer than those assigned to non-low-income route trips, on average (6.62 years versus 7.64 years). The average trip operated on a non-low-income route was assigned a vehicle that was about equal to the average age of the available vehicles that could have operated the trip. Alternatively, low-income route trips were assigned vehicles 0.55 years newer than the average age of the available vehicles that could have operated the trip. Shown in Table 22, both measures of vehicle assignment resulted in comparison indices greater than 1.00, indicating more advantageous results for low-income routes. **Therefore, this analysis identifies no disproportionate burden based on vehicle assignment.**

[34] Metro Transit's METRO Blue Line fleet consists of light rail vehicles (LRVs) manufactured from 2003 to 2007. Metro Transit's METRO Green Line fleet consists of LRVs manufactured from 2012 to 2017. However, in some cases, year 2012 LRVs are assigned to Blue Line service when they are not need on the Green Line. Metro Transit's commuter rail fleet consists of one locomotive manufactured in 2008, six locomotives manufactured in and 2009, and 18 passenger coach cars manufactured in 2009.

Summary of Results

Table 23 lists the disparate impact and disproportionate burden comparison indices results of all analyses of Metro Transit's Title VI standards and policies, in either fall 2019, fall 2020, or both periods.

Most comparison indices in Table 23 are greater than or equal to 1.00, indicating better results for BIPOC and low-income residents and riders compared to non-BIPOC and non-low-income residents and riders, respectively. All comparison indices are above the 0.80 minimum threshold for avoiding disparate impact and disproportionate burden. **Therefore, this analysis identifies no disparate impact nor disproportionate burden based on Metro Transit's Title VI standards and policies.**

Table 23. Summary of Analysis Results

Standard/Policy	Measure	Fall 2019		Fall 2020	
		DI Comp. Index	DB Comp. Index	DI Comp. Index	DB Comp. Index
Vehicle Load	Trips Overloaded	1.63	2.46	--	--
	Trips Consistently Overloaded	3.73	4.41	--	--
Vehicle Headway	Peak	0.92	1.07	1.20	1.75
	Off-Peak	0.99	1.03	0.99	1.05
	Weekend	1.07	1.52	1.07	1.56
	Total	1.04	1.30	1.13	1.62
On-Time Performance	Timepoint Obs. On Time	1.05	1.02	--	--
Route Spacing	Core Local – Market Area I	1.03	1.05	1.00	1.03
	Supporting Local – Market Area I	1.11	1.23	1.08	1.11
	Core, Supporting, Suburban Local – Market Area II	0.98	0.98	0.98	0.98
Midday Service	Market Area I	1.12	1.19	1.13	1.19
	Market Area II	1.04	1.07	1.02	1.04
	Market Area III	1.46	1.62	1.57	1.62
Stop Spacing	Route-Stop Links Meeting Standards	1.11	1.21	1.09	1.19
Distribution of Amenities	Route Description/Map	--	--	1.07	1.07
At Bus Stops	Warranted	--	--	1.07	1.04
	Unwarranted	--	--	1.09	1.26
	Detailed Timetable	--	--	1.00	1.00
	Real-Time Arrival Sign	--	--	4.07	8.86
	Shelter	--	--	2.63	3.87
	Warranted	--	--	1.16	1.21
	Unwarranted	--	--	1.91	2.22
	Lighting within Shelter	--	--	1.13	1.21
	Heaters within Shelter	--	--	2.16	1.86
	Warranted	--	--	2.30	1.83
	Unwarranted	--	--	1.35	1.04

Standard/Policy	Measure	Fall 2019		Fall 2020	
		DI Comp. Index	DB Comp. Index	DI Comp. Index	DB Comp. Index
Distribution of Amenities At Transit Centers	Route Description/Map	--	--	1.00	1.00
	Detailed Timetable	--	--	1.00	1.00
	Real-Time Arrival Sign	--	--	1.16	1.09
	Seating			1.00	1.00
	Shelter	--	--	1.00	1.00
	Lighting within Shelter	--	--	1.32	1.25
	Heaters within Shelter	--	--	1.32	1.25
	Trash Receptacle	--	--	1.00	1.00
Distribution of Amenities At Stations	Route Description/Map	--	--	1.00	1.00
	Detailed Timetable	--	--	1.00	1.00
	Real-Time Arrival Sign	--	--	1.00	1.00
	Seating	--	--	1.00	1.00
	Shelter	--	--	1.00	1.00
	Lighting within Shelter	--	--	1.00	1.00
	Heaters within Shelter	--	--	1.00	1.00
	Trash Receptacle	--	--	1.00	1.00
Vehicle Assignment	Age of Vehicles Assigned	1.04	1.15	--	--
	Age of Vehicles Assigned Relative to Available	2.12	>1.00	--	--

CHAPTER 5: CONCLUSIONS

This report satisfies the FTA Title VI requirement to monitor transit system performance relative to system-wide service standards and policies at least once every three years. This effort replaces the previous service monitoring study, completed in fall 2018.

This analysis identifies no disparate impact on BIPOC populations nor disproportionate burden on low-income populations based on Metro Transit's Title VI standards and policies (Table 24).

Most measures of compliance with Metro Transit's service standards and policies showed that BIPOC and low-income populations received better outcomes compared to non-BIPOC and non-low-income populations. The few exceptions to this are instances where compliance rates for BIPOC or low-income populations were within one to eight percent of those for non-BIPOC or non-low-income populations – well within the allowable difference of 20 percent established in Metro Transit's disparate impact and disproportionate burden thresholds.

Table 24: Disparate Impact and Disproportionate Burden Results Summary

Standard/Policy	Disparate Impact on BIPOC Population	Disproportionate Burden on Low-Income Population
Vehicle Load	No	No
Vehicle Headway	No	No
On-Time Performance	No	No
Service Availability	No	No
Route Spacing	No	No
Midday Service	No	No
Stop Spacing	No	No
Distribution of Amenities	No	No
At Bus Stops	No	No
At Transit Centers	No	No
At Stations	No	No
Vehicle Assignment	No	No

Title VI is one piece of the broader strategic framework that Metro Transit uses to meaningfully advance equity in the region. Broader equity work, including additional quantitative analysis, is ongoing and continuous at Metro Transit. Equity is not achieved through one sole program, project, policy, or procedure, but in the integration of equity work throughout the agency.

Despite the lack of actionable Title VI findings from this study, Metro Transit continues to evaluate its service and improve equity of inputs and outcomes and will continue to evaluate service for disparate impact and disproportionate burden outside of triennial FTA Title VI service monitoring.

APPENDIX A: ROUTE TYPES

Core Local Bus

Core local routes typically serve the denser urban areas of Market Areas I and II, usually providing access to a downtown or major activity center along important commercial corridors. They form the base of the core bus network and are typically some of the most productive routes in the system.

Some core local bus routes are supplemented with a limited stop route designed to serve customers wishing to travel farther distances along the corridor. Limited stop routes make fewer stops and provide faster service than the core local routes.

Supporting Local Bus

Supporting local routes are typically designed to provide crosstown connections within Market Areas I and II. Typically, these routes do not serve a downtown but play an important role connecting to core local routes and ensuring transit access for those not traveling downtown.

Suburban Local Bus

Suburban local routes typically operate in Market Areas II and III in a suburban context and are often less productive that core local routes. These routes serve an important role in providing a basic-level of transit coverage throughout the region. Provider-specific variations on suburban local bus include community routes and feeder routes.

Commuter and Express Bus

Commuter and express bus routes primarily operate during peak periods to serve commuters to downtown or a major employment center. These routes typically operate non-stop on highways for portions of the route between picking up passengers in residential areas or at park & ride facilities and dropping them off at a major destination.

Arterial Bus Rapid Transit

Arterial BRT lines operate in high demand urban arterial corridors with service, facility, and technology improvements that enable faster travel speeds, greater frequency, an improved passenger experience, and better reliability.

Highway Bus Rapid Transit

Highway BRT lines operate in high demand highway corridors with service, facility, and technology improvements providing faster travel speeds, all-day service, greater frequency, an improved passenger experience, and better reliability.

Light Rail

Light rail operates using electrically powered passenger rail cars operating on fixed rails in dedicated right-of-way. It provides frequent, all-day service stopping at stations with high levels of customer amenities and waiting facilities.

Commuter Rail

Commuter rail operates using diesel-power locomotives and passenger coaches on traditional railroad track. These trains typically only operate during the morning and evening peak period to serve work commuters.

APPENDIX B: ROUTE DESIGNATIONS

Table 25: Service Monitoring Routes by Type and Designations

Route	Route Type	Race/Ethnicity Designation	Income Designation
2	Core Local	BIPOC	Low-Income
3	Core Local	BIPOC	Low-Income
4	Core Local	Non-BIPOC	Low-Income
5	Core Local	BIPOC	Low-Income
6	Core Local	Non-BIPOC	Low-Income
7	Core Local	BIPOC	Low-Income
9	Core Local	BIPOC	Low-Income
10	Core Local	BIPOC	Low-Income
11	Core Local	BIPOC	Low-Income
12	Core Local	Non-BIPOC	Low-Income
14	Core Local	BIPOC	Low-Income
16	Supporting Local	BIPOC	Low-Income
17	Core Local	Non-BIPOC	Low-Income
18	Core Local	BIPOC	Low-Income
19	Core Local	BIPOC	Low-Income
21	Core Local	BIPOC	Low-Income
22	Core Local	BIPOC	Low-Income
23	Supporting Local	Non-BIPOC	Non-Low-Income
25	Core Local	Non-BIPOC	Non-Low-Income
27	Supporting Local	BIPOC	Low-Income
30	Supporting Local	BIPOC	Low-Income
32	Supporting Local	BIPOC	Low-Income
39	Supporting Local	Non-BIPOC	Non-Low-Income
46	Supporting Local	Non-BIPOC	Non-Low-Income
53	Core Local	BIPOC	Low-Income
54	Core Local	BIPOC	Low-Income
59	Core Local	BIPOC	Low-Income
61	Core Local	BIPOC	Low-Income
62	Core Local	BIPOC	Low-Income
63	Core Local	BIPOC	Low-Income
64	Core Local	BIPOC	Low-Income
65	Supporting Local	BIPOC	Low-Income
67	Core Local	BIPOC	Low-Income
68	Core Local	BIPOC	Low-Income
70	Core Local	BIPOC	Low-Income
71	Core Local	BIPOC	Low-Income
74	Core Local	BIPOC	Low-Income
75	Core Local	BIPOC	Low-Income
80	Supporting Local	BIPOC	Low-Income
83	Supporting Local	BIPOC	Low-Income
84	Supporting Local	Non-BIPOC	Low-Income
87	Supporting Local	Non-BIPOC	Low-Income
94	Commuter and Express	BIPOC	Low-Income
111	Commuter and Express	BIPOC	Non-Low-Income

Route	Route Type	Race/Ethnicity Designation	Income Designation
113	Commuter and Express	Non-BIPOC	Low-Income
114	Commuter and Express	Non-BIPOC	Low-Income
115	Commuter and Express	Non-BIPOC	Low-Income
118	Commuter and Express	Non-BIPOC	Low-Income
129	Supporting Local	BIPOC	Low-Income
133	Commuter and Express	Non-BIPOC	Non-Low-Income
134	Commuter and Express	Non-BIPOC	Non-Low-Income
135	Commuter and Express	Non-BIPOC	Non-Low-Income
141	Core Local	Non-BIPOC	Non-Low-Income
146	Commuter and Express	Non-BIPOC	Non-Low-Income
156	Commuter and Express	Non-BIPOC	Non-Low-Income
219	Suburban Local	BIPOC	Low-Income
223	Suburban Local	BIPOC	Low-Income
225	Suburban Local	Non-BIPOC	Non-Low-Income
227	Suburban Local	BIPOC	Low-Income
250	Commuter and Express	Non-BIPOC	Non-Low-Income
252	Commuter and Express	Non-BIPOC	Non-Low-Income
261	Commuter and Express	Non-BIPOC	Non-Low-Income
262	Core Local	Non-BIPOC	Non-Low-Income
263	Commuter and Express	BIPOC	Non-Low-Income
264	Commuter and Express	BIPOC	Non-Low-Income
265	Commuter and Express	Non-BIPOC	Non-Low-Income
270	Commuter and Express	BIPOC	Non-Low-Income
272	Commuter and Express	Non-BIPOC	Non-Low-Income
275	Commuter and Express	Non-BIPOC	Non-Low-Income
288	Commuter and Express	Non-BIPOC	Non-Low-Income
294	Commuter and Express	Non-BIPOC	Non-Low-Income
350	Commuter and Express	BIPOC	Non-Low-Income
351	Commuter and Express	BIPOC	Non-Low-Income
353	Commuter and Express	Non-BIPOC	Non-Low-Income
355	Commuter and Express	Non-BIPOC	Non-Low-Income
361	Commuter and Express	Non-BIPOC	Non-Low-Income
364	Commuter and Express	Non-BIPOC	Non-Low-Income
365	Commuter and Express	Non-BIPOC	Non-Low-Income
375	Commuter and Express	Non-BIPOC	Non-Low-Income
415	Suburban Local	BIPOC	Low-Income
417	Suburban Local	Non-BIPOC	Non-Low-Income
452	Commuter and Express	Non-BIPOC	Non-Low-Income
467	Commuter and Express	Non-BIPOC	Non-Low-Income
515	Suburban Local	BIPOC	Low-Income
535	Commuter and Express	BIPOC	Low-Income
537	Suburban Local	Non-BIPOC	Low-Income
538	Suburban Local	BIPOC	Low-Income
539	Suburban Local	BIPOC	Low-Income
540	Suburban Local	BIPOC	Low-Income
542	Suburban Local	BIPOC	Low-Income
552	Commuter and Express	BIPOC	Non-Low-Income
553	Commuter and Express	BIPOC	Non-Low-Income
554	Commuter and Express	BIPOC	Non-Low-Income

Route	Route Type	Race/Ethnicity Designation	Income Designation
558	Commuter and Express	BIPOC	Non-Low-Income
578	Commuter and Express	BIPOC	Non-Low-Income
579	Commuter and Express	Non-BIPOC	Non-Low-Income
587	Commuter and Express	Non-BIPOC	Non-Low-Income
588	Commuter and Express	BIPOC	Low-Income
589	Commuter and Express	Non-BIPOC	Non-Low-Income
597	Commuter and Express	Non-BIPOC	Non-Low-Income
604	Suburban Local	Non-BIPOC	Non-Low-Income
612	Suburban Local	BIPOC	Low-Income
615	Suburban Local	BIPOC	Low-Income
643	Commuter and Express	Non-BIPOC	Non-Low-Income
645	Suburban Local	Non-BIPOC	Non-Low-Income
652	Commuter and Express	Non-BIPOC	Non-Low-Income
663	Commuter and Express	Non-BIPOC	Non-Low-Income
664	Commuter and Express	Non-BIPOC	Non-Low-Income
667	Commuter and Express	Non-BIPOC	Non-Low-Income
668	Commuter and Express	BIPOC	Non-Low-Income
670	Commuter and Express	BIPOC	Low-Income
671	Commuter and Express	Non-BIPOC	Non-Low-Income
672	Commuter and Express	Non-BIPOC	Non-Low-Income
673	Commuter and Express	Non-BIPOC	Non-Low-Income
674	Commuter and Express	Non-BIPOC	Non-Low-Income
677	Commuter and Express	Non-BIPOC	Non-Low-Income
679	Commuter and Express	Non-BIPOC	Non-Low-Income
705	Suburban Local	BIPOC	Low-Income
716	Suburban Local	BIPOC	Low-Income
717	Suburban Local	BIPOC	Low-Income
721	Suburban Local	BIPOC	Low-Income
722	Suburban Local	BIPOC	Low-Income
723	Suburban Local	BIPOC	Low-Income
724	Suburban Local	BIPOC	Low-Income
755	Commuter and Express	BIPOC	Low-Income
756	Commuter and Express	BIPOC	Non-Low-Income
758	Commuter and Express	Non-BIPOC	Non-Low-Income
760	Commuter and Express	BIPOC	Low-Income
761	Commuter and Express	BIPOC	Low-Income
762	Commuter and Express	BIPOC	Non-Low-Income
763	Commuter and Express	BIPOC	Non-Low-Income
764	Commuter and Express	BIPOC	Non-Low-Income
765	Commuter and Express	BIPOC	Non-Low-Income
766	Commuter and Express	BIPOC	Non-Low-Income
767	Commuter and Express	BIPOC	Non-Low-Income
768	Commuter and Express	BIPOC	Non-Low-Income
801	Suburban Local	BIPOC	Low-Income
805	Suburban Local	Non-BIPOC	Low-Income
824	Core Local	BIPOC	Non-Low-Income
825	Core Local	Non-BIPOC	Non-Low-Income
831	Suburban Local	Non-BIPOC	Low-Income
850	Commuter and Express	Non-BIPOC	Non-Low-Income

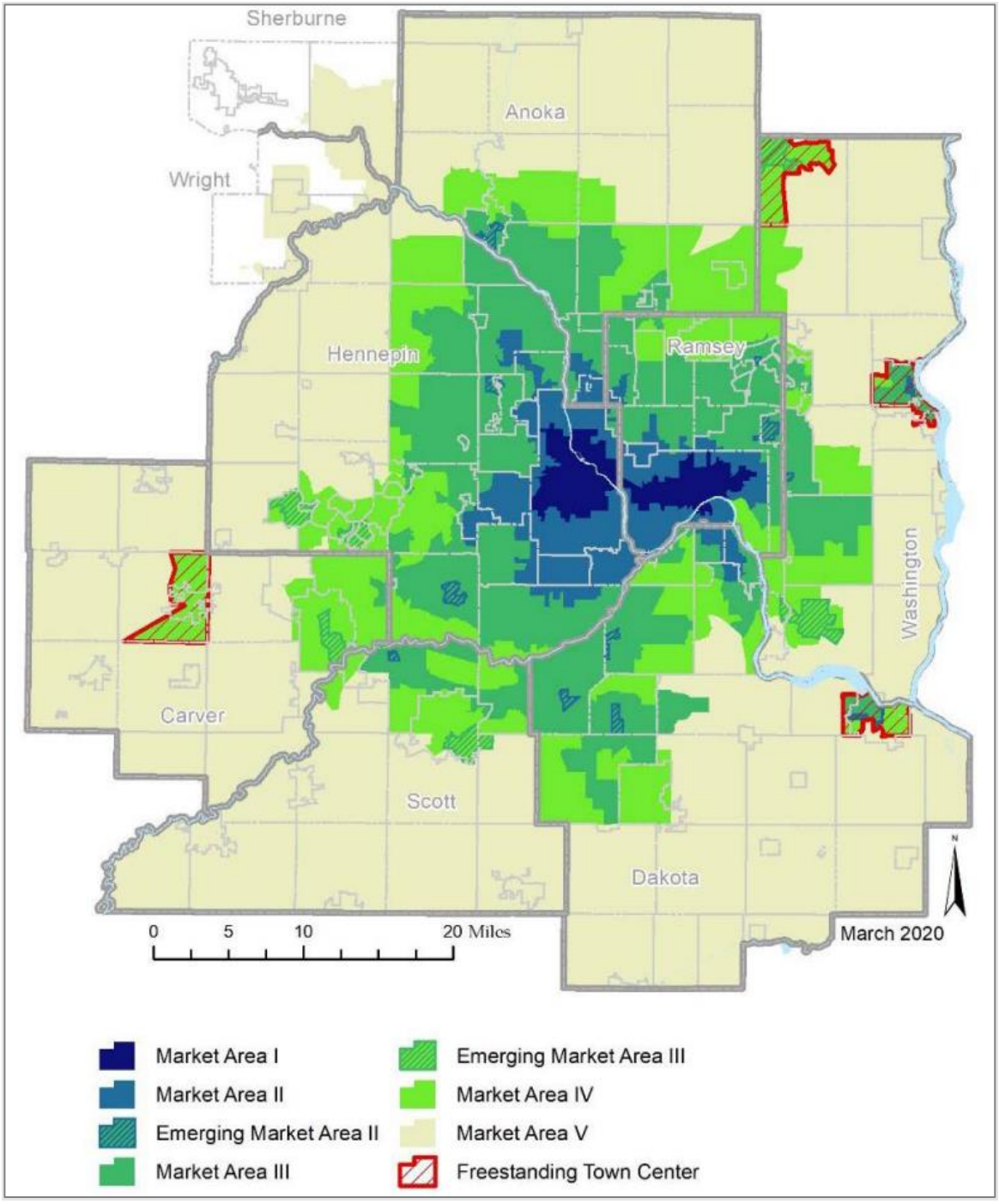
Route	Route Type	Race/Ethnicity Designation	Income Designation
852	Commuter and Express	Non-BIPOC	Low-Income
854	Commuter and Express	Non-BIPOC	Non-Low-Income
860	Commuter and Express	Non-BIPOC	Non-Low-Income
865	Commuter and Express	Non-BIPOC	Non-Low-Income
Northstar (888)	Commuter Rail	Non-BIPOC	Non-Low-Income
METRO Blue Line (901)	Light Rail	BIPOC	Low-Income
METRO Green Line (902)	Light Rail	BIPOC	Low-Income
METRO Red Line (903)	Highway BRT	Non-BIPOC	Non-Low-Income
METRO A Line (921)	Arterial BRT	Non-BIPOC	Low-Income
METRO C Line (923)	Arterial BRT	BIPOC	Low-Income

Table 26. Summary of Route Designations by Route Type

Route Type	Number of Routes	BIPOC	Non-BIPOC	Low-Income	Non-Low-Income
Core Local	34	76%	24%	85%	15%
Supporting Local	13	62%	38%	77%	23%
Suburban Local	26	73%	27%	85%	15%
Commuter and Express	73	37%	63%	16%	84%
Arterial BRT	2	50%	50%	100%	0%
Highway BRT	1	0%	100%	0%	100%
Light Rail	2	100%	0%	100%	0%
Commuter Rail	1	0%	100%	0%	100%
All Routes	**152**	**55%**	**45%**	**51%**	**49%**

APPENDIX C: TRANSIT MARKET AREAS

Figure 4. Transit Market Areas in the Region



APPENDIX D: ROUTE DESIGNATION METHODOLOGY

For the purposes of this analysis, all routes are designated as either BIPOC or non-BIPOC routes and either low-income or non-low-income routes. Doing so enables comparison of service outcomes and service standard and policy compliance rates between BIPOC and non-BIPOC routes and between low-income and non-low-income routes, with which determination of disparate impact and disproportionate burden can be made. Table 25 in Appendix B: Route Designations lists of all 152 routes analyzed in this study alongside their designations.

FTA provides guidance on how routes are to be designated. Page I-4 of FTA *Circular 4702.1B* defines a minority (BIPOC) transit route as:

> one in which at least one-third of the revenue miles are located in a census block, census block group, or traffic analysis zone where the percentage minority population exceeds the percentage minority population in the service area. A recipient may supplement this service area data with route-specific ridership data in cases where ridership does not reflect the characteristics of the census block, block group, or traffic analysis zone [and adjust route designations accordingly].

The same criteria apply to the definition of low-income routes.

FTA provides additional guidance on page IV-9 of FTA *Circular 4702.1B*:

> Transit providers may supplement [service area data] with ridership data and adjust route designations accordingly. For example, a commuter bus that picks up passengers in generally non-minority areas and then travels through predominantly minority neighborhoods but does not pick up passengers who live closer to downtown might be more appropriately classified as a non-minority route, even if one-third of the route mileage is located in predominantly minority census blocks or block groups. On the other hand, a light rail line may carry predominantly minority passengers to an area where employment centers and other activities are located, but the minority population in the surrounding Census blocks or block groups does not meet or exceed the area average. This route may be more appropriately classified as a minority transit route. Transit providers should ensure they have adequate ridership data before making these determinations, and include that data in their analyses.

In keeping with this guidance, Metro Transit assigns route designations for each of its fixed routes for service monitoring purposes using the process described below. All routes that operated in either fall 2019 or fall 2020 are considered.

- **Step 1: Calculate area around stops and stations served by the route.** Separately for each route pattern, create a 100-foot buffer around the route line; doing so accounts for route lines located on the border between census block groups. Remove portions of the route line buffer area that are more than 0.25 miles from bus stops (or 0.50 miles from stations) served by the route, essentially removing non-stop route segments. Aggregate the route pattern-level data to the route level by calculating a weighted average, using the number of weekly scheduled trips from each pattern. This minimizes the influence of service areas generated from infrequent route patterns in the route's final service area calculation and subsequent

designation.

If at least one-third of the route line buffer area (the area near stops/stations) is located in census block groups where the percentage minority population exceeds the percentage minority population in the Metro Transit service area (i.e., 31.3%), then the route is designated as BIPOC; otherwise, the route is designated as non-BIPOC. This same process applies for designating low-income and non-low-income routes.

As described in previous sections, this study uses U.S. Census Bureau 2015-2019 American Community Survey 5-year estimates at the block group level to determine service area averages for percent BIPOC residents and percent low-income residents. The most recent route geometry and stop assignment schedule data of the two periods considered in this study are used to designate routes; a route that operated in both fall 2019 and fall 2020 is assessed using the latter schedule, while a route that operated in fall 2019 but was suspended in fall 2020 is assessed using the former schedule.

- **Step 2: Incorporate park & ride user home origins.** Additional consideration is given to commuter and express bus, highway BRT, light rail, and commuter rail routes serving one or more park & rides. The areas immediately surrounding park & ride facilities are not necessarily representative of the demographics of the users of that facility. To account for this, the designation of commuter and express bus, highway BRT, light rail, and commuter rail routes serving park & rides incorporates information about where park & ride users live. Metro Transit collects biennially license plate data from vehicles parked at park & ride facilities throughout the region, most recently in 2018. These data are used to determine where vehicles are registered to see a park & ride's user origins.

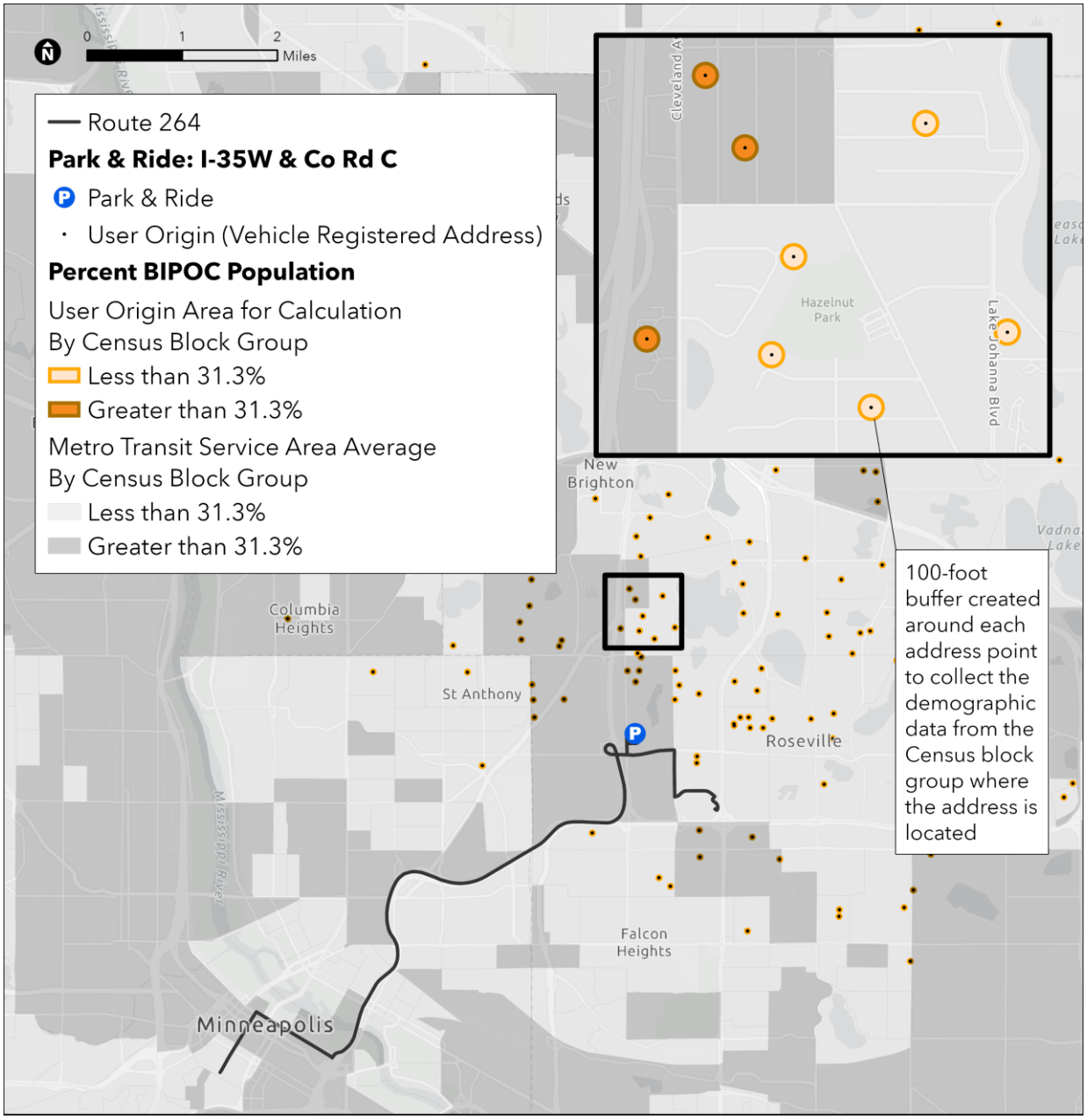
  Separately for each park & ride, create a 100-foot buffer around all user origin points from the 2018 license plate survey that are associated with that park & ride. Figure 5 provides an example of this applied to the I-35W & Co Rd C park & ride, served by commuter and express Route 264. Calculate the area (e.g., square meters) of these home location buffers for each park & ride, noting the total area and the area located in census block groups where the percentage minority population exceeds the percentage minority population in the service area (i.e., 31.3%).

  For each of the applicable routes (i.e., commuter and express bus, highway BRT, LRT, and commuter rail routes serving one or more park & ride), determine which of the route's patterns serve which park & rides. For each route pattern, sum the park & ride user origin service area data from the one or more park & ride facilities it serves. Aggregate the route pattern-level data to the route level by calculating a weighted average, using the number of weekly scheduled trips from each pattern. Using this approach, park & ride user service areas generated from infrequent route patterns are minimized in the route's final service area calculation and subsequent designation.

  Add the route-level park & ride user home location service area data to the route-level service area data calculated based on the route line buffer near stops/stations (from Step 1). If at least one-third of the total buffer area is located in census block groups where the percentage

minority population exceeds the percentage minority population in the service area (i.e., 31.3%), then the route is designated as BIPOC; otherwise, the route is designated as non-BIPOC. This same process applies for designating low-income and non-low-income routes.

Figure 5. Example of Assigning Demographic Data to Park & Ride Origins



- **Step 3: Compare preliminary route designations against route-specific ridership data.** Each route is assigned preliminary route designations following Step 1 or Step 2, where applicable. However, these may not necessarily reflect the known ridership characteristics of the route. Review preliminary route designations against route-specific demographic data (i.e., percent BIPOC riders and percent low-income riders) collected from the latest on-board survey and adjust route designations where results differ notably; document justification for the change. For example, if a route was preliminarily designated as non-BIPOC based on its service area, but ridership data suggest that the majority of riders are BIPOC, adjust the route designation

to BIPOC. Take care to note any known sample size cautions and any significant changes to the route since the on-board survey was conducted.

The Metropolitan Council's 2016 Travel Behavior Inventory (TBI) On-Board Survey, the most recent available, was used in this study to finalize route designations using the approach described above. Following a review of the TBI data, 14 routes had their BIPOC/non-BIPOC designation changed, and 37 routes had their low-income/non-low-income designation changed; these routes and the justification for the changes are documented in Table 27 and Table 28, respectively.

Table 27: Routes with Race/Ethnicity Designation Modified Based on Ridership

Route	Route Type	Percent of Area Served Located in Census Block Groups Where the Percentage BIPOC Population Exceeds the Percentage BIPOC Population in the Service Area	Percent BIPOC Riders from On-Board Survey (Avg.=46.3%)	Notes on Modified Designation
39	Supporting Local	96.1%	4.0%	Changed from BIPOC to non-BIPOC given percent BIPOC riders from survey; and route operates in a largely commercial area with limited stops in residential areas
141	Core Local	40.6%	18.0%	Changed from BIPOC to non-BIPOC given percent BIPOC riders from on-board survey
227	Suburban Local	0.0%	60.0%	Changed from non-BIPOC to BIPOC given percent BIPOC riders from on-board survey
272	Commuter and Express	36.9%	9.0%	Changed from BIPOC to non-BIPOC given percent BIPOC riders from on-board survey
361	Commuter and Express	35.5%	17.0%	Changed from BIPOC to non-BIPOC given percent BIPOC riders from on-board survey
365	Commuter and Express	36.0%	15.0%	Changed from BIPOC to non-BIPOC given percent BIPOC riders from on-board survey
415	Suburban Local	17.0%	100.0%	Changed from non-BIPOC to BIPOC given percent BIPOC riders from on-board survey
452	Commuter and Express	48.4%	18.0%	Changed from BIPOC to non-BIPOC given percent BIPOC riders from on-board survey
558	Commuter and Express	23.4%	50.0%	Changed from non-BIPOC to BIPOC given percent BIPOC riders from on-board survey
588	Commuter and Express	18.4%	54.0%	Changed from non-BIPOC to BIPOC given percent BIPOC riders from on-board survey
615	Suburban Local	33.1%	55.0%	Changed from non-BIPOC to BIPOC given percent BIPOC riders from on-board survey
664	Commuter and Express	50.0%	14.0%	Changed from BIPOC to non-BIPOC given percent BIPOC riders from on-board survey
670	Commuter and Express	11.7%	52.0%	Changed from non-BIPOC to BIPOC given percent BIPOC riders from on-board survey
854	Commuter and Express	39.5%	14.0%	Changed from BIPOC to non-BIPOC given percent BIPOC riders from on-board survey

Table 28: Routes with Income Designation Modified Based on Ridership

Route	Route Type	Percent of Area Served Located in Census Block Groups Where the Percentage Low-Income Population Exceeds the Percentage Low-Income Population in the Service Area	Percent Low-Income Riders from On-Board Survey (Avg.=39.9%)	Notes on Modified Designation
6	Core Local	28.9%	39.0%	Changed from non-Low-Income to Low-Income given percent low-income riders from on-board survey; and percent of area served by the route located in census block groups where the percentage low-income population exceeds the percentage low-income population in the service area (28.9%) is close to the one-third (33.3%) threshold
39	Supporting Local	100.0%	0.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey; and route operates in a largely commercial area with limited stops in residential areas
111	Commuter and Express	49.7%	0.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
134	Commuter and Express	57.7%	7.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
135	Commuter and Express	50.5%	0.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
141	Core Local	54.3%	24.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
156	Commuter and Express	34.1%	1.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
219	Suburban Local	31.7%	38.0%	Changed from non-Low-Income to Low-Income given percent low-income riders from on-board survey; and percent of area served by the route located in census block groups where the percentage low-income population exceeds the percentage low-income population in the service area (31.7%) is close to the one-third (33.3%) threshold
227	Suburban Local	24.4%	54.0%	Changed from non-Low-Income to Low-Income given percent low-income riders from on-board survey
261	Commuter and Express	34.1%	1.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
263	Commuter and Express	52.8%	2.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
270	Commuter and Express	37.9%	3.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
272	Commuter and Express	38.5%	0.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
350	Commuter and Express	50.9%	9.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey

Route	Route Type	Percent of Area Served Located in Census Block Groups Where the Percentage Low-Income Population Exceeds the Percentage Low-Income Population in the Service Area	Percent Low-Income Riders from On-Board Survey (Avg.=39.9%)	Notes on Modified Designation
415	Suburban Local	17.0%	100.0%	Changed from non-Low-Income to Low-Income given percent low-income riders from on-board survey
452	Commuter and Express	39.0%	7.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
537	Suburban Local	11.7%	44.0%	Changed from non-Low-Income to Low-Income given percent low-income riders from on-board survey
539	Suburban Local	28.5%	54.0%	Changed from non-Low-Income to Low-Income given percent low-income riders from on-board survey
552	Commuter and Express	55.4%	10.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
553	Commuter and Express	35.9%	2.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
554	Commuter and Express	40.2%	10.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
579	Commuter and Express	37.5%	7.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
615	Suburban Local	18.9%	60.0%	Changed from non-Low-Income to Low-Income given percent low-income riders from on-board survey
664	Commuter and Express	59.7%	15.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
668	Commuter and Express	36.2%	5.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
670	Commuter and Express	28.1%	42.0%	Changed from non-Low-Income to Low-Income given percent low-income riders from on-board survey
705	Suburban Local	30.6%	63.0%	Changed from non-Low-Income to Low-Income given percent low-income riders from on-board survey
758	Commuter and Express	34.0%	0.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
762	Commuter and Express	93.2%	0.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
763	Commuter and Express	48.5%	4.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
764	Commuter and Express	52.2%	17.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
765	Commuter and Express	54.2%	0.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey

Route	Route Type	Percent of Area Served Located in Census Block Groups Where the Percentage Low-Income Population Exceeds the Percentage Low-Income Population in the Service Area	Percent Low-Income Riders from On-Board Survey (Avg.=39.9%)	Notes on Modified Designation
767	Commuter and Express	47.9%	1.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
805	Suburban Local	28.8%	62.0%	Changed from non-Low-Income to Low-Income given percent low-income riders from on-board survey
824	Core Local	48.7%	5.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey
831	Suburban Local	27.5%	69.0%	Changed from non-Low-Income to Low-Income given percent low-income riders from on-board survey
854	Commuter and Express	42.7%	8.0%	Changed from Low-Income to non-Low-Income given percent low-income riders from on-board survey

APPENDIX E: VEHICLE LOAD

Table 29: Vehicle Overloads by Route (2019)

Route type abbreviations: CL = core local; Supp L = supporting local; Sub L = suburban local; C & E = commuter & express; Art BRT = arterial BRT; Hwy BRT = highway BRT

Race/ethnicity designation abbreviations: B = BIPOC; NB = non-BIPOC
Income designation abbreviations: LI = low-income; NLI = non-low-income

Route	Route Type	Race/Ethnicity Designation	Income Designation	Pct. of Weekday Trip Observations with an Overload	Weekday Sched. Trips Consistently Overloaded	Pct. of Weekday Sched. Trips Consistently Overloaded
2	CL	B	LI	0.4%	-	0.0%
3	CL	B	LI	5.8%	2	1.0%
4	CL	NB	LI	2.5%	-	0.0%
5	CL	B	LI	3.7%	-	0.0%
6	CL	NB	LI	2.8%	1	0.5%
7	CL	B	LI	0.0%	-	0.0%
9	CL	B	LI	0.2%	-	0.0%
10	CL	B	LI	3.1%	1	0.5%
11	CL	B	LI	1.7%	-	0.0%
12	CL	NB	LI	1.4%	-	0.0%
14	CL	B	LI	0.3%	-	0.0%
16	Supp L	B	LI	0.0%	-	0.0%
17	CL	NB	LI	4.0%	3	2.1%
18	CL	B	LI	2.7%	-	0.0%
19	CL	B	LI	0.0%	-	0.0%
21	CL	B	LI	2.2%	-	0.0%
22	CL	B	LI	0.8%	-	0.0%
23	Supp L	NB	NLI	0.0%	-	0.0%
25	CL	NB	NLI	0.3%	-	0.0%
27	Supp L	B	LI	0.2%	-	0.0%
30	Supp L	B	LI	0.0%	-	0.0%
32	Supp L	B	LI	0.1%	-	0.0%
39	Supp L	NB	NLI	0.0%	-	0.0%
46	Supp L	NB	NLI	0.1%	-	0.0%
53	CL	B	LI	3.3%	-	0.0%
54	CL	B	LI	2.0%	1	0.6%
59	CL	B	LI	2.2%	-	0.0%
61	CL	B	LI	0.5%	-	0.0%
62	CL	B	LI	0.1%	-	0.0%
63	CL	B	LI	0.5%	-	0.0%
64	CL	B	LI	0.4%	-	0.0%
65	Supp L	B	LI	0.0%	-	0.0%
67	CL	B	LI	0.0%	-	0.0%
68	CL	B	LI	0.4%	-	0.0%
70	CL	B	LI	0.0%	-	0.0%
71	CL	B	LI	0.0%	-	0.0%
74	CL	B	LI	0.4%	-	0.0%
75	CL	B	LI	0.0%	-	0.0%
80	Supp L	B	LI	0.0%	-	0.0%
83	Supp L	B	LI	0.1%	-	0.0%
84	Supp L	NB	LI	0.0%	-	0.0%
87	Supp L	NB	LI	0.0%	-	0.0%
94	C&E	B	LI	2.6%	1	1.2%
111	C&E	B	NLI	0.0%	-	0.0%
113	C&E	NB	LI	4.4%	-	0.0%

Route	Route Type	Race/Ethnicity Designation	Income Designation	Pct. of Weekday Trip Observations with an Overload	Weekday Sched. Trips Consistently Overloaded	Pct. of Weekday Sched. Trips Consistently Overloaded
114	C&E	NB	LI	6.3%	1	5.3%
115	C&E	NB	LI	0.0%	-	0.0%
118	C&E	NB	LI	0.0%	-	0.0%
129	Supp L	B	LI	0.0%	-	0.0%
133	C&E	NB	NLI	0.6%	-	0.0%
134	C&E	NB	NLI	1.4%	-	0.0%
135	C&E	NB	NLI	1.0%	-	0.0%
141	CL	NB	NLI	3.8%	-	0.0%
146	C&E	NB	NLI	2.5%	-	0.0%
156	C&E	NB	NLI	14.3%	2	11.1%
219	Sub L	B	LI	0.2%	-	0.0%
223	Sub L	B	LI	1.5%	-	0.0%
225	Sub L	NB	NLI	0.1%	-	0.0%
227	Sub L	B	LI	0.0%	-	0.0%
250	C&E	NB	NLI	1.9%	1	1.8%
252	C&E	NB	NLI	1.0%	-	0.0%
261	C&E	NB	NLI	3.0%	-	0.0%
262	CL	NB	NLI	0.0%	-	0.0%
263	C&E	B	NLI	2.2%	-	0.0%
264	C&E	B	NLI	2.5%	-	0.0%
265	C&E	NB	NLI	0.0%	-	0.0%
270	C&E	B	NLI	8.5%	1	3.3%
272	C&E	NB	NLI	0.0%	-	0.0%
275	C&E	NB	NLI	5.2%	-	0.0%
288	C&E	NB	NLI	6.8%	-	0.0%
294	C&E	NB	NLI	3.3%	-	0.0%
350	C&E	B	NLI	0.0%	-	0.0%
351	C&E	B	NLI	3.0%	-	0.0%
353	C&E	NB	NLI	3.4%	-	0.0%
355	C&E	NB	NLI	7.8%	-	0.0%
361	C&E	NB	NLI	1.5%	-	0.0%
364	C&E	NB	NLI	0.0%	-	0.0%
365	C&E	NB	NLI	3.8%	-	0.0%
375	C&E	NB	NLI	5.5%	-	0.0%
415	Sub L	B	LI	0.0%	-	0.0%
417	Sub L	NB	NLI	0.0%	-	0.0%
452	C&E	NB	NLI	0.5%	-	0.0%
467	C&E	NB	NLI	16.5%	3	9.7%
515	Sub L	B	LI	0.0%	-	0.0%
535	C&E	B	LI	0.3%	-	0.0%
537	Sub L	NB	LI	0.0%	-	0.0%
538	Sub L	B	LI	0.0%	-	0.0%
539	Sub L	B	LI	0.1%	-	0.0%
540	Sub L	B	LI	0.0%	-	0.0%
542	Sub L	B	LI	0.0%	-	0.0%
552	C&E	B	NLI	3.0%	-	0.0%
553	C&E	B	NLI	0.5%	-	0.0%
554	C&E	B	NLI	0.2%	-	0.0%
558	C&E	B	NLI	3.6%	-	0.0%
578	C&E	B	NLI	3.9%	-	0.0%
579	C&E	NB	NLI	0.9%	-	0.0%
587	C&E	NB	NLI	2.3%	-	0.0%
588	C&E	B	LI	0.0%	-	0.0%
589	C&E	NB	NLI	1.4%	-	0.0%
597	C&E	NB	NLI	2.2%	-	0.0%
604	Sub L	NB	NLI	0.0%	-	0.0%

Route	Route Type	Race/Ethnicity Designation	Income Designation	Pct. of Weekday Trip Observations with an Overload	Weekday Sched. Trips Consistently Overloaded	Pct. of Weekday Sched. Trips Consistently Overloaded
612	Sub L	B	LI	0.0%	-	0.0%
615	Sub L	B	LI	0.0%	-	0.0%
643	C&E	NB	NLI	0.0%	-	0.0%
645	Sub L	NB	NLI	0.5%	-	0.0%
652	C&E	NB	NLI	2.1%	-	0.0%
663	C&E	NB	NLI	5.0%	-	0.0%
664	C&E	NB	NLI	1.1%	-	0.0%
667	C&E	NB	NLI	2.3%	-	0.0%
668	C&E	B	NLI	0.5%	-	0.0%
670	C&E	B	LI	2.4%	-	0.0%
671	C&E	NB	NLI	0.0%	-	0.0%
672	C&E	NB	NLI	0.1%	-	0.0%
673	C&E	NB	NLI	5.4%	-	0.0%
674	C&E	NB	NLI	0.3%	-	0.0%
677	C&E	NB	NLI	1.6%	-	0.0%
679	C&E	NB	NLI	0.0%	-	0.0%
705	Sub L	B	LI	0.0%	-	0.0%
716	Sub L	B	LI	0.1%	-	0.0%
717	Sub L	B	LI	0.1%	-	0.0%
721	Sub L	B	LI	0.2%	-	0.0%
722	Sub L	B	LI	0.0%	-	0.0%
723	Sub L	B	LI	0.2%	-	0.0%
724	Sub L	B	LI	0.4%	-	0.0%
755	C&E	B	LI	0.0%	-	0.0%
756	C&E	B	NLI	4.4%	-	0.0%
758	C&E	NB	NLI	5.9%	-	0.0%
760	C&E	B	LI	3.0%	-	0.0%
761	C&E	B	LI	4.8%	-	0.0%
762	C&E	B	NLI	0.0%	-	0.0%
763	C&E	B	NLI	0.8%	-	0.0%
764	C&E	B	NLI	2.7%	-	0.0%
765	C&E	B	NLI	2.8%	-	0.0%
766	C&E	B	NLI	2.9%	-	0.0%
767	C&E	B	NLI	0.2%	-	0.0%
768	C&E	B	NLI	13.4%	2	5.3%
801	Sub L	B	LI	0.0%	-	0.0%
805	Sub L	NB	LI	0.0%	-	0.0%
824	CL	B	NLI	0.0%	-	0.0%
825	CL	NB	NLI	0.3%	-	0.0%
831	Sub L	NB	LI	0.0%	-	0.0%
850	C&E	NB	NLI	10.5%	1	2.3%
852	C&E	NB	LI	0.9%	-	0.0%
854	C&E	NB	NLI	1.2%	-	0.0%
860	C&E	NB	NLI	1.3%	-	0.0%
865	C&E	NB	NLI	4.3%	-	0.0%
METRO Red Line	Hwy BRT	NB	NLI	0.0%	-	0.0%
METRO A Line	Art BRT	NB	LI	0.2%	-	0.0%
METRO C Line	Art BRT	B	LI	0.2%	-	0.0%

APPENDIX F: ON-TIME PERFORMANCE

Table 30: On-Time Performance by Route (2019)

Percent of timepoint crossings considered on-time

Route type abbreviations: CL = core local bus; Supp L = supporting local bus; Sub L = suburban local bus; C&E = commuter & express bus; Art BRT = arterial BRT; Hwy BRT = highway BRT; CR = commuter rail; LR = light rail

Race/ethnicity designation abbreviations: B = BIPOC; NB = non-BIPOC
Income designation abbreviations: LI = low-income; NLI = non-low-income

Route	Route Type	Race/Ethnicity Designation	Income Designation	Weekday	Saturday	Sunday	Total
2	CL	B	LI	86%	83%	84%	85%
3	CL	B	LI	83%	88%	88%	84%
4	CL	NB	LI	76%	80%	79%	76%
5	CL	B	LI	78%	79%	79%	78%
6	CL	NB	LI	77%	85%	81%	78%
7	CL	B	LI	80%	78%	88%	81%
9	CL	B	LI	80%	80%	82%	80%
10	CL	B	LI	78%	81%	81%	79%
11	CL	B	LI	80%	86%	77%	81%
12	CL	NB	LI	72%	-	-	72%
14	CL	B	LI	83%	83%	80%	83%
16	Supp L	B	LI	82%	86%	88%	83%
17	CL	NB	LI	77%	71%	76%	76%
18	CL	B	LI	83%	84%	81%	83%
19	CL	B	LI	81%	86%	85%	82%
21	CL	B	LI	83%	82%	83%	83%
22	CL	B	LI	75%	72%	74%	74%
23	Supp L	NB	NLI	86%	87%	83%	86%
25	CL	NB	NLI	74%	86%	-	75%
27	Supp L	B	LI	93%	-	-	93%
30	Supp L	B	LI	83%	88%	83%	83%
32	Supp L	B	LI	86%	89%	93%	87%
39	Supp L	NB	NLI	92%	-	-	92%
46	Supp L	NB	NLI	84%	81%	79%	83%
53	CL	B	LI	82%	-	-	82%
54	CL	B	LI	85%	85%	80%	85%
59	CL	B	LI	73%	-	-	73%
61	CL	B	LI	83%	85%	-	83%
62	CL	B	LI	92%	92%	94%	92%
63	CL	B	LI	86%	85%	85%	86%
64	CL	B	LI	87%	85%	87%	87%
65	Supp L	B	LI	96%	97%	97%	96%
67	CL	B	LI	87%	83%	85%	86%
68	CL	B	LI	92%	91%	94%	92%
70	CL	B	LI	88%	88%	97%	88%
71	CL	B	LI	94%	94%	94%	94%
74	CL	B	LI	89%	92%	93%	90%
75	CL	B	LI	90%	-	-	90%

Route	Route Type	Race/Ethnicity Designation	Income Designation	Weekday	Saturday	Sunday	Total
80	Supp L	B	LI	97%	94%	92%	96%
83	Supp L	B	LI	84%	88%	89%	86%
84	Supp L	NB	LI	83%	85%	88%	84%
87	Supp L	NB	LI	91%	91%	95%	91%
94	C&E	B	LI	89%	-	-	89%
111	C&E	B	NLI	73%	-	-	73%
113	C&E	NB	LI	82%	-	-	82%
114	C&E	NB	LI	88%	-	-	88%
115	C&E	NB	LI	76%	-	-	76%
118	C&E	NB	LI	83%	-	-	83%
129	Supp L	B	LI	99%	-	-	99%
133	C&E	NB	NLI	81%	-	-	81%
134	C&E	NB	NLI	76%	-	-	76%
135	C&E	NB	NLI	74%	-	-	74%
141	CL	NB	NLI	74%	-	-	74%
146	C&E	NB	NLI	81%	-	-	81%
156	C&E	NB	NLI	77%	-	-	77%
219	Sub L	B	LI	88%	88%	-	88%
223	Sub L	B	LI	90%	-	-	90%
225	Sub L	NB	NLI	79%	90%	-	81%
227	Sub L	B	LI	88%	93%	-	89%
250	C&E	NB	NLI	83%	-	-	83%
252	C&E	NB	NLI	89%	-	-	89%
261	C&E	NB	NLI	84%	-	-	84%
262	CL	NB	NLI	83%	-	-	83%
263	C&E	B	NLI	85%	-	-	85%
264	C&E	B	NLI	81%	-	-	81%
265	C&E	NB	NLI	91%	-	-	91%
270	C&E	B	NLI	86%	-	-	86%
272	C&E	NB	NLI	78%	-	-	78%
275	C&E	NB	NLI	97%	-	-	97%
288	C&E	NB	NLI	85%	-	-	85%
294	C&E	NB	NLI	82%	-	-	82%
350	C&E	B	NLI	89%	-	-	89%
351	C&E	B	NLI	92%	-	-	92%
353	C&E	NB	NLI	90%	-	-	90%
355	C&E	NB	NLI	86%	-	-	86%
361	C&E	NB	NLI	90%	-	-	90%
364	C&E	NB	NLI	87%	-	-	87%
365	C&E	NB	NLI	85%	-	-	85%
375	C&E	NB	NLI	92%	-	-	92%
415	Sub L	B	LI	86%	-	-	86%
417	Sub L	NB	NLI	87%	-	-	87%
452	C&E	NB	NLI	83%	-	-	83%
467	C&E	NB	NLI	87%	-	-	87%
515	Sub L	B	LI	96%	97%	94%	96%
535	C&E	B	LI	86%	-	-	86%
537	Sub L	NB	LI	97%	-	-	97%

Route	Route Type	Race/Ethnicity Designation	Income Designation	Weekday	Saturday	Sunday	Total
538	Sub L	B	LI	91%	82%	76%	88%
539	Sub L	B	LI	85%	95%	96%	86%
540	Sub L	B	LI	90%	80%	83%	89%
542	Sub L	B	LI	83%	-	-	83%
552	C&E	B	NLI	78%	-	-	78%
553	C&E	B	NLI	82%	-	-	82%
554	C&E	B	NLI	77%	-	-	77%
558	C&E	B	NLI	82%	-	-	82%
578	C&E	B	NLI	85%	-	-	85%
579	C&E	NB	NLI	83%	-	-	83%
587	C&E	NB	NLI	74%	-	-	74%
588	C&E	B	LI	77%	-	-	77%
589	C&E	NB	NLI	68%	-	-	68%
597	C&E	NB	NLI	78%	-	-	78%
604	Sub L	NB	NLI	95%	-	-	95%
612	Sub L	B	LI	86%	84%	79%	84%
615	Sub L	B	LI	81%	85%	-	82%
643	C&E	NB	NLI	90%	-	-	90%
645	Sub L	NB	NLI	74%	68%	79%	74%
652	C&E	NB	NLI	74%	-	-	74%
663	C&E	NB	NLI	82%	-	-	82%
664	C&E	NB	NLI	84%	-	-	84%
667	C&E	NB	NLI	76%	-	-	76%
668	C&E	B	NLI	69%	-	-	69%
670	C&E	B	LI	70%	-	-	70%
671	C&E	NB	NLI	78%	-	-	78%
672	C&E	NB	NLI	83%	-	-	83%
673	C&E	NB	NLI	84%	-	-	84%
674	C&E	NB	NLI	80%	-	-	80%
677	C&E	NB	NLI	77%	-	-	77%
679	C&E	NB	NLI	95%	-	-	95%
705	Sub L	B	LI	78%	-	-	78%
716	Sub L	B	LI	82%	82%	-	82%
717	Sub L	B	LI	86%	-	-	86%
721	Sub L	B	LI	86%	89%	90%	87%
722	Sub L	B	LI	94%	90%	91%	93%
723	Sub L	B	LI	90%	87%	93%	90%
724	Sub L	B	LI	91%	93%	96%	92%
755	C&E	B	LI	79%	-	-	79%
756	C&E	B	NLI	70%	-	-	70%
758	C&E	NB	NLI	78%	-	-	78%
760	C&E	B	LI	81%	-	-	81%
761	C&E	B	LI	81%	-	-	81%
762	C&E	B	NLI	68%	-	-	68%
763	C&E	B	NLI	81%	-	-	81%
764	C&E	B	NLI	80%	-	-	80%
765	C&E	B	NLI	82%	-	-	82%
766	C&E	B	NLI	83%	-	-	83%

Route	Route Type	Race/Ethnicity Designation	Income Designation	Weekday	Saturday	Sunday	Total
767	C&E	B	NLI	89%	-	-	89%
768	C&E	B	NLI	85%	-	-	85%
801	Sub L	B	LI	85%	-	-	85%
805	Sub L	NB	LI	71%	78%	-	72%
824	CL	B	NLI	82%	-	-	82%
825	CL	NB	NLI	73%	-	-	73%
831	Sub L	NB	LI	97%	-	-	97%
850	C&E	NB	NLI	84%	-	-	84%
852	C&E	NB	LI	83%	85%	-	83%
854	C&E	NB	NLI	81%	-	-	81%
860	C&E	NB	NLI	80%	-	-	80%
865	C&E	NB	NLI	87%	-	-	87%
Northstar	CR	NB	NLI	93%	97%	98%	94%
METRO Blue Line	LR	B	LI	-	-	-	85%
METRO Green Line	LR	B	LI	-	-	-	72%
METRO Red Line	Hwy BRT	NB	NLI	93%	91%	96%	93%
METRO A Line	Art BRT	NB	LI	91%	90%	87%	90%
METRO C Line	Art BRT	B	LI	81%	84%	86%	82%

APPENDIX G: ROUTE SPACING

Route spacing results by Transit Market Areas and route type, for fall 2019 and fall 2020, are shown Figure 6 through Figure 11. In some instances, route spacing standards for supporting local routes are not met for practical reasons – wherein the area is already sufficiently covered by core local routes. These instances are noted on the figures.

Differences between fall 2019 and fall 2020 are minor, with the most notable appearing when considering route spacing for supporting local routes. Substantial differences and their causes are noted on the figures.

Figure 6. Core Local Route Spacing in Market Area I (2019)

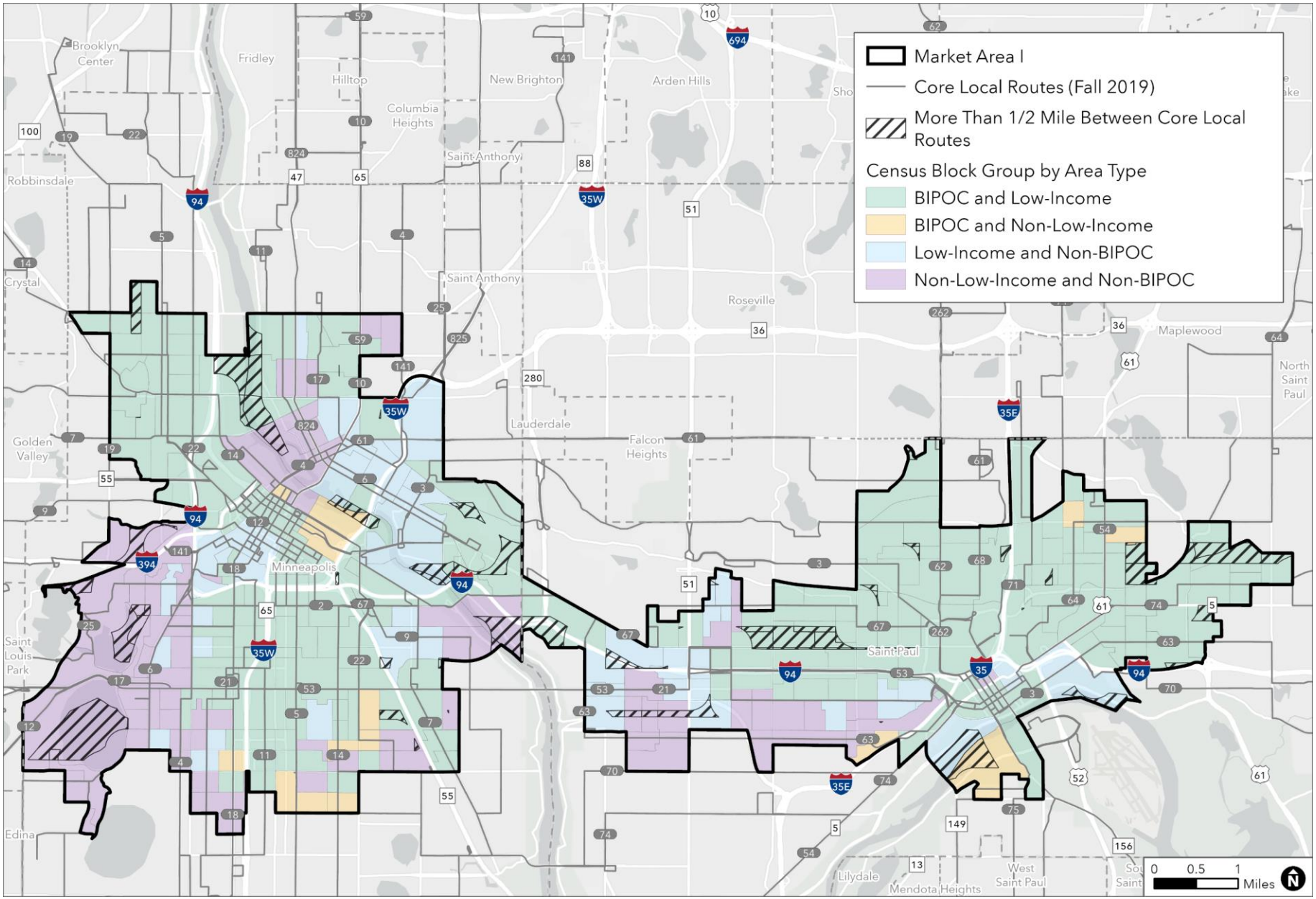


Figure 7. Supporting Local Route Spacing in Market Area I (2019)

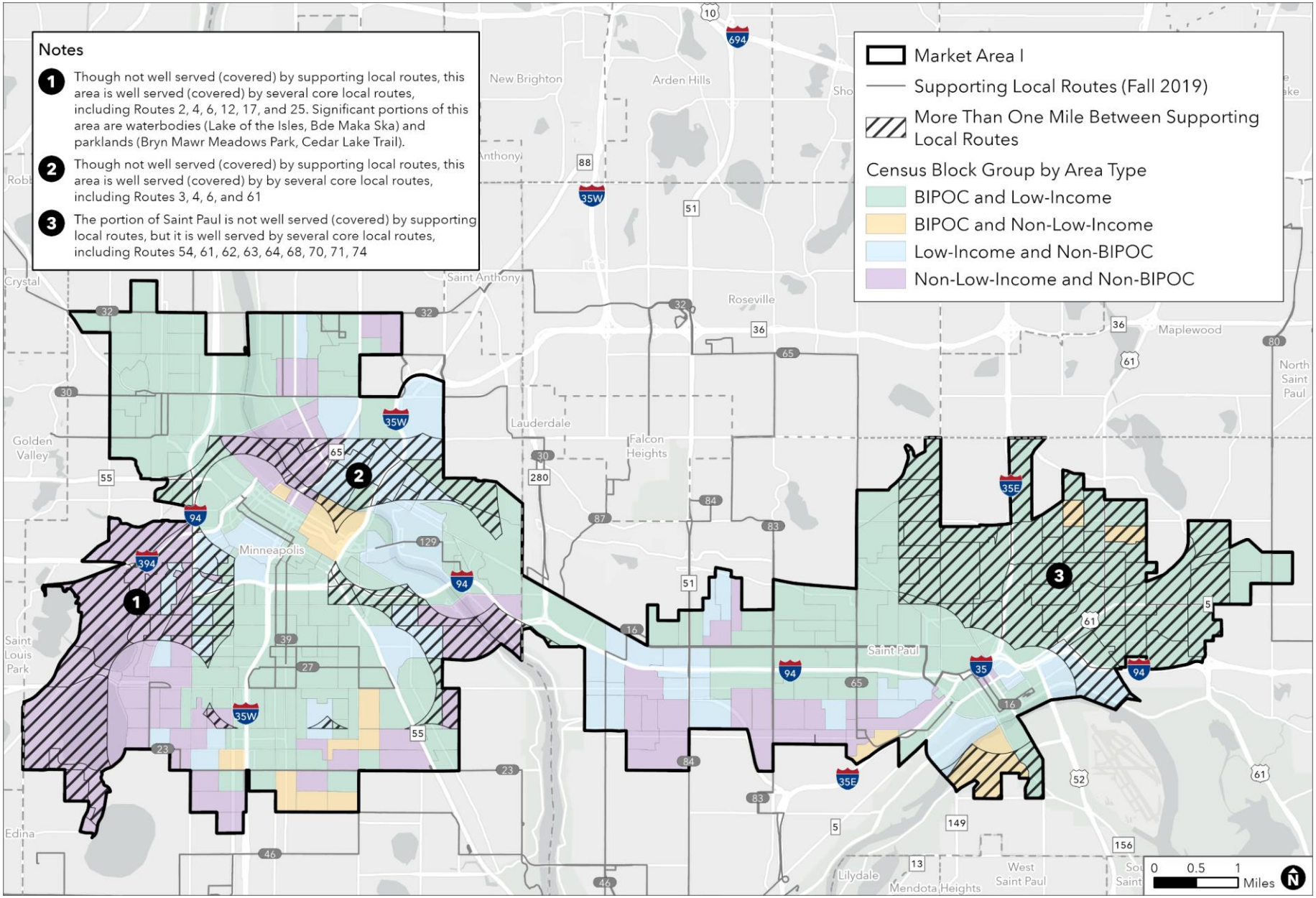


Figure 8. Local Route Spacing in Market Area II (2019)

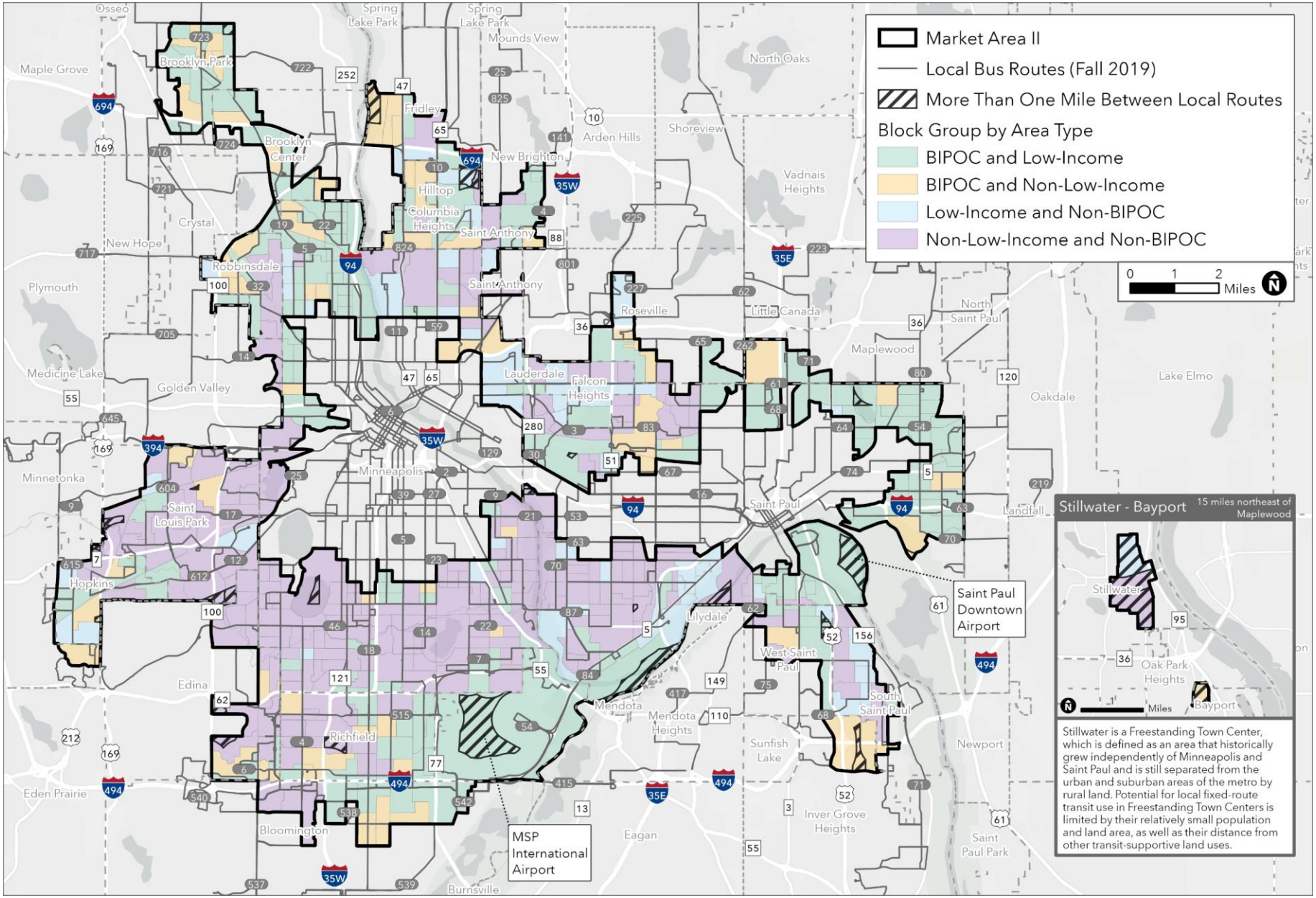


Figure 9. Core Local Route Spacing in Market Area I (2020)

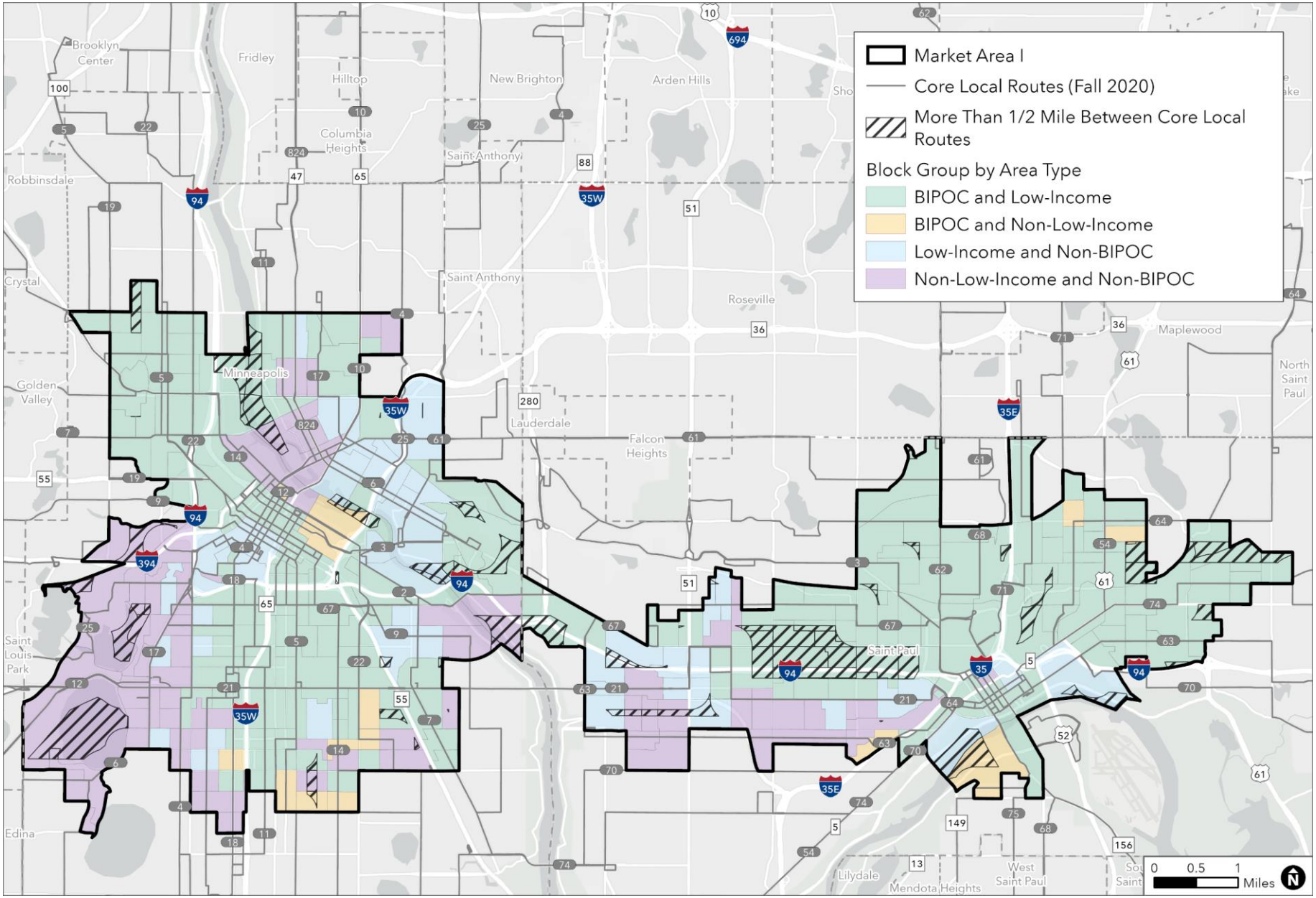


Figure 10. Supporting Local Route Spacing in Market Area I (2020)

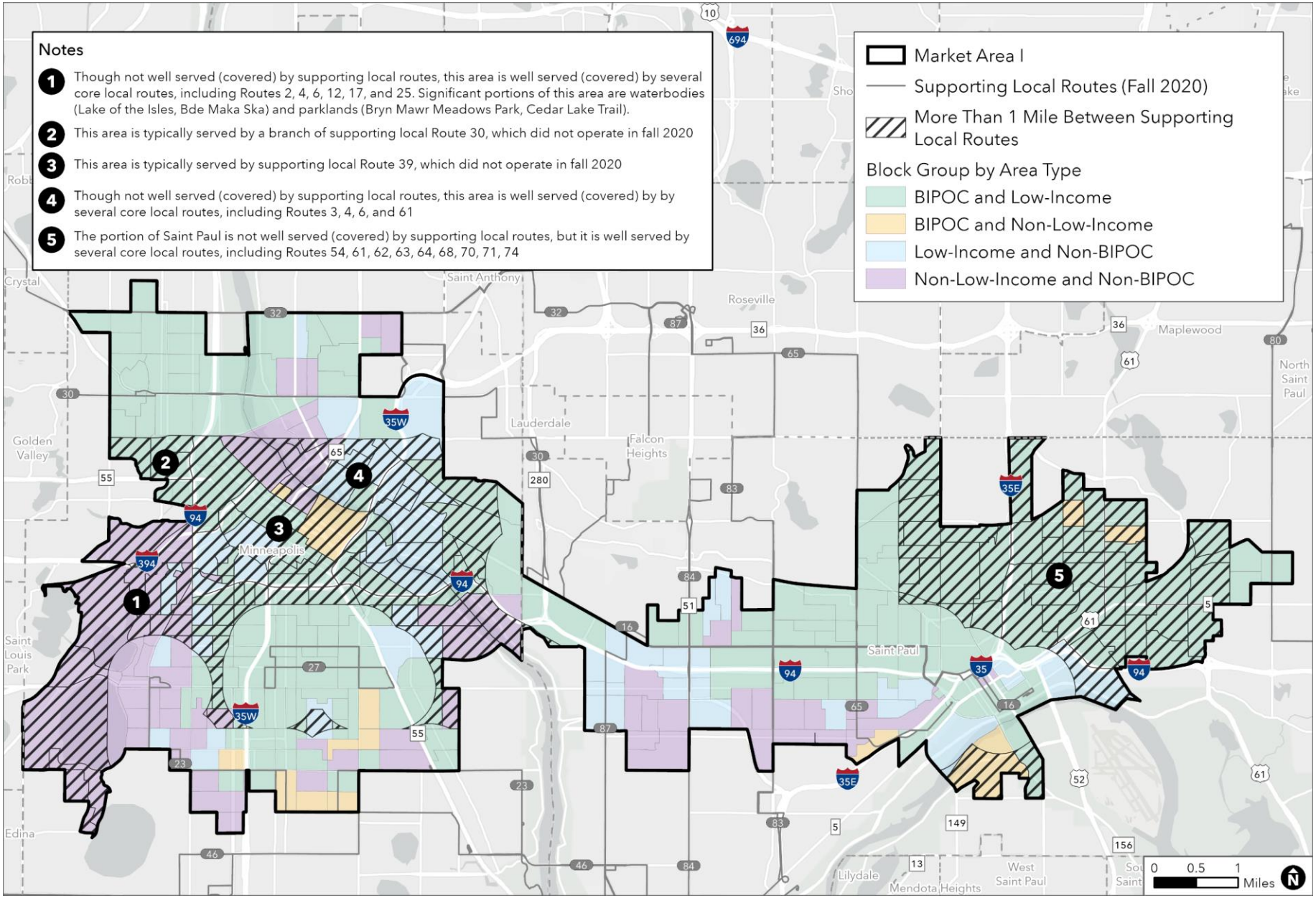
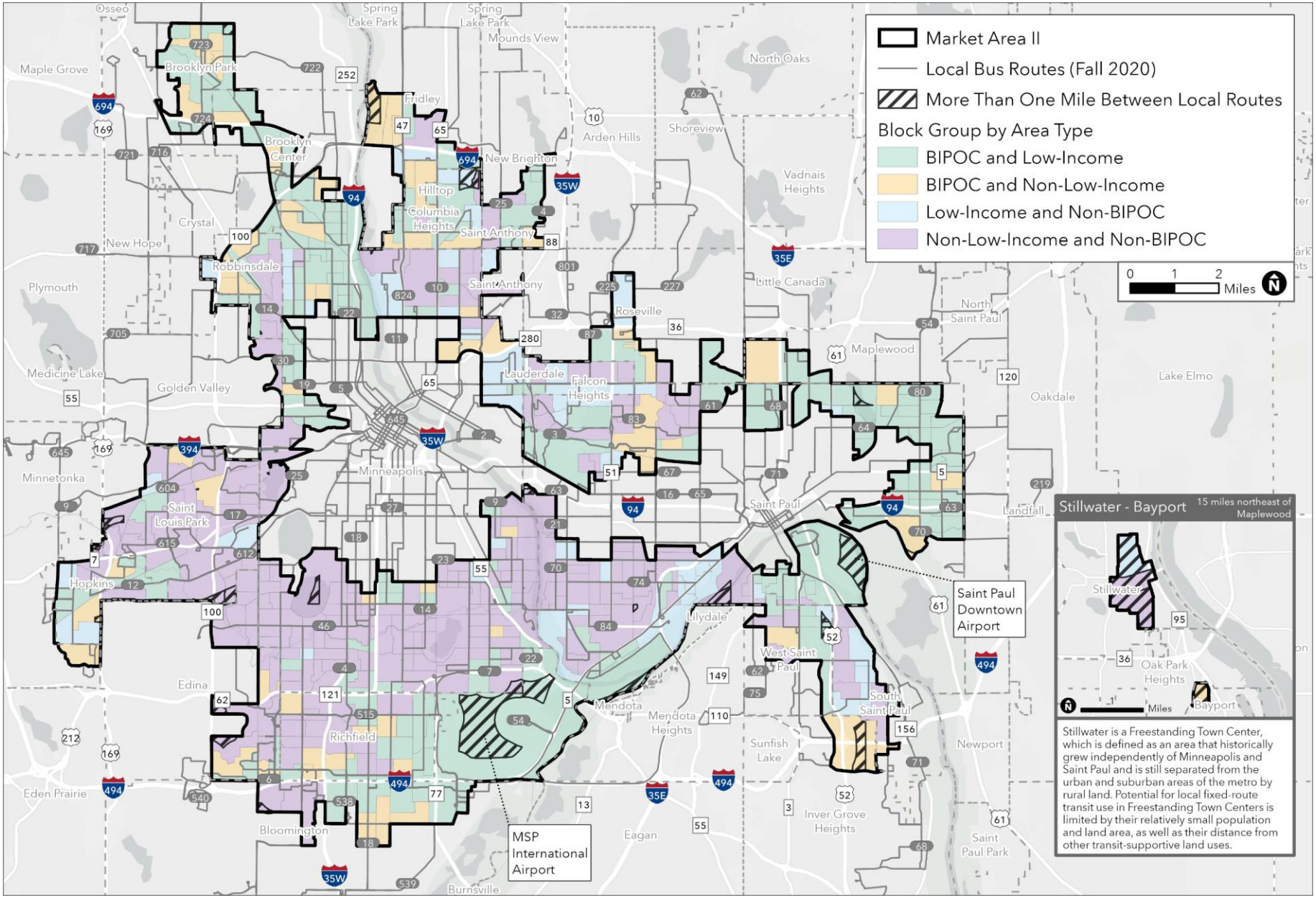


Figure 11. Local Route Spacing in Market Area II (2020)



APPENDIX H: MIDDAY SERVICE AVAILABILITY

Midday service availability for Market Areas I, II, and III in fall 2019 and fall 2020 is shown in Figure 12 and Figure 13, respectively. Stops in Market Area III have low adherence to midday headway standards, and as a result the combined map shows good coverage at the core and limited coverage at the system margins. Differences between fall 2019 and fall 2020 are minor, with the most notable appearing in Little Canada and Shoreview near I-35E and I-694 as a result of reduced/suspended service in fall 2020.

Figure 12. Midday Service Standards Compliance in Market Areas I, II and III (2019)

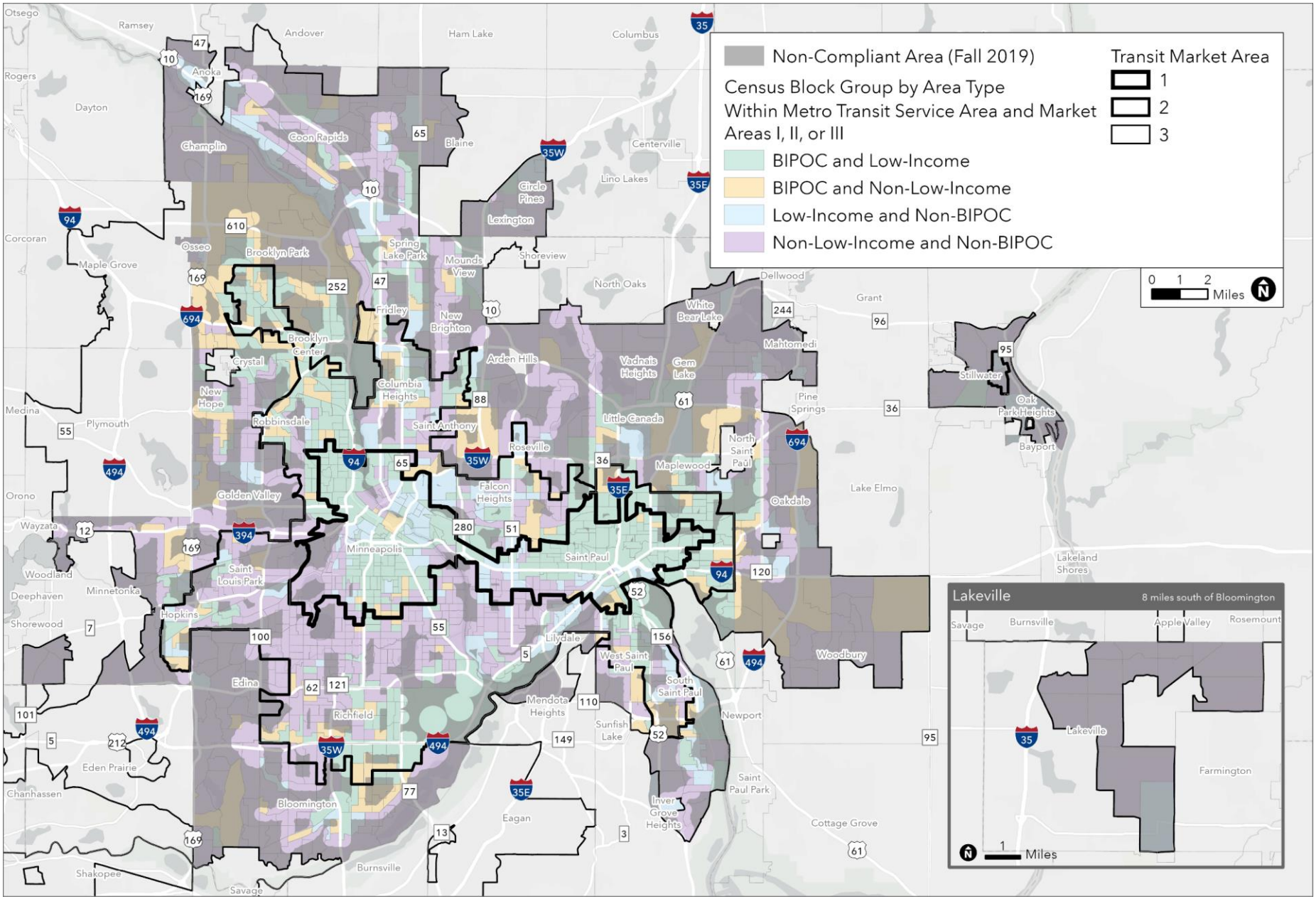
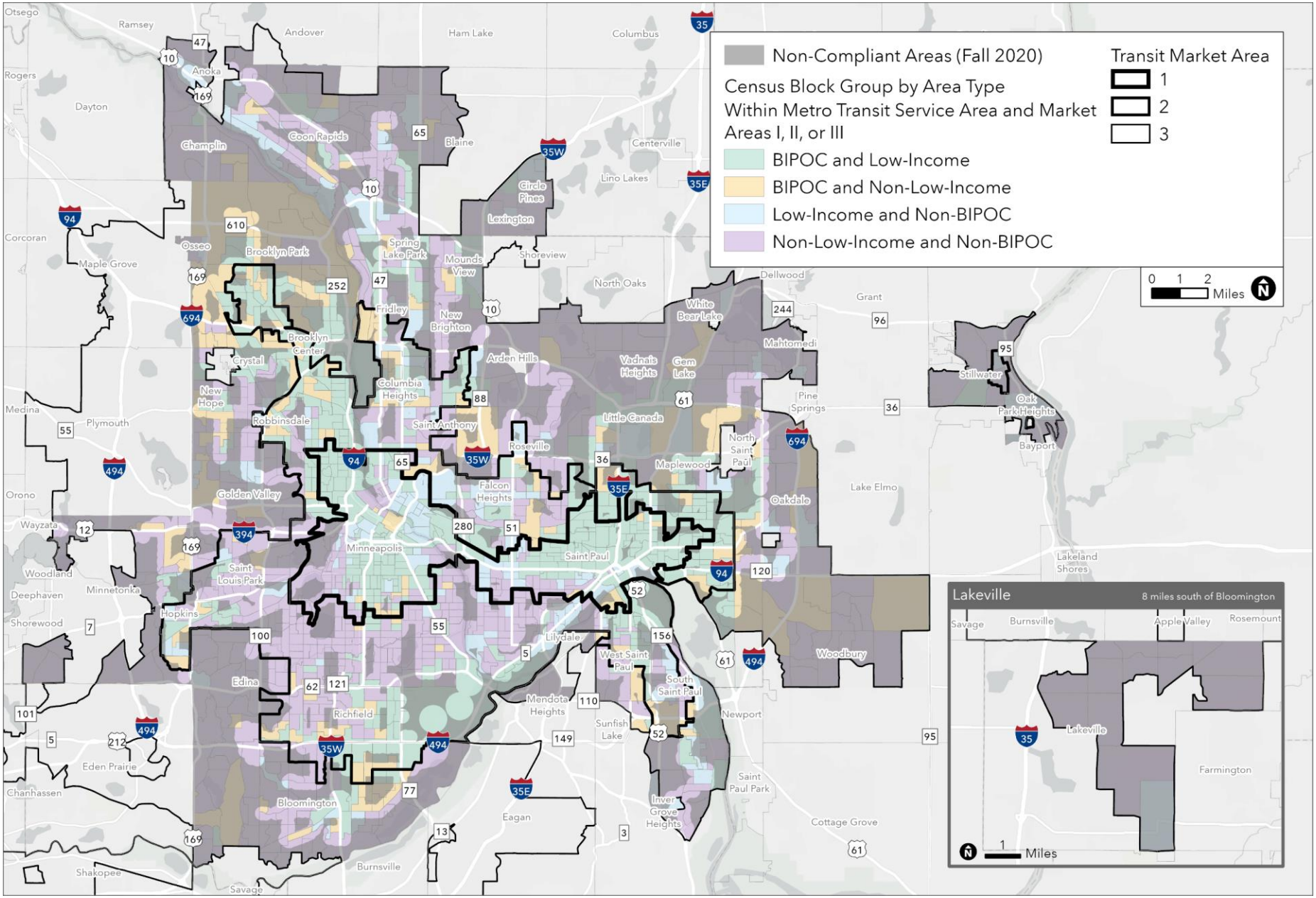


Figure 13. Midday Service Standards Compliance in Market Areas I, II and III (2020)



APPENDIX I: VEHICLE ASSIGNMENT

For the most part, route trips in fall 2019 were assigned buses that were newer than would be expected based on the available fleet averages. There are two reasons for this:

1. Newer buses tend to be more reliable and therefore more available to be assigned to work
2. Old buses were retired and removed from the active revenue fleet during the evaluation period. They appear in the averages as if they had been in service during the whole period.

Table 31 summarizes fall 2019 vehicle assignment data by route. Of the 149 Metro Transit bus routes evaluated, 52 were assigned buses that, on average, were older than would have been expected given the average fleet age. Of those 52 routes, only 2 were, on average, assigned buses more than 2 year older and beyond 1 standard deviation of the age that would be expected: Route 350 (BIPOC and non-low-income) and Route 353 (non-BIPOC and non-low-income), both commuter and express route types.

Table 31: Vehicle Age in Years by Route (2019)

Route type abbreviations: CL = core local; Supp L = supporting local; Sub L = suburban local; C&E = commuter & express; Art BRT = arterial BRT; Hwy BRT = highway BRT

Race/ethnicity designation abbreviations: B = BIPOC; NB = non-BIPOC
Income designation abbreviations: LI = low-income; NLI = non-low-income

Route	Route Type	Race/Ethnicity Designation	Income Designation	Assigned Avg.	Assigned Std.	Available Avg.	Difference if Older	Assigned Relative to Available
2	CL	B	LI	5.2	2.5	6.7		Newer
3	CL	B	LI	6.9	2.9	7.1		Newer
4	CL	NB	LI	6.7	2.5	7.2		Newer
5	CL	B	LI	6.4	2.4	7.6		Newer
6	CL	NB	LI	7.2	2.5	8.0		Newer
7	CL	B	LI	6.7	2.3	7.1		Newer
9	CL	B	LI	7.0	2.4	6.7	0.3	Not sig. older
10	CL	B	LI	9.3	2.4	10.4		Newer
11	CL	B	LI	9.5	2.6	10.1		Newer
12	CL	NB	LI	7.1	2.8	6.7	0.4	Not sig. older
14	CL	B	LI	6.4	2.3	7.4		Newer
16	Supp L	B	LI	7.7	2.0	7.7	0.0	Not sig. older
17	CL	NB	LI	8.8	2.3	10.1		Newer
18	CL	B	LI	9.4	2.5	10.2		Newer
19	CL	B	LI	6.2	2.4	7.0		Newer
21	CL	B	LI	6.0	2.5	7.1		Newer
22	CL	B	LI	6.5	2.3	7.3		Newer
23	Supp L	NB	NLI	7.8	1.8	6.8	1.0	Not sig. older
25	CL	NB	NLI	9.1	2.4	10.4		Newer
27	Supp L	B	LI	1.6	0.2	1.9		Newer
30	Supp L	B	LI	7.1	2.5	7.7		Newer
32	Supp L	B	LI	6.6	2.2	6.6		Newer
39	Supp L	NB	NLI	8.5	2.2	6.7	1.8	Not sig. older
46	Supp L	NB	NLI	7.3	2.0	6.7	0.6	Not sig. older
53	CL	B	LI	7.6	2.9	7.6	0.0	Not sig. older
54	CL	B	LI	7.0	2.4	8.0		Newer
59	CL	B	LI	8.8	2.6	10.4		Newer
61	CL	B	LI	6.8	2.2	7.3		Newer
62	CL	B	LI	6.9	2.2	7.7		Newer

Route	Route Type	Race/Ethnicity Designation	Income Designation	Assigned Avg.	Assigned Std.	Available Avg.	Difference if Older	Assigned Relative to Available
63	CL	B	LI	7.4	2.7	8.3		Newer
64	CL	B	LI	7.2	2.7	8.1		Newer
65	Supp L	B	LI	7.4	2.3	7.7		Newer
67	CL	B	LI	7.1	2.0	7.2		Newer
68	CL	B	LI	7.3	2.5	8.1		Newer
70	CL	B	LI	7.9	2.5	7.7	0.1	Not sig. older
71	CL	B	LI	6.9	2.5	7.8		Newer
74	CL	B	LI	6.9	2.3	7.8		Newer
75	CL	B	LI	7.6	2.7	7.7		Newer
80	Supp L	B	LI	3.9	0.9	4.0		Newer
83	Supp L	B	LI	1.7	0.6	1.9		Newer
84	Supp L	NB	LI	7.4	2.4	7.7		Newer
87	Supp L	NB	LI	3.9	0.9	4.0		Newer
94	C&E	B	LI	7.7	3.0	8.0		Newer
111	C&E	B	NLI	9.2	2.2	8.5	0.7	Not sig. older
113	C&E	NB	LI	8.4	2.3	7.9	0.5	Not sig. older
114	C&E	NB	LI	8.5	1.9	8.6		Newer
115	C&E	NB	LI	8.4	1.8	9.2		Newer
118	C&E	NB	LI	7.6	2.7	7.7		Newer
129	Supp L	B	LI	7.0	2.2	6.4	0.7	Not sig. older
133	C&E	NB	NLI	7.9	2.3	6.7	1.2	Not sig. older
134	C&E	NB	NLI	8.7	2.0	8.8		Newer
135	C&E	NB	NLI	8.5	2.3	7.0	1.6	Not sig. older
141	CL	NB	NLI	6.9	2.3	6.5	0.4	Not sig. older
146	C&E	NB	NLI	8.0	2.5	7.7	0.3	Not sig. older
156	C&E	NB	NLI	8.0	2.5	6.7	1.3	Not sig. older
219	Sub L	B	LI	1.5	0.1	1.5		Newer
223	Sub L	B	LI	1.6	0.2	1.9		Newer
225	Sub L	NB	NLI	1.5	0.2	1.9		Newer
227	Sub L	B	LI	1.5	0.2	1.9		Newer
250	C&E	NB	NLI	8.2	3.4	8.6		Newer
252	C&E	NB	NLI	8.1	2.4	8.5		Newer
261	C&E	NB	NLI	8.7	2.6	9.0		Newer
262	CL	NB	NLI	8.3	2.5	7.7	0.6	Not sig. older
263	C&E	B	NLI	7.8	3.2	7.1	0.7	Not sig. older
264	C&E	B	NLI	7.8	2.6	7.9		Newer
265	C&E	NB	NLI	7.7	3.2	7.3	0.4	Not sig. older
270	C&E	B	NLI	7.4	3.2	7.2	0.2	Not sig. older
272	C&E	NB	NLI	9.0	2.6	7.7	1.2	Not sig. older
275	C&E	NB	NLI	9.1	2.3	9.0	0.1	Not sig. older
288	C&E	NB	NLI	9.0	2.2	9.2		Newer
294	C&E	NB	NLI	8.2	3.0	7.8	0.4	Not sig. older
350	C&E	B	NLI	13.1	1.1	8.3	4.8	**More than 1 std. older**
351	C&E	B	NLI	7.6	3.0	7.4	0.2	Not sig. older
353	C&E	NB	NLI	9.9	2.2	7.7	2.2	**More than 1 std. older**
355	C&E	NB	NLI	7.1	3.1	7.3		Newer
361	C&E	NB	NLI	9.0	2.8	7.6	1.4	Not sig. older
364	C&E	NB	NLI	1.7	0.3	1.9		Newer
365	C&E	NB	NLI	8.8	2.3	8.9		Newer
375	C&E	NB	NLI	7.2	3.1	7.0	0.1	Not sig. older
415	Sub L	B	LI	8.8	2.1	8.8		Newer
417	Sub L	NB	NLI	1.8	0.6	1.9		Newer
452	C&E	NB	NLI	9.1	2.1	8.7	0.4	Not sig. older
467	C&E	NB	NLI	8.6	1.6	8.5	0.1	Not sig. older
515	Sub L	B	LI	8.4	2.0	8.5		Newer
535	C&E	B	LI	8.5	1.9	8.9		Newer

Route	Route Type	Race/Ethnicity Designation	Income Designation	Assigned Avg.	Assigned Std.	Available Avg.	Difference if Older	Assigned Relative to Available
537	Sub L	NB	LI	3.9	1.0	4.0		Newer
538	Sub L	B	LI	3.9	0.9	4.0		Newer
539	Sub L	B	LI	3.7	0.8	4.0		Newer
540	Sub L	B	LI	8.2	2.8	7.7	0.5	Not sig. older
542	Sub L	B	LI	9.3	3.2	7.8	1.4	Not sig. older
552	C&E	B	NLI	10.0	1.8	8.7	1.3	Not sig. older
553	C&E	B	NLI	9.0	2.1	8.6	0.3	Not sig. older
554	C&E	B	NLI	9.3	2.7	9.9		Newer
558	C&E	B	NLI	9.1	2.1	8.5	0.6	Not sig. older
578	C&E	B	NLI	8.8	1.6	9.2		Newer
579	C&E	NB	NLI	9.1	2.2	8.7	0.4	Not sig. older
587	C&E	NB	NLI	8.9	2.2	8.8	0.1	Not sig. older
588	C&E	B	LI	9.4	2.3	8.5	0.9	Not sig. older
589	C&E	NB	NLI	9.1	2.2	8.5	0.7	Not sig. older
597	C&E	NB	NLI	8.9	1.8	9.1		Newer
604	Sub L	NB	NLI	1.8	0.4	1.9		Newer
612	Sub L	B	LI	5.6	2.4	6.7		Newer
615	Sub L	B	LI	1.7	0.4	1.9		Newer
643	C&E	NB	NLI	7.9	2.7	8.0		Newer
645	Sub L	NB	NLI	7.8	2.7	8.3		Newer
652	C&E	NB	NLI	7.4	2.6	7.8		Newer
663	C&E	NB	NLI	7.9	2.6	7.9	0.0	Not sig. older
664	C&E	NB	NLI	7.4	2.5	7.0	0.4	Not sig. older
667	C&E	NB	NLI	7.8	2.6	7.5	0.2	Not sig. older
668	C&E	B	NLI	7.5	2.5	7.5	0.1	Not sig. older
670	C&E	B	LI	3.8	1.9	8.3		Newer
671	C&E	NB	NLI	4.1	2.3	8.3		Newer
672	C&E	NB	NLI	7.5	2.5	7.6		Newer
673	C&E	NB	NLI	8.8	2.6	9.2		Newer
674	C&E	NB	NLI	6.9	2.1	6.4	0.5	Not sig. older
677	C&E	NB	NLI	8.3	2.5	8.2	0.1	Not sig. older
679	C&E	NB	NLI	7.2	2.5	7.0	0.2	Not sig. older
705	Sub L	B	LI	6.3	2.1	7.7		Newer
716	Sub L	B	LI	1.7	0.4	1.9		Newer
717	Sub L	B	LI	1.9	0.8	1.9		Newer
721	Sub L	B	LI	6.8	2.7	7.1		Newer
722	Sub L	B	LI	6.7	2.4	7.0		Newer
723	Sub L	B	LI	6.8	2.5	7.0		Newer
724	Sub L	B	LI	6.6	2.3	7.0		Newer
755	C&E	B	LI	6.5	2.2	6.7		Newer
756	C&E	B	NLI	8.5	2.5	8.5		Newer
758	C&E	NB	NLI	7.9	2.5	7.9		Newer
760	C&E	B	LI	6.9	3.9	8.2		Newer
761	C&E	B	LI	7.1	2.8	7.0	0.1	Not sig. older
762	C&E	B	NLI	7.5	2.6	7.7		Newer
763	C&E	B	NLI	7.0	3.4	7.6		Newer
764	C&E	B	NLI	7.3	4.0	8.5		Newer
765	C&E	B	NLI	7.2	2.7	7.9		Newer
766	C&E	B	NLI	7.2	2.7	7.3		Newer
767	C&E	B	NLI	7.0	2.1	6.4	0.6	Not sig. older
768	C&E	B	NLI	8.3	3.3	9.0		Newer
801	Sub L	B	LI	10.9	2.2	11.9		Newer
805	Sub L	NB	LI	8.8	0.0	8.8		Newer
824	CL	B	NLI	8.6	2.4	8.8		Newer
825	CL	NB	NLI	7.9	2.5	7.9	0.0	Not sig. older
831	Sub L	NB	LI	12.5	1.7	13.3		Newer
850	C&E	NB	NLI	7.0	4.4	8.7		Newer
852	C&E	NB	LI	6.2	3.0	7.7		Newer

Route	Route Type	Race/Ethnicity Designation	Income Designation	Assigned Avg.	Assigned Std.	Available Avg.	Difference if Older	Assigned Relative to Available
854	C&E	NB	NLI	6.8	4.0	8.3		Newer
860	C&E	NB	NLI	9.0	2.2	9.2		Newer
865	C&E	NB	NLI	5.4	0.9	5.3	0.1	Not sig. older
Red	Hwy BRT	NB	NLI	6.7	0.0	6.7		Newer
A	Art BRT	NB	LI	3.8	0.6	3.8	0.1	Not sig. older
C	Art BRT	B	LI	2.3	2.1	1.4	1.0	Not sig. older