



*B Line*

## Draft Corridor Plan

Metro Transit is planning improvements to the Route 21 corridor with the METRO B Line, a bus rapid transit (BRT) line. The B Line will substantially replace Route 21 in Minneapolis and St. Paul, connecting West Lake Street with downtown St. Paul and running primarily on Lake Street, Marshall Avenue, and Selby Avenue. BRT brings better amenities, faster service and a more comfortable ride. The B Line project is currently in the planning phase. The B Line is scheduled for construction in 2023.

We are currently seeking feedback on proposed B Line station locations and corridor-wide recommendations for routing, bus service, and bus priority treatments. We are seeking comments through March 22.

There are several ways to comment on the plan:

- Review the plan and comment online at [metrotransit.org/b-line-project](https://metrotransit.org/b-line-project)
- Email comments to [BLine@metrotransit.org](mailto:BLine@metrotransit.org)
- Call Customer Relations at 612-373-3333

Metro Transit will report back to the community with revisions in a recommended plan in spring 2021 and bring a final plan to the Metropolitan Council for approval in summer 2021.

To stay in touch, sign up for B Line project updates on the project website:  
[metrotransit.org/b-line-project](https://metrotransit.org/b-line-project)

## Executive Summary

### Corridor Overview

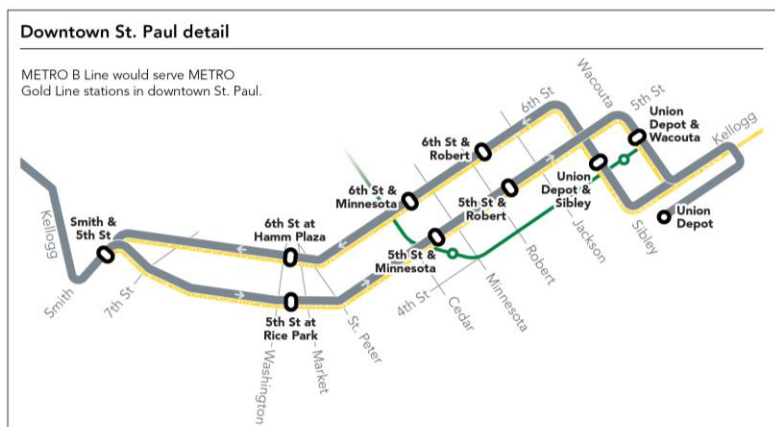
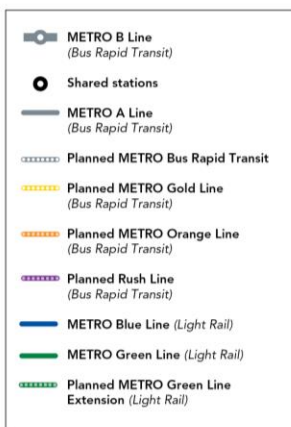
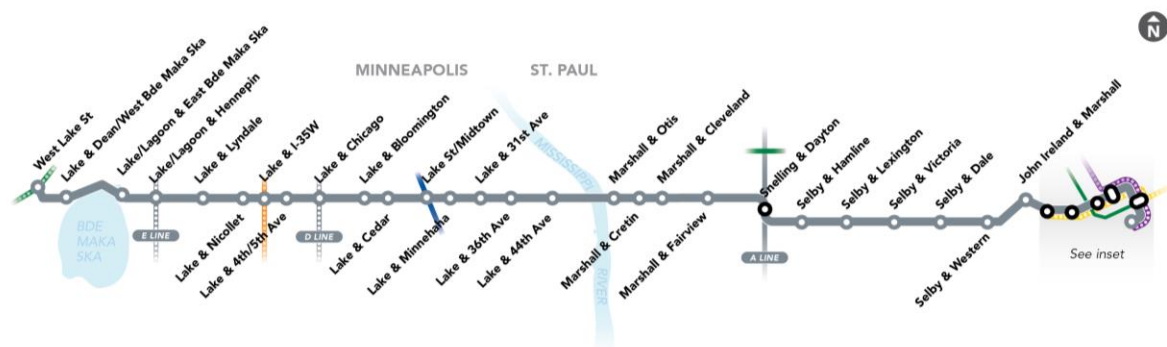
The B Line is a planned arterial bus rapid transit (BRT) line that will upgrade and substantially replace Route 21, one of Metro Transit's highest ridership routes. The 12.6-mile B Line is planned to operate primarily along Lake Street, Marshall Avenue, and Selby Avenue from West Lake Street Station on the METRO Green Line Extension in Minneapolis to Union Depot in downtown St. Paul.

*This plan has been developed with baseline data from years prior to 2020. Therefore, changes in transit service, ridership, or overall traffic patterns resulting from the COVID-19 pandemic have not been used as a baseline for recommendations in this draft plan.*

*Based on Metro Transit research in 2020, Route 21 continues to provide important service throughout the pandemic, remaining one of the highest ridership bus routes in the region. Additionally, ridership on bus rapid transit lines within the Metro Transit system has declined less than other transit service types as a percentage of pre-COVID-19 ridership, indicating the importance of this type of service for essential trips. Fast, frequent, all-day service like the planned B Line will remain an important part of the Metro Transit system as the region emerges from the COVID-19 pandemic.*

### Stations

The B Line is planned to stop at 33 locations along the route, with stops placed about 0.4 miles apart on average (two to three stops per mile) to balance speed and access. B Line stations will be designed to provide faster and more efficient service, along with amenities that foster an improved customer experience.



After this plan is approved by the Metropolitan Council, this document will guide the detailed design of stations by confirming **station intersections** and **platform locations** at those intersections. Other characteristics will be finalized through detailed engineering.

### *Service*

B Line service is planned to run every 10 minutes, seven days a week during the day and most of the evening. Local service on Route 21 is planned to run every 30 minutes on Lake Street between Hennepin Avenue and Minnehaha Avenue. Local service is also planned to run every 30 minutes on Route 60, a new route in St. Paul connecting Selby Avenue with the Midway area and the State Capitol area.

### *Bus Priority Treatments*

In order to help meet project goals for faster transit service, bus priority treatments are being evaluated along the B Line corridor. These treatments include modifications to the timing of traffic signals and changes to the use of roadway space, giving buses priority so that they spend less time stopped at signals or in traffic. Recommendations for B Line bus priority treatments will be refined and finalized as the project moves toward the design phase.

### *Plan process/engagement summary*

This draft corridor plan is being circulated for public review and comment. Following the public comment period, Metro Transit will report back to the community with revisions in a recommended plan and bring a final plan to the Metropolitan Council for approval in summer 2021.

## Table of Contents

I.	Introduction .....	1
	Corridor Overview.....	1
	Purpose and Need for Improved Transit in the Corridor .....	3
	B Line Project Goals .....	5
	What is Arterial BRT?.....	5
	Project Implementation & Timeline.....	11
II.	How was this plan developed? .....	13
	Previous Plans & Studies.....	13
	Planning Process .....	14
	2021 Corridor Plan Review & Engagement .....	16
III.	Termini and Alignment .....	17
	Alignment Extension to Downtown St. Paul .....	17
	Routing from Marshall to Selby.....	17
IV.	Service.....	19
	Considerations.....	19
	Proposed B Line Service .....	19
	Proposed Local Service in the Corridor.....	19
	Limited-Stop Service in the Corridor .....	21
V.	Stations .....	22
	What was considered at each location? .....	22
	Stations by Location .....	28
	Lake & Dean/West Bde Maka Ska .....	35
	Lake/Lagoon & East Bde Maka Ska .....	38
	Lake/Lagoon & Hennepin .....	41
	Lake & Lyndale.....	44
	Lake & Chicago.....	47
	Lake & Bloomington.....	50
	Lake & Cedar.....	53
	Lake & Minnehaha .....	56
	Lake & 31st Avenue.....	59
	Lake & 36th Avenue .....	62
	Lake & 44th Avenue .....	65
	Marshall & Otis.....	68
	Marshall & Cretin .....	71



Marshall & Cleveland .....	74
Marshall & Fairview .....	77
Selby & Hamline .....	80
Selby & Lexington .....	83
Selby & Victoria.....	86
Selby & Dale.....	89
Selby & Western .....	92
John Ireland & Marshall.....	96
Stations Finalized through Coordination with Other Projects .....	99
VI. Bus Priority Treatments .....	104
How can the B Line move people faster? .....	104
Types of Bus Priority Treatments .....	106
Potential Concepts for Bus Priority for the B Line.....	107
Future Bus Priority Treatment Analysis .....	110
Appendix: Other Station Locations Considered .....	A1

# I. Introduction

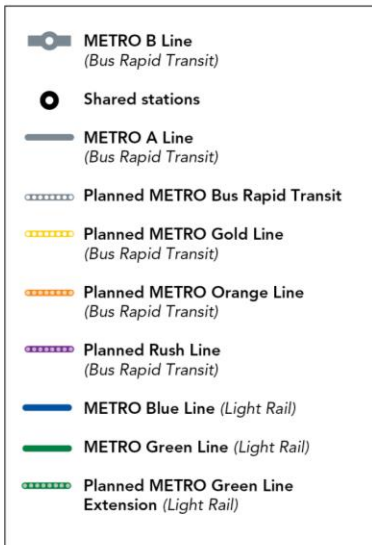
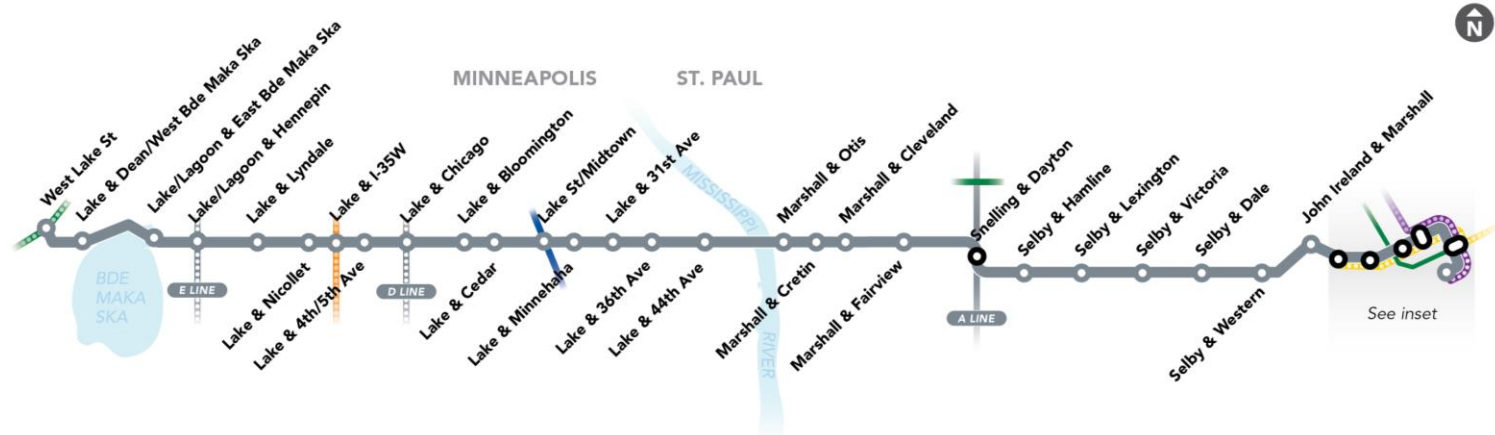
## Corridor Overview

The B Line is a planned arterial bus rapid transit (BRT) line that will upgrade and substantially replace Route 21, one of Metro Transit's highest ridership routes. From west to east, the B Line is proposed to operate from West Lake Street Station (on the planned METRO Green Line Extension) in Minneapolis to Union Depot in St. Paul primarily via Lake Street, Marshall Avenue, and Selby Avenue (**Figure 1**). The B Line corridor connects to many important community destinations and other major transit routes, including multiple existing and planned METRO light rail and BRT lines.

Figure 1: B Line corridor

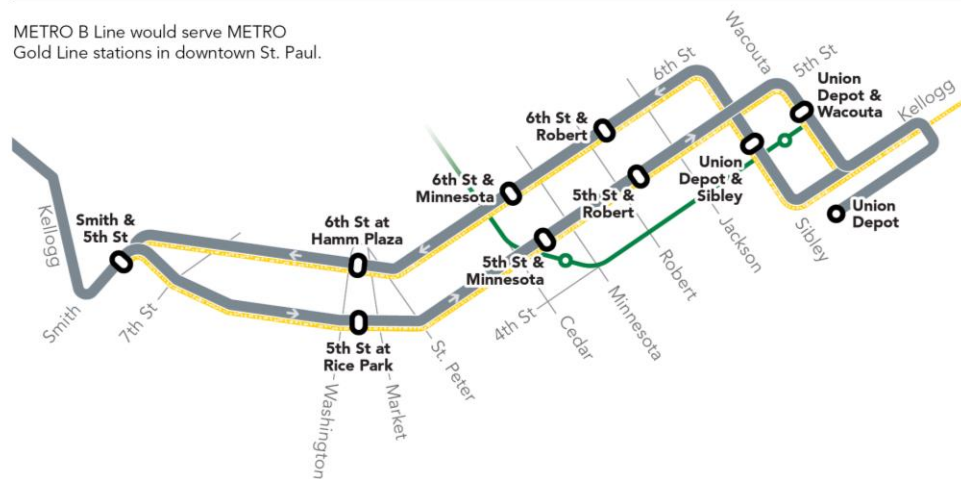


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January 2021



#### Downtown St. Paul detail

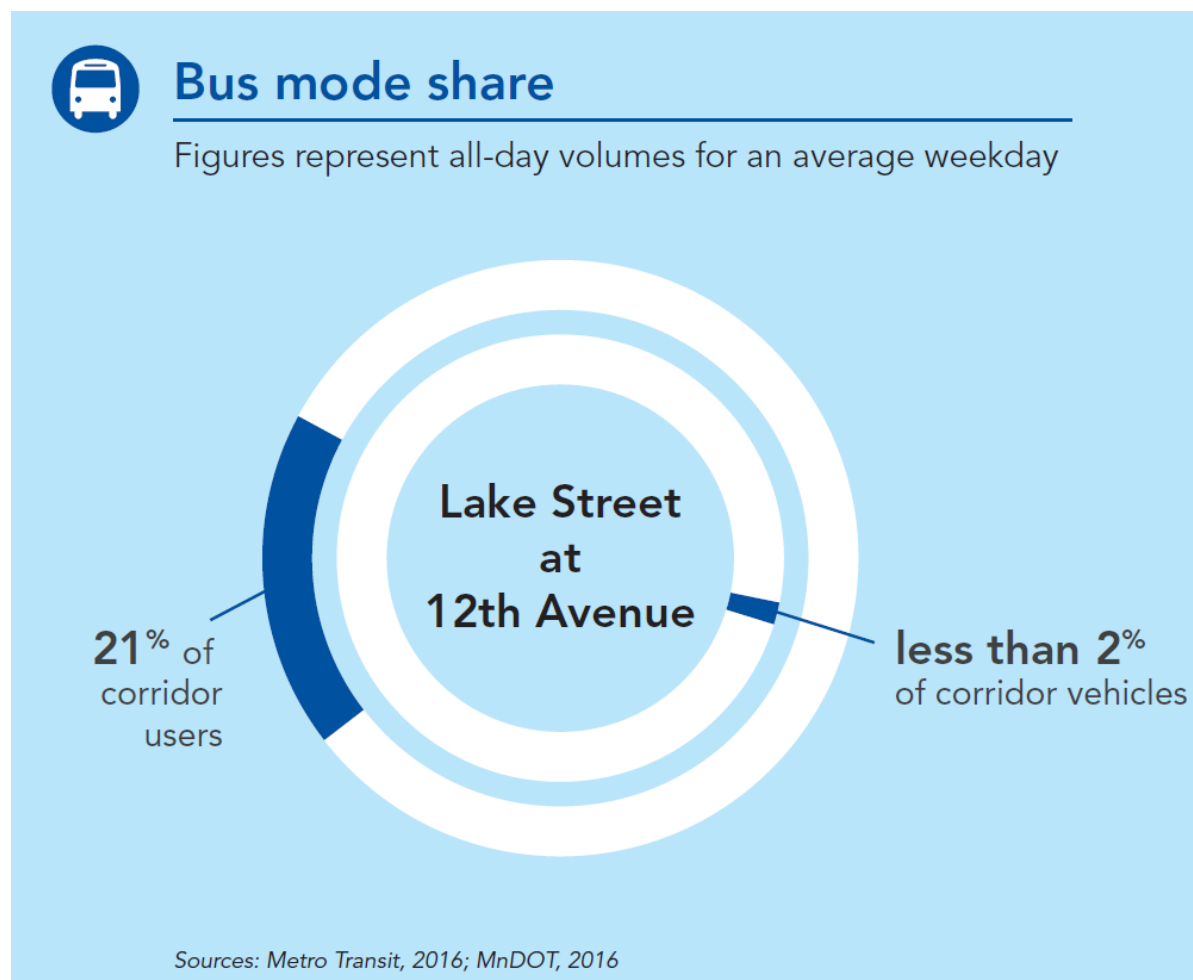
METRO B Line would serve METRO Gold Line stations in downtown St. Paul.



## Purpose and Need for Improved Transit in the Corridor

In 2019, customers took more than 10,000 rides on Route 21 each weekday, making it Metro Transit's second busiest bus route. In some places along the corridor, buses carry approximately 20 percent of people traveling by vehicle on Lake Street and make up less than 2 percent of vehicle traffic (**Figure 2**). But Lake Street is also one of the slowest transit corridors in the region. During peak periods and the middle of the day, buses regularly slow to an average speed of 8 miles per hour (**Figure 3**). Frequent stops, lines of customers waiting to board, and time stopped in traffic or at red lights mean that buses are moving less than half the time. These delays are greatest during time periods when transit ridership is highest and when volumes of auto traffic are highest, highlighting a need to reduce the amount of time that buses are stopped while customers enter and exit the vehicle along with a need to reduce the amount of time that buses are stopped due to general traffic.

*Figure 2: Transit users and buses as a percentage of total corridor users and vehicles*



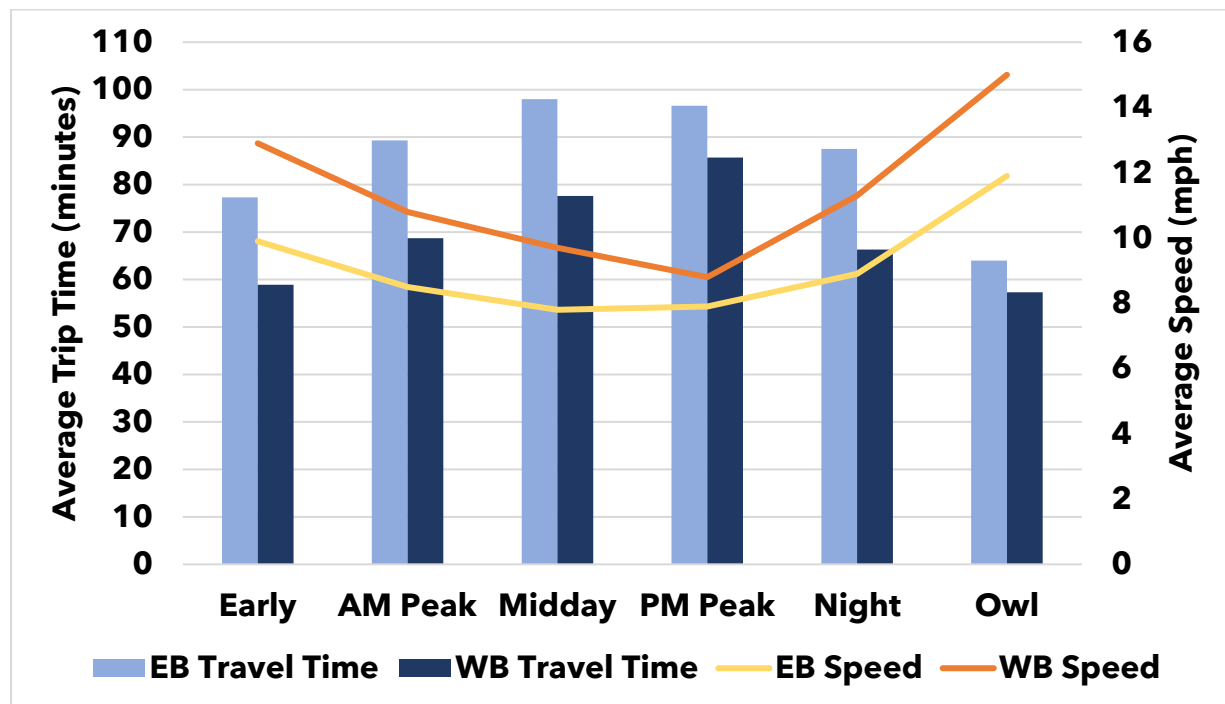
This plan has been developed with baseline data from years prior to 2020. Therefore, changes in transit service, ridership, or overall traffic patterns resulting from the COVID-19 pandemic have not been used as a baseline for recommendations in this draft plan.

Based on Metro Transit research in 2020, Route 21 continues to provide important service during the pandemic, remaining one of the highest-ridership bus routes in the region.

Additionally, ridership on bus rapid transit lines within the Metro Transit system has declined less than other types of transit service as a percentage of pre-COVID-19 ridership, indicating the importance of this type of service within the system.

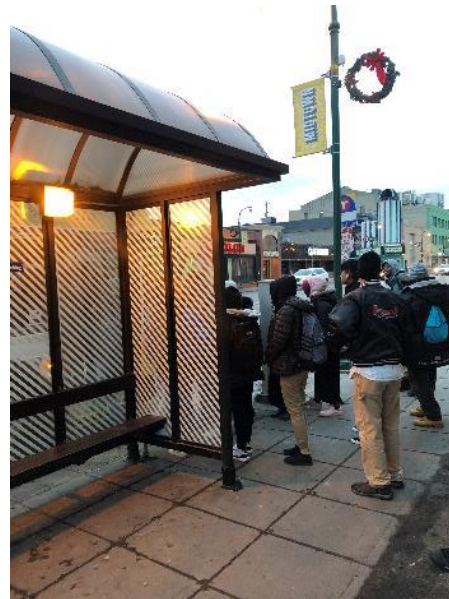
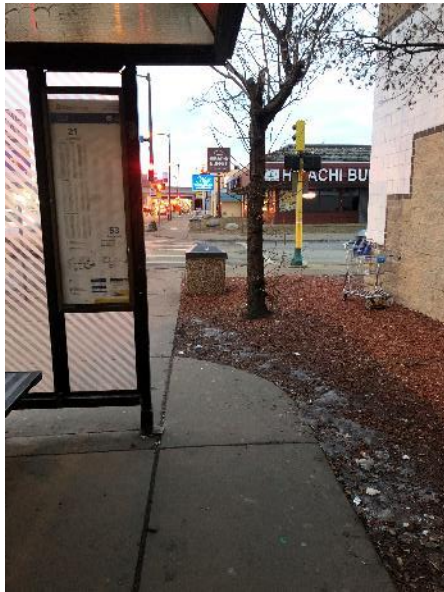
During the summer of 2020, a number of properties along the project corridor were damaged or destroyed following civil unrest in the wake of the killing of George Floyd. As with changes in travel patterns due to the pandemic, any changes in travel patterns as a result of these events are not included in baseline data used for the plan. Redevelopment is underway in various degrees along Lake Street; these plans will be monitored as the B Line project develops toward design and construction.

*Figure 3: Existing Route 21 average speed and travel time by time of day*



The purpose of the B Line is to provide faster, more reliable, and more attractive bus service along an east-west corridor between south Minneapolis and downtown St. Paul. The need for the project can be summarized by two key challenges: (1) slow and unreliable transit service and (2) passenger facilities inadequate for the high volume of people using them (**Figure 4**).

Figure 4: Existing Route 21 passenger facilities



## B Line Project Goals

The goals of the B Line project are to:

- provide faster, more reliable transit service along the Route 21 corridor
- improve transit experience at stops and on vehicles
- expand equitable access to destinations
- provide efficient connections to the existing and planned transit network

## What is Arterial BRT?

Arterial BRT is a package of transit enhancements that produces a faster trip and an improved experience for customers along the busiest corridors in the Twin Cities. It runs on urban streets, typically in mixed traffic conditions.

The B Line will be the fourth operational line in the Twin Cities region's growing arterial BRT system. The A Line on Snelling Avenue and Ford Parkway began service in 2016; the C Line on Penn Avenue began service in 2019, and construction of the D Line on Chicago/Fremont avenues is scheduled to take place in 2021 and 2022.

Every planned arterial BRT corridor is unique in street design and surrounding land use. As a result, each line balances flexibility with implementation strategies while maintaining core BRT characteristics.

## High-Quality Stations Every Half Mile

Arterial BRT provides faster and more efficient service, and station and bus amenities that foster an improved customer experience. See **Figure 5** for the design and features of arterial BRT stations in the Twin Cities. [Section IV](#) also provides more information on important station characteristics.



Figure 5: Arterial BRT station features

# What will METRO BRT stations look like?



- A** Pylon markers help riders identify stations from a distance.
- B** Real-time NexTrip signs provide bus information, and on-demand **annunciators** speak this information for people with low vision.
- C** Utility boxes near station areas house necessary communications and electrical equipment. (not pictured)
- D** Shelters provide weather protection and feature push-button, on-demand **heaters** and shelter **lighting**. Shelter sizes will vary based on customer demand (small shown here).

- E** Ticket machines and fare card validators collect all payment before customers board the bus.
- F** Emergency telephones provide a direct connection to Metro Transit police. Stations also feature **security cameras**.
- G** Stations feature **trash and recycling** containers.
- H** Platform edges are marked with a cast-iron **textured warning strip** to keep passengers safely away from the curb while the bus approaches. Many stations also feature **raised curbs** for easier boarding.

- I** Platform areas are distinguished by a dark gray concrete pattern.
- J** Some stations have pedestrian-scale **light fixtures** to provide a safe, well-lit environment. Fixtures will match existing lights in the surrounding area (not pictured)
- K** Benches at stations provide a place to sit.
- L** Stations have **bike parking**.

- Curb bumpouts / curb extensions
  - » Where arterial BRT runs with general traffic, stations are typically built with bumpouts (also called curb extensions or bus bulbs) where feasible (**Figure 6**). Today, many bus stops are located out of a thru-lane of traffic, in a right-turn lane or in a curbside parking lane, causing delay for buses merging back into traffic. Curb bumpouts at station platforms eliminate delay-inducing merging movements. They also provide extra space for station amenities without crowding sidewalks. Bumpouts also keep the bus moving in a straight line, eliminating side-to-side sway and improving ride comfort. Additionally, platforms on bumpouts are built to be nine inches tall where possible to facilitate easier boarding into the bus.

*Figure 6: Curb bumpout*



- Off-board fare payment
  - » Like on the A Line, C Line, and light rail, customers will pay fares prior to boarding the bus. Ticket vending machines and fare card validators are located at each station (**Figure 7**). Off-board fare payment expedites the boarding process and significantly decreases time spent at stations, allowing buses to stop briefly in the travel lane rather than pulling over. Fare payment is enforced through random on-board inspections by Metro Transit Police.



Figure 7: Off-board ticket vending machines and fare card validators



- Shelters
  - » Shelters provide weather protection while customers wait for the bus (**Figure 8**). Standard arterial BRT shelters feature on-demand heaters, seating, and integrated lighting. Shelters range from 12 to 36 feet long, depending on site conditions and ridership. A concrete foundation increases protection from the elements and makes the station more permanent.

Figure 8: Arterial BRT shelter



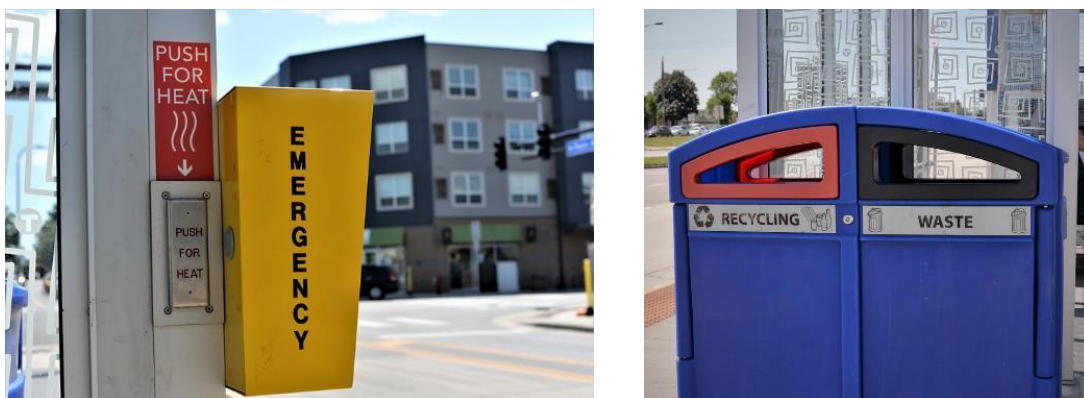
- Information
  - » Transit information is provided in a variety of formats to offer clear direction and increase customer confidence in trip status. Each station includes a pylon marker with a real-time NexTrip sign and annunciator and a printed panel with timetable, maps, and connection information (**Figure 9**).

*Figure 9: Pylon marker with real-time NexTrip information*



- Furnishings and other improvements
  - » Several station components enhance customer safety and comfort, including lighting, security cameras, and emergency telephones. Platform edges are marked with a cast-iron textured warning strip to keep passengers safely away from the curb as the bus approaches. Stations are designed with space for safe boarding and alighting through any bus door. Benches, trash and recycling containers, and bike parking are available for customer use (**Figure 10**).

*Figure 10: Example station enhancements*



## Frequent and Faster Service

- Limited stops and increased frequency
  - » Arterial BRT stations are spaced approximately every half mile, focusing on places where the greatest numbers of customers board buses today. Buses can travel significantly faster with more distance between stations, while also allowing for most customers to conveniently walk or roll to stations.
  - » High frequency service increases the convenience of BRT. The B Line will become the primary service along the corridor, running every ten minutes throughout the day and most of the evening, with increased service on nights and weekends compared to the existing Route 21.
  - » Local service is planned to remain in parts of the corridor as well. Route 21 is planned to run every 30 minutes on the portion of the corridor between Hennepin Avenue and Minnehaha Avenue. Local service for a new Route 60 is planned to run every 30 minutes in St. Paul to connect Selby Avenue with the Midway area and the State Capitol area.
- BRT vehicles
  - » BRT vehicles have distinctive branding to differentiate them from standard buses (**Figure 11**). B Line buses will be 60-foot articulated vehicles to serve large numbers of riders, with three wide doors to allow customers to enter and exit through all doors of the vehicle. BRT buses have low floors to help facilitate comfortable boarding and alighting for all customers, and seating layouts arranged for more interior circulation space. Buses have accessible ramps for customers using a mobility device.
- Bus priority treatments
  - » Bus priority treatments will be used at key locations to help keep buses moving. These include transit signal priority (TSP), where buses will be linked to traffic signals to provide more green lights for buses when conditions allow. TSP helps reduce time spent stopped at red lights, a substantial source of bus delay. Bus priority treatments like bus-only lanes can also reduce time that buses spend stopped in traffic.



Figure 11: BRT bus



## Project Implementation & Timeline

### Anticipated Project Schedule

#### *Planning Phase (2018-2021)*

See [Section II](#) for more information about the B Line planning phase. The B Line planning phase will conclude with the adoption and approval of the final *B Line Corridor Plan* by the Metropolitan Council, anticipated in the summer of 2021. The approved *B Line Corridor Plan* will finalize station locations to inform the design phase.

#### *Design Phase (2021-2022)*

Engineering and design will begin in 2021 and continue into 2022.

#### *Construction Phase (2023-2024)*

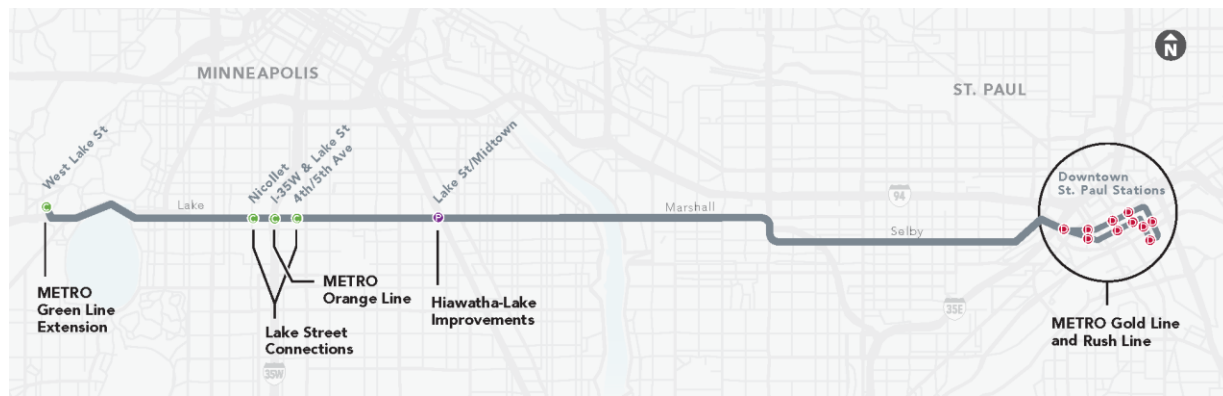
The B Line construction is targeted to begin in 2023. Construction of some B Line stations will be coordinated with other projects and may be built sooner. In other places, the B Line will use existing station facilities.

The B Line is planned to open for service in 2024.

### Coordinated Implementation

Several stations on the B Line will be developed in coordination with planned projects throughout the corridor, as summarized below and shown in **Figure 12**.

Figure 12: B Line stations with coordinated implementation



Coordinated Project Status	
<span style="color: green;">●</span> Construction	<span style="background-color: #444; color: white; padding: 2px;">METRO B Line</span>
<span style="color: purple;">●</span> Planning	
<span style="color: red;">●</span> Design	

### *METRO Green Line Extension*

Construction of the West Lake Street Station will include a covered waiting area and other amenities at the Lake Street bridge level, along with stairs and elevators to access the LRT station.

### *Lake Street Connections*

As part of ongoing construction activities along Lake Street between Blaisdell Avenue and 5th Avenue, B Line-ready stations are being constructed at Nicollet Avenue and 4th/5th Avenue.

### *METRO Orange Line*

As part of ongoing construction activities for the METRO Orange Line, which includes a new freeway-level transit bridge over Lake Street, improved B Line-ready bus facilities are also being constructed in 2020-2021 on the Lake Street level.

### *Hiawatha-Lake Improvements*

Improvements to the intersection of Hiawatha Avenue and Lake Street are being planned by the City of Minneapolis, Hennepin County, and MnDOT. Construction of a westbound BRT platform will be coordinated with improvements at this intersection.

### *METRO Gold Line*

The B Line will serve several planned Gold Line stations in downtown St. Paul. This includes stations on Smith at 5th Street (eastbound), 5th Street at Rice Park/6th Street at Hamm Plaza, 5th/6th Street at Minnesota, 5th/6th Street at Robert, and Sibley at 4th Street/Wacouta at 4th Street. Design activities for these stations are underway.

## II. How was this plan developed?

### Previous Plans & Studies

#### 2012: Arterial Transitway Corridors Study

In 2012, Metro Transit completed the Arterial Transitway Corridors Study (ATCS), which developed the arterial BRT concept and identified 11 urban corridors with high-ridership bus routes for implementation of arterial BRT. This study presented the basic components of how arterial BRT would operate in the Twin Cities and offered initial concept-level station locations, ridership estimates, and costs for the eleven lines, including a Lake Street/Marshall Avenue corridor.

As shown in **Figure 13**, Lake Street and Marshall Avenue (to Snelling and University) was identified as a promising corridor in this study. Completion of an alternatives analysis to further study bus and rail options was identified as the next planning step for this corridor.

*Figure 13: 2012 ATCS Lake Street Corridor rapid bus concept*



#### 2014: Midtown Corridor Alternatives Analysis

The Midtown Corridor Alternatives Analysis, completed in 2014, identified a “Dual Alternative” as the Locally Preferred Alternative for the corridor, which would consist of enhanced bus service along Lake Street and Marshall Avenue with rail in the Midtown Greenway. This study identified 20 preliminary station locations for the “enhanced bus” portion of the project, with a western terminus of Hennepin Avenue in Minneapolis and an eastern terminus of Snelling and University in St. Paul (**Figure 14**).



Figure 14: 2014 Midtown Corridor Alternatives Analysis proposed "Dual Alternative"



## 2016: METRO B Line Selection

In 2016, Metro Transit prepared an updated corridor readiness screening to determine the next corridors for arterial BRT implementation and began securing federal funds for these lines. From this effort, the B Line and the E Line (Hennepin Avenue) were selected as the next two corridors for arterial BRT implementation.

## 2015-2018: Early Project Coordination

B Line planning has included coordination with other planned infrastructure projects throughout the corridor being built by Metro Transit or Hennepin County.

In some cases, coordination between projects was initiated several years ago to ensure compatibility and reduce impacts. For example, project coordination was a major factor for early station location considerations between Nicollet Avenue and 5th Avenue.

## Planning Process

The B Line planning phase began in 2018 and included review of early station location recommendations and specific planning issues. During this time, the City of St. Paul and other stakeholders requested that the B Line be extended to downtown St. Paul rather than ending at the intersection of Snelling Avenue and University Avenue. The contents of this plan were developed by Metro Transit staff throughout 2019 and 2020 with inputs and feedback received from a Technical Advisory Committee and through community outreach and engagement activities.

## Technical Advisory Committee

The Technical Advisory Committee (TAC) consists of interagency partners advising the project on station location issues throughout the corridor. The TAC met monthly in 2019 and the beginning of 2020. Recommendations related to station and platform locations, project alignment, and bus priority treatments in this plan were made in coordination with the TAC, which includes:

- Minnesota Department of Transportation (MnDOT)
- Hennepin County
- Ramsey County
- City of Minneapolis
- City of St. Paul
- Minneapolis Park and Recreation Board

## Community Outreach and Engagement

Metro Transit engaged communities along the B Line throughout 2019 and the first part of 2020 to help inform the recommendations in this plan. Community engagement to date has been especially important in developing recommendations for B Line termini and routing as well as plans for local bus service in the corridor. The goals of engagement were to:

- Build public awareness of B Line development, benefits, and potential as a preferred transportation option.
- Inform the public about project decisions, timelines, impacts, and options.
- Build public awareness and support for the overall B Line project.
- Enhance project decision making by providing opportunities for public input, participation, and dialogue.
- Identify issues from current transit users and corridor neighbors early in the planning process.
- Practice two-way communication with residents, businesses, and interested groups by showing how input was used in decision making and detailing opportunities for further engagement.
- Document and publicly share feedback received.
- Maintain ongoing communication with the public to maintain project momentum over multiple stages and years.
- Develop engagement activities that help community members be involved in the project so that it is created with them and for them.
- Ensure key messages are clear, consistent and responsive to needs.

Recognizing that not every stakeholder participates with a project in the same way, Metro Transit used a variety of activities to reach the broadest audience possible, including:

- Neighborhood and community group meetings
- Community events
- Meeting with area businesses
- Surveying customers about the B Line
- Ride-alongs on Route 21 buses
- Pop-ups in community spaces and at busy bus stops
- Direct mail to corridor residents, businesses, and property owners
- Online project information

Feedback received during these engagements helped inform recommendations in this plan.

### Open Houses

Open houses were scheduled events to engage stakeholders to learn more about the B Line. Project staff was available to answer questions and discuss site-specific concerns along the corridor. Metro Transit hosted four open houses in May 2019 at different sites along the corridor in Minneapolis and St. Paul.

Key questions for community input included:

1. Should the B Line continue east of Snelling Avenue to downtown St. Paul?
2. If yes, what is your preferred routing option?
3. Asking participants to identify areas where transit advantages may be effective.
4. Asking participants to decide and prioritize different values with service and spacing between stops.



228 people attended the open houses and/or provided feedback during this time period.

### *Engagement with Community Groups*

From April to October of 2019, B Line staff attended or hosted 26 community events, participated in bus ride-alongs and stop pop-ups, and were able to connect with over 1,500 individuals to help inform the planning process and preliminary recommendations for the B Line. Since October 2019, project staff have continued to meet with community groups in a more limited fashion to continue conversations about the B Line and Metro Transit service. A full list of past meetings and presentations is available on the B Line project website<sup>1</sup>.

### *Selby-Midway Engagement*

Potential future changes to Route 21 in the Selby Avenue and Midway areas of St. Paul were also a part of focused engagement efforts. Targeted engagement in these portions of the corridor was important as the project team considered whether to recommend an extension of the B Line to downtown St. Paul along Selby Avenue and whether the route for an extended B Line should follow the existing Route 21 through the Midway area or take a different route. In addition to talking with riders during on-bus outreach, Metro Transit staff held open “office hours” at six locations during August and September of 2019.

### *Surveys*

As part of the engagement around preliminary project recommendations, a survey and interactive map, available in both digital and paper form, were presented to the community through a variety of engagement methods. This survey work yielded 847 responses and addressed key questions around routing, station locations, and underlying service with strong support for the proposed routing, stations and service.

### *Communications and Publications*

Metro Transit distributed project information through a variety of media. An email newsletter was created to deliver project news to interested stakeholders. Targeted social media posts promoted B Line developments and opportunities for comment to specific geographic locations.

In addition to Metro Transit communication, local media also published a variety of stories about the B Line, linked on the project website.

## **2021 Corridor Plan Review & Engagement**

This draft corridor plan is being circulated for public review and comment. Following the public comment period, Metro Transit will report back to the community with revisions in a recommended plan and bring a final plan to the Metropolitan Council for approval in summer 2021.

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<sup>1</sup> Available at: <https://www.metrotransit.org/b-line-meetings>

### III. Termini and Alignment

In fall 2019, initial recommendations for the B Line corridor were published as an initial step toward this plan. These recommendations included the project extension to downtown St. Paul and the recommended alignment between Marshall Avenue and Selby Avenue via Snelling Avenue.

#### Alignment Extension to Downtown St. Paul

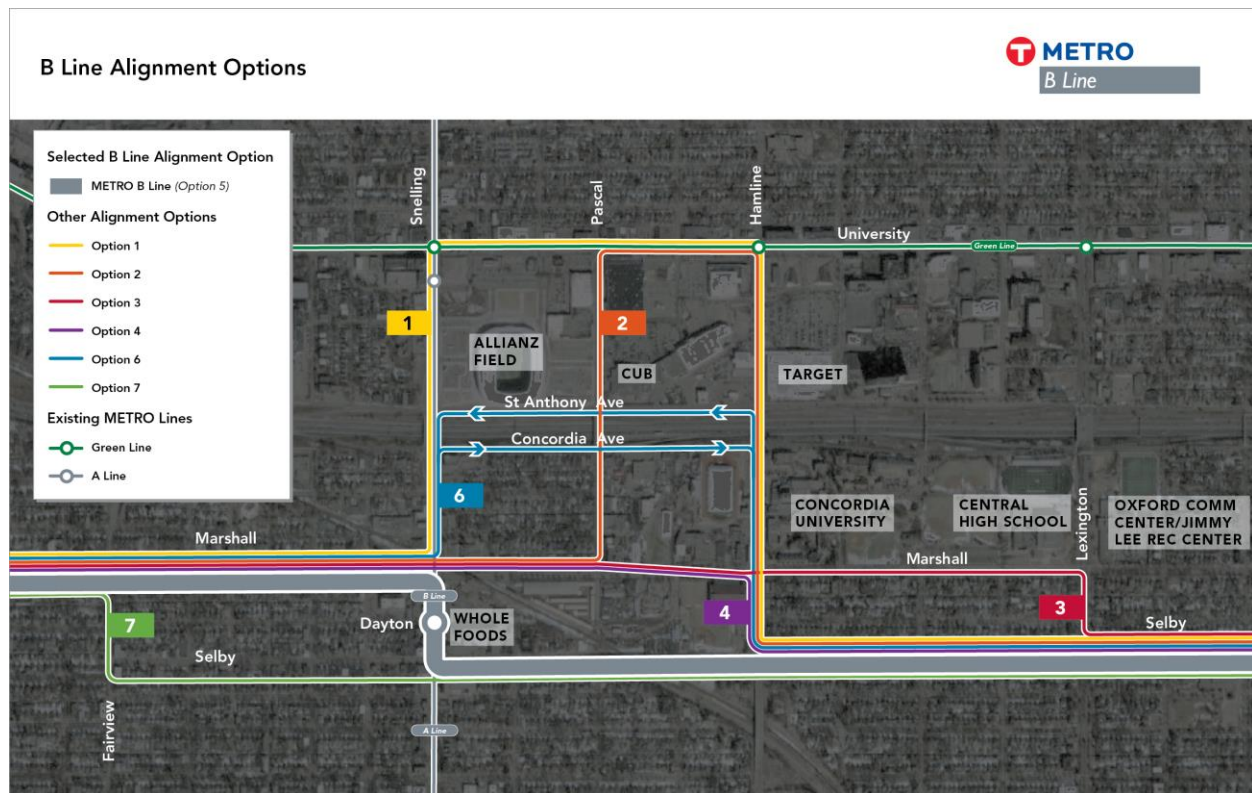
Initial concepts for the B Line anticipated an eastern terminus at the intersection of Snelling Avenue and University Avenue. Based on strong stakeholder interest early in the planning process, Metro Transit evaluated the potential for an extension of the B Line to downtown St. Paul.

Overall, the evaluation found that an extended project would provide an opportunity to expand the region's transitway network and serve more people with faster and more reliable transit connections while introducing more frequent service along Selby Avenue in St. Paul. Ramsey County and the City of St. Paul provided letters supporting the extension and noting areas for additional coordination with Metro Transit, including potential roadway modifications to accommodate BRT service along the extended project corridor. Additionally, Metro Transit heard strong public support for the extended project based on feedback from open house meetings and other public engagement activities completed along the corridor. An extended B Line corridor to downtown St. Paul was recommended.

#### Routing from Marshall to Selby

A consideration closely related to the B Line extension to downtown St. Paul was whether the B Line should continue to divert north to provide service along University Avenue between Snelling Avenue and Hamline Avenue, as the Route 21 does today. A separate evaluation considered seven alignment options, shown in **Figure 15**, including options that would continue to provide service north of I-94 and options that would remain south of I-94.

Figure 15: B Line alignment options between Fairview Avenue and Lexington Avenue



Key considerations in this evaluation included:

- travel time
- directness and legibility
- access to major destinations and other transitways
- capital and operating costs
- constructability of BRT platforms
- pedestrian infrastructure and I-94 crossings
- implications for overall routing and service mix decisions

Based on the results of this evaluation along with community feedback, an alignment following Marshall Avenue to Snelling Avenue to Selby Avenue was recommended as the best alternative to balance these considerations.

When compared with the existing Route 21 routing, this alignment will provide faster and more direct service for more people using the corridor, and allow B Line buses to avoid congestion, reliability challenges, and delays associated with I-94 crossings and the intersection of Snelling & University. The recommended B Line alignment will facilitate north-south connections by intersecting with the METRO A Line at Snelling & Dayton.

## IV. Service

In addition to the B Line, several other bus routes are proposed to run in portions of the corridor. Proposed bus service within the B Line corridor is shown in **Figure 16**. Additional existing/planned routes share smaller portions of the B Line corridor, particularly west of Hennepin Avenue in Minneapolis and in downtown St. Paul.

### Considerations

As described in [Section I](#), a key goal of the B Line is to provide faster and more reliable transit service. Balancing speed and access through wider stop spacing and alignment changes can result in localized changes in access as stops may be moved or consolidated. Other services that operate within the corridor also require evaluation as part of an overall assessment of how arterial BRT implementation will change transit service.

As recommendations for alignment and station locations have taken shape, Metro Transit has also evaluated the overall mix of bus service within the corridor. Key factors considered in this analysis included ridership and trip patterns, pedestrian access, demographics (riders with more mobility challenges or fewer transportation options), and operational cost and efficiency.

### Proposed B Line Service

The B Line is planned to run every 10 minutes, seven days a week during the day and most of the evening, substantially replacing Route 21 as the primary service in the corridor. On average, B Line stops would be placed about 0.4 miles apart (two to three stops per mile) to balance speed and access. 83 percent of existing Route 21 riders would be able to catch the B Line within 1/8 mile of their current bus stop.

The exact B Line schedule, including hours of service and transitions from 10-minute service during the core of the day into later evening service, will be developed closer to the opening of the B Line.

### Proposed Local Service in the Corridor

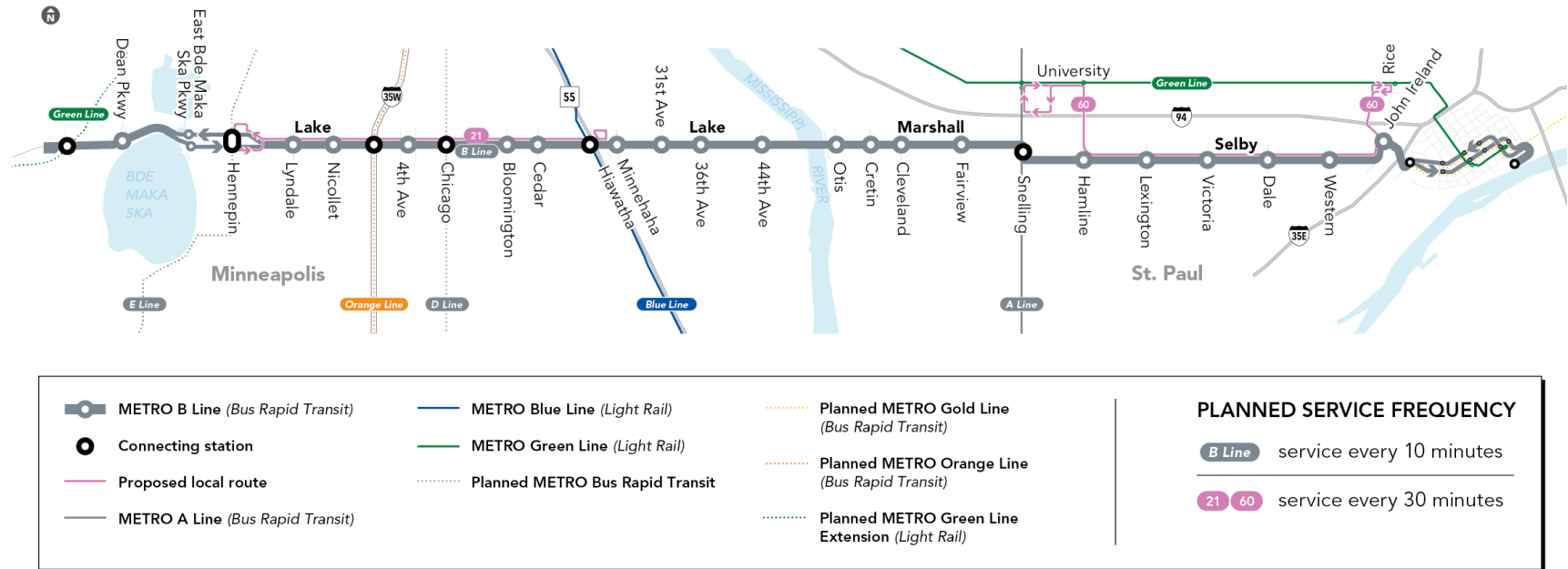
Local service on Route 21 is proposed to run every 30 minutes on the portion of the Lake Street corridor between Hennepin Avenue and Minnehaha Avenue, where ridership is highest and additional bus service is most needed (this is similar to the existing Route 21E).

A new local bus route, Route 60, is proposed to run every 30 minutes on Selby Avenue between the Midway area and the State Capitol area. This route would serve trips between the Midway area and Selby Avenue, maintaining a one-seat bus connection across I-94 and providing access to the METRO Green Line from Selby Avenue.

Retaining a one-seat connection between these destinations was identified as a priority by community members in this portion of the corridor, particularly following the recommendation for the B Line to travel between Marshall Avenue and Selby Avenue without directly serving the Midway area.

Figure 16: Preliminary planned bus service within the B Line corridor

## METRO B Line Underlying Service - Preliminary



11-08-154740-20

## Limited-Stop Service in the Corridor

Under existing conditions (as of fall 2019), Route 53 operates peak-period limited-stop service to and from downtown St. Paul along Lake Street and Marshall Avenue. Between Snelling Avenue and downtown St. Paul, Route 53 operates non-stop along I-94.

Changes to Route 53 service will be evaluated as the B Line approaches implementation. For example, it is possible that speed and reliability improvements associated with the B Line will result in similar travel times as Route 53 between Lake Street/Marshall Avenue and downtown St. Paul. Overall corridor demand and capacity during peak periods will also be considered as long-term planning for Route 53 service is evaluated.

## V. Stations

This section contains recommended locations for each station on the B Line corridor.

After corridor plan approval, this document will guide the detailed design of stations by confirming **station intersections** and **platform locations** at those intersections. Other characteristics will be finalized through detailed engineering.

### What was considered at each location?

#### Station Location Considerations

A key objective of arterial BRT is to offer faster trips for more people along the corridor. Faster trips depend in part upon the strategic placement of stations spaced farther apart than existing Route 21 bus stops. The existing Route 21 stops approximately every 1/8 of a mile. On average, B Line stops would be placed about 0.4 miles apart (two to three stops per mile) to balance speed and access (**Figure 17**). This increase in station spacing distance is anticipated to help B Line service operate about 20 percent faster than the existing Route 21, when combined with other improvements. Serving today's customers well and maximizing future ridership along the corridor depends upon station locations serving a substantial number of passengers without significantly affecting pedestrian access. With the stations included in this plan, 83 percent of existing Route 21 riders would be able to catch the B Line within 1/8 mile of their current bus stop.

*Figure 17: Arterial BRT and local service stop spacing after B Line implementation*

#### Today: Route 21



#### Future: B Line



Station location inputs include, but are not limited to:

- Targeted half-mile station spacing, on average
- Existing transit ridership at current bus stops
- Connectivity to existing transit network
- Community input and feedback
- Existing land uses
- Street design (e.g., roadway cross-section, pedestrian/bicycle facilities, driveways, medians, etc.)
- Available right-of-way
- Overall traffic operations



## Platform Location Considerations

Each BRT **station** is made up of two **platforms**—one for each direction the bus travels. In most cases, platforms can either be placed on the **nearside** or **farside** of an intersection. A nearside station platform is located just before a roadway intersection. A farside platform is located just after a roadway intersection. Farside platforms are usually preferred because they help support faster bus service.

*Figure 18: Farside platform example*



Depending on the context, farside platforms can also be beneficial because they reduce conflicts between right-turning vehicles and stopped transit vehicles common at nearside stop locations (**Figure 18**). Farside stations also maximize transit signal priority effectiveness by allowing a bus to activate its priority call to the signal, progress through the intersection, and stop at the farside platform. This reduces delay in scenarios more common to nearside locations when a bus is required to stop twice before moving through an intersection: once to unload and load passengers at the platform itself and again for a red traffic signal after leaving the platform.

The preferred B Line platform location is on the farside of intersections. However, not all platforms are sited farside. Site-specific conditions that may limit farside platforms include:

- Existing roadway access points or driveways
- Right-of-way constraints
- Surrounding land uses

Additionally, nearside platforms may be preferred in limited cases based on signal timing or certain bus priority treatments, or at four-way stop-controlled intersections.

## Other Considerations

### *Shelter Size*

Preliminary shelter sizes are shown for each planned station to illustrate how the shelter will fit into each location at a conceptual level.

Except in limited cases near the end of the line, all arterial BRT stations are equipped with shelters, as described in [Section I](#). A key variable at each station is shelter size: small, medium, or large shelter structures. Basic shelter dimensions are:

- Small shelter: 12 feet long by 5 feet wide by 9 feet high
- Medium shelter: 24 feet long by 5 feet wide by 9-12 feet high
- Large shelter: 36 feet long by 5 feet wide by 9-12 feet high



The primary consideration in determining shelter sizes at each platform is projected ridership during the day and at peak times (specifically, the number of waiting customers at a single stop) for all routes serving the station.

Specific site conditions may also influence the size of the shelter planned for each location. Shelter size will ultimately be determined through detailed site engineering during the design phase.

See **Figures 19-21** for example images of small, medium, and large arterial BRT shelters.

*Figure 19: Small shelter on the A Line, Snelling & Dayton Station*



*Figure 20: Medium shelter on the A Line, Snelling & County Road B Station*



Figure 21: Large shelter on the A Line, Snelling & University Station



### *Curb Extensions / Bumpouts*

For each station in this plan, a conceptual design is included to illustrate how the station platforms will fit into the existing street section. In many cases, curb extensions are illustrated. These are preliminary ideas for how the stations will fit into the surrounding environment that will be refined and finalized through detailed engineering.

Many existing local bus stops are located in curbside parking lanes or right-turn lanes, causing delay for buses merging back into traffic. Platform bumpouts are considered at locations where the area against the curb is currently used for on-street parking or in some cases, turn lanes, to eliminate delay-inducing merging movements. They also provide extra space for station amenities without crowding sidewalks. This is illustrated in **Figure 22**. Bicycle facilities can also influence whether a bumpout is proposed.

Bumpouts improve overall bus operations by:

- Eliminating the need for buses to merge in and out of traffic to access stations, which adds delay and reduces ride quality
- Providing space for clear and accessible all-door boarding, shelters, and station amenities
- Minimizing conflicts between waiting bus passengers and pedestrians using the sidewalk

Bumpouts can also potentially reduce overall bus stop zone length, which may allow on-street parking spaces to be added in space previously used for bus movements.

At locations where bumpout platforms are not considered due to lane configurations or the absence of on-street parking, the platforms will be adjacent to the existing curbside travel lane without moving the curb.

Figure 22: Typical current bus stop versus bumpout / curb extension



Today, buses stop outside of the through lane with little space for customer amenities. Merging back into traffic causes delay.



Curb bumpouts provide space for station amenities and pedestrians.

### *Platform Length, Width, and Height*

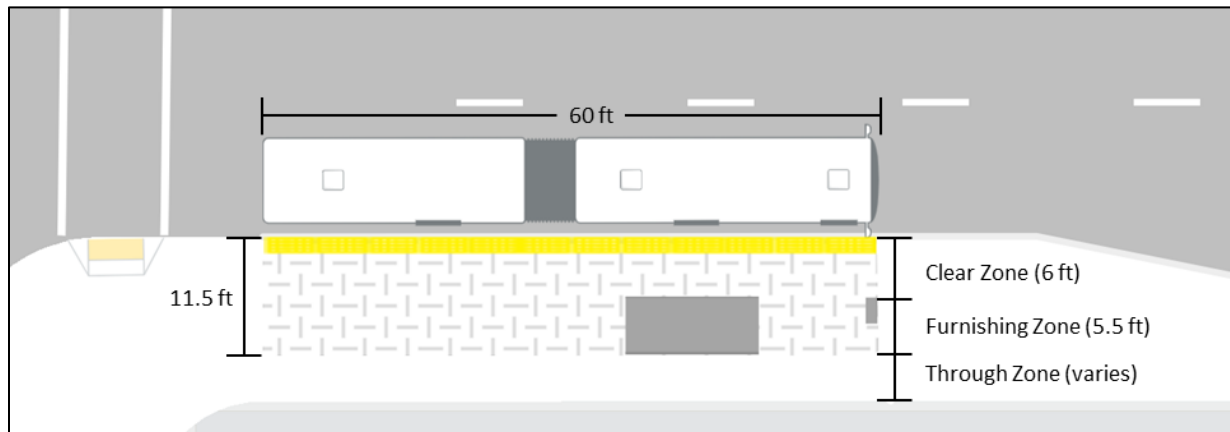
Typical dimensions for B Line platforms are shown in **Figure 23**. Generally, B Line platforms will be designed for a standard length of 60 feet. A 60-foot platform length can fully accommodate all doors of the 60-foot articulated buses planned for the B Line. Certain constrained conditions, like existing access points and driveways, might prevent a full 60-foot-long platform from being constructed; however, these situations are avoided wherever possible. In some places, stations may be designed at a longer length to accommodate more than one stopped bus. Platform lengths will be finalized during design.

B Line platforms will generally be designed for a standard width of 11.5 feet. This width can accommodate a 6-foot-wide clear zone behind the curb and 5.5-foot-wide furnishing zone to accommodate BRT station elements including the shelter, pylon marker, and other amenities. The clear zone is generally provided independently from a through zone behind the platform. However, certain constrained conditions, like narrow distances between the curb and a building face might prevent a full 11.5-foot-wide platform from being constructed in



addition to an independent through zone. In these cases, the through zone and clear zone may be combined. Platform widths will be finalized during design.

*Figure 23: Typical B Line platform dimensions*



Platforms will be designed with a standard nine-inch curb height to facilitate “near-level boarding.” Near-level boarding substantially reduces the distance between the curb and the floor of the bus, easing vehicle access for passengers with low mobility and enabling faster boarding and alighting for all passengers. Near-level boarding does not eliminate the need for ramps to be deployed to assist passengers using mobility devices. Curb heights of nine inches or lower are compatible with all bus models. Curb heights for specific B Line platforms will be finalized during design.

Near-level boarding is not “level boarding,” where platforms are located at the same level and height as the floor of the bus, which is approximately 14 inches. Light rail platforms within the Twin Cities are an example of level-boarding platforms. Level-boarding platforms are not being considered for the B Line due to engineering considerations and the tight space constraints of the corridor; ramping up to a 14-inch curb from a 6-inch sidewalk requires a prohibitively large area. Level boarding also requires that buses slow down considerably upon approaching stations, which can significantly negate the travel time savings benefit that arterial BRT may provide.

## Stations by Location

The following section contains individual station plans for each of the B Line stations. The plans communicate two core station components: the station intersection and the location of platforms at that intersection. Other preliminary design details are provided for additional context but are conceptual and will be finalized during the design phase.

The individual station plans are organized west to east beginning in Minneapolis and continuing to St. Paul. Note that this list includes stations with finalized locations based on planning, design, and/or construction of other projects. These stations do not include station plan illustrations, but descriptions are provided for information.

The plan identifies 33 stations over the 12.6-mile corridor. **Figures 24-29** summarize the recommended station locations at the corridor-wide level, illustrating connecting bus service, existing Route 21 ridership, and planned station spacing.

### Minneapolis

[West Lake Street \\*](#)

[Lake & Dean/West Bde Maka Ska](#)

[Lake/Lagoon & East Bde Maka Ska](#)

[Lake/Lagoon & Hennepin](#)

[Lake & Lyndale](#)

[Lake & Nicollet \\*](#)

[Lake & I-35W \\*](#)

[Lake & 4th/5th Avenue \\*](#)

[Lake & Chicago](#)

[Lake & Bloomington](#)

[Lake & Cedar](#)

[Lake St/Midtown Station \\*](#)

[Lake & Minnehaha](#)

[Lake & 31st Avenue](#)

[Lake & 36th Avenue](#)

[Lake & 44th Avenue](#)

### St. Paul

[Marshall & Otis](#)

[Marshall & Cretin](#)

[Marshall & Cleveland](#)

[Marshall & Fairview](#)

[Snelling & Dayton \\*](#)

[Selby & Hamline](#)

[Selby & Lexington](#)

[Selby & Victoria](#)

[Selby & Dale](#)

[Selby & Western](#)

[John Ireland & Marshall](#)

[Smith & 5th Street \\*](#)

[5th Street at Rice Park/6th Street at Hamm Plaza \\*](#)

[5th Street/6th Street & Minnesota \\*](#)

[5th Street/6th Street & Robert \\*](#)

[Union Depot & Wacouta/Sibley \\*](#)

[Union Depot \\*](#)

\* Denotes a station location that has been previously finalized, based on earlier coordination with other projects.

Figure 24: Planned B Line stations and connecting bus service, western section

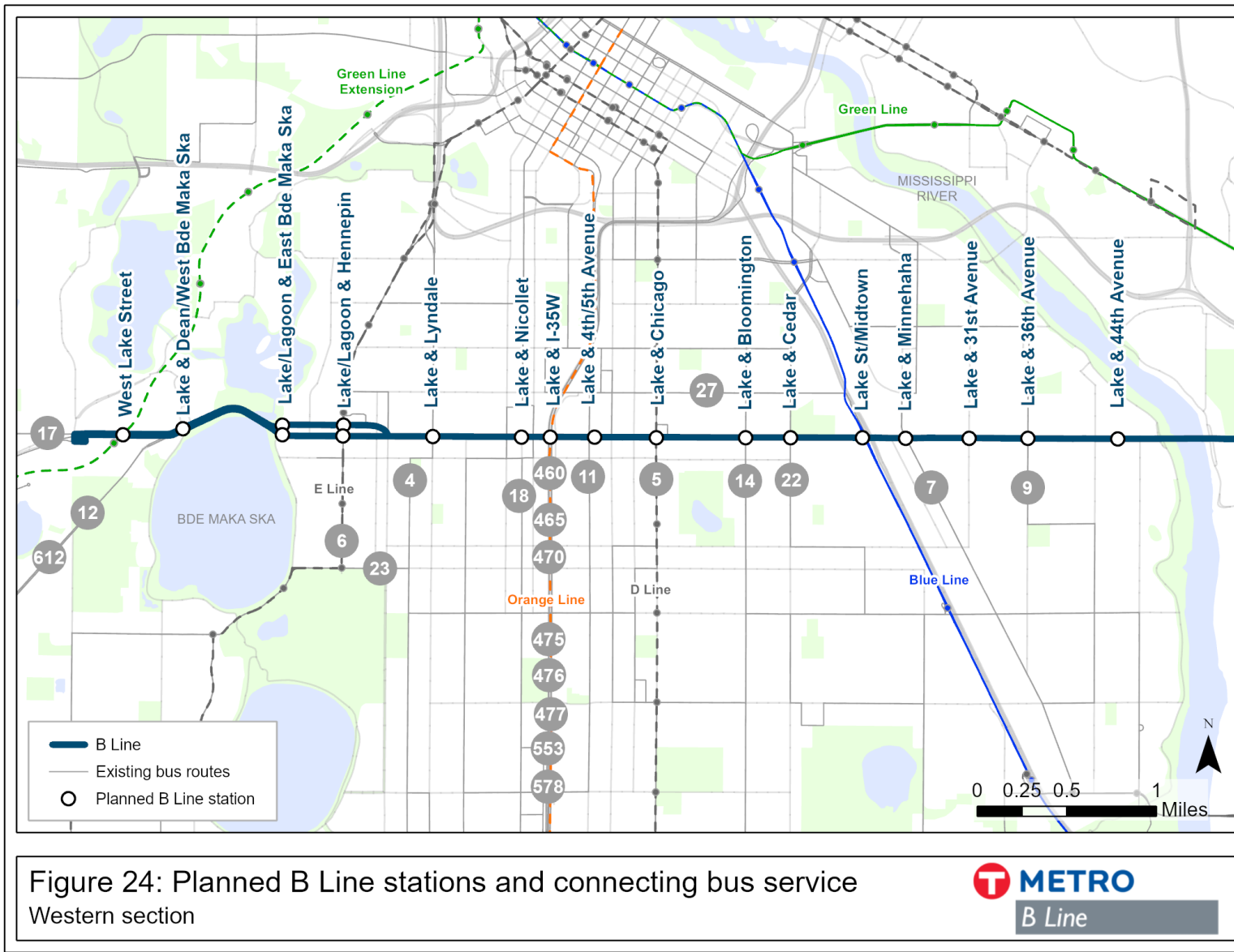


Figure 25: Planned B Line stations and connecting bus service, eastern section

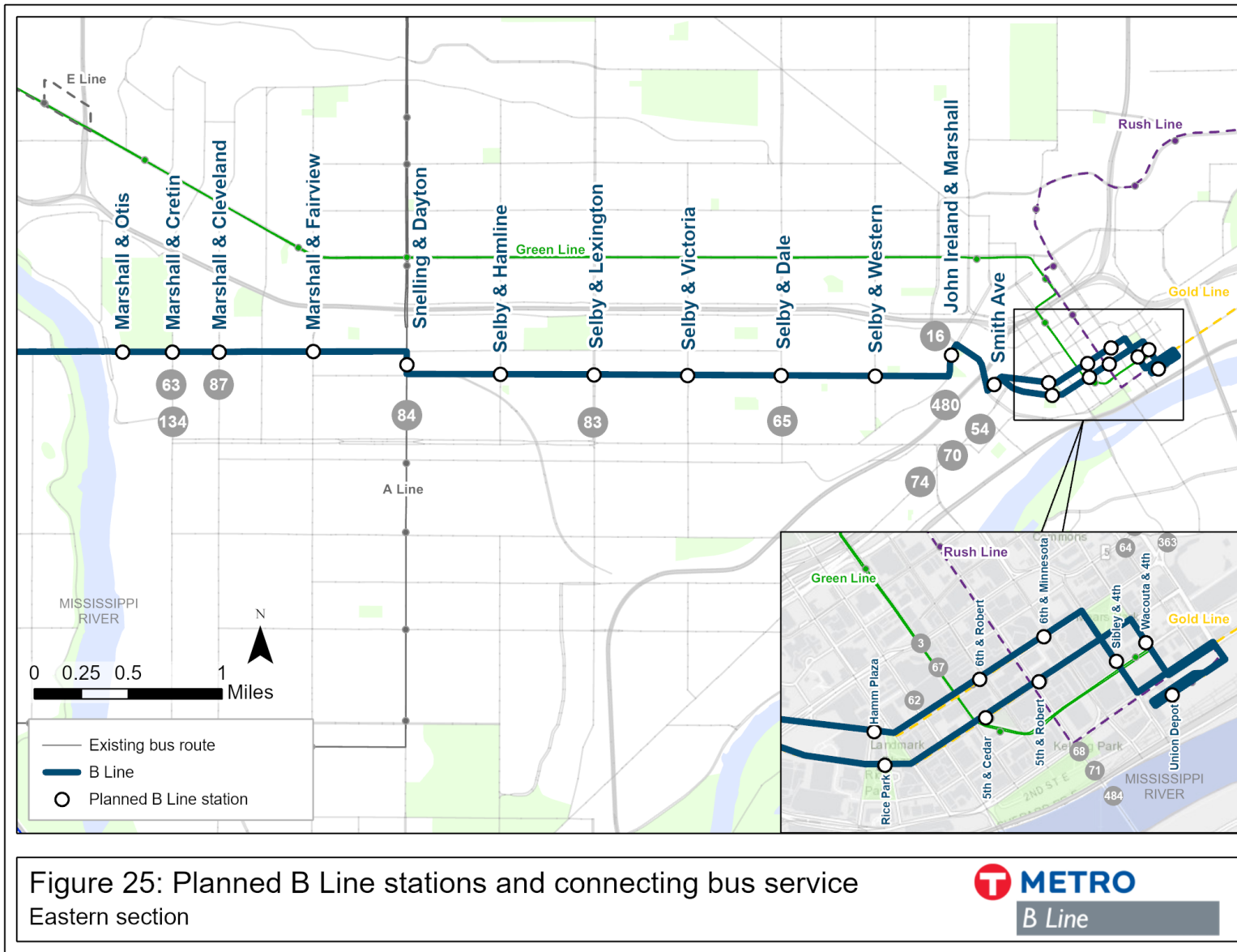


Figure 26: Planned B Line stations and 2019 Route 21 ridership, western section

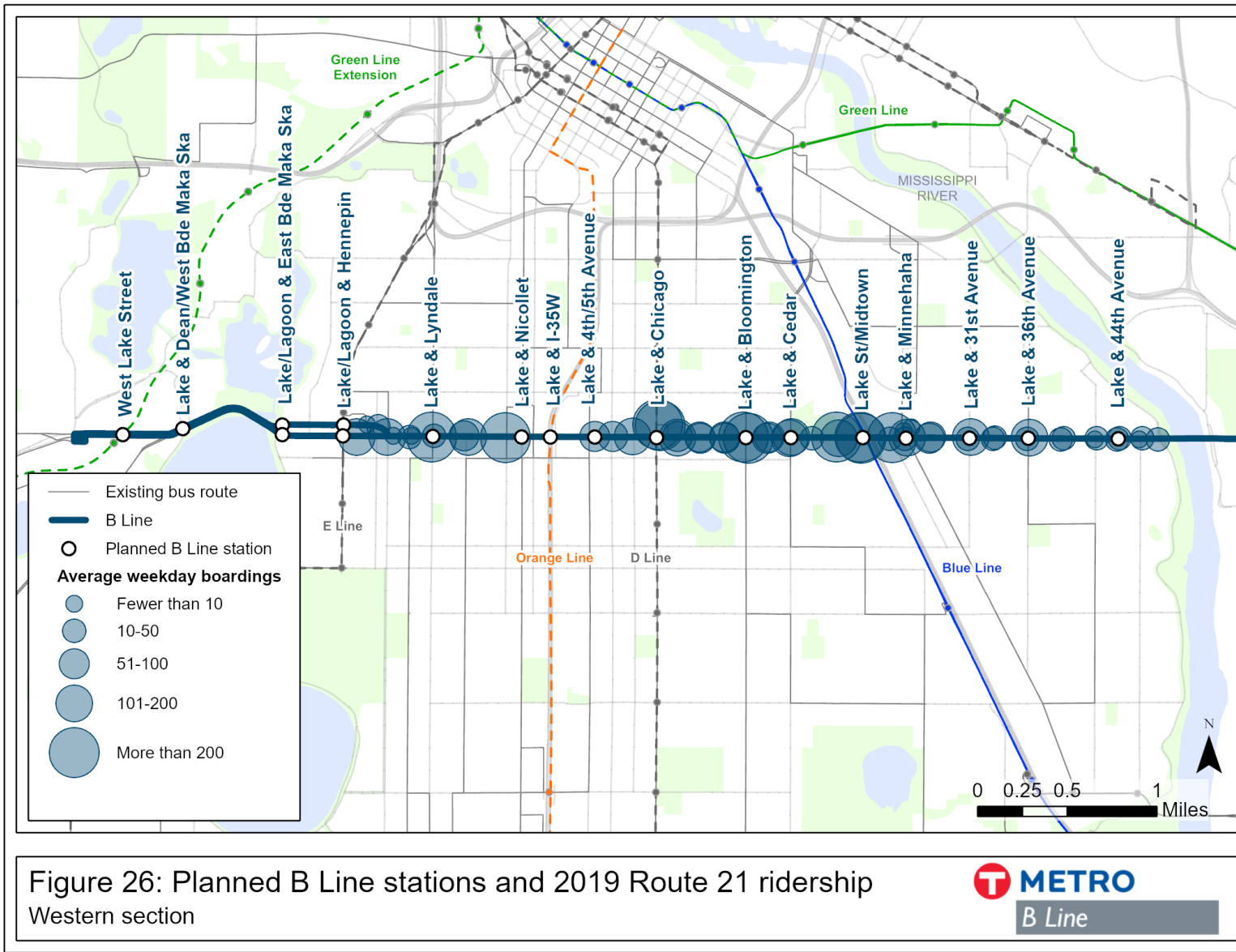




Figure 27: Planned B Line stations and existing Route 21 ridership, eastern section

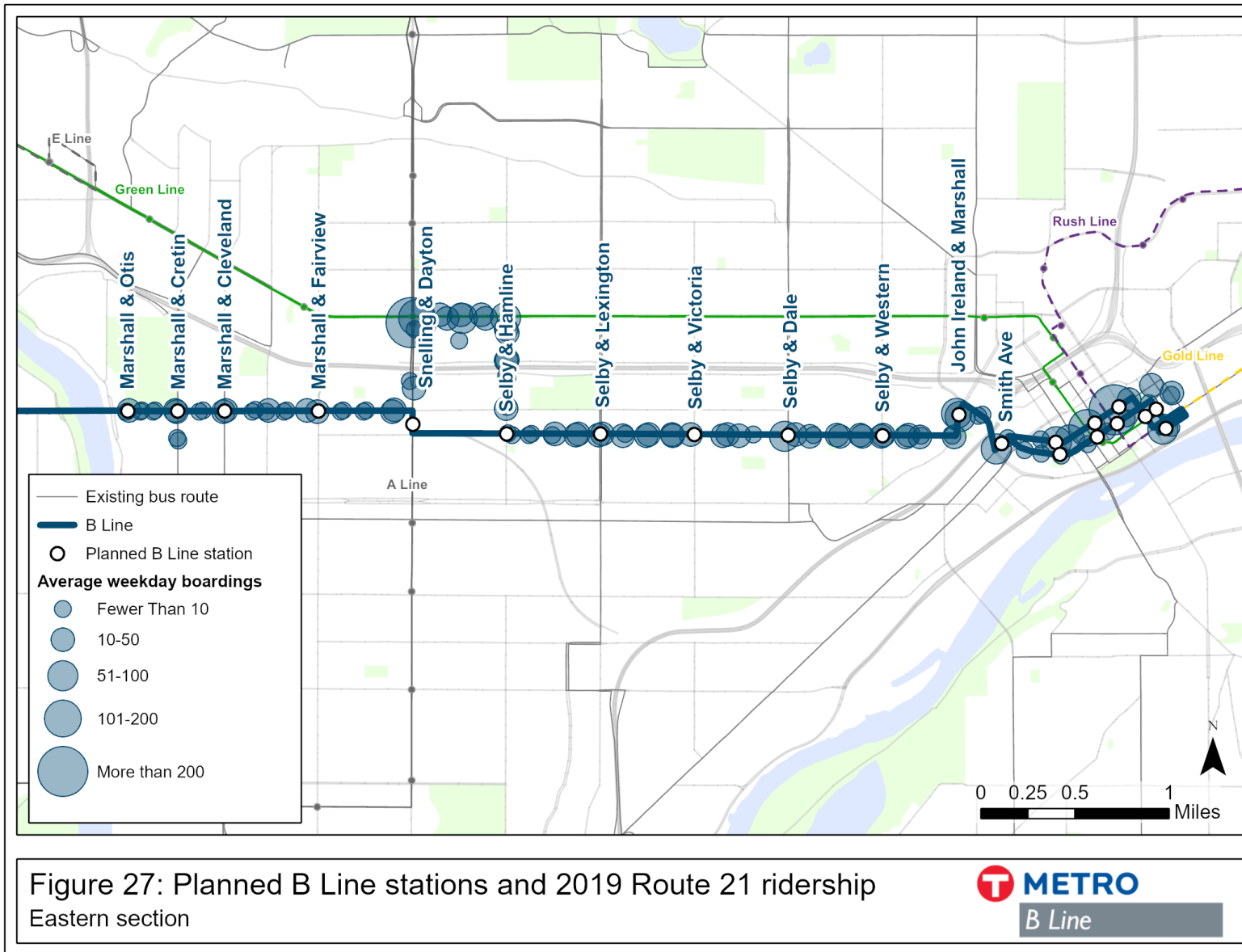


Figure 28: Planned B Line stations and station spacing, western section

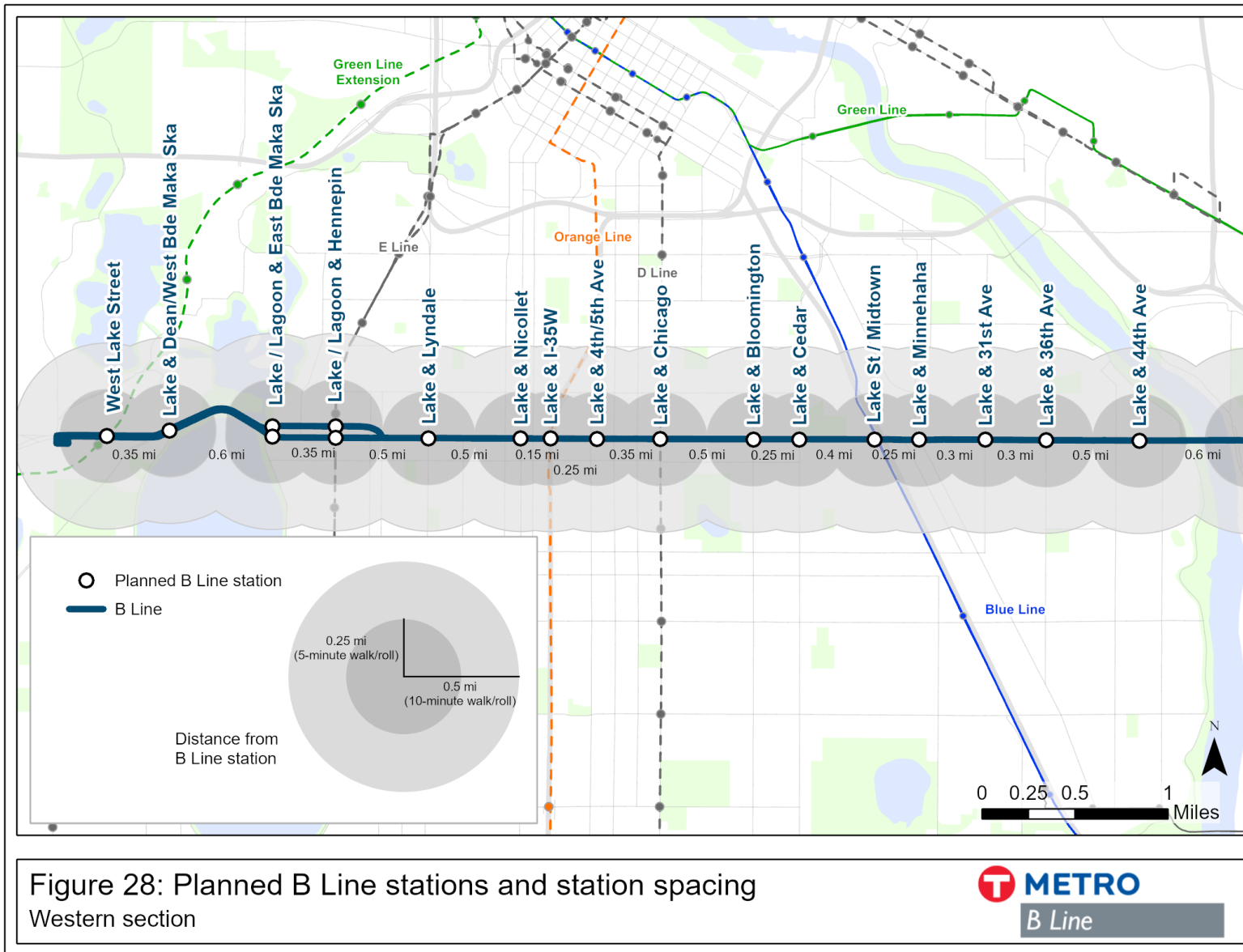
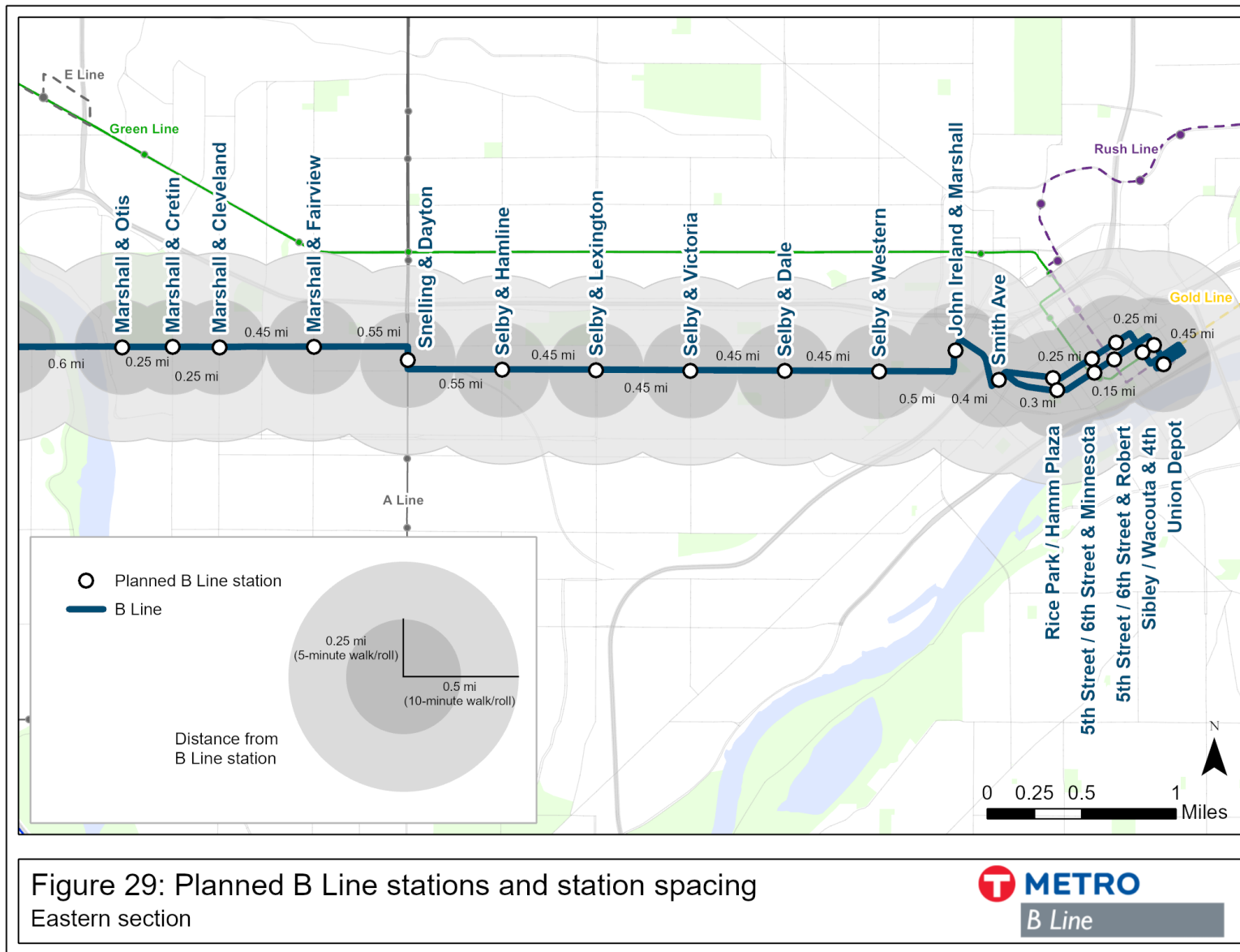


Figure 29: Planned B Line stations and station spacing, eastern section

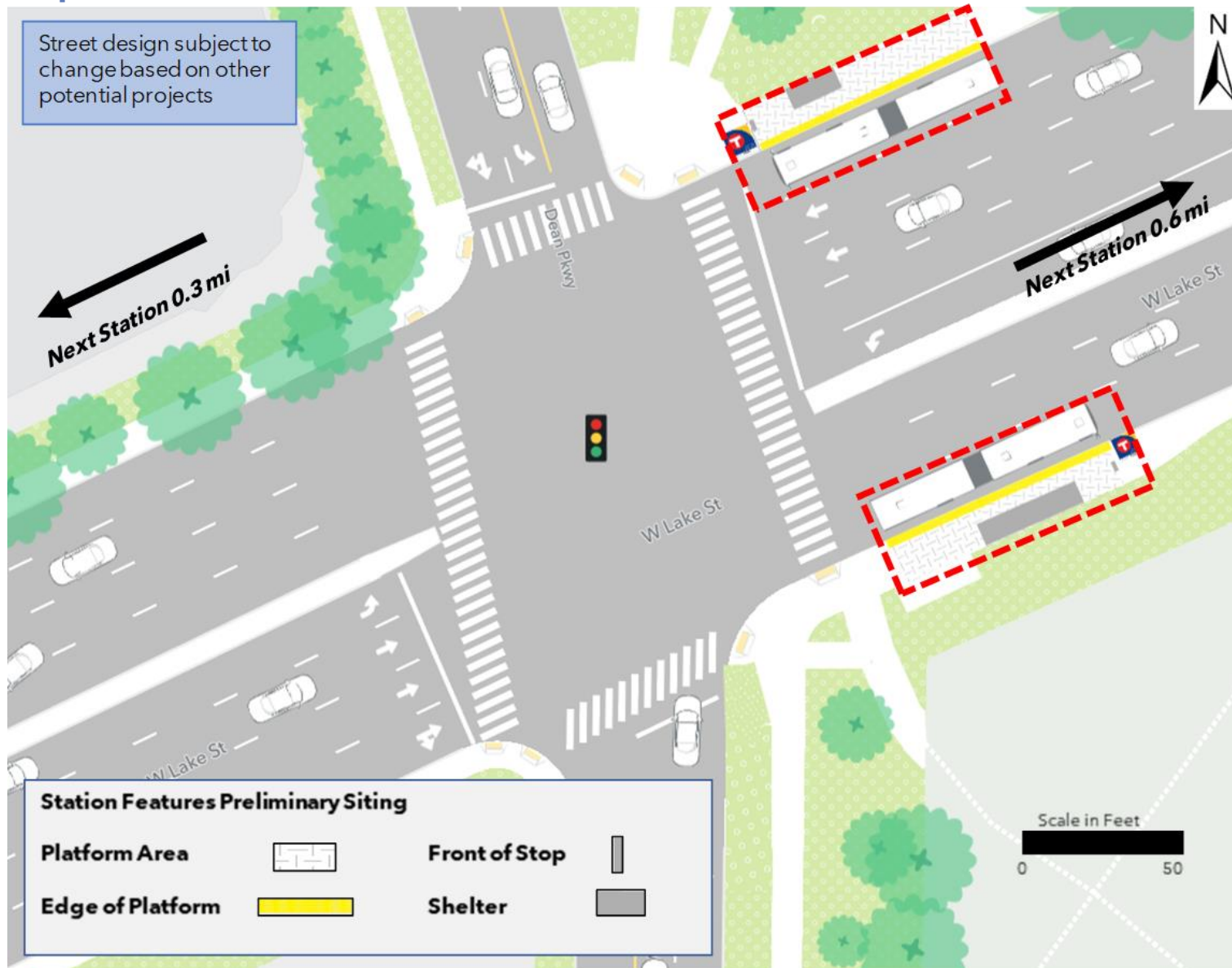


## Lake & Dean/West Bde Maka Ska

Existing



## Proposed Lake & Dean/West Bde Maka Ska Station Plan





## Notes and Discussion

### *Land use*

- Three quadrants of the intersection are adjacent to parkland. Metro Transit is coordinating design and construction of these platforms with the Minneapolis Park and Recreation Board.

### *Pedestrian access*

- There are heavy pedestrian/bicycle trail crossings and an existing marked crosswalk on the eastern leg of the intersection. A farside eastbound platform is recommended, in part, to provide convenient pedestrian access for transit users crossing Lake Street.

### *Station spacing*

- The distance to the next station to the east is slightly higher than guidelines due to the adjacent parkland in this area.

### *Other station location considered: Lake and Thomas*

- An alternative station location was considered at Lake and Thomas. While this location would provide more even spacing between West Lake Street and East Bde Maka Ska, ridership and higher-intensity land uses are concentrated further to the west in this area.

### *Project coordination*

- Construction activities at this station may be coordinated with a City of Minneapolis-led Highway Safety Improvement Project currently scheduled for 2022 or 2023. This project includes potential changes to the intersection to improve pedestrian safety, including a marked crosswalk on the western leg of the intersection, Americans with Disabilities Act (ADA)-compliant curb ramps, changes to the median between Dean and Thomas, traffic signal replacement, and signal timing modifications.

## Lake/Lagoon & East Bde Maka Ska

### Existing



Proposed Lake/Lagoon & East Bde Maka Ska Station Plan



## Notes and Discussion

### *Previous study*

- Platforms farside of East Bde Maka Ska Parkway were recommended for both the eastbound and westbound directions at this location as part of the Midtown Corridor Alternatives Analysis. This plan recommends a westbound platform nearside of East Bde Maka Ska Parkway in order to be closer to higher-intensity land uses and positioned along the segment of roadway with lower vehicle speeds compared to the parkland areas further to the west.

### *Station spacing*

- The distance to the next station to the west is slightly higher than guidelines due to the adjacent parkland in this area.

### *Project coordination*

- Design and construction of this station may be coordinated with accessibility improvements and a future bikeway project along Lake Street/ Lagoon Avenue between East Bde Maka Ska Parkway and Hennepin Avenue, as proposed in the Minneapolis Transportation Action Plan.<sup>2</sup>

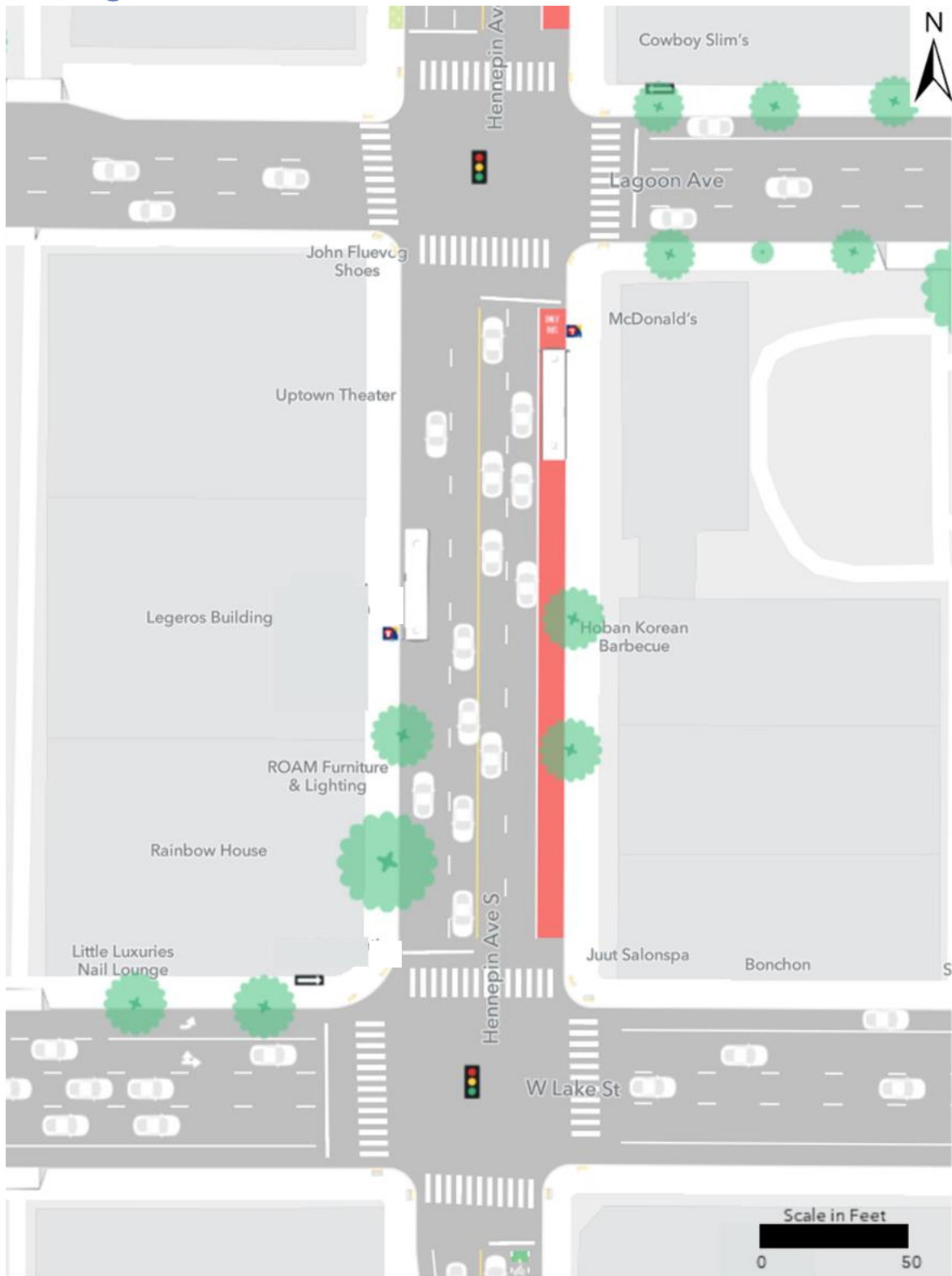
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<sup>2</sup> Available at:

[http://go.minneapolismn.gov/application/files/5316/0753/2042/TAP\\_Final\\_BICYCLING.pdf](http://go.minneapolismn.gov/application/files/5316/0753/2042/TAP_Final_BICYCLING.pdf)

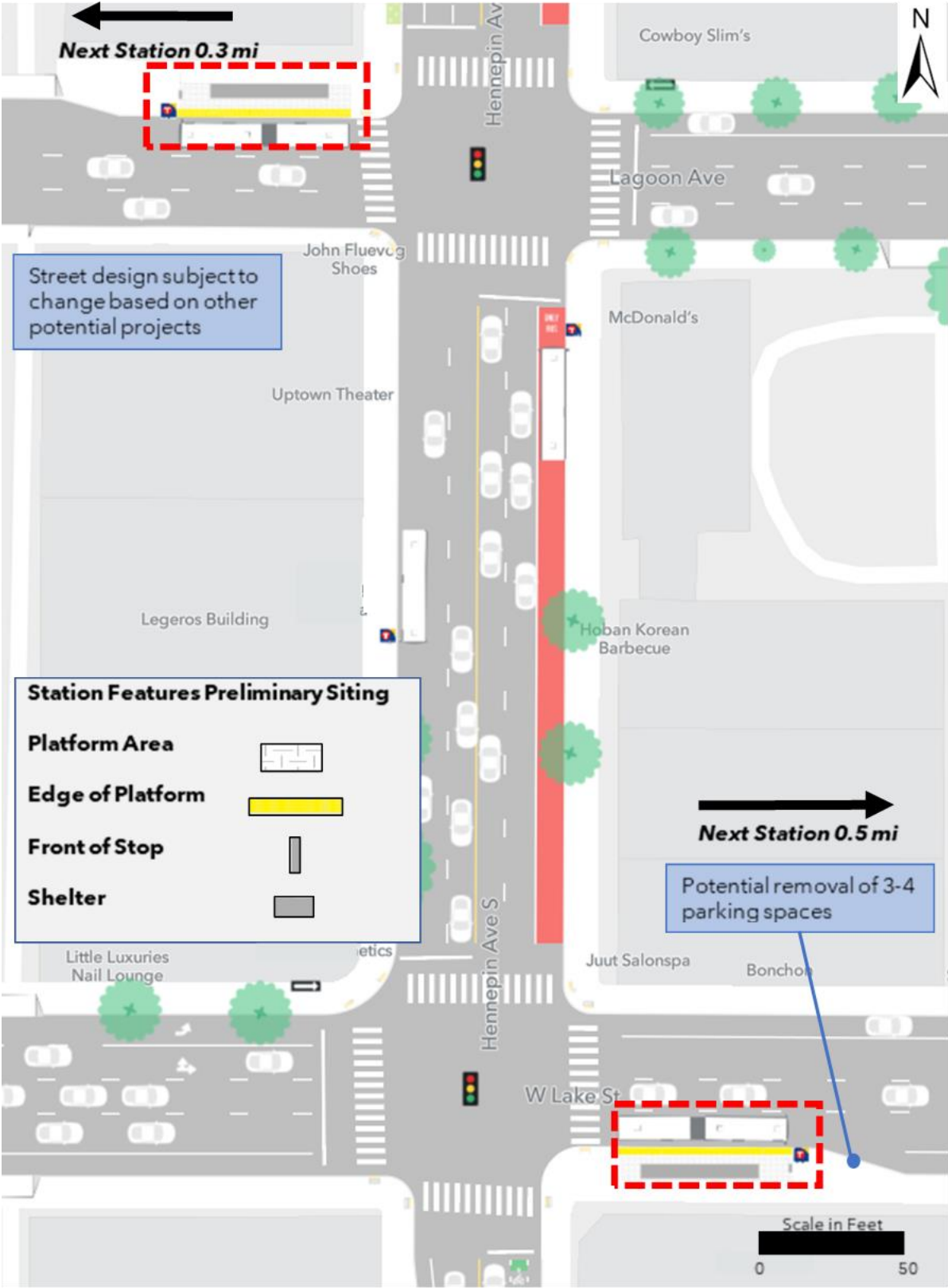
# Lake/Lagoon & Hennepin

## Existing





Proposed Lake/Lagoon & Hennepin Station Plan



## Notes and Discussion

### *Project coordination*

- Design and construction of this station may be coordinated with the City of Minneapolis' Hennepin Avenue reconstruction project, planned for construction to start in 2024. The METRO E Line is also being planned along Hennepin Avenue. The station locations included in this plan are sited to make convenient transfers between these lines.

### *Other station location considered: Uptown Transit Station*

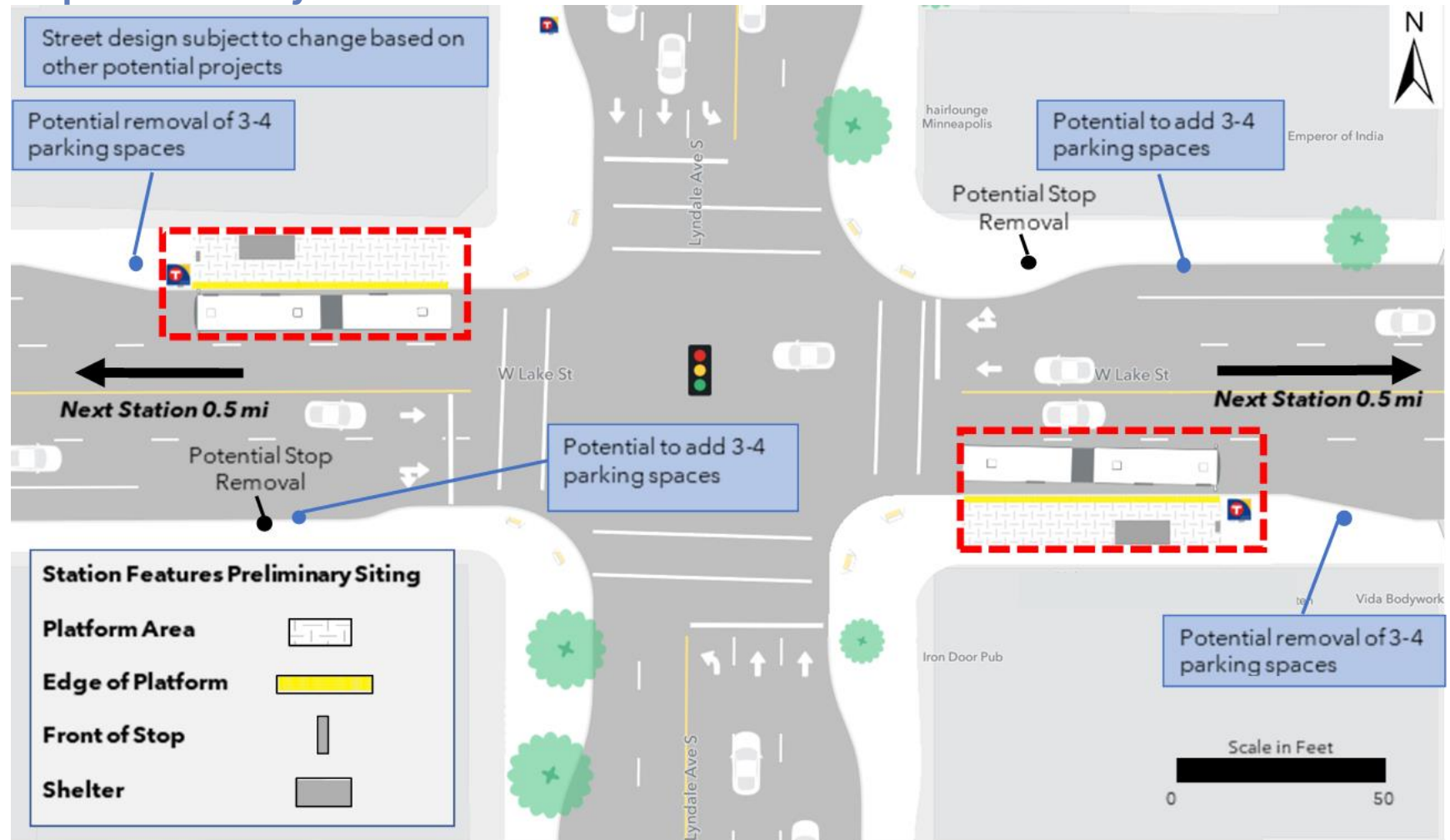
- Uptown Transit Station, located north of Lagoon on Hennepin, is the existing western terminus for Route 21. Buses turn around at this location on a one-way loop to return east.
- While this location could provide existing waiting facilities and connections to transit service on Hennepin Avenue, it is not a desirable B Line station since the planned alignment continues further west.
- Serving the existing Uptown Transit Station would require B Line buses to deviate from Lagoon/Lake, adding significant delay. The one-way nature of 29th Street between Hennepin and Fremont means that buses could not easily travel in both directions through the station without making an out-of-direction loop. Furthermore, using Uptown Transit Station for the B Line would detract from the east-west directionality of the alignment, making the line less direct and legible for riders. Route 21 would continue to provide local service at Uptown Transit Station.

## Lake & Lyndale

### Existing



## Proposed Lake & Lyndale Station Plan



## Notes and Discussion

### *Project coordination*

- This intersection was included in the Minneapolis/Hennepin County Pedestrian Crossing Study<sup>3</sup> and several strategies are being considered to improve safety conditions at this intersection.

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<sup>3</sup> Available at:

<http://www2.minneapolismn.gov/www/groups/public/@publicworks/documents/webcontent/wcmstp-221214.pdf>

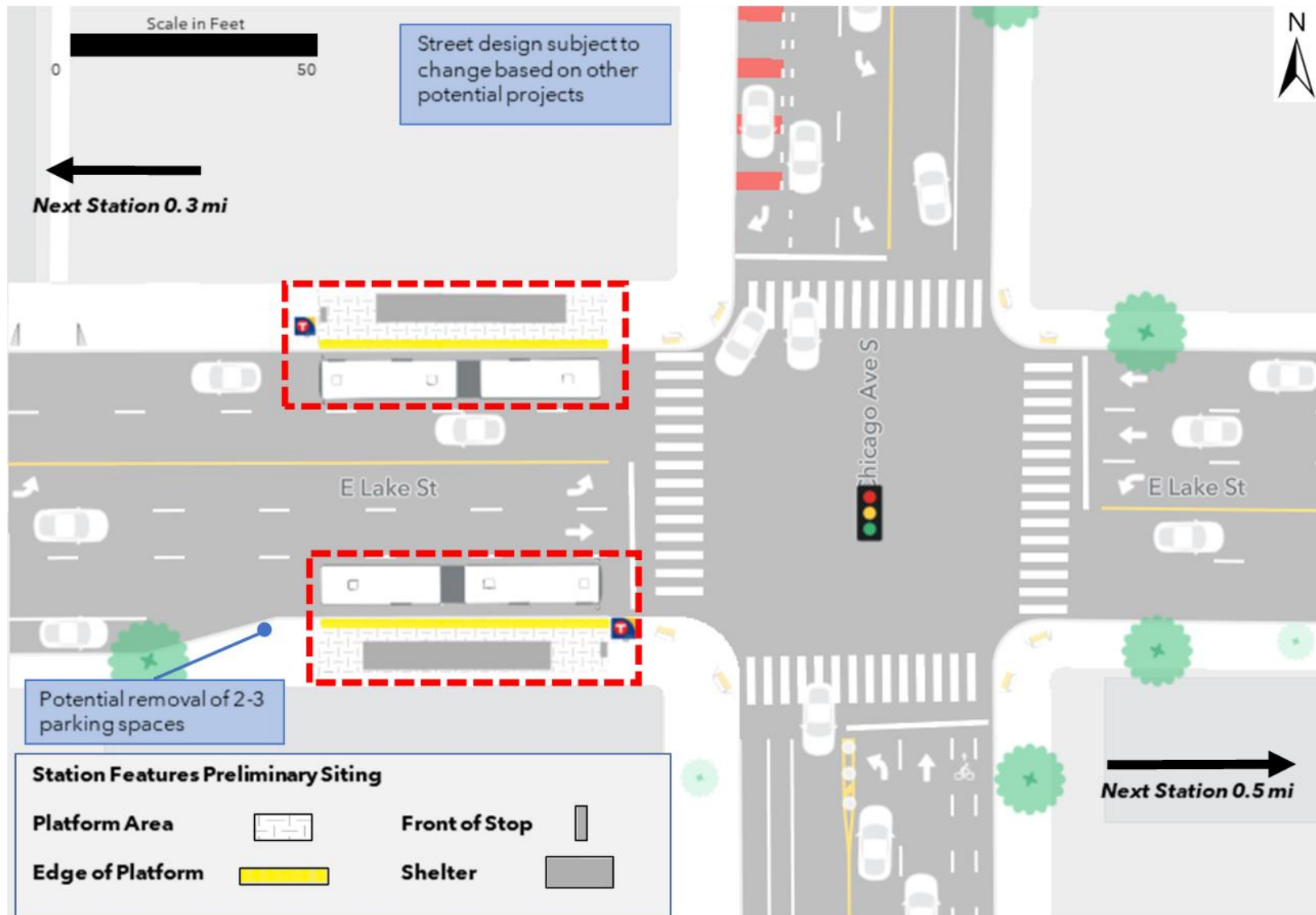


## Lake & Chicago

### Existing



## Proposed Lake & Chicago Station Plan



## Notes and Discussion

### *Previous study*

- A farside westbound platform and a nearside eastbound platform was recommended at this location as part of the Midtown Corridor Alternatives Analysis. Recommendations in this plan are consistent with the previous study.

### *Right-of-Way constraints*

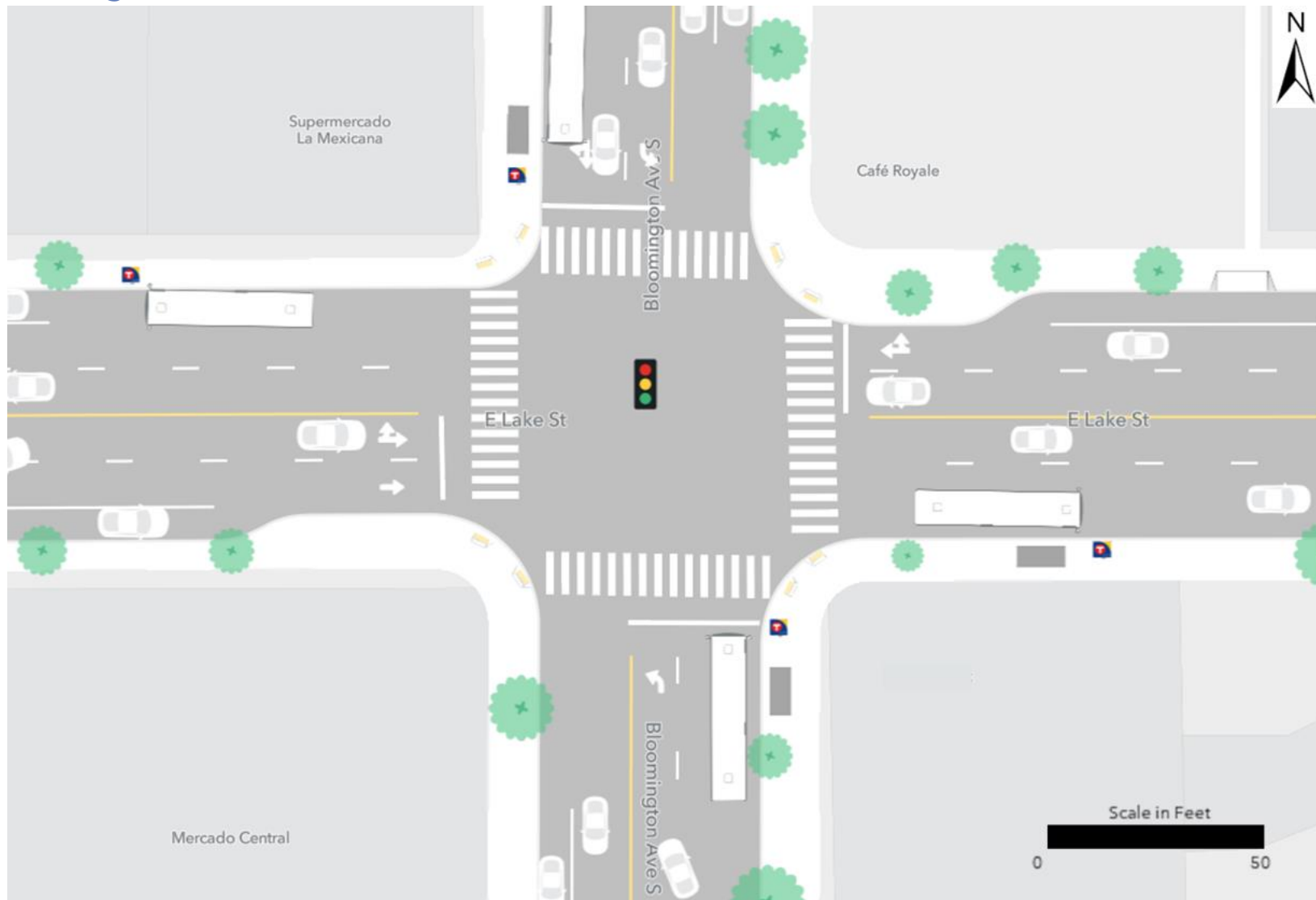
- The existing right-of-way at this location presents constraints for accommodating adequate space for customers, particularly due to the high volume of riders at this location. Station siting, and sidewalk integration will continue to be reviewed as the design advances at this location.

### *Other station locations considered: Chicago-Lake Transit Center*

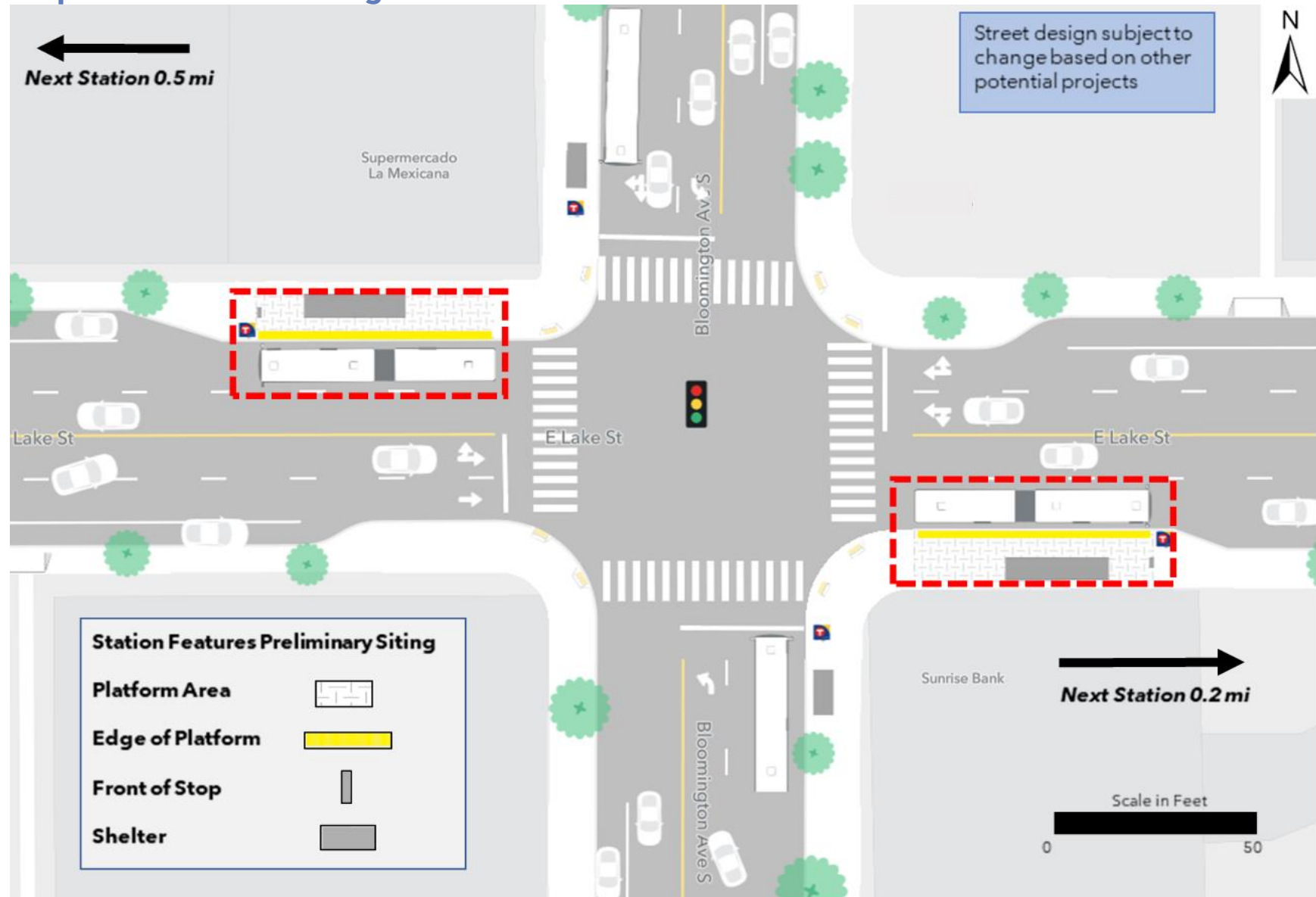
- Under existing conditions, Route 21 buses turn off Lake Street in both directions, making an additional turn onto the transit promenade, and then stopping at the Chicago-Lake Transit Center, which is located one block north of the intersection of Chicago and Lake.
- While the transit center would be well-suited for providing existing waiting facilities and connections to transit service on Chicago Avenue, it is undesirable as a B Line station. Traveling through the transit center would add minutes of travel time in each direction, with additional delays associated with making four additional turns in each direction. Use of the transit center would also detract from the east-west directionality of the alignment, making the line less direct and legible for riders.
- When implemented, the METRO D Line will stop on Chicago Avenue north of Lake Street instead of turning off of Chicago Avenue and circulating through the transit center.

## Lake & Bloomington

### Existing



## Proposed Lake & Bloomington Station Plan





## Notes and Discussion

### *Previous study*

- An eastbound nearside platform and a westbound farside platform was recommended at this location as part of the Midtown Corridor Alternatives Analysis. However, a recent redevelopment project in the southeastern quadrant of this intersection closed two driveways along Lake Street, which makes a farside platform in the eastbound direction more feasible. This plan recommends an eastbound farside platform to achieve improved transit operations.

### *Station spacing*

- The distance to the next station to the east is slightly lower than guidelines due to the need to facilitate connections with key north-south transit service on both Bloomington Avenue (Route 14) and Cedar Avenue (Route 22).

### *Project coordination*

- This intersection was included in the Minneapolis/Hennepin County Pedestrian Crossing Study<sup>4</sup> and several strategies are being considered to improve safety conditions at this intersection.

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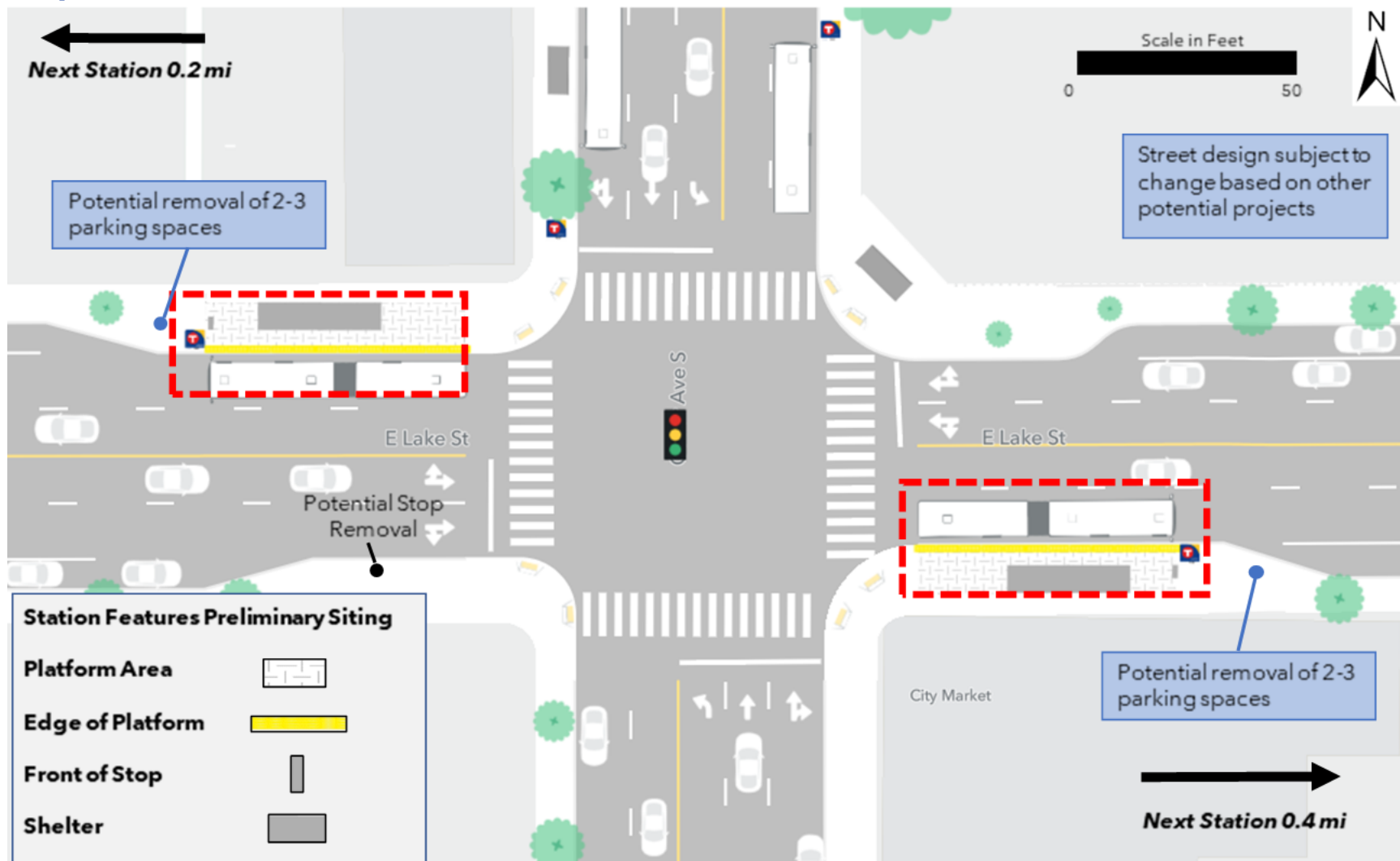
<sup>4</sup> Available at:  
<http://www2.minneapolismn.gov/www/groups/public/@publicworks/documents/webcontent/wcmstp-221214.pdf>

## Lake & Cedar

### Existing



## Proposed Lake & Cedar Station Plan



## Notes and Discussion

### *Station spacing*

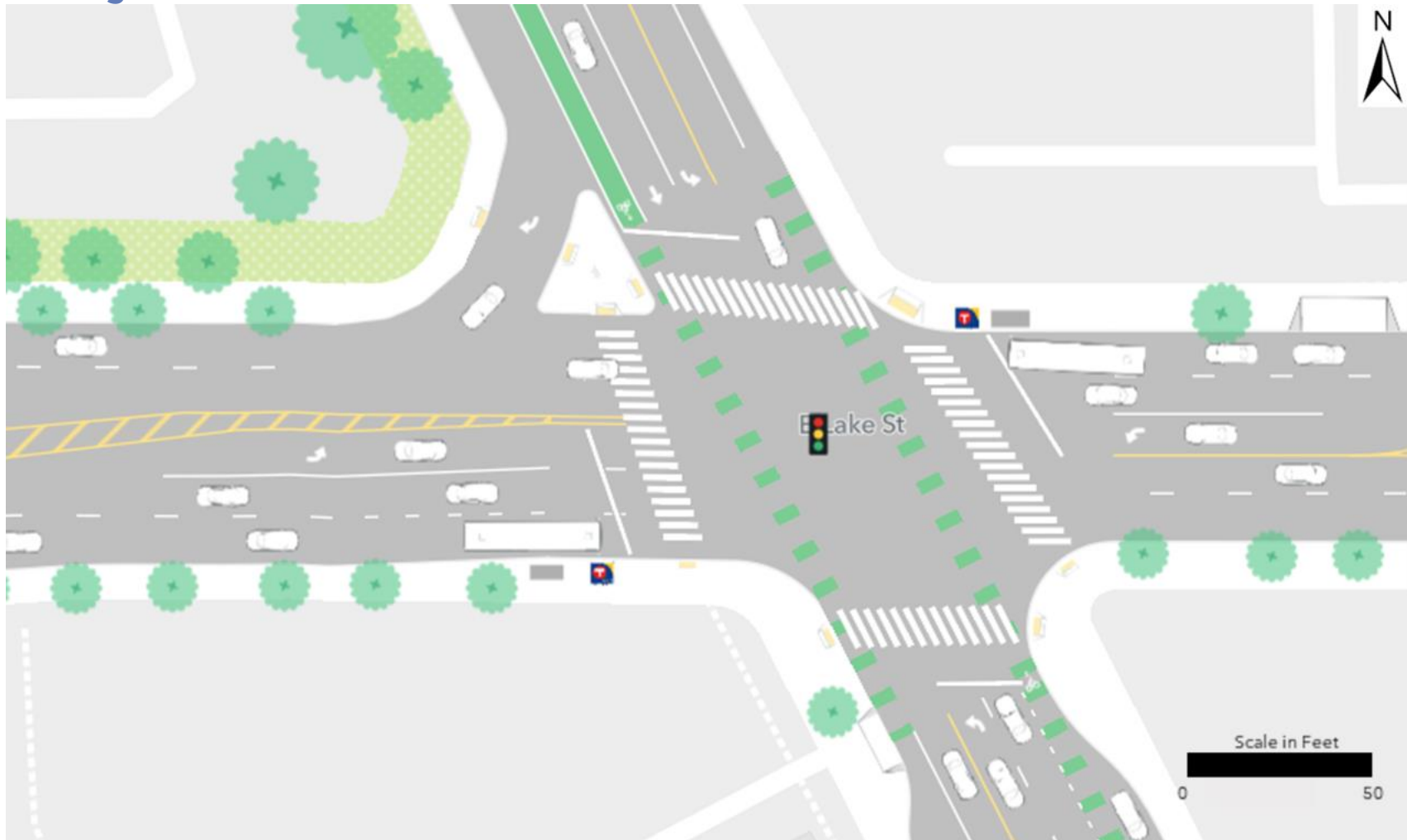
- The distance to the next station to the west is slightly lower than guidelines due to the need to facilitate connections with key north-south transit service on both Bloomington Avenue (Route 14) and Cedar Avenue (Route 22).

### *Project coordination*

- Design and construction at this station may be coordinated with a Hennepin County Highway Safety Improvement Project. This project includes potential changes at the intersection to improve pedestrian safety, including a new bumpout in the southwest quadrant.

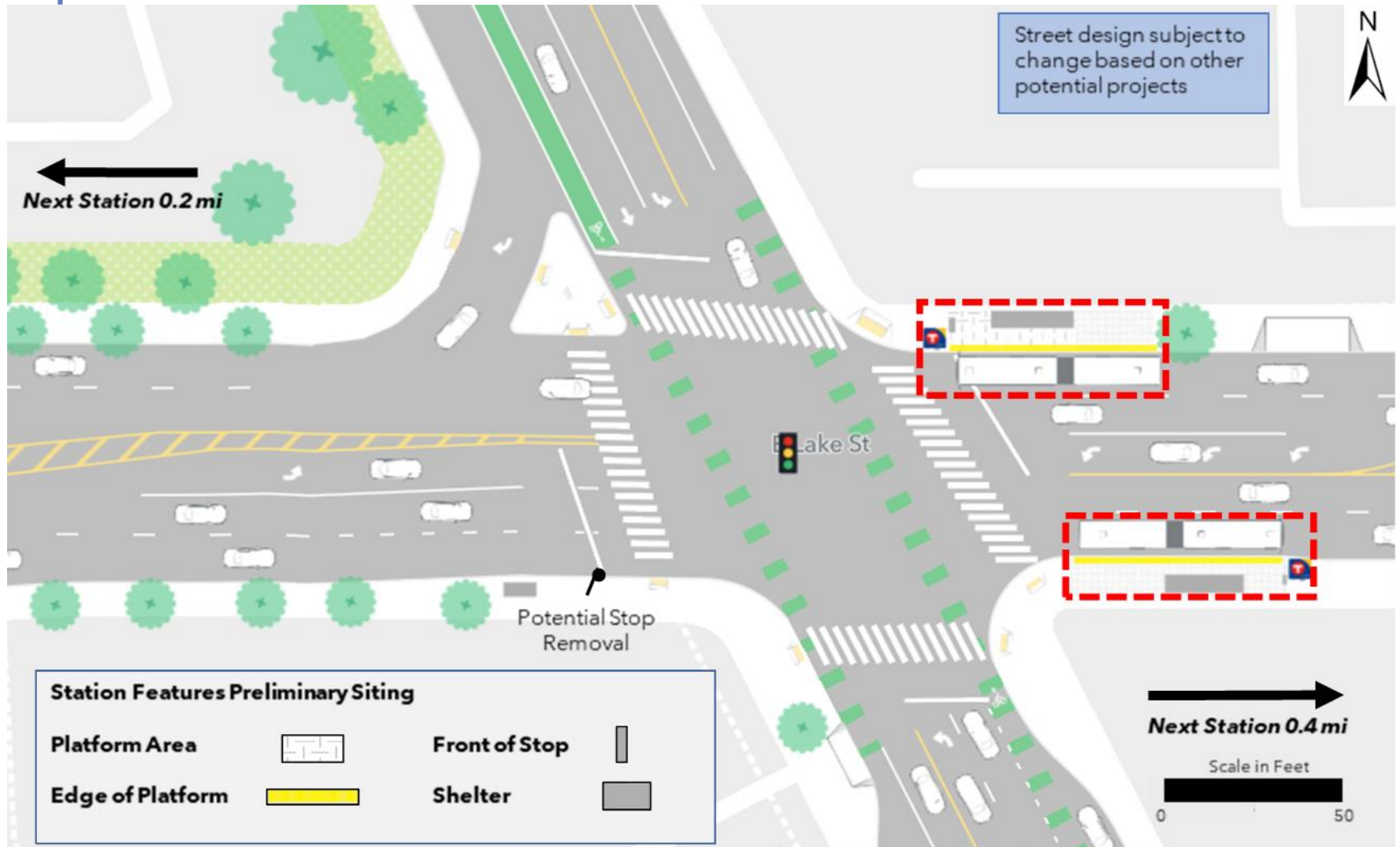
## Lake & Minnehaha

### Existing





## Proposed Lake & Minnehaha Station Plan



## Notes and Discussion

### *Station spacing*

- The distance to the next station to the west is slightly lower than guidelines due to the need to facilitate connections with key north-south transit service (METRO Blue Line west of Hiawatha Avenue and Route 7 on Minnehaha Avenue) and major destinations.

### *Safety and operations*

- Because this intersection is at a skewed angle and because Minnehaha is a designated freight truck route, safety and operational concerns were raised regarding a potential farside westbound platform. Intersection modifications to address these issues do not appear feasible. While farside platforms are typically preferred for BRT operations, in this case, a nearside westbound platform has been recommended as part of this plan.

### *Land use*

- During the summer of 2020, a number of properties in this area were damaged or destroyed following civil unrest in the wake of the killing of George Floyd. Redevelopment is underway in various degrees; these plans will be monitored as the project develops toward the design phase.

### *Project coordination*

- Design and construction of this station may be coordinated with a future bikeway project along Lake Street, as proposed in the Minneapolis Transportation Action Plan.<sup>5</sup>

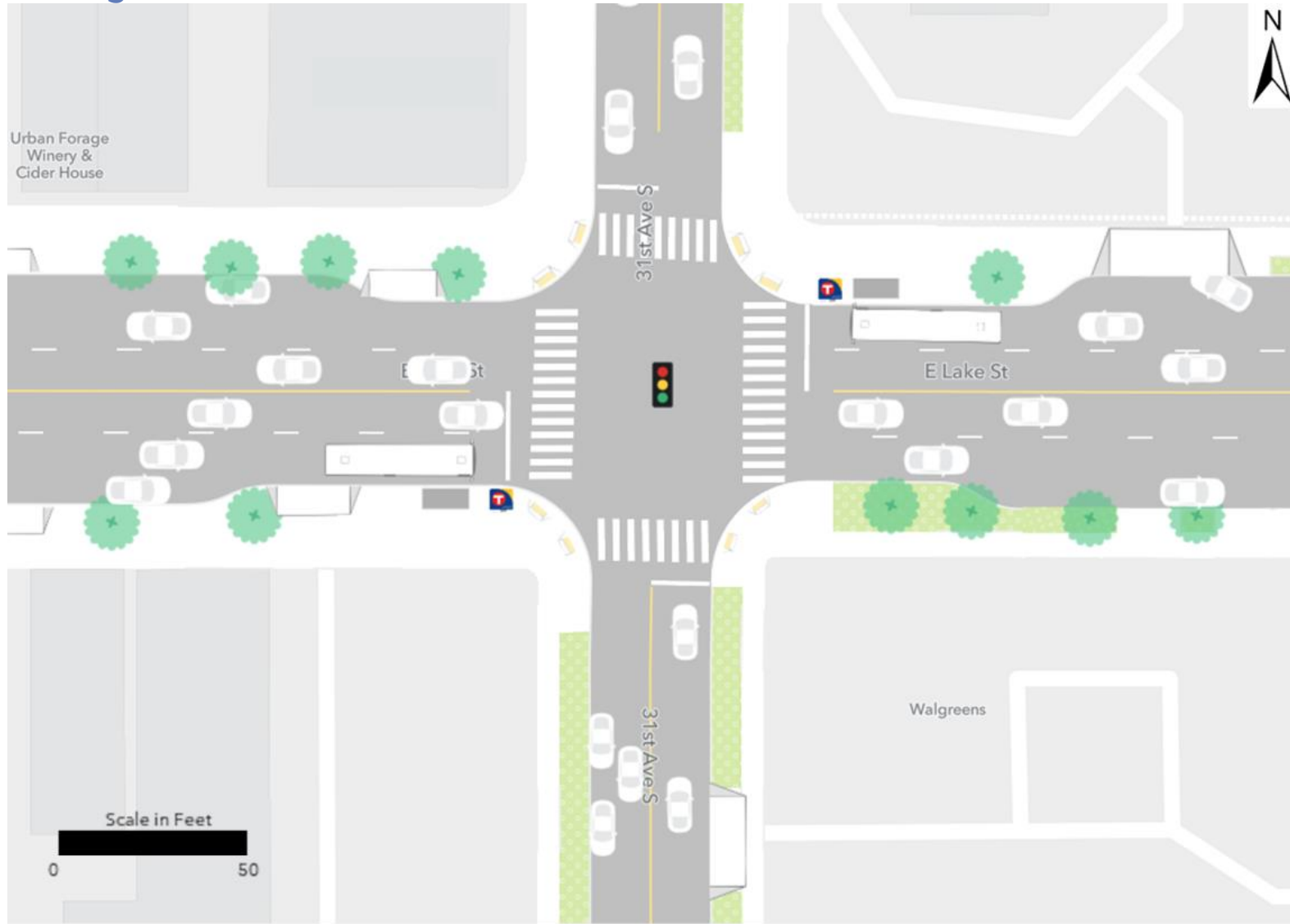
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<sup>5</sup> Available at:

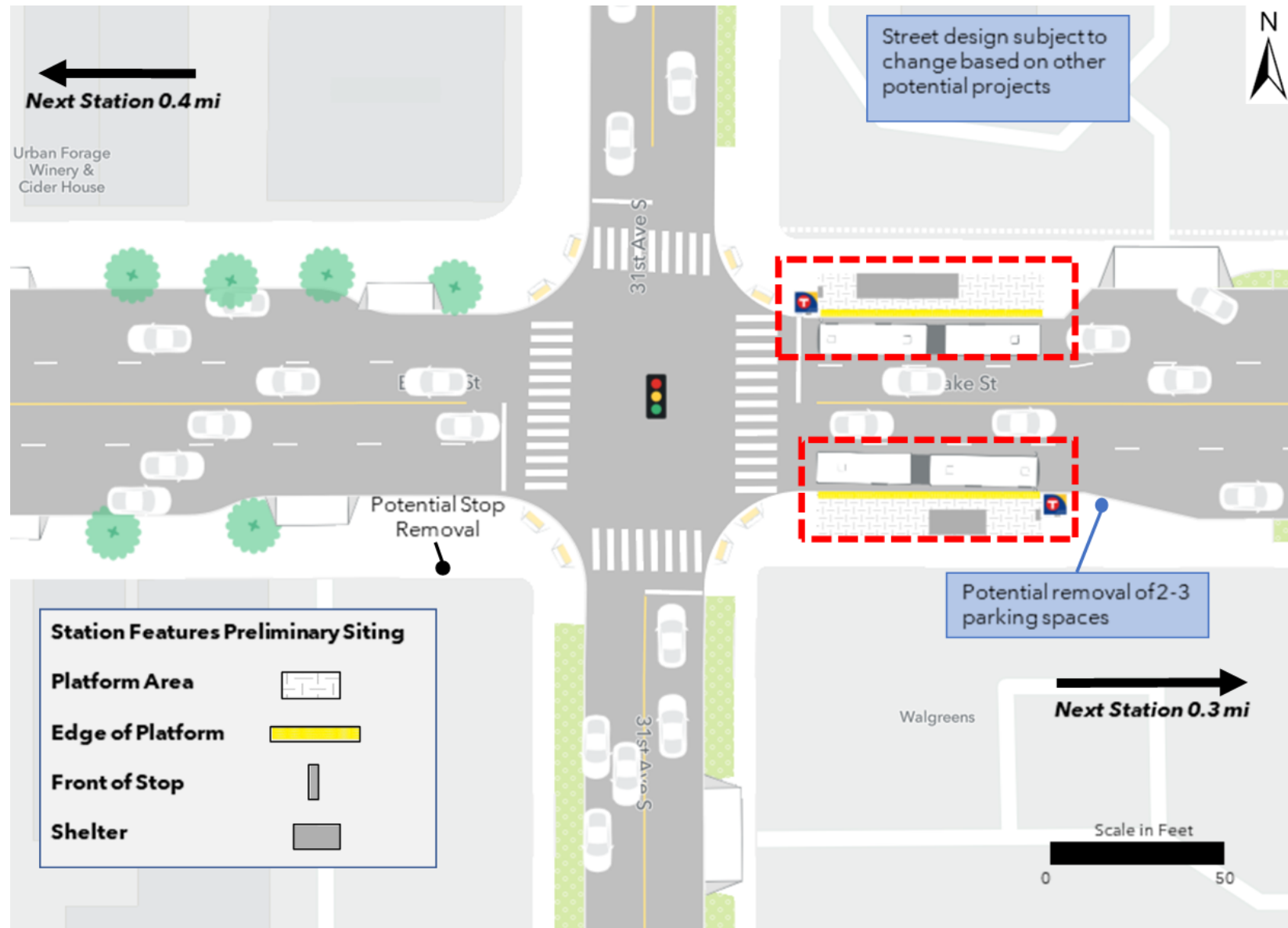
[http://go.minneapolismn.gov/application/files/5316/0753/2042/TAP\\_Final\\_BICYCLING.pdf](http://go.minneapolismn.gov/application/files/5316/0753/2042/TAP_Final_BICYCLING.pdf)

## Lake & 31st Avenue

### Existing



## Proposed Lake & 31st Avenue Station Plan



## Notes and Discussion

### *Station spacing*

- While 31st Avenue has lower existing bus stop use than other station locations along the corridor, underlying local service is not recommended for this portion of the corridor. Therefore, to retain reasonable pedestrian access to B Line stations, 31st Avenue was recommended as a station to provide equivalent distances between Minnehaha and 36th Avenue.
- The intersections of 28th Avenue and 33rd Avenue were also considered for a potential station. While ridership is somewhat similar between each of these stops, 31st Avenue best provides even spacing between planned B Line stations anchoring other transit connections at Minnehaha and 36th Avenue.

### *Project coordination*

- Design and construction of this station may be coordinated with accessibility improvements and a future bikeway project along Lake Street, as proposed in the Minneapolis Transportation Action Plan.<sup>6</sup>

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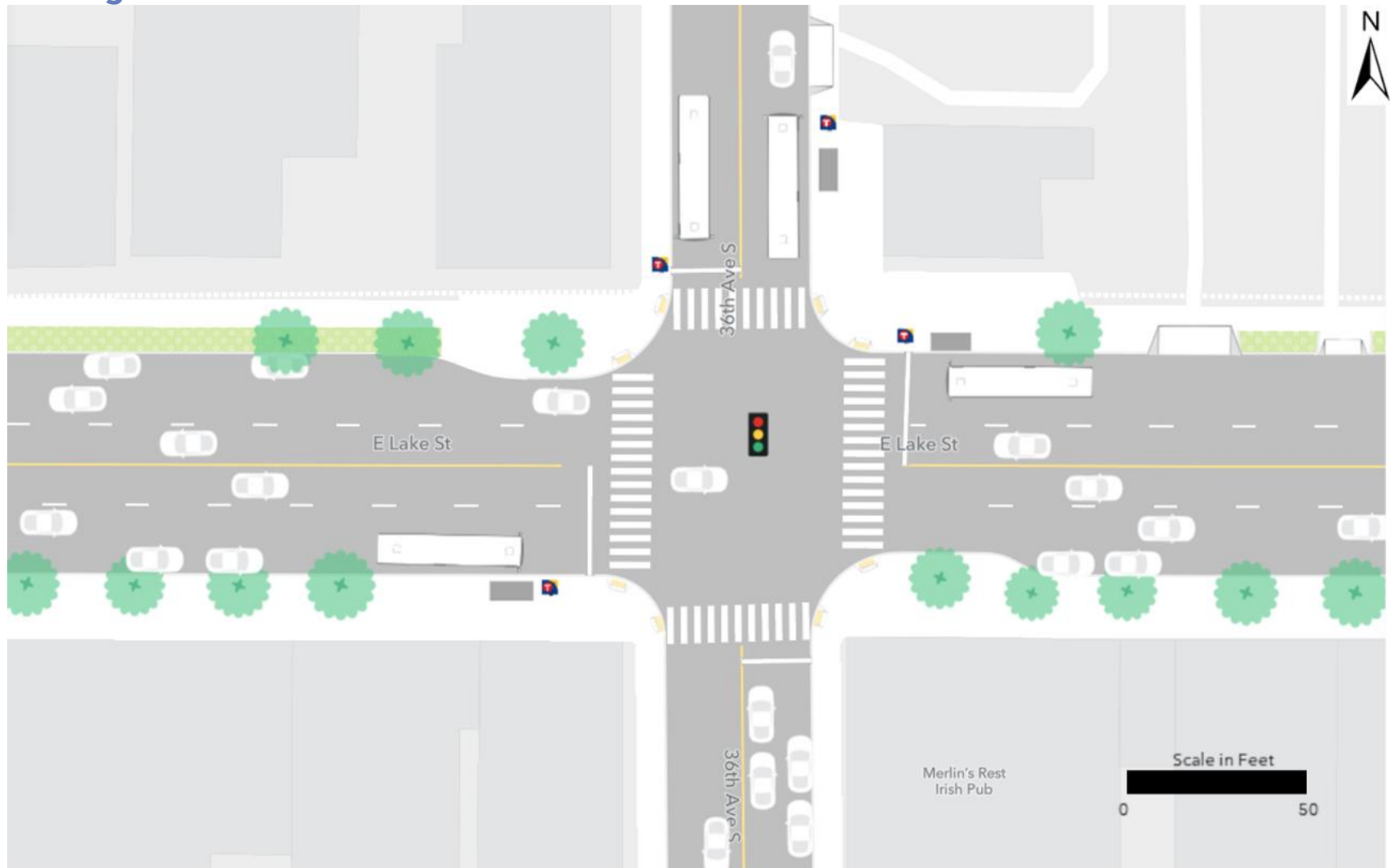
<sup>6</sup> Available at:

[http://go.minneapolismn.gov/application/files/5316/0753/2042/TAP\\_Final\\_BICYCLING.pdf](http://go.minneapolismn.gov/application/files/5316/0753/2042/TAP_Final_BICYCLING.pdf)

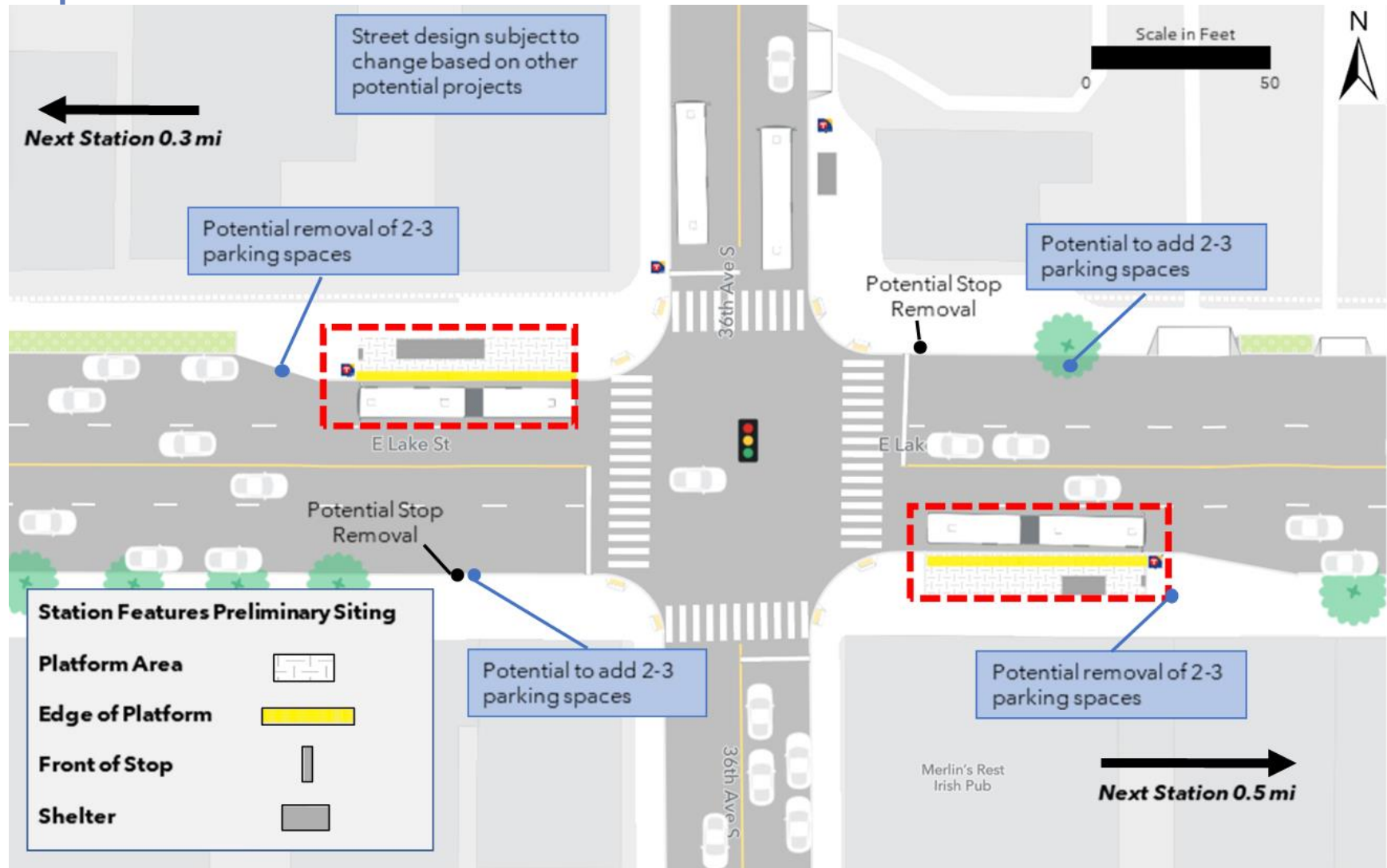


## Lake & 36th Avenue

### Existing



## Proposed Lake & 36th Avenue Station Plan



## Notes and Discussion

### *Project coordination*

- Design and construction of this station may be coordinated with accessibility improvements and a future bikeway project along Lake Street, as proposed in the Minneapolis Transportation Action Plan.<sup>7</sup>

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<sup>7</sup> Available at:

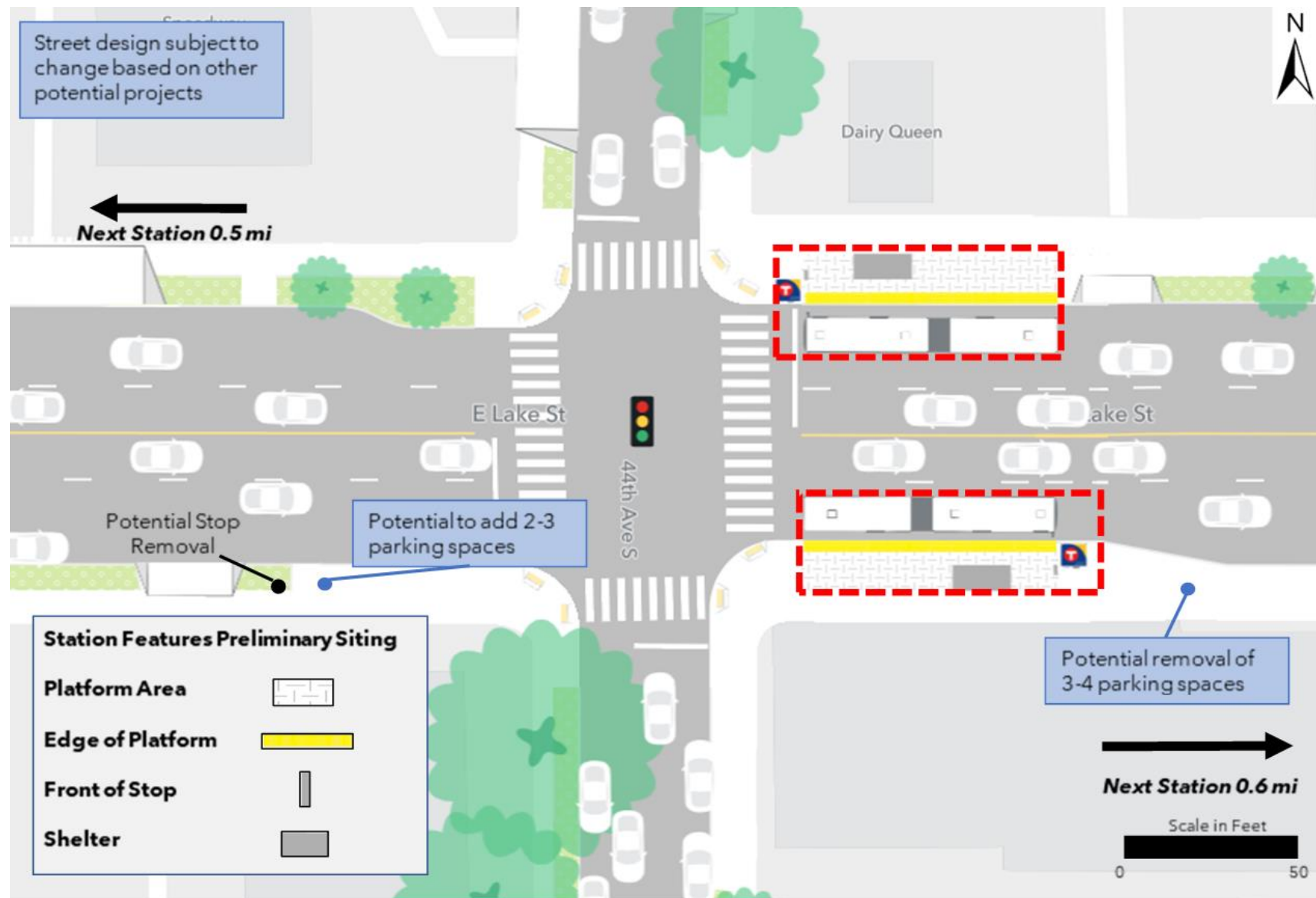
[http://go.minneapolismn.gov/application/files/5316/0753/2042/TAP\\_Final\\_BICYCLING.pdf](http://go.minneapolismn.gov/application/files/5316/0753/2042/TAP_Final_BICYCLING.pdf)

## Lake & 44th Avenue

### Existing



## Proposed Lake & 44th Avenue Station Plan





## Notes and Discussion

### *Station spacing*

- The distance to the next station to the east is slightly higher than guidelines due to the Mississippi River.

### *Platform space*

- Driveways are located relatively close to the intersection on both potential westbound platform locations; however, there is more space for a platform on the nearside of the intersection. This may require driveway modification or closure at this location.

### *Other station locations considered: 42nd Avenue and 46th Avenue*

- 42nd Avenue and 46th Avenue, both of which have existing bus stops, were considered for a station. 44th Avenue has the highest use of these three intersections and best provides even spacing between the planned B Line station at 36th Avenue and the Mississippi River.
- 46th Avenue is not a signalized intersection and 42nd Avenue and 44th Avenue are signalized intersections. Signalized intersections are preferred for supporting safe pedestrian access to and from the BRT station.
- The option of constructing two stations (at 42nd Avenue and 46th Avenue) was also considered. However, ridership is relatively low in this portion of the corridor and two stations approximately 0.3 miles apart were not considered warranted based on ridership patterns and land use in this area.

### *Project coordination*

- Design and construction of this station may be coordinated with accessibility improvements and a future bikeway project along Lake Street, as proposed in the Minneapolis Transportation Action Plan.<sup>8</sup>

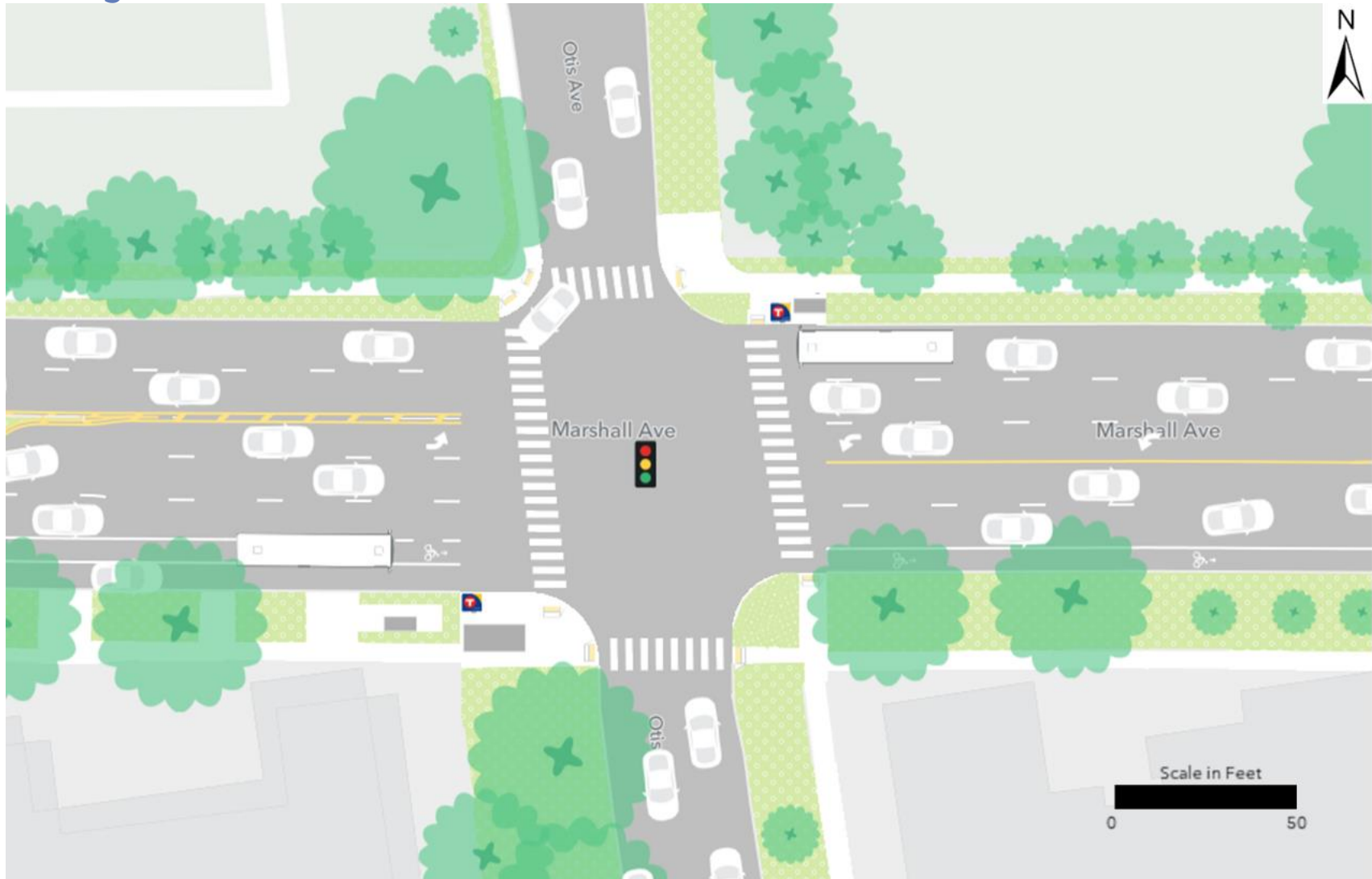
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<sup>8</sup> Available at:

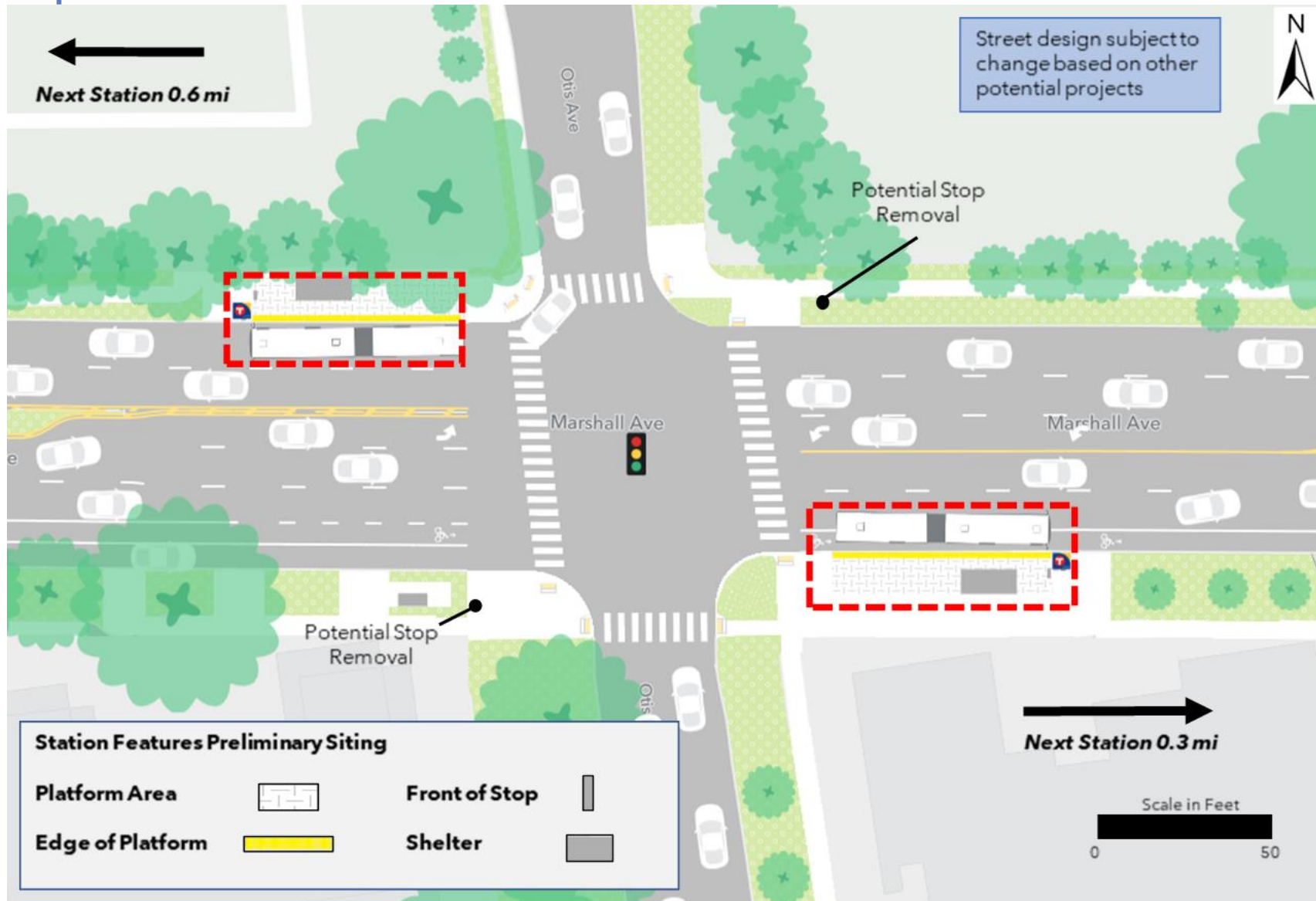
[http://go.minneapolismn.gov/application/files/5316/0753/2042/TAP\\_Final\\_BICYCLING.pdf](http://go.minneapolismn.gov/application/files/5316/0753/2042/TAP_Final_BICYCLING.pdf)

## Marshall & Otis

### Existing



## Proposed Marshall & Otis Station Plan



## Notes and Discussion

### *Station spacing*

- While Otis has lower existing stop use than other station locations along the corridor, underlying local service is not recommended for this portion of the corridor. Therefore, to retain reasonable pedestrian access to B Line stations (particularly in consideration of large hill on the eastern end of the Lake Street/Marshall Avenue Bridge), Otis is recommended as a station to provide adequate pedestrian access to transit between 44th Avenue and Cretin Avenue.

### *Project coordination*

- Future planning and design of this station will consider the existing eastbound bicycle lane at this location, along with potential future changes to the Marshall Avenue roadway section. A potential conversion to a 3-lane street with westbound bicycle facility has been considered on this part of Marshall.

### *Other station location considered: Mississippi River Boulevard*

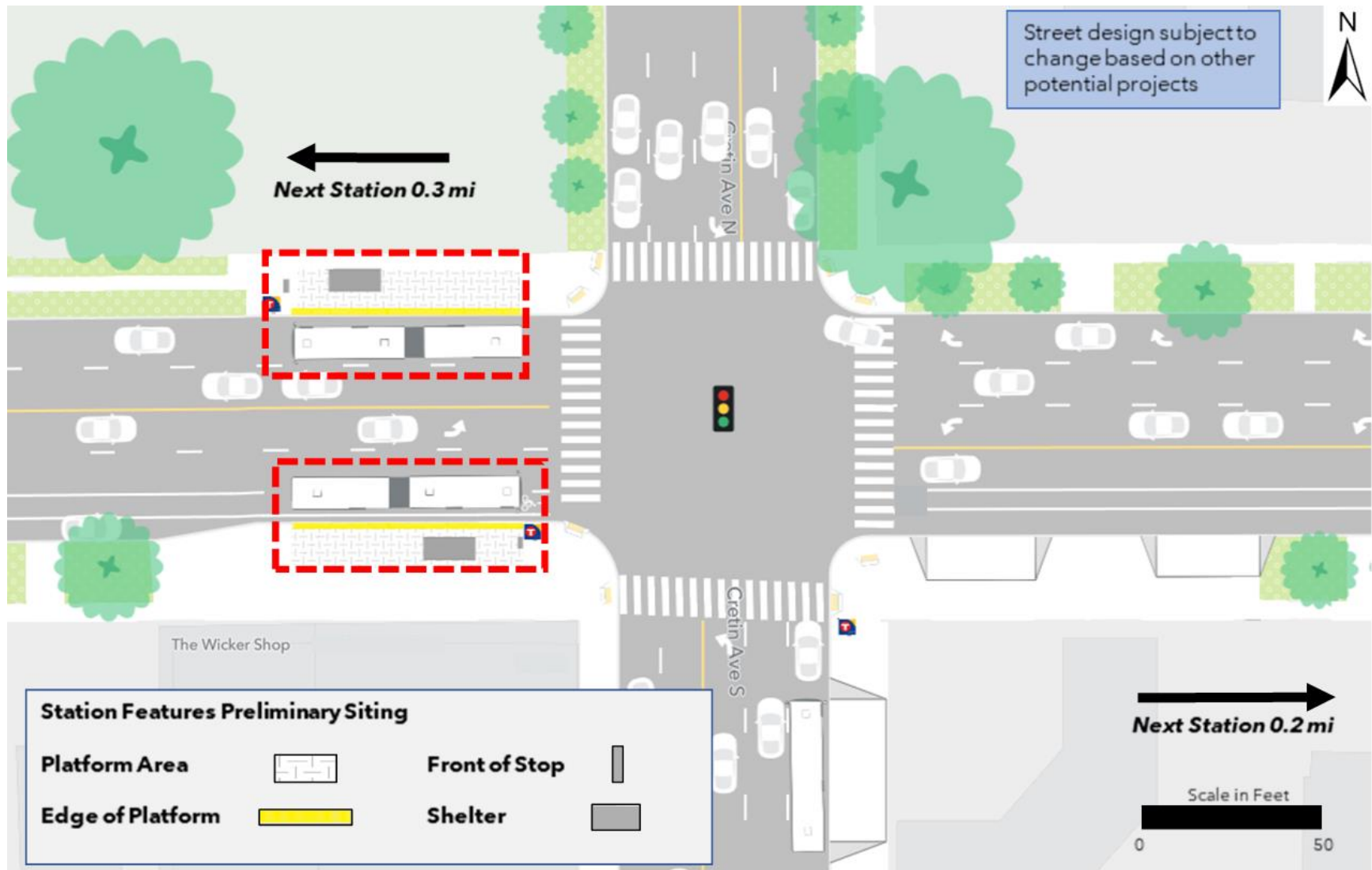
- Mississippi River Boulevard was considered as a station location to better balance spacing between 44th Avenue and Cretin Avenue. Otis Avenue is closer to several multi-family housing areas and has active land uses to the east and west; Mississippi River Boulevard lies adjacent to the river, so its ridership base would be more limited to the east.
- Mississippi River Boulevard is not a signalized intersection and Otis is a signalized intersection. Signalized intersections are preferred for supporting safe pedestrian access to and from the BRT station.

## Marshall & Cretin

### Existing



## Proposed Marshall & Cretin Station Plan





## Notes and Discussion

### *Station spacing*

- The distance to the next station to the east is slightly lower than guidelines due to the need to facilitate connections with key north-south transit service (Route 63 on Cretin Avenue and Route 87 on Cleveland Avenue).

### *Project coordination*

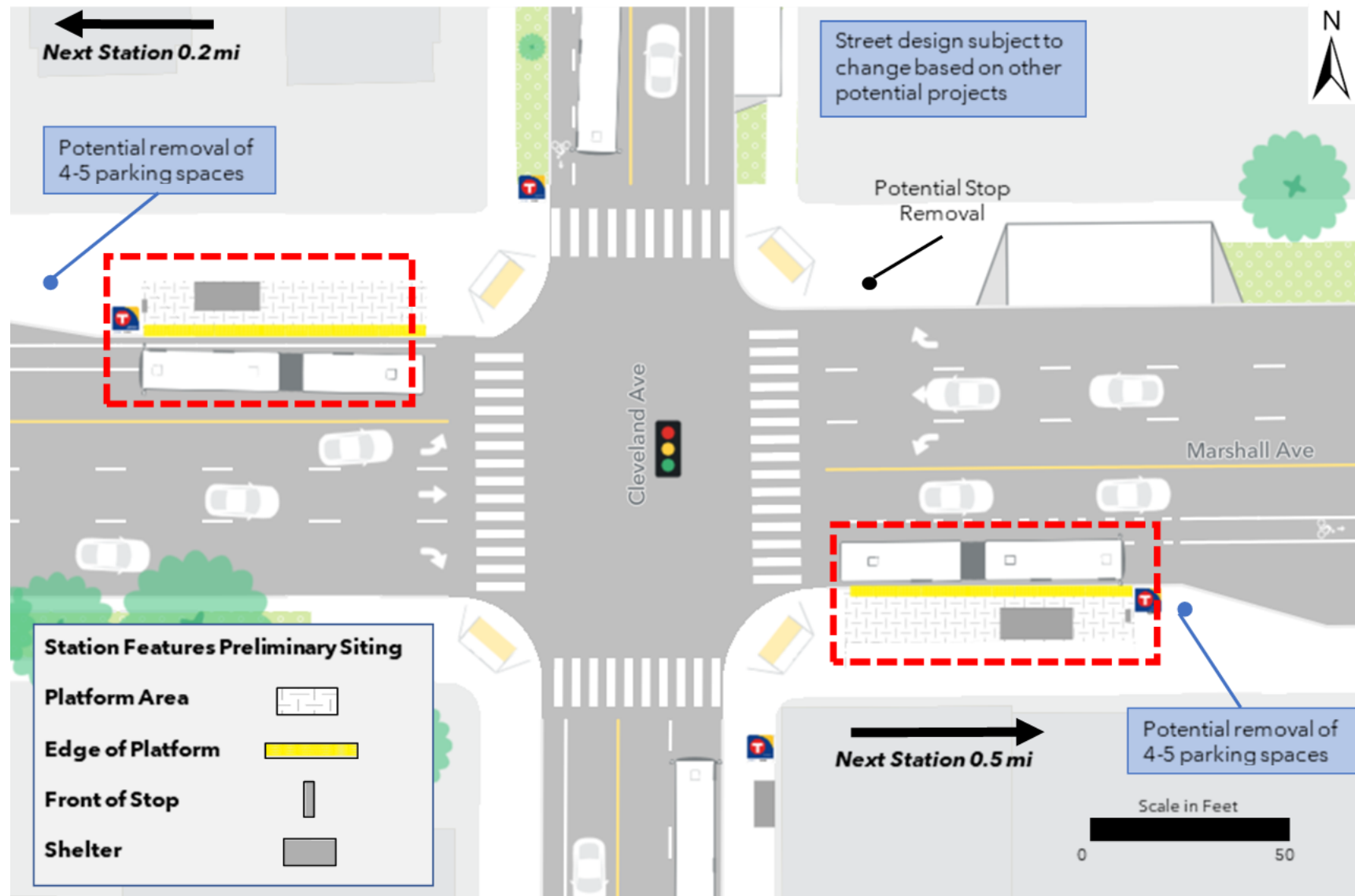
- Future planning and design of this station will consider the existing eastbound bicycle lane at this location, along with potential future changes to the Marshall Avenue roadway section (potential conversion to a 3-lane street with westbound bicycle facilities).

## Marshall & Cleveland

### Existing



## Proposed Marshall & Cleveland Station Plan



## Notes and Discussion

### *Station spacing*

- The distance to the next station to the west is slightly lower than guidelines due to the need to facilitate connections with key north-south transit service (Route 63 on Cretin Avenue and Route 87 on Cleveland Avenue).

### *Bicycle lanes*

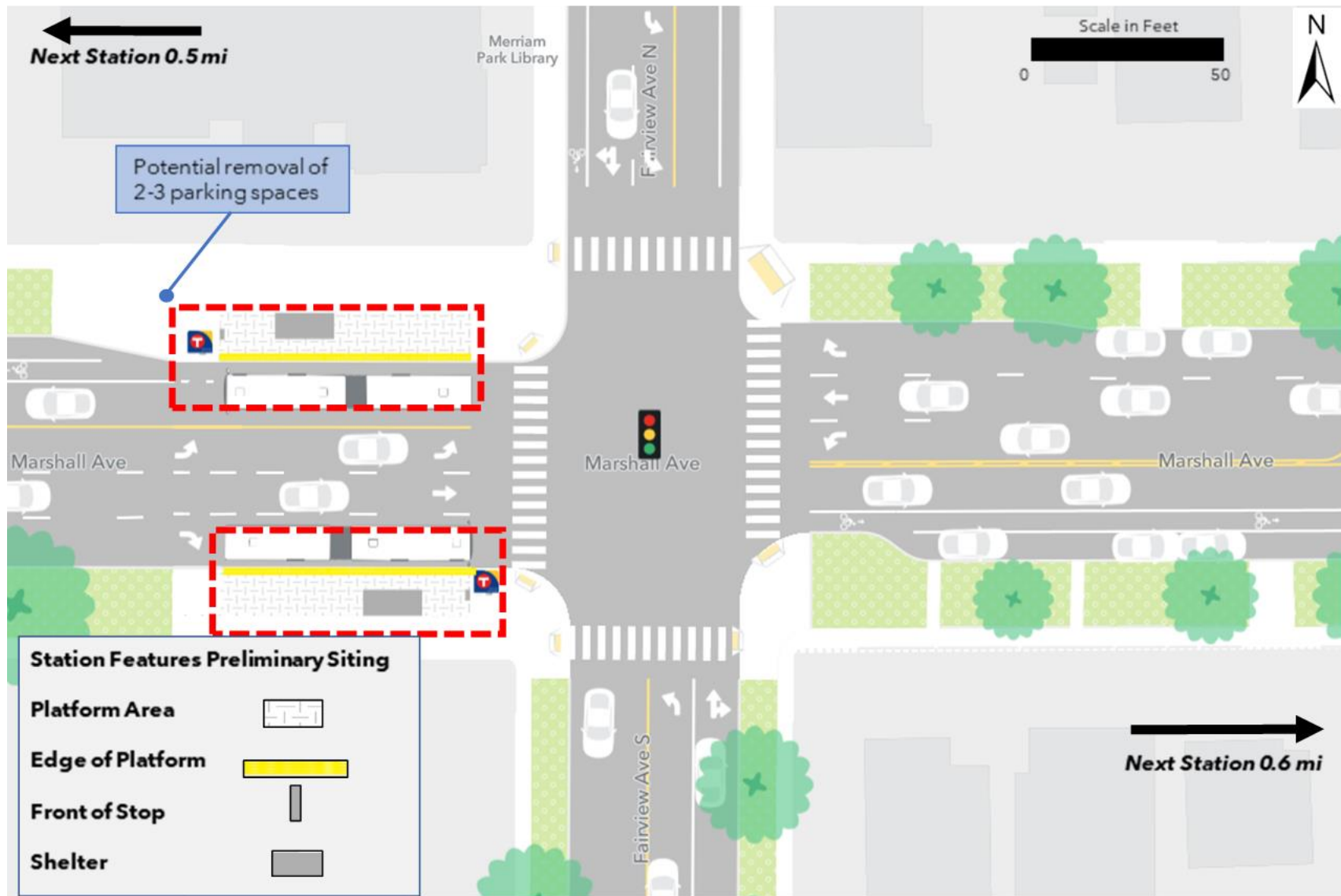
- Future design should consider options for minimizing conflicts between buses and bicycles at this location.

## Marshall & Fairview

### Existing



## Proposed Marshall & Fairview Station Plan





## Notes and Discussion

### *Station spacing*

- The distance to the next station to the east is slightly higher than guidelines due to the shift in the B Line alignment between Marshall and Selby, and because the B Line will use the existing BRT station at Snelling & Dayton.

### *Platform location*

- A nearside platform is recommended in the eastbound direction to support access to neighboring land uses including the Merriam Park Library and Charles Thompson Memorial Hall.

### *Bicycle lanes*

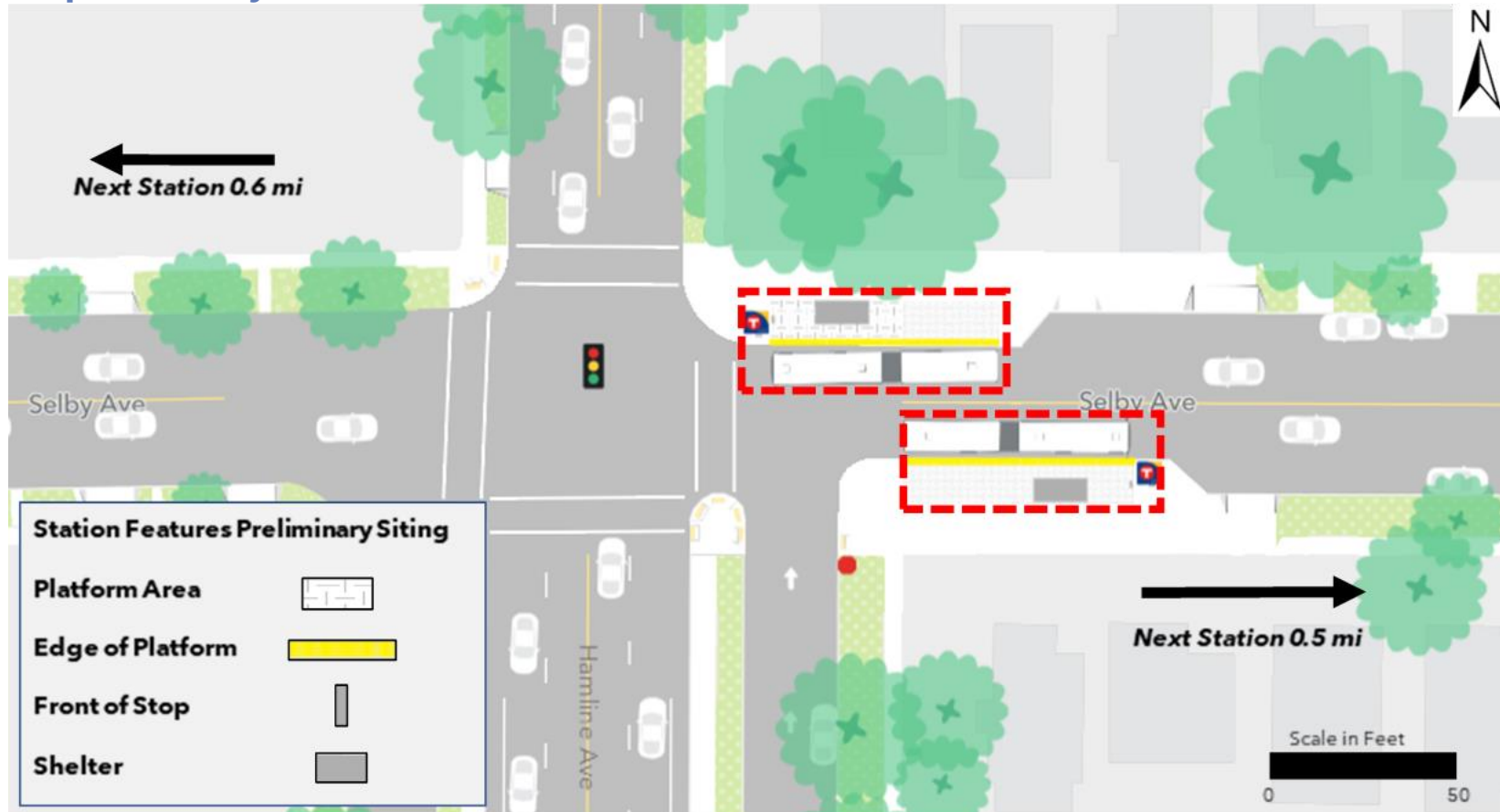
- Future design should consider options for minimizing conflicts between buses and bicycles at this location.

## Selby & Hamline

### Existing



## Proposed Selby & Hamline Station Plan



## Notes and Discussion

### *Station spacing*

- The distance to the next station to the west is slightly higher than guidelines due to the shift in the B Line alignment between Marshall and Selby, and because the B Line will use the existing BRT station at Snelling & Dayton.

### *Platform location*

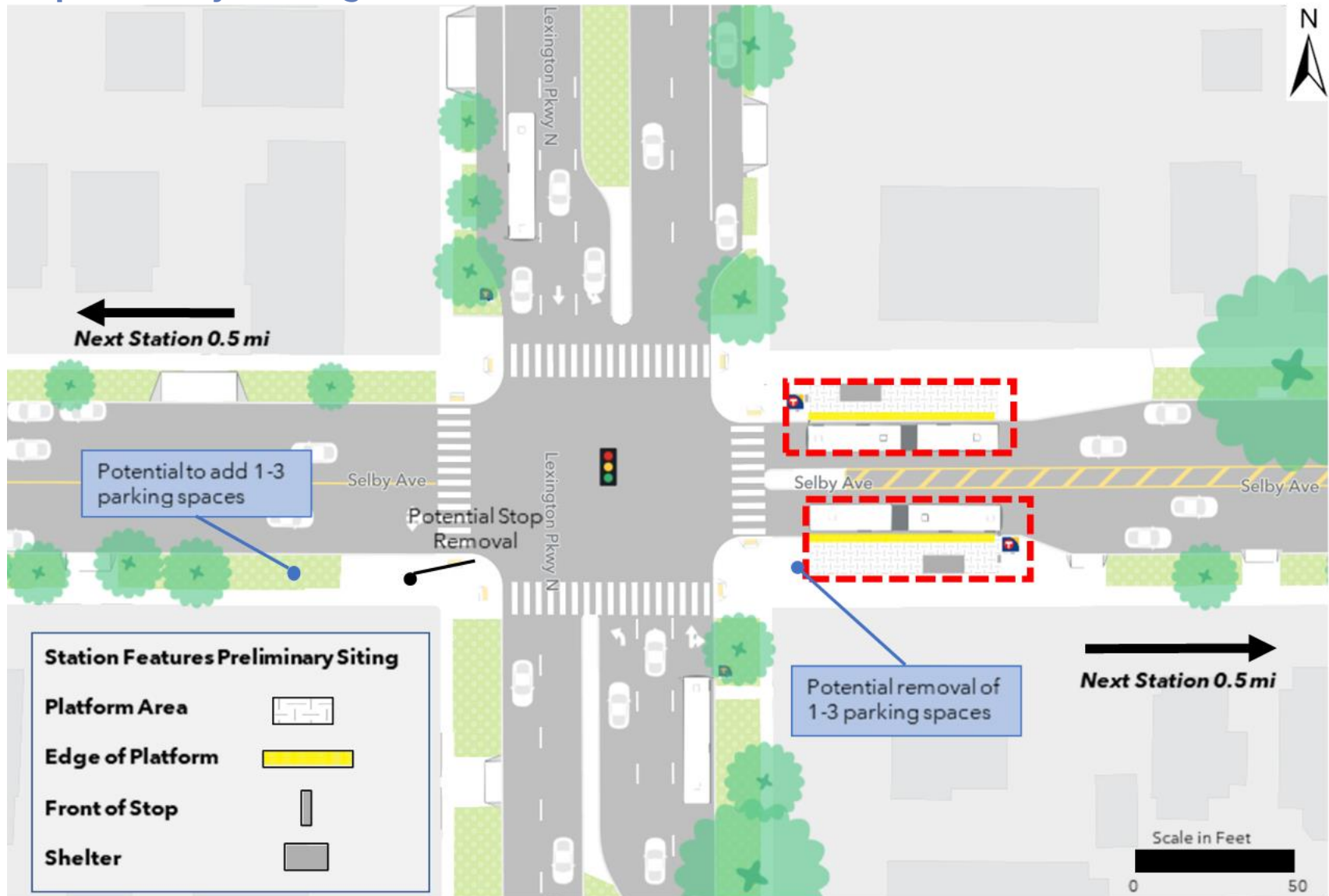
- A nearside platform is recommended in the westbound direction to support access to land uses along the east side of Hamline Avenue, including the main campus of Concordia University. This configuration also avoids conflicts with a parking lot driveway situated in the northwest quadrant of the intersection. A nearside platform in this location also allows for the proposed Route 60 to share this stop with the B Line.

## Selby & Lexington

### Existing



## Proposed Selby & Lexington Station Plan





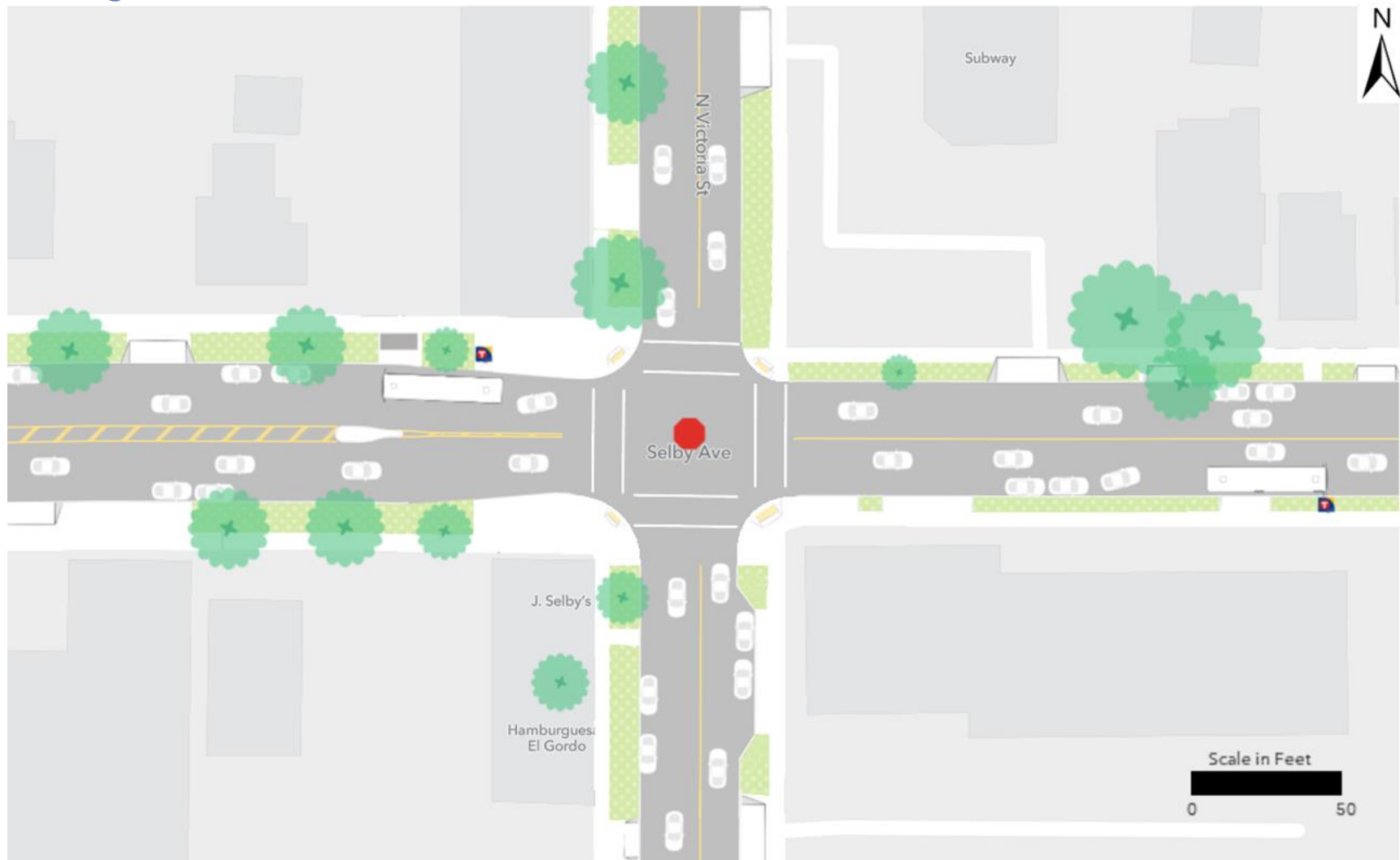
## Notes and Discussion

### *Platform location*

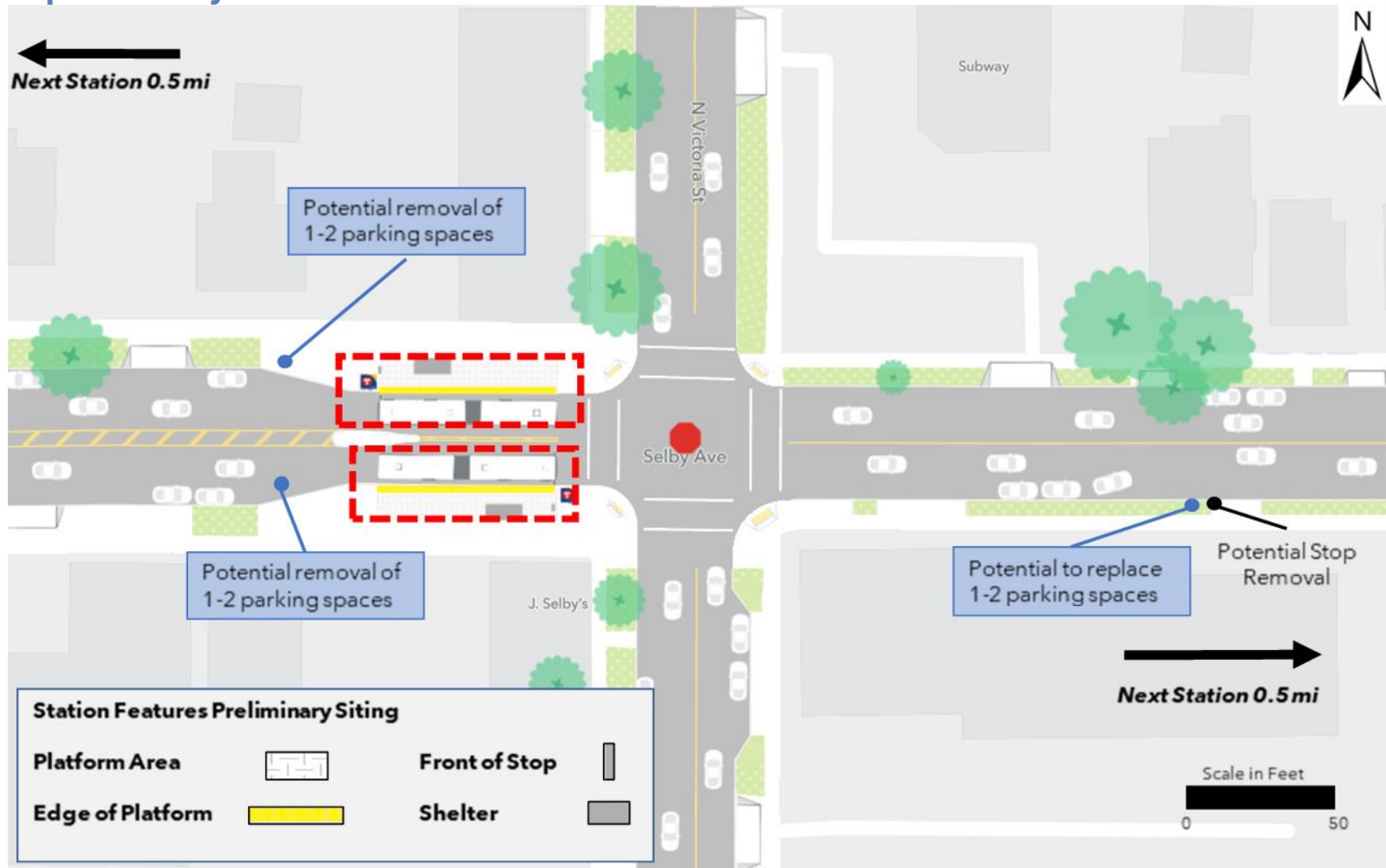
- A nearside platform is recommended in the westbound direction to avoid conflicts with a driveway situated in the northwest quadrant of the intersection.

## Selby & Victoria

### Existing



## Proposed Selby & Victoria Station Plan



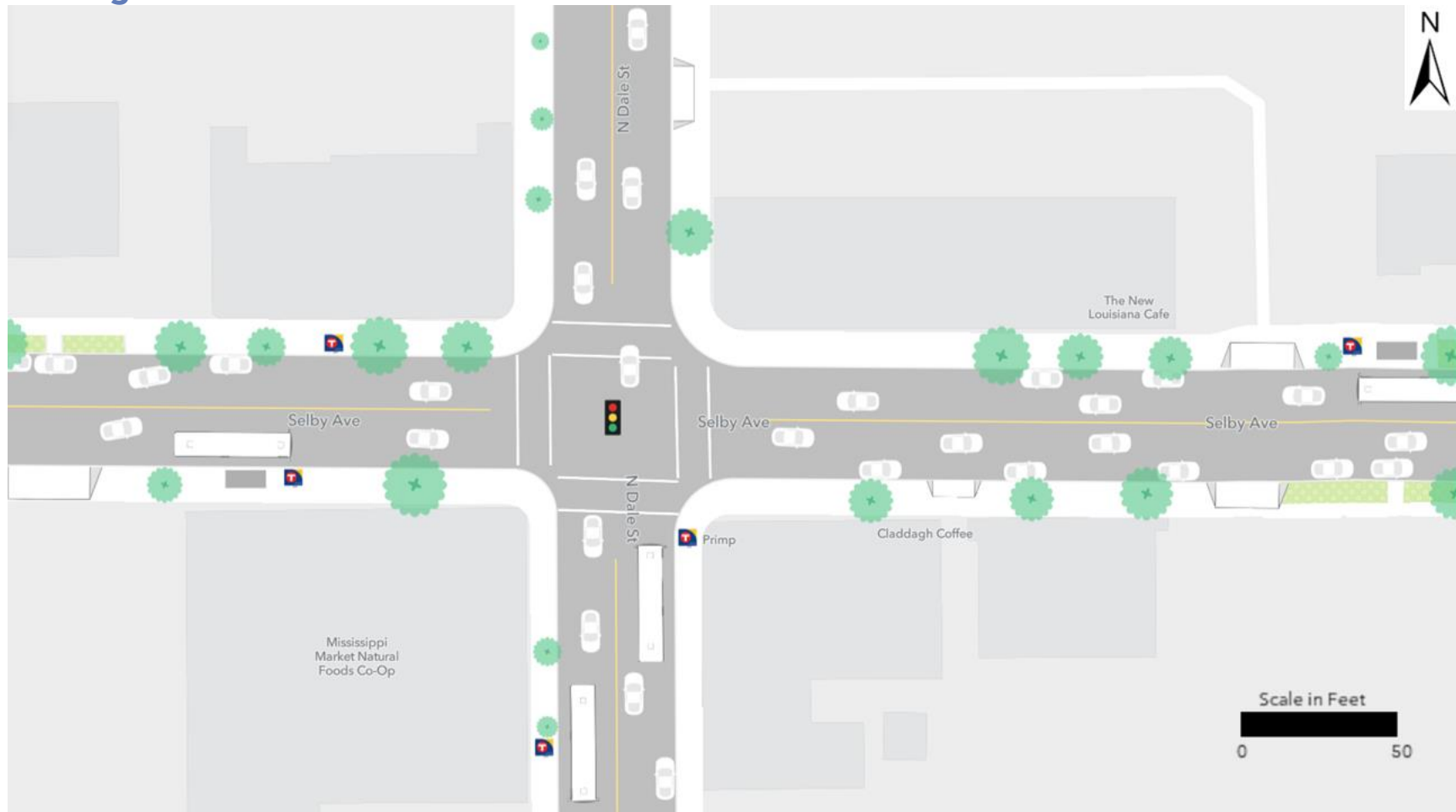
## Notes and Discussion

### *Right-of-Way constraints*

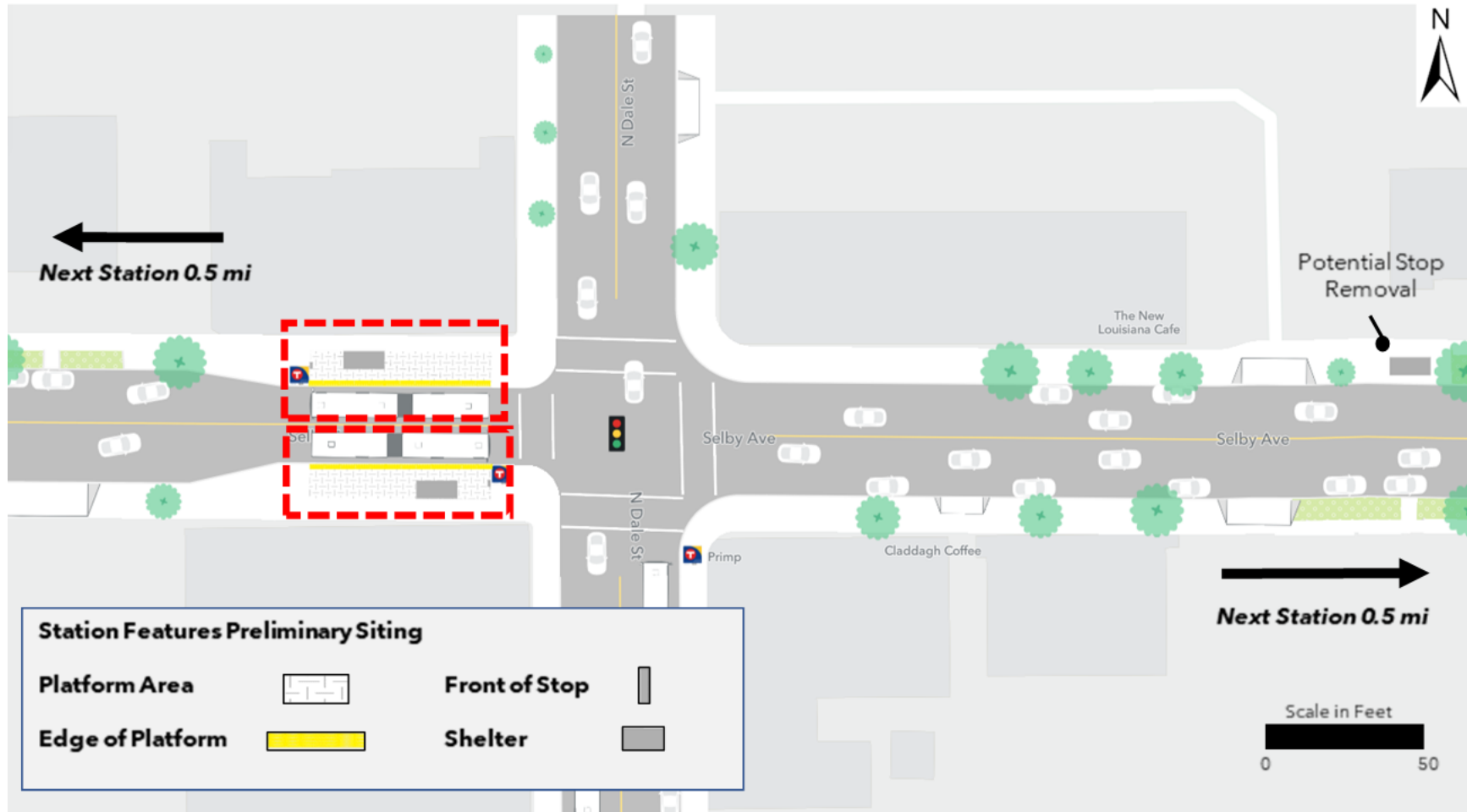
- Modification or removal of a concrete median may be necessary at this location to provide adequate space for bus operations, vehicle turning movements, and two BRT platforms on the west leg of the intersection.

## Selby & Dale

### Existing



## Proposed Selby & Dale Station Plan





## Notes and Discussion

### *Platform location*

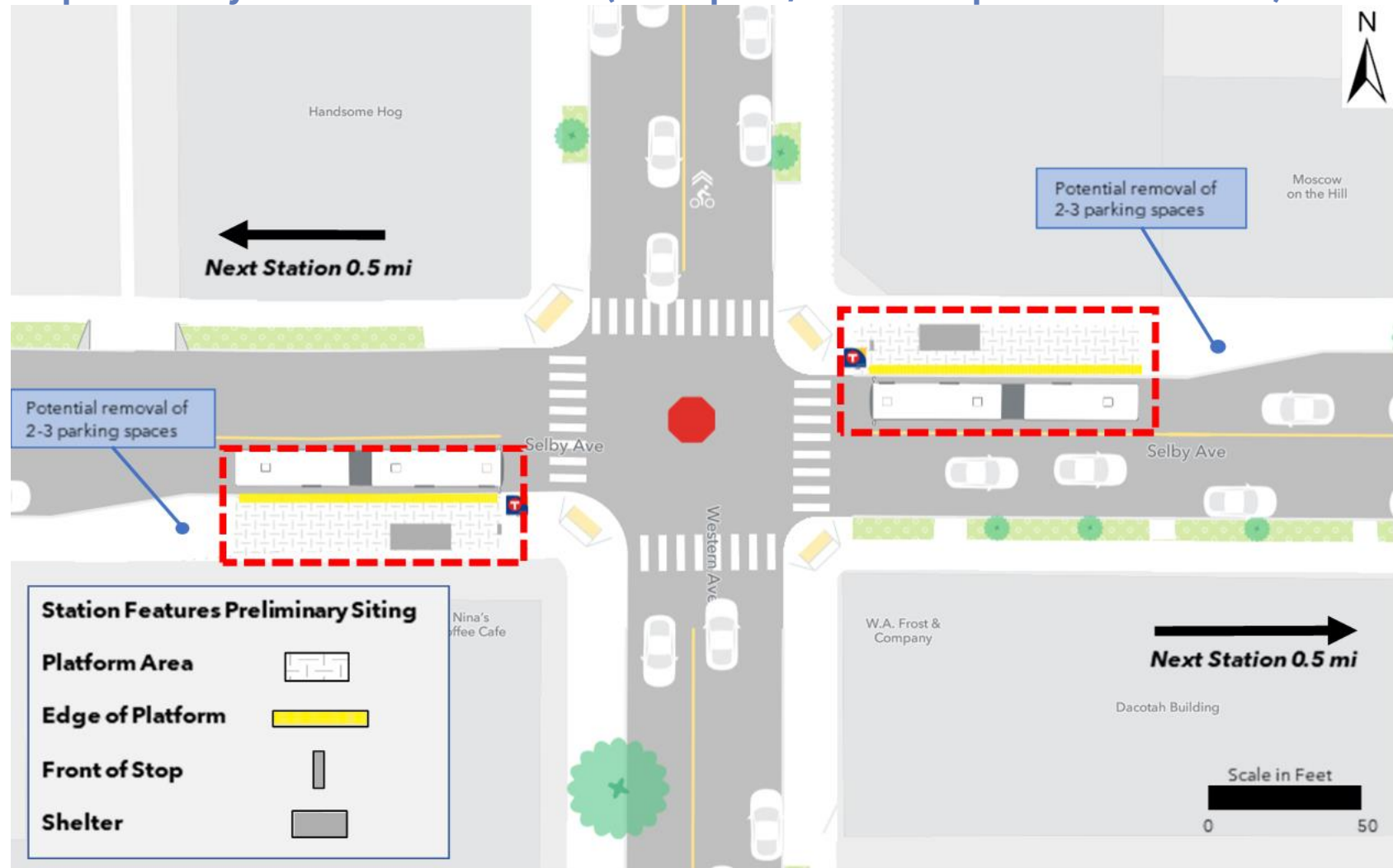
- A nearside platform is recommended in the eastbound direction to avoid conflicts with a driveway situated in the southeast quadrant of the intersection and to support access to the adjacent grocery store.

## Selby & Western

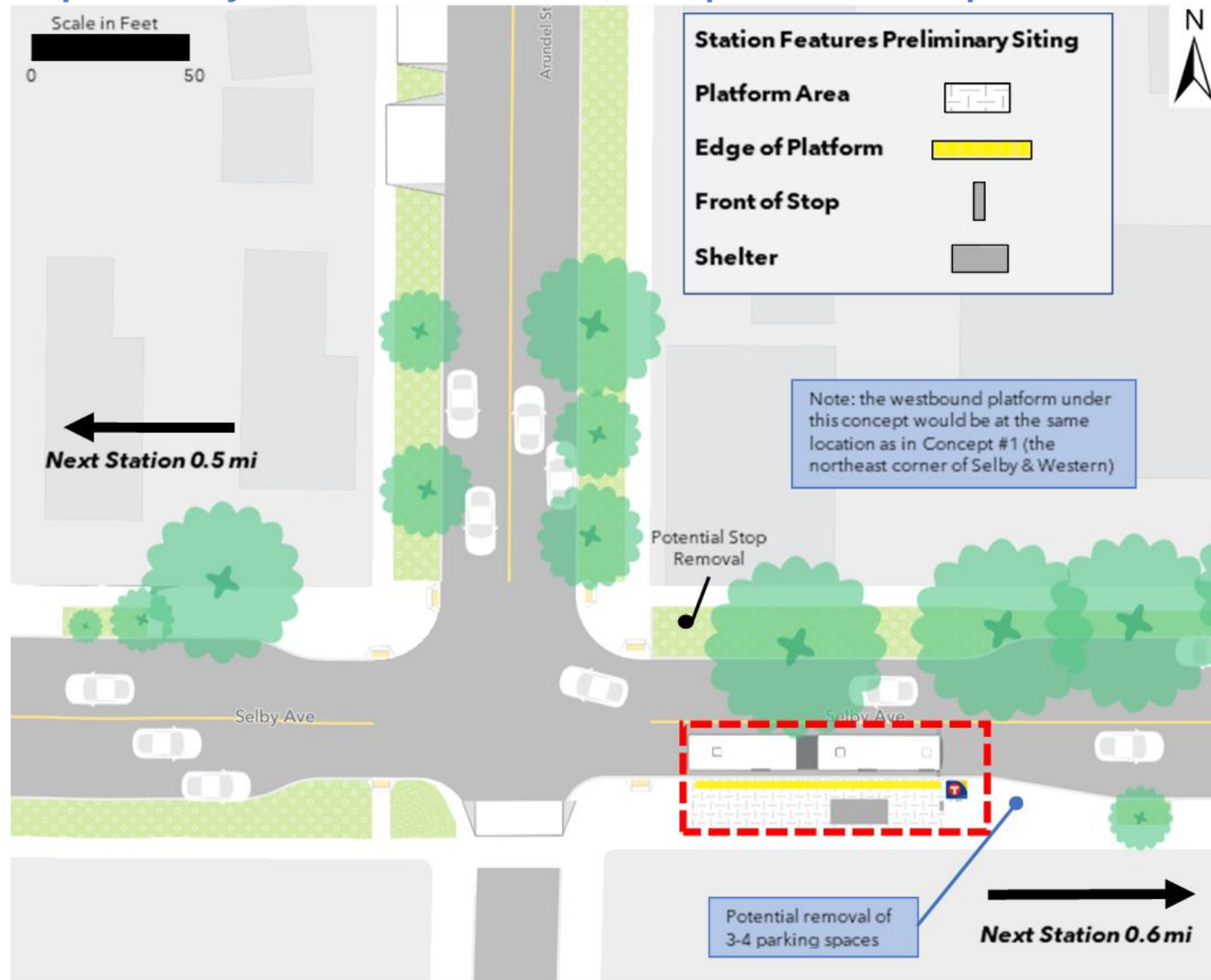
### Existing



## Proposed Selby & Western Station Plan (Concept #1, eastbound platform at Western)



## Proposed Selby & Western Station Plan (Concept #2, eastbound platform at Arundel)



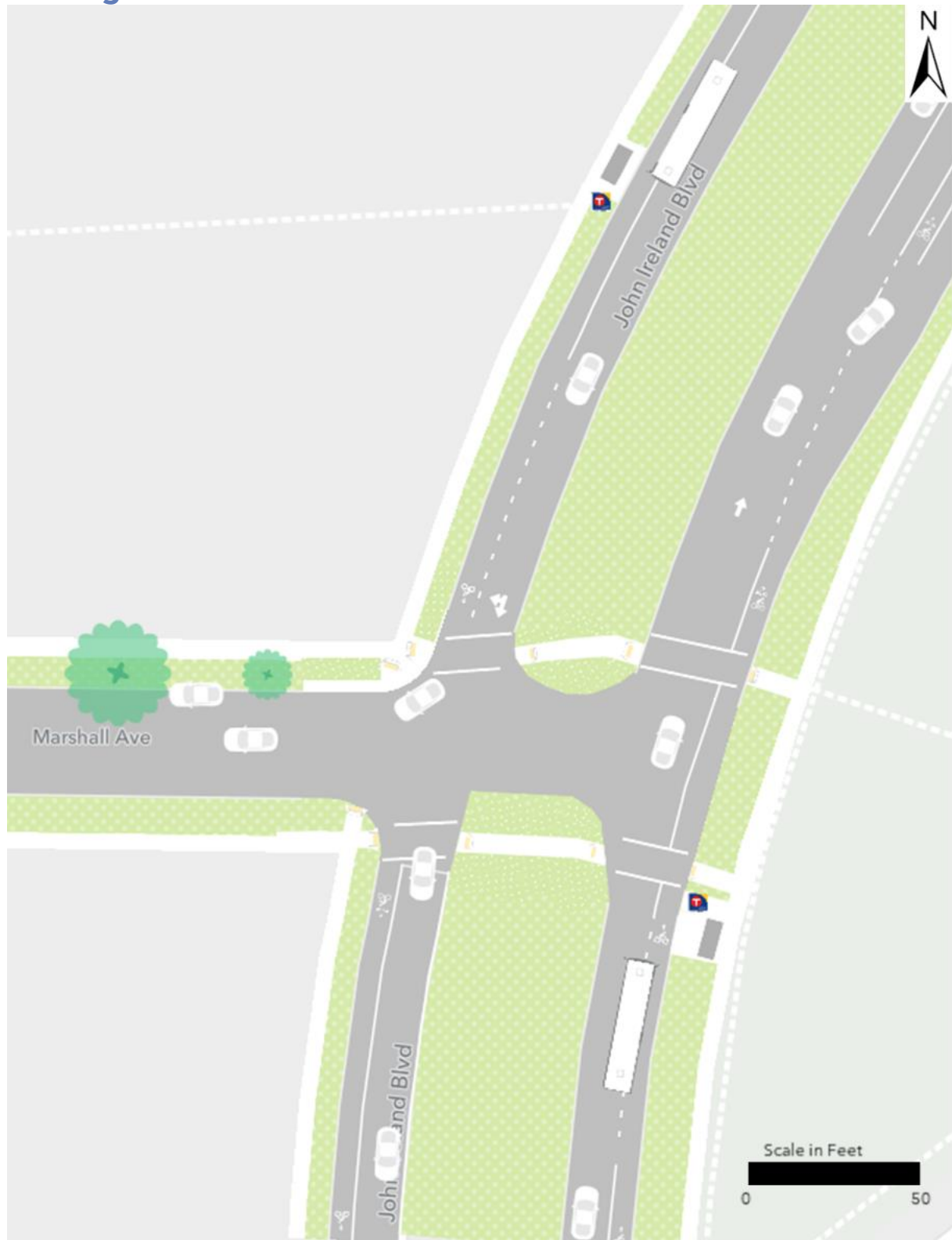
## Notes and Discussion

### *Platform location*

- The Selby Avenue right-of-way is narrower on the western leg of the intersection with Western Avenue than along the rest of Selby Avenue. Because of this, two alternative concepts for an eastbound platform are shown: one located in the southwest quadrant of the intersection of Selby & Western (Concept #1) and one located in the southeast quadrant of the junction of Selby & Arundel Street (Concept #2).
- Only one westbound concept platform location is proposed.
- The relatively narrow right-of-way at Western may require that the eastbound platform under Concept #1 be designed with a combined boarding and through zone.
- Concept #2 may provide more space for pedestrians and waiting transit customers because the right-of-way is wider at Arundel than at Western.
- Selby & Western is a stop-controlled intersection with a marked crosswalk, which may provide a safer pedestrian crossing of Selby Avenue under Concept #1, because the junction with Arundel Street does not include a stop sign for vehicles on Selby.
- Concept #1 would provide more even stop spacing between stations at Dale and John Ireland & Marshall.
- Concept #1 would provide more direct access to destinations clustered at the intersection of Selby & Western, along with providing better legibility for customers.

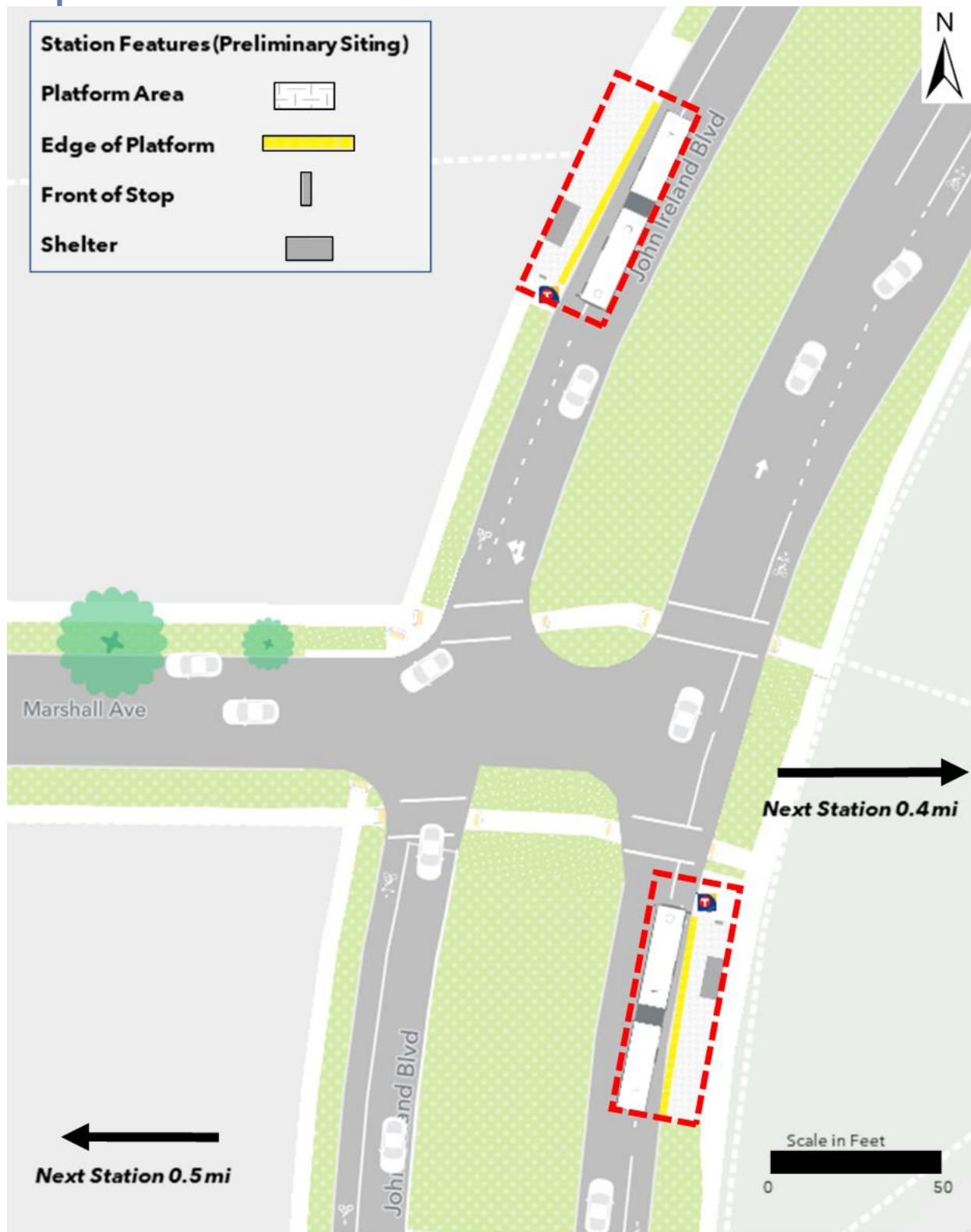
## John Ireland & Marshall

Existing





## Proposed John Ireland & Marshall Station Plan



## Notes and Discussion

### *Land use*

- This station is located within the Minnesota State Capitol Area. Station design will be coordinated with the Capitol Area Architectural and Planning Board.

### *Bicycle lanes*

- Future design should consider options for minimizing conflicts between buses and bicycles at this location.

### *Other station locations considered: John Ireland & Dayton and John Ireland & Kellogg*

- St. Paul College is the key generator of transit ridership in this area. The recommended platform locations are based partially on keeping these stops convenient to St. Paul College.
- This location also provides the most even stop spacing between Western and Smith & Kellogg/5th Street Stations.

## Stations Finalized through Coordination with Other Projects

### METRO Green Line Extension

#### *West Lake Street*

Construction for the METRO Green Line Extension is ongoing. At West Lake Street station, that project will build stairways and elevators providing access between the BRT platforms on the Lake Street bridge to the light rail platform below (see **Figure 30**; the right side of the image shows the structure containing stairs, elevators, and indoor waiting areas at the Lake Street bridge). B Line construction will upgrade Lake Street-level transit facilities at this location to a full BRT station with standard station amenities; however, no standalone B Line shelter will be constructed at this station because both platforms will include a covered waiting area.

*Figure 30: West Lake Street Station on the METRO Green Line Extension*

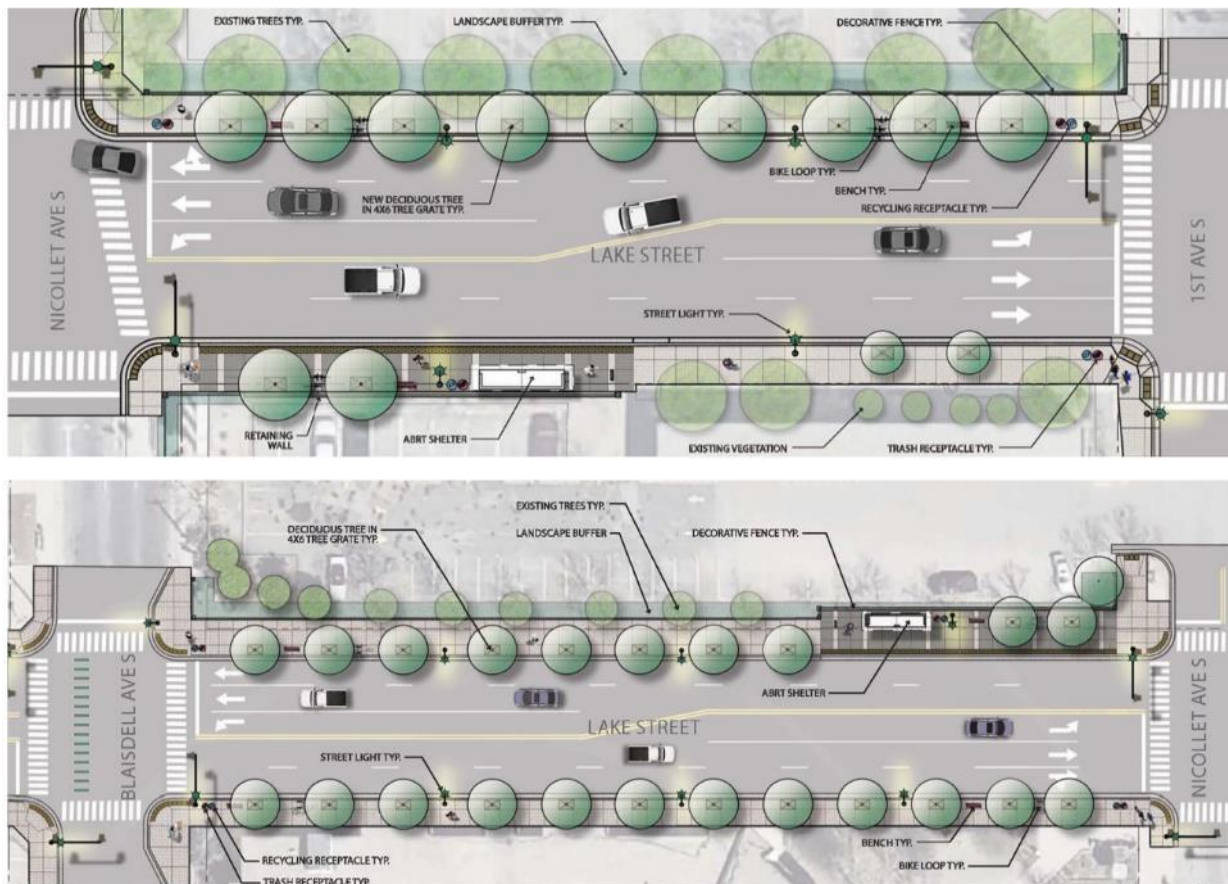


## Lake Street Connections

### Lake & Nicollet

Construction of enhanced transit facilities at Lake & Nicollet is underway as part of the Lake Street Connections project (see **Figure 31**). B Line construction will upgrade transit facilities at this location to be a full BRT station with standard station amenities.

Figure 31: Lake & Nicollet Station



### I-35W & Lake Street Station (METRO Orange Line)

Construction of I-35W & Lake Street Station is underway as part of the METRO Orange Line project. In addition to providing new transit waiting facilities for the METRO Orange Line and other transit routes that use I-35W along with stairs and elevators to access Lake Street, construction of this station also includes enhanced transit facilities on the Lake Street level (see **Figure 32**). B Line construction will upgrade transit facilities at this location to be full BRT stations with standard station amenities.



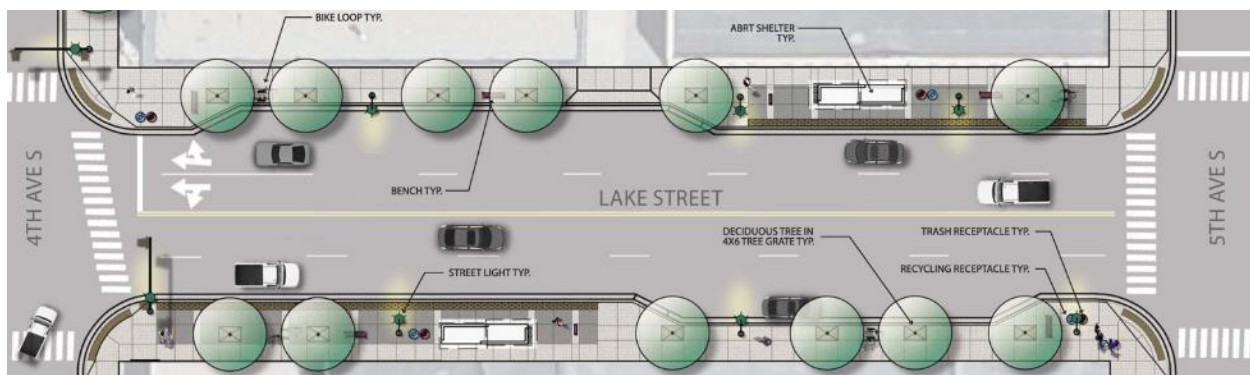
Figure 32: I-35W & Lake Street Station



### Lake & 4th/5th Avenue

Construction of enhanced transit facilities at Lake & 4th/5th Avenue is underway as part of the Lake Street Connections project (see **Figure 33**). B Line construction will upgrade transit facilities at this location to be a full BRT station with standard station amenities.

Figure 33: Lake & 4th/5th Avenue Station



## Hiawatha-Lake Improvements

### Lake St/Midtown Station

In 2017, an enhanced bus stop was constructed in the eastbound direction at this location. B Line construction will add features, including fare collection equipment, to make this a full BRT station. Improvements to the intersection of Hiawatha Avenue and Lake Street are being planned by the City of Minneapolis, Hennepin County, and MnDOT for construction in 2023. Construction of a westbound BRT platform will be coordinated with improvements at this intersection.

## METRO A Line

### Snelling & Dayton

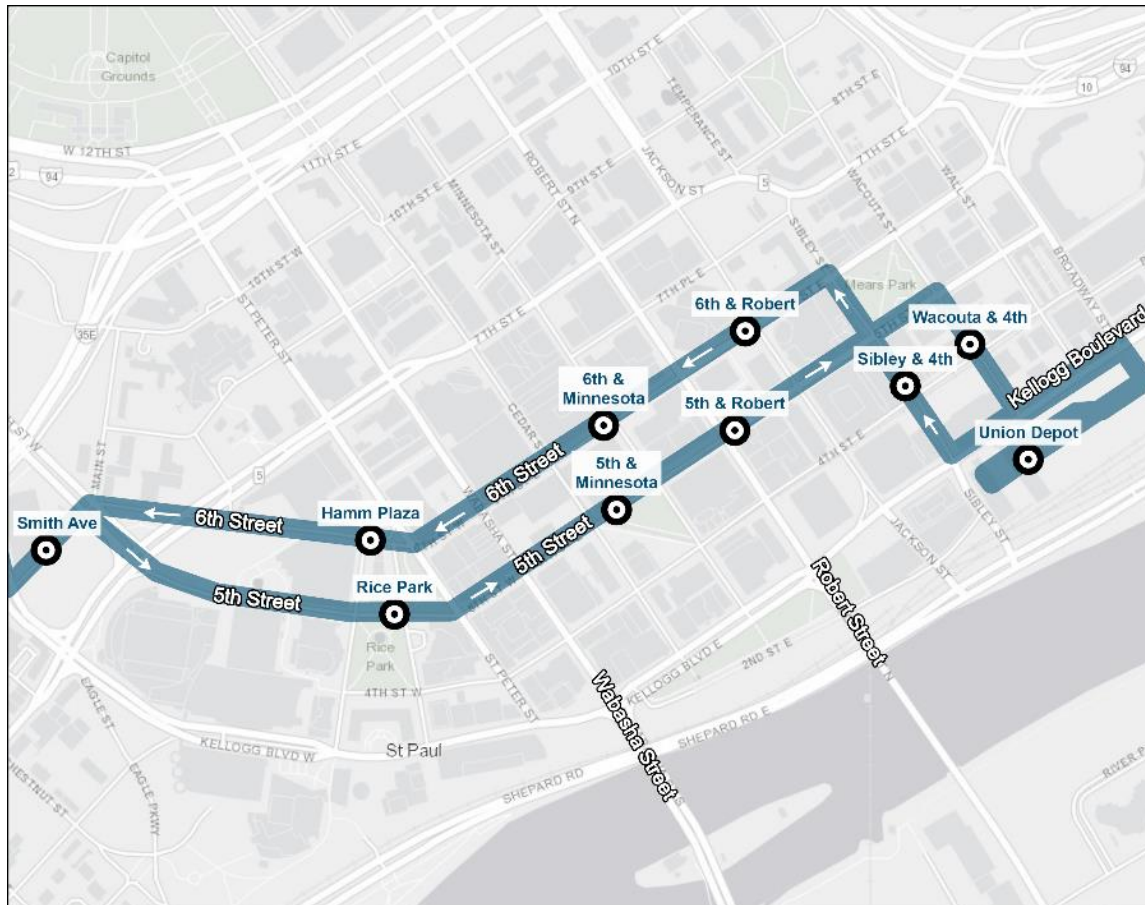
The B Line will share the existing Snelling & Dayton station with the METRO A Line. No changes to the existing platforms are anticipated to be necessary in order to accommodate B Line buses.

## METRO Gold Line

The stations below are part of the METRO Gold Line project (**Figure 34**). Design is currently underway for these stations, which are planned for construction in 2022-2023.<sup>9</sup> These shared stations will serve both the B Line and Gold Line.

- Smith & 5th Street (eastbound)
- 5th Street at Rice Park/6th Street at Hamm Plaza
- 5th Street/6th Street & Minnesota
- 5th Street/6th Street & Robert
- Union Depot & Wacouta/Sibley

Figure 34: Shared B Line stations in downtown St. Paul



<sup>9</sup> For additional detail regarding the development of these stations, see the Gold Line website at: <https://www.metrotransit.org/gold-line-design-and-engineering>

### *Smith & 5th Street (westbound)*

Because the Smith Avenue Transit Center will serve as the western terminus of the Gold Line, the Gold Line project does not include construction of a westbound platform at the Smith Avenue and 5th Street location. The B Line will construct a corresponding westbound platform with full BRT station amenities. This platform is recommended to be located at the existing Route 21 stop on Smith Avenue at Kellogg, where B Line customers will use an existing indoor (heated and lighted) waiting area instead of a standalone shelter.

### *Union Depot*

In addition to the Gold Line stations along Wacouta and Sibley Street, the B Line and the Rush Line BRT projects will both terminate and layover at the back of Union Depot (where existing Route 21 buses end and layover). Design and construction of BRT facilities at this site will be coordinated between the two projects.



## VI. Bus Priority Treatments

### How can the B Line move people faster?

Providing faster and more reliable transit service is a key goal for the B Line project. Under existing conditions, Route 21 buses regularly slow to an average speed of 8 miles per hour during rush hour. Frequent stops, lines of customers waiting to board, and red lights mean that buses are moving less than half the time.

The B Line is intended to operate about 20 percent faster than the existing Route 21. Achieving this goal and improving transit operations will be made more challenging if auto traffic grows in the future. Future traffic forecasts suggest that anticipated growth in auto traffic, along with planned street changes along the corridor, would result in increased delays and slower speeds for buses in the future compared to today. By 2040, if no changes were made to speed up buses in the B Line corridor, rush hour transit would be 18% slower than in 2019.

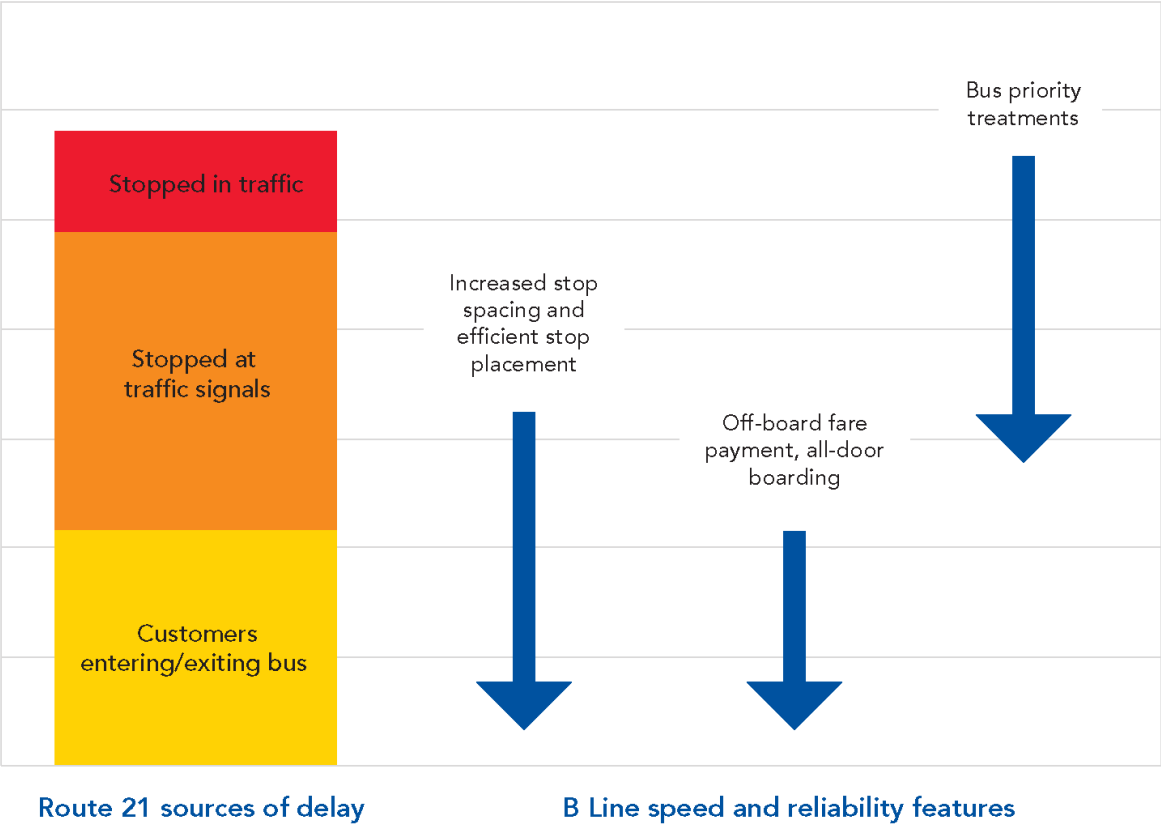
### Base Planned Improvements

As described earlier in this plan, Metro Transit is planning a core set of improvements as part of the B Line to speed up buses. These include increasing stop spacing, placing stops at the farside of an intersection where feasible, and allowing buses to stay within the travel lane. These changes reduce the number of stops that buses make and the amount of time that buses spend merging into and out of travel lanes. Other standard arterial BRT features, such as off-board fare payment and all-door boarding, reduce the amount of time that buses are stopped while customers enter and exit the vehicle.

Across the AM and PM rush hours, preliminary analysis estimates that building all of these “base arterial BRT improvements” would improve future end-to-end transit travel times by approximately 7 percent compared to existing (2019) travel times.

These results indicate that further improvements are necessary to reach the goal of improving travel times by about 20 percent. Therefore, in addition to the standard set of arterial BRT improvements, Metro Transit wishes to work with its partners to implement a series of bus priority treatments in order to make the B Line successful in improving speed and reliability (see **Figure 35**).

Figure 35: Existing sources of delay and potential B Line speed and reliability features



## Types of Bus Priority Treatments

Bus priority treatments include modifications to the timing of traffic signals and changes to roadway sections to provide buses with priority as they move along the corridor. While there are many ways in which bus priority treatments can be applied, they are generally intended to reduce the amount of time that buses spend stopped at traffic signals or slowed by general traffic congestion. This can include changing the timing of traffic signals to provide more time with a green light for all vehicles using a street or it can include a change traffic signal timing that is only activated when a bus is present. Similarly, street space can be modified to include changes for all vehicles (i.e. identifying a new turn lane to be used by buses and auto traffic) or changes specific to buses (i.e. a bus-only lane). Bus-only lanes implemented on Hennepin Avenue (see **Figure 36**) have been proven to improve bus speeds and reduce variability.

*Figure 36: Bus-only lane on Hennepin Avenue in Minneapolis*



An overview of selected bus priority treatments is available here:  
<http://www.metrotransit.org/Data/Sites/1/media/b-line/bus-priority.pdf>.

## Potential Concepts for Bus Priority for the B Line

Bus priority treatments can be implemented in different ways at different locations. Across an entire corridor, one can think of the application of bus priority treatments as existing on a spectrum. On the lower end of the spectrum, minimal changes to existing traffic signals and roadway sections would result in limited improvements for transit travel times while more extensive changes would provide greater improvements.

To better understand how different packages of bus priority treatments could be implemented across the entire B Line corridor, Metro Transit developed two bus priority concepts based on data inputs including average bus speeds, transit ridership, traffic conditions, and public input. These scenarios are summarized below and in **Figure 37**.

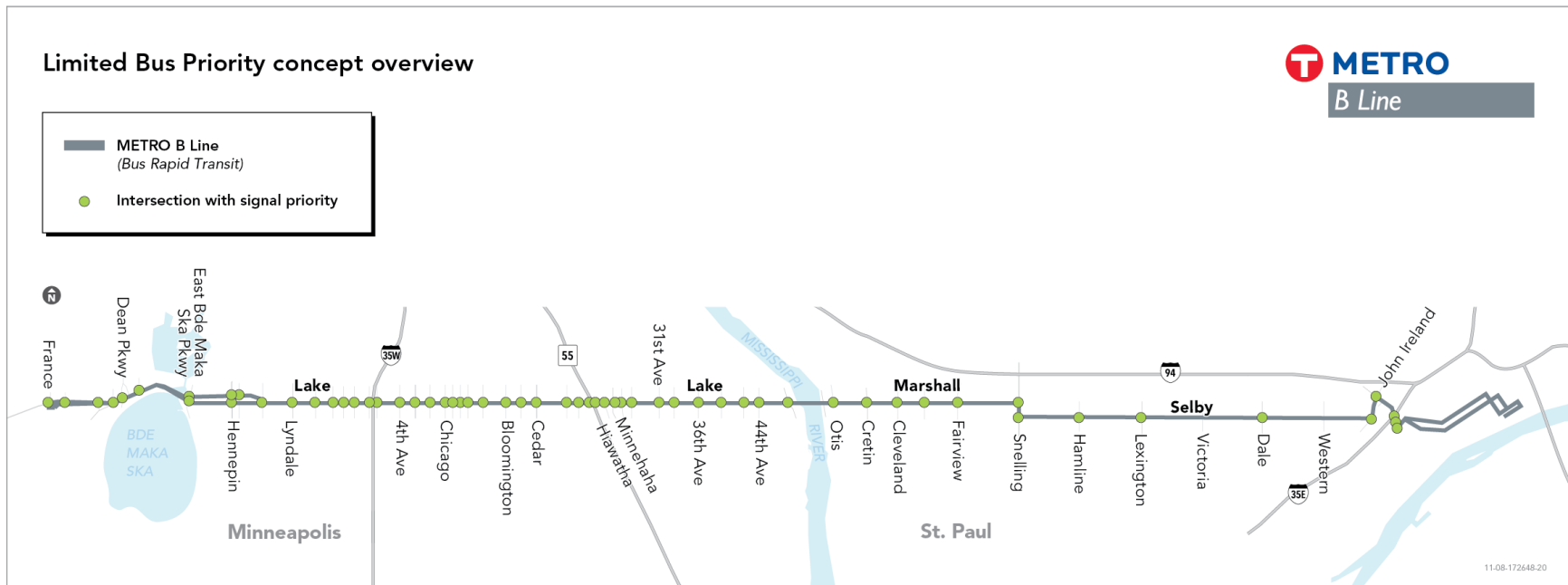
*Figure 37: Bus priority treatment spectrum*



## Limited Bus Priority

The Limited Bus Priority concept focuses on improvements to traffic signals, including the use of transit signal priority and other signal phasing/timing improvements to benefit buses along the corridor and reduce the amount of time that buses are spent stopped at red lights. The Limited Bus Priority concept does not assume any changes to street space along the corridor. Intersections where signal priority was assumed as part of the Limited Bus Priority concept are identified in **Figure 38**.

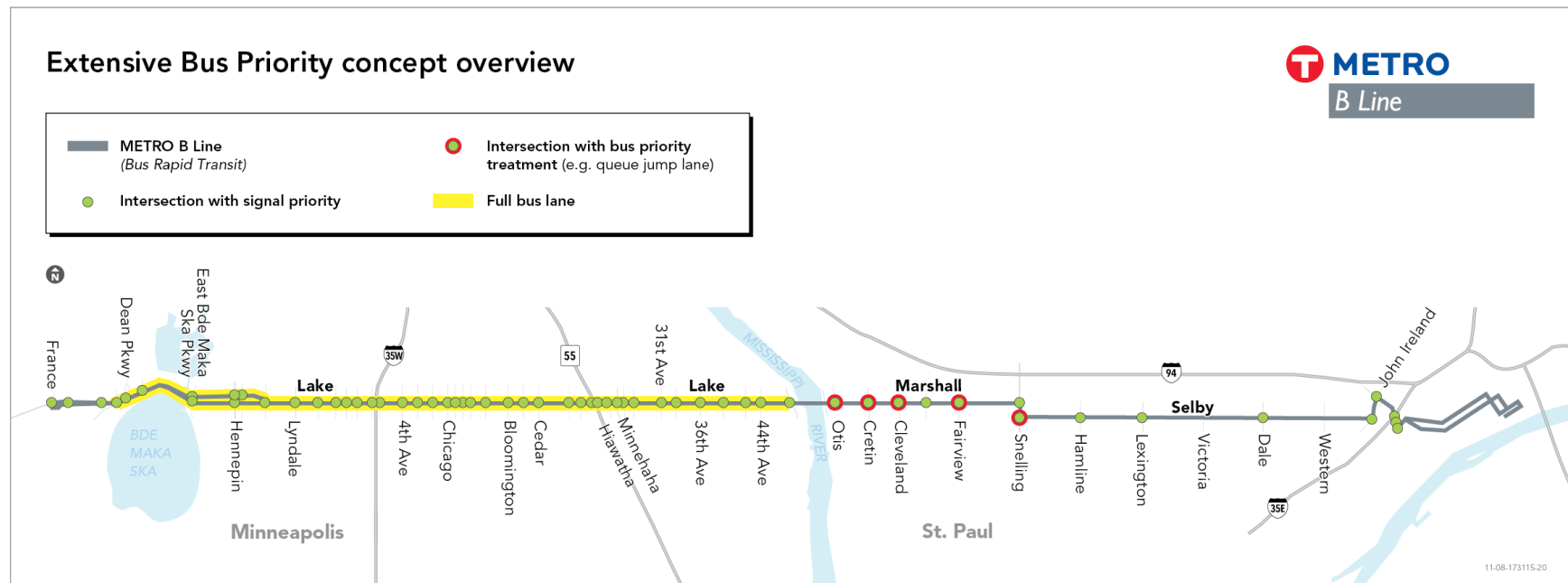
Figure 38: Limited Bus Priority concept overview



## Extensive Bus Priority

The Extensive Bus Priority concept retains many of the same signal modifications included in the Limited concept but adds roadway changes in a number of locations across the corridor. This includes designation of full bus lanes along Lake Street between Excelsior Boulevard and the Mississippi River. These lanes would convert the existing outside general-purpose travel lane to a bus lane in both the eastbound and westbound directions. Autos would continue to use these lanes to access parking or driveways, or when making right turns. The Extensive Bus Priority concept would also include bus-specific intersection treatments (e.g. queue jump lanes) at five locations. Locations where bus priority treatments were assumed as part of the Extensive Bus Priority concept are identified in **Figure 39**.

Figure 39: Extensive Bus Priority concept overview



## **Future Bus Priority Treatment Analysis**

Future analysis will focus on developing strategic bus priority treatments for the B Line corridor that will help achieve project goals while balancing effects on other street users. Recommendations for B Line bus priority treatments will continue to be refined and finalized as the project moves through planning and engineering. Because Metro Transit does not own or operate streets, any changes would need to be made in partnership with the corridor cities and counties.



# Appendix: Other Station Locations Considered

Appendix A compiles information about other station locations considered and discussed within the individual station plans, but not included in the corridor plan document.

## Lake and Dupont

The 2012 Arterial Transitway Corridor Study (ATCS) and the 2014 Midtown Corridor Alternatives Analysis included a conceptual Lake & Dupont station. This corridor plan does not include a B Line station at Lake and Dupont.

### *Station spacing*

- The B Line draft corridor plan does not include a Lake & Dupont station. Proximity to the Lake & Hennepin and Lake & Lyndale areas (approximately 1/4 mile) limit the feasibility of building an additional station within this area.
- Transit customers in this area will access the B Line at the Lake & Hennepin station or Lake & Lyndale station. Route 21 will continue to provide local service at this stop.

## Lake and Grand

### *Station spacing and ridership*

- A Lake & Grand station is not included due to relatively lower transit demand at this location along with proximity to the Lake & Lyndale and Lake & Nicollet areas (approximately 1/4 mile) which limits the feasibility of building an additional station within this area.
- Transit customers in this area will access the B Line at the Lake & Lyndale station or Lake & Nicollet station. Route 21 will continue to provide local service at this stop.

## Lake and Portland

The 2012 Arterial Transitway Corridor Study (ATCS) and the 2014 Midtown Corridor Alternatives Analysis included a conceptual Lake & Portland station. This corridor plan does not include a B Line station at Lake and Portland.

### *Station spacing and other transit service*

- The B Line draft corridor plan does not include a Lake & Portland station because of the construction of enhanced transit facilities in the 4th/5th Avenue area as part of the Lake Street Connections project. The proximity from this area to the Lake & 4th/5th Avenue station (less than two short blocks) limits the feasibility of building a second station within this area.
- The Lake & 4th/5th Avenue station will provide more convenient access between the B Line and Route 11, which operates along 4th Avenue.
- Transit customers in this area will access the B Line at the Lake & 4th/5th Avenue station. Route 21 will continue to provide local service at this stop.

## Lake and 12th Avenue

### *Station spacing and ridership*

- A station in the 12th Avenue area is not included due to the proximity to the Lake & Chicago and Lake & Bloomington areas (approximately 1/4 mile) which limits the feasibility of building an additional station within this area. Ridership at the 10th, 12th, and 14th Avenue stops is lower than at existing stops at Chicago and Bloomington.
- Transit customers in this area will access the B Line at the Lake & Chicago station or Lake & Bloomington station. Route 21 will continue to provide local service at this stop.

## Marshall and Prior

A station in the Marshall and Prior area was considered based on consistency of station spacing in the segment of Marshall Avenue to the west of this area (recommended stations at Otis, Cretin, and Cleveland).

### *Station spacing and ridership*

- A Marshall & Prior station is not included due to relatively lower transit demand at this location along with proximity to the Marshall & Cleveland and Marshall & Fairview areas (approximately 1/4 mile) which limits the feasibility of building an additional station within this area.
- Transit customers in this area will access the B Line at the Marshall & Cleveland station or Marshall & Fairview station.

## Marshall and Fry

The 2012 Arterial Transitway Corridor Study (ATCS) included a conceptual Marshall & Fry station. This corridor plan does not include a B Line station at Marshall and Fry.

### *Termini and alignment*

- A conceptual station at this location was proposed prior to the recommendation to extend the B Line to downtown St. Paul along Snelling and Selby Avenues. Based on these recommendations, it is recommended that the B Line stop at the existing A Line station at Snelling and Dayton.