



A-2. Appendix Chapter 2: Alternatives Development Process

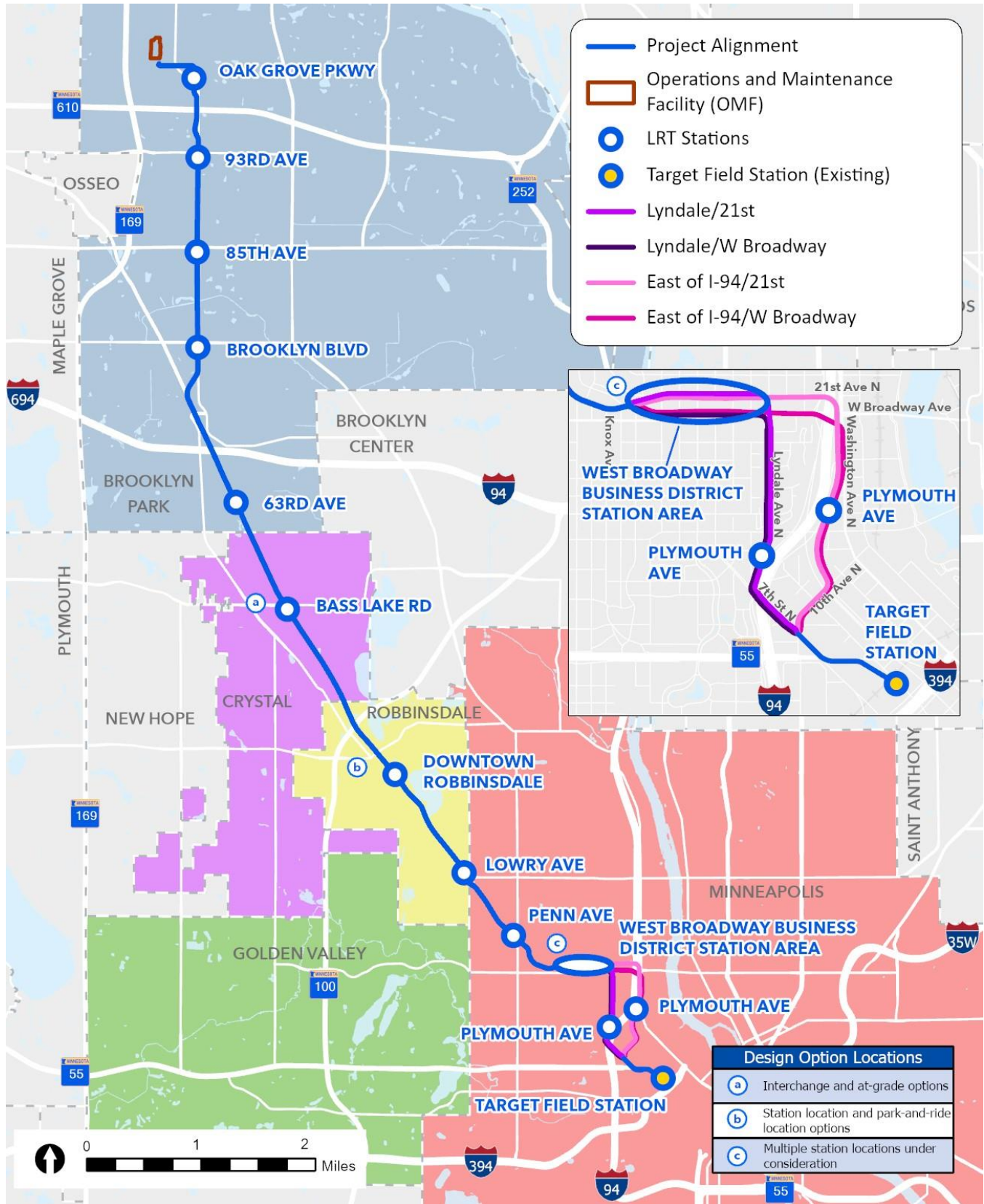
Appendix A-2 supplements Chapter 2 and presents in greater detail the Project alignment and design option locations that were considered during the development of the Supplemental Draft EIS and discusses the process through which the alignment and design option locations were developed. As noted in Chapter 1 of the Supplemental Draft EIS, the Project completed the environmental review process by publishing a Final EIS and ROD for the 2016 Alignment. Since that time, alternative alignments were identified to avoid using freight rail right-of-way. Chapter 2 of the Supplemental Draft EIS presents a Build Alternative along with a No-Build Alternative for baseline comparison purposes to understand the impacts and benefits of the Project. This appendix summarizes the process undertaken to identify and evaluate alignment and design option locations, provides a focused discussion of the alignment and design option locations not carried forward, and how the Build Alternative emerged from that process.

The Build Alternative, as noted above, is the focus of Chapter 2. Details regarding the Build Alternative are presented in Section 2.4.2 and summarized in Table 2-3 of Chapter 2. The alignment and design option locations that were evaluated prior to identifying the Build Alternative are shown in Figure A2-1.

- The design options that would have affected Project alignment are referred to as “alignment options” and only occurred in the City of Minneapolis. Multiple alignment options were considered in the City of Minneapolis due to the Project Alignment transitioning into a denser urban context and complexities associated with routing on constrained urban streets.
- The design options that would have affected discrete Project elements are referred to as “design options” and generally refer to station and/or park-and-ride options (labeled a, b, and c in Figure A2-1). The City of Crystal design option location refers to the evaluation of an at-grade intersection versus a grade-separated interchange.



Figure A2-1 Project Alignment and Design Options in the City of Minneapolis





2.1 Route Modification Process (2020-2022) and Design Decision Process (2023)

As discussed in Section 2.2 of Chapter 2 of the Supplemental Draft EIS, the Council and Hennepin County embarked on a Route Modification process starting in 2020. Using a series of principles that included using as much of the 2016 Alignment as possible and maintaining the Project endpoints, the Council and Hennepin County sought public, stakeholder, and partner agency input in developing modified alignments for consideration. In April 2022, the Council published a Route Modification Report recommending an alignment largely similar to the 2016 Alignment from the OMF in the City of Brooklyn Park to about the intersection of W Broadway Ave and Knox Ave in City of Minneapolis. East of Knox Ave, the Route Modification Report recommendation included both 21st Ave and W Broadway Ave as options for evaluation. The alignment then followed Lyndale Ave south to 7th Ave, then on into Downtown Minneapolis to connect to Target Field Station. Following publication of the Route Modification Report, community concern about an alignment on Lyndale Ave resulted in the addition of alignment options east of I-94 to be evaluated as well.

In early 2023, multiple options were under consideration along the Project Alignment following the Route Modification process. The intent of this process was to continue refinement of the alignment from the recommendations in the Route Modification Process and narrow multiple options to one preferred alignment option in many areas of the Project Alignment. Table A2-1 provides an overview of the alignment and design option locations decisions (the process of determining which alignment and design option locations to carry forward or modify) and how they are addressed within this Supplemental Draft EIS. Figure A2-1 shows where the alignment and design option locations were considered within the Project area. Throughout 2023, the alignment and design option locations were shared during extensive stakeholder and public engagement, culminating in formal alignment and design option locations decisions preferred by local municipalities in parallel with the development of the Supplemental Draft EIS. Chapter 11 of the Supplemental Draft EIS includes a description of the Preferred Alternative that resulted from the resolution of these alignment and design option locations decisions.

Table A2-1 Alignment and Design Option Decisions by Location (2023)

Location (Project City)	Design Decision under Consideration
Brooklyn Park	Consolidated definition of project roadway scope
Crystal	CR 81/Bass Lake Rd intersection design: at-grade or grade separated
Crystal	CR 81 lane configuration
Robbinsdale	Downtown Robbinsdale Station location
Robbinsdale	Robbinsdale park-and-ride location
Robbinsdale	Lowry Station – elevated or at-grade
Minneapolis	Track routing on E Lyndale Ave N/TH 55 or N 7th St
Minneapolis	Track routing on Lyndale Ave N or east side of I-94
Minneapolis	Track routing on W Broadway Ave or N 21st Ave approximately between Knox Ave N and Lyndale Ave N or I-94
Minneapolis	W Broadway Business District Station location and number of stations



2.2 Alignment and Design Option Locations Considered in the Supplemental Draft EIS

One Project Alignment that included four alignment options in the City of Minneapolis were advanced from the Route Modification process and Design Decision Process for further study. Additionally, design option locations in the Cities of Crystal, Robbinsdale, and Minneapolis are also described in this section.

2.2.1 Alignment and Design Option Locations

The following sections present the alignment and design option locations by Project city.

2.2.1.1 City of Brooklyn Park

In the City of Brooklyn Park, the Project alignment would remain unchanged north of 73rd Ave N, operating in the median of W Broadway Ave (CR 103). The location of the LRT on W Broadway Ave and the location of the OMF north of TH 610 is unchanged from the 2016 Alignment. LRT would be center-running and follow W Broadway Ave from Oak Grove Pkwy to 73rd Ave N in the City of Brooklyn Park. There were therefore no other alignments or design option locations that were considered during the process to identify a Build Alternative, because the alignment remains as studied in the 2016 Final EIS.

2.2.1.2 City of Crystal

In the City of Crystal, the Project alignment would shift from freight rail right-of-way to Bottineau Blvd (CR 81) right-of-way. The Project alignment within the median on Bottineau Blvd (CR 81 from 63rd Ave N to 47th Ave N) is evaluated in the Supplemental Draft EIS. Reconstruction of CR 81 to generally four lanes from 63rd Ave N to 47th Ave N would be included in the Project; variations on additional lanes were considered (see discussion below).

Bass Lake Road and CR 81 Intersection Design Options

Two design options were evaluated at the Bass Lake Rd intersection (CR 81/Bass Lake Rd) including:

- An at-grade conventional intersection with a pedestrian bridge over CR 81 (Figure A2-2)
- A grade-separated intersection carrying CR 81 over Bass Lake Rd on an elevated structure (Figure A2-3)

The Bass Lake Road Station would be located south of Bass Lake Rd. Currently CR 81 is three lanes in each direction with a posted speed of 45 to 55 mph in the City of Crystal. Various lane configurations were considered as a part of the at-grade or grade-separated design options as described above. For the at-grade option, the addition of lanes from four to six in key roadway segments was considered (see Figure A2-4) in the Supplemental Draft EIS. For the grade-separated option, the addition of a fifth lane between Corvallis Ave and TH 100 was considered (see Figure A2-5).

Both design options would include a park-and-ride facility located west of the Project alignment approximately one-fourth mile south of Bass Lake Rd with vehicular access from Lakeland Ave N and additional pedestrian access from Bass Lake Rd.



Figure A2-2 At-Grade Intersection at Bass Lake Rd/CR 81



Figure A2-3 At-Grade Intersection Lane Configuration on CR 81

4/6 Lanes at Grade with LRT

CROSS SECTION

Airport Rd to Wilshire Blvd



3 lanes of vehicular traffic in each direction, center running LRT in median

CP Rail to Corvallis Ave N



2 lanes of vehicular traffic in each direction, center running LRT in median

Corvallis Ave N to Hwy 100



3 lanes of vehicular traffic between Corvallis Ave and HWY 100 to accommodate HWY 100 traffic volume

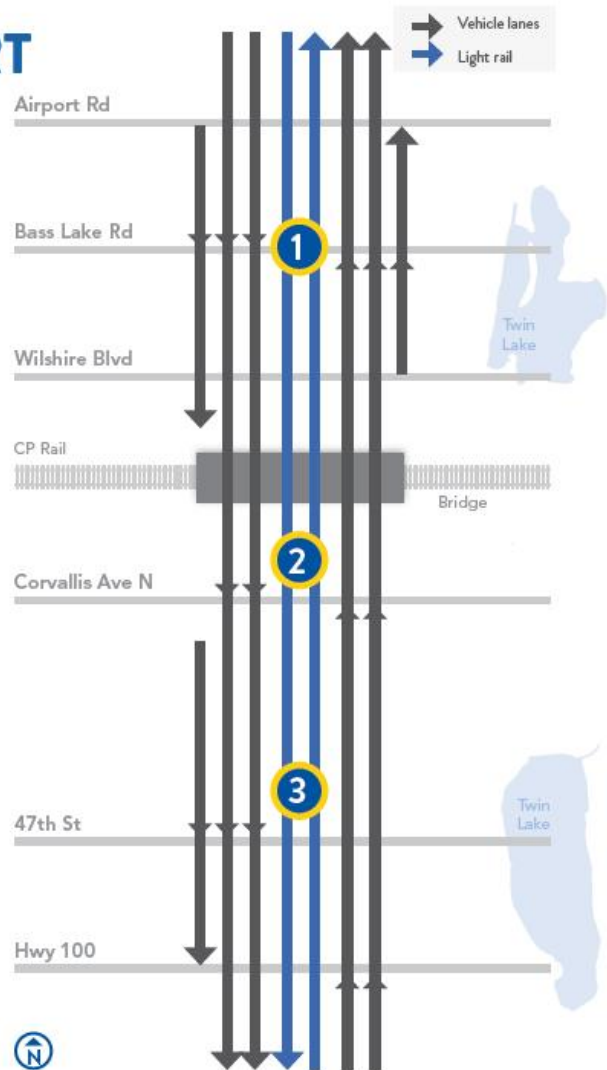




Figure A2-4 Grade-Separated Intersection at Bass Lake Rd/CR 81



Figure A2-5 Grade-Separated Intersection Lane Configuration on CR 81

4/5 Lanes with Grade Separated Interchange with LRT

CROSS SECTION

Airport Rd to Corvallis Ave N

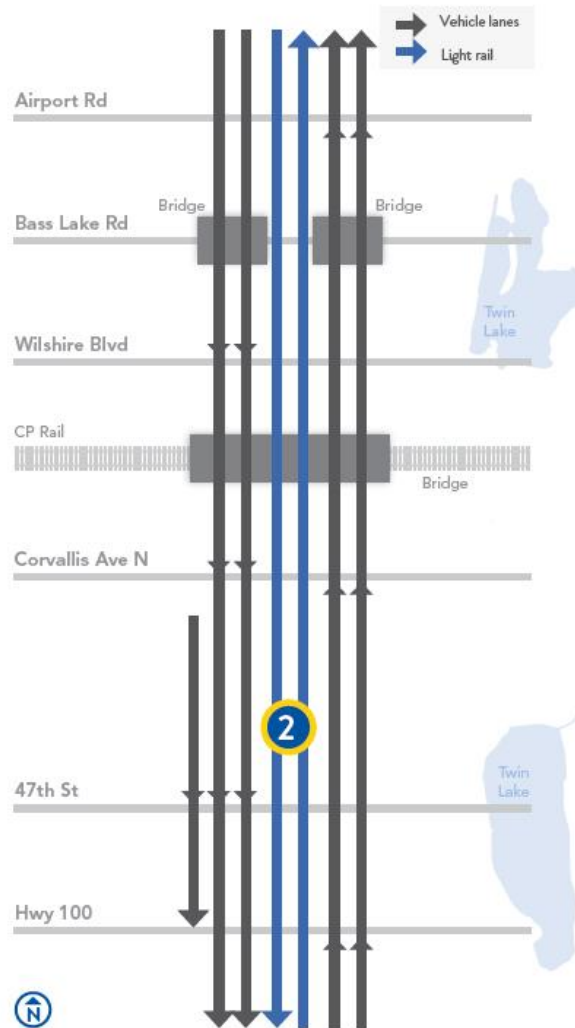


2 lanes of vehicular traffic in each direction, center running LRT in median grade separated interchange at Bass Lake Road

Corvallis Ave N to Hwy 100



3 lanes of vehicular traffic between Corvallis Ave and HWY 100 to accommodate HWY 100 traffic volume





2.2.1.3 City of Robbinsdale

In the City of Robbinsdale, the Project alignment would shift from freight rail right-of-way to run in the center of Bottineau Blvd between 47th Ave N and the transition to W Broadway Ave at the Robbinsdale and Minneapolis city limits. Reconstruction of Bottineau Blvd to four lanes from 47th Ave N to W Broadway Ave would be included in the Project. Multiple design option locations for a Downtown Robbinsdale Station and an adjacent park-and-ride facility were considered.

Downtown Robbinsdale Station and Park-and-Ride Location Design Options

Three locations for the station and three locations for the park-and-ride were considered (see Figure A2-6) The park-and-ride design options located at the U.S. Bank and Elim Lutheran Church could serve either station at 40th Ave N:

- ***Downtown Robbinsdale station location design options:***
 - Center platform south of 41st Ave N
 - Center platform north of 40th Ave N
 - Center platform south of 40th Ave N

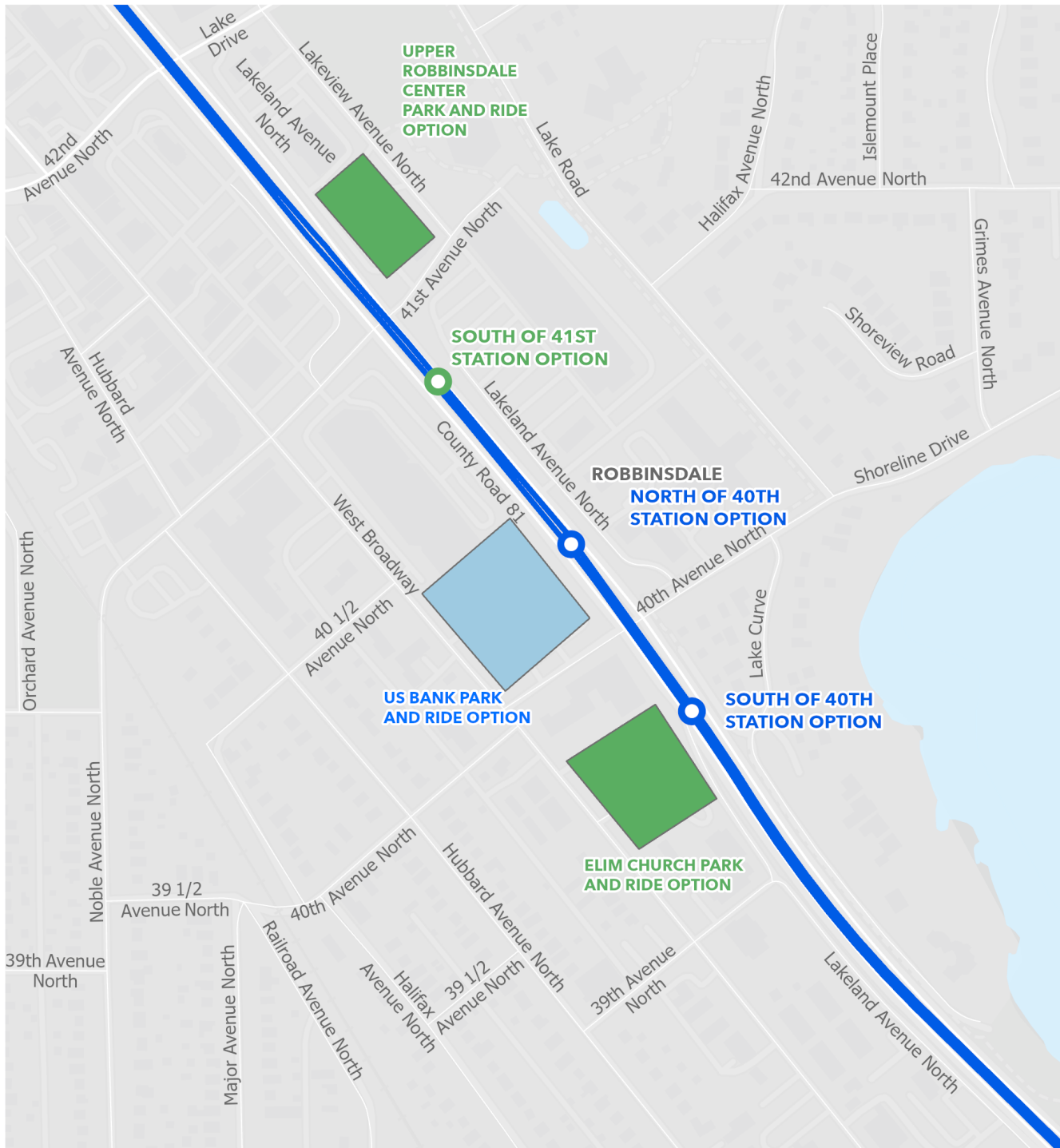
- ***Downtown Robbinsdale park-and-ride location design options:***
 - Property at Robin Center, 4100 Lakeland Ave N
 - Property at U.S. Bank, 4000 W Broadway Ave
 - Property at Elim Lutheran Church (parking lot), 3978 W Broadway Ave

Lowry Station – Elevated or At-Grade

In response to feedback from the City of Minneapolis, the City of Robbinsdale, and the Minneapolis Park and Recreation Board, the Project developed an at-grade track and LRT station design for the Lowry Station south of Lowry Ave and Oakdale Ave at CR 81. The LRT guideway would be at-grade between the northbound and southbound CR 81 bridges, with an at-grade LRT crossing of Lowry Ave and Oakdale Ave. An at-grade LRT station includes geometric modifications to the road system including realignment of a portion of Theodore Wirth Pkwy and the approaches to the CR 81 bridges. The at-grade track and LRT station also requires modifications to the existing CR 81 bridges over Lowry Ave. The southbound bridge would be modified to narrow its width, and both bridges would be extended south from their existing abutments. The interchange would remain functionally similar to the existing conditions. The at-grade station would provide enhanced access to the park and better integrate with the surrounding community compared to an elevated station.



Figure A2-6 Downtown Robbinsdale Station and Park-and-Ride Design Options



Downtown Robbinsdale Station and Park-and-Ride Options

Park-and-Ride Locations

- Park-and-Rides Considered
- Park and Ride Carried Forward for Evaluation

Project Alignment

- LRT Stations
- Station Considered





2.2.1.4 City of Minneapolis

In the City of Minneapolis, the Project alignment would shift from freight rail right-of-way to be center running on W Broadway Ave from southern Robbinsdale into the City of Minneapolis to Knox Ave. East of Knox Ave N in City of Minneapolis, multiple alignment options were considered. Early in the Route Modification process, alignment options that would have LRT on W Broadway Ave, 21st Ave N, or both roadways in a one-way pair track configuration were considered. The one-way pair alignment option was eliminated early in the process due to concerns about rider confusion. Therefore, the Route Modification Report included a W Broadway Ave to Lyndale Ave N alignment option and a 21st Ave N to Lyndale Ave N alignment option.

Following the publication of the Route Modification Report, notable feedback was received regarding the recommendation to carry forward two City of Minneapolis alignment options (21st Ave N/Lyndale Ave N and W Broadway Ave/Lyndale Ave N). Based on this feedback, Council and Hennepin County developed an alignment option east of I-94 that generally paralleled the I-94 right-of-way to the 3rd/4th St viaduct, then paralleled the viaduct to 10th Ave N, following 10th Ave N to 7th St N, and on to connect with Target Field Station. An LRT station would be located north of Plymouth Ave N between I-94 and the buildings on the west side of Washington Ave. This East of I-94 alignment option would connect to either the 21st Ave N option or W Broadway Ave option via a bridge across I-94. To minimize impacts to the W Broadway Ave interchange and access to I-94, the LRT guideway was proposed on an elevated structure or fly-over bridge. The structure would cross over the interstate and transition to street level west of N 4th St. The final recommendation from the Route Modification process included four alignment options in the City of Minneapolis:

- Lyndale Ave N/21st Ave N
- Lyndale Ave N/W Broadway Ave
- East of I-94/21st Ave N
- East of I-94/W Broadway Ave

Additional information regarding each of these alignment options is presented in the following sections.

2.2.1.5 Lyndale Ave N/21st Ave N Alignment Option

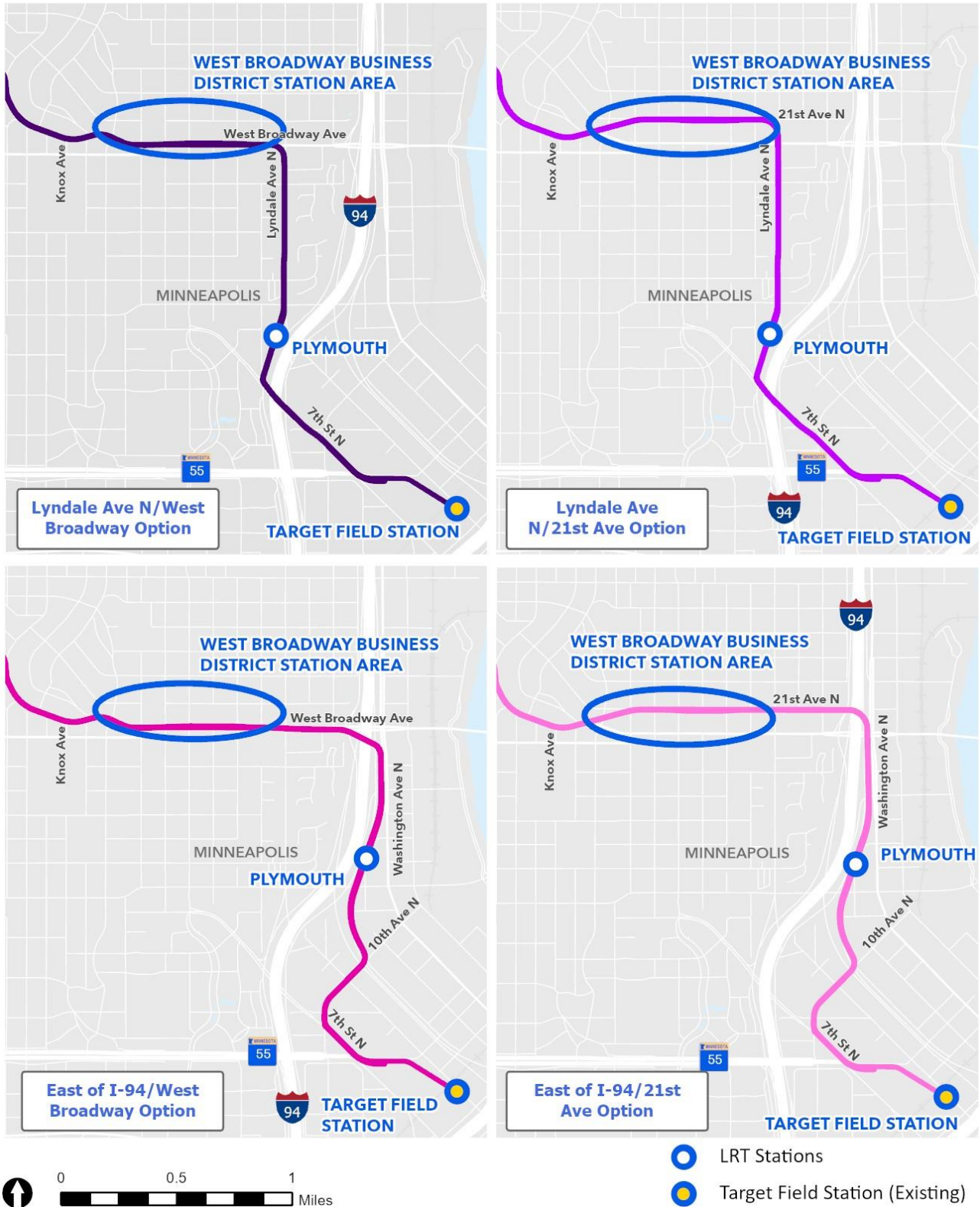
As shown in Figure A2-7 and described in Table A2-2, the Lyndale Ave N/21st Ave N alignment option would include center-running LRT on 21st Ave N from Irving Ave N to Lyndale Ave N, terminating at Target Field Station.

Table A2-2 Lyndale Ave N/ 21st Ave N Alignment and Design Option Locations

Feature	Description
LRT Alignment	<ul style="list-style-type: none"> ■ LRT would use all of 21st Ave N (Fremont Ave N to Lyndale Ave N), road would be closed to vehicle traffic ■ LRT would run along west side of Lyndale Ave N ■ LRT would run along north side of N 7th St ■ LRT would terminate at Target Field Station
Stations	<ul style="list-style-type: none"> ■ Plymouth Ave (at Lyndale Ave N) ■ One or two station design options in West Broadway Business District ■ Target Field Station (existing)



Figure A2-7 Project Alignment Options in the City of Minneapolis





2.2.1.6 Lyndale Ave N/W Broadway Ave Alignment Option

As shown in Figure A2-7 and described in Table A2-3, the Lyndale Ave N/W Broadway Ave alignment option would include center-running LRT on W Broadway Ave from Irving Ave N to Lyndale Ave N, terminating at Target Field Station.

Table A2-3 Lyndale Ave N/W Broadway Ave Alignment and Design Option Locations

Feature	Description
LRT Alignment	<ul style="list-style-type: none"> ■ LRT would run along center of W Broadway Ave (with vehicle traffic) from Irving Ave N to Lyndale Ave N ■ LRT would run along west side of Lyndale Ave N ■ LRT would run along north side of N 7th St ■ LRT would terminate at Target Field Station
Stations	<ul style="list-style-type: none"> ■ Plymouth Ave (at Lyndale Ave N) ■ One or two station design options in West Broadway Business District ■ Target Field Station (existing)

2.2.1.7 East of I-94/21st Ave A Alignment Option

As shown in Figure A2-7 and described in Table A2-4, the east of I-94/ 21st Ave N alignment option would include center-running LRT on 21st Ave N from Irving Ave N to Washington Ave N with a new bridge over I-94, routing along the east side of I-94, and terminating at Target Field Station.

Note that a second alignment option east of I-94 (referred to as the “East of I-94 sub-option”) was developed in late spring/early summer 2023 after the completion of the Route Modification process. This sub-option eventually was selected for inclusion in the Build Alternative. Details regarding the East of I-94 sub-option are presented in Section 2.3.1 of Chapter 2.

Table A2-4 East of I-94/ 21st Ave N Alignment and Design Option Locations

Feature	Description
LRT Alignment	<ul style="list-style-type: none"> ■ LRT would use all of 21st Ave N (Fremont Ave N to I-94), road would be closed to vehicle traffic ■ LRT would travel over I-94 on a new LRT-only bridge ■ LRT would run along west side of Washington Ave N (on an elevated bridge) ■ LRT would run along east side of I-94 ramps (16th Ave N to 10th Ave N) ■ LRT would run along west side of 10th Ave N and north side of N 7th St ■ LRT would terminate at Target Field Station
Stations	<ul style="list-style-type: none"> ■ Plymouth Ave (at N 3rd St) ■ One or two station design options in West Broadway Business District ■ Target Field Station (existing)

2.2.1.8 East of I-94/W Broadway Ave Alignment Option

As shown in Figure A2-7 above and described in Table A2-5, the East of I-94/W Broadway Ave alignment option would include center-running LRT on W Broadway Ave from Irving Ave N to Washington Ave N with a new bridge over I-94, routing along the east side of I-94, and terminating at Target Field Station.



Table A2-5 East of I-94/W Broadway Ave Alignment and Design Option Locations

Feature	Description
LRT Alignment	<ul style="list-style-type: none"> ■ LRT would run along center of W Broadway Ave (with vehicle traffic) from Irving Ave N to I-94 ■ LRT would travel over I-94 on a new LRT-only bridge ■ LRT would run along west side of Washington Ave N (on an elevated bridge) ■ LRT would run along east side of I-94 ramps (16th Ave N to 10th Ave N) ■ LRT would run along west side of 10th Ave N and north side of N 7th St ■ LRT would terminate at Target Field Station
Stations	<ul style="list-style-type: none"> ■ Plymouth Ave (at N 3rd St) ■ One or two station design options in West Broadway Business District ■ Target Field Station (existing)

2.2.1.9 West Broadway Business District Station Area Design Options

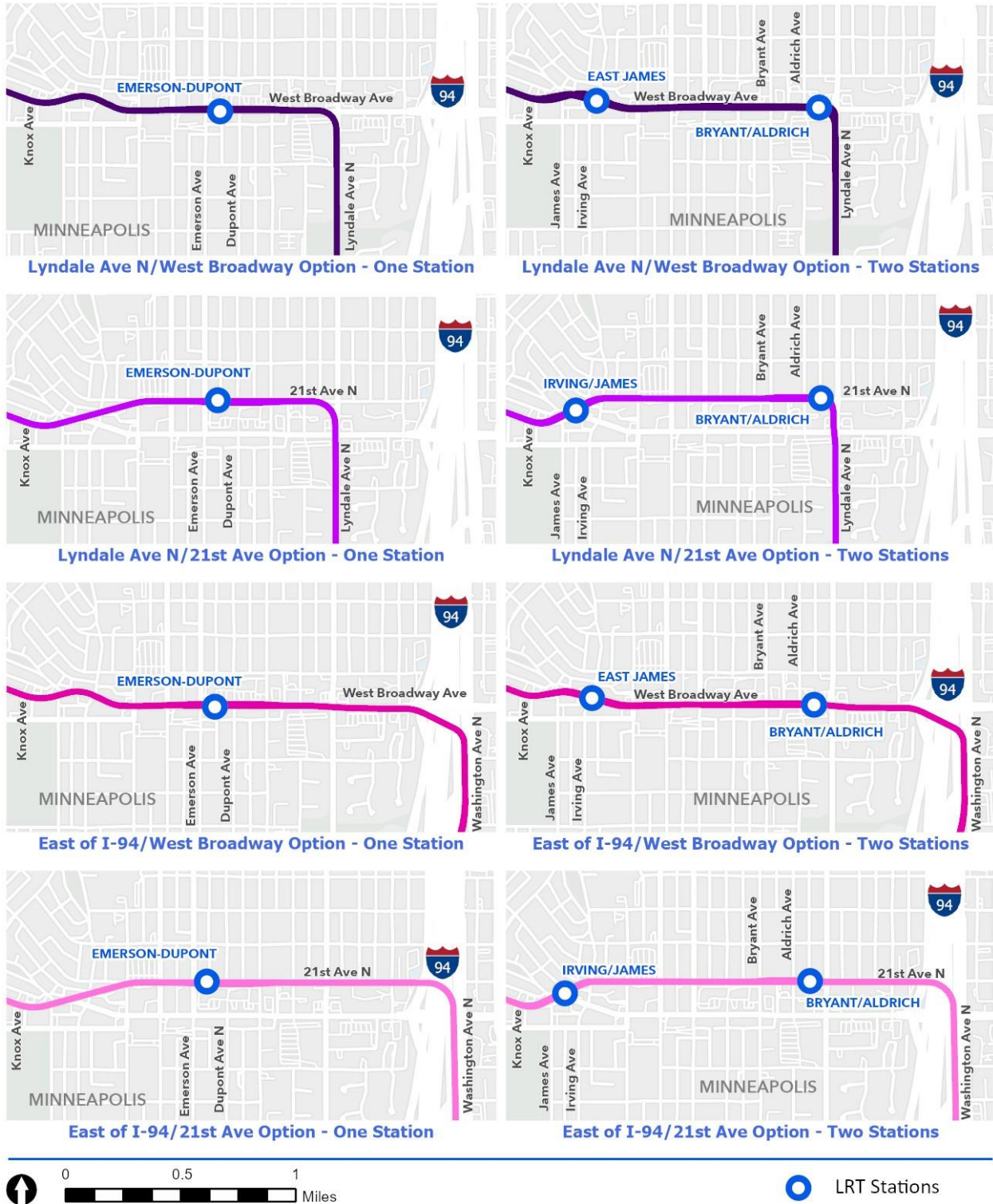
The location and number of stations in the West Broadway Business District station area were evaluated, including locations on both W Broadway Ave and 21st Ave N (Figure A2-8 and Table A2-6). The station design options are related to the Project alignment options, with one and two station design options under consideration for the portion of the Project alignment between Irving Ave N/James Ave N and Bryant Ave N/Aldrich Ave N, respectively.

Table A2-6 West Broadway Business District Station Area Design Options

Alignment Option	One Station Design Option Location	Two Station Design Option Location
Lyndale Ave N/21st Ave N Alignment Option	<ul style="list-style-type: none"> ■ Emerson/Dupont 	<ul style="list-style-type: none"> ■ East James ■ Bryant/Aldrich
Lyndale Ave N/W Broadway Alignment Option	<ul style="list-style-type: none"> ■ Emerson/Dupont 	<ul style="list-style-type: none"> ■ East James ■ Bryant/Aldrich
East of I-94/N 21st Ave Alignment Option	<ul style="list-style-type: none"> ■ Emerson/Dupont 	<ul style="list-style-type: none"> ■ East James ■ Bryant/Aldrich
East of I-94/W Broadway Ave Alignment Option	<ul style="list-style-type: none"> ■ Emerson/Dupont 	<ul style="list-style-type: none"> ■ East James ■ Bryant/Aldrich



Figure A2-8 West Broadway Business District Station Area Alignment and Design Options





2.3 Elements of the Alignment and Design Option Locations Compared to the 2016 Alignment

Notable differences between each alignment option of the Project is described below, including the differences between the 2016 Alignment identified in the Final EIS and the alignment options evaluated in the City of Minneapolis.

- Length:
 - The project as defined in 2016 Final EIS was about 13.5 miles long
 - The alignment options that include Lyndale Ave N are around 13.1 miles long
 - The East of I-94 alignment options are between about 13.3 and 13.4 miles long
- Ridership:
 - It is difficult to make a viable comparison between ridership projections from the 2016 Final EIS and those for the Project because of a change in the ridership model used. The 2016 project used the Twin Cities Regional Travel Demand Model; current guidance requires transit projects to now use the FTA's STOPS model. The STOPS model indicated that ridership for all four alignment options is similar, with slightly higher ridership for the East of I-94 alignment options.
- Stations:
 - The project as defined in 2016 Final EIS included 11 new LRT stations
 - Each of the alignment options would include 11 or 12 new LRT stations, depending on whether one or two stations are included on the 21st Ave N/W Broadway Ave segment in North Minneapolis.
 - Station locations (four) along W Broadway Ave in the City of Brooklyn Park are the same (for all alignment options) as they were in the 2016 Final EIS
 - In general, LRT stations along CR 81 for the Project alignment option are in equivalent locations to stations on the 2016 Alignment where CR 81 parallels the BNSF corridor. These stations include 63rd Ave, Bass Lake Rd, and Downtown Robbinsdale. These three station locations have overlapping service areas with the stations in the 2016 Final EIS
 - LRT stations where CR 81 has diverted from paralleling the BNSF corridor are in entirely new locations and serve new areas (four to five stations from Lowry Ave to Plymouth Ave)
- Structures:
 - The project as defined in 2016 Final EIS included seven new LRT bridges, and five reconstructed roadway bridges and two modified roadway bridges to accommodate LRT
 - The Project alignment options include six new LRT bridges and up to one new roadway bridge (grade-separated design option at Bass Lake Rd)



2.4 Summary of Preliminary Socio-Economic and Environmental Impacts

An analysis of the transportation, community and social, and physical and environmental impacts of the Project was conducted for each of the alignment and design option locations under consideration, to inform evaluation and identify which option should be advanced to the Build Alternative. Details of the analysis can be found in Appendices A-3, A-4, and A-5. Summaries of the analysis are provided below; comparisons of the alignment and design options in the Cities of Crystal and Robbinsdale are provided as narrative, while the comparison of alignment and design options in the City of Minneapolis are presented in Table A2-7, Table A2-8, and Table A2-9. Note that there is only one alignment option and no design options in the City of Brooklyn Park, therefore comparative analysis is not provided.

2.4.1 Comparison of the City of Crystal Design Options

Analysis of socio-economic and environmental impacts revealed the following differences between the at-grade and interchange design options at the CR 81/Bass Lake Rd intersection:

- Pedestrian conditions:
 - Interchange design option at Bass Lake Rd provides separation of pedestrians and through traffic on CR 81 at grade.
 - Intersection design option at Bass Lake Rd provides separation of pedestrians and through traffic on CR 81 via a pedestrian overpass.
- Traffic:
 - Five lane configuration design options were evaluated from a traffic operations perspective:
 - Four lane at-grade intersection at Bass Lake Rd
 - Four/six lane at-grade intersection at Bass Lake Rd (four through lanes north and south of the intersection, expanding to six through lanes at the intersection)
 - Six lane at-grade intersection at Bass Lake Rd
 - Four/five lane grade-separated interchange at Bass Lake Rd (four through lanes at the interchange, with an auxiliary lane added to facilitate the southbound CR 81 to southbound TH 100 movement)
 - Six lane grade-separated interchange at Bass Lake Rd
 - Two intersections in the CR 81 corridor would be at capacity in the PM peak in the City of Crystal under the four lane at-grade intersection scenario; all intersection would operate under capacity in the four/six lane and six lane at-grade intersection scenarios
 - No adverse traffic impacts identified under either interchange scenario
- Acquisitions/Relocations:
 - Fewer acres of right-of-way acquisition under the interchange design option at Bass Lake Rd
- Stormwater:
 - The City of Crystal impervious surface increases:
 - 8.6 acres – Bass Lake Rd at-grade
 - 9.5 acres – Bass Lake Rd interchange



2.4.2 Comparison of the City of Robbinsdale Design Options

Analysis of socio-economic and environmental impacts revealed the following differences between the potential City of Robbinsdale design locations:

- Parking (station location design options do not affect parking):
 - Loss of 139 off-street parking spaces with Upper Robin Center (URC) park-and-ride design option
 - Loss of 134 off-street parking spaces with US Bank park-and-ride design option
 - Loss of 213 off-street parking spaces with Elim Church park-and-ride design option
- Acquisitions/Relocations:
 - A total of 25 to 31 parcels impacted in the city; differences by design option locations include:
 - Upper Robin Center park-and-ride - 1 full acquisition and 6 relocations
 - US Bank park-and-ride – 1 full acquisition and 1 relocation
 - Elim Church park-and-ride – 1 partial acquisition
 - 7 to 11 parcels impacted depending on station location (south of 41st Ave, north of 40th Ave, south of 40th Ave)
- Stormwater:
 - Impervious surface increases:
 - 3.8 acres – south of 40th Ave Station/Elim park-and-ride
 - 3.4 acres – south of 40th Ave Station/US Bank park-and-ride
 - 3.4 acres – north of 40th Ave Station/US Bank park-and-ride
 - 3.6 acres – south of 41st Ave Station/Upper Robin Center park-and-ride
- City of Robbinsdale
 - Cultural resources:
 - 1 historic property with URC park-and-ride design option
 - 2 potential historic properties with 40th Ave Station/US Bank park-and-ride
 - 1 potential historic property with 41st Ave Station/URC park-and-ride
 - 1 potential historic property with US Bank park-and-ride design option
 - 1 potential historic property with Elim Church park-and-ride

2.4.3 Comparison of the City of Minneapolis Alignment and Design Options

Analysis of socio-economic and environmental impacts revealed certain differences between the alignment and design option locations in The City of Minneapolis as presented in the following tables.



Table A2-7 Socio-Economic and Environmental Impacts by Project Alignment Option – Transportation Resources (see Appendix A-3 for additional details)

Subject Area (Transportation)	Project Alignment with 21st/ Lyndale Option	Project Alignment with West Broadway/Lyndale Option	Project Alignment with 21st/ East of I-94 Option ¹	Project Alignment with West Broadway/East of I-94 Option ¹
Transit Conditions	<ul style="list-style-type: none"> • Similar ridership when compared to the other options. 	<ul style="list-style-type: none"> • Similar ridership when compared to the other options. 	<ul style="list-style-type: none"> • Similar ridership when compared to the other options. 	<ul style="list-style-type: none"> • Similar ridership when compared to the other options.
Pedestrian Conditions	<ul style="list-style-type: none"> • Improved pedestrian conditions along 21st; crossings of 21st would occur at signalized intersections; DuPont, Aldrich, and 6th St. crossings eliminated. • Improved conditions along Lyndale, comfortable for most users; crossing Lyndale would occur at existing and new signalized intersections. 	<ul style="list-style-type: none"> • Improved conditions on W Broadway, but likely would remain an uncomfortable pedestrian environment. • Improved conditions along Lyndale, comfortable for most users; crossing Lyndale would occur at existing and new signalized intersections. 	<ul style="list-style-type: none"> • Improved pedestrian conditions along 21st; crossings of 21st would occur at signalized intersections; DuPont, Aldrich, and 6th St. crossings eliminated. • Opportunity for additional crossing of I-94 associated with LRT bridge. 	<ul style="list-style-type: none"> • Improved conditions on W Broadway, but likely would remain an uncomfortable pedestrian environment. • Opportunity for additional crossing of I-94 associated with LRT bridge, or improved W Broadway Ave bridge.
Bicycle Conditions	<ul style="list-style-type: none"> • Bicycle facilities on Lyndale Ave may be placed at sidewalk elevation if LRT is added. • In general, bicycling conditions would remain the same or be improved throughout the Project area. 	<ul style="list-style-type: none"> • Bicycle facilities on Lyndale Ave may be placed at sidewalk elevation if LRT is added. • Planned bicycle facility on W Broadway may not be feasible if LRT is on W Broadway between Knox Ave and Lyndale Ave. • In general, bicycling conditions would remain the same or be improved throughout the Project area. 	<ul style="list-style-type: none"> • Existing bicycle facilities on 10th St would be elevated to sidewalk grade between N 4th St and N 8th Ave. • In general, bicycling conditions would remain the same or be improved throughout the Project area. 	<ul style="list-style-type: none"> • Planned bicycle facility on W Broadway may not be feasible if LRT is on W Broadway between Knox Ave and Lyndale Ave. • Existing bicycle facilities on 10th St would be elevated to sidewalk grade between N 4th St and N 8th Ave. • In general, bicycling conditions would remain the same or be improved throughout the Project area.
Vehicle Traffic	<ul style="list-style-type: none"> • Traffic removed from 21st Ave N; crossings of 21st Ave N eliminated at DuPont and Aldrich avenues. • The following W Broadway intersections would be at or over capacity in the City of Minneapolis: <ul style="list-style-type: none"> ○ Penn (at capacity AM and PM peaks) ○ Knox (over capacity at AM and PM peaks) ○ Irving (at capacity at AM and PM peaks) ○ Girard (at capacity at PM peak) ○ Emerson (at capacity at PM peak) 	<ul style="list-style-type: none"> • The following W Broadway intersections would be at or over capacity in the City of Minneapolis: <ul style="list-style-type: none"> ○ Penn (at capacity AM and PM peaks) ○ Knox (over capacity at AM and PM peaks) ○ Irving (at capacity at AM and PM peaks) ○ Girard (at capacity at PM peak) ○ Emerson (at capacity at PM peak) 	<ul style="list-style-type: none"> • Traffic removed from 21st Ave N; crossings of 21st Ave N eliminated at DuPont and Aldrich avenues. • The following W Broadway intersections would be at or over capacity in the City of Minneapolis: <ul style="list-style-type: none"> ○ Penn (at capacity AM and PM peaks) ○ Knox (over capacity at AM and PM peaks) 	<ul style="list-style-type: none"> • The following W Broadway intersections would be at or over capacity in the City of Minneapolis: <ul style="list-style-type: none"> ○ Penn (at capacity AM and PM peaks) ○ Knox (over capacity at AM and PM peaks) ○ Irving (at capacity at AM and PM peaks) ○ Girard (at capacity at PM peak) ○ Emerson (at capacity at PM peak)



Subject Area (Transportation)	Project Alignment with 21st/Lyndale Option	Project Alignment with West Broadway/Lyndale Option	Project Alignment with 21st/East of I-94 Option ¹	Project Alignment with West Broadway/East of I-94 Option ¹
	<ul style="list-style-type: none"> ○ Irving (at capacity at AM and PM peaks) ○ Girard (at capacity at PM peak) ○ Emerson (at capacity at PM peak) ● W Broadway/N Lyndale Ave intersection at capacity in the AM peak and overcapacity in the PM peak. ● N Lyndale Ave/Plymouth Ave N intersection at capacity in the AM peak. ● N 7th St/W Lyndale Ave intersection over capacity in AM peak. ● N 7th St/Oak Lake Ave intersection at capacity in AM peak ● Olson Memorial Highway/N 7th St/N 6th Ave intersection over capacity in PM peak. 	<ul style="list-style-type: none"> ● W Broadway/N Lyndale Ave intersection at capacity in the AM peak and overcapacity in the PM peak. ● N Lyndale Ave/Plymouth Ave N intersection at capacity in the AM peak. ● N 7th St/W Lyndale Ave intersection over capacity in AM peak. ● N 7th St/Oak Lake Ave intersection at capacity in AM peak ● Olson Memorial Highway/N 7th St/N 6th Ave intersection over capacity in PM peak. 	<ul style="list-style-type: none"> ○ Irving (at capacity at AM and PM peaks) ○ Girard (at capacity at PM peak) ○ Emerson (at capacity at PM peak) ● W Broadway/N Lyndale Ave intersection would be over capacity in the PM peak. ● N 7th St/Oak Lake Ave intersection would be at capacity in the AM peak ● Olson Memorial Highway/N 7th St/N 6th Ave intersection would be over capacity in the PM peak. ● Requires FHWA IAR process for ramp modification. 	<ul style="list-style-type: none"> ● W Broadway/N Lyndale Ave intersection would be over capacity in the PM peak. ● N 7th St/Oak Lake Ave intersection would be at capacity in the AM peak ● Olson Memorial Highway/N 7th St/N 6th Ave intersection would be over capacity in the PM peak. ● Requires FHWA IAR process for interchange reconstruction.
Parking	<ul style="list-style-type: none"> ● Loss of 525 on-street parking spaces ● Loss of 104 off-street parking spaces 	<ul style="list-style-type: none"> ● Loss of 485 on-street parking spaces ● Loss of 47 off-street parking spaces 	<ul style="list-style-type: none"> ● Loss of 613 on-street parking spaces ● Loss of 148 off-street parking spaces 	<ul style="list-style-type: none"> ● Loss of 516 on-street parking spaces ● Loss of 160 off-street parking spaces
Freight Rail	No impacts in the City of Minneapolis	No impacts in the City of Minneapolis	No impacts in the City of Minneapolis	No impacts in the City of Minneapolis
Aviation	No impacts in the City of Minneapolis	No impacts in the City of Minneapolis	No impacts in the City of Minneapolis	No impacts in the City of Minneapolis

¹East of I-94 refers to the alignment option that runs adjacent to the I-94 corridor, and not the East of I-94 sub-option. The East of I-94 sub-option is discussed in Chapter 2.



Table A2-8 Socio-Economic and Environmental Impacts by Project Alignment Option – Community and Social Resources (see Appendix A-4 for additional details)

Subject Area (Community and Social)	Project Alignment with N 21st Ave/ Lyndale Option	Project Alignment with West Broadway/Lyndale Option	Project Alignment with N 21st Ave/ East of I-94 Option ¹	Project Alignment with West Broadway/East of I-94 Option ¹
Land Use Plan Compatibility	<ul style="list-style-type: none"> Project compatible with all city land use plans. 	<ul style="list-style-type: none"> Project compatible with all city land use plans. 	<ul style="list-style-type: none"> Project compatible with all city land use plans. 	<ul style="list-style-type: none"> Project compatible with all city land use plans.
Community Facilities/ Community Character and Cohesion	<ul style="list-style-type: none"> Overall benefits to community cohesion Transit mall on N 21st Ave would change character of blocks affected and increase noise levels at residential properties on Lyndale and N 21st Ave. 	<ul style="list-style-type: none"> Overall benefits to community cohesion Increased noise levels at residential properties on Lyndale. 	<ul style="list-style-type: none"> Overall benefits to community cohesion Transit mall on N 21st Ave would change character of blocks affected and increase noise levels at residential properties on N 21st Ave. 	<ul style="list-style-type: none"> Overall benefits to community cohesion
Relocation of Residents and Businesses	<ul style="list-style-type: none"> City of Minneapolis – common section (Lowry Ave to Knox Ave) <ul style="list-style-type: none"> 74 partial acquisitions 13 full acquisitions 11 relocations City of Minneapolis – east of Knox Ave <ul style="list-style-type: none"> 56 partial acquisitions 16 full acquisitions 12 relocations 	<ul style="list-style-type: none"> City of Minneapolis – common section (Lowry Ave to Knox Ave) <ul style="list-style-type: none"> 74 partial acquisitions 13 full acquisitions 11 relocations City of Minneapolis – east of Knox Ave <ul style="list-style-type: none"> 45 partial acquisitions 21 full acquisitions 24 relocations 	<ul style="list-style-type: none"> City of Minneapolis – common section (Lowry Ave to Knox Ave) <ul style="list-style-type: none"> 74 partial acquisitions 13 full acquisitions 11 relocations City of Minneapolis – east of Knox Ave <ul style="list-style-type: none"> 29 partial acquisitions 17 full acquisitions 12 relocations 	<ul style="list-style-type: none"> City of Minneapolis – common section (Lowry Ave to Knox Ave) <ul style="list-style-type: none"> 74 partial acquisitions 13 full acquisitions 11 relocations City of Minneapolis – east of Knox Ave <ul style="list-style-type: none"> 23 partial acquisitions 24 full acquisitions 28 relocations
Cultural Resources	<ul style="list-style-type: none"> City of Minneapolis (N 21st Ave) <ul style="list-style-type: none"> 1 Historic property 4 potential historic properties City of Minneapolis (Lyndale Ave N) <ul style="list-style-type: none"> 1 potential historic property City of Minneapolis (TH 55) <ul style="list-style-type: none"> NA City of Minneapolis (N 7th St) <ul style="list-style-type: none"> 1 potential historic property 	<ul style="list-style-type: none"> City of Minneapolis (W Broadway Ave) <ul style="list-style-type: none"> 3 Historic properties 5 Potential historic properties City of Minneapolis (Lyndale Ave N) <ul style="list-style-type: none"> 1 potential historic property City of Minneapolis (TH 55) <ul style="list-style-type: none"> NA City of Minneapolis (N 7th St) <ul style="list-style-type: none"> 1 potential historic property 	<ul style="list-style-type: none"> City of Minneapolis (N 21st Ave) <ul style="list-style-type: none"> 1 Historic property 5 Potential historic properties City of Minneapolis (adjacent to I-94) <ul style="list-style-type: none"> 2 Potential historic properties 	<ul style="list-style-type: none"> City of Minneapolis (W Broadway Ave) <ul style="list-style-type: none"> 3 Historic properties 5 Potential historic properties City of Minneapolis (adjacent to I-94) <ul style="list-style-type: none"> 2 Potential historic properties



Subject Area (Community and Social)	Project Alignment with N 21st Ave/ Lyndale Option	Project Alignment with West Broadway/Lyndale Option	Project Alignment with N 21st Ave/ East of I-94 Option ¹	Project Alignment with West Broadway/East of I-94 Option ¹
Visual/ Aesthetics	<ul style="list-style-type: none"> • City of Minneapolis <ul style="list-style-type: none"> ○ Generally adverse effects on visual quality along N 21st Ave ○ Some adverse effects on visual quality along Lyndale Ave 	<ul style="list-style-type: none"> • City of Minneapolis <ul style="list-style-type: none"> ○ Some adverse effects on visual quality along Lyndale Ave 	<ul style="list-style-type: none"> • City of Minneapolis <ul style="list-style-type: none"> ○ Generally adverse effects on visual quality along N 21st Ave ○ Some adverse effects on visual quality from bridge over I-94 	<ul style="list-style-type: none"> • City of Minneapolis <ul style="list-style-type: none"> ○ Some adverse effects on visual quality from bridge over I-94
Economic Effects	<ul style="list-style-type: none"> • Positive short-term economic effects from influx of capital (FTA Full-Funding Grant Agreement) • Long-term economic benefits may accrue to communities adjacent to the Project with implementation of anti-displacement initiatives. 	<ul style="list-style-type: none"> • Positive short-term economic effects from influx of capital (FTA Full-Funding Grant Agreement) • Long-term economic benefits may accrue to communities adjacent to the Project with implementation of anti-displacement initiatives. 	<ul style="list-style-type: none"> • Positive short-term economic effects from influx of capital (FTA Full-Funding Grant Agreement) • Long-term economic benefits may accrue to communities adjacent to the Project with implementation of anti-displacement initiatives. 	<ul style="list-style-type: none"> • Positive short-term economic effects from influx of capital (FTA Full-Funding Grant Agreement) • Long-term economic benefits may accrue to communities adjacent to the Project with implementation of anti-displacement initiatives.
Safety and Security	<ul style="list-style-type: none"> • Pedestrian and bicycle facilities would be improved, and generally safer. • Traffic control systems would be upgraded to interface with train operation systems and reduce the potential for train/vehicle interactions. • Security concerns would be addressed through implementation of the Safety and Security Action Plan. 	<ul style="list-style-type: none"> • Pedestrian and bicycle facilities would be improved, and generally safer. • Traffic control systems would be upgraded to interface with train operation systems and reduce the potential for train/vehicle interactions. • Security concerns would be addressed through implementation of the Safety and Security Action Plan. 	<ul style="list-style-type: none"> • Pedestrian and bicycle facilities would be improved, and generally safer. • Traffic control systems would be upgraded to interface with train operation systems and reduce the potential for train/vehicle interactions. • Security concerns would be addressed through implementation of the Safety and Security Action Plan. 	<ul style="list-style-type: none"> • Pedestrian and bicycle facilities would be improved, and generally safer. • Traffic control systems would be upgraded to interface with train operation systems and reduce the potential for train/vehicle interactions. • Security concerns would be addressed through implementation of the Safety and Security Action Plan.

¹East of I-94 refers to the alignment option that runs adjacent to the I-94 corridor, and not the East of I-94 sub-option. The East of I-94 sub-option is discussed in Chapter 2.



Table A2-9 Socio-Economic and Environmental Impacts by Project Alignment Option – Physical and Environmental Resources (see Appendix A-5 for additional details)

Subject Area (Physical and Environmental)	Project Alignment with 21st/Lyndale Option	Project Alignment with West Broadway/Lyndale Option	Project Alignment with 21st/East of I-94 Option ¹	Project Alignment with West Broadway/East of I-94 Option ¹
Utilities	<ul style="list-style-type: none"> 86-inch brick sanitary sewer under Lyndale Ave on east side of I-94. 39-inch to 42-inch storm sewer running under 21st Ave between Bryant Ave and Lyndale Ave. 36-inch storm sewer crossing Lyndale Ave just north of Plymouth Ave. 56-inch storm sewer crossing under 7th St between I-94 and E Lyndale Ave, then paralleling E Lyndale Ave from 7th St to Olson Memorial Highway. 	<ul style="list-style-type: none"> 86-inch brick sanitary sewer under Lyndale Ave on east side of I-94. 36-inch to 48-inch storm sewer running under W Broadway Ave from James Ave to Lyndale Ave. 36-inch storm sewer crossing Lyndale Ave just north of Plymouth Ave. 56-inch storm sewer crossing under 7th St between I-94 and E Lyndale Ave, then paralleling E Lyndale Ave from 7th St to Olson Memorial Highway. 	<ul style="list-style-type: none"> Commercial water supply well near Project Alignment for East of I-94 options. 39-inch to 42-inch storm sewer running under 21st Ave between Bryant Ave and Lyndale Ave. 	<ul style="list-style-type: none"> Commercial water supply well near Project Alignment for East of I-94 options. 36-inch to 48-inch storm sewer running under W Broadway Ave from James Ave to Lyndale Ave.
Floodplains	No impacts in the City of Minneapolis	No impacts in the City of Minneapolis	No impacts in the City of Minneapolis	No impacts in the City of Minneapolis
Wetlands	No impacts in the City of Minneapolis	No impacts in the City of Minneapolis	No impacts in the City of Minneapolis	No impacts in the City of Minneapolis
Geology, Soils, and Topography	<ul style="list-style-type: none"> Potential karst in the City of Minneapolis between Lowry and Knox Aven. 	<ul style="list-style-type: none"> Potential karst in the City of Minneapolis between Lowry and Knox Ave. 	<ul style="list-style-type: none"> Potential karst in the City of Minneapolis between Lowry and Knox Ave. 	<ul style="list-style-type: none"> Potential karst in the City of Minneapolis between Lowry and Knox Ave.
Hazardous Materials Contamination	<ul style="list-style-type: none"> City of Minneapolis – east of Knox Ave: <ul style="list-style-type: none"> 63 properties with low potential for contamination 257 properties with medium potential for contamination 112 properties with high potential for contamination 	<ul style="list-style-type: none"> City of Minneapolis – east of Knox Ave: <ul style="list-style-type: none"> 63 properties with low potential for contamination 258 properties with medium potential for contamination 114 properties with high potential for contamination 	<ul style="list-style-type: none"> City of Minneapolis – east of Knox Ave: <ul style="list-style-type: none"> 63 properties with low potential for contamination 267 properties with medium potential for contamination 141 properties with high potential for contamination 	<ul style="list-style-type: none"> City of Minneapolis – east of Knox Ave: <ul style="list-style-type: none"> 63 properties with low potential for contamination 269 properties with medium potential for contamination 143 properties with high potential for contamination
Noise ³	<ul style="list-style-type: none"> City of Minneapolis: <ul style="list-style-type: none"> Up to 178 moderate impacts Up to 92 severe impacts 	<ul style="list-style-type: none"> City of Minneapolis: <ul style="list-style-type: none"> Up to 168 moderate impacts Up to 54 severe impacts 	<ul style="list-style-type: none"> City of Minneapolis: <ul style="list-style-type: none"> Up to 212 moderate impacts Up to 173 severe impacts 	<ul style="list-style-type: none"> City of Minneapolis: <ul style="list-style-type: none"> Up to 152 moderate impacts Up to 3 severe impacts
Vibration	<ul style="list-style-type: none"> City of Minneapolis – 20 vibration impacts 	<ul style="list-style-type: none"> City of Minneapolis – 0 vibration impacts 	<ul style="list-style-type: none"> City of Minneapolis – 20 vibration impacts 	<ul style="list-style-type: none"> City of Minneapolis – 0 vibration impacts



Subject Area (Physical and Environmental)	Project Alignment with 21st/Lyndale Option	Project Alignment with West Broadway/Lyndale Option	Project Alignment with 21st/East of I-94 Option ¹	Project Alignment with West Broadway/East of I-94 Option ¹
Biological Resources	No impacts in the City of Minneapolis	No impacts in the City of Minneapolis	No impacts in the City of Minneapolis	No impacts in the City of Minneapolis
Stormwater/Water Quality	<ul style="list-style-type: none"> City of Minneapolis – 6.4 acres of impervious surface increase 	<ul style="list-style-type: none"> City of Minneapolis – 5.9 acres of impervious surface increase 	<ul style="list-style-type: none"> City of Minneapolis – 7.4 acres of impervious surface increase 	<ul style="list-style-type: none"> City of Minneapolis – 7.9 acres of impervious surface increase
Air Quality/GHG Emissions ²	<ul style="list-style-type: none"> Estimated annual GHG emissions reduction of 14,527.26 million tons of CO₂ equivalent in 2040 General reduction in mobile source air toxics 	<ul style="list-style-type: none"> Estimated annual GHG emissions reduction of 14,527.26 million tons of CO₂ equivalent in 2040 General reduction in mobile source air toxics 	<ul style="list-style-type: none"> Estimated annual GHG emissions reduction of 13,592.87 million tons of CO₂ equivalent in 2040 General reduction in mobile source air toxics 	<ul style="list-style-type: none"> Estimated annual GHG emissions reduction of 13,592.87 million tons of CO₂ equivalent in 2040 General reduction in mobile source air toxics
Energy ²	<ul style="list-style-type: none"> Estimated annual reduction of 119 billion Btu in transportation energy use in 2040 	<ul style="list-style-type: none"> Estimated annual reduction of 119 billion Btu in transportation energy use in 2040 	<ul style="list-style-type: none"> Estimated annual reduction of 119 billion Btu in transportation energy use in 2040 	<ul style="list-style-type: none"> Estimated annual reduction of 119 billion Btu in transportation energy use in 2040

¹East of I-94 refers to the alignment option that runs adjacent to the I-94 corridor, and not the East of I-94 sub-option. The East of I-94 sub-option is discussed in Chapter 2.

²Air quality/greenhouse gas emission and energy information are presented for the entire project, not just the City of Minneapolis segment.

³Includes total number of dwelling units at the affected properties. Additional noise measurements and analysis will be performed to determine potential impacts at each dwelling unit and the reasonable and feasible mitigation measures that would be implemented. See the *Noise and Vibration Technical Report* for additional details in Appendix A-5.