



THE GREEN LINE

**PROMOTING SAFETY AND CONNECTIONS
THROUGH A YEAR ROUND BICYCLE NETWORK
FOR FARGO, NORTH DAKOTA.**

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OULU, FINLAND

Bicycle Network Type: A separate and straightforward cycle path network

Population: 196,828

Size: 142.6 mi²

Amount of Bicycle Paths: Approximately 600 km

Planning Process: Oulu's bicycle planning started in the 1970s. Their bicycle network has been being constructed along with the city making the network very strong and easy to navigate.

Bicycle Network Successes: The key to Oulu's success was the early implementation of bicycle friendly design. The first bicycle plan was made in the early 1970's and was implemented by 1982. Ever since the city of Oulu has constructed an average of 17 km bicycle paths/ year. Oulu, Finland is named winter cycling capitol of the world.



UMEA, SWEDEN

Bicycle Network Type: Prioritized cycle path and footway network

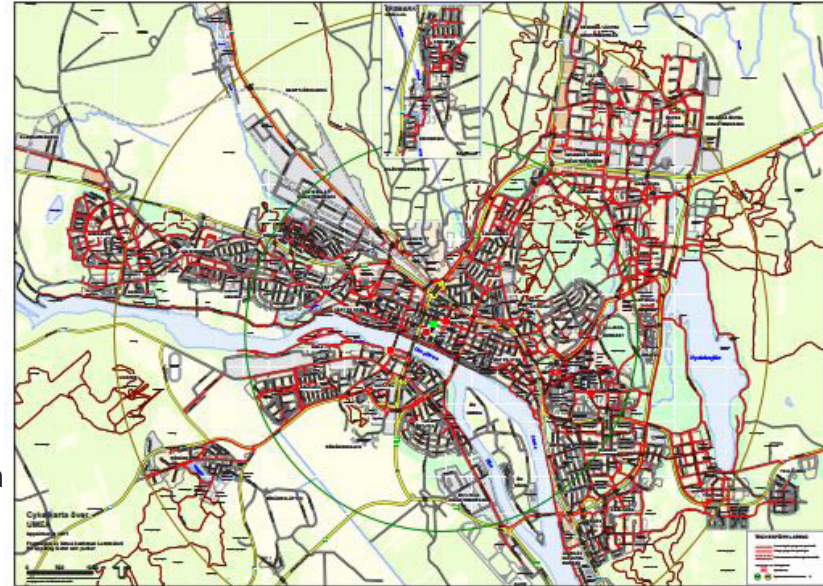
Population: 111,503

Size: 13.19 mi²

Amount of Bicycle Paths: Approximately 240 km, 67km belong to the prioritized cycle path and footway network, which has stronger winter maintenance quality requirements

Planning Process: The town of Umea looked over all of their bicycle network and determined areas that saw high traffic. These areas were then prioritized into the cycle path and footway network mentioned above. This network grants access to all residential areas to the university, hospital and the city center

Bicycle Network Successes: Umea succeeds in cost effectiveness, by separating heavily used pathways from pathways that are not used very often Umea saves money on winter maintenance costs. By separating paths and networks into two categories Umea saves money by not heavily maintaining pathways that will not be heavily utilized in the winter.



60%



“During the years 2008-12, about 786,000 Americans commuted by bicycle, up from about 488,000 in 2000.”

Each year the league of American Bicyclists ranks states in overall bicycle friendliness.

The top 4 are.

1. Washington
2. Minnesota
3. Delaware
4. Massachusetts

BIKING THROUGHOUT THE US

WASHINGTON



MINNESOTA



DELAWARE



MASSACHUSETTS



WASHINGTON



CATEGORY SCORES

LEGISLATION AND ENFORCEMENT 4

POLICIES AND PROGRAMS 4

INFRASTRUCTURE AND FUNDING 3

EDUCATION AND ENCOURAGEMENT 5

EVALUATION AND PLANNING 3

WASHINGTON



MINNESOTA



DELAWARE



MASSACHUSETTS



MINNESOTA



CATEGORY SCORES

LEGISLATION AND ENFORCEMENT 3

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MINNESOTA



DELAWARE



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DELAWARE



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EVALUATION AND PLANNING 2

WASHINGTON

MINNESOTA

DELAWARE

MASSACHUSETTS



MASSACHUSETTS



CATEGORY SCORES

LEGISLATION AND ENFORCEMENT 3

POLICIES AND PROGRAMS 4

INFRASTRUCTURE AND FUNDING 3

EDUCATION AND ENCOURAGEMENT 4

EVALUATION AND PLANNING 3

WASHINGTON



MINNESOTA



DELAWARE



MASSACHUSETTS



“Dedicate state funding for bicycle projects and programs, especially those focused on safety and eliminating gaps and increasing access for bicycle networks.”

-League of American Bicyclists Judging Committee

Currently North Dakota is ranked 39 overall. North Dakota is strong in both the Policies and Programs and on Education and Encouragement. However, the two areas that North Dakota struggles with are Infrastructure and Planning.

CATEGORY SCORES

LEGISLATION AND ENFORCEMENT 2

POLICIES AND PROGRAMS 3

INFRASTRUCTURE AND FUNDING 1

EDUCATION AND ENCOURAGEMENT 3

EVALUATION AND PLANNING 1

FARGO, ND



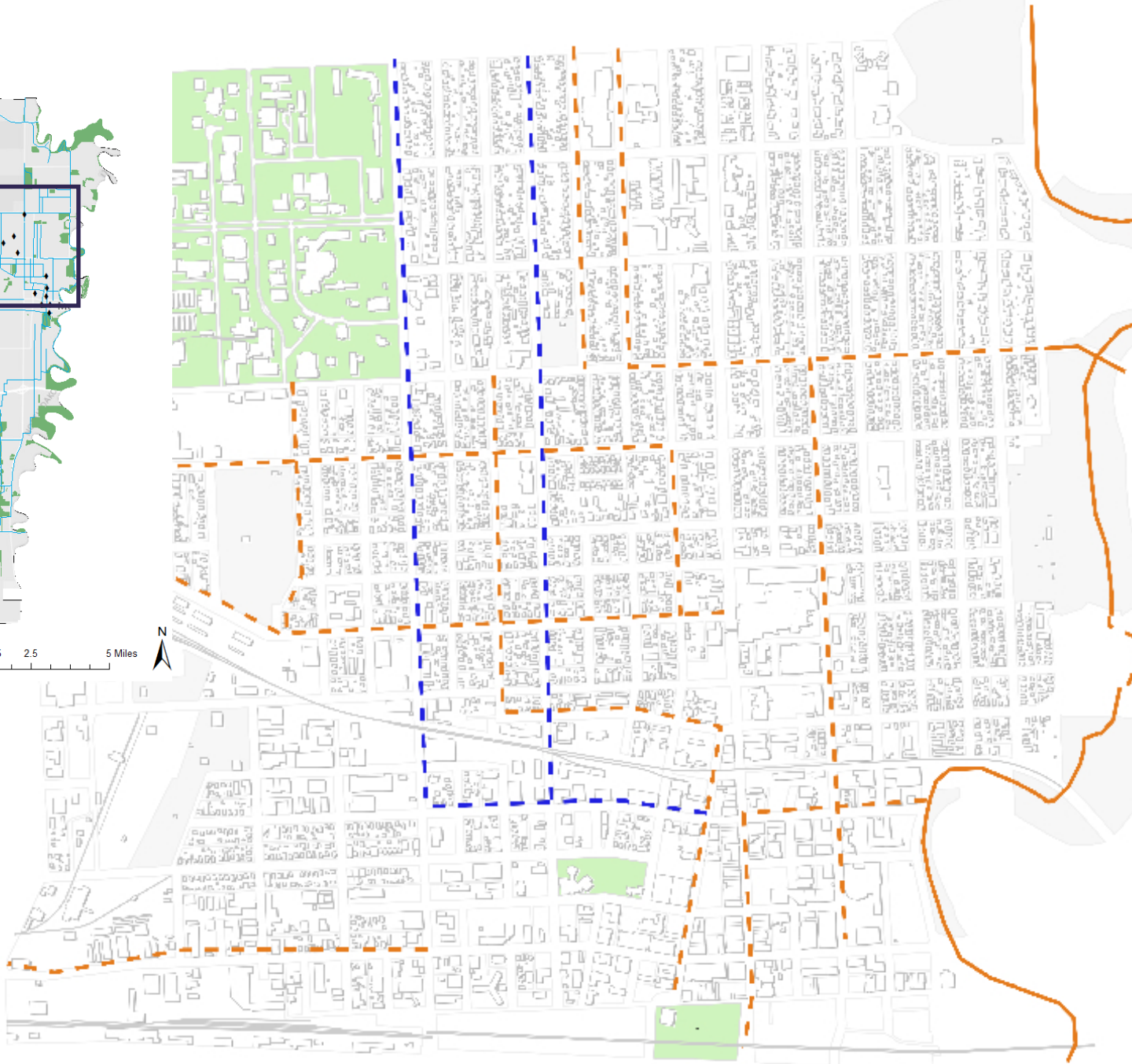
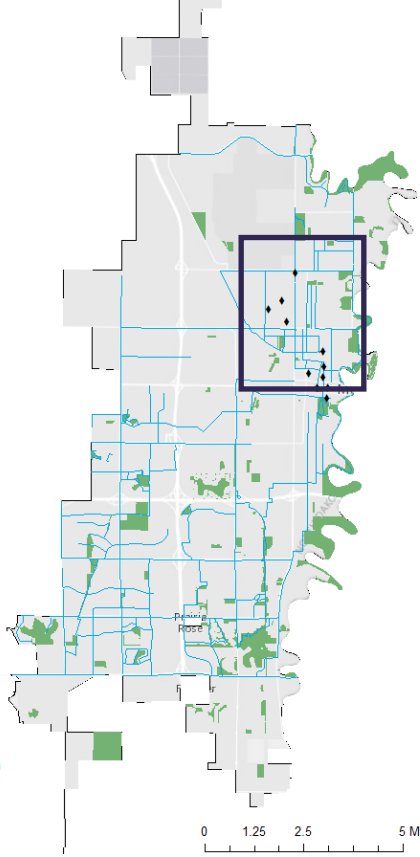
Total Bicycle Network Mileage to
Total Road Network Mileage
23%

Ridership
0.80%

Fargo was awarded a bronze rank in November of 2014 and shows signs that it is improving in bicycle friendliness



BICYCLE NETWORK





WORN AND WEATHERED

Many existing bike lane symbols are worn and hard to see from a distance. During the winter the bike lanes are even harder to see due to snow covering most of the lane.

Sand and trash collect on the side of the street causing the bike path to have unsafe riding conditions.

COLLECTS RUNOFF AND SEDIMENTS





SNOW COVER

Snow from the plough collects on the bike lane decreasing visibility and safety.

COLLECTS RUNOFF AND SEDIMENTS

Stormwater can collect on the side of the street in some areas causing portions of the bikelane to be slick and dangerous.



EVENTS



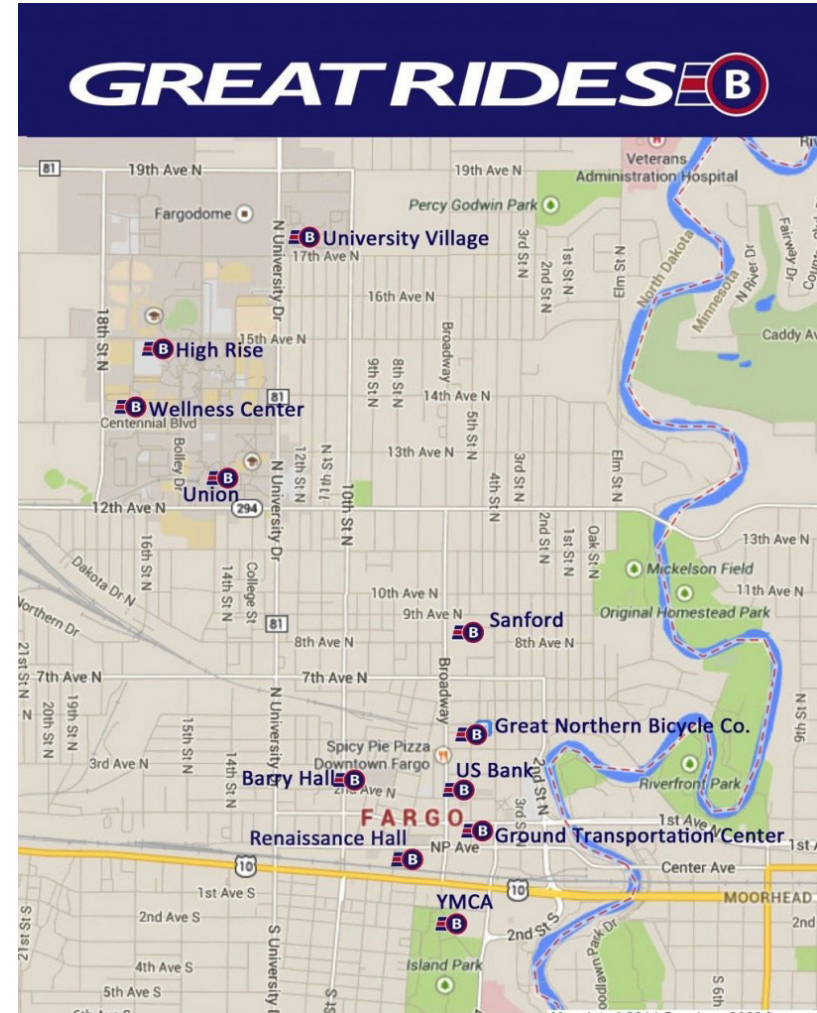
Streets Alive, Fargo/Moorhead



Rotary Ride, Fargo/Moorhead



B-CYCLE BIKE SHARE



Launched in 2015 the bike share program provided bicycles to the residents of Fargo through 11 docking stations.

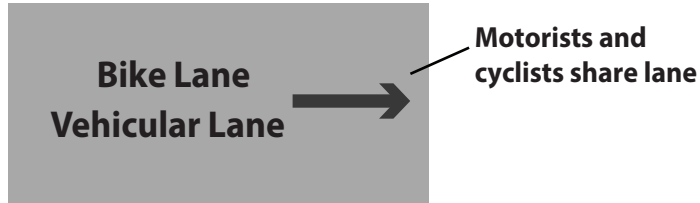
Cycling as a means for transportation and for recreation has been steadily increasing throughout the years in the United States. More cities are beginning or have finished projects involving bicycle infrastructure to address this growing trend. Fargo, North Dakota is no exception. Fargo has risen in bike friendliness over the years due to creating new bicycling infrastructure like bike lanes, promoting cycling through events and starting a bike share program.

Fargo's bicycle network however is lacking. Many of the existing bicycle paths are worn down making them harder to see and ride. This causes cyclists to favor the sidewalks over the bike lanes creating potential pedestrian conflicts. Winter maintenance for bicycle lanes in Fargo is little to non-existent with many paths being covered in snow and runoff creating unsafe conditions for cyclists.

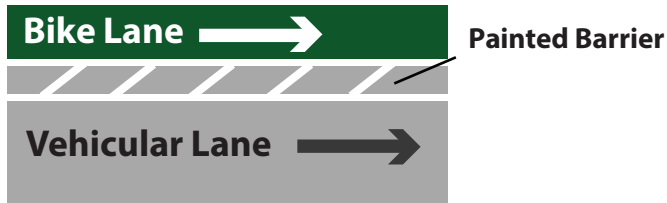
By proposing a bicycle network that builds off the former, that provides a stronger maintenance plan and provides a stronger visual identity through wayfinding and amenities can help encourage new cyclists to pick up cycling or encourage cyclists to use cycling as a mode of transportation more often.

BIKELANE TYPES

SHARROW



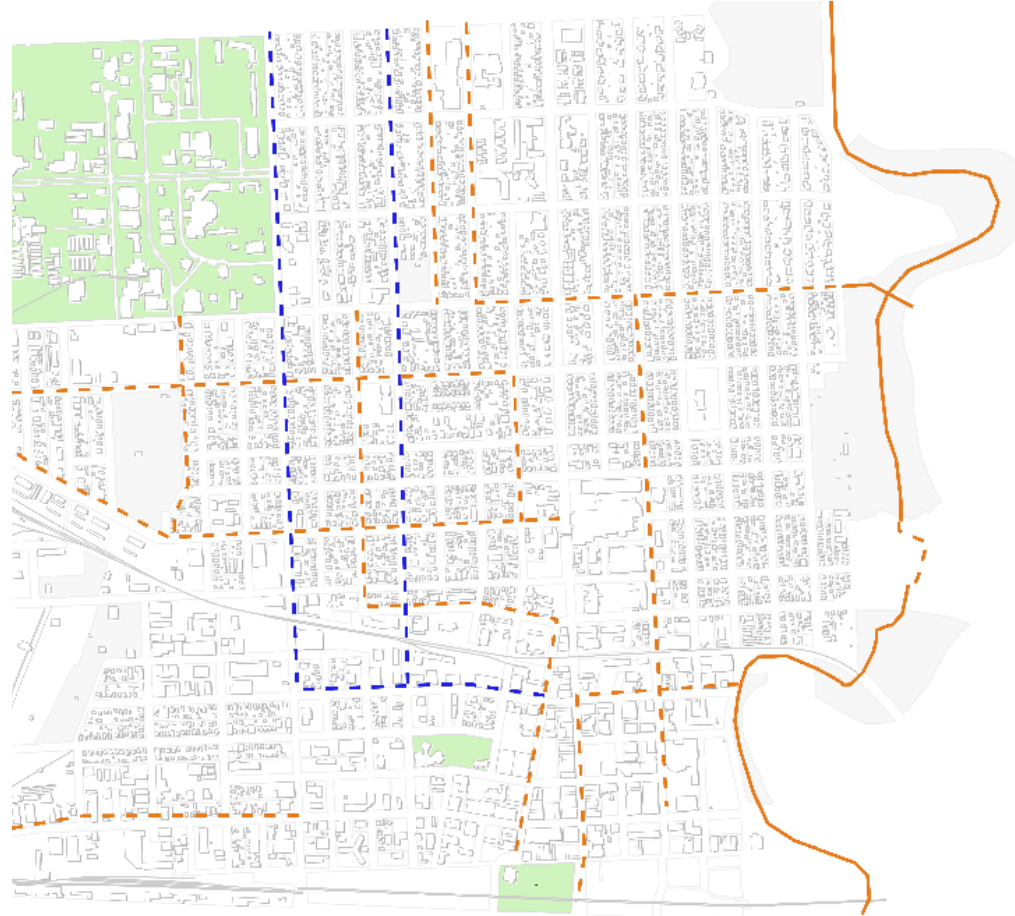
BUFFERED BIKELANE

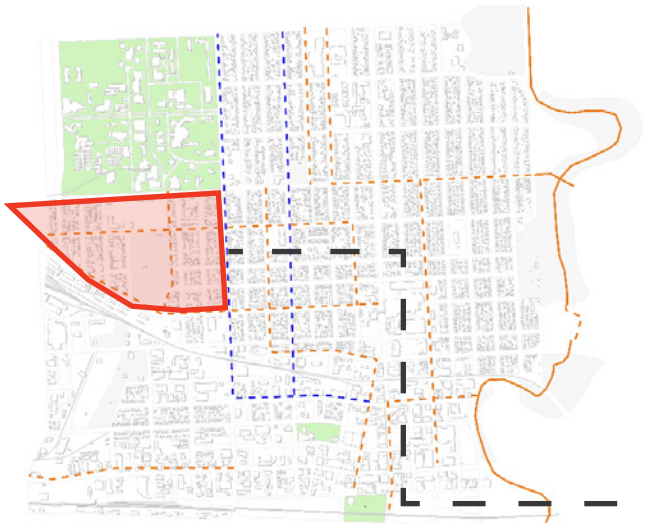


SHARROW



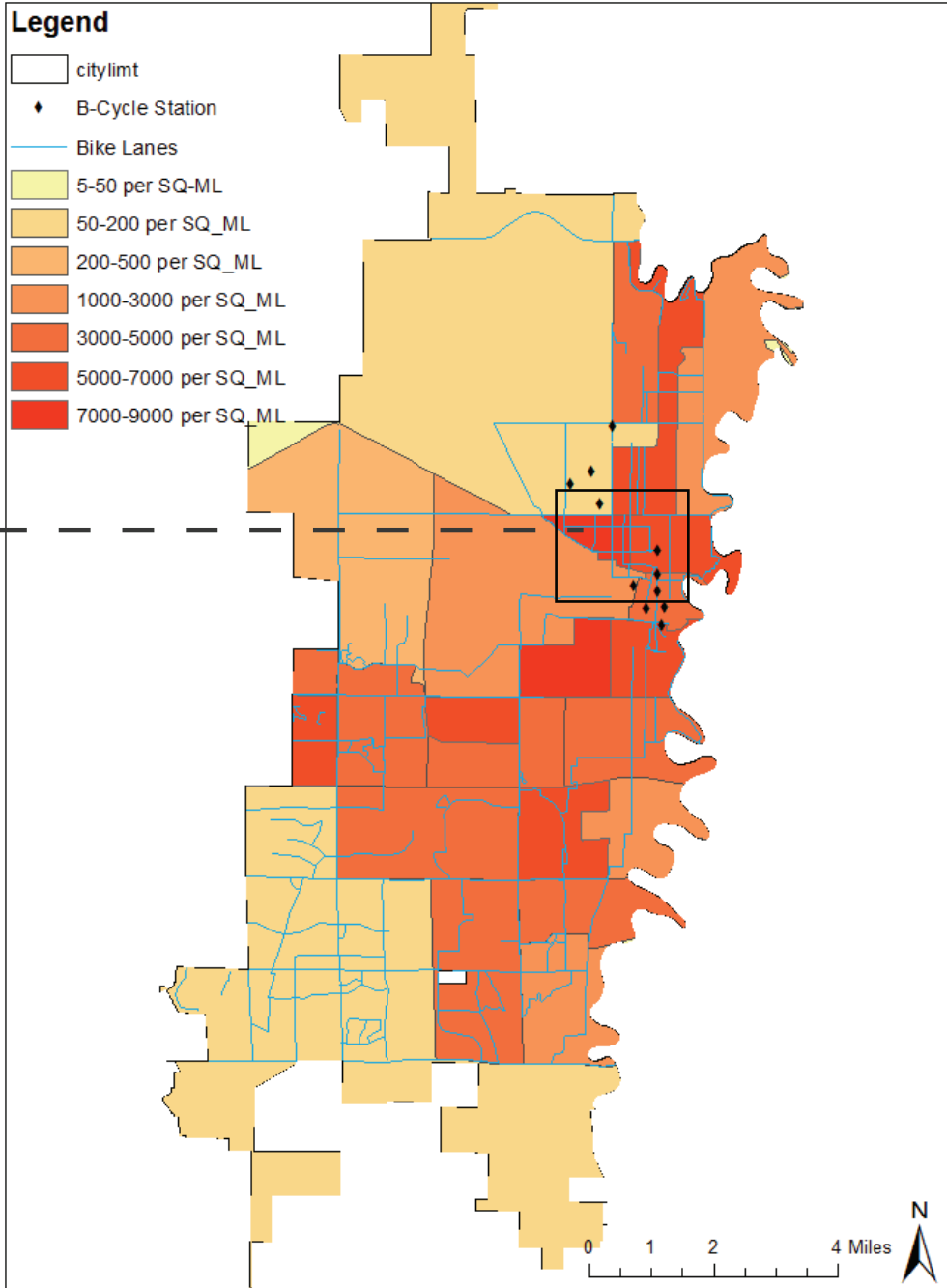
BUFFERED BIKELANE



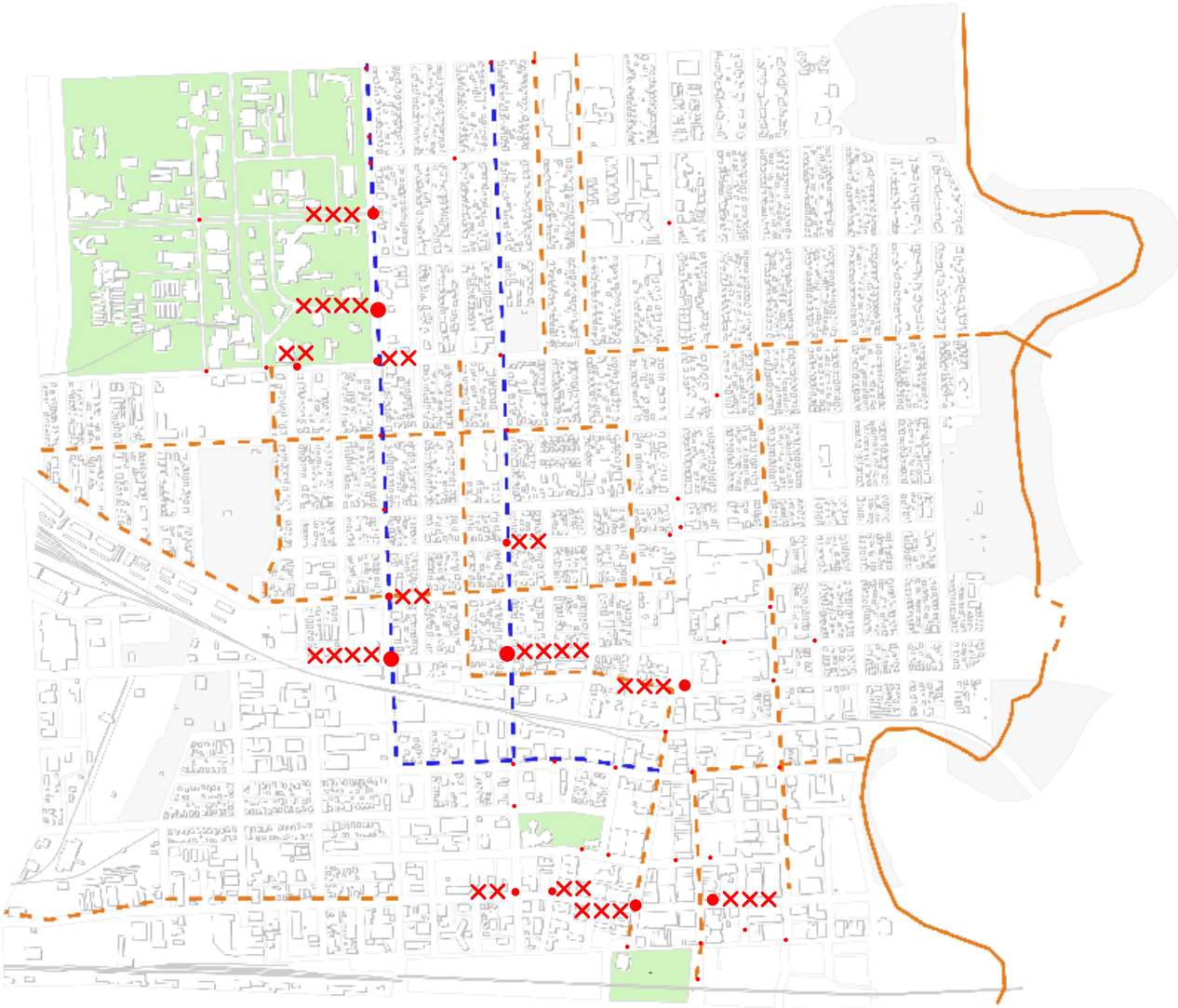


ROOSEVELT

- No dedicated bikelanes
- No bikeshare stations
- Very High population and housing density
- Zone map labels it as University housing



CRASHES



-Most of the collisions occurred at intersections

-Visibility of the bicycle lanes need to be increased. Especially at intersections

BIKELANE VISIBILITY

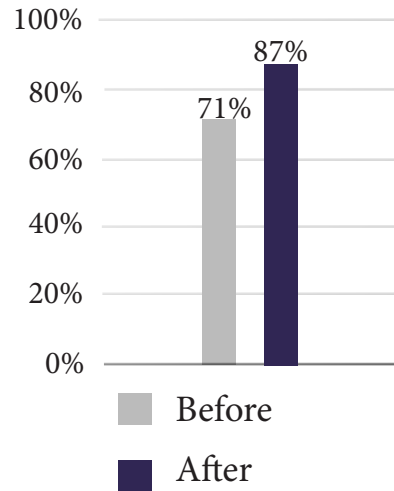


Painted bikelane in Oulu, Norway

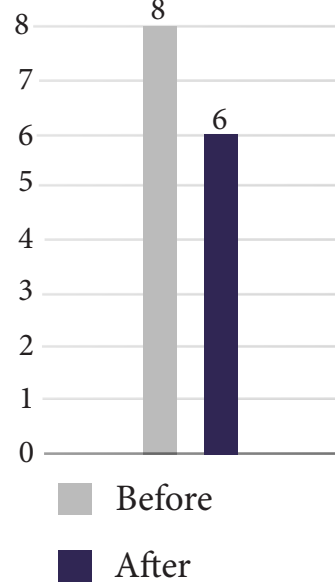


Painted bikelane in New York

Motorists slows/ stops



Number of Conflicts



FINDINGS FROM EUROPE

-A Swedish study found the use of colored markings increased safety per bicyclist by 20 percent.

-Denmark found the use of blue markings reduced bike motor vehicle collisions by 38 percent and fatalities and serious injuries by 71 percent.

-Studies in England showed colored markings to be effective at reducing conflicts.

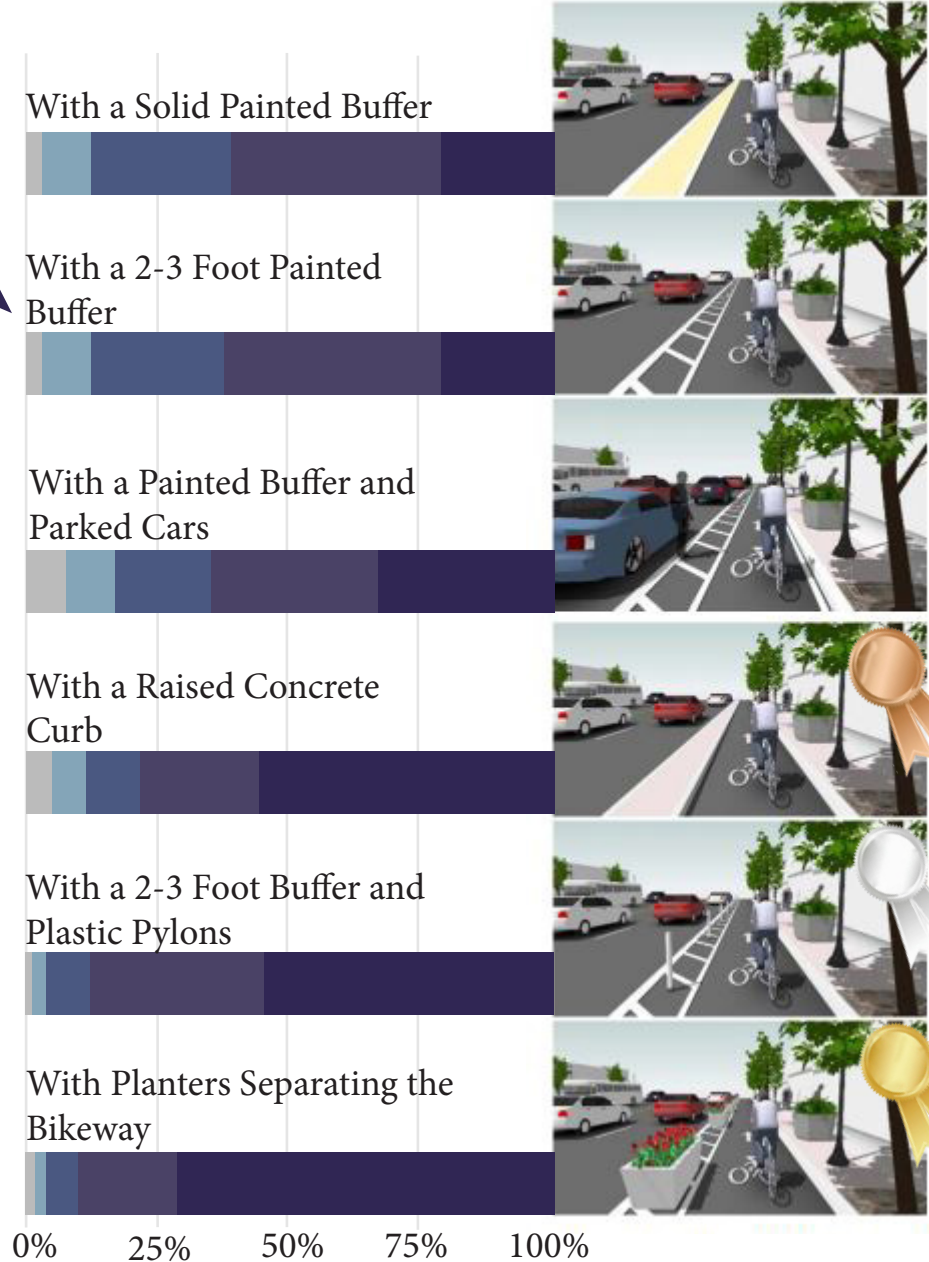
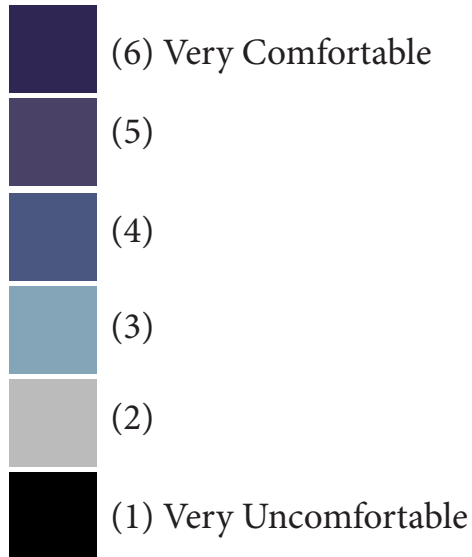


Study done in Portland, recorded data through video of the street without a painted lane and with a painted lane.

BIKELANE BUFFER TYPE

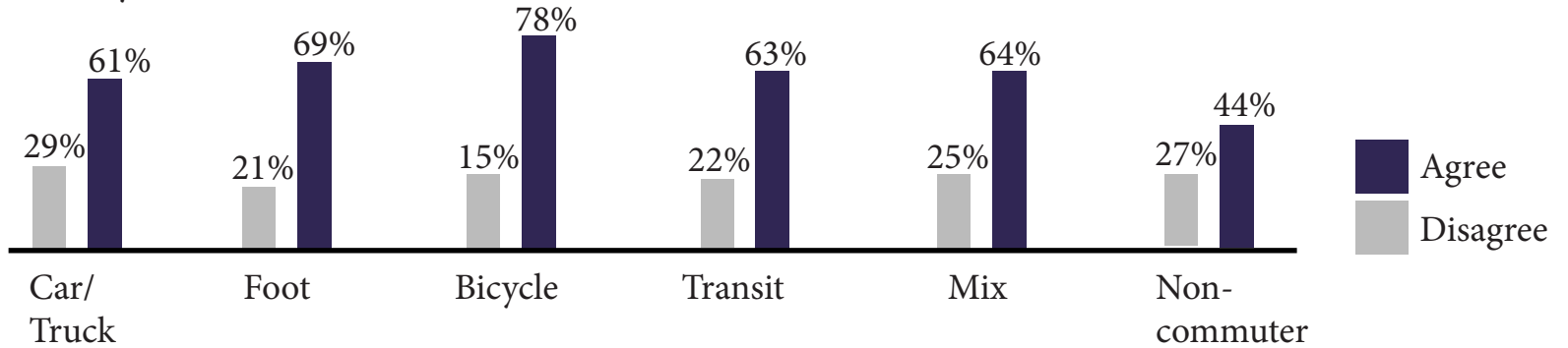
This survey was given out to adults in the 50 largest U.S. metro areas by the National Association of Realtors, conducted by Portland State University

Buffer type currently being used in Fargo



INTEREST IN CYCLING BY PRIMARY COMMUTE MODE

I would be more likely to ride a bicycle if motor vehicles and bicycles were separated by a barrier.

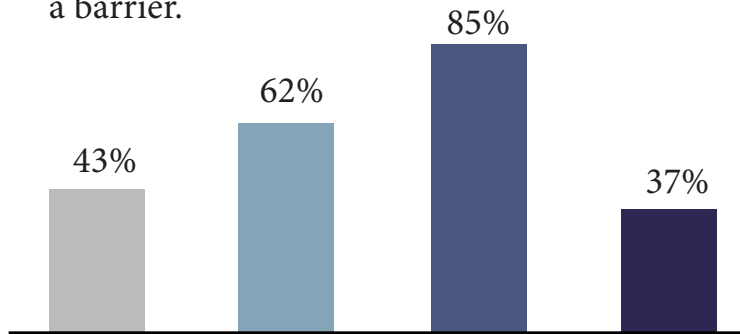


INTEREST IN CYCLING BY RIDER TYPE

Rider Type



I would be more likely to ride a bicycle if motor vehicles and bicycles were separated by a barrier.



FARGO RIDERSHIP

Protected bike lanes have shown through surveys and research that they help increase ridership and encourage new cyclist growth.



- 1 Build upon the existing bicycle network to make it available all year round. This is done by implementing a maintenance plan that is similar what you would find in Europe. The Green Line would be designated a primary transportation route while the other bicycle lanes would be secondary. The plan for primary routes is that once the snow on the bike path reaches 4 cm the area will be ploughed. Anti-skid treatment will be carried out frequently with methods used to remove snowfall being ploughing and warmwetted sanding
- 2 The bicycle network is easy to find and navigate. To increase visibility the bicycle lanes will be painted green compared to the existing network paths that are not painted. Wayfinding will be used throughout the bicycle network to ensure that the rider is always confident in where they are going when traveling the Green Line.
- 3 Create a bicycle network that will connect to the already existent transportation systems in the City of Fargo. The Green Line will incorporate both the MATBUS transportation routes and the already existent bicycle network. This will enhance the already existing network by providing many transportation options for however uses the Green Line.

I/A

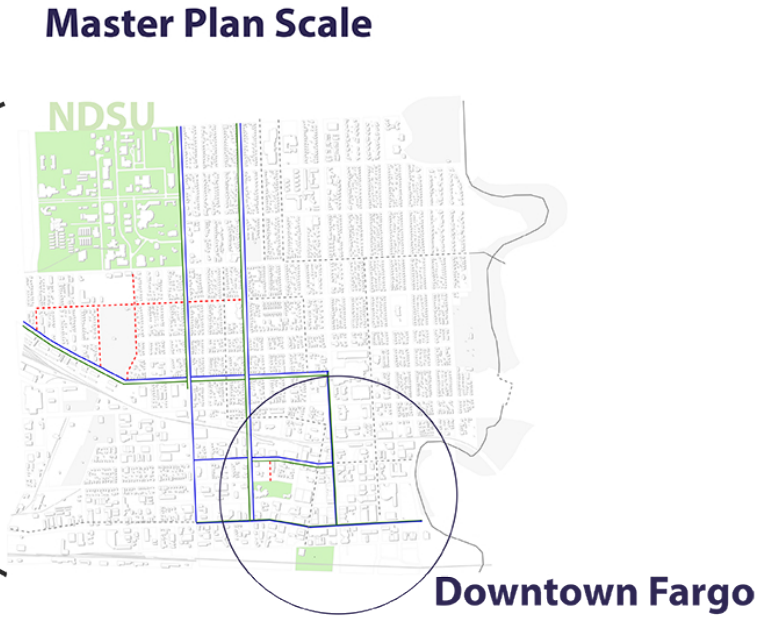
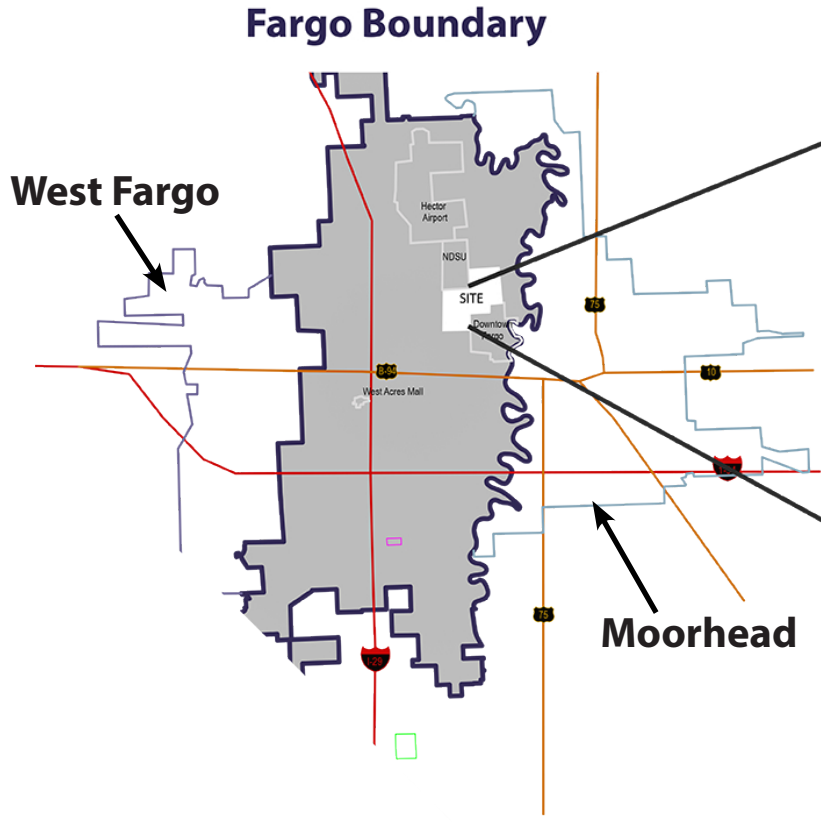
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MASTER PLAN

KEY



Existing Bike Share Station



Proposed Bike Share Station



NDSU Buildings



Existing Park

BIKE LANE TYPES



Existing Bike Lane



Proposed Sharrow



Protected Bike Lane



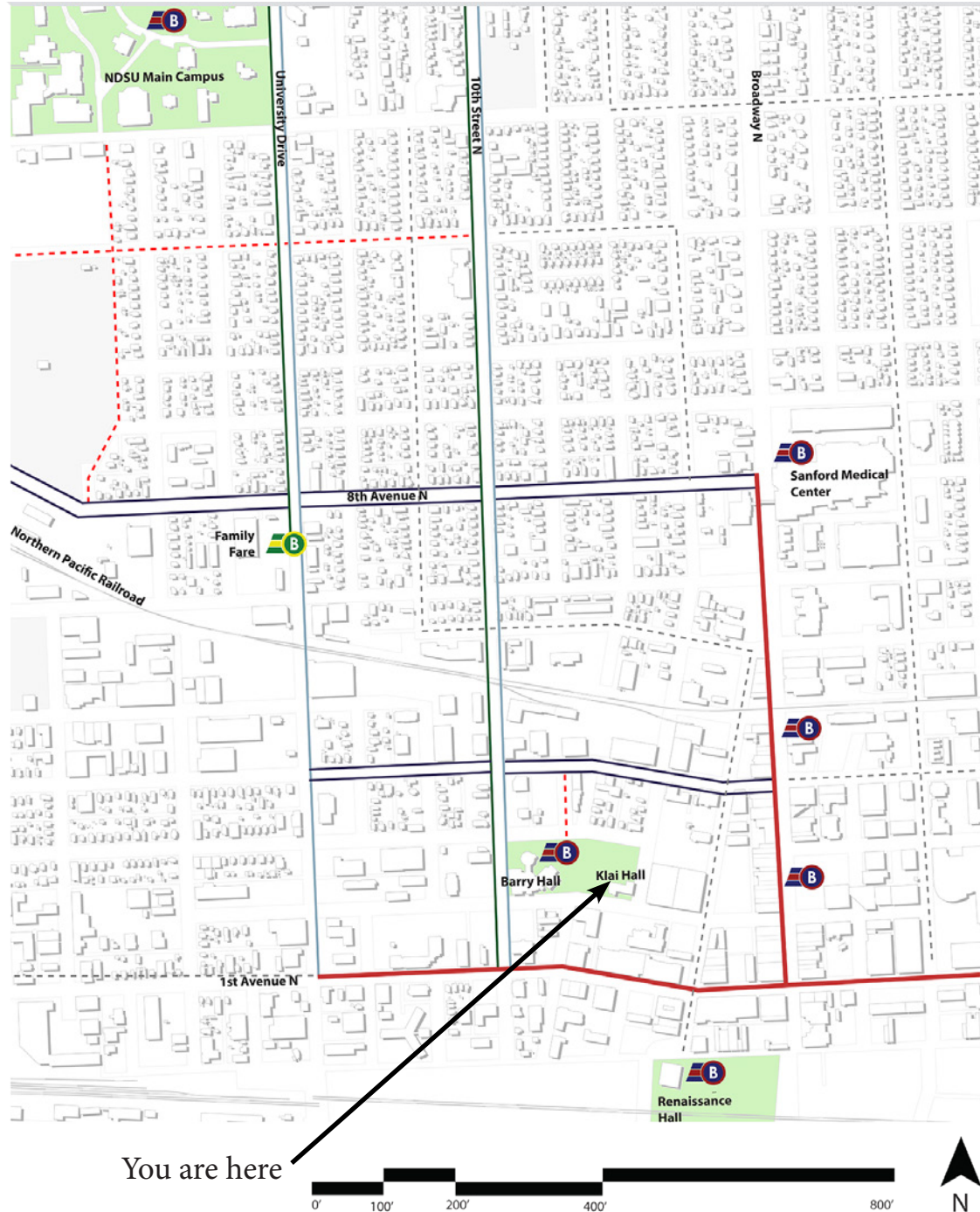
Protected contra flow Bike Lane



Buffered Bike Lane



Pedestrian and Cyclist Shared Lane



PRIMARY

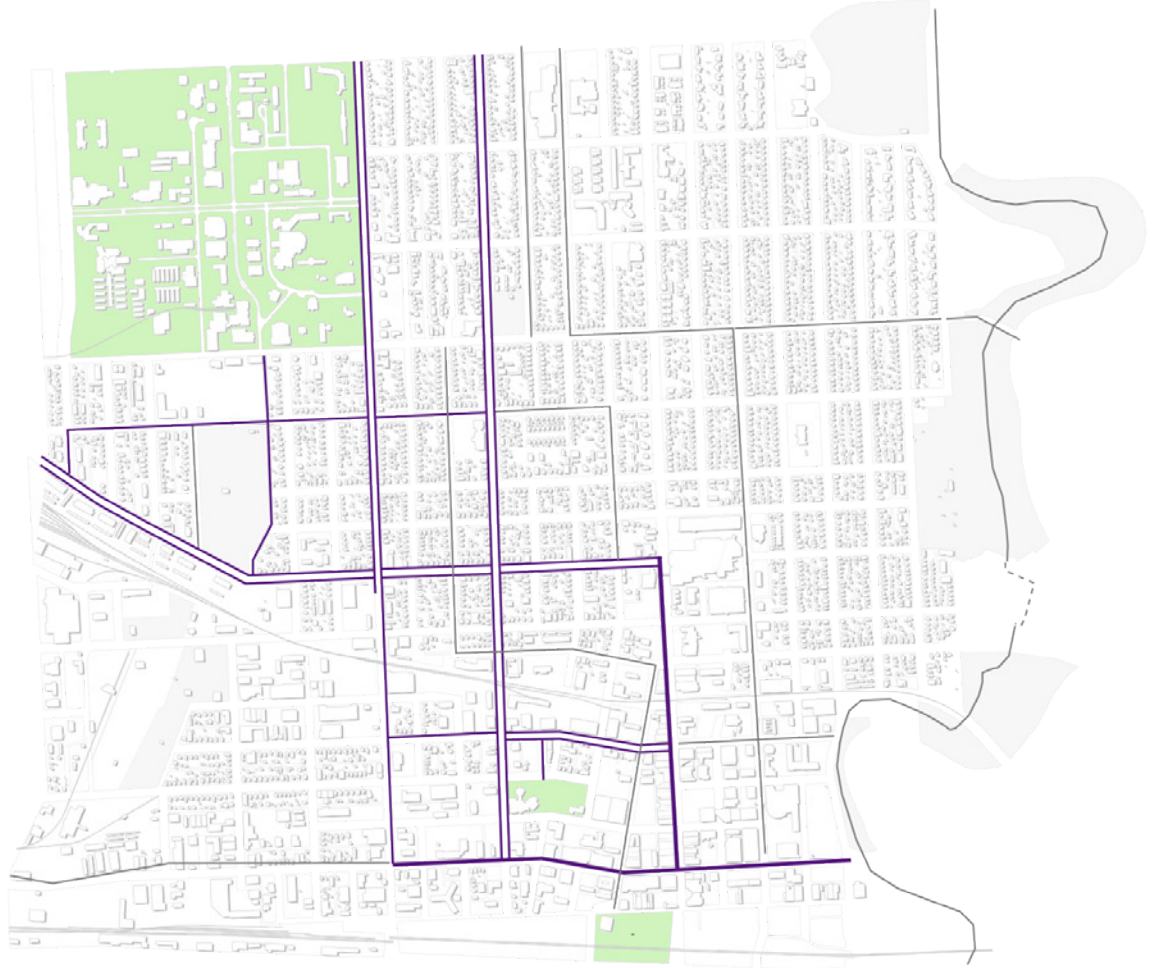
Primary routes are plowed within four hours of 3 centimeters of snow accumulation and de-icing treatments are applied before 7 am. Plowing is done before 7 am when snowing at night.

SECONDARY

Secondary routes are plowed within four hours of 5 centimeters of snow accumulation and de-icing treatments are applied as needed. Plowing is done before 7 am when snowing at night.

DE-ICING

A Beet juice solution with roadway sand will be used. Beet juice is an inexpensive additive to a de-icing solution that improves the adherence of salt and sand to the roadway and also lowers the freezing temperature of the ice.



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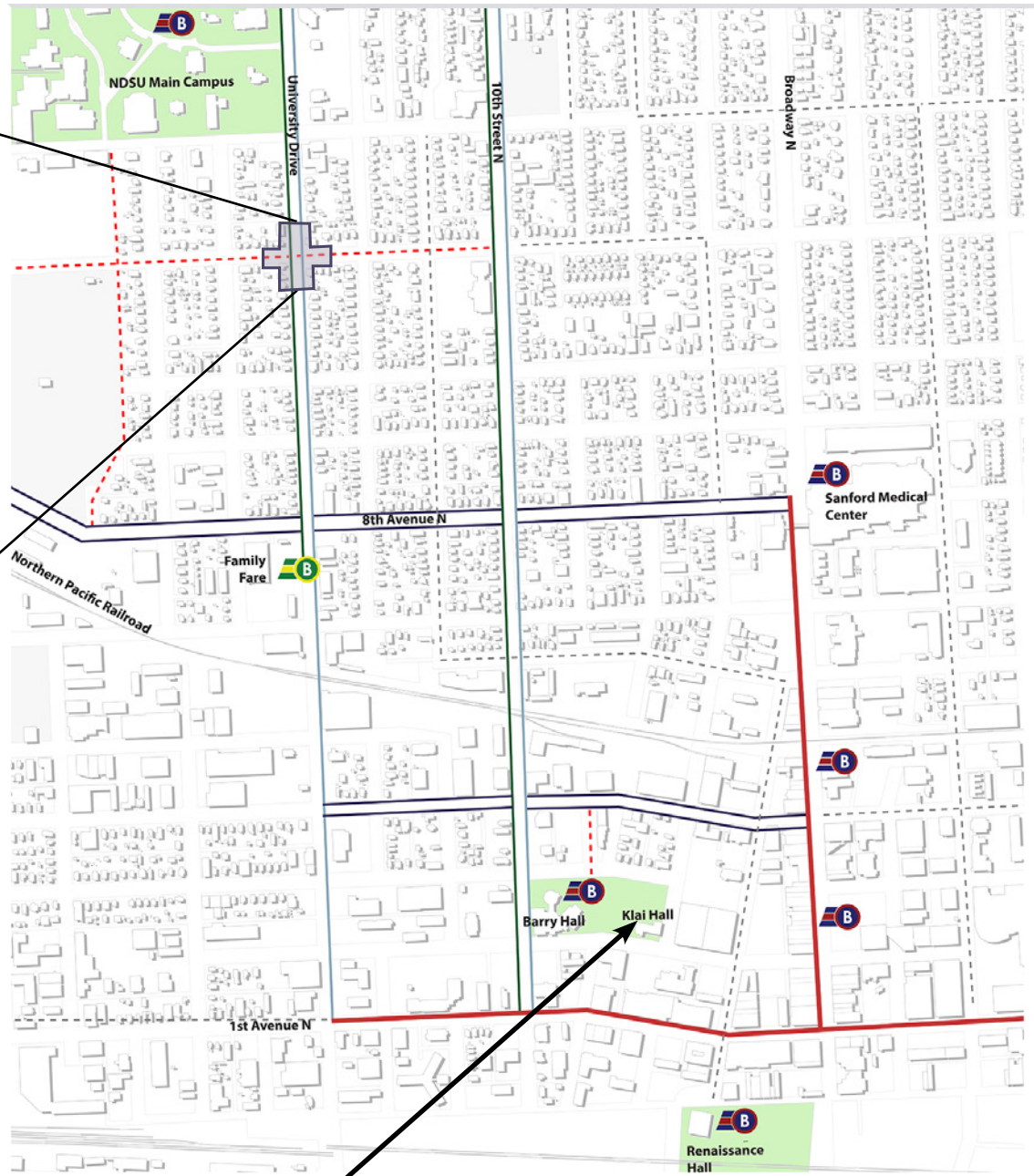
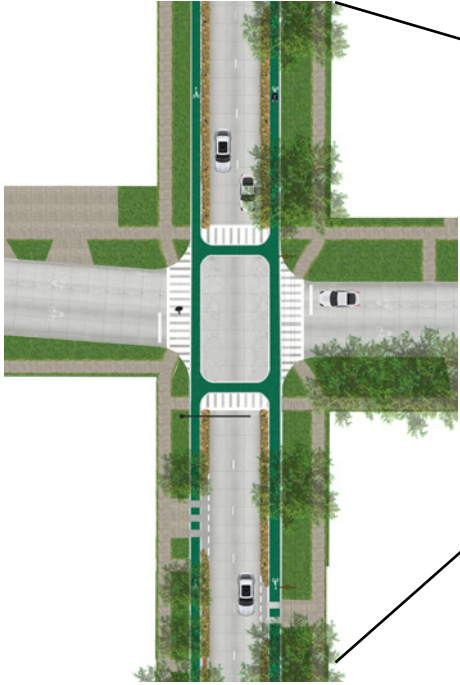
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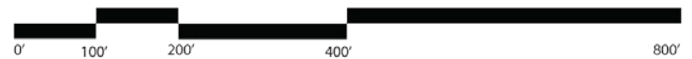
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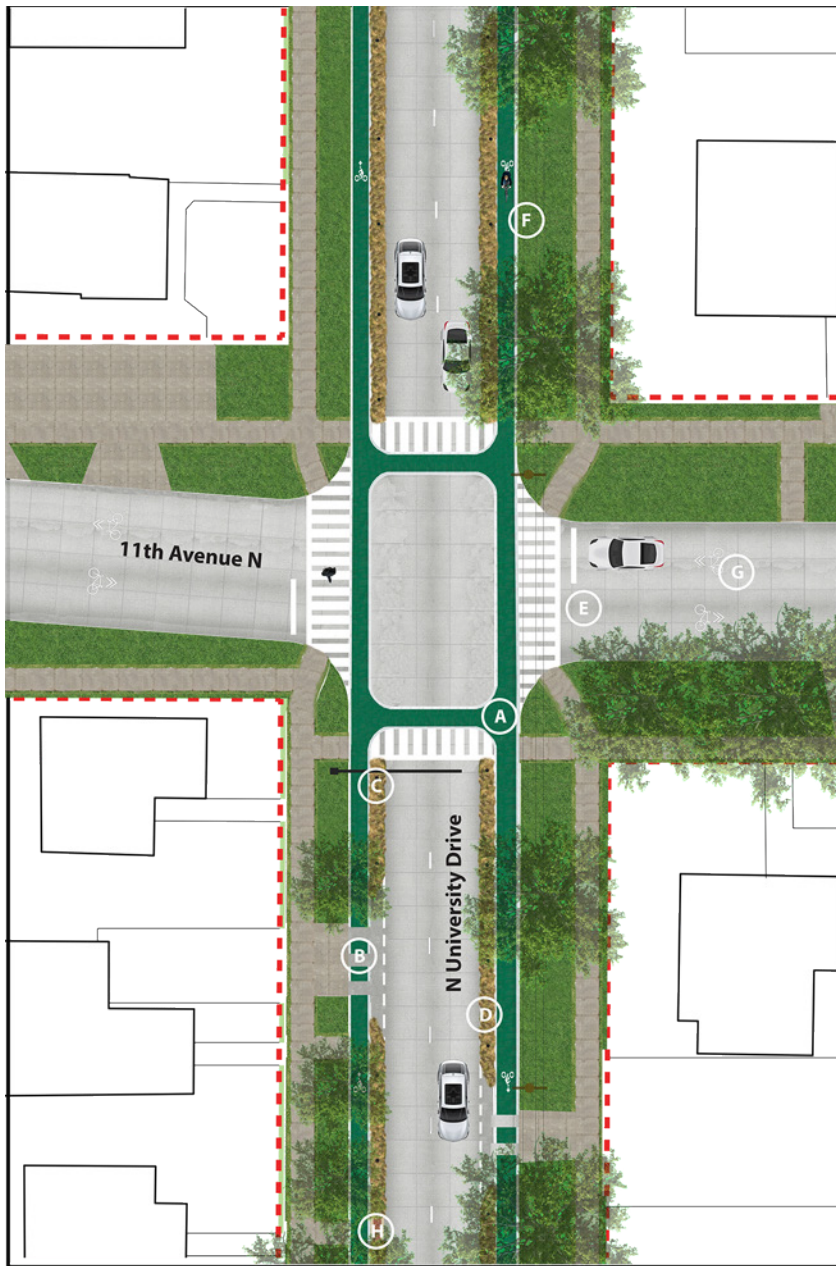
UNIVERSITY DRIVE N



You are here



SITE PLAN

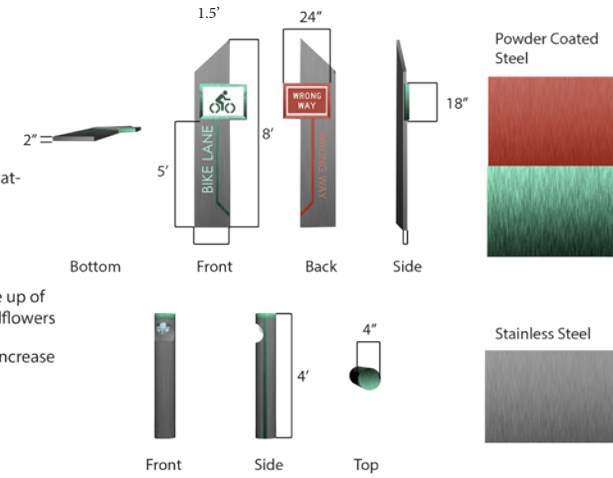


Signage and Lighting

The Green Line features custom made bicycle wayfinding signs. The bicycle sign meets the size requirements and features two sides to tell the user if they are going the right direction of the wrong direction.

Key

- (A)** Painted Bike Lane
- (B)** Dashed Bike Lane indicating vehicles can cross
- (C)** Lighting
- (D)** Vegetative buffer made up of prairie grasses and wildflowers
- (E)** Widened crosswalk to increase visibility
- (F)** Wayfinding Signage
- (G)** Existing Sharrow
- (H)** Gap in buffer to allow water to drain



PERSPECTIVE VIEW

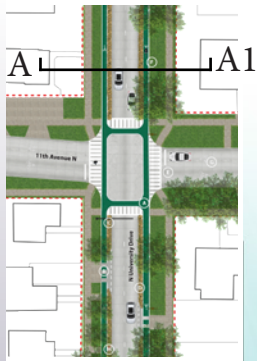
Perspective of Bike Lane

SPRING

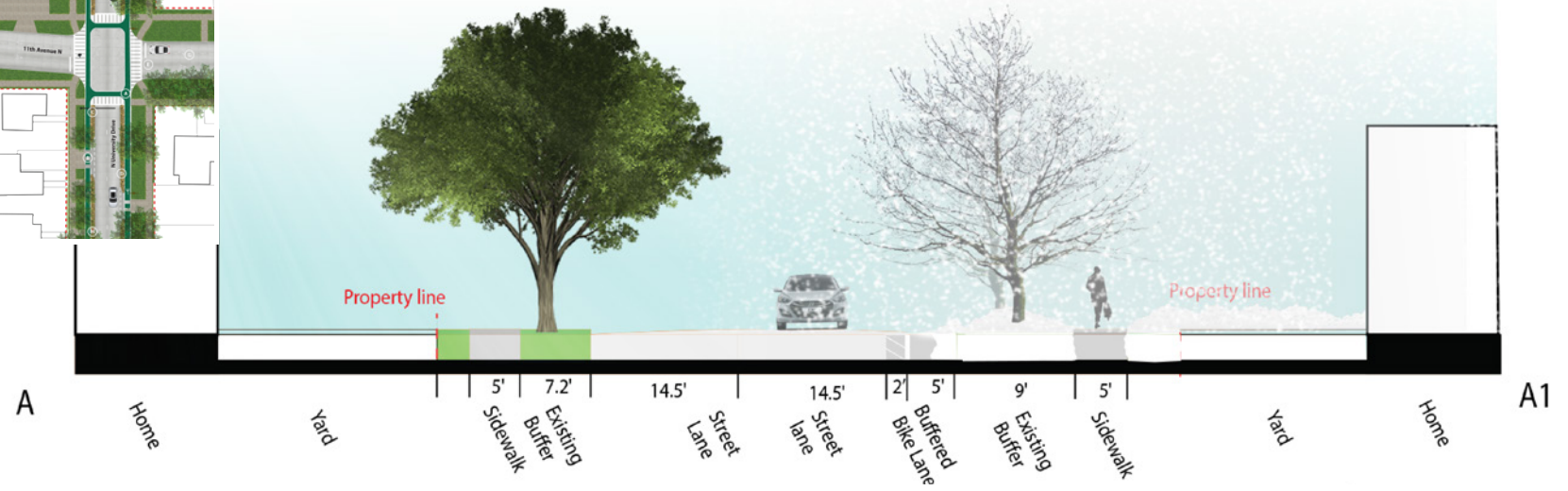


WINTER

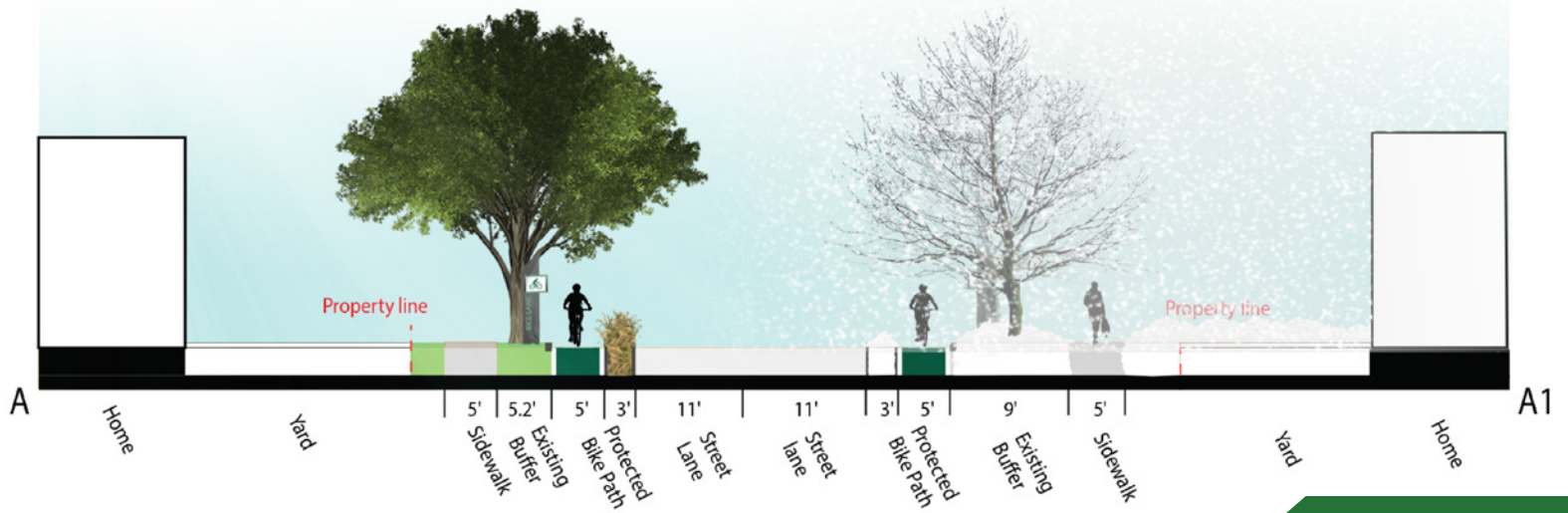
SECTIONS



EXISTING SECTION



PROPOSED SECTION



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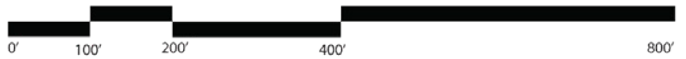
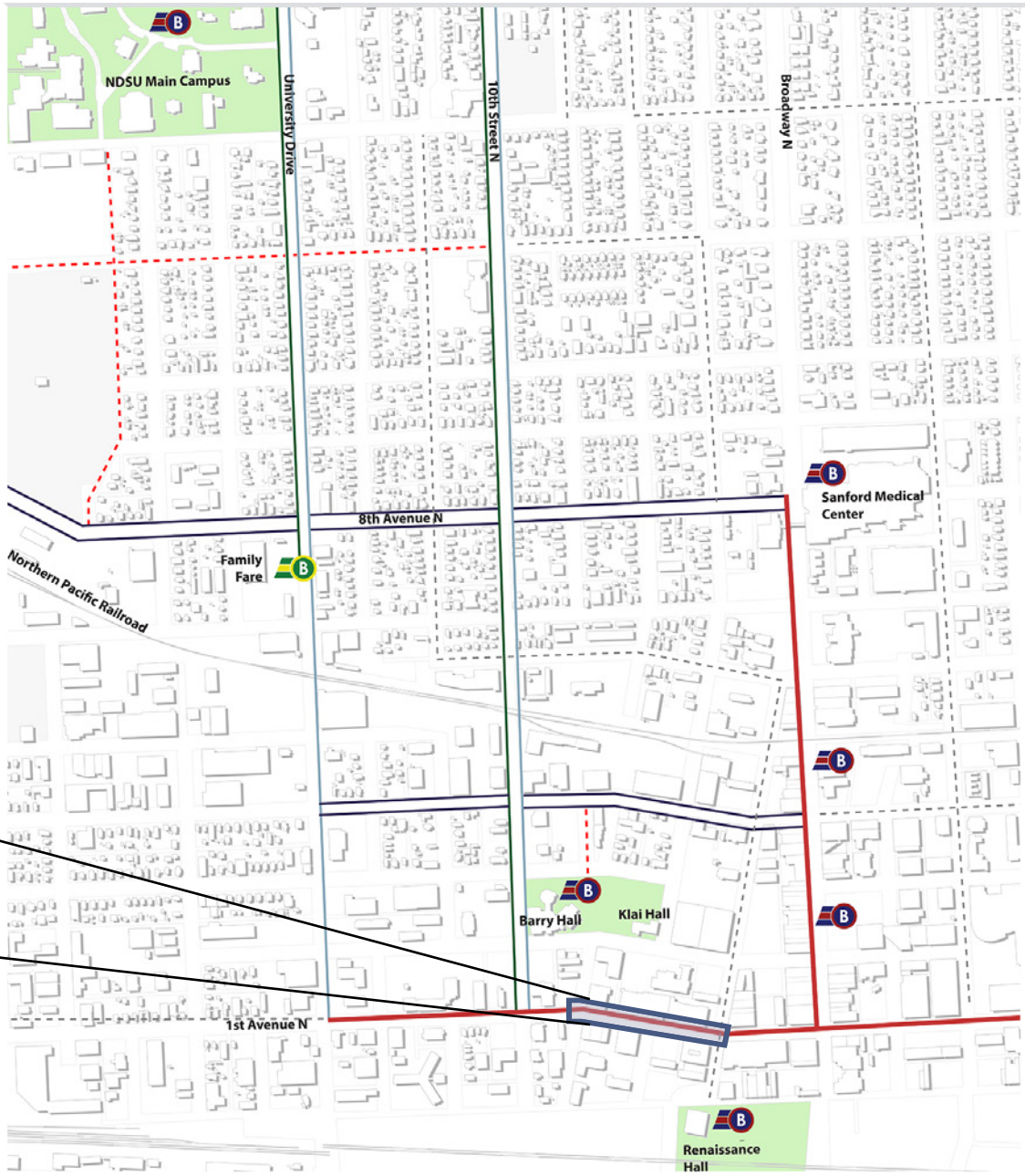
IST

8TH

UP

1ST AVENUE N

IST



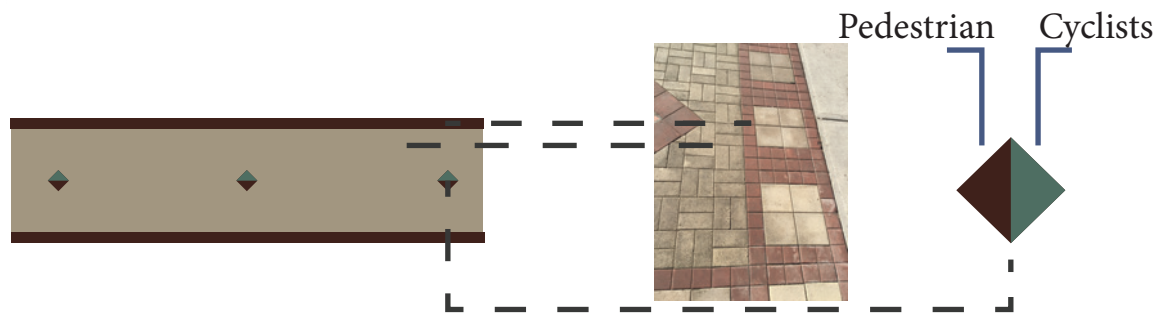
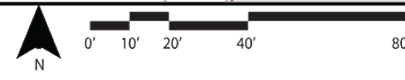
SITE PLAN



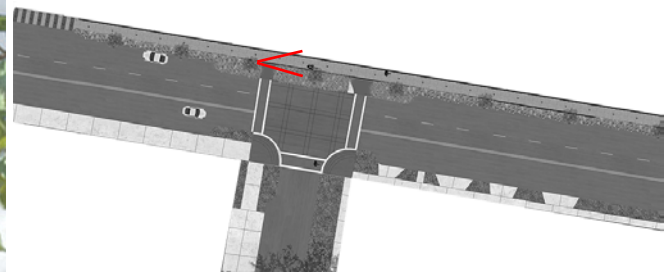
Key

- A** Mixed use walkway for both pedestrians and cyclists
- B** Dashed Bike Lane indicating vehicles can cross
- C** Lighting
- D** Vegetative buffer made up of prairie grasses and wildflowers
- E** Existing Crosswalk

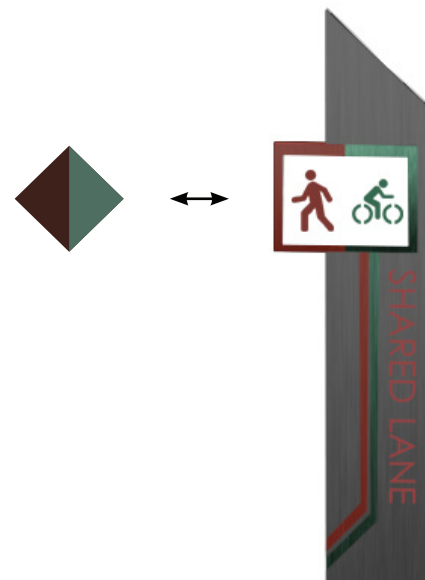
- F** Wayfinding Signage



PERSPECTIVE VIEW



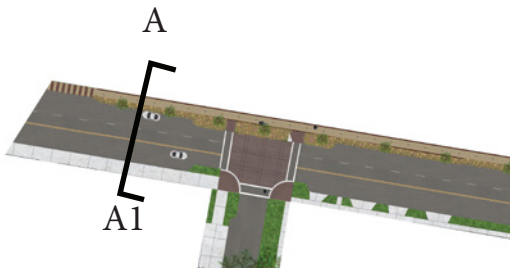
SHARED PATH SIGN



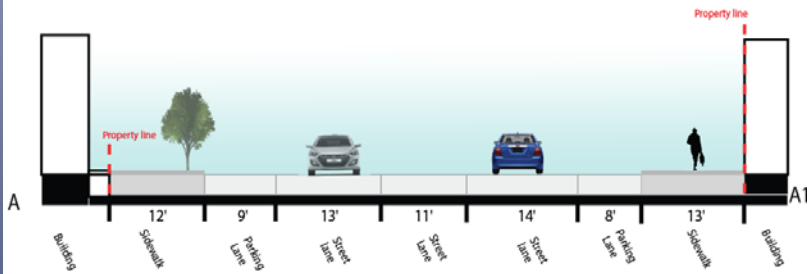


SPRING

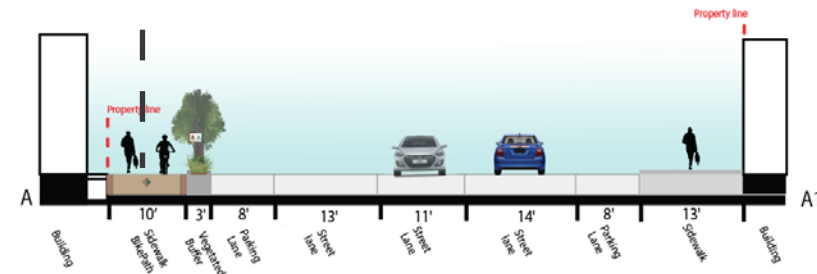
Similar to the other sites maintenance plans the shared use path can store some of the snow in the 3 foot buffers to provide a barrier in the winter.



WINTER



EXISTING SECTION



PROPOSED SECTION

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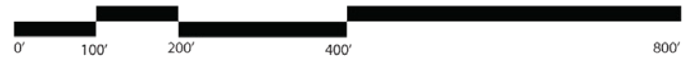
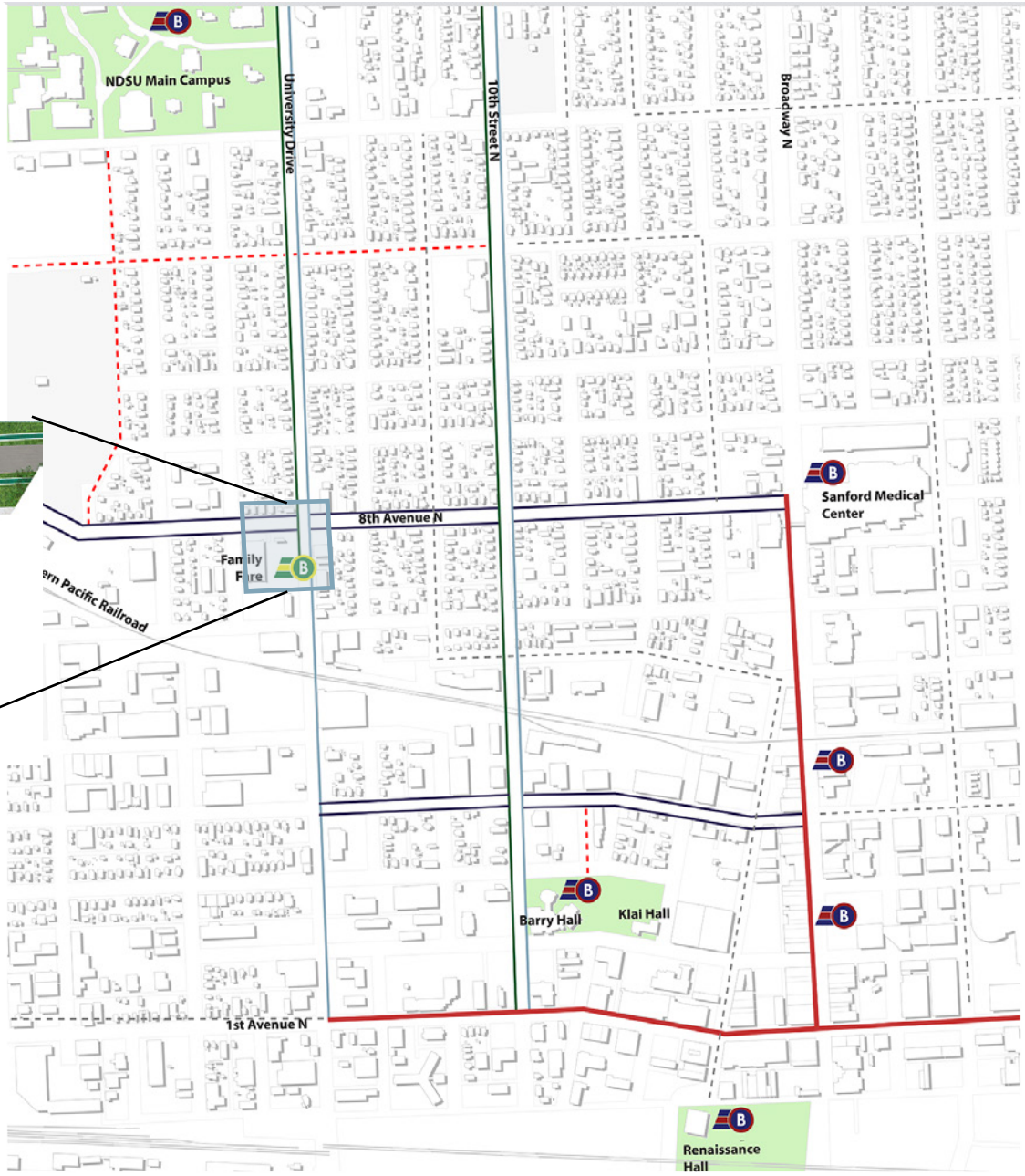
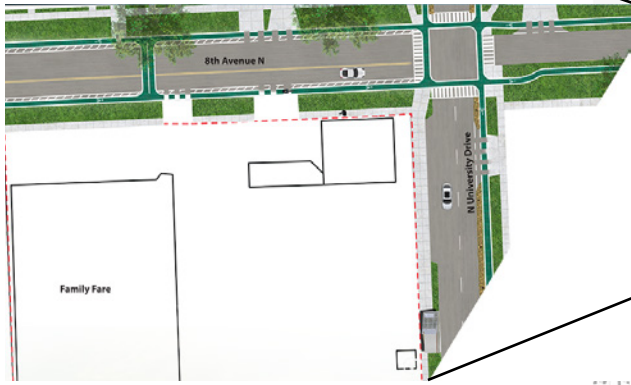
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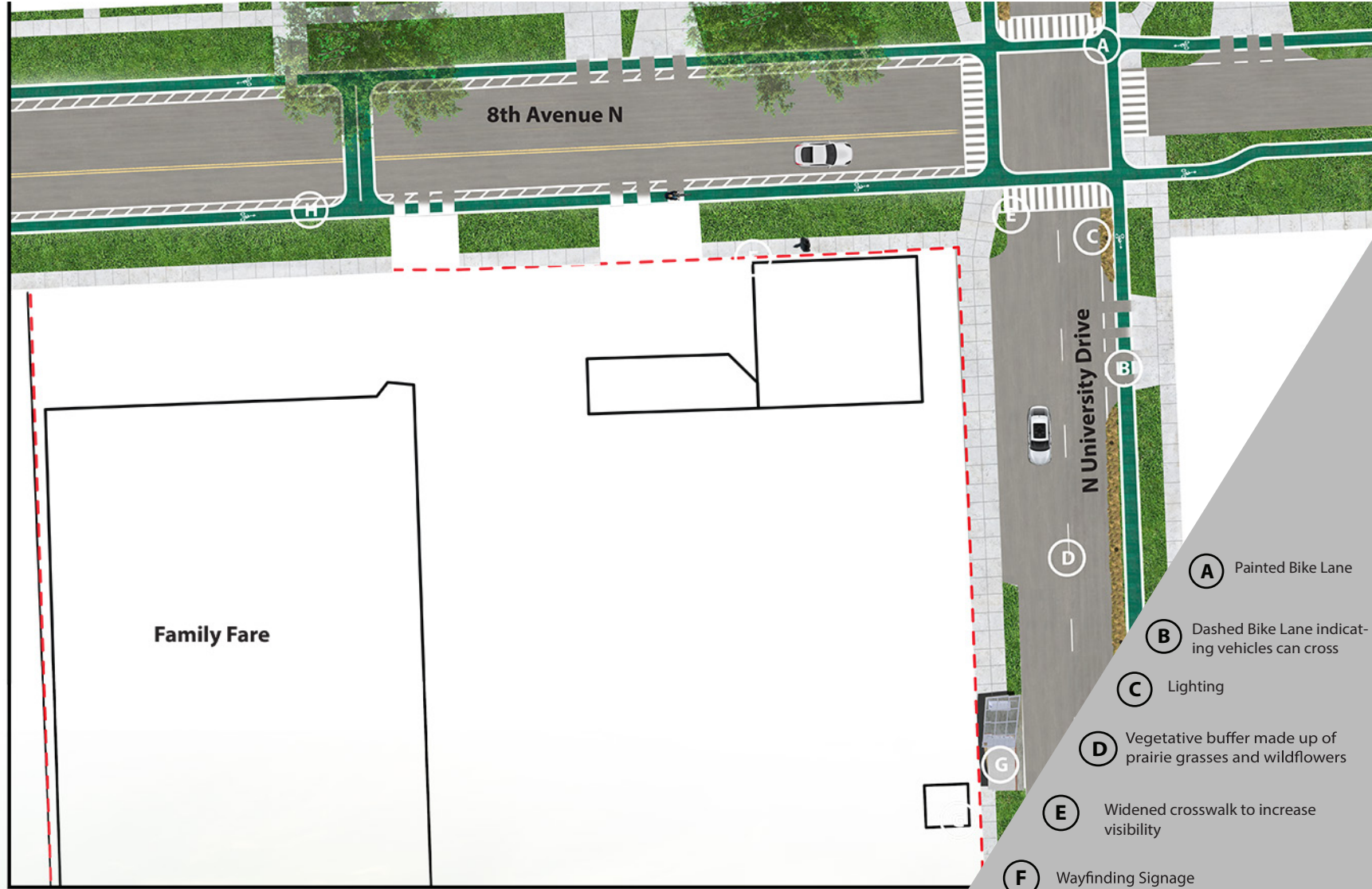
UP

8TH AVENUE N

8TH



SITE PLAN

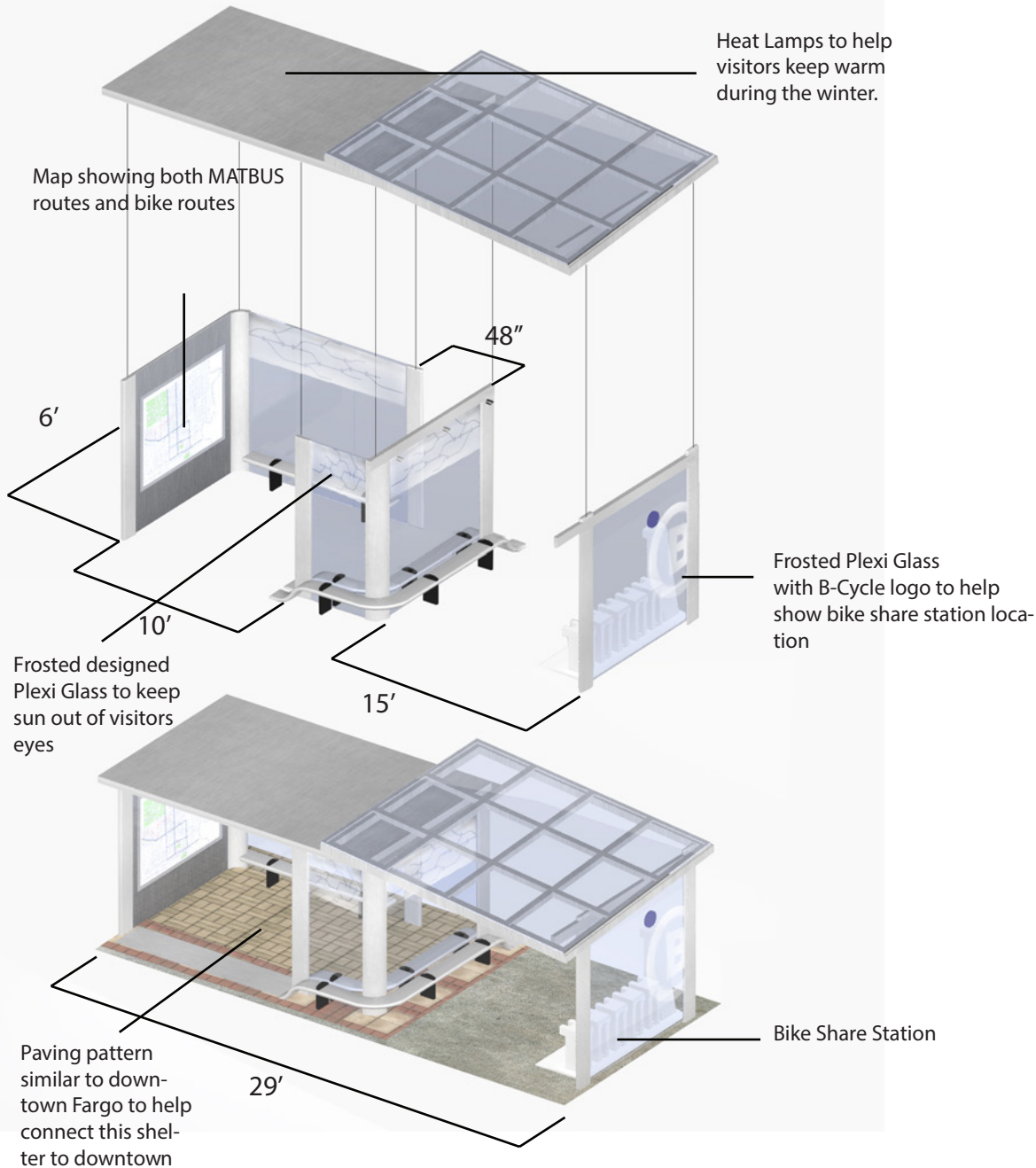


- A** Painted Bike Lane
- B** Dashed Bike Lane indicating vehicles can cross
- C** Lighting
- D** Vegetative buffer made up of prairie grasses and wildflowers
- E** Widened crosswalk to increase visibility
- F** Wayfinding Signage
- G** Bus Shelter and Bike share station
- H** Bike lane crossing to allow cyclists access to the Family Fare grocery store

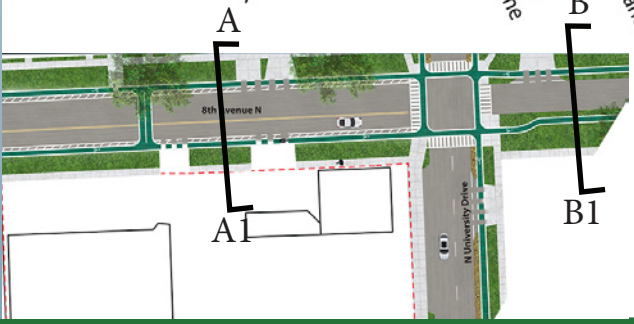
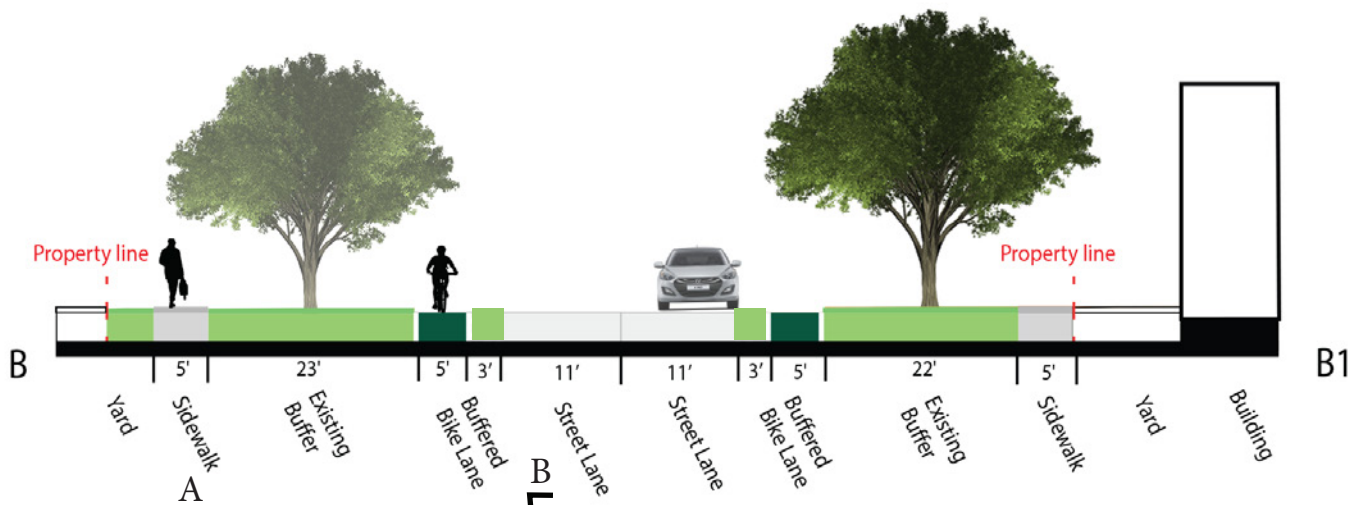
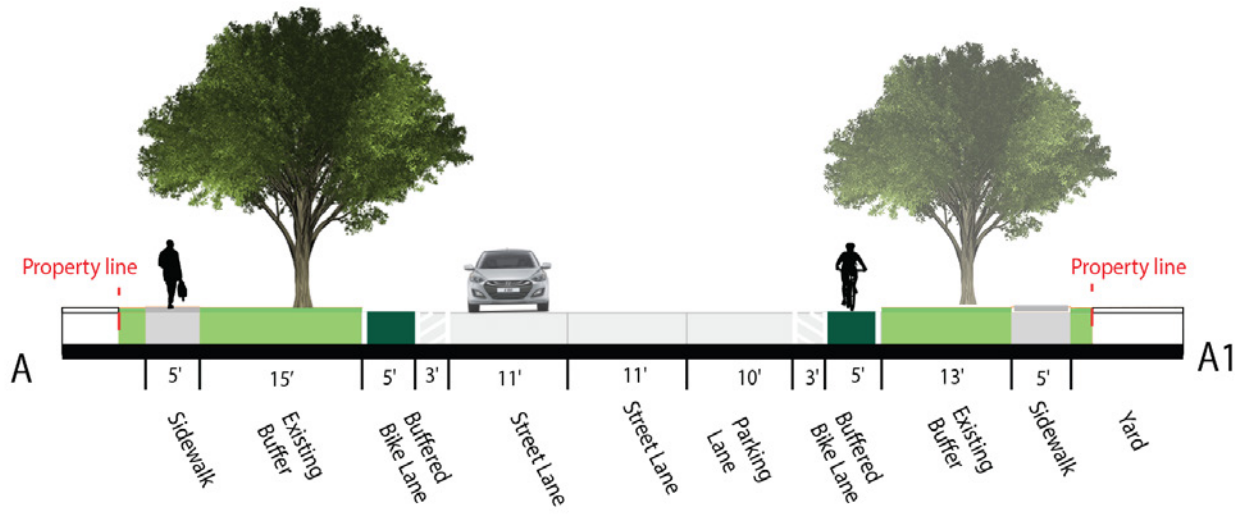
PERSPECTIVE VIEW



BUS SHELTER



SECTIONS



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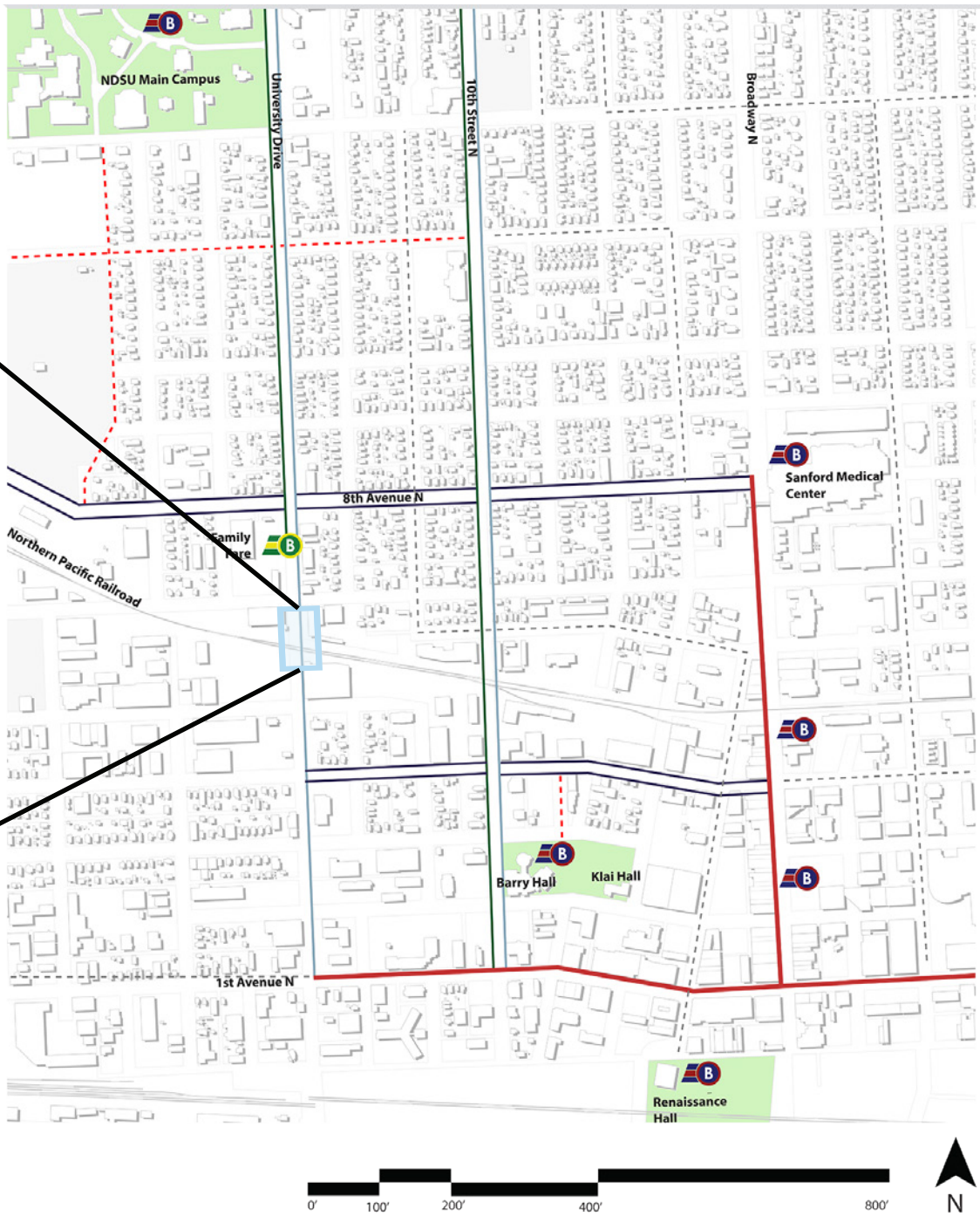
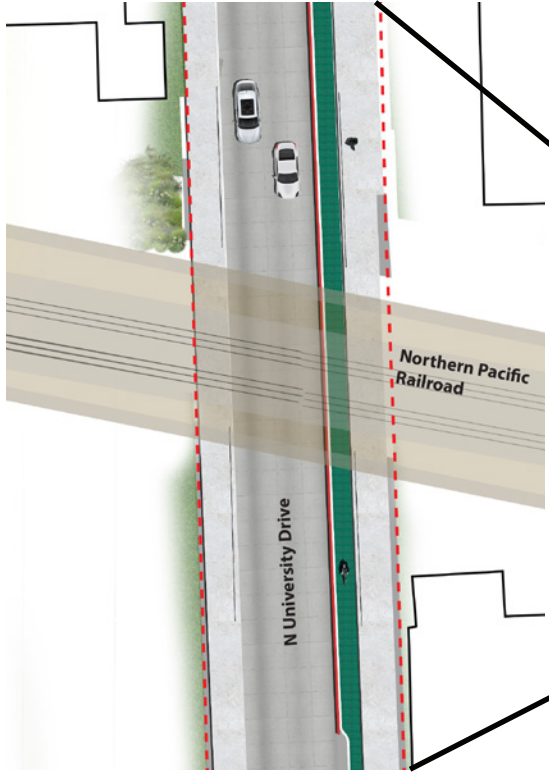
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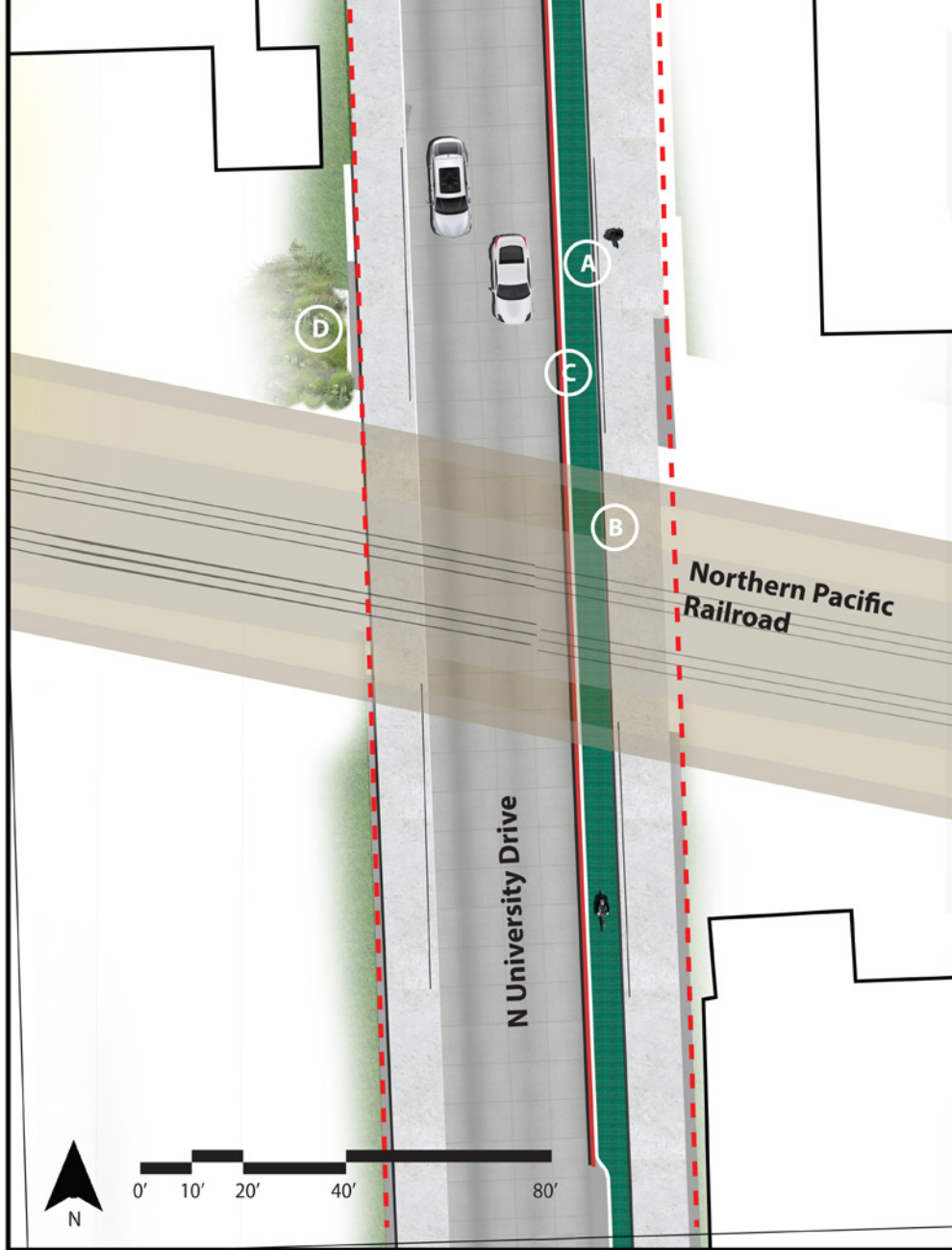
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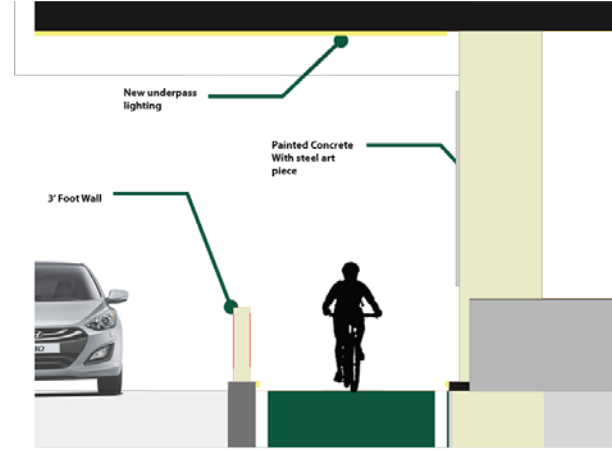


SITE PLAN

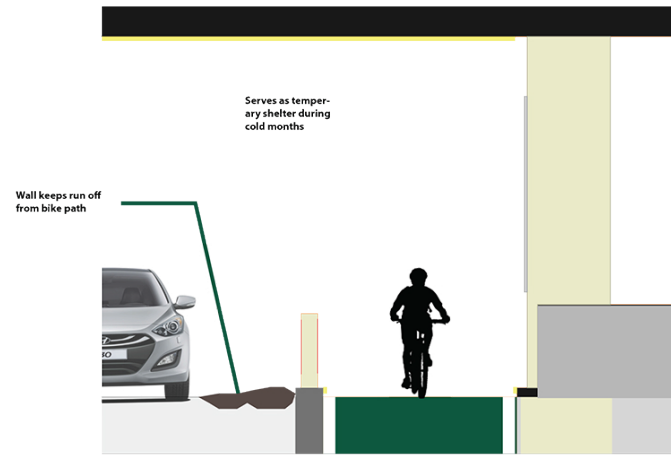


- Key**
- A** Painted Bike Lane
 - B** Lighting
 - C** Wall separating the cyclist from the motorist
 - D** Additional Prairie Grass Plantings

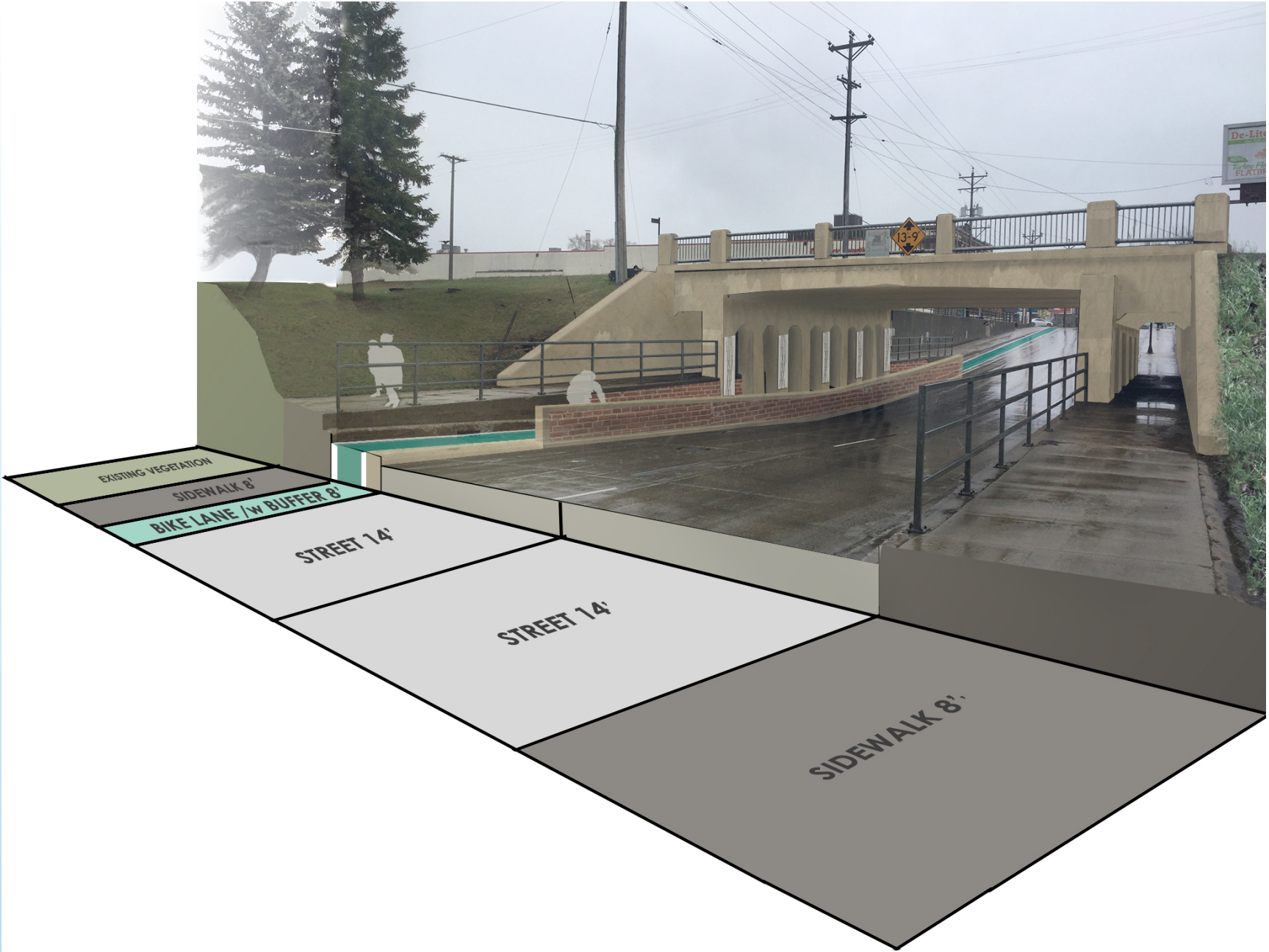
SPRING



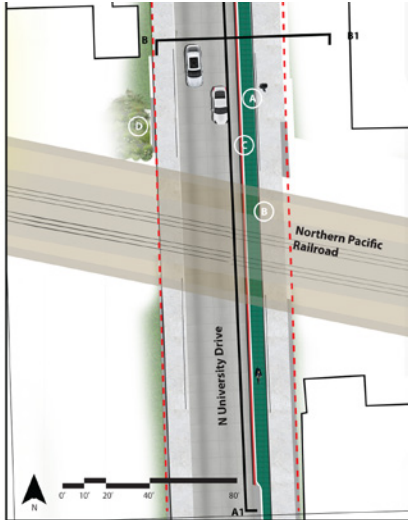
WINTER



SECTION PERSPECTIVE



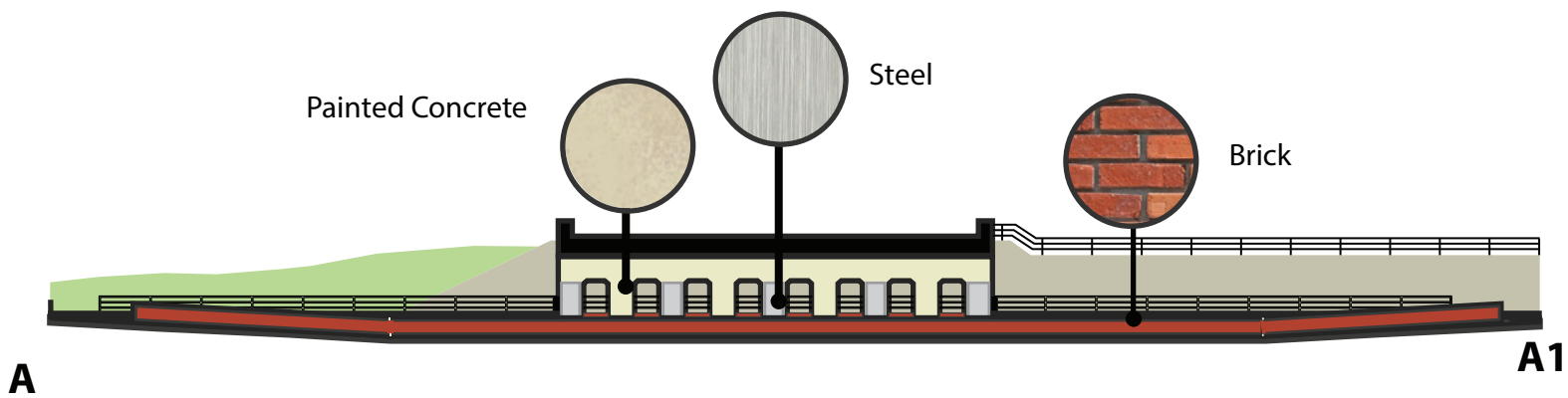
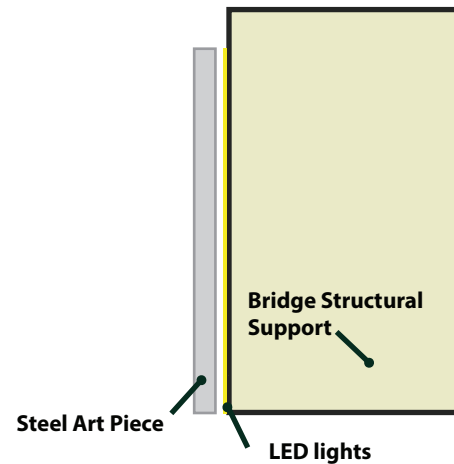
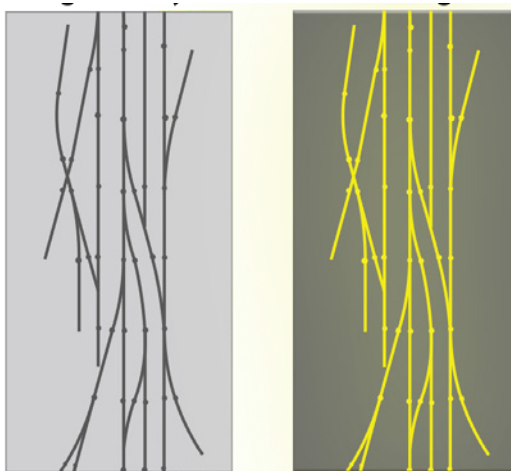
SECTION/ DETAILS



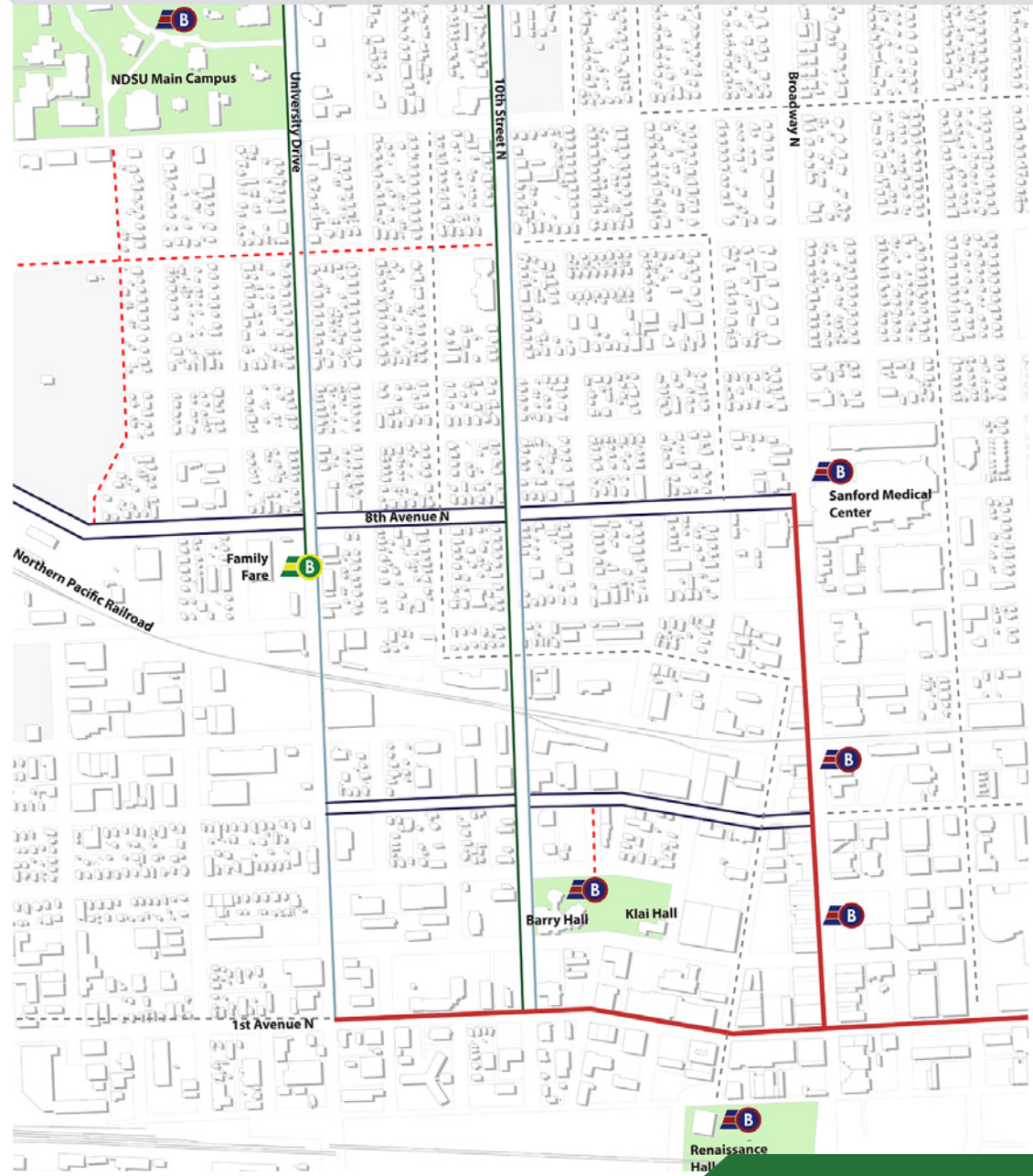
DAY

NIGHT

SIDE DETAIL



THANK YOU



QUESTIONS?