THE FRONT!

RE-IMAGINING MAIN AVENUE IN DOWNTOWN FARGO AS A MULTI-MODAL TRANSIT DESTINATION

Figure 01: Main Avenue - Fall 2015

THE FRONT

RE-IMAGINING MAIN AVENUE IN DOWNTOWN FARGO AS A MULTI-MODAL TRANSIT DESTINATION

A Design Thesis Submitted to the
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By

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TABLE OF CONTENTS

LIST OF TABLES, CHARTS, AND FIGURES

TABLES

CHARTS

FIGURES

Figure 14: Historic Front Street in Downtown Fargo

Figure 15: Levee Construction

PART ONE

ABSTRACT
STATEMENT OF INTENT

ABSTRACT

HOW TO COMPLETE THE STREET?

As cities strive to become more walkable, considerate of bicyclists, and more accommodating of mass transit, one has to ask **how current arterial roadways can be retrofitted to allow for all modes of transportation.** Downtown Fargo has several major transit corridors, three of which have or are in the process of being redesigned to enhance the urban street life. This thesis examines the possibility of a redesign of Main Avenue to accommodate new modes of transportation while connecting urban destinations within the downtown Fargo neighborhood. Other key factors that play a role in the redesign of this transit corridor are safety concerns, and economic development. The end result is an aesthetically pleasing, functional, and unique streetscape that enhances the neighborhood and the urban vitality of the downtown core.

Figure 02: Existing Sidewalk Along Main Avenue

STATEMENT OF INTENT

Downtown Fargo has seen a resurgence since the early 2000's when one of its most prominent corridors, Broadway Drive, was redesigned for a more walkable and bicycle friendly experience. Since then, the downtown area has seen tremendous growth and an increase in both walkability and revenue. Currently two other major roadways, NP Avenue and 1st Avenue North, have plans to make them more pedestrian friendly and considerate of cyclists needs. However, the most prominent of downtown thoroughfares has changed very little since it was constructed.

Main Avenue has the highest of all traffic counts in the downtown area - according to traffic reports done by the Fargo-Moorhead Council of Governments - and serves as a gateway to downtown and the state of North Dakota from neighboring Minnesota. This four lane roadway with sporadic left turn lanes is designed for the automobile, not pedestrians, cyclists, or mass transit users. The purpose of this design thesis is to retrofit the roadway to accommodate for all modes of transportation. Through the completed research, the solution answers questions regarding street design, the connection, creation, and enhancement of urban destinations and economic growth.

Various methods of research has been conducted including neighborhood surveys, traffic studies, streetscape design studies, economic studies, case studies, and safety studies. This quantitative and qualitative data has helped shape the overall redesign of Main Avenue.

The design reflects what the research pointed to which was putting Main Avenue on a street diet - that is, reducing the amount of traffic lanes and using that space for cyclists and pedestrians. The research indicates that traffic congestion should not increase due to the traffic count numbers and the availability of other thoroughfares nearby. The design reflects this research and fits into the neighborhood context well while still being a unique destination.

Figure 03: Existing Structure Along Main Avenue in Fall 2015: Fargo, North Dakota

PART TWO

PROJECT TYPOLOGY
RESEARCH QUESTIONS
ANNOTATED BIBLIOGRAPHY
CRITICAL ANALYSIS
RESEARCH HYPOTHESIS
CASE STUDIES

Figure 04: Complete Street Rendering: Seattle, Washington

PROJECT TYPOLOGY

The project typology for this thesis is as follows:

- Transportation/Streetscape Planning
- Urban Design
- Economic Development

RESEARCH QUESTIONS

This thesis answers the following research questions:

- **How can existing roadways be retrofitted to accommodate for multiple modes of transportation?**

- How can urban destinations within the downtown neighborhood be better connected?
- What safety concerns need to be addressed in the design of the updated roadway?
- What economic considerations need to be addressed?

LITERATURE REVIEW

ANNOTATED BIBLIOGRAPHY

With longevity as the featured aspect, Andres Duany, Jeff Speck, and Mike Lydon have compiled **The Smart Growth Manual** (2010) to suggest their ideas on how to design a sustainable way of growing cities from regional planning to details on the building level. They accomplish this by breaking the book into several different interrelated sections - the Region, the Neighborhood, the Street, and the Building - that have subsections offering ideas, plans, and suggestions on what needs to be done in order to create the most sustainable way of developing cities. The purpose of this manual is to offer many design solutions for growth and rectification in cities to make them maintainable in the long run. One entire section of the book is focused solely on the street and the benefits of having a completely interconnected street system as well as streets that can accommodate multiple modes of transportation. They bring up many interesting aspects of the street including the implementation of complete streets, block sizes, design speeds, pedestrian and bicyclist considerations and overall streetscape design. They state that smaller block sizes are generally more walkable and safer for pedestrians, as is the case in downtown Fargo. They also recommend that the safest travel speed hovers near twenty miles per hour as 95% of pedestrians stuck at this speed have the highest chance at survival. Pedestrian and bicycle thoroughfares should range anywhere from ten to twenty feet in width and should face storefronts, open spaces, and other active fronts.

CRITICAL ANALYSIS

This resource is helpful in looking at what types of streetscape design can have the biggest benefits in the long run. This directly correlates with this thesis' secondary goal of creating a streetscape design that has a long life span.

ANNOTATED BIBLIOGRAPHY

The next resource was written by Barbara McCann, a transportation and land-use consultant, who writes the journal article, "**Complete the Streets!**" which argues that the current method of thinking about streets is not sufficient in present times and therefore should be altered to a broader perspective to better fit the needs of the future. McCann begins her analysis by looking at the policies that are most common at the city, state, and federal level when it comes to planning. Some of the cities and states she researched have gone through a series of policy changes and notes they are on the right track to completing the street. However; she then details the many obstacles that stand between our current way of thinking and fully implementing the complete street strategies that will benefit pedestrians, mass transit users, cyclists, people with disabilities and motorists. The overall purpose of this journal article is to try and alter the way people think of current street planning in order to accommodate everyone as best as possible.

CRITICAL ANALYSIS

This article accentuates my main argument that streets need to be retrofitted to accommodate for everyone for the betterment of future generations. This article, similar to the first one, assists this paper in addressing one of its secondary research questions: how can streets be
retrofitted for the long run?

ANNOTATED BIBLIOGRAPHY

In his article "**Complete Streets: If only Mumford Had Lived to See This**," Bill Millard claims that transforming overly-wide roadways into more narrow, pedestrian friendly corridors is more economically beneficial. Millard first states that the implementation of these strategies is good for the economies of these areas. He then goes on to state three transportation planning projects in the state of New York, (Times Square, Fordham Plaza, and Astor Place) noting that it is favorable and most likely will prevail. The apparent purpose of this article is to showcase that the implementation of complete street strategies is economically beneficial.

CRITICAL ANALYSIS

It is nice that the author gives three case studies within his article of places in high density areas that have implemented thinner streets and had stronger economic growth. This was the first article that focused on the economic benefits of street redesign. It is also useful that New York City is an area with four distinct seasons; therefore, this thesis can adopt some of the principles from this article and use them in downtown Fargo. This article strongly enforces my main research question.

ANNOTATED BIBLIOGRAPHY

The authors Patrick Clarke, Robert Thorne, and William Filmer-Sankey in their respective chapters from **Sustainable Urban Design: An Environmental Approach** speak greatly about seeking out some of the planning and design principles that are the base for attractive, successful, and maintainable urban areas. Clarke starts the discussion with bulleted lists pinpointing elements that revolve around walkable communities, human-sized blocks, and optimizing densities. Thorne and Filmer-Sankey then begin focusing more on the role transportation plays in sustainable cities. This then leads to focus on mass transit, pedestrian-orientated corridors, and plenty of room for cyclists as well as the implementation of "local hubs" which are interconnected within the overarching web of "regional hubs." The apparent purpose of these sections is to encourage a wider understanding of "how basic layout and design principles can help create a robust urban form around which innovative design and the application of emerging construction and service technologies can flourish" (Filmer-Sankey, 2009).

CRITICAL ANALYSIS

These chapters, again, focus primarily on the community plan and how creating denser and walkable areas can have a more profound effect then those of less density and auto-dependent areas. This provides a good base for how this paper is going to design the Main Avenue roadway. I will be focusing on more walkable streets which promotes infill.

ANNOTATED BIBLIOGRAPHY

The **Urban Street Design Guide** written by the National Association of City Transportation Officials (NACTC, 2013) is a design guide that suggests many different ways in which to redesign existing roadways in both urban and suburban areas as shown in the Figure 05 to the right. The guide details the overall design of streets, specific street design elements, the phasing of street elements, how to deal with intersection design along with the elements that go along with it. The overall purpose of this book is to "lay out the principles and vision for a new generation of city street design in a dynamic, engaging visual context both Online and in print. It is a mirror of the new city street, easy

to use and inviting for all" (NACTC, 2013). This book en- courages a new way of design thinking especially when it comes to retrofitting existing roadways in urban areas.

CRITICAL ANALYSIS

This thesis can use this resource similarly to how it can use Bill Millard's article in potentially implementing some of the design principles that have been found to work in communities across the United States. The point that most sparked my interest in this book was that it stated four lane roadways that have traffic volumes of around 25,000 vehicles per day can be thinned to two lanes with a turn lane with little to no increase in congestion. This encourages a new design idea for Main Avenue.

ANNOTATED BIBLIOGRAPHY

The next resource researched is entitled the **Urban Bike Design Guide** written by the National Association of City Transportation Officials (NACTO, 2009). Although this book is similar to the aforementioned Urban Street Design Guide, it focuses more heavily on cyclist transportation and the design interventions needed to ensure the safety of cycling on the streets. This book covers many different areas of cycling design from bike lanes and cycle tracks to the design of intersections and wayfinding signage. Numerous case studies can be found throughout this work with real design solutions that are functioning properly.

CRITICAL ANALYSIS

This thesis will most definitely look at the ideas brought forth in this book and pick and choose elements of several different design concepts. It will then combine them in a way that best suits the needs of the Main Avenue corridor in downtown Fargo.

Figure 05: Urban Street Design Guide Graphic

Figure 06: Desired Transportation Modes

ANNOTATED BIBLIOGRAPHY

An article entitled "Demographic Preferences Shifting in Favor of Walkable, Urban Communities" published in the American Planning Association's PLANNING MAGAZINE written by John Yung was the next resource I utilized. According to research by the Pew Institute and Urban Land Institute, millennials are significantly driving less than generations before them and "demand living and working in" more urban settings (Yung,2014). This doesn't necessarily mean they want to return to the center of the city, however, it just means that they are wanting to live in more urban environments whether that be a retrofitted suburb, urban core, or new development connected to transit. Approximately 55% of millennials have a preference of living within walking distance to transit facilities. This article states that not only do millennials have this way of thinking, but baby boomers are leaning this way now as well. According to the AARP, 50% of seniors now want to live close to a bus stop and 47% would like to live within a mile from a grocery store. "Additionally, it is increasingly being seen that efforts by millennials to influence policy such as complete streets, pedestrian enhancements, and bicycle infrastructure are also helping baby boomers by improving the safety on our roadways" (Yung, 2015).

CRITICAL ANALYSIS

This article provides a great deal of information when it comes to statistical data showing the support for complete streets. The millennial generation is the largest generation and is quickly gaining influence in the political realm. Complete streets will definitely be something that will continue be discussed and implemented in years to come. Baby boomers also agree that complete streets are important for safety concerns.

ANNOTATED BIBLIOGRAPHY

The next piece of information this thesis gathered was from Smart Growth America in their document entitled "Complete Streets Stimulate the Local Economy" written by both Smart Growth America and the National Complete Streets Coalition. This document begins by presenting statistical data on the savings a person can obtain from switching to using mass transit over that of a car. It goes on to state that local businesses can also see many benefits in improving access to people traveling by foot or by bicycle. For example, when a bicycle lane was added to a street in San Francisco, nearby businesses saw a sales increase of sixty percent! Dollars invested in complete street strategies also can have a positive effect on the local economy even before construction has ended. "Road improvement projects that include bike and pedestrian facilities create more jobs during construction than those that are only designed for vehicles, per dollar spent" (Smart Growth America, 2014). They conclude their article by stating that complete street projects can spur private investment along and near the corridor location as well as raise property values.

CRITICAL ANALYSIS

This article I believe is very helpful in persuading both policy makers and business owners to open their mind to the idea of complete streets. With all the economic benefits that rise out of a simple project, it makes absolutely no sense to continue to design roadways the current way we are building them. It is also interesting to touch on the fact that complete street designs can also spur private investment. For example, when Broadway was redesigned and reconstructed in the early 2000's, local businesses have thrived and it is arguably the most vibrant corridor in the state and region. To see hard data on the return of investment from this project, see research results.

RESEARCH HYPOTHESIS

The current construction and design of roadways is not sufficient for not only the demands of today, but of the future. As the millennial generation continues to be in favor of walkable communities and the baby boomer generation continues to downsize, the cities these people live in need to reflect what their citizens desire. Narrower roadways that reduce traffic speed, convenient and efficient mass transit options, bicycle lanes that ensure the safety of all users, and wide walkable sidewalks will contribute to the future growth of cities. Higher densities and infill projects also need to be encouraged so that people walking have destinations they can easily access without the use of an automobile.

Figure 07: Complete Street in Portland, Oregon

CASE STUDIES

INGERSOLL AVENUE – DES MOINES, IA

This two mile stretch of four lane road in Des Moines, Iowa that carried around 17,000 vehicles per day became the center of attention when it was proposed that it be put on a road diet. The objectives of this project was to calm traffic, improve pedestrian and bicycle access, and enhance the business environment. It was also set up as a temporary diet, just to gauge how road diets could function within the Des Moines area. Many neighborhood residents and businesses originally opposed the idea mainly because they believed there would be an increase in automobile congestion which, in turn, would hurt retail sales. The city ended up designing and implementing this temporary complete street with the addition of bike lanes and the reduction of two traffic lanes while keeping one turning lane. When all was said and done, Ingersoll Avenue ended up seeing no major traffic concerns. An added bonus showed itself with safety statistics: there was a fifty percent reduction in crashes, a fact that the city was not expecting. Overall traffic volumes did not decrease, in fact, there was an increase in traffic around the lunch hour time period. The city conducted a survey to see how businesses owners and residents felt about the new roadway design; they found that while some people still opposed it, a majority favored keeping the road diet and felt the road was safer. This led the city to vote on whether or not to keep this temporary road diet; the Council voted in favor of making the roadway permanent.

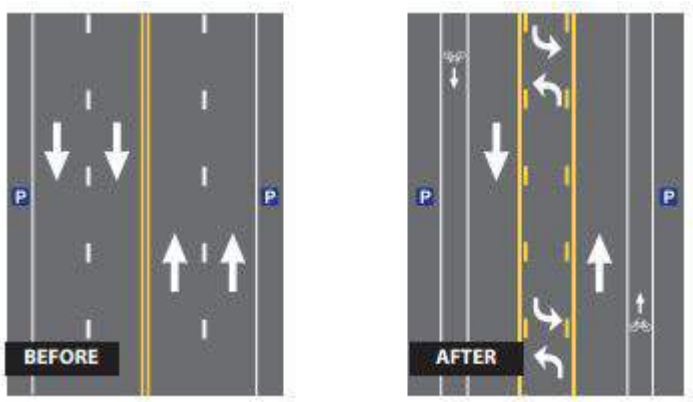


Figure 08: Ingersoll Avenue Road Diet

> "WE WERE CRITICAL OF THE DES MOINES CITY COUNCIL FOR ITS DECISION TO APPROVE THE RESTRIPING OF INGERSOLL AVENUE TO CHANGE IT FROM FOUR LANES TO THREE LANES...ON ALL ACCOUNTS, WE WERE WRONG. OUR CONCERNS PROVED TO BE UNWARRANTED."
>
> — Cityview, Central Iowa's Independent Weekly

Figure 09: Division Street Cross Section

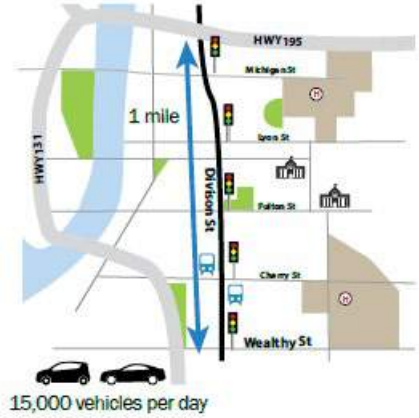


Figure 10: Map of Division Street

DIVISION STREET – GRAND RAPIDS, MI

Grand Rapids, Michigan has taken a holistic approach at addressing street thinning methods within its borders. They have identified all four lane roads within the city and recorded traffic volumes, corridor use, and the overall operation under existing conditions. This led to the road diet that occurred on Division Street - a one mile four and five lane corridor with a mix of commercial and residential uses. The five lane road was redesigned as two lanes in each direction with a turning lane and a variety of on-street biking facilities. In the end, business owners were pleased with increase in the quality of life along the corridor and saw their profits increase. A few residences that had been vacant for two years had been rented because of the increased bicycle connectivity. Parking increased, vehicle speeds were reduced, there was an increase in pedestrian and bicycle flow, and there was a reduction in head-on left turn crashes, angle crashes, and sideswipe crashes. However, rear-end crashes nearly tripled and there was an increase in traffic delays. Overall, residents and business owners have supported and enjoy their newly designed street.

55TH STREET – CHICAGO, IL

In 2011, Chicago's mayor announced that the city would install 100 miles of separated bicycle lanes which led to the road diet on East 55th Street. This redesign changed a four lane roadway with parking on both sides to a three lane roadway with parking-separated bicycle lanes. The land use along this .8 mile corridor is a healthy mix of institutional, residential, commercial, and service uses. It is directly adjacent to the University of Chicago which brings an influx of college students and younger professionals. The Chicago Transit Authority (CTA) has a primary bus route along this corridor, with headways ranging from five to twenty minutes throughout the day. The overall design and layout of the bus stops in coordination with the separated bicycle lanes was a critical issue to maintain efficient bus operations. The overall redesign resulted in lower traffic speeds, increased pedestrian connectivity, and a loss in parking spaces which hasn't really affected business.

> "THE ADDITION OF BICYCLE LANES IS A GREAT ADVANTAGE TO UNIVERSITY OF CHICAGO STUDENTS, STAFF, AND VISITORS."

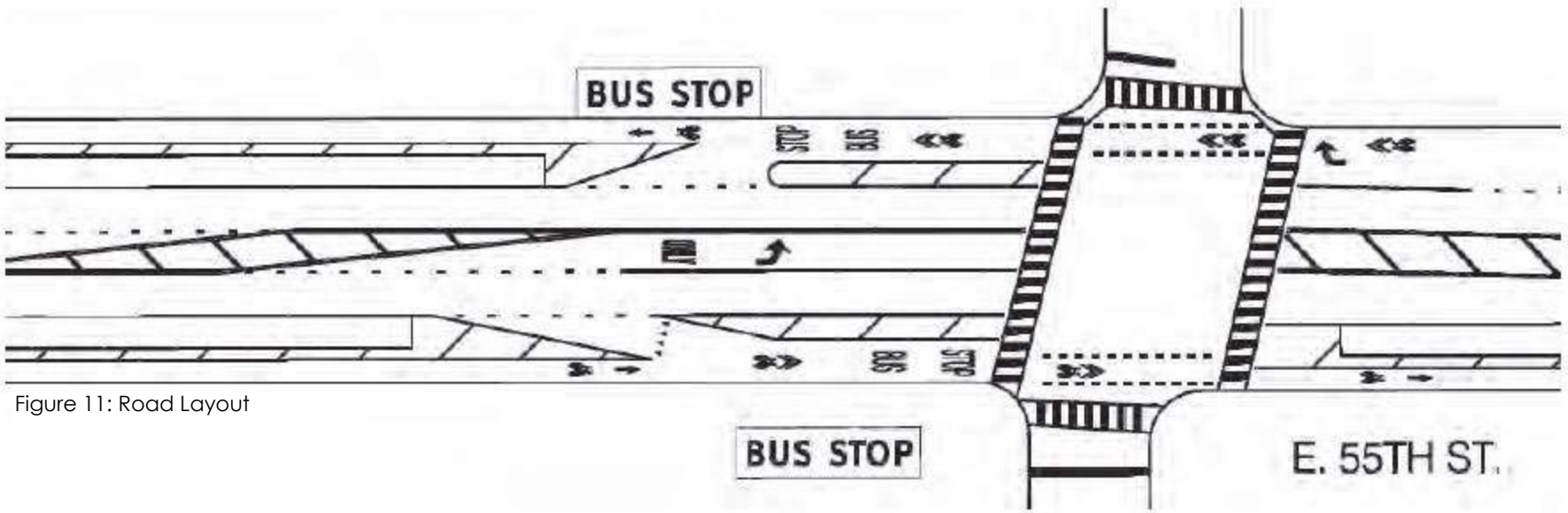


Figure 11: Road Layout

Figure 12: Main Avenue Road Diet

MAIN AVENUE – SIOUX FALLS, SD

The City of Sioux Falls, South Dakota has been trying over the past few years to make their downtown more pedestrian friendly by increasing safety in many different ways. One way they went about doing this was through a Main Avenue Road Diet. Originally intended to be a temporary project designed by a local landscape architecture firm, the ublic fully embraced the traffic calming measure and plans are in place to make the changes permanent. Main Avenue is currently a three lane one way travels south through downtown Sioux Falls. The road diet was placed on this avenue between 6th Street and 14th street and carries around 21,000 vehicles per day - very similar to Main Avenue in downtown Fargo. Changes included, bumpout areas near intersections, seventy-five additional parking spaces, a reduction in travel speed, and the loss of one travel lane. Public reaction has been incredibly supportive and the City of Sioux Falls is planning on permanently striping the new parking spaces, implementing permanent planters and bumpouts, and possibly adding a bicycle lane to flow with the traffic.

> “CREATING A VIBRANT, WALKABLE DOWNTOWN REQUIRES US TO RETHINK OUR STREET SYSTEMS, AND THIS PROJECT IS ONE EXAMPLE OF OUR EFFORTS TO CREATE COMPLETE STREETS IN SIOUX FALLS.”

— Mark Cotter, Director of Public Works

PART THREE

RESEARCH APPROACH
DATA MEASURES
SITE INTRODUCTION
SITE LOCATION & CLIENT DESCRIPTION

RESEARCH APPROACH

For this thesis paper, a mixed methodology approach was used to collect qualitative and quantitative information. For the qualitative research component of the thesis, a survey was conducted and given to business owners and residents along Main Avenue as well as to transportation leaders in the Fargo area such as Great Rides Bike Share, Fargo-Moorhead Council of Governments, and MAT Bus leaders. This survey will seek to see visual preferences of protected bike lanes, street furniture and other elements, and the possibility of relocating the bus terminal to Main Avenue. Quantitative research for this thesis includes pedestrian and bicycle counts, MAT Bus information, case study programmatic elements, cost efficiency, and road types. The main focus in the quantitative research will focus around traffic counts and spatial needs while secondary focuses will be placed on the cost efficiency of thinning Main Avenue.

GO 2030 PLAN: TRANSPORTATION

The Go 2030 Plan is the long range growth plan developed by the city of Fargo. There were nine different categories that many of the goals were categorized into such as Energy, Health,
Education, Economy and Transportation. Under the transportation chapter, there were seven key initiatives that were prioritized. Those initiatives are listed below:

1) Bicycle and Pedestrian Infrastructure

2) Complete Streets

3) Transit Improvements

4) Clear and Attractive Access to Downtown

5) Transportation Linkages Across the Red River

6) Intelligent Transportation System

7) Parking

This thesis proposal address six of these seven initiatives (does not address number 4) which falls directly in line with the Go 2030 Comprehensive Plan.

01: BICYCLE AND PEDESTRIAN INFRASTRUCTURE
Improve bicycle and pedestrian connectivity by identification of gaps in the local and to the regional system.

02: COMPLETE STREETS
Transform Fargo's roadways with a connected network of complete streets. Implement study recommendations to convert one way streets in downtown Fargo to two way streets.

03: TRANSIT IMPROVEMENTS
Expand and improve the existing transit service in terms of frequency, mode, and other options, including an effort to revise both the existing MAT bus schedule and frequency of bus service throughout the city and the region (Moorhead and West Fargo). Study the possibility of new local and regional travel venues, such as bus rapid transit and rideshare programs.

04: CLEAR AND ATTRACTIVE ACCESS TO DOWNTOWN
Enhance connectivity to downtown with clear and attractive signage and simplify access from I-29 and I-94.

05: TRANSPORTATION LINKAGES ACROSS THE RED RIVER
Improve mobility in a manner that will accommodate growth and secure availability of emergency routes by developing an additional crossing of the Red River south of 52nd Ave and improve availability of, and access to, river crossings for bicycles and pedestrians.

06: INTELLIGENT TRANSPORTATION SYSTEM
Increase the use of Intelligent Transportation System (ITS) technology to improve efficiency and safety throughout the transportation system.

07: PARKING
Pursue creative parking strategies to fund and activate parking structures, explore reducing minimum parking standards, and share parking between daytime and nighttime uses.

DATA MEASURES

MASS TRANSIT

Metropolitan Area Transit (MAT Bus) has seen significant growth in ridership and route expansions in recent years. Although down slightly from 2014, 2015 ridership is still one of the highest totals in MAT Bus history. Currently MAT Bus is composed of 19 different bus routes with ridership of over two million. Listed below are the routes in order of highest ridership to lowest. Most routes converge at the Ground Transportation Center (GTC) currently located at 501 NP Avenue North in downtown Fargo. It sits on approximately two acres.

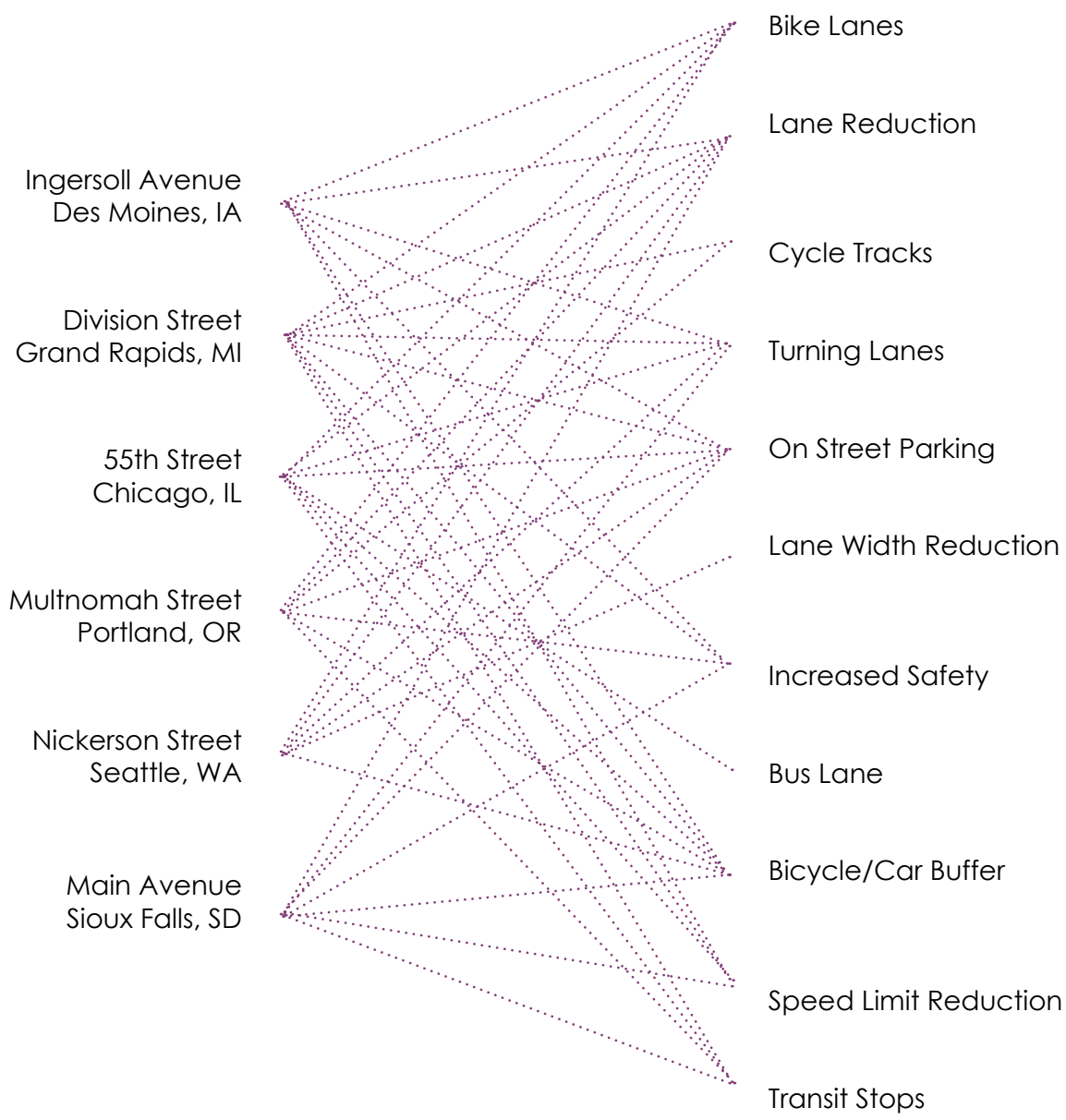
Route 15 - **Downtown** to 13 Avenue Retail Corridor
Route14 - **Downtown** to Kmart, Essentia, West Acres
Route 13 - **Downtown** to NDSU, Northport, Trollwood
Route 33 - NDSU Union to Klai and Barry Hall
Route 32 - NDSU Campus
Route 2 - **Downtown** to MSUM, Courtyard Marriott
Route 4 - **Downtown** to EasTen Shopping, North Moorhead
Route 16 - **Downtown** to Cashwise, West Acres, West Fargo
Route 11 - **Downtown** to Northport and VA Hospital
Route 1 - **Downtown** to Concordia and Courtyard Marriott
Route 34 - NDSU Campus, Days Inn, Stop and Go Center
Route 18 - **Downtown** to Jefferson Neighborhood
Route 31 - NDSU Campus to Technology Park, Fargodome
Route 3 - Moorhead High, Horizon, Cashwise, Target
Route 13U - **Downtown** to Renaissance and NDSU Campus
Route 5 - Moorhead south of I94, Village Green, Marriott
Route 17 - **Downtown** to Madison Neighborhood
Route 23 - West Acres to Microsoft, South Walmart, Osgood
Route 8 - **Downtown** (Evenings) Concordia, Safari
Route 7 - **Downtown** (Evenings) Hwy 10 Shopping, MSUM
Route 6 - Dilworth
Route 35 - NDSU Evening Routes
Route 9 - SE Moorhead: Walmart, Sams Club, Sanford Health

SURVEY CONDUCTION

A survey was conducted in order to gauge the publics' perception on Main Avenues future. Questions were broken into several different categories: Background, Complete Streets, Mass Transit, Bicycling, and Programming, and General Aesthetics. The survey was taken by nearly 200 people from across the Fargo-Moorhead area. Respondents either filled out a hard copy of the survey or a digital version. Please see the attached document, "Ellingson - Survey Results" to view the findings gathered by the survey.

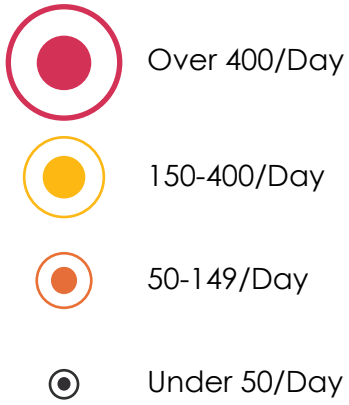
CASE STUDY COMPARISON

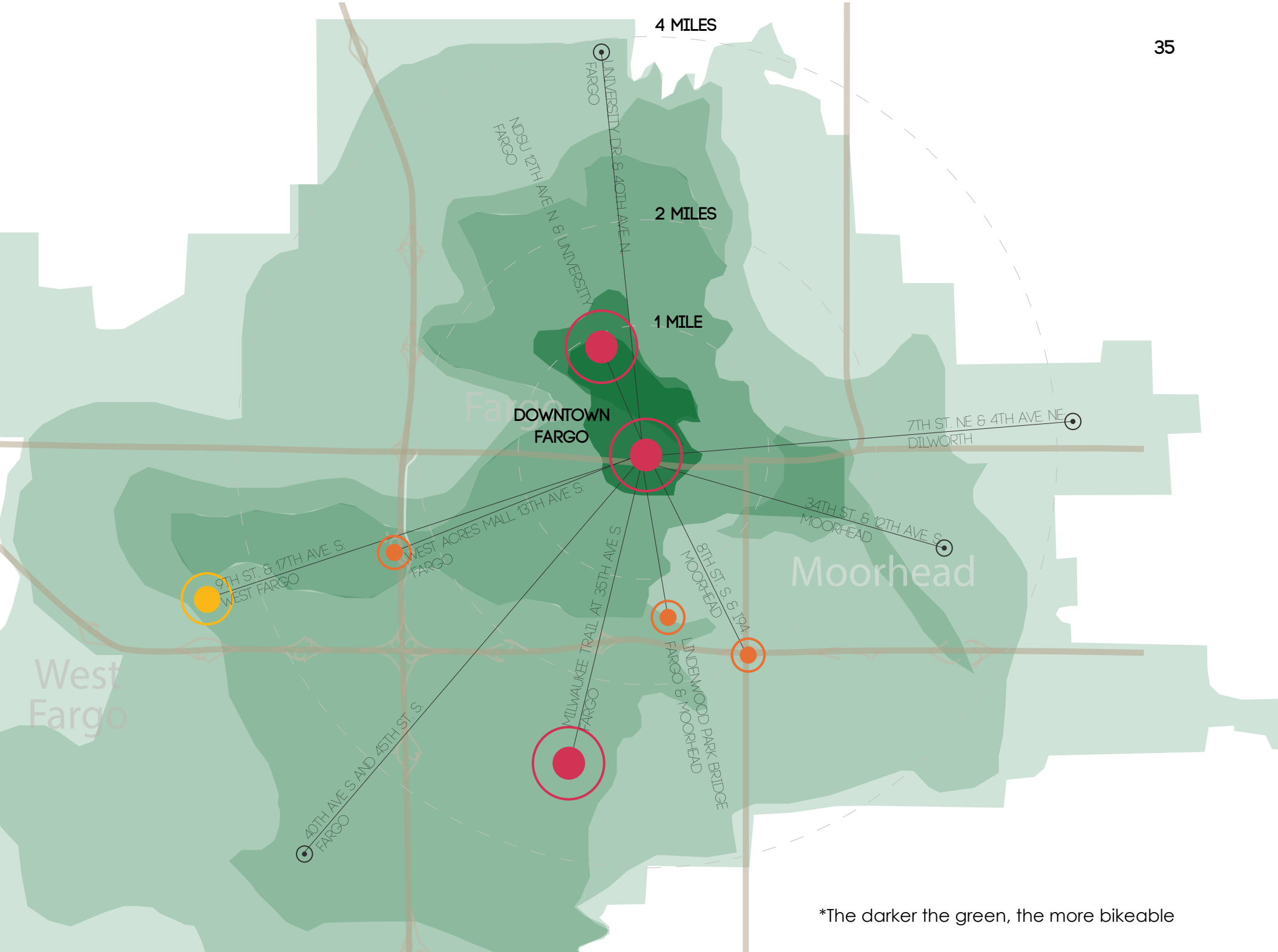
After researching numerous case studies in street thinning, pedestrian and bicycle infrastructure improvements, and how to increase safety, this thesis has compiled a graphic featuring the prominent programmatic elements that were prevalent in each. This will aid in the overall design of the Main Avenue project that this thesis proposal is hoping to redevelop.



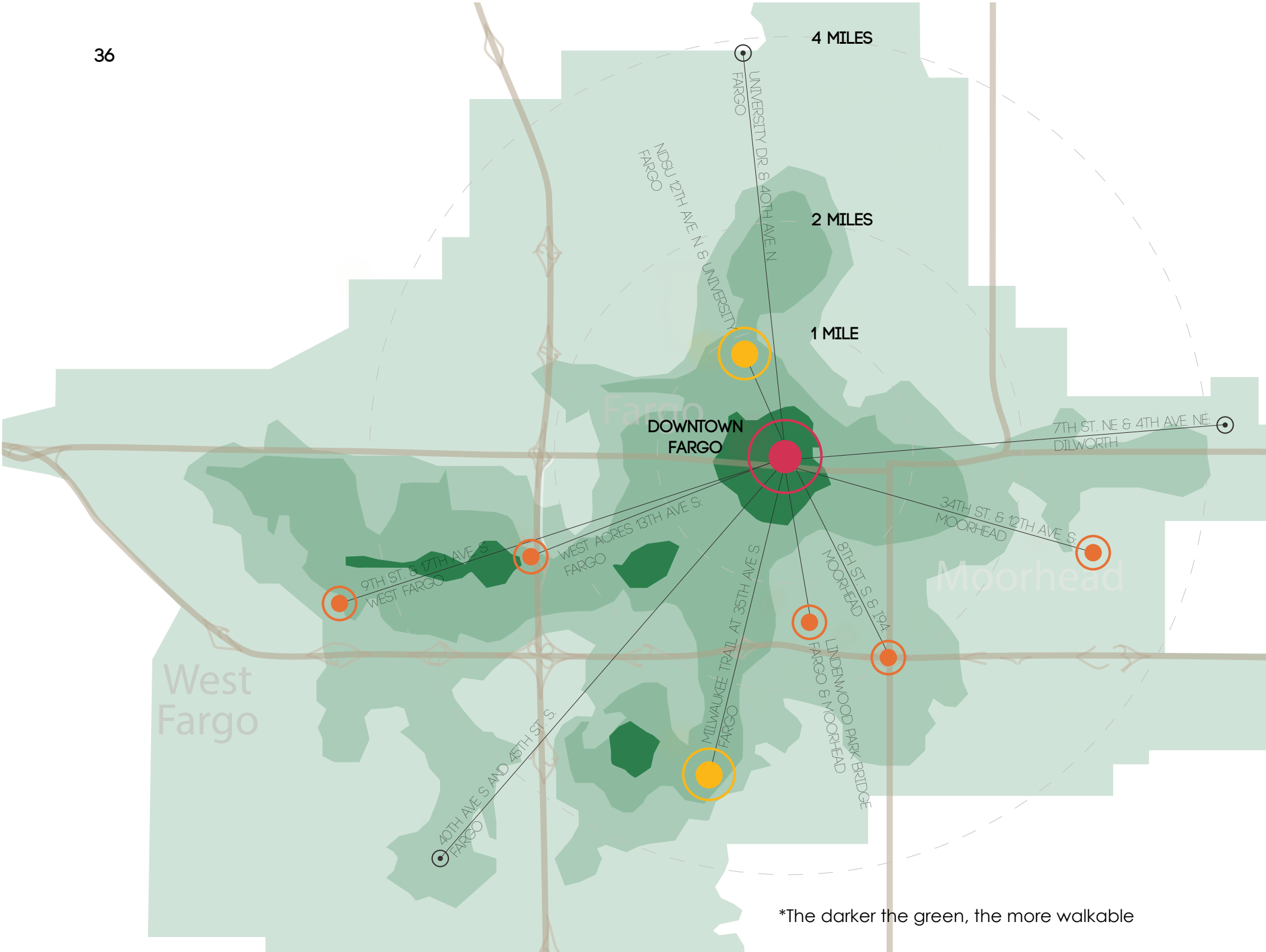
BICYCLE COUNTS REGIONAL SCALE

With data gathered from the Fargo-Moorhead Council of Governments, one can notice the major bicycle areas in the Fargo-Moorhead area as seen in the graphic on the adjacent page. Downtown Fargo is the leader with bicyclists in part due to its higher density and abundance of bicycle infrastructure. However, as previously stated, Main Avenue does not have adequate bicycling infrastructure to meet the immense demand in the area. With improved bicycling elements such as bike lanes or a cycle track, the growing number of cyclists in the downtown area will be able to use this underutilized corridor in the downtown area.





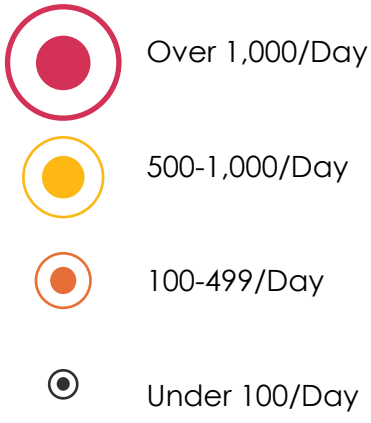
*The darker the green, the more bikeable



*The darker the green, the more walkable

PEDESTRIAN COUNTS
REGIONAL SCALE

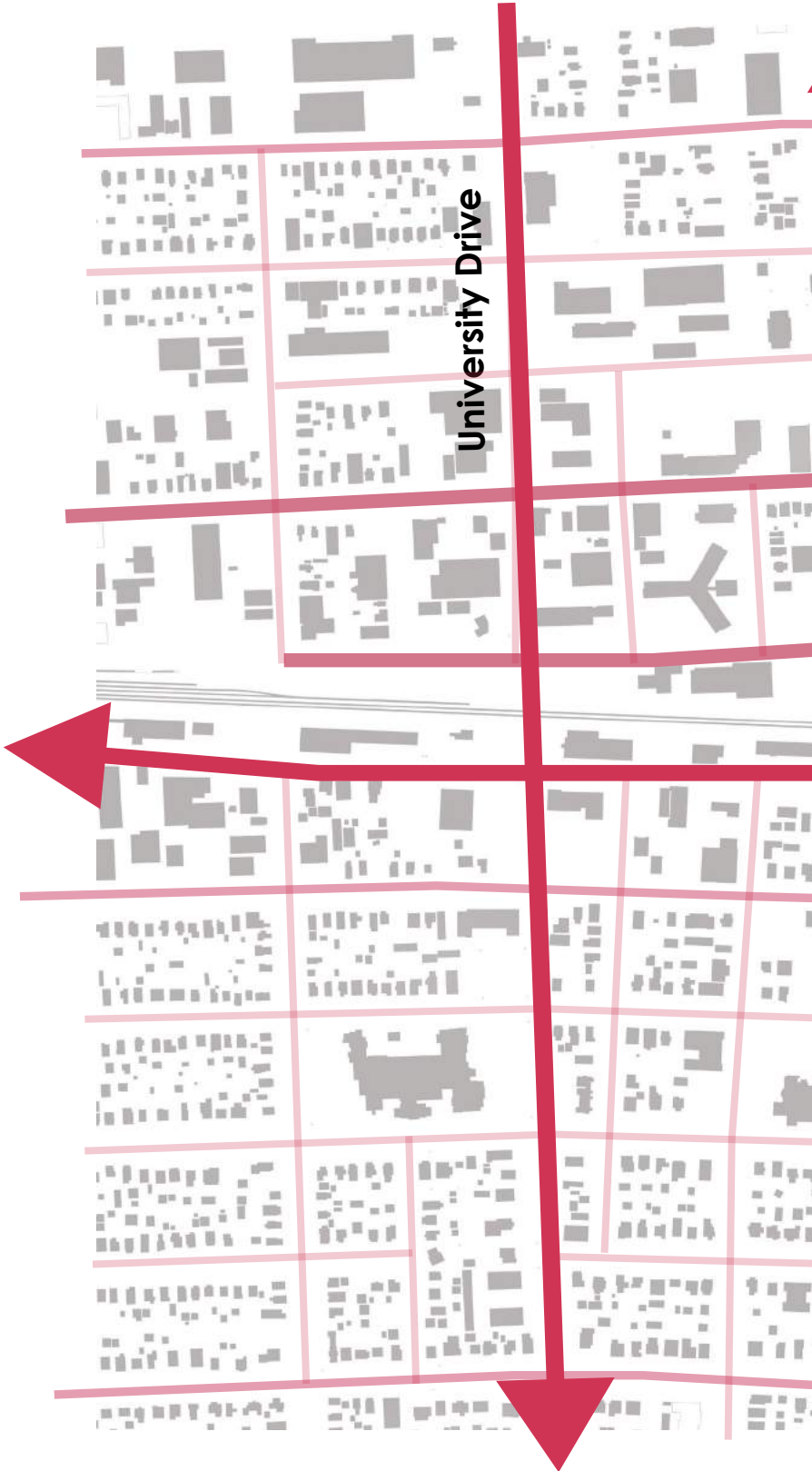
Again, with data gathered from the Fargo-Moorhead Council of Governments, one can notice the major pedestrian areas in the Fargo-Moorhead area as seen in the graphic on the right page. Downtown Fargo has by far the most pedestrians within the entire metropolitan area. Broadway attracts the most pedestrians on an average day and the Broadway/2nd Avenue North intersection is the most populated on that corridor. Main Avenue only sees a small fraction of the pedestrians that Broadway sees and this is in part due to the fact that the north side of Main Avenue is almost unusable because of how narrow it is, the placement of utilities and signage, and that there are no major destinations on this side. If Main Avenue wants to attract more business to stimulate its economy, pedestrian infrastructure enhancements must be made.

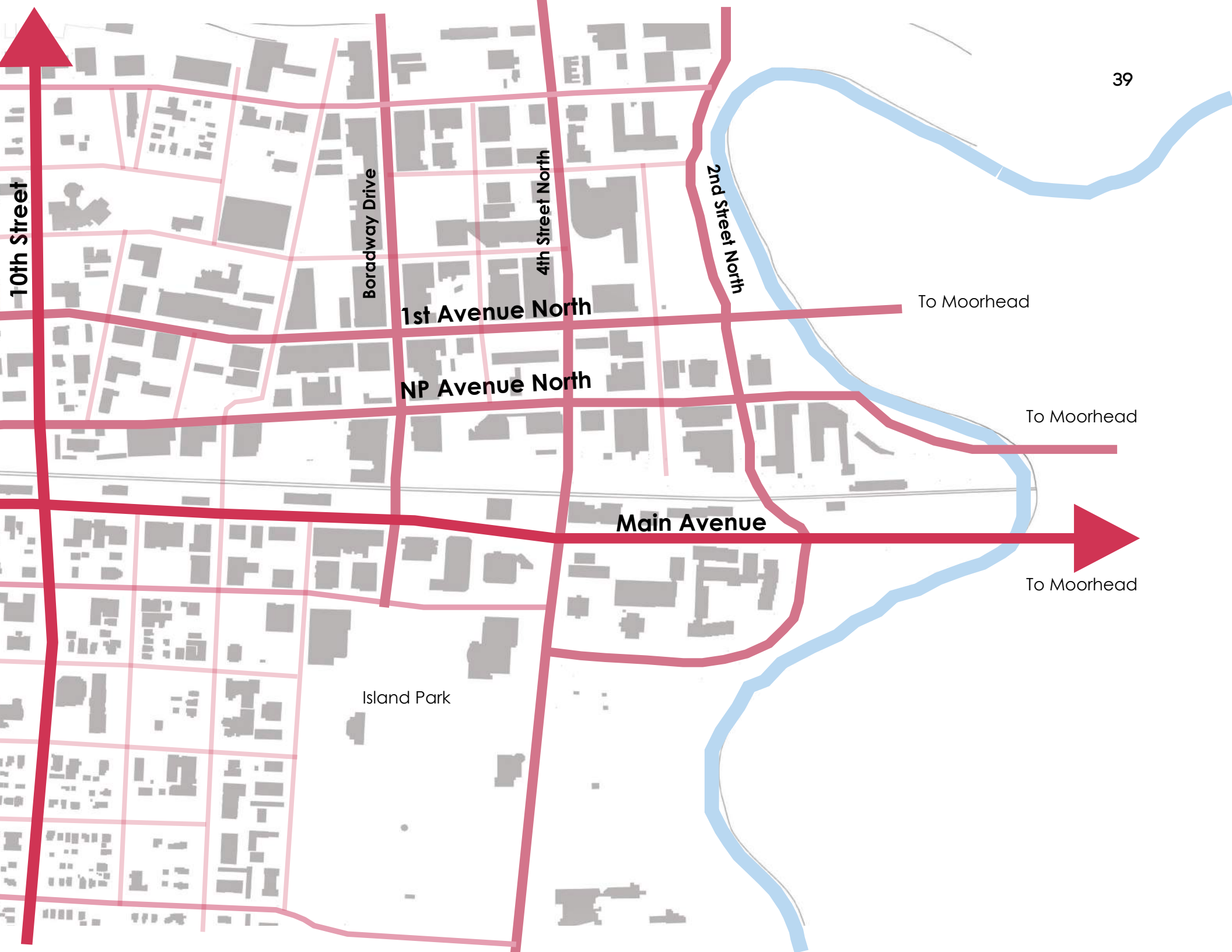


ROAD HIERARCHY

Downtown Fargo is well connected in terms of its streets. As many case studies have stated, four lane roads can be reduced to three with the third lane being a turning lane. Main Avenue could easily redirect some of its traffic to 1st Avenue North and NP Avenue North. This would allow for additional space to be reallocated to bicycle and pedestrian infrastructure like wider sidewalks and cycle tracks. There could even be room for additional vegetation. According to the Main Avenue Corridor Study conducted by the Fargo-Moorhead Council of Governments, the southbound left hand turning lane or University should and could be reversed in order to carry northbound traffic from Main Avenue to NP Avenue. This would enhance the road connectivity in the greater downtown Fargo neighborhood.

*The darker the pink, the more major the roadway




10th Street
Boradway Drive
4th Street North
2nd Street North
1st Avenue North
NP Avenue North
Main Avenue
To Moorhead
To Moorhead
To Moorhead
Island Park

ECONOMIC RESEARCH

Another important data source comes from many private firm studies conducted by the National Complete Streets Coalition and Smart Growth America as these two practices have had the highest presence in supporting complete street strategies and research in the United States. These two organizations not only have created several reports on economic benefits, but also have created an in depth look at the overall design that should be taken to maximize these benefits and how they cater to the general public on a daily basis. Data will also be found using a series of favorability polls conducted by the National Complete Streets Coalition, interviews with cold climate community city leaders on their interpretation of the economic benefits of complete streets in their communities, and the U.S. Census Bureau for demographic information, population density factors, and economic diversity. In conducting research for this paper, there were a few limitations that presented themselves. Because this paper focuses mainly on the benefits in cold climates, data is not always readily available for such a specific topic. Many complete street policies started forming in the southern and Mid-Atlantic States where temperatures are more moderate and are just now starting to become more prevalent in northern areas. Although there is still information and data to support this papers claim and purpose, it is not always the most predominant. Using the aforementioned data, this paper will use and manipulate this information in order to support the main purpose. Much of what has been collected, for the most part, emphasizes the benefits of implementing such strategies. However, because there are a few differences in what economic benefits arise from this implementation depending on the climate does provide a different array of outcomes. In the study completed by PERI on the employment impacts of pedestrian and bicycle infrastructure, the cold climate city of Anchorage, Alaska saw the greatest number of jobs arise from an infrastructure project that only dealt with the road; that is, it did not enhance any pedestrian or bicycle modes of transportation, strictly automobile (See Table 1). This contrasts to several warmer cities including Austin, Texas, Baltimore, Maryland, and Santa Cruz, California. However, two other cities in colder climates that were researched in the report (Madison, Wisconsin and Concord, New Hampshire) found that pedestrian and bicyclist enhancements resulted in greater job growth. These contradictory results reveal the discrepancies that still exist in the research, thus further investigation must commence in order to identify if climate does have an effect on the benefits of complete streets. Therefore, this paper is expecting that either the data will support that complete streets benefit any community's economy or that climate does have an effect on the amount of benefits reaped from such implementation. These outcomes will help in identifying if climate has an effect on how many benefits are gained from the enactment of said strategies.

Madison, **Wisconsin** (PASS)

Type of Infrastructure	Jobs/$1 Million Invested
Off-street Multi-Use Trails	8.21
Pedestrian Infrastructure Only	8.99
Road, Bike, & Pedestrian Only	8.99
Road & Pedestrian Infrastructure	8.73
Road Infrastructure Only	7.3

Table 01: Madison, WI

Concord, **New Hampshire** (PASS)

Type of infrastructure	Jobs/$1 Million Invested
Pedestrian infrastructure Only	10.39
Road infrastructure only	8.11

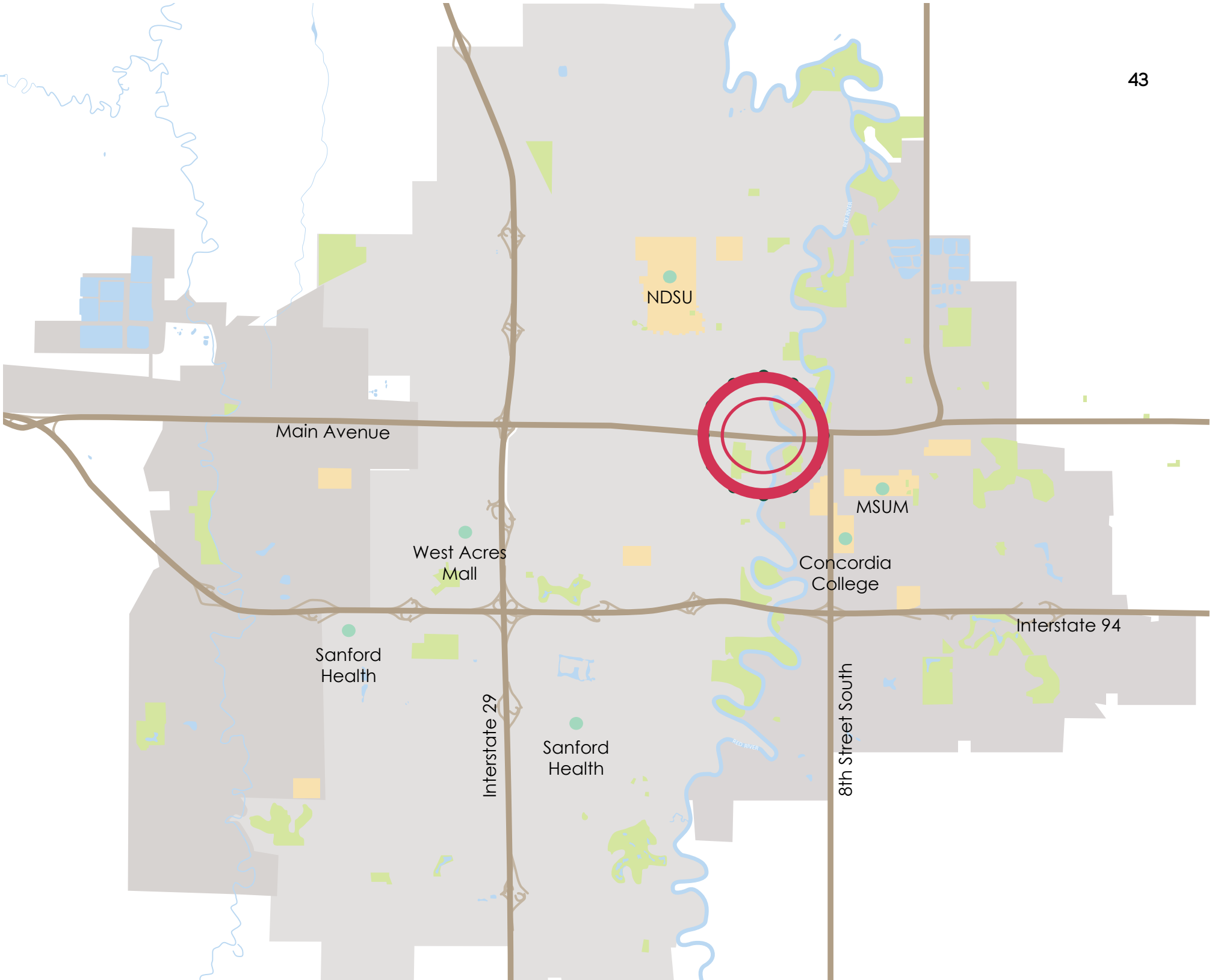
Table 02: Concord, NH

Anchorage, **Alaska** (FAIL)

Type of infrastructure	Jobs/$1 Million Invested
Pedestrian Infrastructure Only	9.57
Road, Bike, & Pedestrian	6.64
Road Infrastructure Only	11.61

Table 03: Anchorage, AK

SITE INTRODUCTION

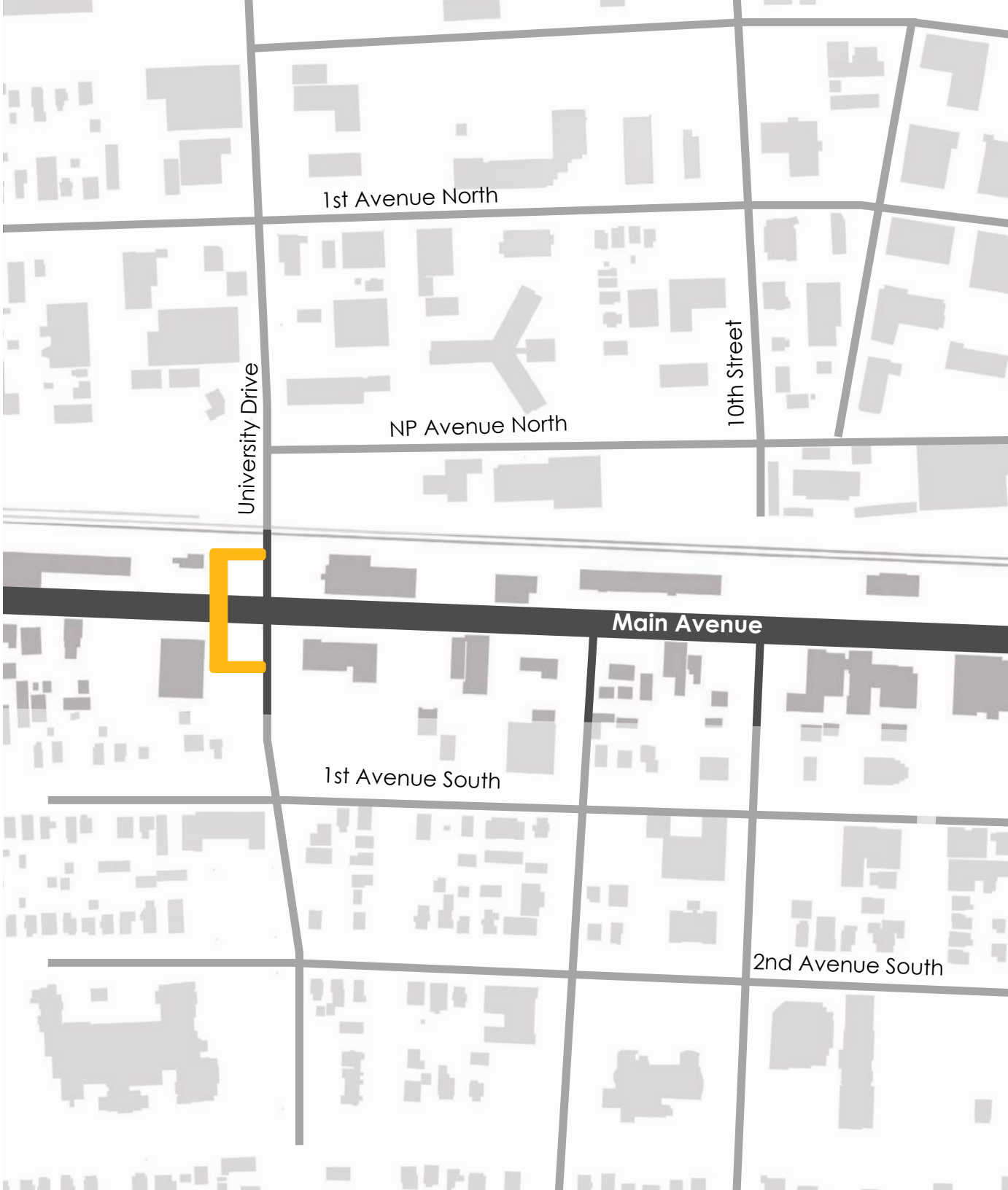

NDSU
Main Avenue
MSUM
West Acres
Mall
Concordia
College
Interstate 94
Sanford
Health
Interstate 29
Sanford
Health
8th Street South
RED RIVER
RED RIVER

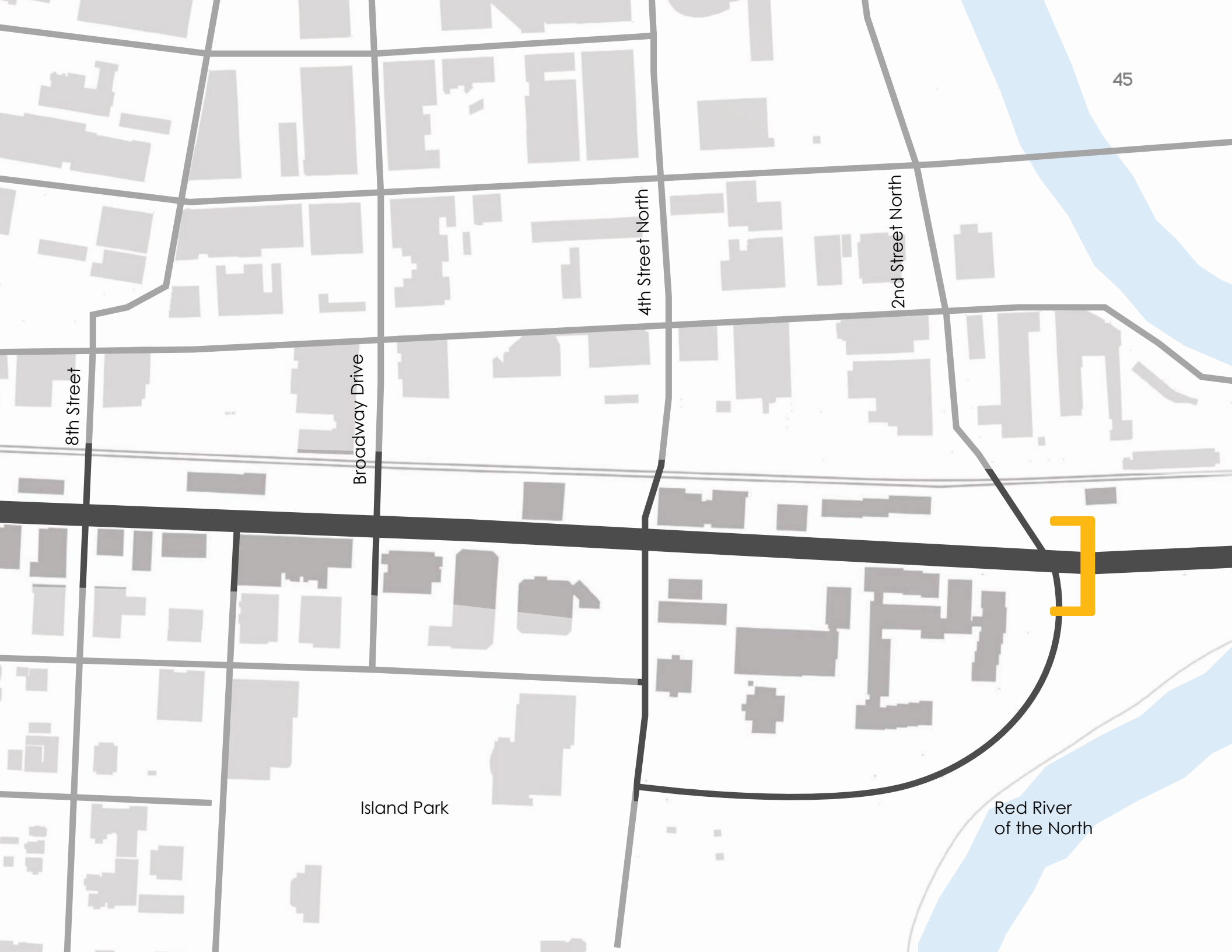
SITE LOCATION

For the purposes of this thesis proposal, the site will be Main Avenue in Fargo, North Dakota between the Red River of the North and University Drive. This approximately one mile stretch of road serves as a major gateway into the city of Fargo and the state of North Dakota. There are many attractive parts to this site including the connection to the river. With several flood control projects underway, this thesis proposal will come at a time where necessary changes need to made to ensure a healthy river connection.

CLIENT DESCRIPTION

The intended audience that I am hoping will use this space are residents, business owners, downtown visitors, cyclists, and mass transit users; to put it simply, this thesis proposal is open and intended to be used by everyone in the public realm.




45
4th Street North
2nd Street North
8th Street
Broadway Drive
Island Park
Red River
of the North

PART FOUR:

RESEARCH SUMMARY
ECONOMIC FINDINGS
SITE VALUES
PLAN FOR PROCEEDING
DESIGN GOALS

RESEARCH FINDINGS

PEDESTRIAN & BICYCLE INFRASTRUCTURE SUMMARY

Through the use of case studies, survey results and information gathered from the Fargo-Moorhead Metropolitan Council of Governments and WalkScore, it was concluded that Main Avenue would be well suited to enhance it's pedestrian and bicycle infrastructure. This could lead to more vegetation along pedestrian corridors, protected bicycle lanes, and adequate space for sidewalk cafes and various other street amenities.

MASS TRANSIT SUMMARY

Results gathered from the survey indicate a high favoribility for relocated the MAT Bus Terminal from N.P. Avenue North to Main Avenue. This would allow for a complete redesign of the terminal and could incorporate a mix of commercial uses like retail, office, and restaurants. This would enhance the street life on Main Avenue and could potentially increase property values along the corridor.

ROAD INTERCONNECTIVITY SUMMARY

Downtown Fargo is well connected in terms of its street patterns. If Main Avenue was to be reduced to three lanes, one being a turning, lane as many sources say could happen with little backlash, NP Avenue, 1st Avenue North and 1st Avenue South could absorb some of the overflow traffic.

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ECONOMIC FINDINGS

WHY IT'S FINANCIALLY RESPONSIBLE

Data has been collected from a variety of sources across the United States. For ease of understating, the paper has broken the data retrieved into the economic benefits that can arise from implementation of bicycle infrastructure, wider pedestrian facilities, thinner streets, mass transit, and a regional connection to Fargo, North Dakota and Minneapolis, Minnesota.

BICYCLING INFRASTRUCTURE

According to the League of American Bicyclists' report entitled "Bicycling Means Business: the Economic Benefits of Bicycle Infrastructure," there are several basic principles of why bicycle infrastructure is good for the economy:
1) People who ride bikes buy bikes. This puts people to work in bicycle shops and apparel stores.
2) People who ride bikes buy other things, too. Bike accessible business districts benefit by catering to these customers.
3) People on bikes are also more likely to make repeat trips to their local stores.
4) People who ride bikes on vacation buy food, have travel costs, and pay for lodging, bicycling tourists bring millions of dollars to cities and towns across the country that wouldn't otherwise end up there.
5) People who ride bikes can save their companies money on health insurance costs.
6) Developers, cities, and individuals can save money on parking costs by providing space-efficient, low-cost parking instead of expensive car parking.
7) Road projects are materials-intensive. Much of a road project budget goes to materials. By contrast, bicycling and walking projects are labor-intensive. Bicycling and walking projects create more jobs per dollar than road projects.
8) A built-up city can add capacity for new bicyclists much less expensively than new capacity for drivers.
9) Spill-over effects of all bicycling-related activities could be as large as $133 billion, supporting 1.1 million jobs and generating $17.7 billion in federal, state, and local taxes.

These basic principles coincide with numerous case studies from across the nation. In a North Carolina city, property values rose $5,000 due to a nearby bikeway being constructed. In Delaware, property values rose $8,800 because of newly constructed trails near these developments. In Wisconsin, cycling adds over $556 million and 3400 jobs to its economy through increased tourism, manufacturing, sales and repair and bicycle tours. In Colorado, over $1 billion comes in the form of tax revenue due to manufacturing, retail, and tourism related to bicycling. 65% of merchants of San Francisco businesses located along transit corridors that have recently added bicycle infrastructure have said they believed these newly

added bike lanes has had a positive impact on business.

WIDER PEDESTRIAN FACILITIES

Widening sidewalks is an effective way of bringing new life to a street. Many cities are beginning to see the benefits of widened sidewalks and are opting to decrease the width of streets and use the space to widen the existing sidewalks, which are typically too narrow to handle large numbers of pedestrians. According to Health by Design, their study found that home buyers are willing to pay more for homes in walkable neighborhoods. These property values tend to rise the fastest compared to the homes in not walkable areas. In commercial areas, retail businesses see an increase in patronage when fronted with a walkable entrance. Case studies from Washington D.C. has found that patterned and widened sidewalks in neighborhoods has helped in attracting forty four new businesses, 200 new jobs, and has increased sales in existing businesses. These neighborhoods has also helped in adding $9 per square foot to retail rents and nearly $82 per square foot to home values. In Lancaster, California, the city has invested in adding a pedestrian only plaza, wider sidewalks, and landscaping. This alone has spurred $125 million in private investment, a 26% increase in sales tax revenue, and over 800 new jobs after only a $10.6 million initial investment. In Mountain View, a suburb of San Francisco, California, the addition of sidewalk cafes and a street redesign has spurred over $150 million in private investment. All in all, these walkable neighborhoods are preferred by the millennial generation – the largest generation to exist. This generation includes many young professionals (ages 25-34 years old) who are creating a booming workforce that can further add to the economic growth of these walkable communities.

THINNER STREETS

Across the nation, cities are rethinking the average width of their streets. They are realizing that taking some of the right of way (ROW) that is usually dominated by the cars and giving it back to mass transit users, bicyclists, and pedestrians can have a profound effect on economic vibrancy of a neighborhood. In New York City, several streets have recently been redesigned with thinner traffic lanes and the introduction of other complete street strategies. The first street researched, Vanderbilt Avenue, had goals of creating rededicated cycling space, improving pedestrian safety and comfort, further traffic calming measures, and improving streetscape to support residents and businesses.

Area Improvement Site		Baseline Quarterly Sales	Sales Post-Improvement 1st Year	2nd Year	3rd Year
Vanderbilt	$	894,673.00	39%	56%	102%
Borough					
Brooklyn	$	982,413,239.00	27%	19%	18%
Neighborhood Comparisons					
Average	$	1,713,174.00	19%	46%	64%
Flatbush	$	2,191,880.00	27%	32%	51%
7th Avenue	$	2,176,027.00	12%	35%	21%
Washinton	$	771,616.00	19%	70%	120%

Table 04: Vanderbilt - NYC

As evidenced by the data, Vanderbilt Avenue businesses have seen a tremendous increase in sales due to the redevelopment. The other streets listed below Vanderbilt Avenue's information are located near Vanderbilt and have also seen increases in businesses due to Vanderbilt's success. The second street

looked at for the study was St. Nicholas Avenue/Amsterdam Avenue. Its goals were to promote safer walking conditions, provide safer walking routes to buses and subways, create shorter and more direct crosswalks, maintain travel times and bus route connectivity, maintain parking and improve loading for local businesses, improve existing bicycle facilities, and enhance green space and provide seating areas.

Area Improvement Site	Baseline Quarterly Sales	Sales Post-Improvement 1st Year	2nd Year
St. Nicholas/Amsterdai	$ 706,940.00	18%	48%
Borough			
Manhattan	$ 3,962,683,573.00	17%	39%
Neighborhood Comparisons			
Average	$ 601,716.00	9%	7%
Broadway	$ 896,680.00	13%	22%
Amsterdam	$ 306,752.00	4%	-9%

Table 05: St. Nicholas/Amsterdam - NYC

St. Nicholas/Amsterdam Avenue, the most recent of the redesign projects has also seen a modest increase in sales revenue. Located in upper Manhattan, this redesign has spurred economic development in an area that was suffering economically. The last street redesign project that was looked at was the Bronx Hub in the Bronx borough of New York. The main goals of this project redevelopment was to simplify and clarify the intersection operation to improve safety for all users and provide additional public space to enhance transit passenger experience and encourage "staying" activities, not just getting from point A to point B in the shortest time possible. They also have goals to reduce congestion – both automotive and pedestrian – by simplifying and eliminating unnecessary movements, improve bus and subway transfer access, introduce new bike routes and bike-to-transit connections, and create shorter pedestrian crossings and new connections alone pedestrian desire lines.

Area Improvement Site	Baseline Quarterly Sales	Sales Post-Improvement 1st Year	2nd Year	3rd Yea
Bronx Hub	$ 4,721,163.00	30%	77%	50%
Borough				
Bronx	$ 374,373,474.00	11%	10%	18%
Neighborhood Comparisons				
Average	$ 1,245,141.00	24%	63%	179%
138th St.	$ 1,149,312.00	22%	33%	14%
3rd Avenue	$ 2,197,114.00	32%	135%	505%
Courtland	$ 388,998.00	19%	20%	19%

Table 06: Bronx Hub - NYC

Based off of this information, the Bronx Hub has enjoyed a modest increase in sales revenue as well. This is an interesting case study because of the immense increase in sales revenue in streets near the Bronx Hub intersection. 3rd Avenue, which passes through the hub, has relished an extreme increase in economic impacts.

Another example of economic benefits that can arise from shrinking street lanes was brought up by the New City Institute in Canada. They hypothesized that by reducing the ROW in residential neighborhoods from 66 feet to 33 feet, there is a huge potential for additional low-income housing on that salvaged 33 feet. They state that the average lot value is $600,000 after site preparation. If that number is valued by the amount of lots in the city that have the potential to house these low-income housing, it would result in $4.1 billion in additional property values.

MASS TRANSIT

Investment in public transit has a huge possibility in increasing business activity along major transit corridors. The capital investment in public transit sparks a chain reaction in business activity that far exceeds the initial investment. For example, in St. Louis, Missouri, the city saw $2.3 billion return on the expansion of the public transit system; In Chicago, that number was $4.6 billion over 20 years from only doing minor repairs and upgrades on their existing system. New businesses are also attracted to these transit hubs. In Plano, Texas, a transit hub was constructed; shortly after a $16 million transit village has been constructed with a wide variety of uses.

Investing in mass public transit also generates numerous jobs. A capital investment in public transportation translates into thousands of private-sector jobs in the design, construction, and manufacturing industries and in the retail and retail/wholesale trade sectors – not just in the regions served but throughout the entire country. Imlay City, Michigan saw 365 jobs building buses that serve rural and mid-size communities. Public transportation alone in New York supports 375,000 jobs and over $26 billion in wages. In the grief-stricken city of New Orleans, the public transportation workforce employs over 1,600 people with jobs. Large corporations are now seeing the benefits of mass transit and are now reorganizing in order to play off of the transit lines.

When capital investments are made in public transportation, property values near transit stops swell, as do tax revenues. In Virginia, a 19.2% return on an investment by the Metrorail is expected to generate an additional $2.1 billion in tax revenues. New Jersey's Kearney Connection (a passenger train system that runs through New Jersey to Penn Station in New York City) has raised home values near stations on the Morris and Essex Lines by $30 million and boosted local tax revenues by $6.7 million. Finally, in Chicago, homes within a half mile of the suburban rail stations sell on average $36,000 more than houses located further away.

FARGO: REGIONAL CONNECTION

Complete street strategies and their economic impacts, as evidenced by the preceding data, do not restrict themselves to cities and areas that have mild climates. Areas in northern climates have benefited from these strategies just as much as their southern counterparts. In 2004, downtown Fargo, North Dakota went through a major street redesign on one of its thoroughfares, Broadway Drive. The city of Fargo invested $10 million in a pedestrian friendly street design that included decorative paves on streets and sidewalks and well as bicycle friendly infrastructure. The streets were designed to slow traffic as well as promote walkability and bicycling on street. Building values have increased from $103 million in 2000 to over $215 million in 2009. This demonstrates that despite an areas climate, economic benefits will comprise when creative and smart planning practices are composed. The city of Fargo also has a popular mass transit route called the MatBus. This route can save the average household over $8000 per year. This allows for riders to spend that money in local businesses that are located along the routes and stops. Their website states that every $1 invested in public transportation projects generates from $4 to $9 in local economic activity.

A new study conducted in the spring of 2014 reviewed the economic benefits of reconstructing Nicollet Mall, a popular pedestrian and mass transit corridor in the heart of Minneapolis. The study found that the reconstruction will benefit the city, state, and

region in a variety of ways. The following tables display the economic and employment benefits of said reconstructions. The total economic benefits that would arise from the Nicollet Mall reconstruction would be extremely significant. Over 860 full-time equivalent jobs would come about as well as $105.5 million in additional spending in Minnesota. This MSP destination attracts nearly 28 million visitors that spend $6.88 billion per year. The Nicollet Mall area brings in $13.8 million in city sales tax receipts. That number will only continue to climb if accessibility increases after construction finishes.

Metric		Finding
Direct, indirect, and induced spending resulting from reconstruction	$	105,500,000.00
Statewide employment generated by project		860 FTEs
Development currently underway on or adjacent to Nicollet Mall	$	76,000,000.00
Development anticipated in 24-36 months, on blocks facing Nicollet Mall	$	185,000,000.00
Development anticipated in 24-36 months, in areas one block distant	$	168,000,000.00
Estimated employeesadded in converted and new office space		1,900.00
Estimated appreciation of exisitng property resulting from reconstruction	$	57,000,000.00
Estimated annual property tax revenue, collected by local governments	$	10,900,000.00
Estimated annual property tax revenue, collected by State of Minnesota	$	2,100,000.00

Table 07: Total Economic Impacts of Nicollet Mall Reconstruction

Category of Spending	Direct Spending	Impact Multiplier ($ per $)	Total Impact
Construction (labor, equipment, and mat	$ 35,000,000.00	2.1572	$ 75,500,000.00
Soft Costs	$ 15,000,000.00	1.9976	$ 30,000,000.00
Totals	$ 50,000,000.00		$ 105,500,000.00

Table 08: Economic Impact of the Nicollet Mall Reconstruction

Category of Spending	Direct Spending	Employment Multiplier (jobs per $1 Million)	Total Employment Impact (FTEs)
Construction (labor, equipment, and mat	$ 35,000,000.00	17.8845	626
Soft Costs	$ 15,000,000.00	15.8941	238
Totals	$ 50,000,000.00		864

Table 09: Employment Impact of the Nicollet Mall Reconstruction

Below is a bar graph detailing the return on investment (ROI) on several different complete street projects in varied climatic regions in the United States. Some of the biggest gains were those projects that were in northern areas such as Fargo, North Dakota and Minneapolis, Minnesota. This demonstrates that the implementation of these strategies will have a positive effect in northern regions and the climate has little to no influence on how great of a return one can obtain.

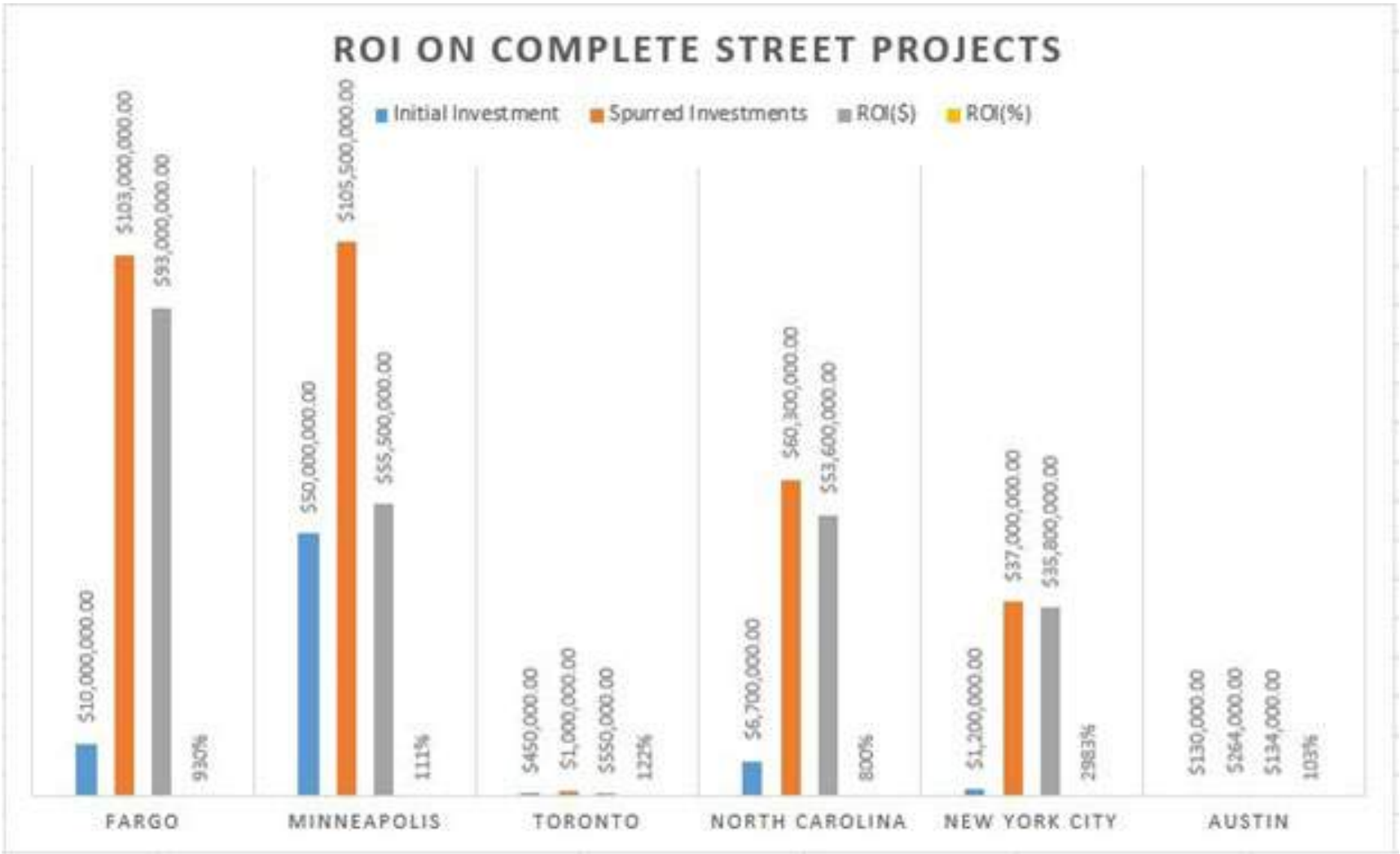


Chart 01: Return on Investment on Complete Street Projects in Different Climates

SITE VALUES

Currently Main Avenue has many strong assets that make it a very attractive site for redevelopment: Main Avenue is located in the most urban part of North Dakota, it is strongly connected to the rest of downtown, the Hawthorne neighborhood, and the Red River. There is also a strong social connection with this area of the downtown neighborhood. The South of Main Avenue district (SOMA) is a lively arts community that has a unique identity amongst the rest of downtown. They emphasize their "quirkiness" through their many galleries, cozy coffee joints, and the oldest park in Fargo. They aim to be both walkable and bikeable and open to all kinds of people. Historically, this part of town was the gateway to North Dakota by way of the Northern Pacific Railway. The depot and the adjacent park spaces were a popular destination for residents and visitors alike to congregate and socialize. Originally named Front Street, this area has always been an important corridor in the city of Fargo and essentially has served as the heart of the city and metro area.

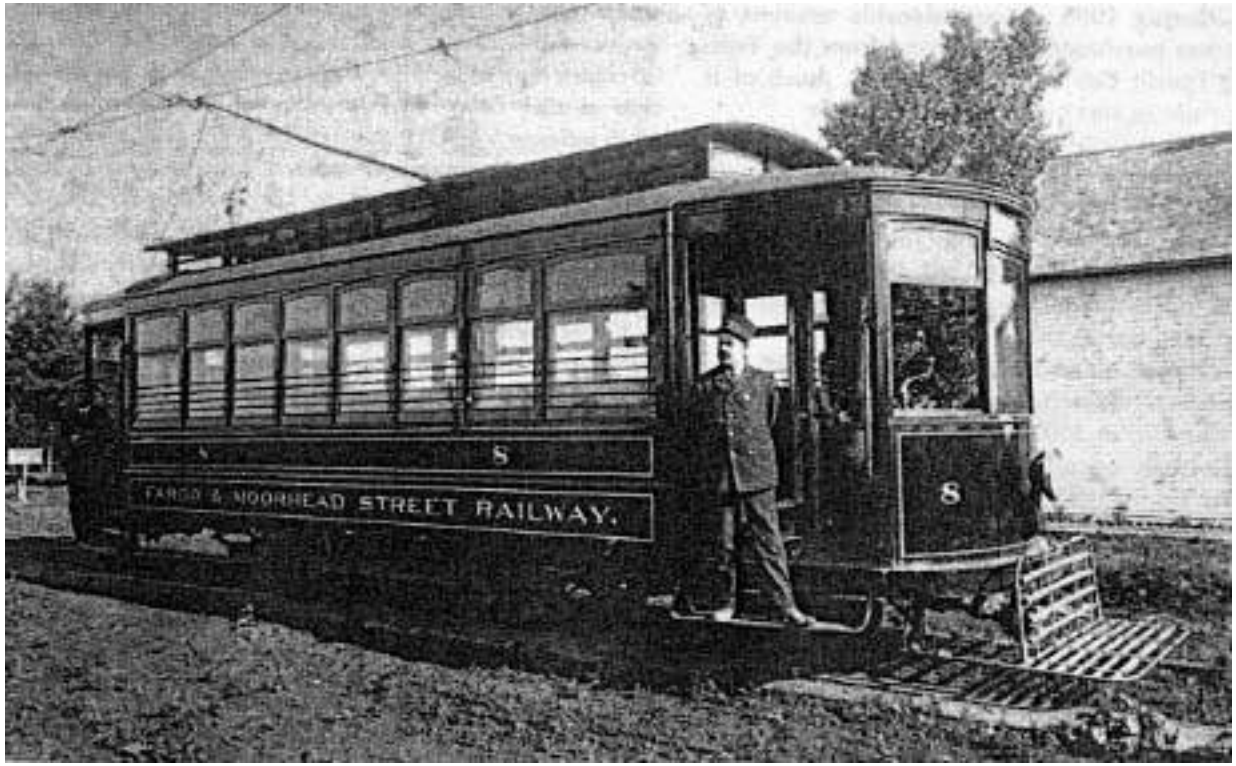


Figure 13: Fargo-Moorhead Trolley Car

Although this site has many important assets - physically, culturally, and historically - there are several downfalls that are currently existing. Much of this once lively corridor has given way to expansive parking lots, unnecessarily wide roads, and urban renewal practices that have left parts of the road looking rather suburban. Bicycle connectivity is somewhat lacking as it connects to the river; as of now, cyclists need to cross six lanes of traffic in order to connect to the recreational paths near the Main Avenue bridge. This thesis proposal aims to retroactively fix what negatively has occurred in the past to better benefit the future.

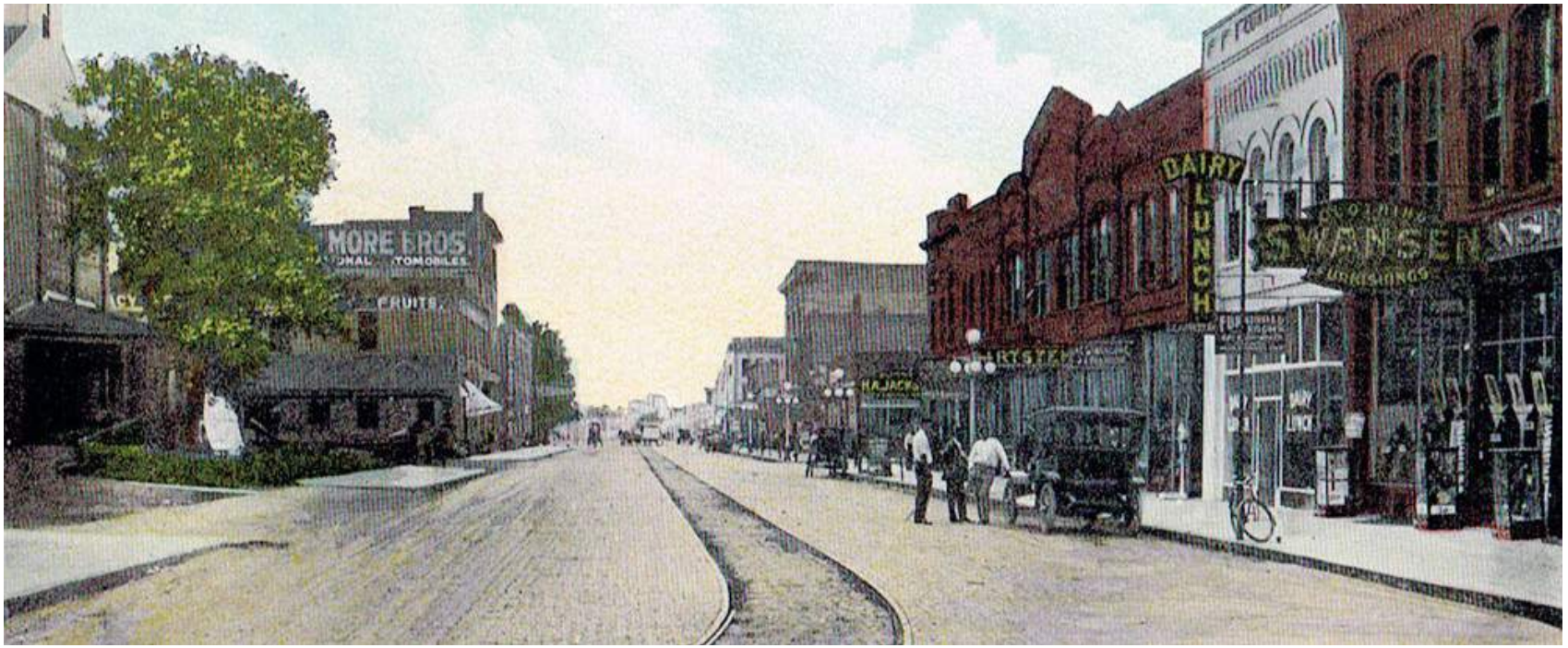


Figure 14: Historic Front Street: Downtown Fargo

PLAN FOR PROCEEDING AND DESIGN GOALS

As this thesis proposal continues to develop, the plan for proceeding involves starting a site inventory and analysis, developing a conceptual framework and plan, taking into great consideration the results of the survey and reach out to professionals in the Landscape Architecture profession for advice on the overall design of my project. Below is a non-exhaustive list of the design goals for this thesis proposal in no particular order.

1) Develop a functional street layout

2) Create an aesthetically pleasing streetscape that fits with the context of downtown

3) Decide on a material palette that has a long life span that is also visually appealing

4) Engineer a functional traffic flow for the bus system with the relocation of the terminal to Main Avenue

5) Respect the historical, cultural, and social ties that this corridor has and enhance the vitality of the street

6) Enhance the economic vitality of the Main Avenue corridor

PART FIVE:

INVENTORY

INVENTORY

BASE MAP

- Existing Structures Downtown Mixed Use Zone
- Existing Structures to be Razed Downtown Mixed Use Zone
- Public and Open Spaces
- Existing Parking Lots
- Existing Driveway

In the Downtown Mixed Use Zone, there are no setback requirements. Structures are encouraged to meet the sidewalk at the right of way (ROW) although exceptions can be made for small plazas and other open spaces. On the opposite page is a list of appropriate uses allowed in the downtown neighborhood. Currently along this stretch of Main Avenue, the main uses are retail, office, and residential. However, there is a few light industrial uses, entertainment venues, and parks and open spaces. There is a lot of potential on this corridor when it comes to infill projects that will aid in the economic redevelopment of this section of downtown Fargo.

DOWNTOWN MIXED USE ALLOWABLE USES

- House, detached
- House, attached*
- Duplex*
- Multi-Dwelling Structure*
- Group Living**
- College
- Community Service*
- Daycare*
- Detention Facilities
- Health Care Facility
- Parks and Open Areas
- Religious Institution
- Safety Services
- Schools***
- Basic Utilities*
- Religious Institution
- Safety Services
- Schools***
- Basic Utilities*
- Office
- Parking, Commercial
- Recreation and Entertainment, Outdoor***
- Retail Services
- Self Service Storage*
- Vehicle Repair*
- Industrial Service****
- Manufacturing and Production***
- Warehouse and Freight Movement***
- Wholesale Sales***
- Aviation***
- Surface Transportation***

TOPOGRAPHIC MAP

Although the majority of the site is fairly flat, there are some areas of significant grade change. Nearing the eastern boundary of the site, Main Avenue drops approximately ten feet where the bridge begins. 2nd Street South slopes upward from the intersection to the south before dropping significantly where it passes in front of the Park East apartment complex site. There is a major drop in topography as well near the intersection of Main Avenue and Broadway Drive. Broadway slopes downward as it terminates at Island Park. Future infill projects along the corridor near any significatn slopes need to ensure erosion control efforts so as to not have any major building settling issues in the future. Special attention needs to be paid to future flood control projects as noted on the next page.

FLOOD CONTROL EFFORTS

Building demolition has already been completed of the Park East Apartment complex on the large parcel of land surrounded by 2nd Street South and Main Avenue. Plans are to proceed with levee construction as seen in the image to the right. However, this thesis believes the current design of the levee will further cut downtown Fargo off from the river, create to "dead" spaces (one on the north side of the levee and one on the south) and not use the site to its full potential.

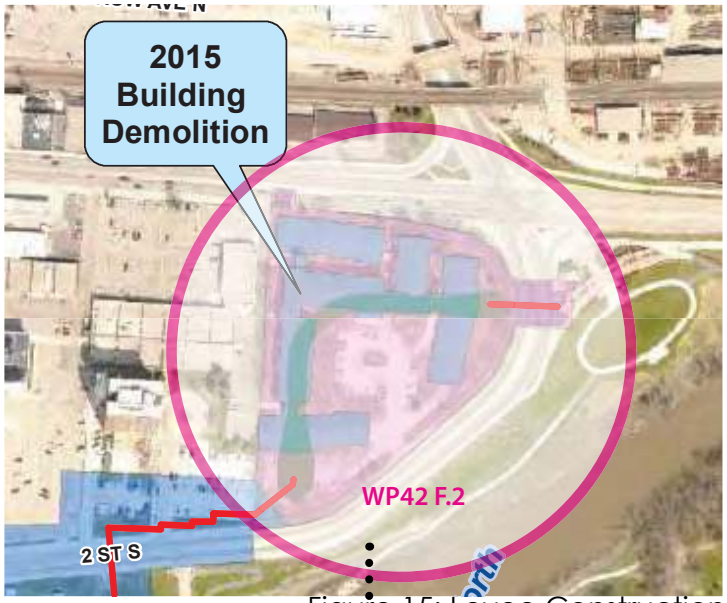
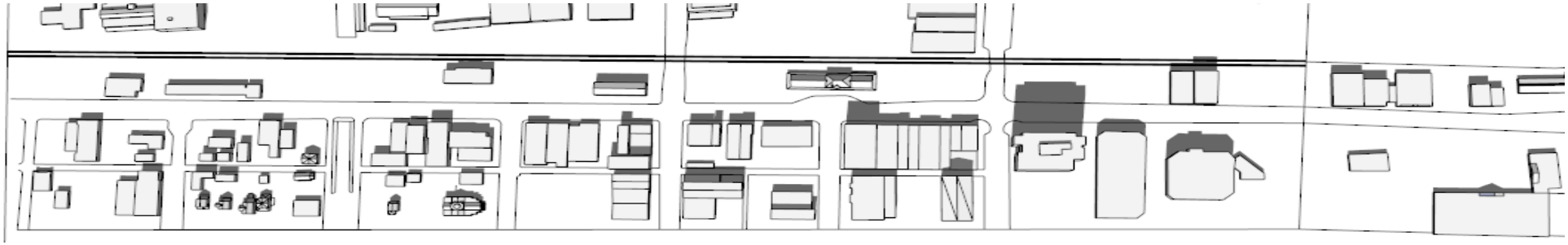


Figure 15: Levee Construction

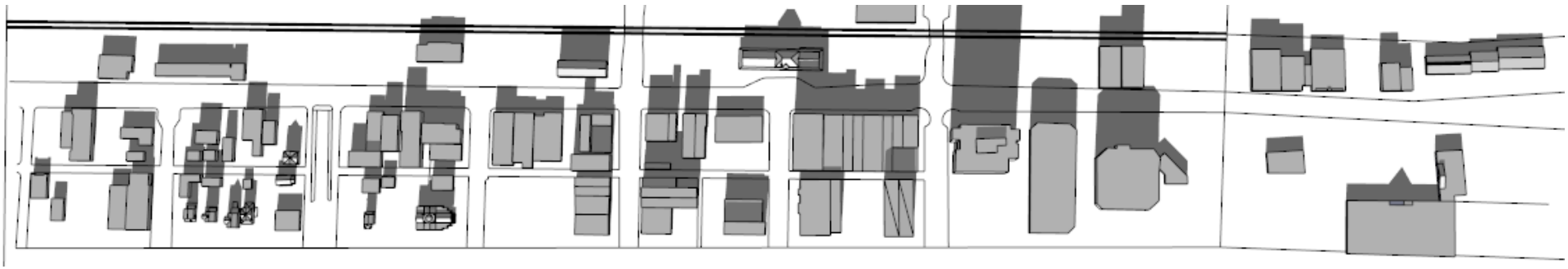
SHADE STUDY



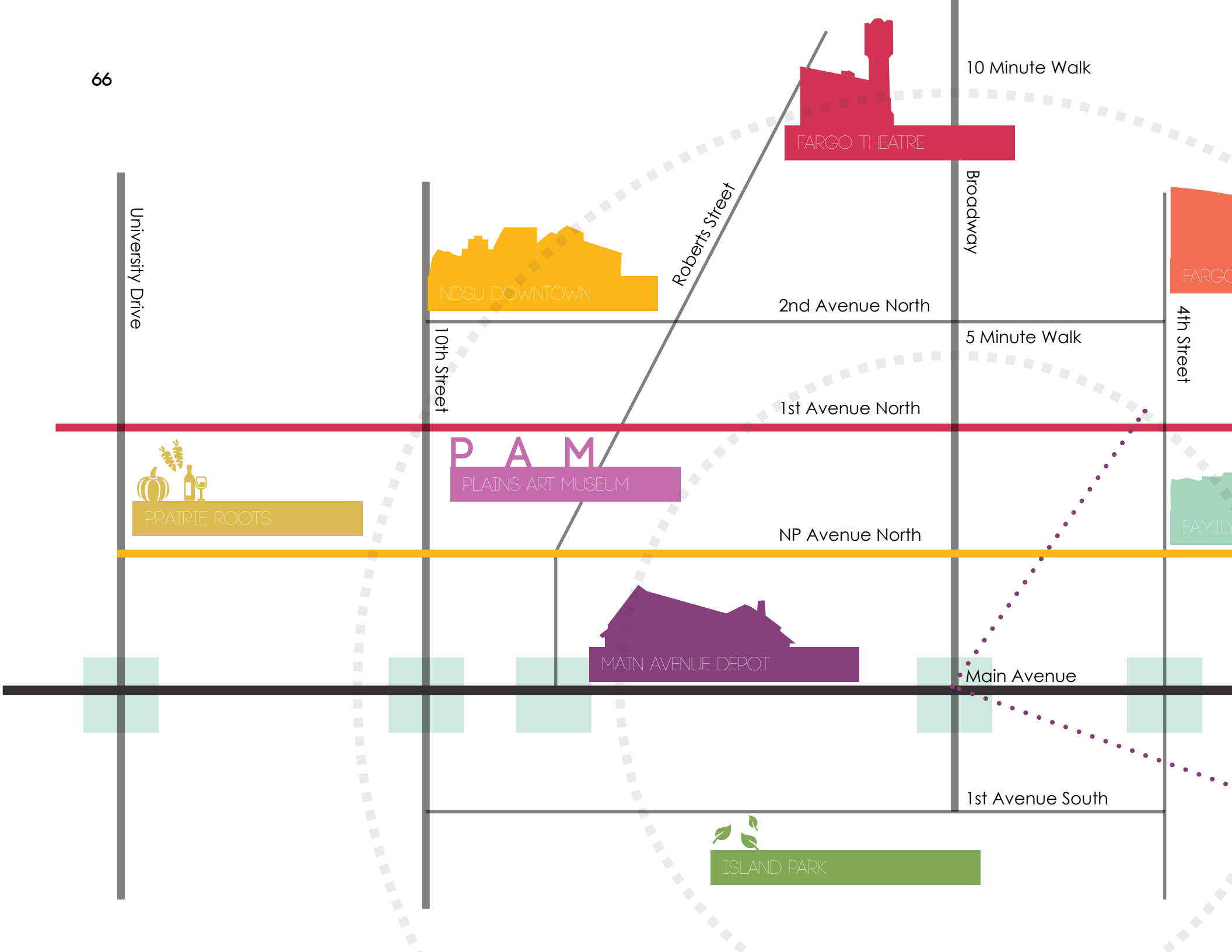
Spring: March 21st, 12:00 PM

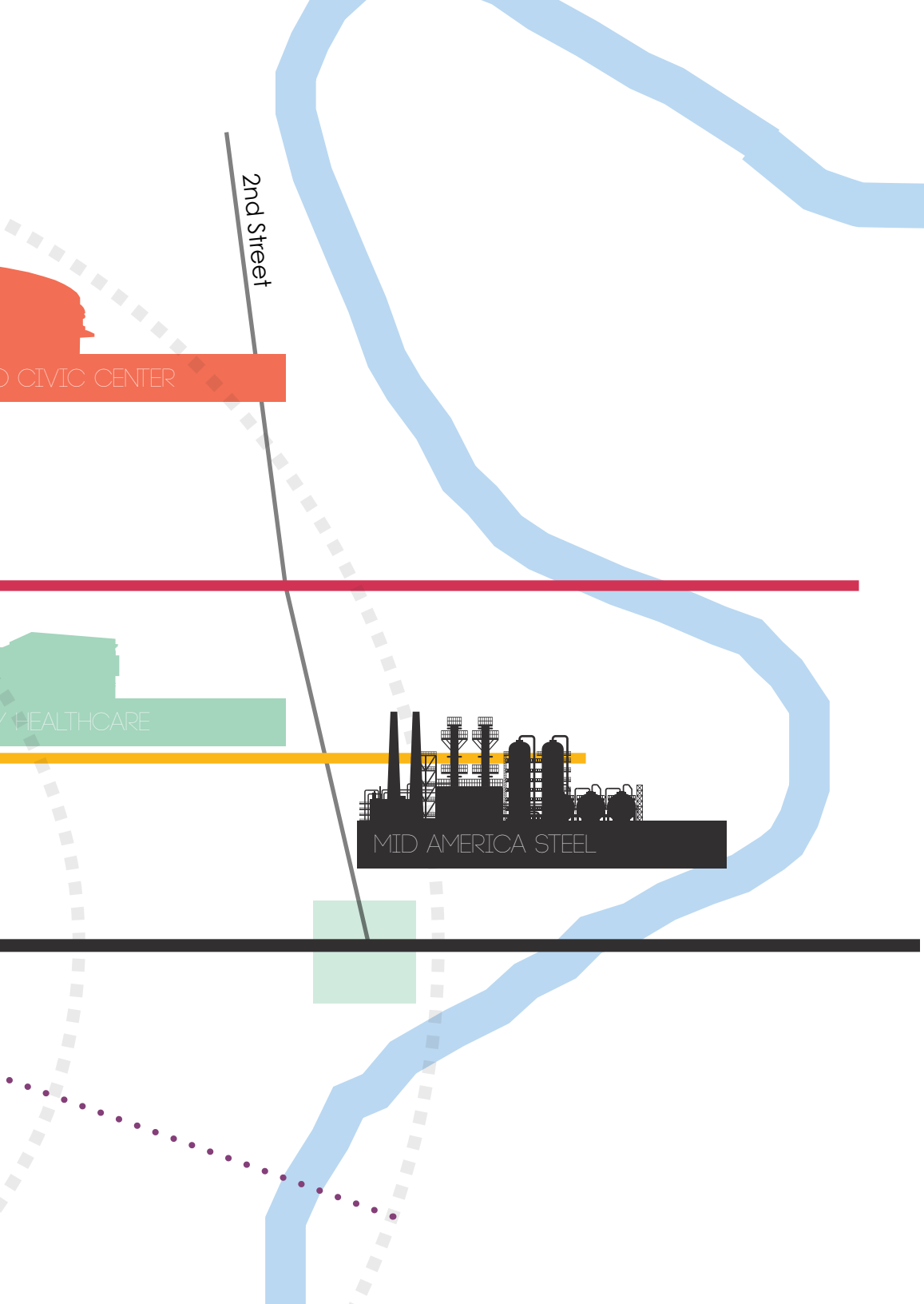
Summer: June 21st, 12:00 PM

Autumn: September 21st, 12:00 PM



Winter: December 21st, 12:00 PM


10 Minute Walk
FARGO THEATRE
Broadway
Roberts Street
University Drive
NDSU DOWNTOWN
2nd Avenue North
5 Minute Walk
10th Street
4th Street
1st Avenue North
P A M
PLAINS ART MUSEUM
PRAIRIE ROOTS
NP Avenue North
MAIN AVENUE DEPOT
Main Avenue
1st Avenue South
ISLAND PARK



DOWNTOWN AREA DESTINATIONS

Downtown Fargo has several major destinations all within walking distance from the Main Avenue corridor. Attractions such as the Fargo Theatre, Island Park, and the Plains Art Museum bring thousands of visitors each year while destinations such as Family Healthcare, Mid America Steel, and Prairie Roots Co-Op attract many locals to the downtown area. The Main Avenue corridor should attract these people as well.

ROAD INTERCONNECTIVITY

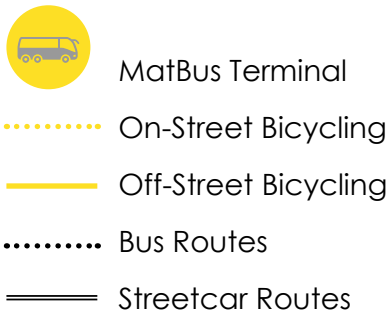
Currently, there are six roads that run perpendicularly to Main Avenue that bisect it and cross over the railroad. However, three of these crossings are underpasses making it less appealing for pedestrian usage. Only 4th Street, Broadway, and 8th Street are ground level crossings. This may be the reason Main Avenue is segmented from the rest of the downtown activity.

EXISTING AND PAST MASS TRANSIT NETWORK

Fourteen different MAT Bus routes converge at the Grand Transportation Center located at 502 N.P. Avenue North in downtown Fargo. As NP Avenue is being transformed into a narrower, neighborhood street consisting of two lanes in both direction and no turning lane, it is becoming more obsolete as a viable transit corridor. With the wider right of way that Main Avenue has to offer, the transit hub could easily be moved to a location along Main. Routes would have to use the 2nd Street underpass so as to not conflict with train traffic.

EXISTING BICYCLE NETWORK

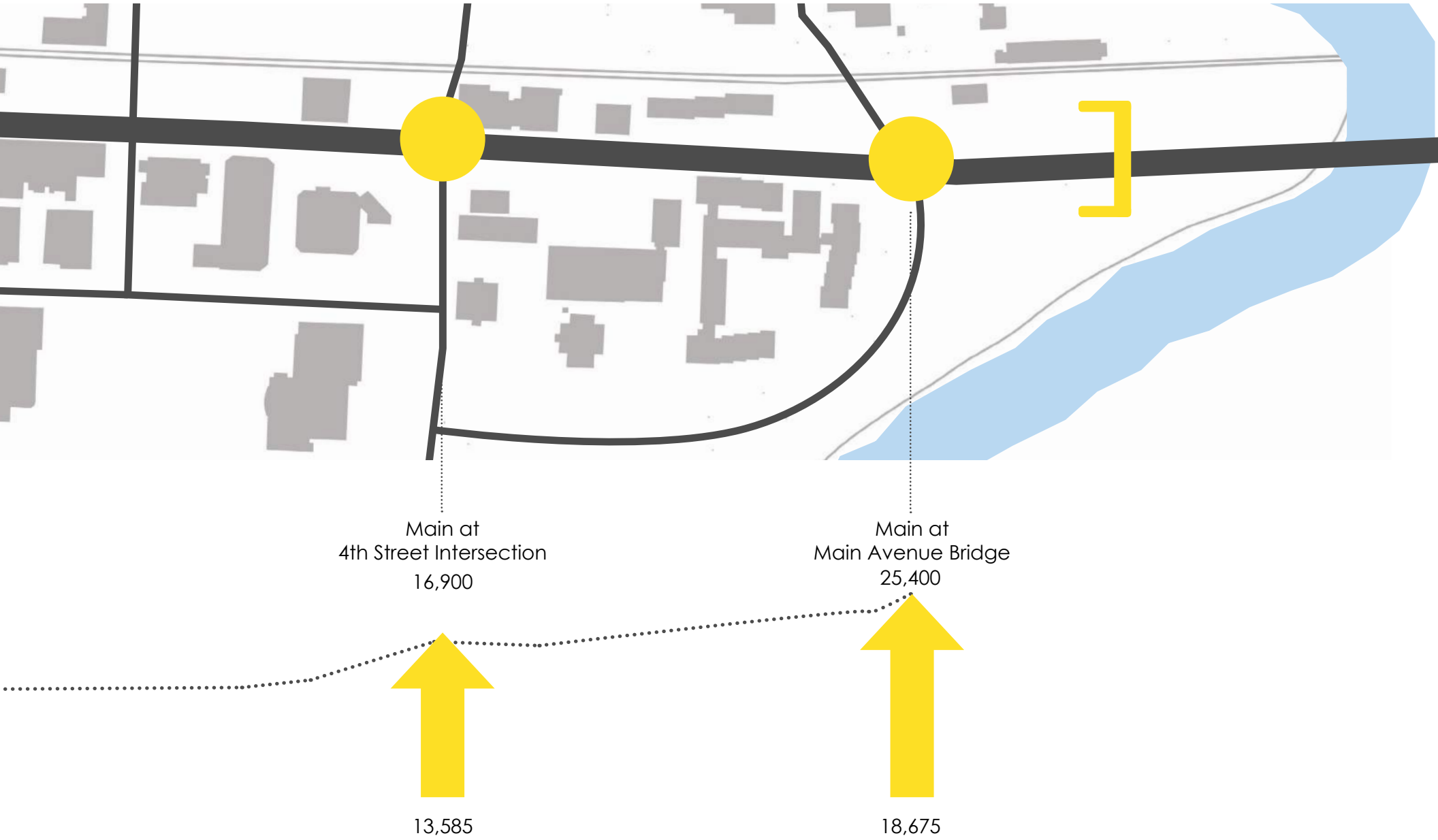
Downtown Fargo has a solid path system along the Red River, however, there is a disconnect between the on street biking downtown and the connection to the river. A stronger connection should be made to enhance this cycling network.

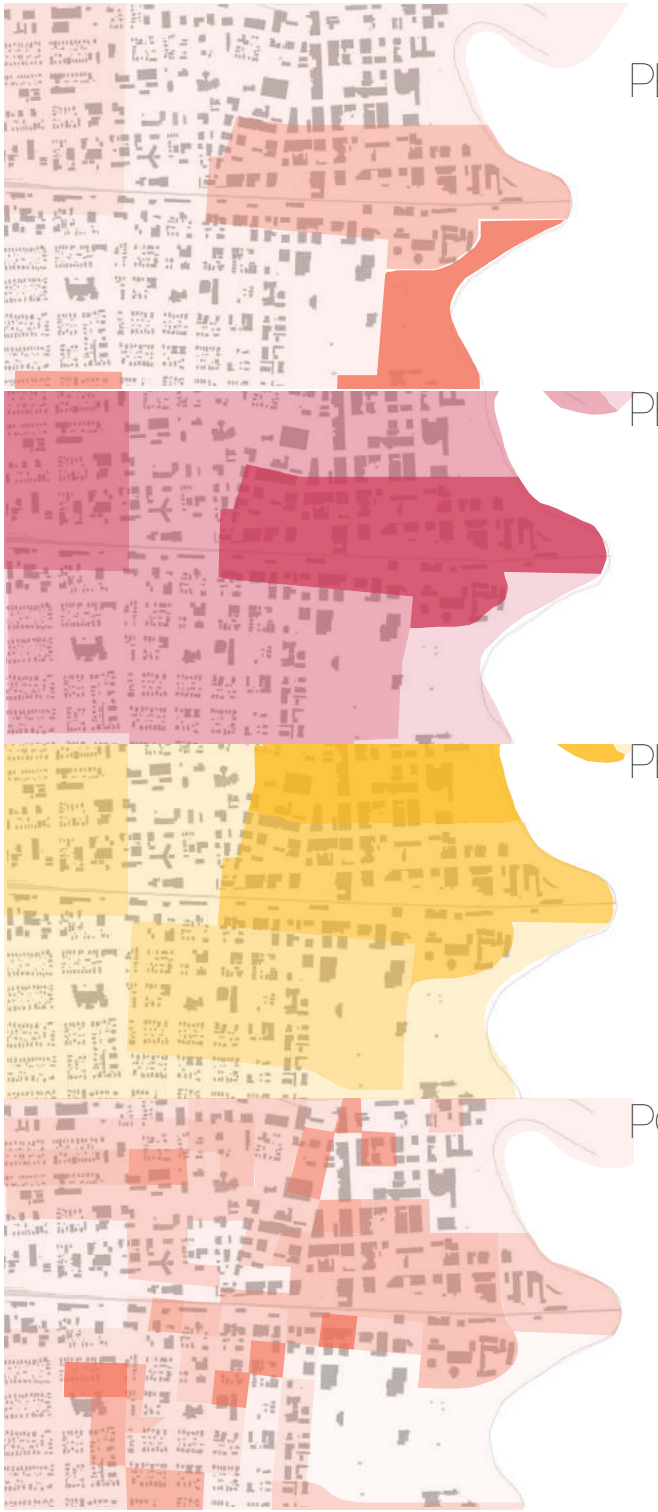



Klai
Hall
Civic
Center
University Drive
1st Avenue North
Broadway
NP Avenue North
Main Avenue
10th Street
Island Park

TRAFFIC COUNTS
2013 ·····▸ 2040

Although traffic projections are expected to increase along the corridor, research states that roadways can be thinned to three traffic lanes up to 25,000 vehicles per day if it's well connected to other streets.


Main at
4th Street Intersection
16,900
Main at
Main Avenue Bridge
25,400
13,585
18,675



PERCENTAGE OF BICYCLE COMMUTERS

- Less Than 1%
- 1% - 3%
- 3% - 5%
- More Than 5%

PERCENTAGE OF WALKING COMMUTERS

- Less Than 10%
- 10% - 20%
- 20% - 30%
- More Than 30%

PERCENTAGE OF MASS TRANSIT COMMUTERS

- Less Than 4%
- 4% - 12%
- 12% - 15%
- More Than 15%

POPULATION DENSITY PER SQUARE MILE

- Less Than 5,000
- 5,000 - 10,000
- 10,000 - 15,000
- 15,000 - 20,000
- 20,000 - 25,000
- More Than 25,000

BUILDING USE AT STREET LEVEL

- Office
- Retail
- Residential
- Specialty: Church, Gym, Theatre
- Inactive/Abandoned

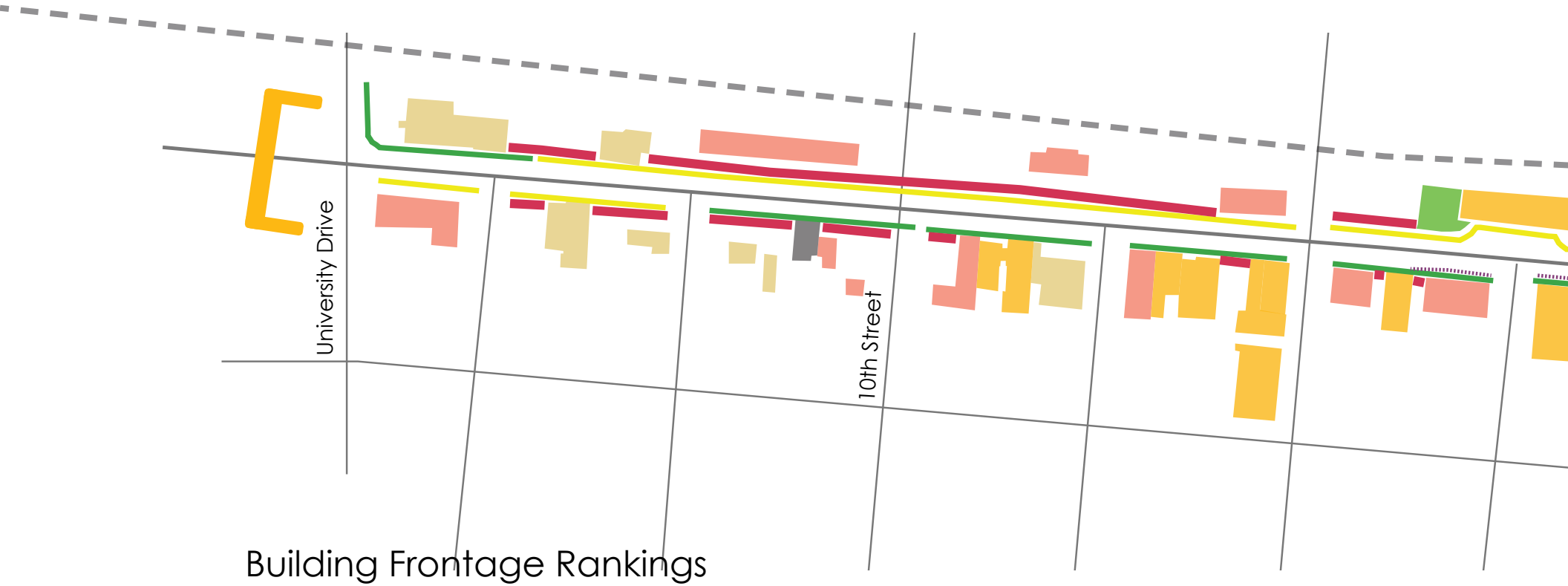
PROPERTY VALUES

- $0 - $100,000
- $100,000 - $500,000
- $500,000 - $1,000,000
- $1,000,000 - $5,000,000
- $5,000,000 +

PART SIX:
ANALYSIS

ANALYSIS

QUANTIFYING THE INVENTORY



Building Frontage Rankings

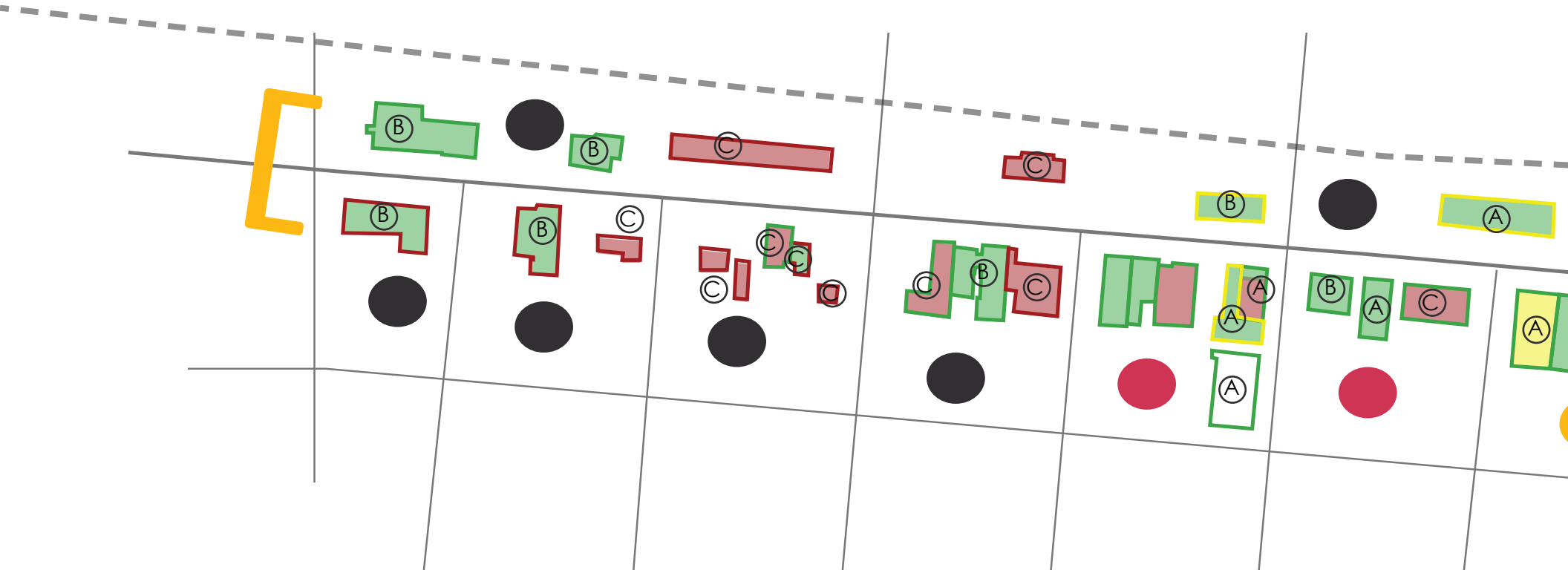
1) **Active Storefront**: Retail, Restaurant, Etc.
2) **Green/Open Space:** Parks, Plazas, Etc.
3) **Neutral Storefronts:** Office, Small Windows, Etc.
4) **Industrial Frontages**: Services, No Windows, Etc.
5) **Parking:** Concrete and Asphalt Sea Adjacent
6) I**nactive/Abandoned:** Blank Walls, Vacant Space, Etc.

Sidewalk Classifications

- **8'+ Sidewalk Width** - Enjoyable
- **6'-8' Sidewalk Width** - Neutral Enjoyment
- **Below 6' Sidewalk Width** - Avoid


Broadway

BUILDING CLASSIFICATIONS



Setback Rankings

1) **Sidewalk Adjacent:** Most Comfortable

2) **1-15':** Somewhat Comfortable

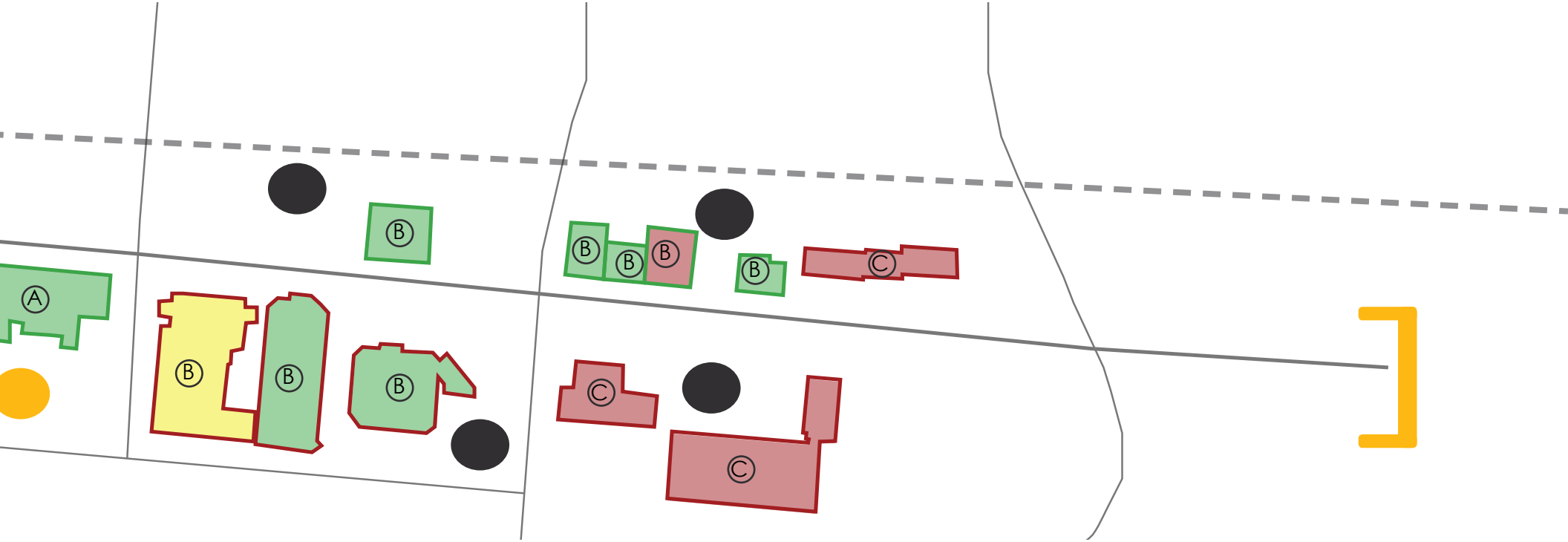
3) **Over 15':** Not Comfortable

Building Height Rankings

1) **2-5 Stories:** Most Comfortable

2) **6+ Stories:** Somewhat Comfortable

3) **1 Story:** Not Comfortable



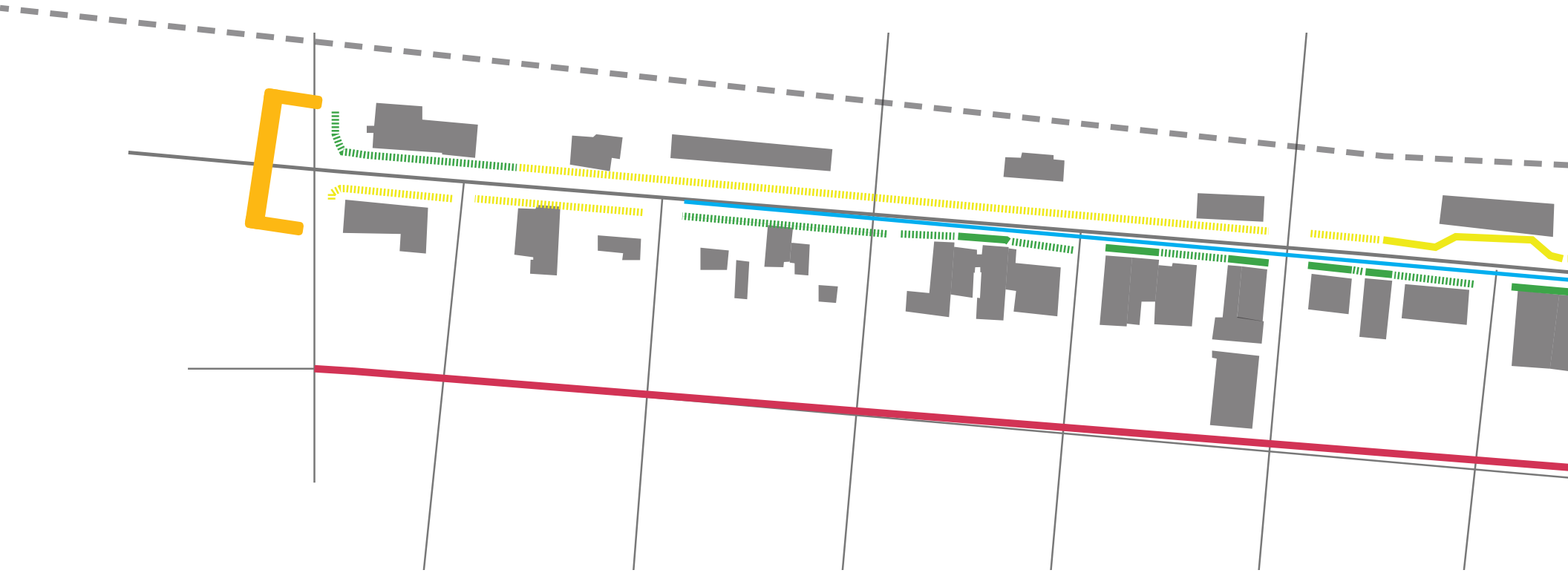
Frontage Density Rankings

- 1) **90-100%:** Most Comfortable
- 2) **75-90%:** Comfortable
- 3) **50-75%:** Somewhat Comfortable
- 4) **Under 50%:** Not Comfortable

Aesthetic Rankings

- Ⓐ 1) **Most Appealing:** Historic, Unique, Culturally Significant
- Ⓑ 2) **Somewhat Appealing:** Generic, Well Kept, Few Windows
- Ⓒ 3) **Not Appealing:** Run Down, No Windows, Blank Walls, Etc.

SITE ANALYSIS



Pedestrian Infrastructure

1) **8'+ Sidewalk Width Adjacent to UD**

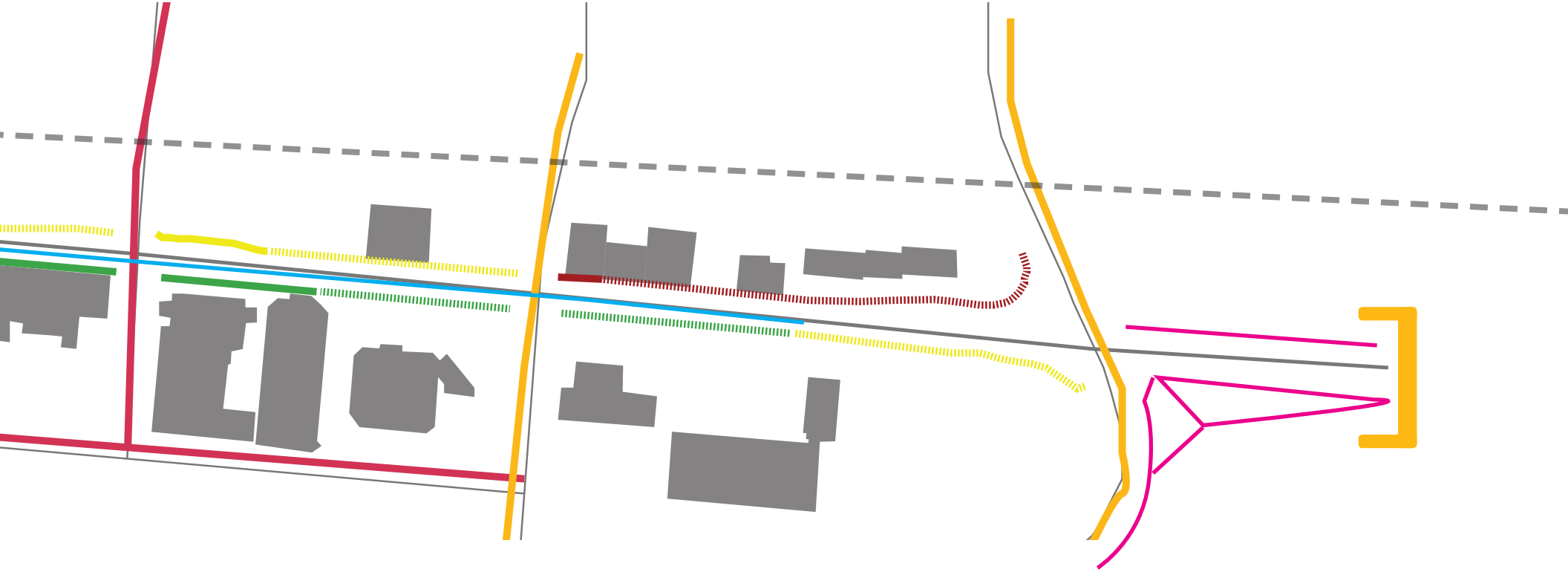
2) **8'+ Sidewalk Width Not Adjacent to UD**

3) **6-8' Sidewalk Width Adjacent to UD**

4) **6-8' Sidewalk Width Not Adjacent to UD**

5) **Under 6' Adjacent to UD**

6) **Under 6' Not Adjacent to UD**



Bicycling Infrastructure

1) **Cycling Track or Path**

2) **On-Street Bicycle Lanes or Sharrows**

3) **8'+ Sidewalks**

Mass Transit Infrastructure

1) **Currently has Mass Transit**

2) **No Mass Transit**

PART SEVEN:
DESIGN PROCESS

DESIGN PROCESS

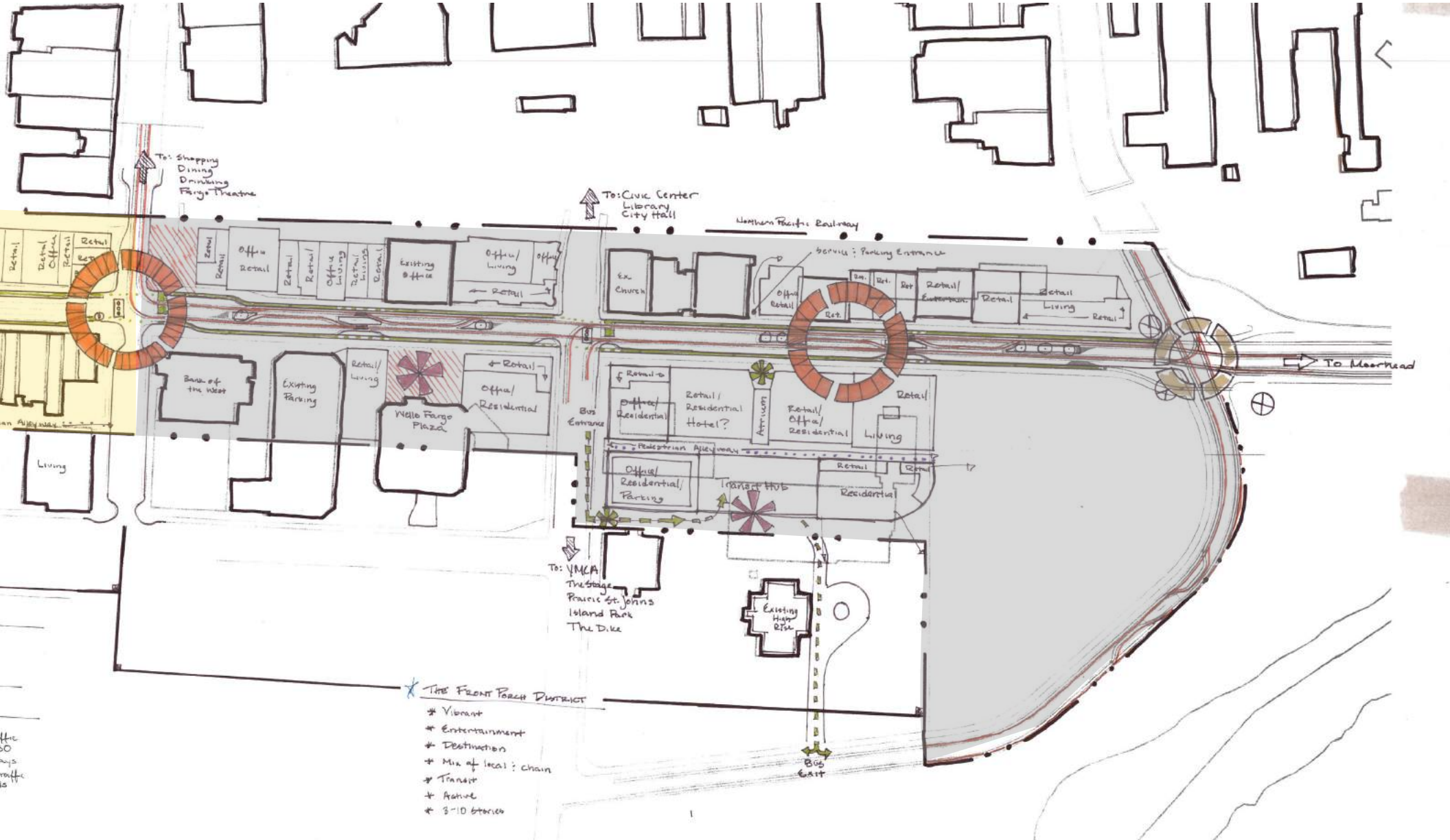
Throughout the conceptual design portion of this thesis, numerous sketches were created and several digital graphics were produced to aid in the overall scale of the project. Over the next few pages, images of the overall design development process are shown to view how the project grew to its end result.

The image to the right shows early design work regarding the street layout and how the different modes of transportation could work cohesively together with as little traffic congestion as possible. The transit stop for the trolley can be seen in the center of the roadway so as to not intrude upon automobile and bus traffic. The trolley itself uses the turn lane to stop and allow for passengers boarding and unloading.

MASTER PLANNING CONCEPT

Upon the completion of my inventory and analysis phase, a conceptual master plan was designed to best accomplish the goals of this thesis while acknowledging the results from the research, inventory, and analysis. Primary and secondary hubs were selected based on their location in relation to other destinations and context.

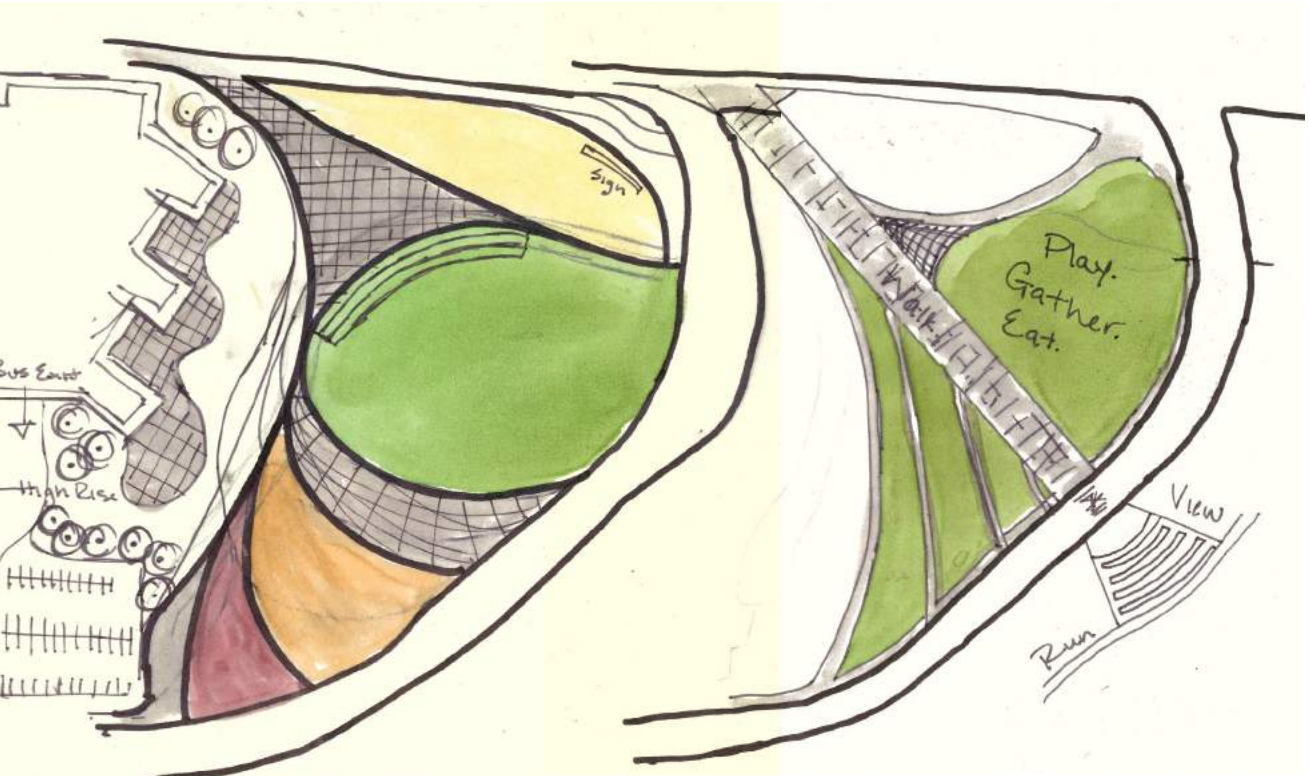
It was at this phase in the design process, the creation of three distinct districts within the context of this corridor occurred: the Front, SOMA, and the West End. More information on these districts will be located on page XX in the next chapter.

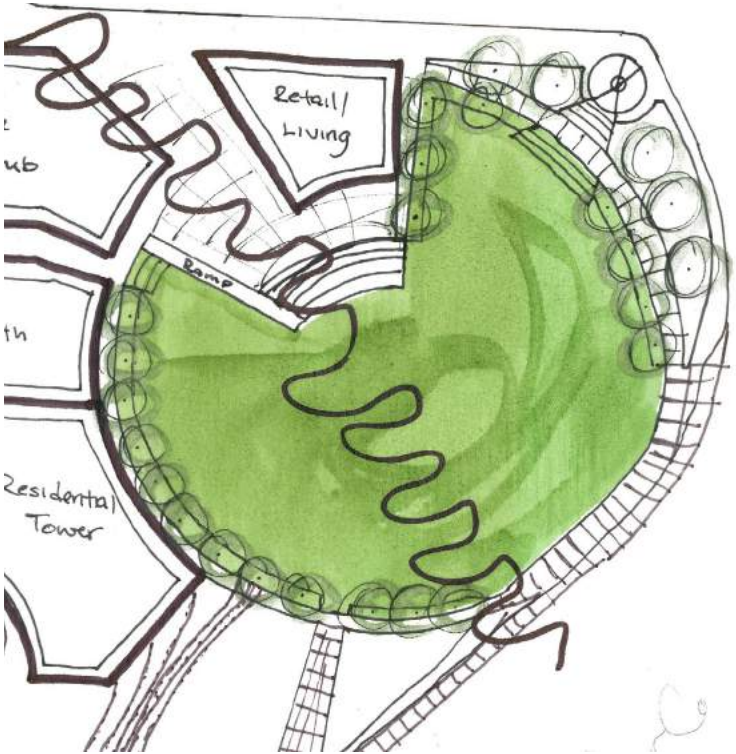


PARK & STREETSCAPE DEVELOPMENT

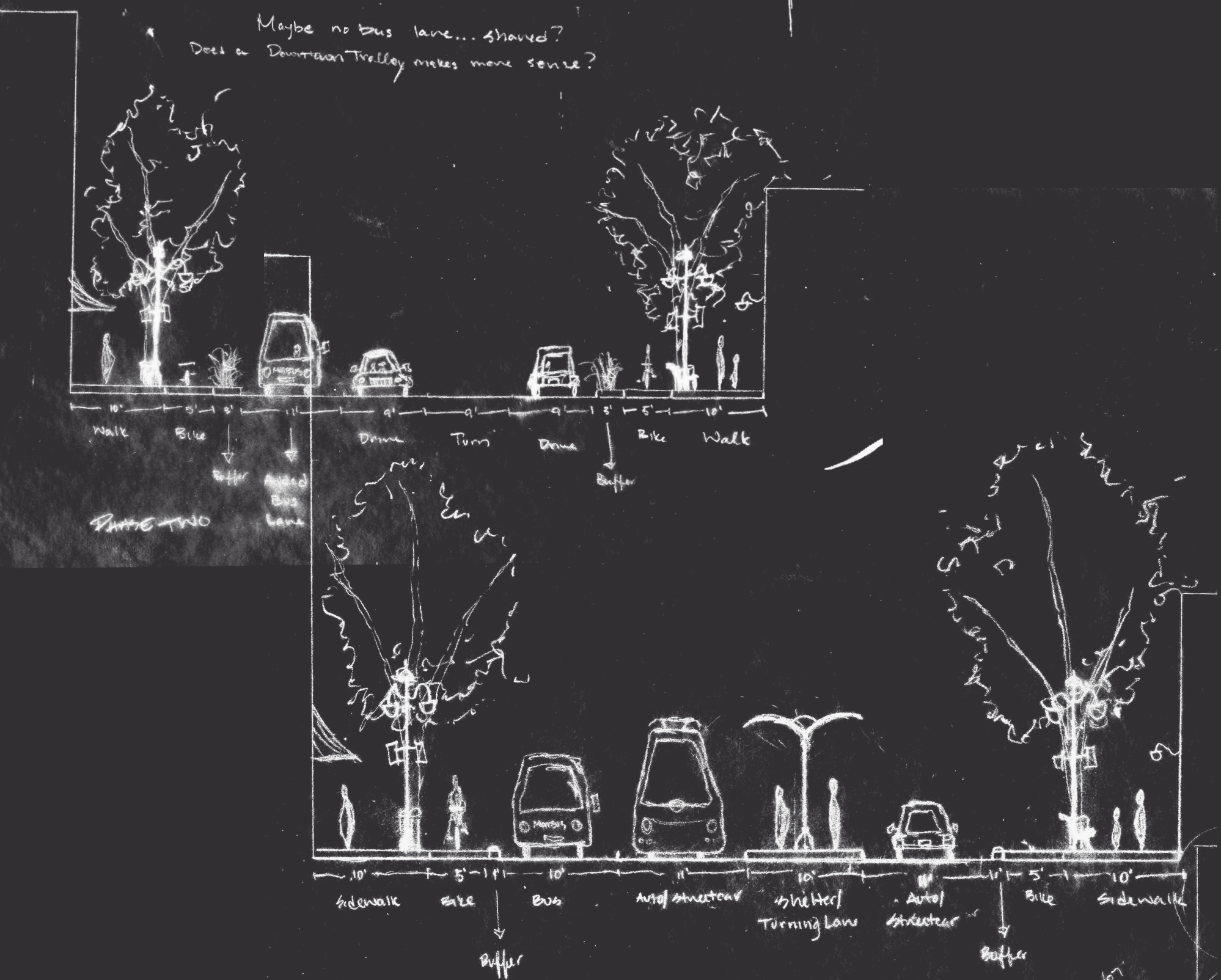
Below are three concepts designed in the spaces where the new flood protection levee is to be built. A big concern when designing the park was its both function and aesthetic qualities but also work as a flood combatant.

The two images on the right are early drawings of how the streetscape would look in different phasing stages of implementation across a long span of time. Ideas of a bus only lane was thought could be a stepping stone before the grand re-introduction of a streetcar system.





Maybe no bus lane... shared?
Does a Downtown Trolley makes more sense?



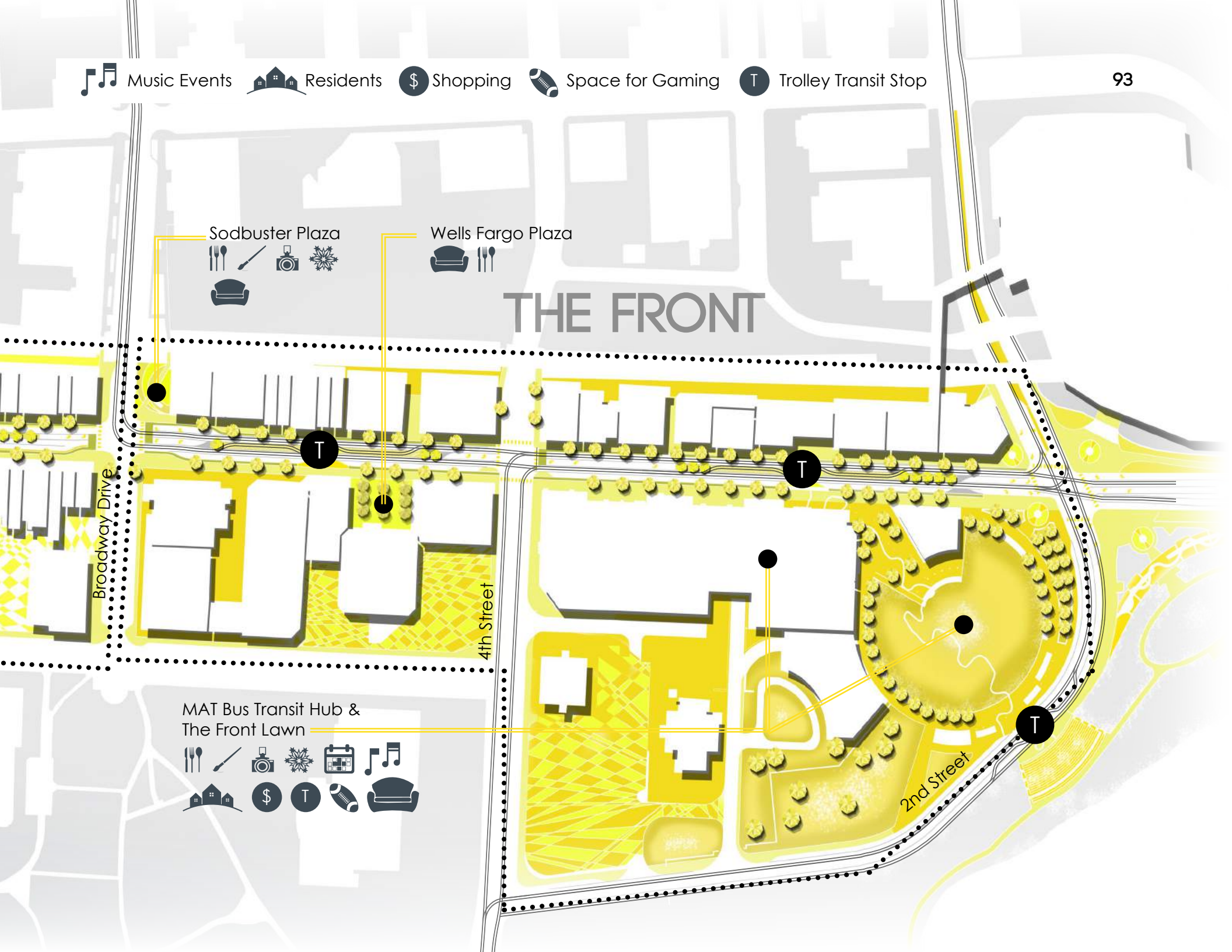
8

PART EIGHT:

FINALIZED DESIGN

KEY Dining Seating Public Art Events Photo Opportunities Year-Round Space

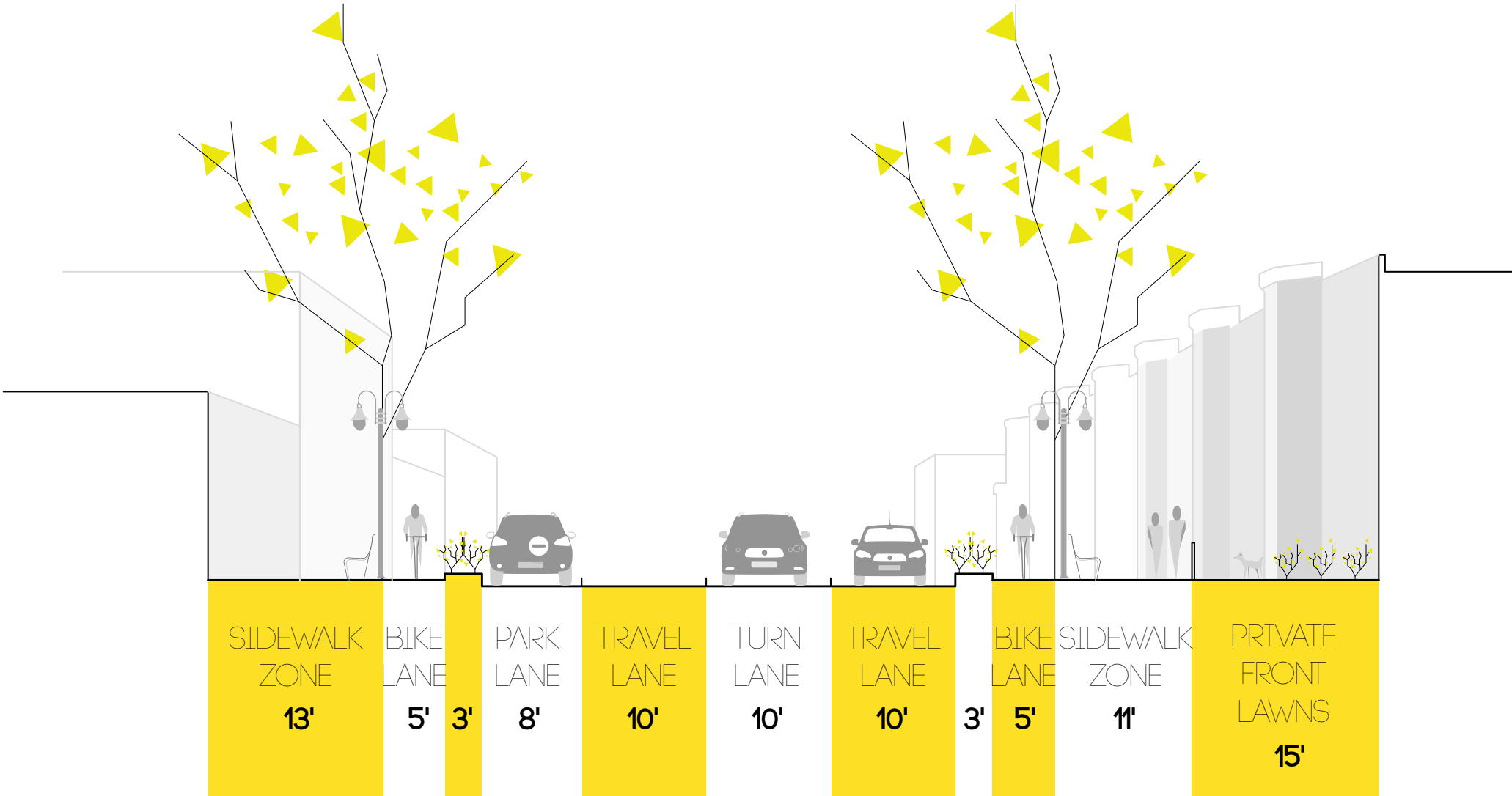
MASTER PLAN


Music Events
Residents
$ Shopping
Space for Gaming
T Trolley Transit Stop
Sodbuster Plaza
Wells Fargo Plaza
THE FRONT
Broadway Drive
4th Street
2nd Street
MAT Bus Transit Hub &
The Front Lawn

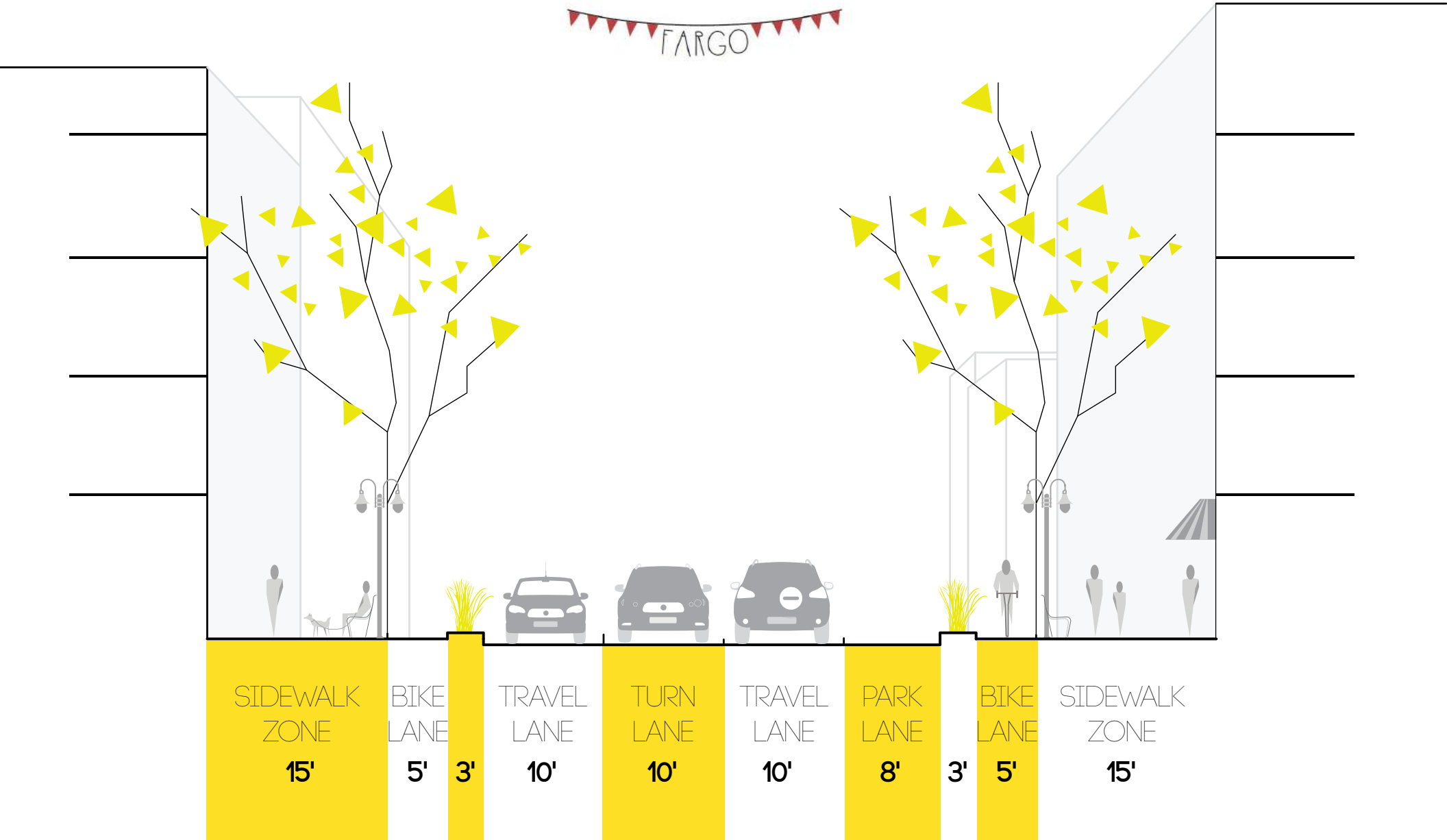

Row Homes
3' Vegetated Buffer
15' Private
Entry Courtyards

The West End
Downtown Fargo

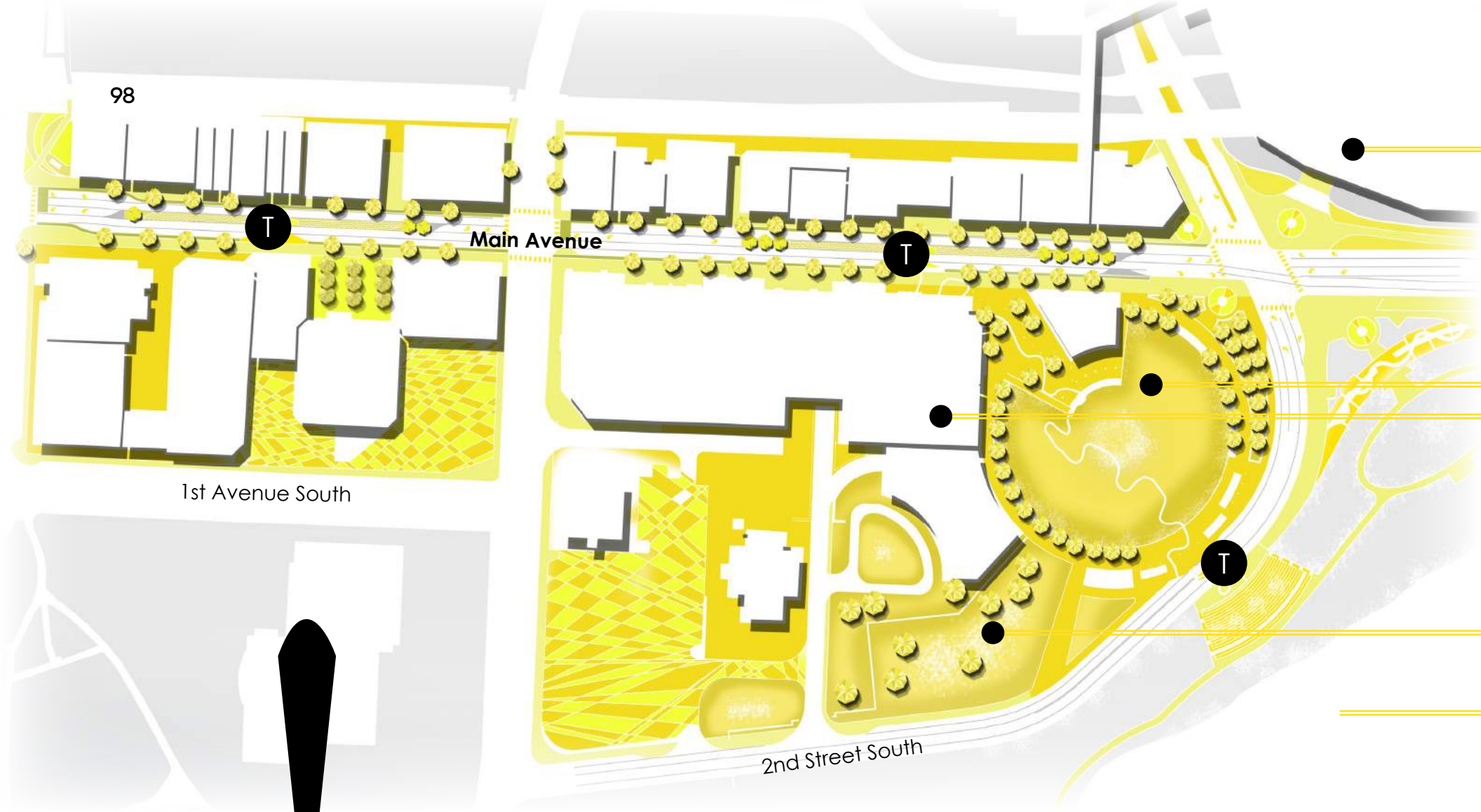
The West End is intended to be a neighborhood focused district. Businesses in this district primarily cater more towards local residents rather than that of vistiors. Retail establishments in her include a hardware store, pharmacy, bakery, and others of that sort. The housing types in this district vary from higher end row homes on the north side of Main Avenue to lower income apartments on the south side. High quality materials are used in construction of new buildings to ensure a higher quality of life.



SoMA FARGO


SIDEWALK ZONE
15'
BIKE LANE
5'
3'
TRAVEL LANE
10'
TURN LANE
10'
TRAVEL LANE
10'
PARK LANE
8'
3'
BIKE LANE
5'
SIDEWALK ZONE
15'

The SOMA District - South of Main Avenue - is an existing district in the downtown Fargo neighborhood. It prides itself on its histroic charm and artistic flair. For the purposes of this thesis, the boundaries of SOMA have been slightly altered. The western boundary is the 10th Street underpass and the eastern boundary is Broadway Drive. It still functions and operates as an artistic and historical haven and serves as a transitional district between the more urban Front District and the more neighborhood focused West End.



THE FRONT

The purpose of this thesis was to examine how Main Avenue could be retrofitted to accommodate more modes of transportation as well as connect and strengthen urban destinations within the downtown community. This district in particular exemplifies the effort and attention paid to those two over-arching goals. As this is the district that the trolley uses, it becomes a true multi-modal transit corridor providing infrastructure and traffic flow for the trolley, buses, automobiles, cyclists, and pedestrians. This area is also home to the Front Lawn which lies in a well connected spot along the entire length of the corridor.

Proposed Convention Center

The Front Lawn

MAT Bus Transit Hub and Walaker Atrium

Native Prairie Plantings

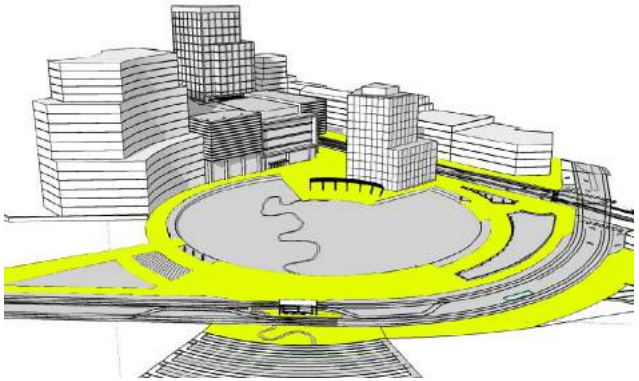
Red River of the North

One major component of this thesis was to reintroduce the streetcar back into the community. The Fargo-Moorhead area, at its peak, had around seventeen miles of streetcar track laid throughout the area. Although this thesis does not revive the streetcar to its historical scale, it does breathe new life into this unique mode of transportation. The streetcar lines connect the historic core neighborhoods of Fargo - Hawthorne, Horace Mann, Downtown, Roosevelt, and Jefferson - while providing a mode of transit to downtown visitors as well.

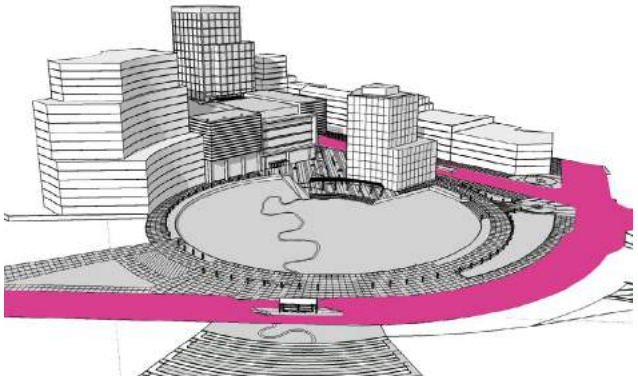
The multi-story Transit Hub building, located on the corner of 4th Street and Main Avenue, replaces the existing MAT Building on NP Avenue one block to the north. With the on-going construction and redesign of NP to make it a "neighborhood street" this thesis moved the Transit Hub to Main Avenue. Buses enter the lower level of the building on the south-side. Users enter the building in the five story Walaker Atrium that houses the main ticketing office for both buses and streetcars. The area is completely open to the public and offers seating, greenery, shopping, and food options.

Cyclists and pedestrians enjoy a more walkable and bikeable Main Avenue. Protected bike lanes stretch from University Drive and connect to the existing trail system along the Red River. At the Transit Hub building, a bike share location has been added and in the Walaker Atrium, a cycle carousel is found Widened sidewalks allow for easy pedestrian traffic flow and a variety of configurations allow for outdoor seating, public art, and furniture.

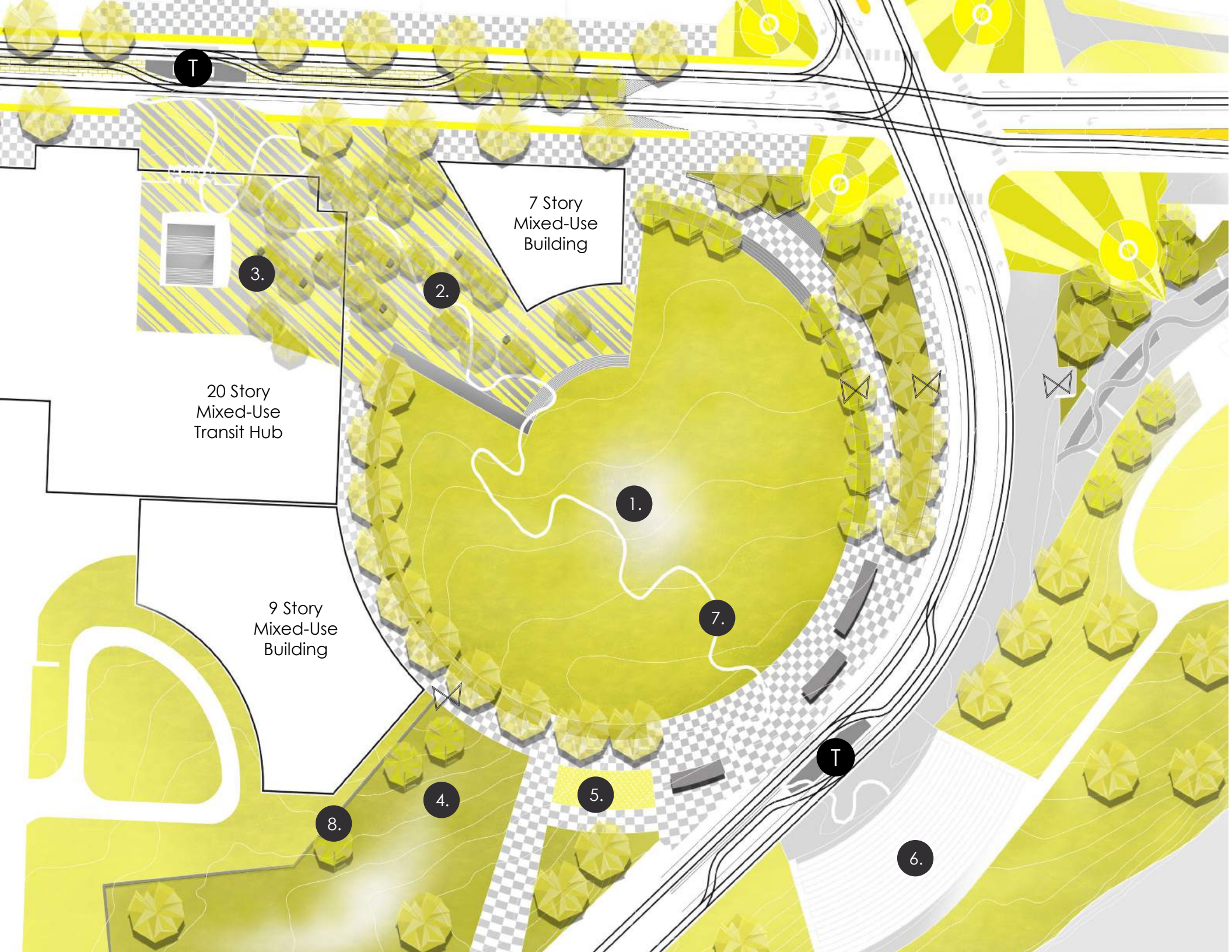
Green Area



Pedestrian Circulation



Transit & Automobile Circulation


T
7 Story
Mixed-Use
Building
3.
2.
20 Story
Mixed-Use
Transit Hub
1.
9 Story
Mixed-Use
Building
7.
T
5.
4.
8.
6.

SITE DESIGN

The site design area is composed of three important places: The Front Lawn, Agassiz Plaza, and the Walaker Atrium located inside the multi-story Transit Hub Building. As previously mentioned, flood protection is a major issue facing this site; therefore, the park and associated pathways were graded in a way so they could be used throughout the year in spite of flooding activity. The lawn portion of the site would be allowed to flood while half of the paths will flood before reaching flood panels located halfway up the path as noted by the icon defined to the right.

Agassiz Plaza and Walaker Atrium seamlessly feel like one large space as identical paving and plantings are used in both. The angled form of the walkway is designed to strengthen the visual connection between the trolley stop located on Main Avenue and the Front Lawn area as a whole. It further connects to a new enhanced river connection which ties into the existing trail network. Pedestrians and cyclists access these existing trails via the newly designed ADA compliant ramp and stairway.

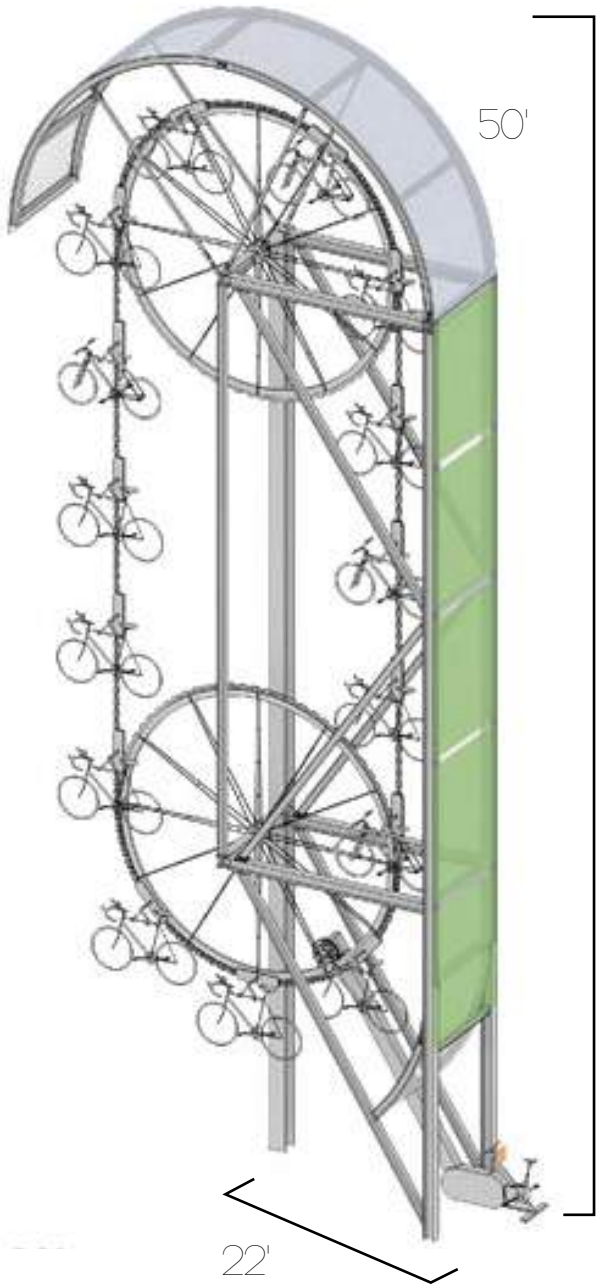
Another way the three areas are connected is by the steel river piece that flows through all. Meandering in and outside of the Walaker Atrium, the river element draws its forms from that of the Red River itself. It was designed to connect all elements in a harmonious way while also being a unique focal point to the Front District as a whole.

KEY

1. The Front Lawn
2. Agassiz Plaza
3. Walaker Atirum
4. Prairie Plantings
5. Splash Pad
6. Enhanced River Connection
7. Flood Wall

Flood Panel Locations

T Trolley Transit Stop



WALAKER ATRIUM & MAIN AVENUE

As seen in the persepective to the right, the five story glass enclosed Walaker Atrium provides a large public gathering space for all. As previously mentioned, the main ticketing booths for both the trolley and bus service is here as well as greenery, seating, and food vendors.

In the foreground of the persepective, the trolley stop can be seen. Located in the center turning lane of Main Avenue, the trolley stop has a partially covered structure to keep out rain and snow from reaching the seating underneath. There is also outdoor seating in the form of portable tables and chairs. As the trolley pulls off into the turn lane, riders can walk from the stop to where the trolley is located and board.

A strong visual connection from the trolley stop to The Front Lawn and Agassiz Plaza was designed purposefully to strengthen the connection between these spaces. The angled paving and allee of trees creates a pulling effect that engages the riders at the trolley stop.

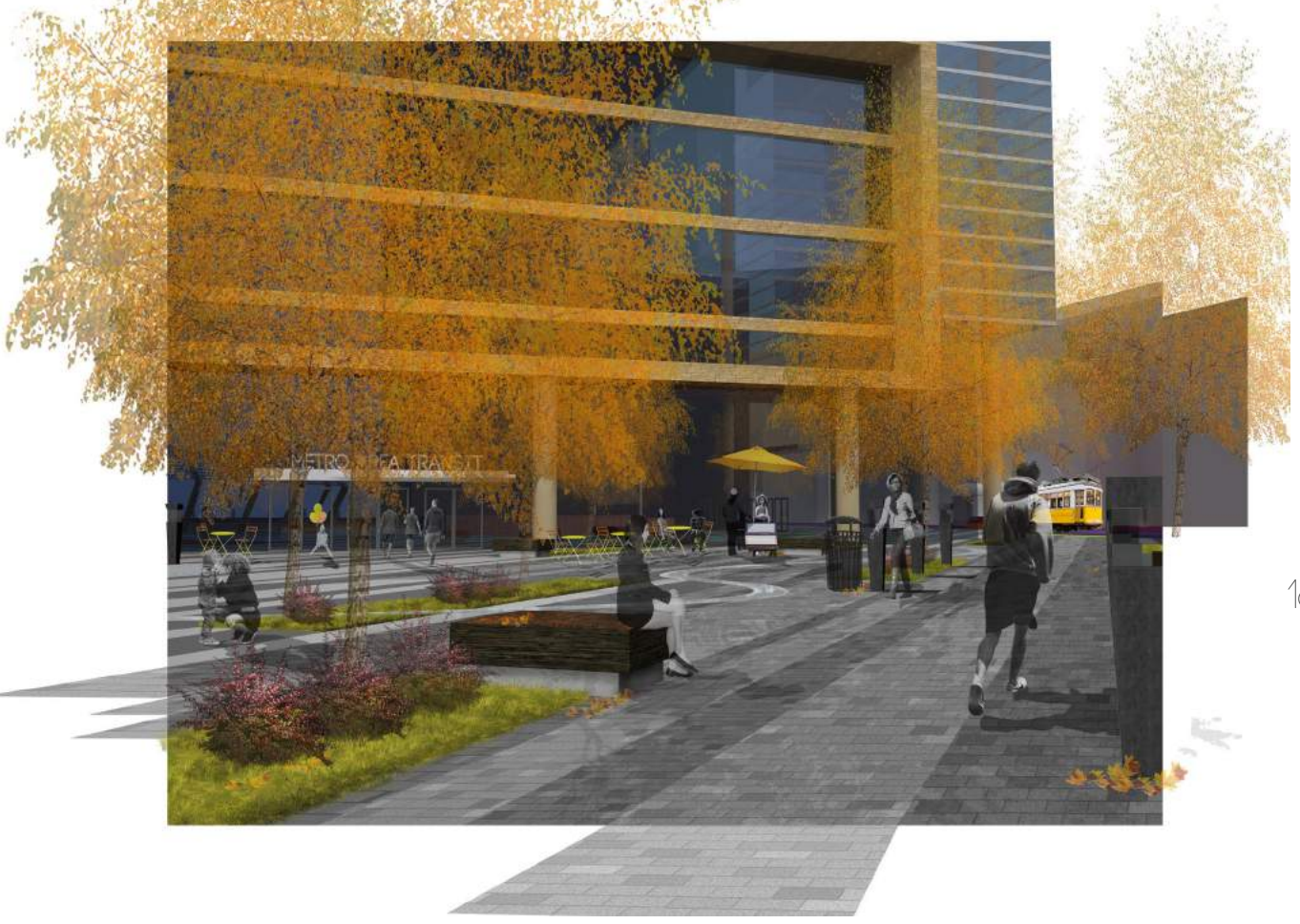
The Cycle Carousel, seen to the left, is located in the Walaker Atrium and can house up to fifteen bicycles at one time. Much attention was paid to all modes of transportation in this thesis and this is yet another example of providing a highly unique yet functional piece to aid in the temporary storage of bicycles.

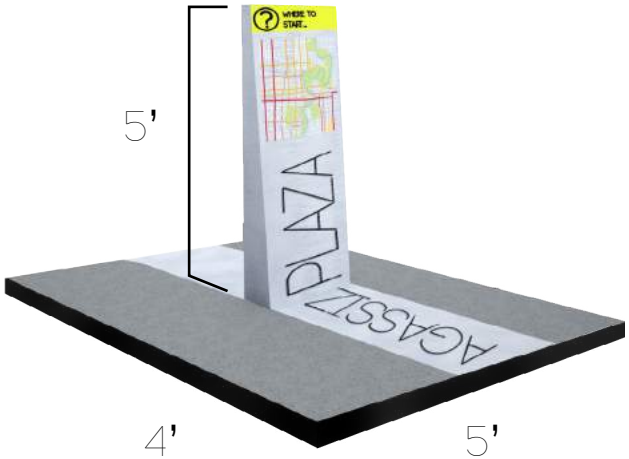

TROLLEY STOP
METRO AREA TRANSIT HUB

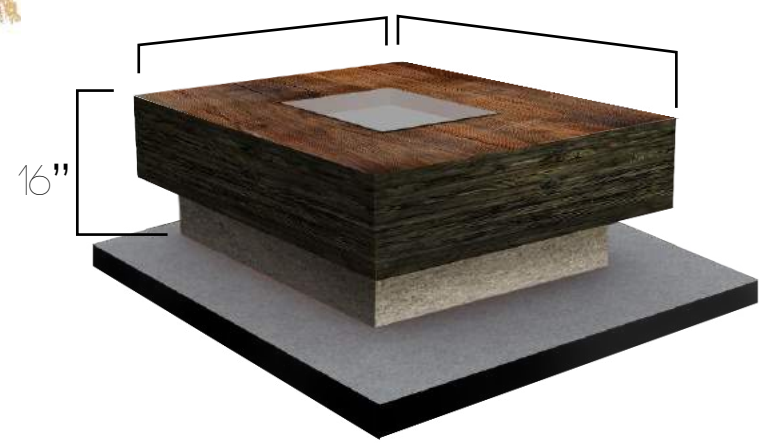
AGASSIZ PLAZA & SITE FURNISHINGS

Agassiz Plaza derives its unique design from the Red River Valley itself. The linear paving pattern reflects the geometric forms of the farms throughout the region while the steel river cuts through and breaks up this angular pattern. The paving intermittently ceases and allows for small planters where grasses, shrubs, and trees are planted to add a pop of color and warmth.

The wayfinding located throughout the plaza emerges from the steel river providing maps of downtown Fargo and attractive signage signally where you are located. The seating draws upon the minimal aesthetic quality of the Red River Valley. Reclaimed wood and concrete create a warm furniture piece.

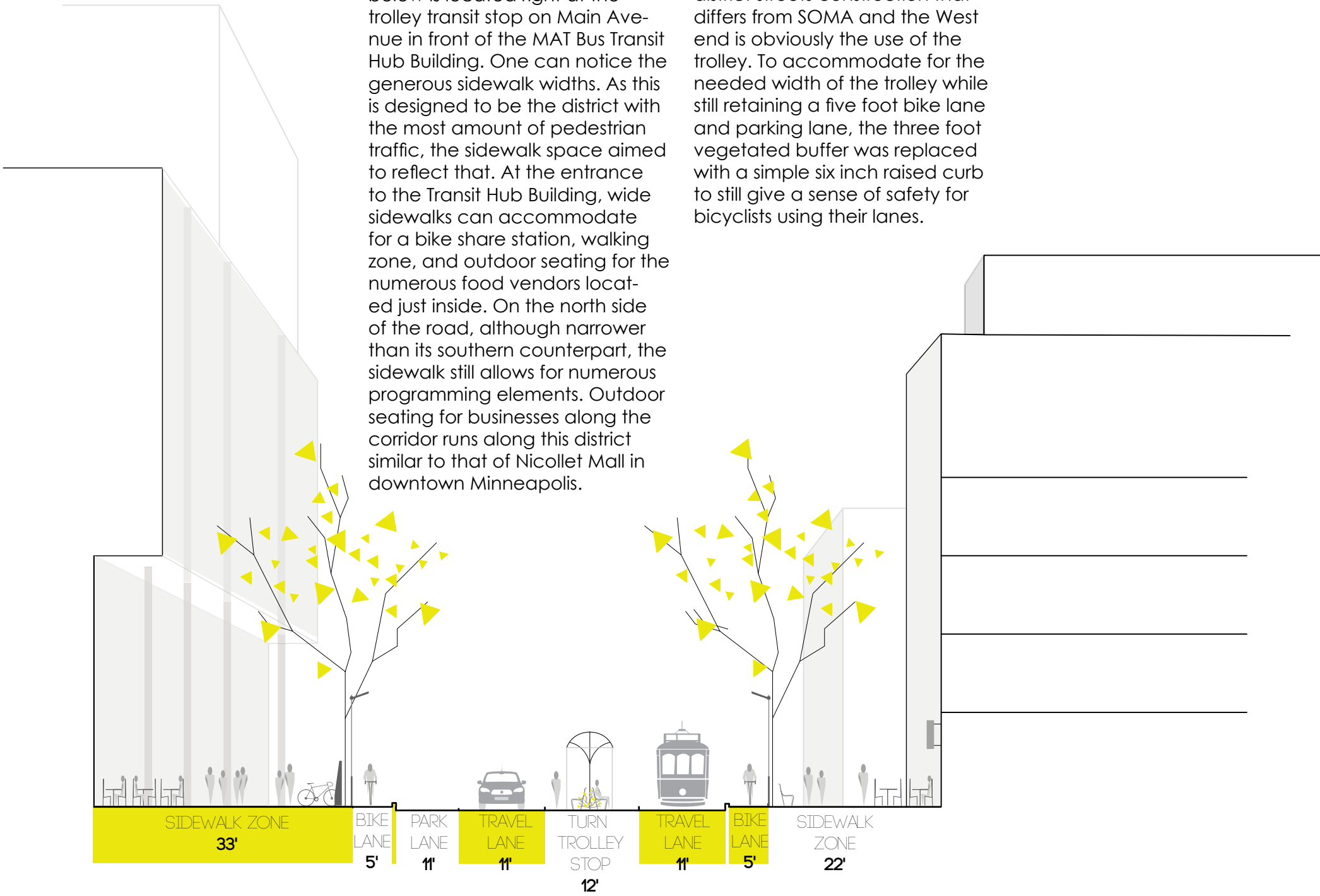






The streetscape section pictured below is located right at the trolley transit stop on Main Avenue in front of the MAT Bus Transit Hub Building. One can notice the generous sidewalk widths. As this is designed to be the district with the most amount of pedestrian traffic, the sidewalk space aimed to reflect that. At the entrance to the Transit Hub Building, wide sidewalks can accommodate for a bike share station, walking zone, and outdoor seating for the numerous food vendors located just inside. On the north side of the road, although narrower than its southern counterpart, the sidewalk still allows for numerous programming elements. Outdoor seating for businesses along the corridor runs along this district similar to that of Nicollet Mall in downtown Minneapolis.

One different component of this district streets construction that differs from SOMA and the West end is obviously the use of the trolley. To accommodate for the needed width of the trolley while still retaining a five foot bike lane and parking lane, the three foot vegetated buffer was replaced with a simple six inch raised curb to still give a sense of safety for bicyclists using their lanes.



THE FRONT LAWN

The Front Lawn was to be a versatile space that can accommodate numerous events all year round. As pictured in the perspective to the right, one event that it could house every fall would be playing the North Dakota State University Bison football games on its large retractable screen. Agassiz Plaza could transform into a sea of grills and tents for tail-gaters and the lawn itself would open itself up to lawn chairs and blankets for people to use while watching the game. The size of this space would also allow for pick up games of football during events like this. The retractable screen could also be used during annual events like the Fargo Marathon, Streets Alive, and the Downtown Street Fair.

The abstracted band shell piece located on the edge of Agassiz Plaza and the Front Lawn can be used as a backdrop for small concerts and the lawn can turn into an amphitheater of sorts where people can bring lawn chairs and blankets and enjoy a nice concert.

In winter, the annual Fargo Frostival can use this space in several different ways. Snow sculpture building contests could line the edges of the lawn, forts could be built, and the Walaker Atrium could act as a warming house. During the holiday season, the birches that hug the perimeter of the lawn could be decorated with sparking lights giving the space a more magical feeling like that of Broadway in downtown Fargo. The lawn could even be flooded during the winter months and take the role of an ice skating rink where families, students, and any member of the public can congregate and skate on the nice winter days.


TROLLEY STOP

CONCLUSION

COMPLETING THE STREET

Throughout this thesis, a great amount of thought and care went into developing the best possible solution to retrofit this current arterial roadway in favor of a more multi-modal transportation friendly street. Through its use of enhanced pedestrian infrastructure, the addition of protected bicycle lanes, the relocation of the MAT Bus Terminal, and the rebirth of the streetcar system, Main Avenue has truly been turned into a multi-modal transit corridor. The inclusion of urban infill projects and the creation and enhancement of well connected urban destinations ensures that plenty of people will be using these new places and have an efficient means of transportation to get around them. This thesis has proven to be an aesthetically pleasing, functional, and unique streetscape that enhances the neighborhood and the urban vibrancy of the downtown Fargo neighborhood as a whole.

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THE FRONT

RE-IMAGINING MAIN AVENUE IN DOWNTOWN
FARGO AS A MULTI MODAL TRANSIT DESTINATION