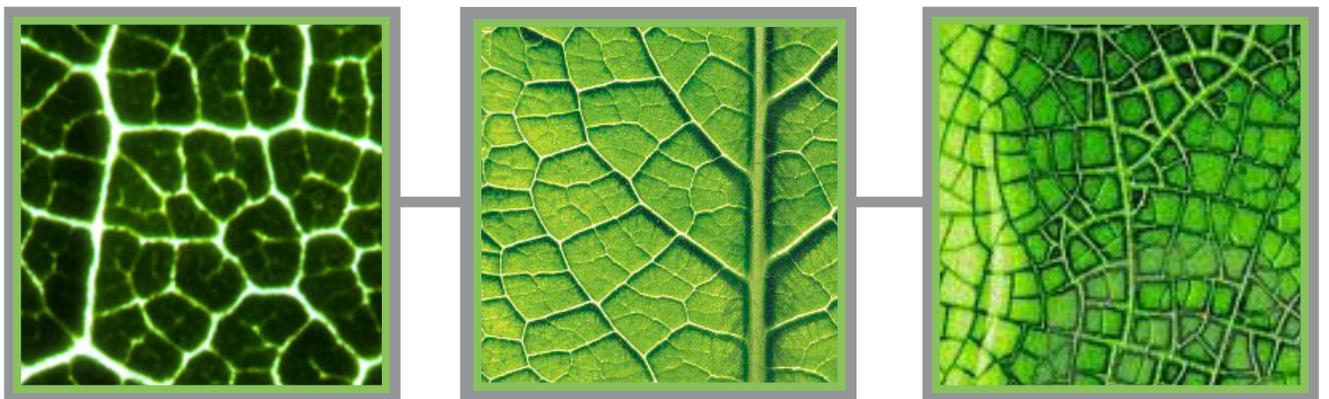


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# URBAN GREENWAY RETROFIT

a design for alternative transportation, community, and the environment



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URBAN GREENWAY RETROFIT  
a design for alternative transportation, community, and the environment

A Design Thesis Submitted to the  
Department of Architecture and Landscape Architecture  
of North Dakota State University

By

Maegin A. Rude

In Partial Fulfillment of the Requirements  
for the Degree of  
Bachelors of Landscape Architecture



Primary Thesis Advisor



Thesis Committee Chair

May 2011  
Fargo, ND



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## URBAN GREENWAY RETROFIT

### Abstract

This thesis will examine how greenway systems connect and strengthen neighborhoods and green spaces within a city. A connected greenway system links green spaces within a city to enhance the relationships and well-being of the communities in the city. A working greenway infrastructure makes connections within a city that will encourage sustainable approaches, enhance the social attributes of neighborhoods, and create a cohesive link throughout the city, which are essential for a unified, lasting community.

### Key Words

greenway retrofit, greenway systems, park systems, greenway connections, neighborhood, community, green network

---

PROBLEM STATEMENT

How can greenway systems connect and strengthen neighborhoods and green spaces within a city?

---

## STATEMENT OF INTENT

### TPOLOGY

#### Urban greenways:

Linear, vegetated spaces used for recreation and alternate transportation that also provide multiple ecological benefits within a city.

### THE CLAIM

Parks and green spaces serve a valuable purpose, but are often designed as islands with little or no connection to the rest of the city.

### PREMISES

A greenway connection can strengthen the neighborhood by encouraging use and creating relationships to turn a neighborhood into a community.

A greenway network will connect neighborhoods throughout the city and connect to destinations.

A greenway system will link the city and serve as a sustainable transportation network that will allow movement by non-motorized modes of transportation.

### THEORETICAL PREMISE/UNIFYING IDEA

A connected greenway system will link green spaces within a city and enhance the relationships and well-being of the neighborhoods within a city.

### THE PROJECT JUSTIFICATION

A working greenway infrastructure will make connections within a city that will encourage sustainable approaches, enhance the social attributes of neighborhoods, and create a cohesive link throughout the city, which are essential for a unified, lasting community.

---

# THESIS PROPOSAL

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## NARRATIVE

I grew up on a farm, outside a town of 200 people, with little to watch on TV and a gaming system that was kept in my parent's room. I spent most of my childhood outdoors. I didn't know it then, but I was lucky to grow up on a farm. I knew where my food came from, how a farm worked, and that if I wanted to go to town, I could just ride my bike two miles.

These are days where most children and teens would rather sit inside, close to the internet and gaming systems. Children, teens, and adults are spending less time enjoying the outdoors and more time inside with the comforts of home. The comforts of controlled heat, air conditioning and humidity, endless snacks in the pantry, internet at their fingertips, and hundreds of channels outweigh experiences the outdoors can offer. Oftentimes, even neighbors' identities are unknown.

Could this simply be a lack of outdoor spaces or unknown destinations? Is there a missing link between these spaces that doesn't involve lanes of traffic and vehicles? How can people connect with each other and the landscape?

Greenway infrastructure can stimulate interest in connecting with the outdoors. Outdoor destinations can be linked to create a system to interconnect the green spaces, promote the use of alternative transportation, and serve as a catalyst for sustainable initiatives. The idea is to create a link that connects individuals, communities, and cities for a healthier, stronger environment for the future.

---

## USER/CLIENT DESCRIPTION

### CLIENT

The client is the city of Fargo.

### USERS

#### Commuters

These users generally use alternate forms of transportation, especially to and from work, and need direct access to major business areas, stores, and services. Peak usage will be a majority of the year, mornings and evenings.

#### Recreational Enthusiasts

These users enjoy the outdoors for recreation, as well as using alternate forms of transportation to and from destinations. These users use the outdoors more leisurely, and need access to parks and destinations, as well as some stores and services. Many users may be of college age, and peak usage will occur in the warmer months, throughout the days and weekends.

#### Sustainable Enthusiasts

These users are looking to rely more on sustainable forms of transportation for everyday needs and need direct access to stores and services, as well as recreational spaces. Peak usage will occur in warmer months, evenings, and weekends.

#### Community

These users are mostly families and individuals within neighborhoods needing safe connections to destinations, such as schools and parks. Peak usage will be the warmer months, during the evenings and weekends.

Physical ability levels of users will vary. All design work will comply with the American's with Disabilities Act (ADA).

---

## MAJOR PROJECT ELEMENTS

### MAJOR PEDESTRIAN CORRIDOR

These corridors will serve as direct routes connecting the northern and southern most areas, as well as the eastern and western most areas. The major greenway will serve as an expressway for reaching destinations faster.

### SMALLER GREENWAYS

These will be linear parks. The greenways will be more direct routes to the edges of the city by non-motorized transportation.

### DESTINATION AREAS

This includes current and future parks, plazas, and corridors. These areas will serve as destination points that will be areas of interest and draw people.

### STORMWATER MANAGEMENT AREAS

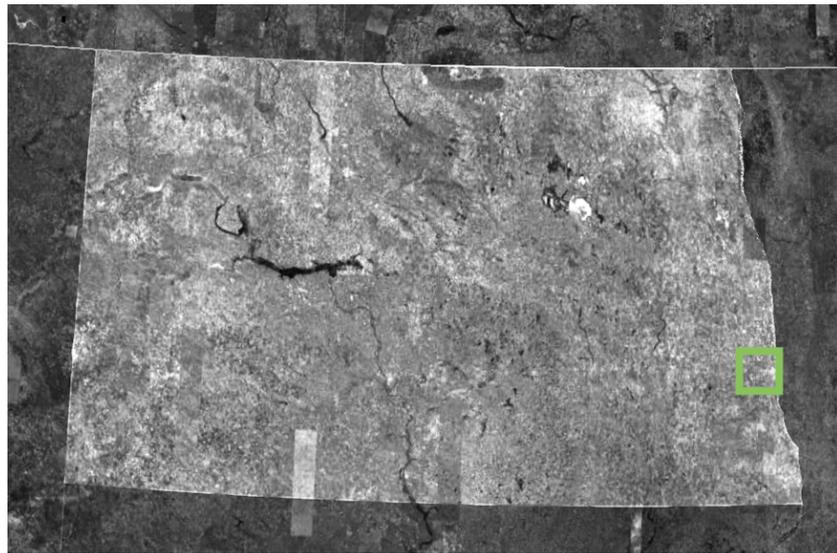
Stormwater is an issue in many areas, and will be discussed later in this document. By utilizing stormwater retention, the water flow to the Red River will be lower, reducing the spread of pollution, and will allow for groundwater recharging. Greenways are an ideal area for stormwater management because they can be aesthetically pleasing places while helping the environment by inhibiting erosion, maintaining clean water, and creating habitat.

## SITE INFORMATION

### REGION

North Dakota is bordered by Canada, Minnesota, South Dakota, and Montana.

Fargo is surrounded by agricultural fields and is near the Sheyenne National Grasslands. Fargo is bordered by West Fargo on the west and the Red River on the east. The expansion of Fargo mainly extends north and south.



### NORTH DAKOTA DEMOGRAPHICS

Population: 646,844<sup>1</sup>  
Land Area: 68,975.93 sq. miles  
Counties: 53  
Persons/Sq. Mile: 9.3<sup>1</sup>  
State Bird: Western Meadowlark  
State Tree: American Elm  
State Grass: Western Wheatgrass

### CITY

Fargo and West Fargo are located in the Midwest region, in southeast North Dakota. The Red River divides Fargo and Moorhead, Minnesota.



The cities of Fargo and West Fargo are connected by an expansive roadway infrastructure for motor vehicles, with many roads that are over-engineered, meaning they were built to withstand more stress than currently needed. By creating a greenway infrastructure that focuses on alternative forms of transportation, the city will be more connected, the environment will be cleaner, communities will be unified, and individuals will be healthier.

---

## PROJECT EMPHASIS

The main goal for the project is to investigate and determine the need for a city greenway infrastructure. This project will examine the existing roadway infrastructure, the need for alternative transportation corridors, and determine future needs for the cities in terms of connections, destinations, and recreational spaces.

Many neighborhoods lack a sense of community. A connected greenway system will link spaces within a city to enhance the relationships and well-being of the neighborhoods and city. Physical activity and engaging in outdoor activities will improve the quality of life and aid in the well-being of individuals, further strengthening the communities.

A greenway system will link the city and serve as a sustainable transportation network. The greenways will allow quicker and easier ways to reach destinations. The greenway system will also have parks and plazas to serve as destination points.

---

## PLAN FOR PROCEEDING

### RESEARCH DIRECTION

This thesis will utilize an in-depth, mixed method approach of qualitative and quantitative research. Research will be conducted in areas that follow the theoretical premise, as well as project typology, historical context, site analysis, and programmatic requirements.

### DESIGN METHODOLOGY

The method that will be employed is a Mixed Method Model and follow a Concurrent Transformative Strategy that includes a synthesis of quantitative and qualitative analysis. The information will be analyzed and demonstrated through text and graphics. The research will be guided by the theoretical premise. Quantitative data will include statistical and scientific data through local and archival searches. Qualitative data will be gathered by analyzing and observing the sites directly, through archival searches, and one-on-one discussions.

### DOCUMENTATION OF DESIGN

All research and design for this project will be compiled and documented digitally. The design process will be documented with sketches, photos, graphics, drawings, and research findings.

At the conclusion of the project, the final product will be presented through a digital presentation. All of the research, text, and graphics will be documented in a bound hardcopy book as well as a digital file available at NDSU's Library Archive for future viewing.

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# THESIS PROGRAM

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## THEORETICAL PREMISE/UNIFYING IDEA RESEARCH

### GREENWAYS

There are many definitions for what a greenway is, but all explain similar ideas. One definition that stood out from the rest is from Greenways, INC., a North Carolina company specializing in greenways. Greenways, INC. defines greenways as

corridors of land recognized for their ability to connect people and places together. These ribbons of open space are located within linear corridors that are either natural, such as rivers and streams, or manmade, such as abandoned railroad beds and utility corridors. Greenways as vegetated buffers protect natural habitats, improve water quality and reduce the impacts of flooding in floodplain areas. Most greenways contain trails, which enhance existing recreational opportunities, provide routes for alternative transportation, and improve the overall quality of life in an area. (Greenways.com, 2010)

This definition encompasses many aspects and functions of a greenway. The key points of this definition will be retained as this thesis progresses into the design and development phase. Ahern describes greenways functions more in depth:

Connectivity is defined here as a spatial characteristic of systems (i.e. landscapes) which enables and supports the occurrence of specific processes and functions, through adjacency, proximity or functional linkage and connection. The sustainability of certain landscape processes is dependent on connectivity. These processes include, for example, the movement of wildlife species and populations, the flow of water, the flux of nutrients, and human movement. Besides ecological benefits, other benefits of connectivity that can be supported by greenways include alternative forms of

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transportation, trail recreation, and the human need or preference for nearby nature and recreation". (Ahern, 2003, 40)

Ahern suggests that the most abstract benefit of greenway connectivity is psychological: linking people with nature. Humans need and prefer to be near nature as a course of everyday life. Ahern suggests that historically, human-nature interaction involved large parks in cities. The greenway strategy creates "fingers of green" into urban and suburban areas that supports the human need for nature interaction (Ahern, 2003).

#### HEALTH BENEFITS OF PHYSICAL ACTIVITY AND NATURE

"A healthy parks system is a vital component of a healthy community" (Parks Victoria, 2008).

According to a report by the Centers for Disease Control and Prevention, benefits of regular physical activity that is performed on most days of the week can improve health in the following ways (this list is not all-inclusive): reduce the risk of developing diabetes, high blood pressure, and colon cancer, reduces blood pressure (in those who have high blood pressure), reduces feelings of depression and anxiety, helps control weight, helps build and maintain healthy bones, muscles, and joints, and promotes psychological well-being. The lack of physical activity is a national problem, causing unnecessary illness and premature death (Centers for Disease, 1996).

Physical well-being is not the only result of physical activity: "In a study of people suffering from mental illness, 90% or more of them indicated that green exercise activities had benefited their mental health, they had greater self esteem, focus of mind, were more relaxed, more motivated, enjoyed an improved quality of life, and felt 'refreshed and alive'" (Mind, 2007).

According to an article from the University of Illinois (2009), Frances Kuo, a professor of natural resources and environmental science and psychology at the university, suggests that humans' newer and more common habitat is in urban areas, and human behavior can be studied similarly as animal behavior is studied in the wild to see how dynamic habitats are impacting humans. Kuo says, "Humans living in landscapes that lack trees or other natural features undergo patterns of social, psychological and physical breakdown that are strikingly similar to those observed in other animals that have been deprived of their natural habitat" (Frances E. Kuo et al, 1998, 24).

Physical activity and recreation improve quality of life. According to a document published by California State Parks, "recreation activity is a medium in which participants can change their self-image and gain personal satisfaction (2005)". These benefits include enhanced self-esteem through improved feelings of self-worth, reliance, and confidence, personal growth, enhanced expression of and reflection on personal spiritual ideals, and feelings of satisfaction from one's personal, neighborhood and community life (California State Parks, 2005).

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## SOCIAL BENEFITS OF NATURE

### Strengthening Communities

Park and recreation opportunities are essential for strengthening and maintaining a healthy community. Positive impacts are evident throughout the community. Recreation brings neighbors together, encourages safer, cleaner neighborhoods and creates a livelier community atmosphere. Parks and recreational facilities also help improve a community's image, socioeconomic status and enhances the area's desirability. (California State Parks, 2005).

Green spaces assist in building and strengthening community bonds. Research shows that within neighborhoods with green spaces, residents were more likely to have stronger social ties than those who were surrounded by concrete. A study by the University of Illinois and the University of Chicago found that there was a correlation between amounts of vegetation and formation of neighborhood social ties. "In inner-city neighborhoods where common spaces are often barren no-man's lands, the presence of trees and grass supports common space use and informal social contact among neighbors" (E. Kuo et al., 1998). The study also found that residents perceived safety as connected with the amount of vegetation and social ties.

### Promotes Social Bonds

Recreation and parks can promote social bonds by uniting families, building cultural tolerance, and supporting individuals with disabilities and seniors.

According to California State Parks, families who enjoy recreational activities together often have stronger bonds, including parent-child and

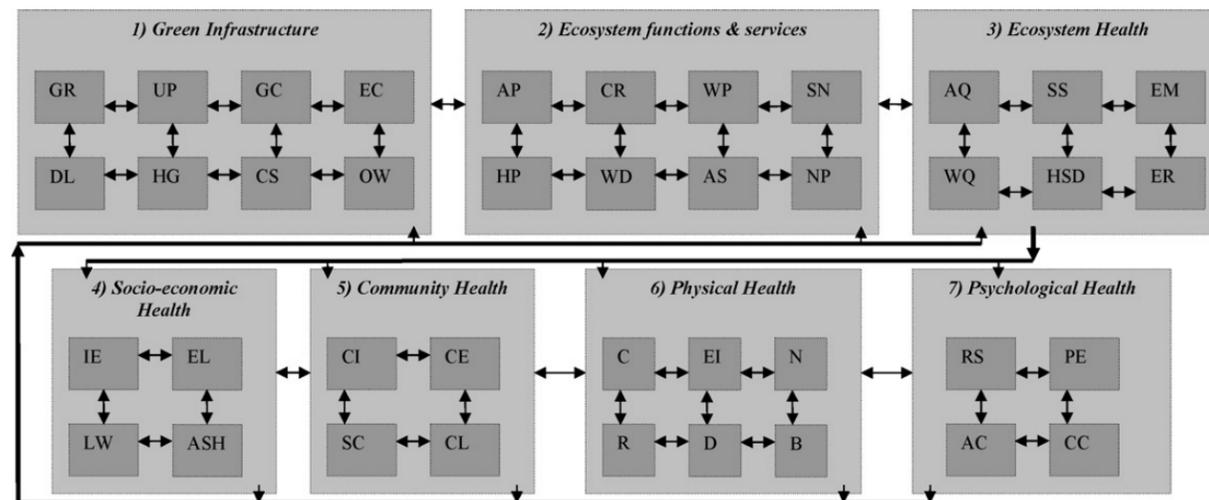
spousal relationships. The activities allow for new, shared experiences and family members gain feelings of trust, loyalty and teamwork. These activities promote bonding, shared values and positive memories (California State Parks, 2005).

### Encourages Stewardship

Parks and greenspaces are areas that can promote stewardship of the land. Individuals who visit parks and engage in recreational activities on a regular basis become familiar with the environment and understand that their actions can affect it. Individuals feel a sense of ownership and pride, and in turn take care of the land. In addition, outdoor recreation increases participants' political involvement in environmental issues. This participation can lead to time and money spent to protect, conserve and maintain parks and open spaces (California State Parks, 2005).

## ECOLOGICAL AND SOCIAL BENEFITS OF GREENWAY INFRASTRUCTURE

The diagram below is derived from the paper “Promoting ecosystem and human health in urban areas using Green Infrastructure: A literature review” (James et al., 2007). This image suggests the findings of integrating green infrastructure, ecosystem, and human health. The top half denotes ecosystem relationships, and the bottom, human health. The two-way arrows indicate two-way interactions.



### Key:

- |  |                                      |
|--|--------------------------------------|
| GR: green roofs                                | HSD: habitat and species diversity   |
| UP: urban parks                                | ER: ecosystem resilience             |
| GC: green corridors                            | IE: income and employment            |
| EC: encapsulated countryside                   | EL: education and lifestyle          |
| DL: derelict land                              | LW: living and working conditions    |
| HG: housing green space and domestic gardens   | ASH: access to services and housing  |
| CS: churchyards, cemeteries and school grounds | CI: sense of community identity      |
| OW: open standing and running water            | CE: community empowerment            |
| AP: air purification                           | SC: socialcapital                    |
| CR: climate and radiation regulation           | CL: culture                          |
| WP: water purification                         | C: cardiovascular                    |
| SN: soil and nutrient cycling                  | EI: endocrine functions and immunity |
| HP: habitat provision                          | N: nervous system                    |
| WD: waste decomposition                        | R: respiratory                       |
| AS: aesthetic and spiritual                    | D: digestive                         |
| NP: noise pollution control                    | B: bone tissue                       |
| AQ: air quality                                | RS: relaxation from stress           |
| SS: soil structure                             | PE: positive emotions                |
| EM: energy and material cycling                | AC: attention capacity               |
| WQ: water quality                              | CC: cognitive capacity               |

This diagram was created to show previous research on the relationships between green infrastructure, ecosystems, and human health, as well as to serve as a base for further investigation. The diagram suggests that the health and function of the environment and individuals are interconnected. It also suggests interdisciplinary collaboration for the study between green infrastructure, ecosystems, and human health (James et al., 2007).

## ECOLOGICAL BENEFITS OF GREENWAYS

Ahern(2003) describes several ecological benefits: flood protection, water storage and purification, air cleaning, degradation of organic wastes, and reducing the urban heat island effect.

### Protection of Natural Resources

The Pennsylvania Greenways Partnership Commission says greenways can connect natural corridors to protect and enhance wildlife and ecological systems. These areas allow for plant growth and wildlife connections for food, water and habitat. Other benefits include improved air and water quality, and reduced noise and thermal pollution (Pennsylvania Greenways Partnership Commission with Committee Assistance, 2002).

### Stormwater Management

Stormwater is rain or snow melt that runs off of impervious surfaces; oftentimes this water flows into storm sewers, which flow into bodies of water. The quantity and quality of this water can be affected by the land use. Stormwater is more of an issue in urban settings, because an increase of impervious materials decreases the amount of water that can naturally filter into the ground.

This can lead to more frequent and severe flooding issues (Land-Of-Sky Regional Council, 2004).

The quality of water can be compromised when stormwater collects and carries pollutants from impervious surfaces. Impacts of polluted water can include toxic and/or poisonous chemicals entering drinking sources, compromised aquatic habitats and aquatic life, lowered aesthetic qualities of water, increased cost of wastewater treatment, and economic impacts (Land-Of-Sky Regional Council).

The City of Fargo has a stormwater master plan, and much of it addresses the need to control stormwater in developed and developing areas. The City of Fargo has created guidelines for the sizes of sites; sites with less than one acre are not required to have a retention area, but it is encouraged to think of stormwater retention in a regional manner. Other guidelines apply to larger sites and depend on the amount of impervious surfaces (City of Fargo).

Even on a small scale, steps can be taken to help mitigate impacts, such as reducing the impervious surfaces, planting trees and vegetation strips, and including drainage swales (Girling, & Kellett, 2005).

#### ECONOMIC BENEFIT OF GREENWAYS AND VEGETATION

According to *Benefits of Greenways: A Pennsylvania Study*, almost 20% of Pennsylvania's tourists visit for outdoor recreation. The study also says there is evidence that communities with greenways have had increases in real estate values (Pennsylvania Greenways Partnership Commission with Committee Assistance, 2002).

A study was conducted to explore the influence of trees and green streetscapes within retail environments of small cities and towns competing with national marketers. A mailed packet was sent to residents with shopping scenarios with and without tree canopies and vegetation (Wolf, 2005). Some findings include:

The presence of trees enhances judgments of place character. Respondents infer that the green streetscape has more positive atmosphere, image, and comfort level, and would be a more favorable place to visit and dine out. Judgments of products and merchants are slightly more positive in forested places as inferences are made about shopping selection, product value, product quality, and merchant responsiveness (Wolf, 2005, 392).

This study suggests that the presence of trees and vegetation creates a more pleasant environment and that people are more willing to spend money at such locations. This information can be utilized as an incentive for greener streetscapes in cities: the more desirable a place is, the more likely it will be visited, and in turn, money spent. Although the study was done in small cities, this idea can be considered with small businesses in Fargo.

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## RESEARCH SUMMARY

Studies and research have shown that human interaction with nature is a necessity. Physical activity and interaction with the outdoors improves psychological, mental, and physical health. Green spaces can strengthen communities; studies have shown that communities with more green spaces have stronger social bonds. Recreation as family activities (parent-child and couples) promote feelings of loyalty, trust, harmony, teamwork and goodwill and encourage lifestyle changes. Open space and recreation areas encourage stewardship of the land. Individuals who engage in greenspaces on a regular basis feel a sense of ownership.

The ecological benefits of greenways are numerous, such as flood protection, water storage and purification, air cleaning, degradation of organic wastes, and reducing the urban heat island effect. Greenways can also protect natural resources.

In addition to human health and ecological benefits, greenways can also provide economic benefits for businesses, real estate values, and tourism. Green spaces and vegetation are more desired areas, and can promote economic value to businesses. Homes in proximity to parks and green spaces tend to have higher value than those that aren't. Green infrastructure can also promote tourism.

## CASE STUDY: San Francisco, CA

### PROJECT TYPE

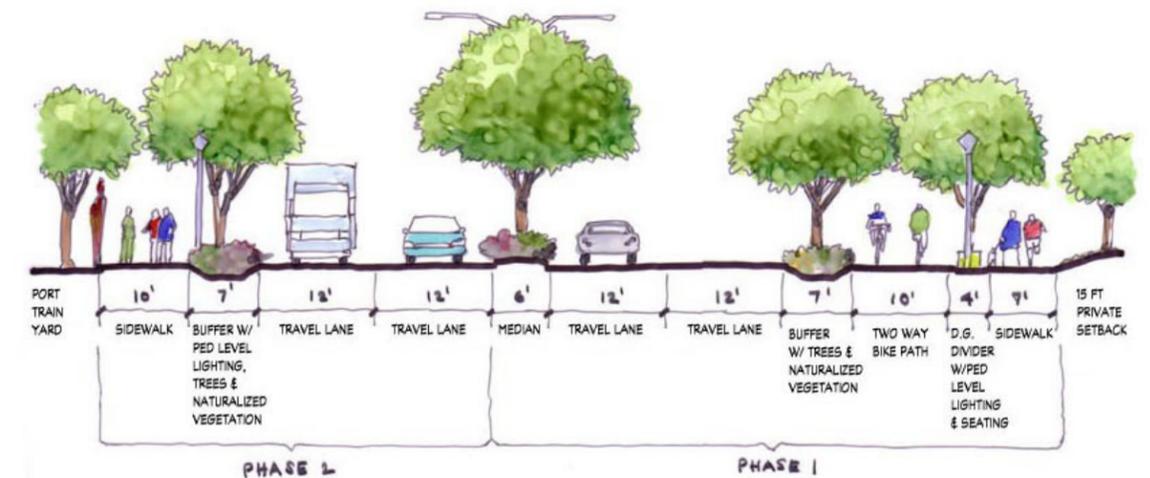
“Livable City”

### MAJOR ELEMENTS

Walkability  
Promote Use of Bicycle  
Traffic Calming  
Linking/Connecting Spaces  
Environmental Issues

The organization Transportation for a Livable City (TLC) compiled a document titled “The Path to a Livable City” for the city of San Francisco. The purpose of the document was to improve the transportation and land use to promote a safer, healthier, and more accessible city. Some areas of study included public transit, walkability of neighborhoods, safe and comfortable biking, and reclaiming streets.

One aspect of walkability of a neighborhood was to ensure safety and comfort of pedestrians; another is aesthetics. A place is much more desirable to be if there are interesting things to see. The document noted that a good walking environment should also be a good sitting environment. Comfort, security, and visual interest help make the public realm a living place (Transportation for a Livable City, 2002).



Conceptual Design Study, San Francisco

Bicycles are friendly for a city; they are quiet, they don't pollute, and they don't take up much space. TLC's goals were to build the bike network, provide parking where needed, and to promote the use of bicycles in the city.

TLC determined that streets are also a place for social gathering, not just vehicles. Streets should be designed for the desired traffic speed. Some techniques used to calm traffic include traffic circles and roundabouts, two-way streets, speed humps, landscaping, and narrower streets (Transportation for a Livable City, 2002).

In addition to the Livable City, the city created a Greenway Initiative:

The goal of the Greenway Network Initiative is to create a citywide network of landscaped boulevards, green streets, and linear parks



San Francisco's Green Initiative Master Plan



Corwin Street Community Garden, San Francisco



Visitacion Valley Greenway, San Francisco

which link the city's neighborhoods to one another and to the major parks, wildlife corridors, waterfront, and public transit hubs. The Network will serve as sustainable transportation infrastructure (walking, bicycling, and public transit), and provide stormwater infiltration and management, environmental restoration, recreation, and neighborhood economic development (Transportation for a Livable City, 2002).

Purposes of the Greenway Initiative including recreational opportunities, using open space in neighborhoods as links, providing more opportunities for better water quality with stormwater management, environmental restoration and education, creating wildlife corridors, and sustainable economic development.

Some objectives for the Greenway Initiative include:

Transforming isolated parks to open space networks

- linking parks
- linking neighborhoods to parks
- providing new greenway connections creating high quality and continuous networks
- connecting greenway network to transit network

Utilizing more "green infrastructure" and lower "grey infrastructure costs"

- integrating vegetation
- enabling groundwater recharge
- restoring natural drainage where possible

("Livable city: livable," 2010)

## CASE STUDY: Duluth, MN

### PROJECT TYPE

Connect/Update Park System

### MAJOR ELEMENTS

Living Document  
Improve Existing Greenspaces  
Connections with Trails  
Care of Natural Resources

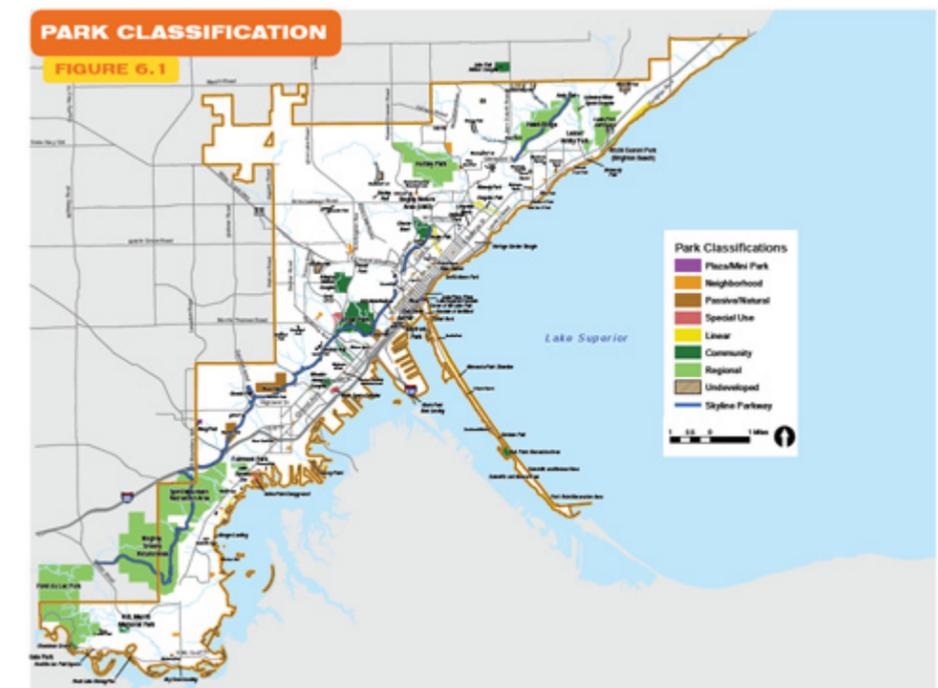
Duluth has identified a need to assess the state of their current park and recreation network. A Master Plan Draft, completed in 2010, was developed to enhance, expand, and connect the communities of the city.

Some of the key elements of the master plan are:

- improve the quality of existing parks
- focus on connecting the community through trails and bikeways
- enhance stewardship of natural resources

The plan also included standards and guidelines for park and recreation planning and design specific to the city.

This document is a Living Plan and will be periodically revised and updated to keep pace with civic, economic, and natural environment (“Parks and recreation,” 2002).



Duluth Parks and Recreation Master Plan Draft

## CASE STUDY: Vancouver, Canada

The Urban Landscape Task Force was appointed in 1991 by the City of Vancouver “to report on the current use and future management of the city’s urban landscape”. The Vancouver Greenways Plan was adopted in 1995. The two major components in the plan included city greenways and neighborhood greenways.

Vancouver’s Greenway Plan network includes 16 routes, and are “generally evenly distributed throughout the city”. Some routes are concentrated in areas of higher density and more destinations. When the plan is completed, no resident will be more than a 25 minute walk or 10 minute bike ride from a greenway.

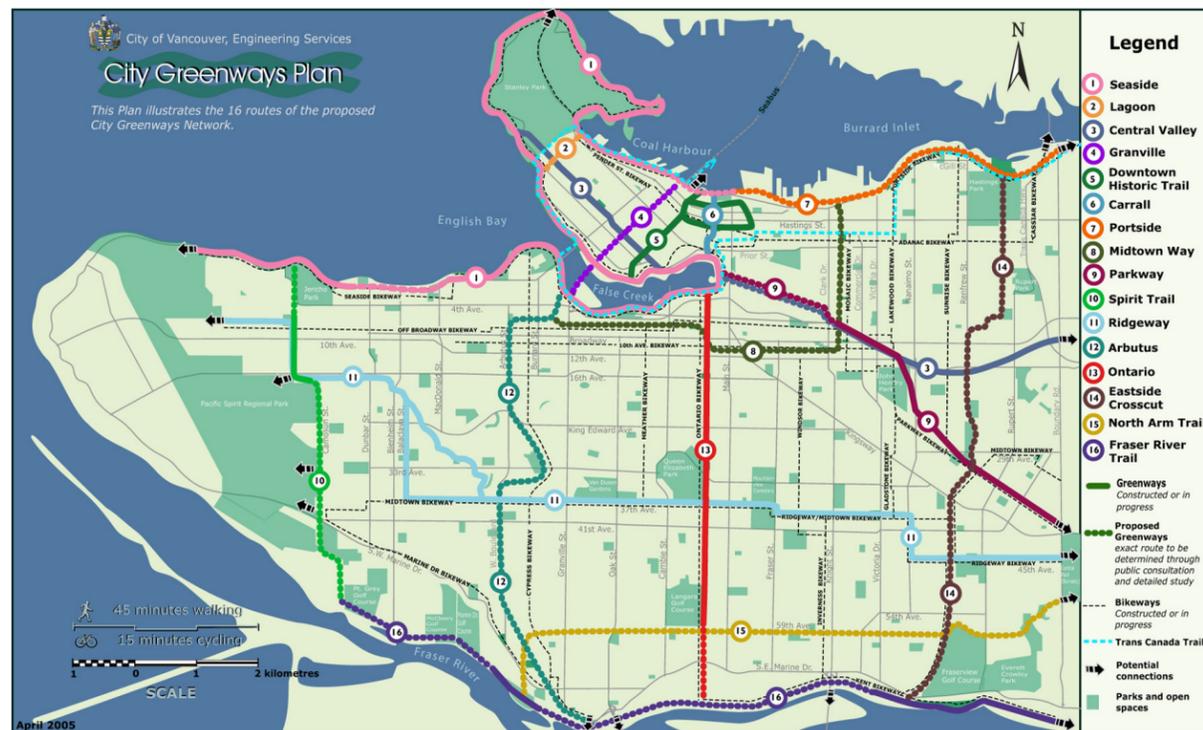
Below is a detailed map of the proposed 16 greenway routes, transit, and green spaces in Vancouver.

**PROJECT TYPE**

Green Streets and Greenway Plan

**MAJOR ELEMENTS**

Quick, Safe Routes  
Areas Identified by Communities  
Some Built by Communities  
Culture Integrated into Links  
Adopt-a-Garden



Vancouver City Greenway Plan



A Vancouver Greenway.



Crown Street, Vancouver, after renovation.

The proposed neighborhood greenways are smaller scale connections that link community amenities, such as schools, libraries, parks, and places of special interest. These greenways are identified by residents of the neighborhood, and many are constructed by them. Although all the neighborhood greenways enhance pedestrian links and make routes appealing, some do so by transforming a street into a plaza, preserving history, featuring public art, or creating direct routes to schools for children’s safety.

The City of Vancouver’s Green Streets program allows residents to adopt a street garden in a traffic circle or corner bulge. These street gardens beautify the neighborhood and create a sense of pride. They also help calm traffic and make streets more safe (“Greenways program,”).



Vancouver’s Neighborhood Greenways

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## TYPOTOLOGICAL SUMMARY

Cities of all sizes are evaluating their green infrastructure and networks. Cities are planning for cohesive green networks throughout the city that will enhance the landscape and provide links within the city. These green networks also promote sustainable transportation, making destinations more accessible for pedestrians, non-motorized transportation, and public transportation. In addition to providing links, these spaces are desirable places to be. With an abundance of vegetation, visitors are exposed to nature. Cities are also using green networks to make neighborhoods safer by slowing traffic and creating buffers from vehicles.

Many cities are creating comprehensive plans for the city that include objectives and goals. This serves as a reference and protocol of what the city deems necessary. Much of the planning for the greenway networks revolves around community input. In some cases, communities and individuals are the means for the design and construction of the greenways.

## HISTORICAL, SOCIAL and PHYSICAL CONTEXT

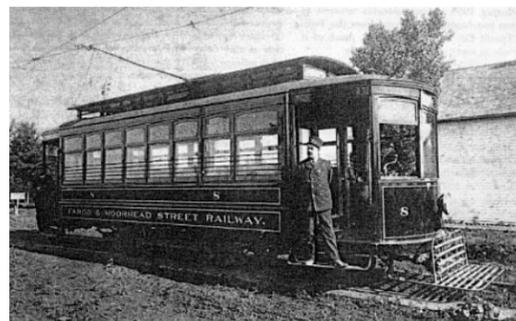
### EARLY HISTORY OF FARGO

Fargo, founded in the 1870s, was a product of the expansion of the railroad. The location of Fargo was determined by the appropriate place to cross the Red River west of Minneapolis and St. Paul. The Red River was also used as a main north-south corridor for travel to and from Fort Garry, now Winnipeg.



Fargo map in 1880. The image is a photograph by F.J. Haynes of a map of Fargo in 1880, drawn by T.M. Fowler.

As many cities did, Fargo had an early start in public transportation. In the late 1800s, two horsedrawn streetcar systems were established; however, both failed. A third railway, the Fargo Street Railway, accepted its first passenger in November of 1904. The line operated until 1937.



Streetcar in Fargo.



NP Depot Park, July 1909.



Island Park postcard

### PARKS AND RECREATION

Island Park was part of the original townsite of Fargo platted out by the Northern Pacific Railroad. Jacob Lowell, Jr. and J.B. Power interceded with the railroad and the area that is now Island Park was deeded to the city for a park. The first public swimming pool was located in Island Park (Caron, 2010).

The NP Depot Park, located along Main Avenue, was also one of the first parks in Fargo. It was constructed before 1900; however, in 1964 the land became a parking lot (Caron, 2010).

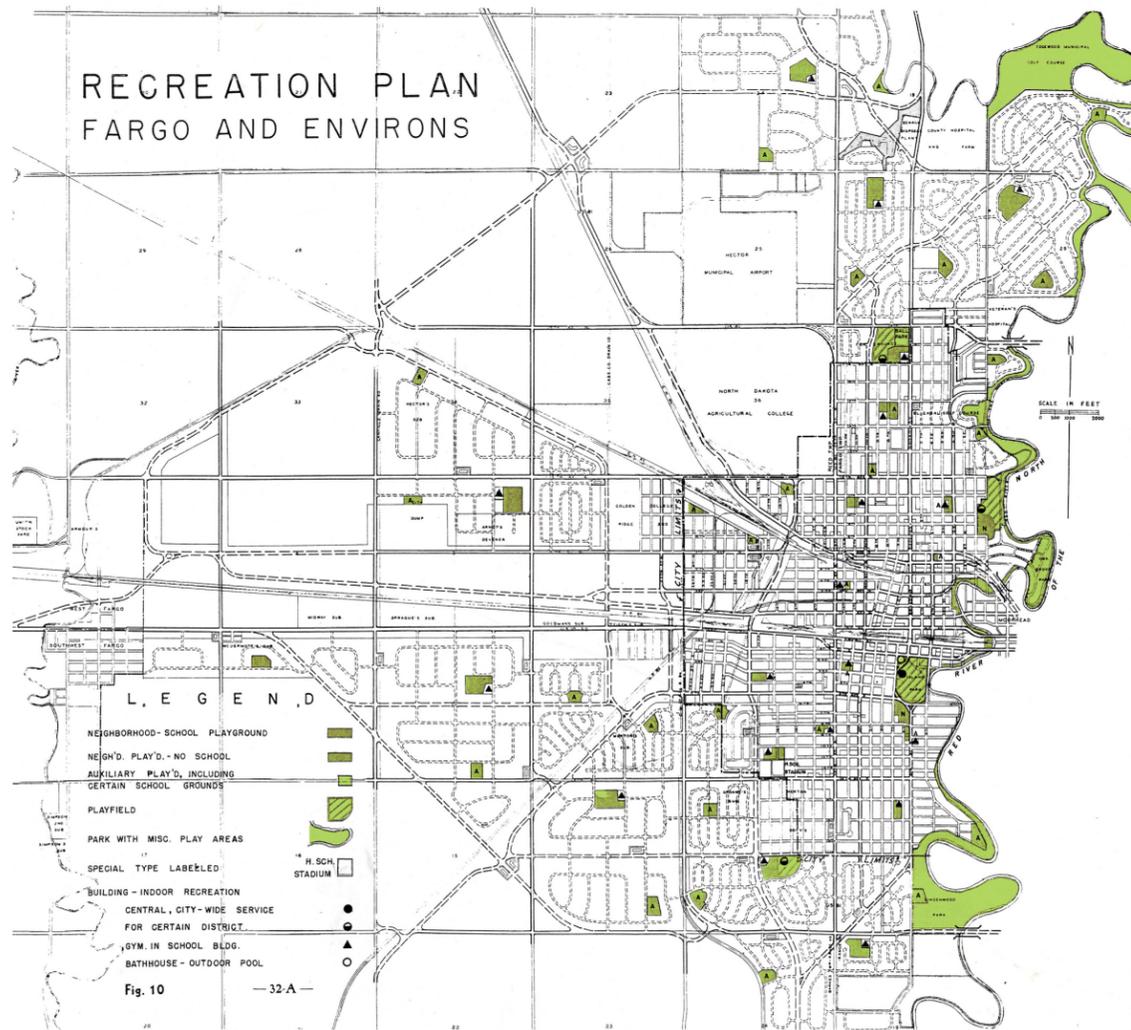
Another important recreation area was the Red River, where people would swim and boat. Baseball was one of the first sports in Fargo; the Red River Baseball Club was started in 1875. The first golf course, the Fargo Country Club, dates back to 1898 (Caron, 2010).

The City of Fargo's first annexation was in 1922, and as the population grew, additional annexations were needed throughout the years.

The National Recreation Association submitted a "Recreation Plan" for the City of Fargo in 1949. A major deficiency, as stated in this document, was the lack of sufficient neighborhood playgrounds.

The current and suggested plans act this time were to create small, isolated parks and playgrounds to serve as the greenspaces for the city ("Fargo master plan," 1952).

In its early days, the city of Fargo was compact, bound by railways to the north and south, within a half mile radius. As the importance of automobiles increased, the growth pattern of the city drastically changed. The central area began to decay while the rest of the metropolitan area expanded in all directions. As a result, "the central area lacks the



Inventory of Fargo's parks in 1970. Map by Hatlen, Loh, & Pike.

basic elements of urban design-nodes, districts, well-defined paths, landmarks, focal points, and above all, a unified and coordinated open space system" (Hatlen, Loh, & Pike, 1970, 27).

The image illustrates the green spaces of Fargo in 1970. Many of the small parks are gone, as well as areas adjacent to the river. This map includes golf courses.

In a 1970s study "Inventory and Analysis of Open Space, Fargo-Moorhead Metropolitan Area", Hatlen, Loh, and Pike identified these green space classifications (not all-inclusive):

- Playgrounds or mini parks
  - service radius of 1/4 mile
  - area of 2-4 acres
- Neighborhood parks
  - service radius 1/2-1 mile
  - 5-20 acres
- Community park
  - 2-3 mile service radius
  - 40-100 acres
- Metropolitan park
  - 3-4 mile service radius
  - 100-300 acres

**Greenways**  
Traffic greenways (tree-lined boulevards) are used in cities to link and connect separate isolated open spaces. Drainage ditches were in abundance and were unable to be built upon. At this time, it was thought that greenways could be a "quite unique" feature for later consideration (Hatlen, Loh, & Pike, 1970).

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During this time, the need for connections of green spaces and parks was deemed necessary; however, these spaces are still isolated, possibly even more so today.

The need for a unified and coordinated system still exists in the Fargo-Moorhead area, however there have been several major shifts from what a park or green space should be. Greenways now are not just tree-lined streets, neighborhood parks are more than turf with manufactured playground equipment, and parks have ecological benefits and do not just serve humans.

#### HISTORY OF GREENWAYS

According to Ahern, greenways grew from urban design concepts of the nineteenth century of boulevards and parkways. The first greenways originated from metropolitan open space systems that spatially linked a network of publicly owned land. One of the first systems was Emerald Necklace in Boston. As greenways evolved, the concept changed from large parks to linear corridors. During the '60s and '70s, the environmental movement brought awareness for environmental conditions. During this time, there was an emphasis on trail-orientated recreation (Ahern, 2003).

There was a loss of open space in the 1980s and an increased need for recreation. There was also strong support for greenways to fulfill additional green space needs.

Greenways have evolved to serve various purposes; they are “working” landscapes. Now, greenways need to be efficient and multi-use to gain support (Ahern, 2003).

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## HISTORICAL, SOCIAL and PHYSICAL CONTEXT SUMMARY

Fargo was founded in the 1870s. It was apparent from its early roots that parks and open spaces were needed. As the city expanded and made way for the automobile, the tight, central core of the city began to lessen and expand outward. People began to rely on automobiles to reach the places they needed to be, and many of the small parks that dotted the city were demolished and used for other purposes, such as parking lots. It was known that Fargo needed a cohesive green network to serve the city; however, green spaces remained isolated and small.

Greenways grew from urban design concepts in the nineteenth century, and were implemented starting in the 1960s and 1970s, during a time of broader environmental awareness. Greenways have evolved and now are considered to be “working” landscapes that are efficient and serve a multitude of purposes.

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## GOALS FOR THIS THESIS PROJECT

### ACADEMIC

The academic goal for this project is to contribute valuable insight into the relationships and well-being of greenway systems and communities, and how the two can function in unison, not as separate entities. This is carried out by investigating current park and greenway networks and identifying missing links at the community level and city level. The goal is to be achieved by creating a quality publication that outlines these ideas so this document may be used in other applications concurrent with ideas described in this thesis document.

### PROFESSIONAL

The professional goal for this thesis project is to execute a clear, complete, and quality document that can be presented outside of the university level and into the professional field. The finished project should be a well-developed thesis project that is consistent with the standards in the professional practice of landscape architecture.

### PERSONAL

The personal goals of this thesis document are to utilize and develop skills from previous design education. Another personal goal of this thesis project is to link areas of interest to me: sustainable design, the benefit of contact with nature, and community functionality. A final goal is for this thesis to serve as a stepping stone in academia that will propel me into the professional world.

## SITE INVENTORY

### DEMOGRAPHIC INFORMATION

Population 2000 Census

Fargo: 90,599

Metro: 174,367

(includes Fargo, West Fargo, and Moorhead)

The population increase for Fargo and the Metro area grew 22% and 17%, respectively, in the past decade (City of Fargo, 2010).

### CLIMATE

Fargo has a continental climate, with warm summers and cold winters.

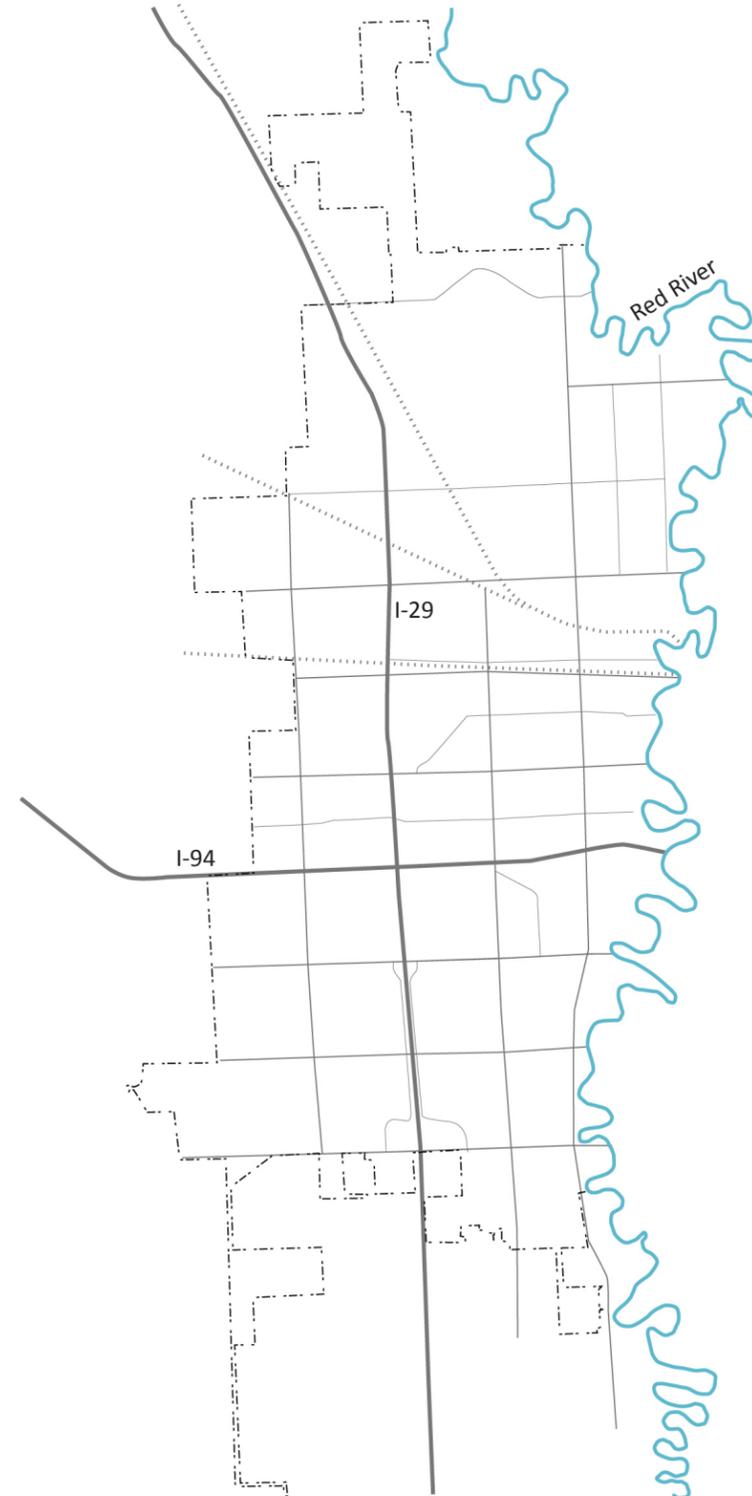
- average annual temperature: 41.5°
- warmest month: July
- coldest month: January
- average precipitation: 21.19"
- wettest months: May-August
- driest months: Dec.-Feb.
- yearly snowfall: 40"
- average sunlight in winter: 8.5 hours
- average sunlight in summer: 13 hours

(Godon, & Godon, 2002)

### WIND PATTERNS

The average wind speed per month ranges from 10.9 miles per hour to 14.9 miles per hour. Prevailing winds usually occur from three directions throughout the year: south, southeast, and north. Months in which south winds are more prevalent are July, November, and December. Months in which southeast winds occur most are January, June, August, September, and October. Months in which north winds are more prevalent are February, March, April, and May ("Climate of north," 2006).

Climatic characteristics will be factors considered during the design and development stages.



### RED RIVER

The Red River divides Fargo and Moorhead. Because the river flows north, flooding in the spring is a regular occurrence. Historic flooding has occurred many times, with the most recent record in 2009 with a level of 41.5'. Design intervention with proximity to the river and floodplains will be studied with great detail to ensure lasting design solutions that do not hinder or disrupt the river, but work with it. The river is an asset to the city and can be used to unite communities together in many ways.

### SOILS

Beneath Fargo are about 90 feet of dominantly clay sediments that are extremely weak. The clays have expansive properties: it can absorb large amounts of water and release it during droughts. As the clay absorbs, it expands and becomes weak and plastic, and as it releases water, they contract and become hard and brittle (Schwert, 2011).

FARGO 2006 GROWTH PLAN

Fargo has very strict boundaries: the Red River and Minnesota to the east, and the West Fargo city boundaries to the west. Because Fargo cannot expand in either of these directions, it is limited to expansion north and south.

The map on this page illustrates what the current plan for the future of Fargo looks like. The neighborhoods are designed to each have a small park within, and a larger park centralized between four neighborhoods. Multi-use lanes, for pedestrian and non-motorized transportation, are also developed at this stage.

The area that lacks green spaces and greenways are most of Fargo that exists now. The areas between 19th Avenue North down to 32nd Avenue South have much less connection.

Because of this growth, it is important to connect the north and south ends of Fargo, as well as to bring people living at the outskirts of the city to downtown.

The city of Fargo has put large amounts of money into redeveloping the downtown area. As the city grows, there is potential for the city center to shift, especially as expansion continues south. A greenway can promote use of non-motorized transportation with safe routes to and from neighborhoods to main areas.

FARGO GROWTH PLAN

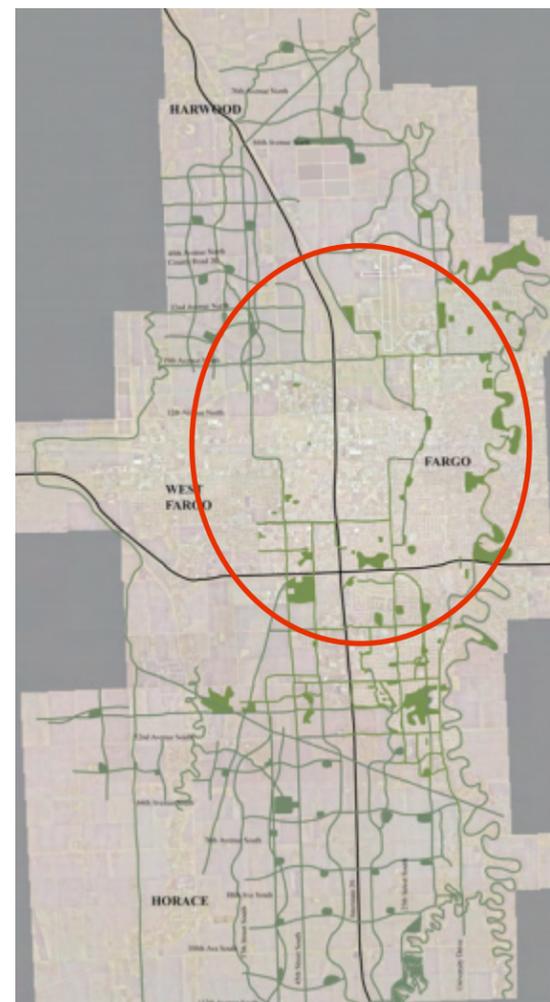
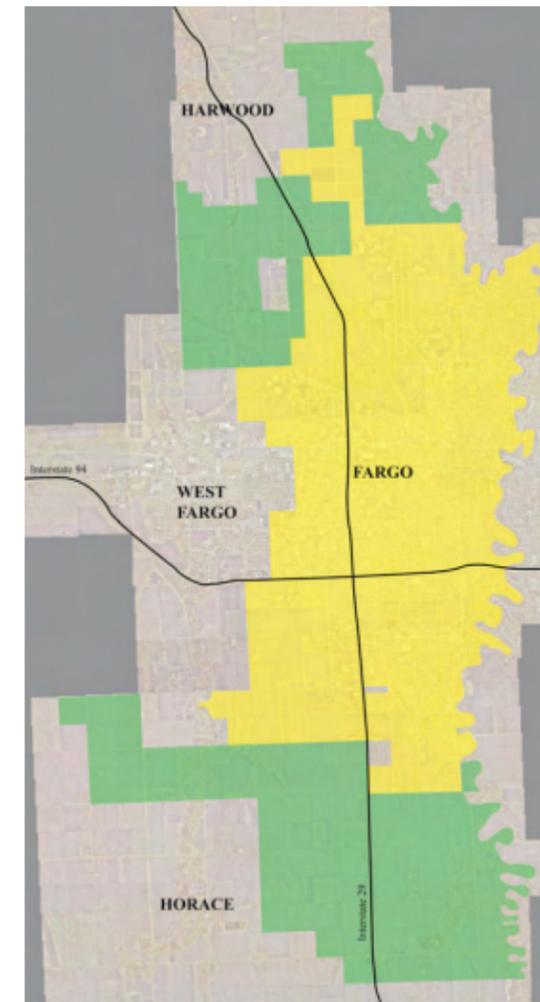
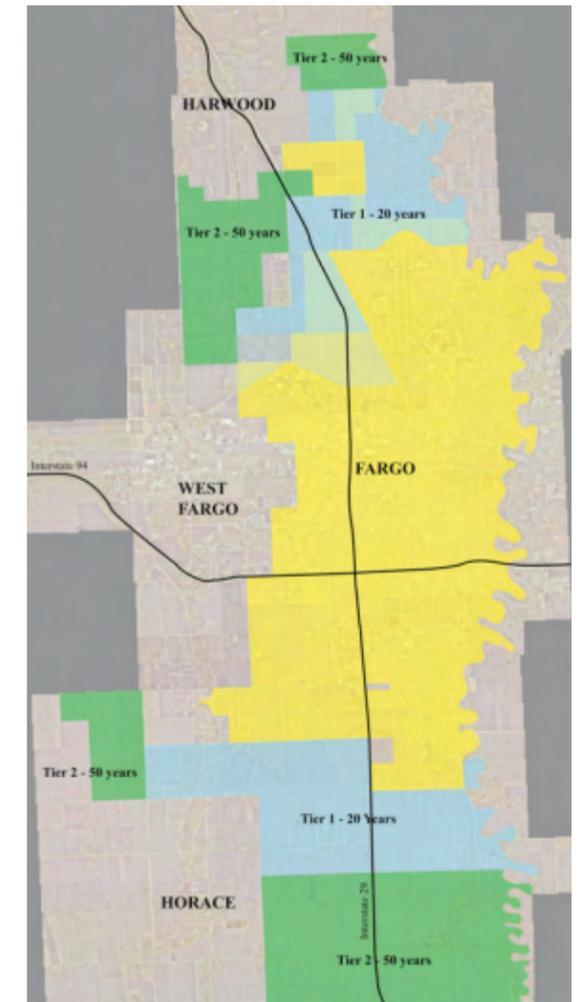


Image from 2007 City of Fargo Growth Plan

CITY LIMITS AND EXTRA-TERRITORIAL AREAS



GROWTH SECTORS



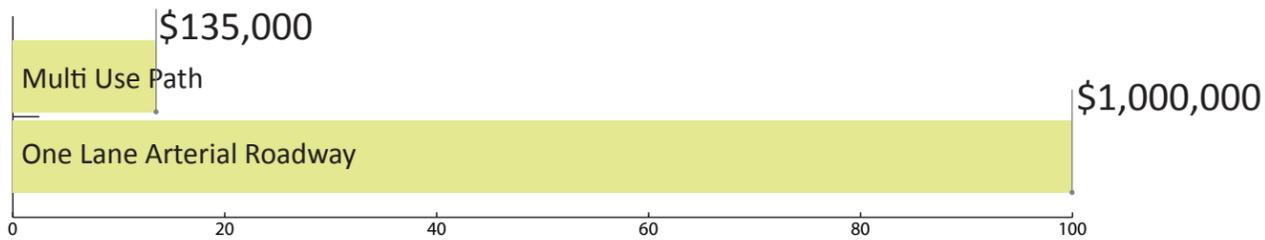
Images from 2007 City of Fargo Growth Plan

The city plans to accommodate growth for the next 50 years by utilizing the growth sectors. Development is encouraged but not limited to Tier 1. By doing this, the city would like growth to occur only as needed, close to the city. This will also lower costs of infrastructure, by building fewer roads, sewer, stormwater, and electrical lines.

NON-MOTORIZED COMMUTING IN THE FARGO METRO

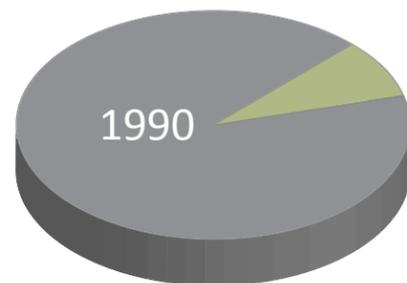
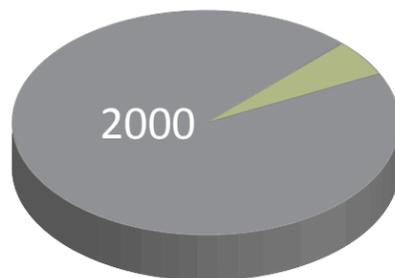
“Increased use of bike and pedestrian facilities would save infrastructure costs considerably. It takes about **\$1 million** per lane per mile to build an urban arterial roadway and about **\$135,000** per mile for a multi use path”

- FM Metropolitan Bicycle and Pedestrian Plan 2005



	2000 Census				1990 Census			
	Population	% Bike Commuters	% Ped. Commuters	% Total	Population	% Bike Commuters	% Ped. Commuters	% Total
FM Metro	174,367	0.26%	2.58%	2.84%	153,296	0.24%	3.75%	3.99%
Fargo	90,787	0.61%	4.48%	5.56%	74,115	0.67%	8.38%	8.38%
Moorhead	32,161	0.62%	10.05%	11.67%	32,295	0.50%	16.71%	16.71%
West Fargo	14,632	0.17%	1.07%	1.24%	12,287	0.08%	2.41%	2.41%
Dilworth	3,007	0%	3.71%	3.71%	2,562	0%	2.79%	2.79%

<http://www.bikesatwork.com/carfree/census-form.shtmlandCensus.gov>



The Census Bureau projects the city of Fargo’s population to reach over 128,000 people by the year 2030, and the metro area to total over 192,000.

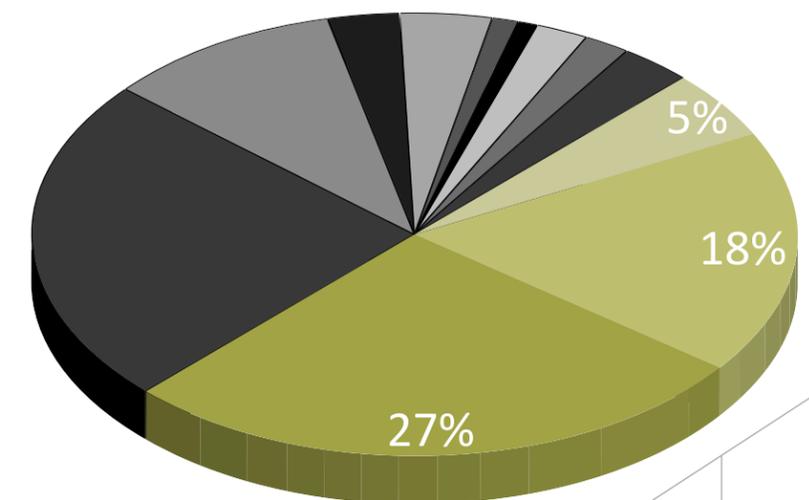
In 1990, 8.38% of people in Fargo were bicycle and pedestrian commuters. In 2000, it was reduced to 5.56%.

About 50% of people in the metro area are within 14 minutes and 6 miles of their workplace.

Existing Fargo Metro Commute to Work in Minutes

< 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-59	60-89	>90 Home
5%	18%	27%	24%	10%	3%	4%	1%	1%	2%	2%	3%

Source: Census Bureau



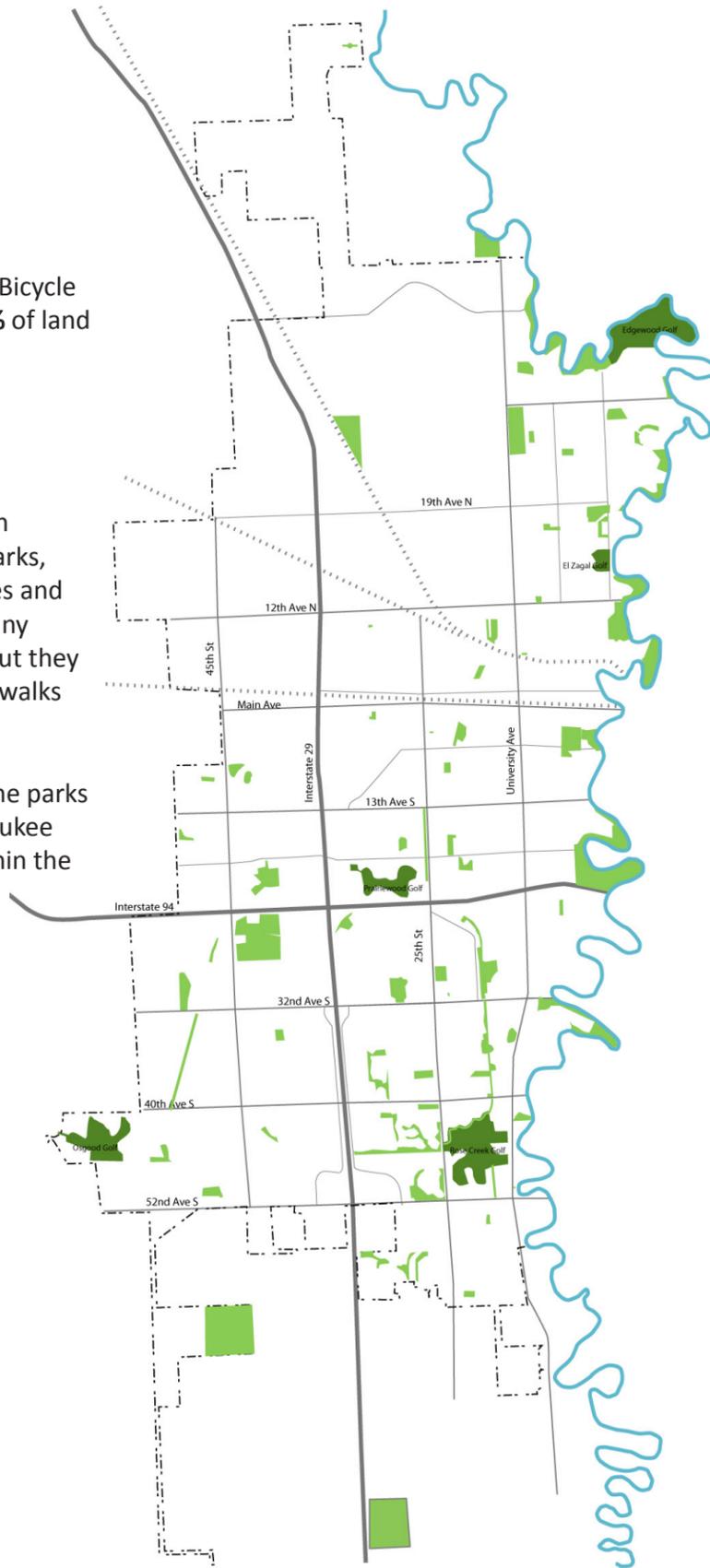
## GREEN INFRASTRUCTURE

According to the FM Metropolitan Bicycle and Pedestrian Plan of 2006, **7.29%** of land was for parks and recreation.

### Green Spaces

This illustration shows the existing (and one proposed) green spaces in Fargo. The green spaces include parks, sports recreation areas, golf courses and one linear park/trail. There are many greenspaces throughout the city, but they are mostly connected through sidewalks next to roadways.

It would be beneficial to connect the parks with greenways, such as the Milwaukee Trail, to make a green network within the city.



## Parks

This map is similar to the map on the left page, but without golf courses. The amount of greenspace is less. Golf courses are greenspaces and are recreational, but they are not multi-functioning, making them spaces with only one use.

The area of the recreational greenspaces lost can be regained by implementing greenway connections that serve as linear parks.



## GREENSPACES AND PEDESTRIAN PATHS

This map illustrates the relationship of greenspaces and pedestrian paths. The pedestrian path denotes sidewalks with a minimum ten-foot width. There is some connectivity currently, but many parks are still isolated.

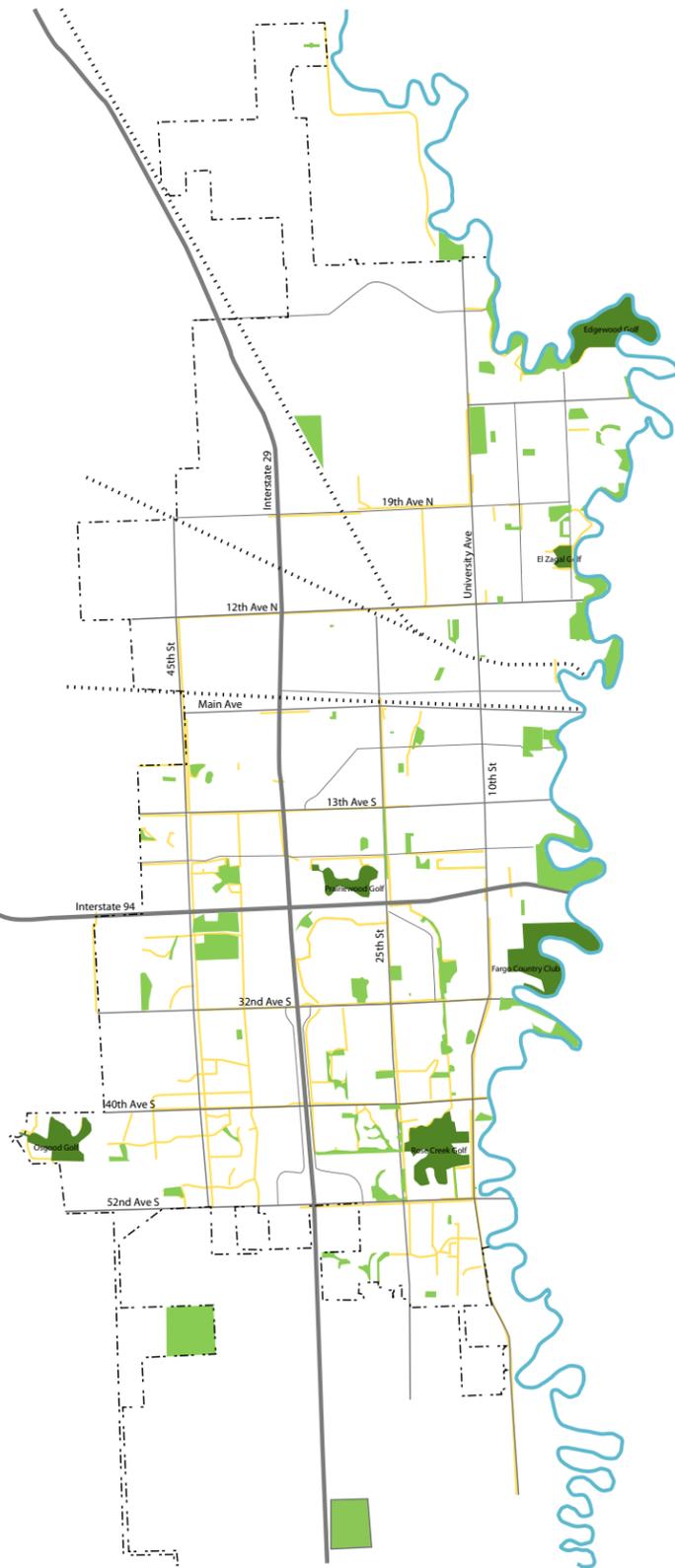
According to the FM Metropolitan Bicycle and Pedestrian Plan of 2006, the challenges and concerns to create a cohesive pedestrian and bike network include the development pattern, physical barriers, safety and comfort, and an inviting ambiance.

**Development Pattern:** Sprawl discourages non-motorized transportation, and often segregates retail, work, recreation, and living areas.

**Physical Barriers:** Man-made barriers (high traffic, narrow sidewalks) and natural barriers such as rivers, deter people from using other forms of transportation.

**Safety and Comfort:** A major concern is volume and speed of traffic, as well as lighting and police control in higher density area.

**Inviting Ambiance:** Low-maintained pathways deter users (cracked sidewalks, broken bridges). Ambiance should be clean and comfortable. (FM Metropolitan Bicycle and Pedestrian Plan, 2006)



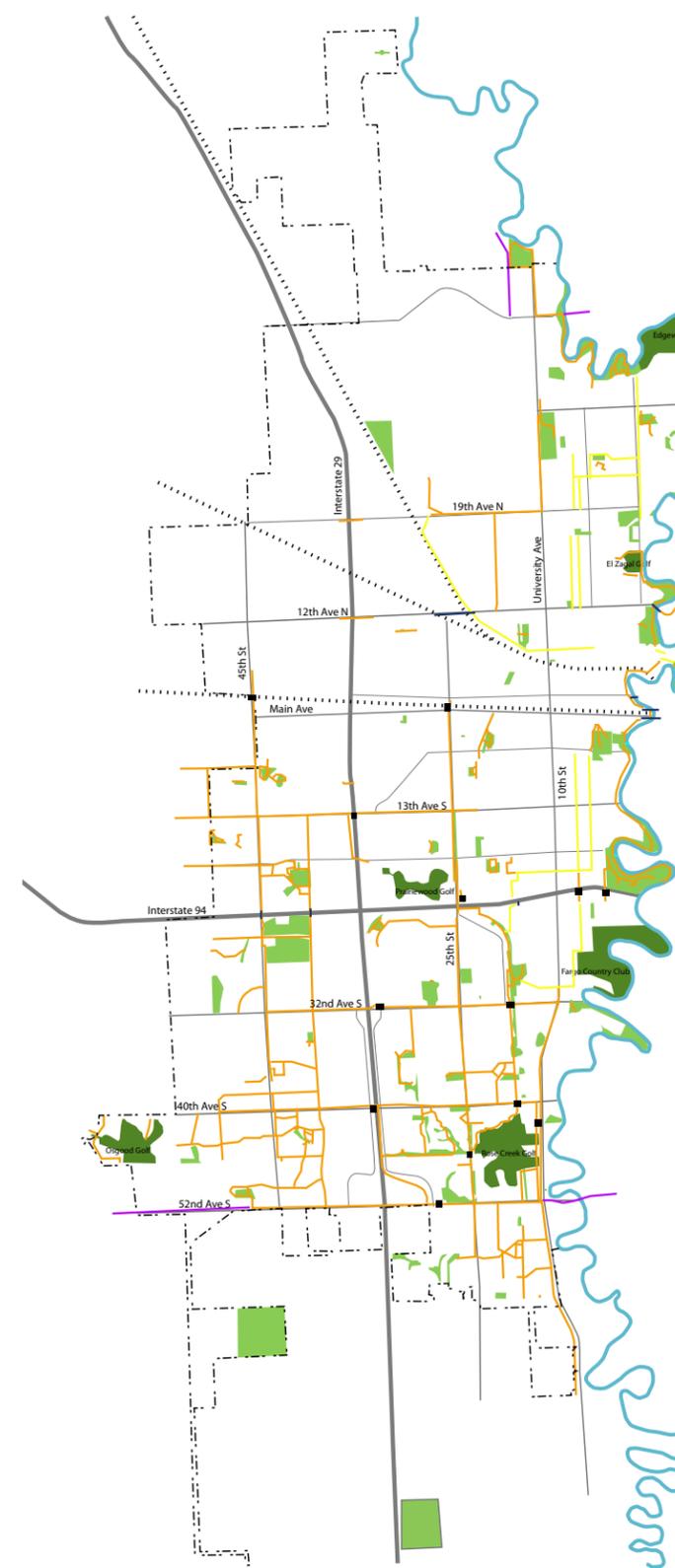
## GREEN NETWORK AND BIKE PATHS

This map illustrates the bike paths and green spaces in Fargo. Bike path classifications are:

**Shared use path (Class I):**  
A shared use path is a bicycle and pedestrian facility which is physically separated from motorized vehicular traffic by an open space or barrier. It can provide recreational opportunities or, in some cases, can serve as a direct commute route if cross flow by motor vehicles is minimized. These facilities are usually 8-12' wide, according to American Association of State Highway and Transportation Officials (AASHTO) standards.

**Bicycle lane (Class II):**  
A bicycle lane is a facility in which a portion of the roadway has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists. It is intended to delineate the right of way assigned to bicyclists and motorists and to provide for more predictable movements by each. These facilities are 4-6' wide according to AASHTO standards.

**Shared Roadway (Class III):**  
A shared roadway is a facility on a roadway which is open to both bicycle and motor vehicle travel. This may be an existing roadway, street with wide curb lanes, or road with paved shoulders. Signage on shared roadways indicates to bicyclists that particular advantages exist in using these routes compared with alternative routes. (FM Metropolitan Bicycle and Pedestrian Plan, 2006)



## TRAVEL DISTANCE ANALYSIS

### PROXIMITY TO GREEN SPACES

This map illustrates areas within Fargo that can access exterior points of a park or golf course in increments of .25 and .5 miles.



### PROXIMITY TO PARKS

This map illustrates areas within Fargo that can access exterior points of a park within .25 and .5 miles. Because golf courses provide large expanses of greenspace throughout the city, there are fewer areas that are accessible to parks alone.



### PROXIMITY TO BIKE PATHS

This map includes all three classes of bike paths, including those shared with auto traffic. This map shows areas that can access bike paths within .25 and .5 miles.



### PROXIMITY TO PEDESTRIAN PATHS

Pedestrian paths are sidewalks within the city that are a minimum of 10 feet wide. This map shows areas that are accessible within .25 and .5 miles. Slightly more areas are accessible from bike paths alone.

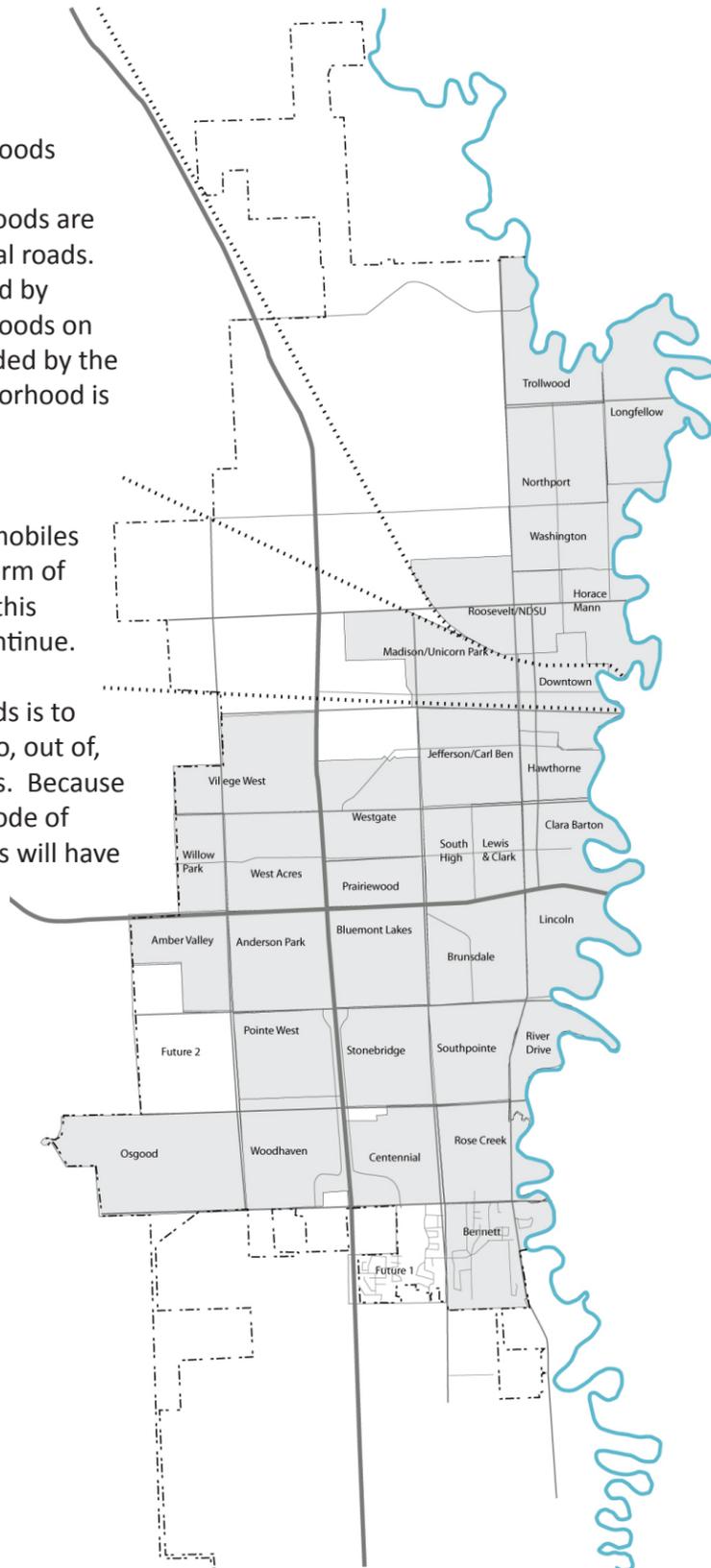


## NEIGHBORHOOD DISCONNECT

Currently, there are 32 neighborhoods in Fargo, with two planned future neighborhoods. Most neighborhoods are rectilinear and bounded by arterial roads. Some neighborhoods are bounded by Interstates 29 and 94. Neighborhoods on the east side of the city are bounded by the Red River. The downtown neighborhood is separated by railroad tracks.

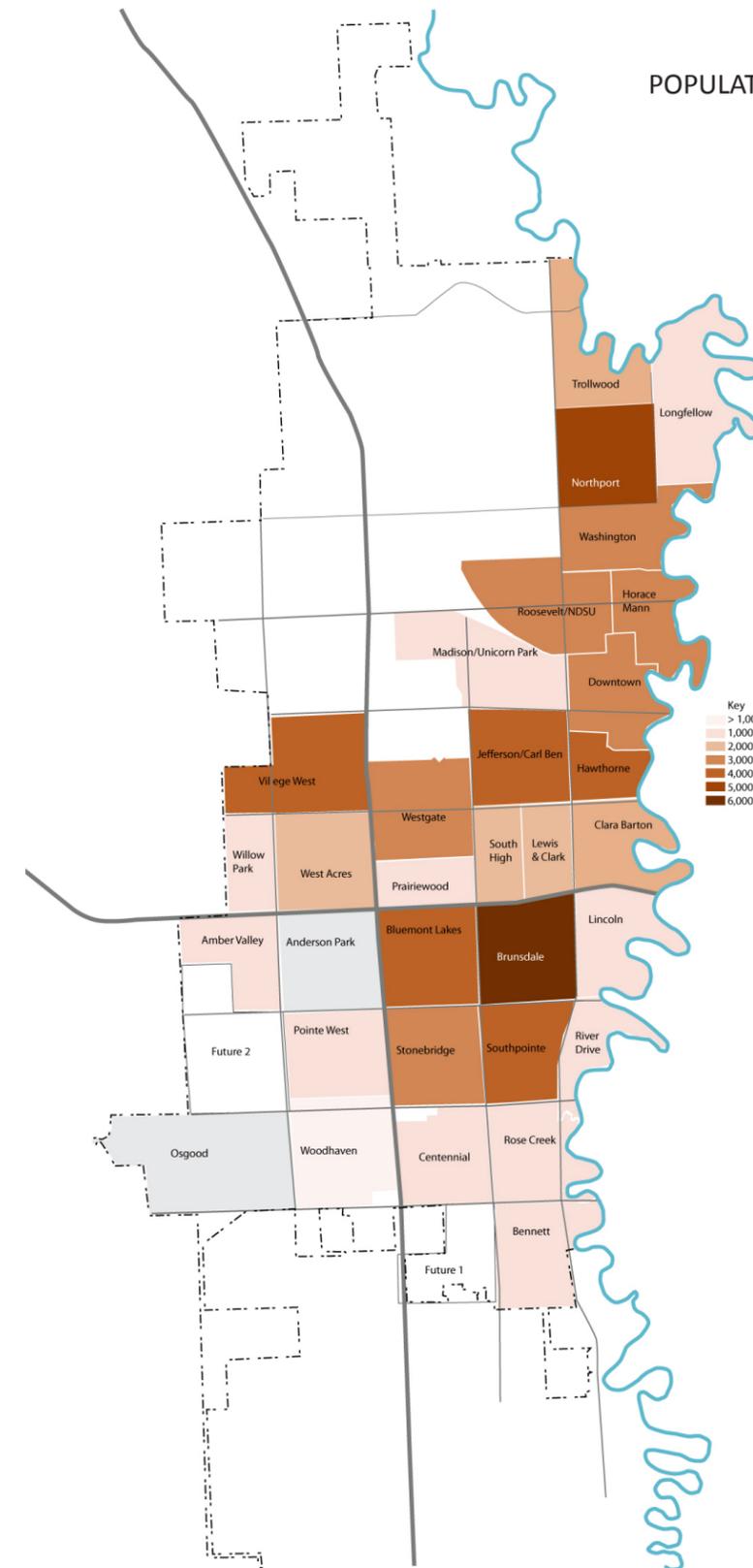
Because of these boundaries, the neighborhoods are cut off. Automobiles will likely be the most common form of transportation for some time, so this division of neighborhoods will continue.

The way to connect neighborhoods is to ensure safe connection points into, out of, and through other neighborhoods. Because automobiles are the dominant mode of transportation, these connections will have to be carefully thought out.



## POPULATION DISTRIBUTION

This map shows the population of each neighborhood. Because each neighborhood's land area varies between the residential/business ratio, this map does not show density. There seems to be no correlation between earlier developed neighborhoods and population. However, neighborhoods toward the outskirts of the city have a lower population that could indicate fewer people living there currently, larger lot sizes or fewer businesses than other neighborhoods.



Woodhaven	831
Bennet	1,013
Pointe West	1,077
Rose Creek	1,149
Amber Valley	1,188
River Drive	1,295
Madison/Unicorn Park	1,344
Centennial	1,439
Lincoln	1,564
Longfellow	1,720
Willow Park	1,899
Prairiewood	1,967
South High	2,219
West Acres	2,407
Lewis and Clark	2,659
Trollwood	2,701
Clara Barton	2,713
Horace Mann	3,005
Downtown	3,300
Roosevelt/NDSU	3,379
Washington	3,663
Stonebridge	3,967
West Gate	3,988
South Pointe	4,143
Hawthorne	4,338
Bluemont Lakes	4,350
Jefferson/Carl Ben	4,360
Village West	4,864
Northport	5,478
Brunsdale	6,953
Osgood	-
Anderson Park	-

\*No information for Anderson Park or Osgood neighborhoods

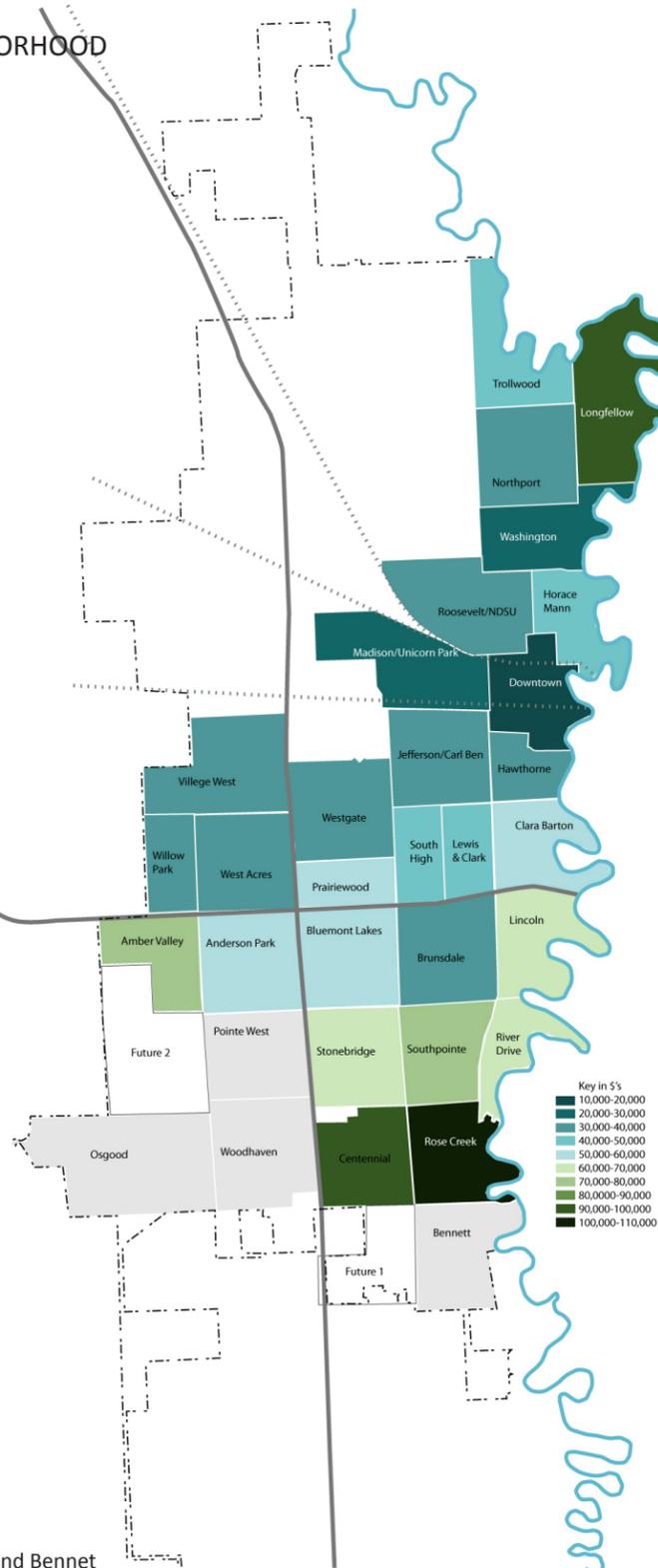
**MEDIAN HOUSEHOLD INCOME BY NEIGHBORHOOD**

This map shows the divisions of median household income (MHI) per neighborhood in Fargo. There is no data for the newer neighborhoods of Points West, Osgood, Woodhaven and Bennet. These neighborhoods are in the same areas as future neighborhoods, which suggests development has been more recent.

As discussed earlier, the city of Fargo initially started with a dense central core around the railways of downtown. The trend of incomes of the neighborhoods seem to follow the spread of the city. The neighborhoods with lower incomes are closer to the downtown core of the city, and the higher income neighborhoods are generally further away.

**Top Occupations by Neighborhood**

The following page shows each MHI by neighborhood, and the top three professions of both males and females. Comparing the MHI and top occupations held by a majority of people in the neighborhood, helps determine where people live and work.



\*No information for Points West, Osgood, Woodhaven, and Bennet

**TOP OCCUPATIONS IN EACH NEIGHBORHOOD, 2008 (Fargo average - \$41,181)**

<p><b>Downtown - \$18,750 (MHI)</b>                  Male: 18.1% Service                  15.9% Sales/Office                  13.8% Construction/Maint.                  Female: 42.5% Sales/Office                  28% Service                  7.3% Management</p>	<p><b>Brunsdale - \$32,226</b>                  M: 23.3% Sales/Office                  12.2% Transport/Moving                  11.7% Management                  F: 39.4% Sales/Office                  18.1% Service                  11.4% Healthcare/Tech.</p>	<p><b>South High - \$49,203</b>                  M: 32.2% Sales/Office                  16% Construction/Maint.                  12.4% Transport/Moving                  F: 24.6% Sales/Office                  23.4% Service                  9.8% Healthcare/Tech.</p>	<p><b>Stonebridge - \$65,672</b>                  M: 30.4% Sales                  14.4% Construction                  10.5% Management                  F: 38.6% Sales                  11.5% Healthcare/Train/Lib.                  11.3% Service</p>
<p><b>Madison/Unicorn Park - \$28,325</b>                  M: 29.8% Construction/Maint.                  20.1% Service                  15.1% Sales/Office                  F: 37.7% Service                  23.9% Sales/Office                  13.4% Production</p>	<p><b>Westgate - \$34,592</b>                  M: 31.1% Sales/Office                  11.8% Construction/Maint.                  11.6% Production                  F: 38.3% Sales/Office                  22.7% Service                  10.9% Healthcare/Tech.</p>	<p><b>Horace Mann - \$49,309</b>                  M: 20.3% Sales/Office                  14.6% Construction/Main.                  14.2% Transport/Moving                  F: 41.6% Sales/Office                  15.1% Service                  10.2% Management</p>	<p><b>Lincoln - \$69,440</b>                  M: 29.5% Sales                  13.6% Management                  13.1% Service                  F: 32.8% Sales                  18.1% Education                  10.2% Comm./Soc. Services</p>
<p><b>Washington - \$28,325</b>                  M: 29.8% Construction/Maint.                  20.1% Service                  15.1% Sales/Office                  F: 37.7% Service                  23.9% Sales/Office                  13.4% Production</p>	<p><b>Village West - \$35,909</b>                  M: 26.8% Sales/Office                  13.3% Construction/Maint.                  11.9% Service                  F: 41.2% Sales/Office                  19.9% Service                  7.5% Healthcare/Tech.</p>	<p><b>Prairiewood - \$56,184</b>                  M: 20.7% Sales/Office                  15.1% Management                  12.3% Construction/Maint.                  F: 37.8% Sales/Office                  16.8% Service                  14.1% Management</p>	<p><b>Amber Valley - \$72,026</b>                  M: 18.5% Sales/Office                  18% Transport                  14.1% Construction                  F: 49.3% Sales                  14.9% Service                  10.1% Healthcare</p>
<p><b>West Acres - \$30,140</b>                  M: 27.2% Sales/Office                  15.3% Service                  14.5% Construction/Maint.                  F: 43.7% Sales/Office                  24.8% Service                  5.8% Healthcare/Tech.</p>	<p><b>Northport - \$36,213</b>                  M: 21.4% Sales/Office                  15.1% Service                  11.8% Construction/Main.                  F: 35.8% Sales/Office                  18.4% Service                  11.6% Healthcare/Tech.</p>	<p><b>Clara Barton - \$59,336</b>                  M: 26.9% Sales                  13.4% Construction                  10.6% Service                  F: 33.8% Sales                  17.1% Service                  13.0% Healthcare/Tech.</p>	<p><b>South Pointe - \$79,679</b>                  M: 26.8% Sales/Office                  18% Management                  11.2% Service                  F: 45.8% Sales                  13.6% Service                  10.4% Healthcare</p>
<p><b>Roosevelt/NDSU - \$31,331</b>                  M: 24.1% Sales/Office                  18.4% Construction/Maint.                  8.9% Transport/Mat. Moving                  F: 43.4% Sales/Office                  21.9% Service                  10.5% Healthcare/Tech.</p>	<p><b>Willow Park - \$ 38,123</b>                  M: 30.6% Sales/Office                  15.5% Construction                  13.5% Service                  F: 44.7% Sales                  23.9% Service                  8.8% Healthcare/Tech.</p>	<p><b>Anderson Park - \$59,399</b>                  M: 29.1% Sales                  12.1% Construction                  11.7% Management                  F: 38.1% Sales                  12.7% Service                  10.1% Education/Train/Lib.</p>	<p><b>Longfellow - \$93,014</b>                  M: 21.9% Sales/Office                  14.8% Management                  14.1% Healthcare                  F: 25.6% Education/Train/Lib.                  22.9% Sales/Office                  13% Management</p>
<p><b>Hawthorne - \$31,821</b>                  M: 18.8% Service                  16.7% Sales/Office                  13.6% Construction/Maint.                  F: 31% Sales/Office                  26.3% Service                  8.4% Management</p>	<p><b>Trollwood - \$45,590</b>                  M: 23.6% Sales/Office                  18% Construction/Maint.                  15% Management                  F: 37.2% Sales/Office                  20.8% Service                  8.5% Healthcare/Tech.</p>	<p><b>Bluement Lakes - \$59,399</b>                  M: 29.1% Sales                  12.1% Construction                  11.7% Management                  F: 38.1% Sales                  13.7% Service                  10% Management</p>	<p><b>Centennial - \$ 93,435</b>                  M: 23.3% Sales                  18.7% Management                  10.7% Healthcare                  F: 37.9% Sales                  14.8% Service                  10.2% Education</p>
<p><b>Jefferson/Carl Ben - \$31,834</b>                  M: 19.5% Sales/Office                  17.3% Construction/Maint.                  16.5% Service                  F: 44.3% Sales/Office                  23.8% Service                  7.7% Production</p>	<p><b>Lewis &amp; Clark - \$47,793</b>                  M: 23.4% Sales/Office                  20.7% Construction/Maint.                  10.9% Transport                  F: 41.4% Sales                  21.2% Service                  7.8% Healthcare/Tech.</p>	<p><b>River Drive - \$64,255</b>                  M: 26.8% Sales                  16% Management                  11.3% Construction                  F: 45.1% Sales                  15.4% Service                  9.3% Healthcare/Tech.</p>	<p><b>Rose Creek - \$119,229</b>                  M: 26.8% Management                  26.5% Sales/Office                  7.8% Health/Tech. &amp; C/M                  F: 49.5% Sales/Office                  15.5% Healthcare/Tech.                  9.5% Education/Train/Lib.</p>

\*No information for Points West, Osgood, Woodhaven, and Bennet

## MAJOR EMPLOYERS

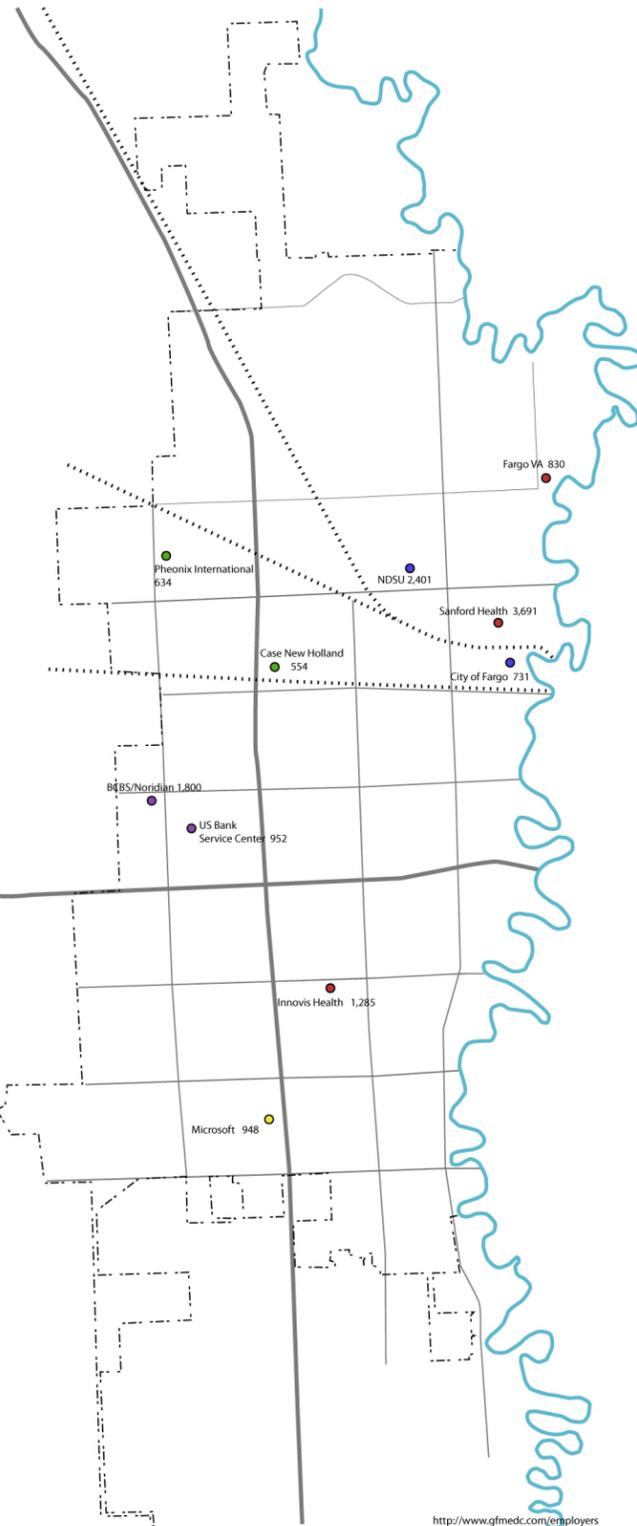
The next step is to identify the major employers in the city to find where large numbers of people are working. Identifying these locations, along with lines of connection, will help determine areas of needed transportation.

According to the Greater Fargo Moorhead website, Fargo's major employers include:

- Pheonix International
- Case New Holland
- Fargo VA
- Innovis
- Microsoft
- Blue Cross Blue Shield/Noridian
- Sanford Health
- City of Fargo
- NDSU
- US Bank Service Center
- Fargo Public Schools (not shown)

Major employers can be categorized into manufacturing/production, healthcare, technology, financial services and back office.

The major employers are dotted throughout the city, but most exist in the northern areas.



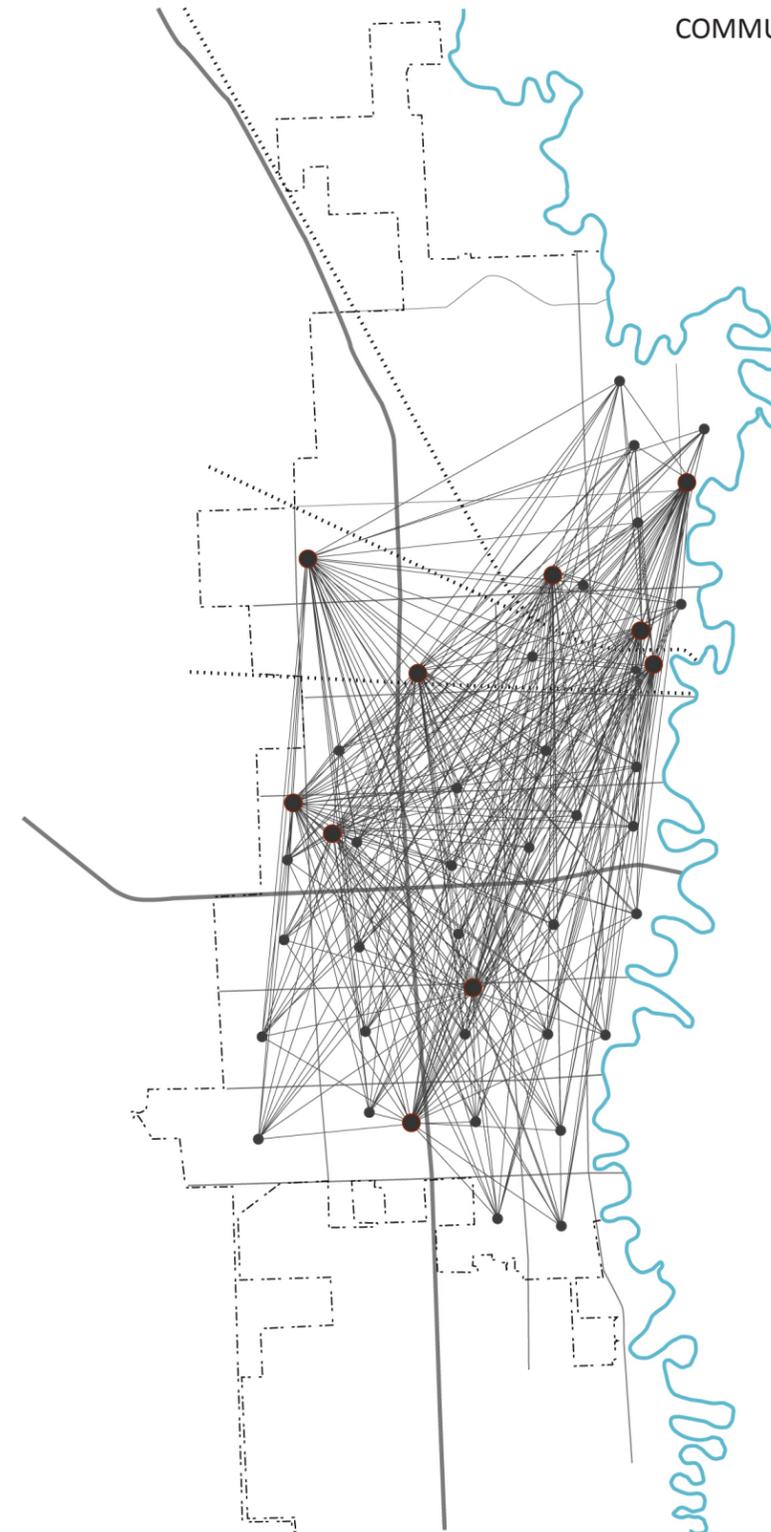
<http://www.gfmedc.com/employers>

## COMMUTE ANALYSIS TO MAJOR EMPLOYERS

This map shows a web system between the center of each neighborhood and the major employers in the city. It connects 32 current neighborhoods and two future neighborhoods to the top 10 employers.

Although most of the employers are in northern Fargo, there are likely still a lot of people traveling from south Fargo to jobs in north Fargo.

The darker areas suggest a higher volume of travelers. These areas include around downtown, between I-94 and Main Avenue, and along University Avenue.

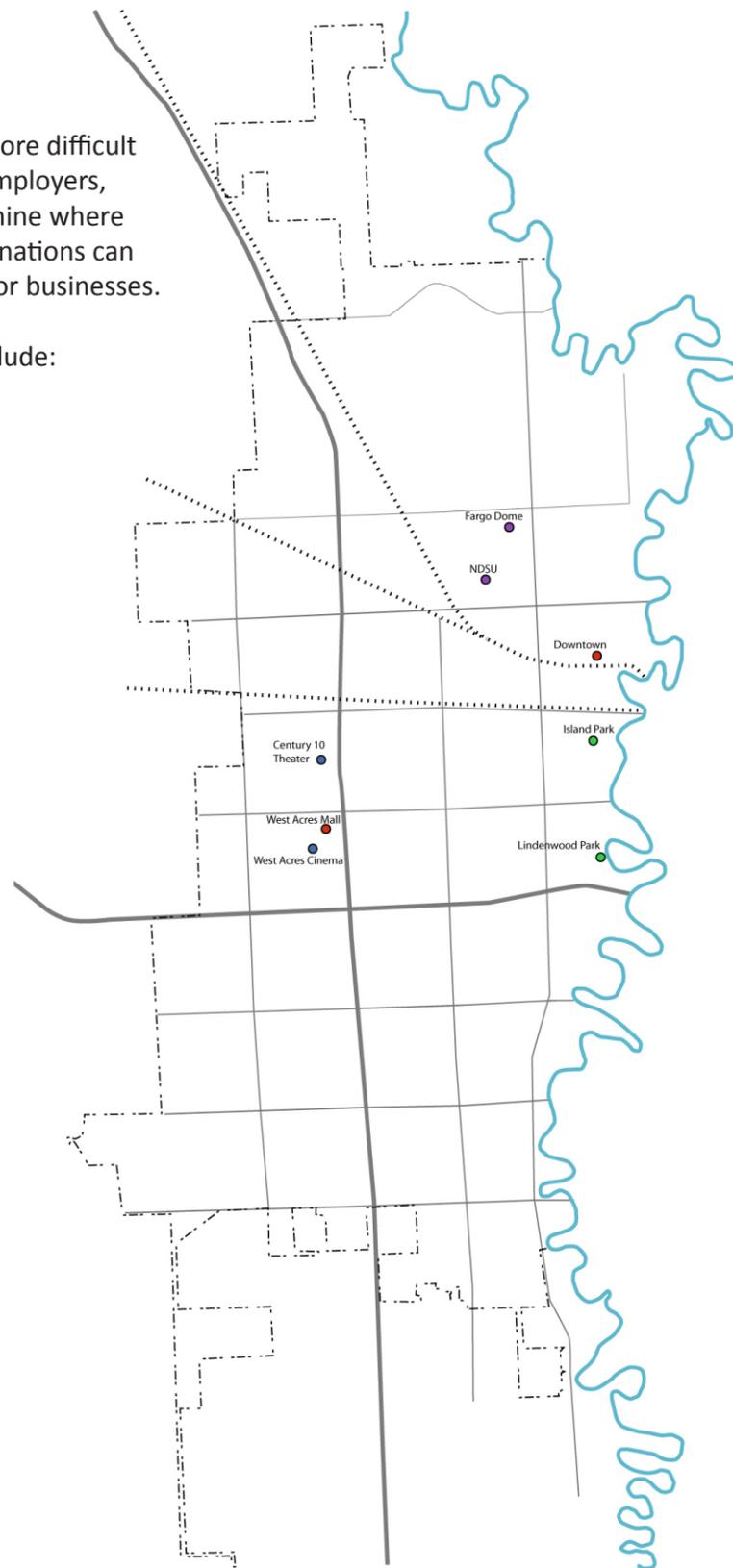


## MAJOR DESTINATIONS

The major destinations were more difficult to determine. Just as major employers, major destinations help determine where people are going. Linking destinations can also help to increase revenue for businesses.

Major destinations in Fargo include:

- The Fargodome
- NDSU
- Downtown
- Island Park
- West Acres Mall
- Century 10 Theater
- Lindenwood Park
- West Acres Cinema

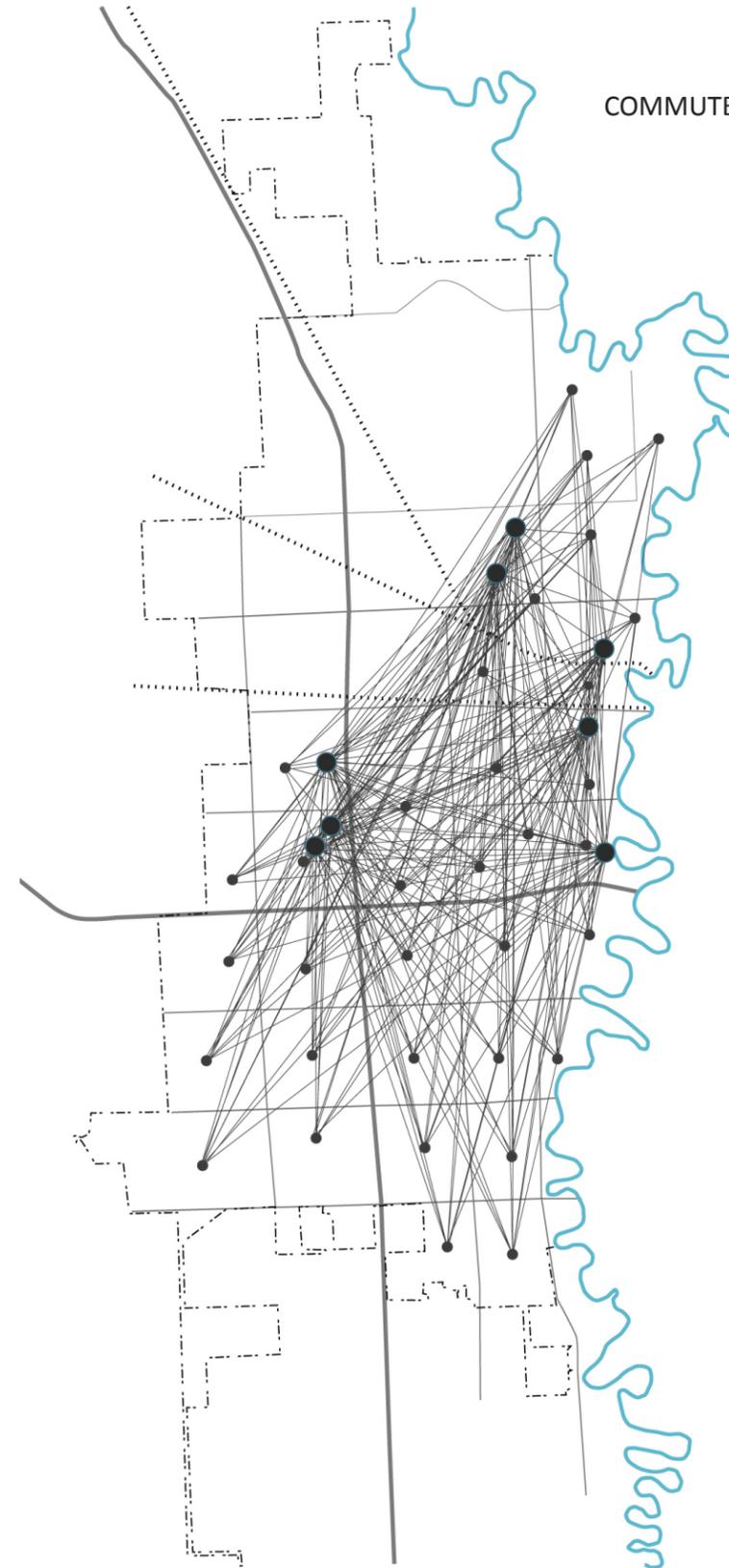


## COMMUTE ANALYSIS TO MAJOR DESTINATIONS

This map shows a web system between the center of each neighborhood and the major destinations in the city.

This map also helps determine the best option for green corridors, to connect people to where they need to go.

Most of the destinations are on the east side of town, and all of the destinations are north of Interstate 94. The darker areas suggest a higher volume of travelers.



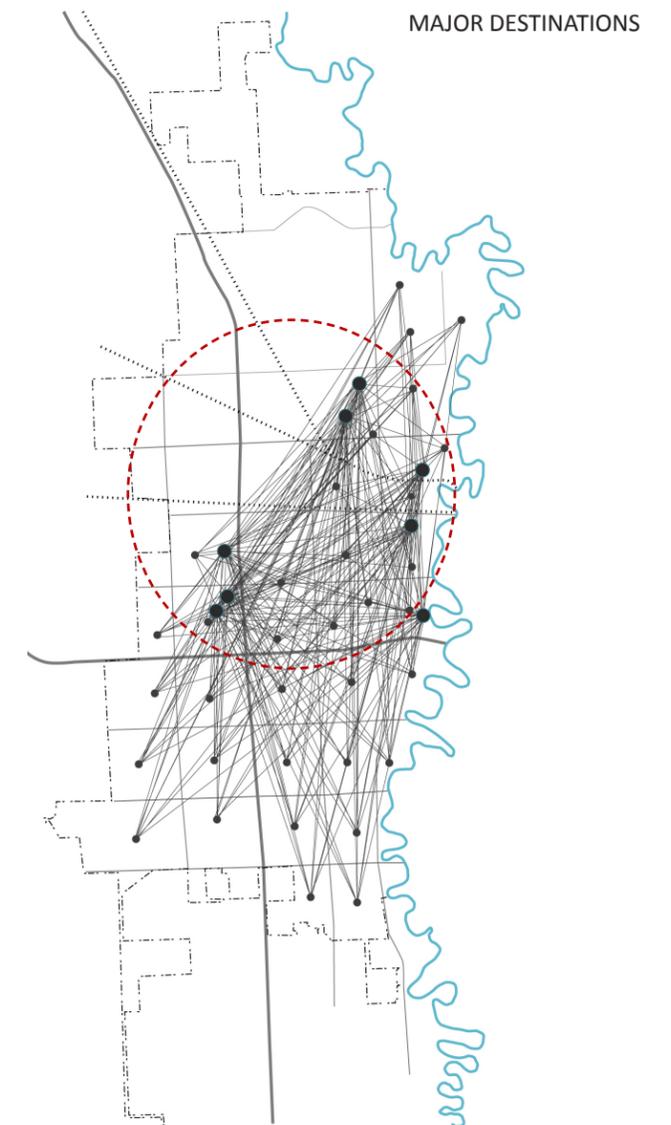
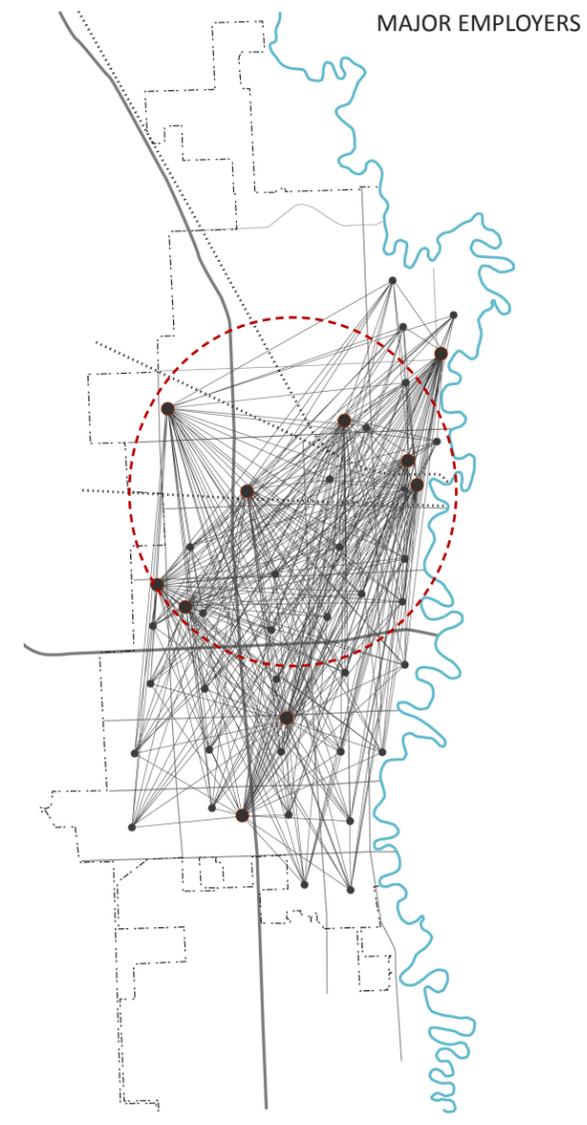
### COMPARATIVE ANALYSIS OF EXISTING AND PROJECTED USE

Between the current bike network and the projections for the growth plan, the central core of the city is left without connections. Furthermore, many of the pathways are smaller sidewalks or paths on or along roadways.



Image from 2007 City of Fargo Growth Plan

The maps of major employers and destinations show the likelihood of travel between the areas. Comparing all four maps, there is evidence for where connections should be that don't exist currently. These maps serve as a basis for the master greenway plan.



HOW TO MAKE THESE CONNECTIONS BY IDENTIFYING SPACES:

Properties owned by the City, County, Park District  
 - Utility Right-of-Ways  
 - Existing Park or Greenspace

Property Owned by Developers

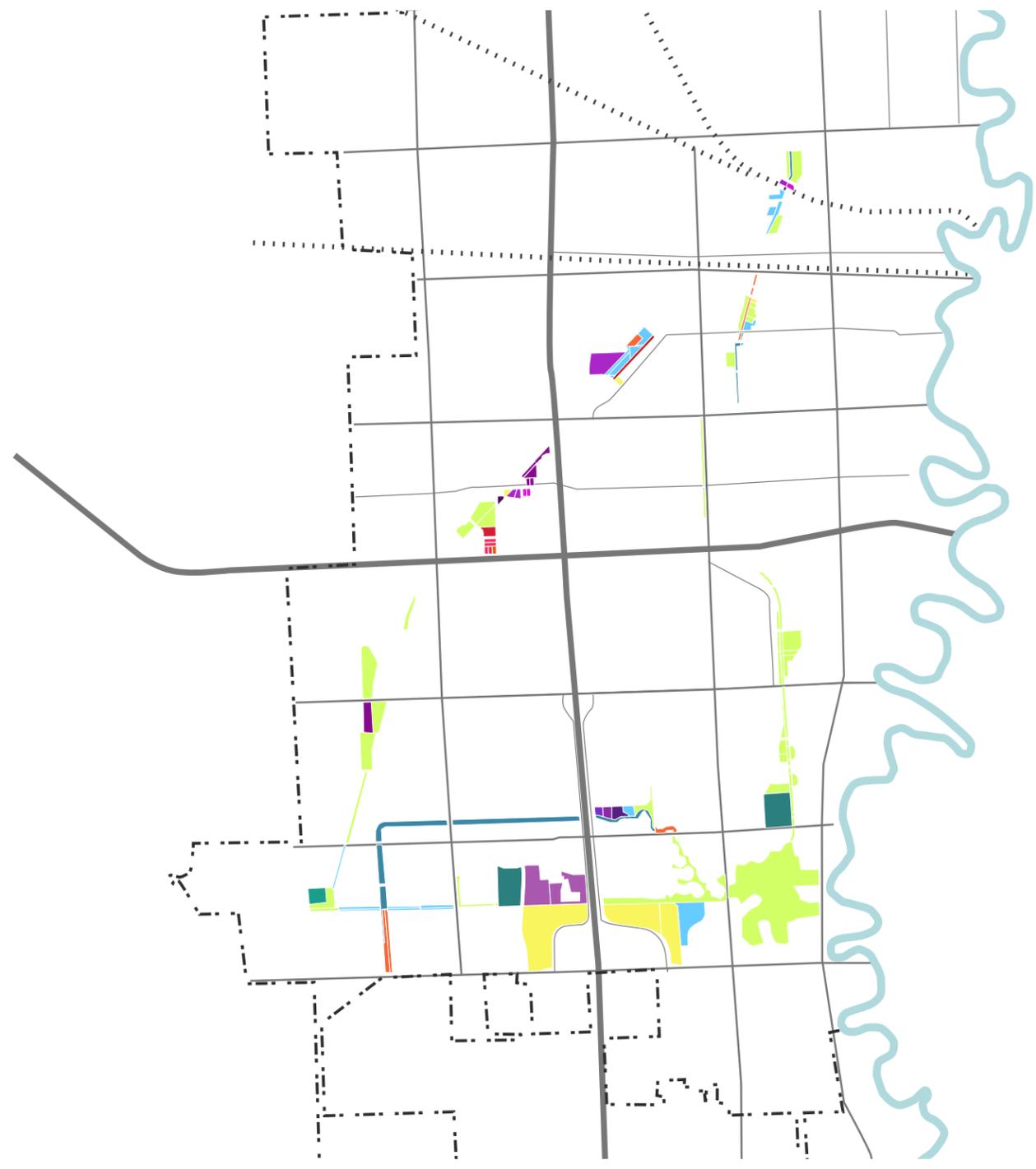
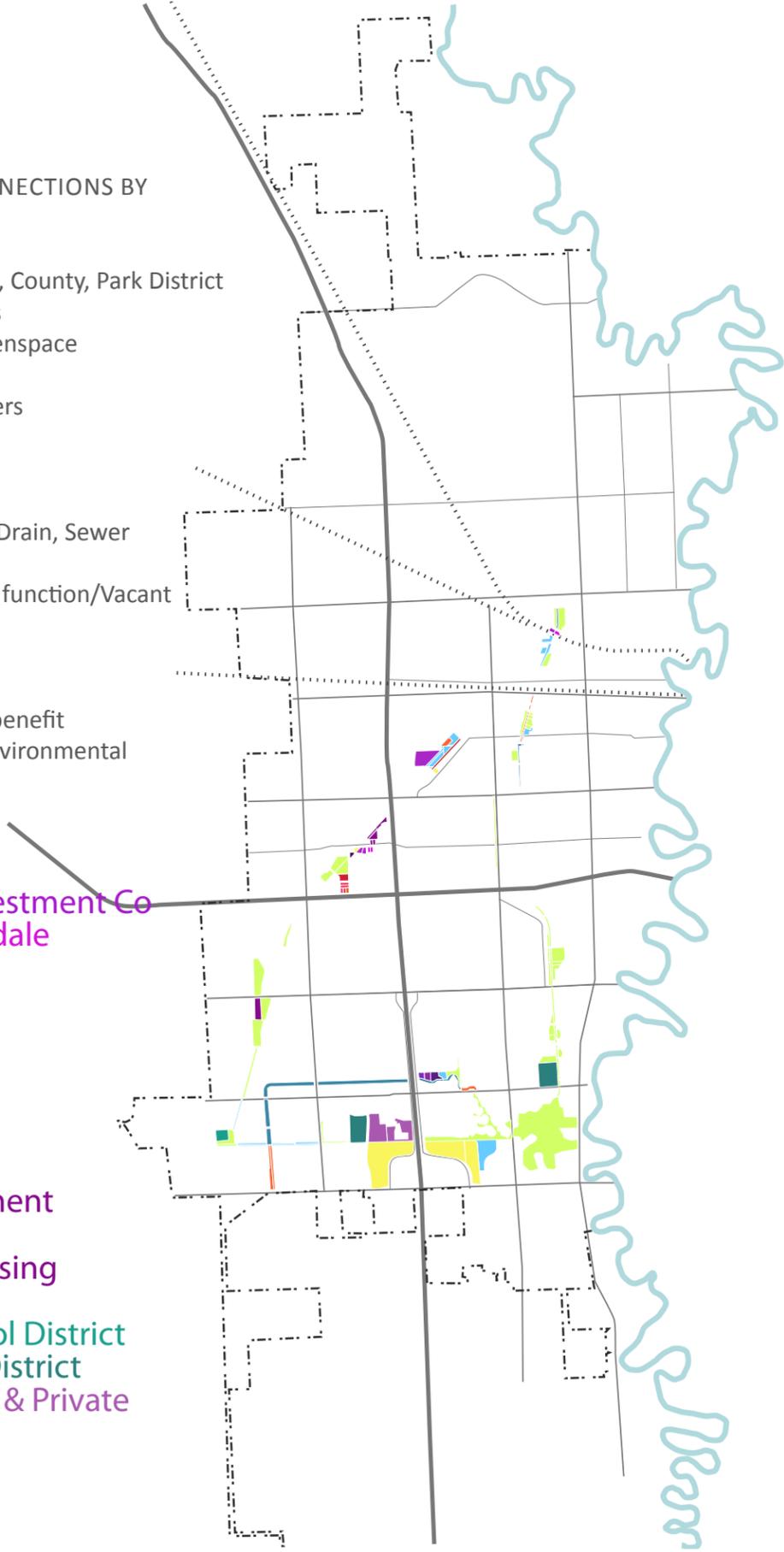
Easements  
 - Electrical  
 - Water, Stormwater, Drain, Sewer

Property having no apparent function/Vacant

Vacant/Low Use Railroad

Other Properties that could benefit  
 - Social, Economic, Environmental

- Drain
- Builders MGMT & Investment Co
- John and Tom Brunsdale
- City of Fargo
- Fargo Parks District
- Cass County
- Private
- BNSF
- Railroad
- Van Raden Properties
- West Acres Development
- T. Sloan Properties
- BC Investments & Leasing
- Brandt Crossing
- W. Fargo Public School District
- Fargo Public School District
- Great Plains Software & Private
- Mills Supply
- Ulteig Engineers
- U-Tag Investments



## DESIGN GOALS

### Designing for Alternative Transportation

- Connect people to places by providing routes separate from motor vehicle transportation
- Provide routes that connect existing greenspaces and recreational amenities
- Create a safe links between neighborhoods to facilitate use

### Designing for Community

- Strengthen social bonds by creating centralized gathering spaces with amenities for all ages
- Improve quality of life and overall health of citizens

### Designing for the Environment

- Design multi functioning sites that allows people to engage and interact with the environment
- Develop interventions that improve the quality of the environment and create areas for habitat



## MASTER PLAN

The master plan is an outline the greenway. The route is 21 miles long, with a 15 mile loop. It connects to the Milwaukee Bike Trail, creating a nine mile stretch of minimal interruptions. The plan increases park space in the city by 15%, with many areas along the trail for more park space. The greenway connects 20 existing and two proposed parks.

The greenway is divided into different conditions that occur along the greenway, including existing or proposed parks, narrow corridors, existing bike path, biking on the roadway, road crossing, and special conditions, which in the case refer to railroad, interstate, and drain channel crossing. Four areas along the greenway are designed to collectively address all the conditions.

### Designing for Alternative Transportation

The plan spans much of the city, providing routes from home to destinations and greenspaces throughout the city, including commercial areas. Arterial road crossing will have an underpass; collector road crossings have speed tables with narrowed roadway, pavement change, and indicator tree sets. Railroad crossings of above or below dependent on grade.

### Designing for Community

The master plan links communities by connecting destinations, while providing safe connections throughout the city. These gathering spaces will encourage social interaction and increase feelings of ownership and pride, as well as increase recreation.

### Designing for the Environment

By having multi-functioning spaces, people can interact with the environment and learn natural processes. Spaces provide natural habitat and area for infiltration of water runoff, among others.

### KEY

- Greenway Trail
- Park

### CONDITIONS

- Existing or Proposed Park
- Narrow Corridor
- Existing Bike Path
- Biking on Roadway
- Road Crossing
- Special Condition



# JOHNSON PARK: NDSU Campus

## MASTER PLAN

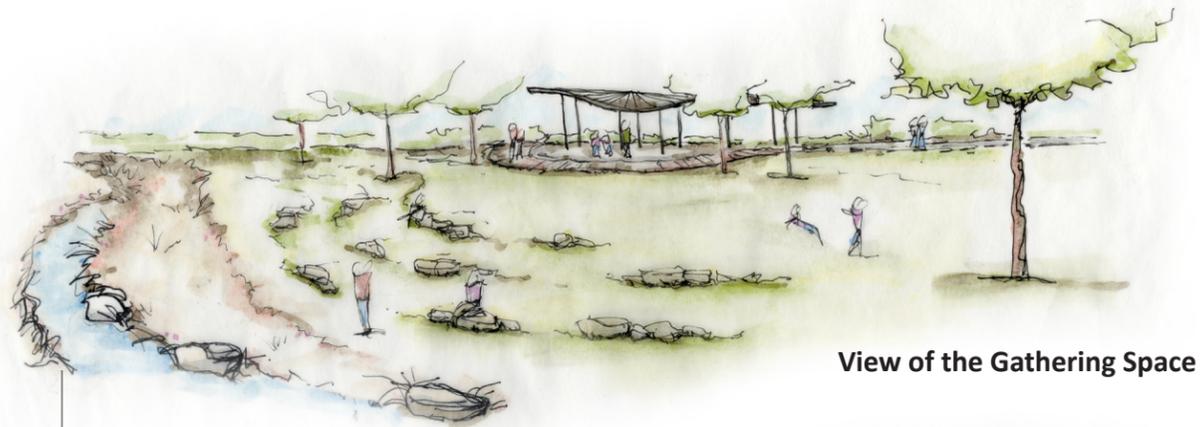
Johnson Park is located in the Roosevelt/NDSU neighborhood, which has a population of about 3,300 people. The only other park in the neighborhood is Roosevelt Park, which has playground equipment and hockey rinks in the winter. Conditions for this area include an existing park, road crossing, and special (railroad). The park currently has soccer fields, a steep drainage channel blocked by chain link fences, and mown turf. There is not central gathering area for the neighborhood.

The design allows this area to serve as a central hub for the neighborhood. This area allows opportunities for social interaction between the neighborhood residents, including students. The bike trail connects from campus, through the site, and over the tracks. The stormwater channel with a gradual slope creates a natural feel while creating habitat. The shade structure and play equipment creates an opportunity for neighborhood gatherings. The walking path, soccer fields and open turf are opportunities for recreation.



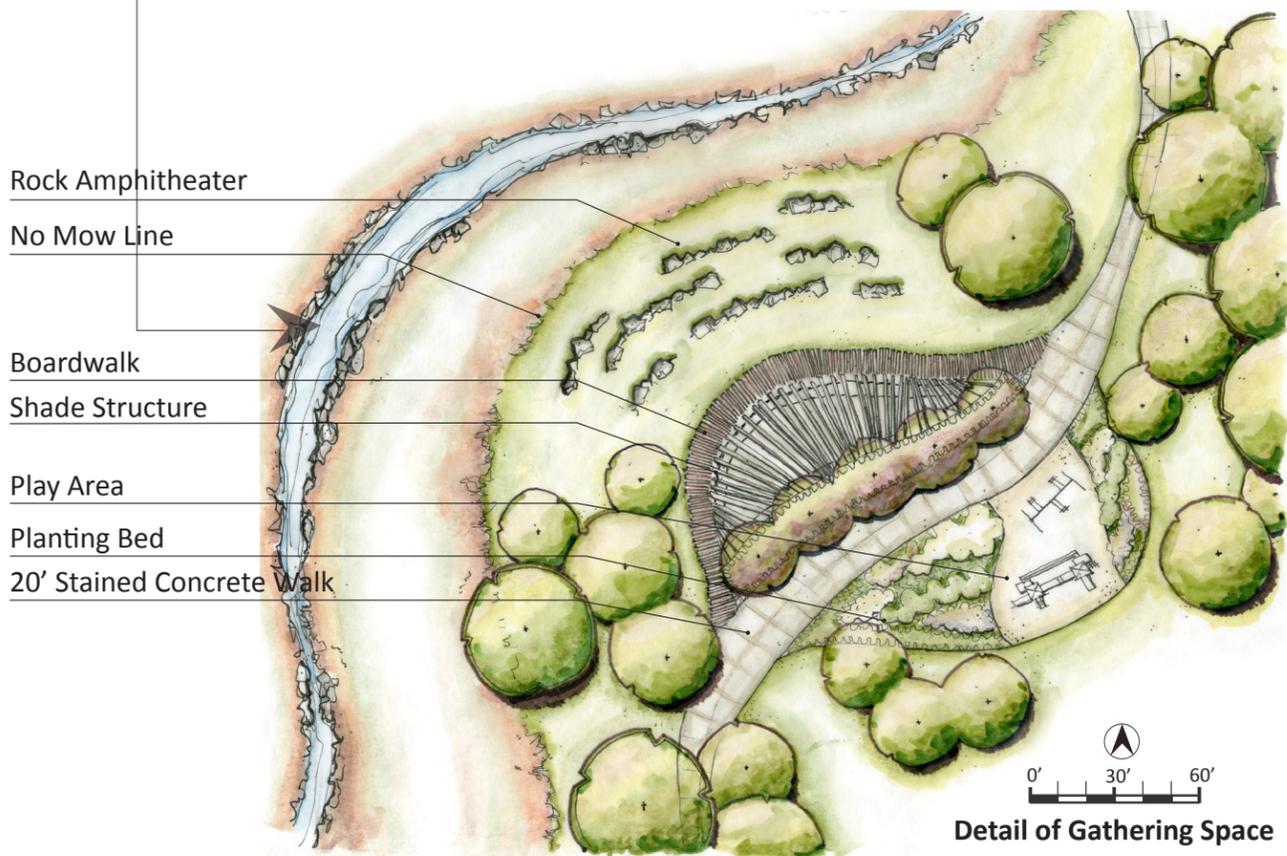
# Johnson Park

## QUALITY AND CHARACTER



View of the Gathering Space

This space is the central gathering area of the site, with a shade structure, rock amphitheater for informal seating, a walking path connecting the site, with open turf and play equipment in proximity of the shade structure.



Detail of Gathering Space

- Rock Amphitheater
- No Mow Line
- Boardwalk
- Shade Structure
- Play Area
- Planting Bed
- 20' Stained Concrete Walk

10' Bike Path

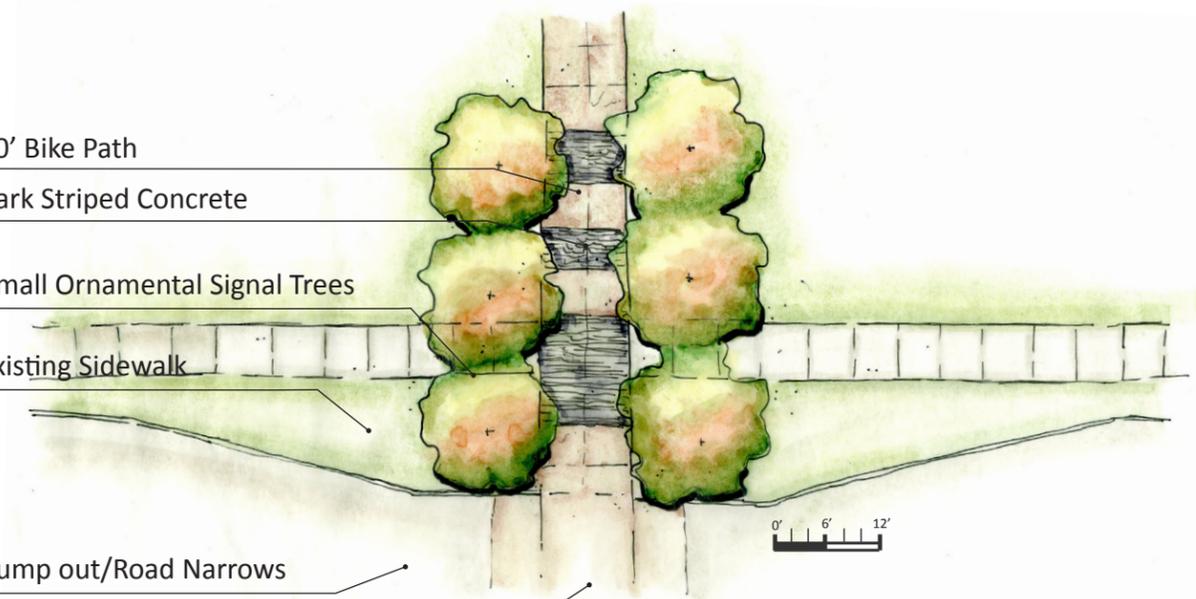
Dark Striped Concrete

Small Ornamental Signal Trees

Existing Sidewalk

Bump out/Road Narrows

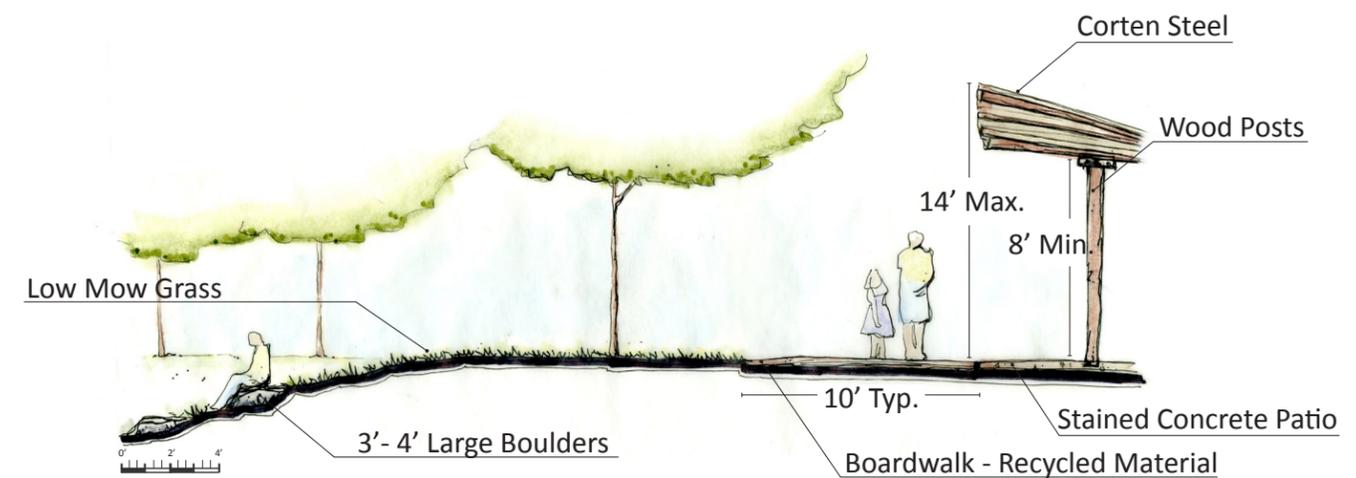
Speed Table



Crossing a Collector Roadway

There will be an underpass everywhere the trail meets an arterial road for safety and fewer interruptions. Wherever the trail meets a collector road, the road will narrow and will be designated with an ornamental signal tree to calm traffic. Material texture will change to alert users a crossing is ahead.

This section shows the area from the rock amphitheater to the shade structure. Materials used here create a rustic, natural feel, by using boulders, natural grasses, and wood. The corten steel reacts to weather processes and will change in appearance over time.



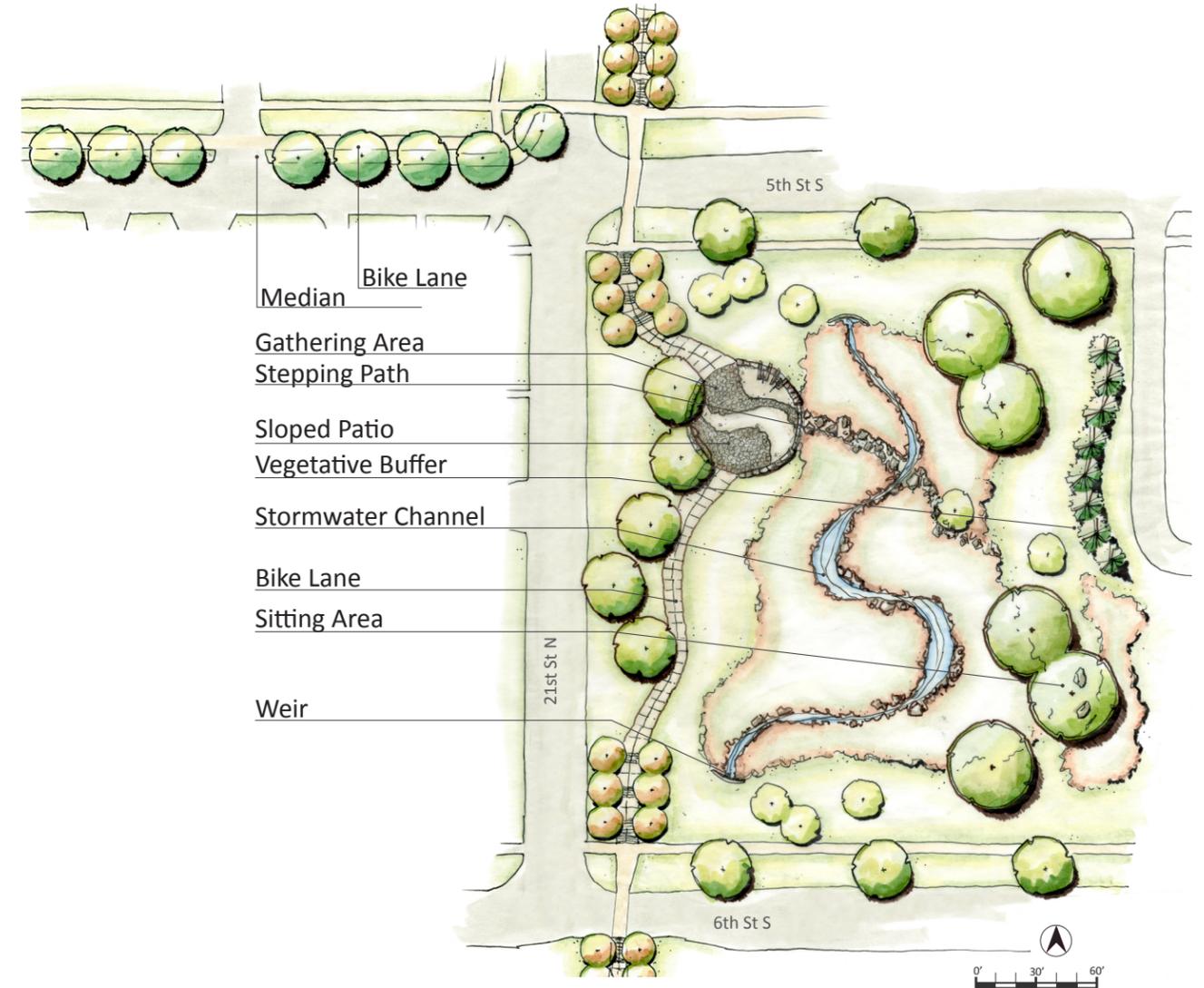
Section of Rock Amphitheater, Boardwalk and Shade Structure

# SOUTH JEFFERSON PARK

## MASTER PLAN

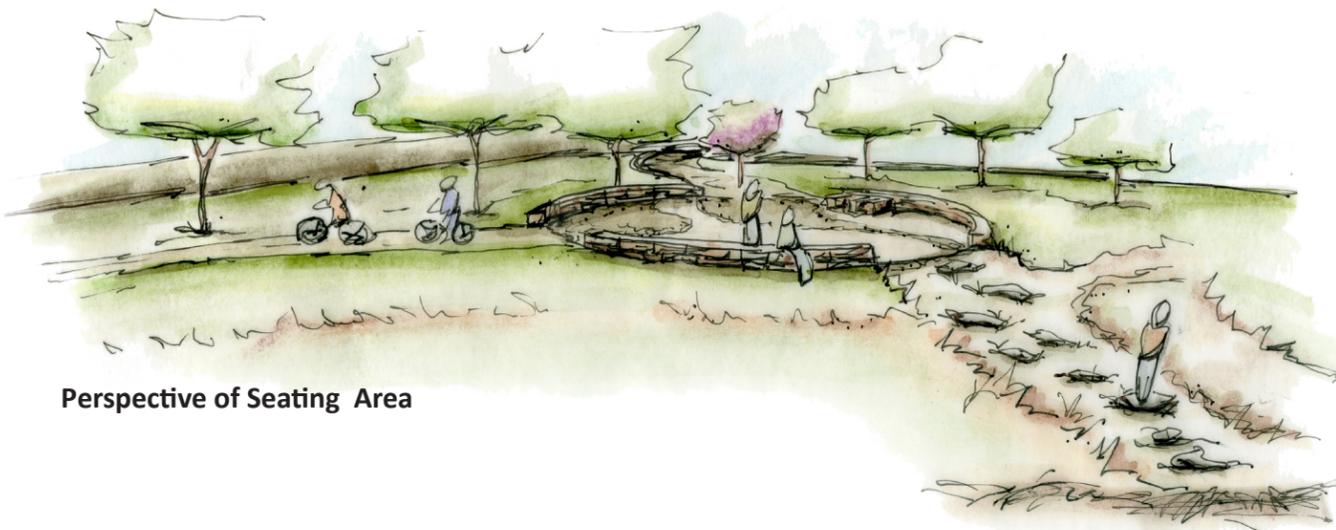
This greenspace is located in the Jefferson/Carl Ben neighborhood, which has a population of about 6,500 people. This neighborhood has three parks: Teamsters Park, Jefferson West Park, and McCormick Park. These parks collectively have a walking path, playground equipment, soccer fields and basketball courts. Conditions of this site include biking on the roadway and road crossing.

This pocket park is just south of Jefferson Park. This area is where the bike trail diverges in two directions; biking on the street with a buffer, and continuing the path to the south. There are safe crossings in all three areas where bikers and pedestrians will cross the road. The trail passes through a paved patio area that serves as a resting spot. The walls are low enough for seating, and contain an area for parking bikes. The passive space allows people to interact with the landscape by taking a stone path through natural grasses to the waters edge or crossing to get to the boulder seating in the shade.



# Jefferson South Park

## QUALITY AND CHARACTER

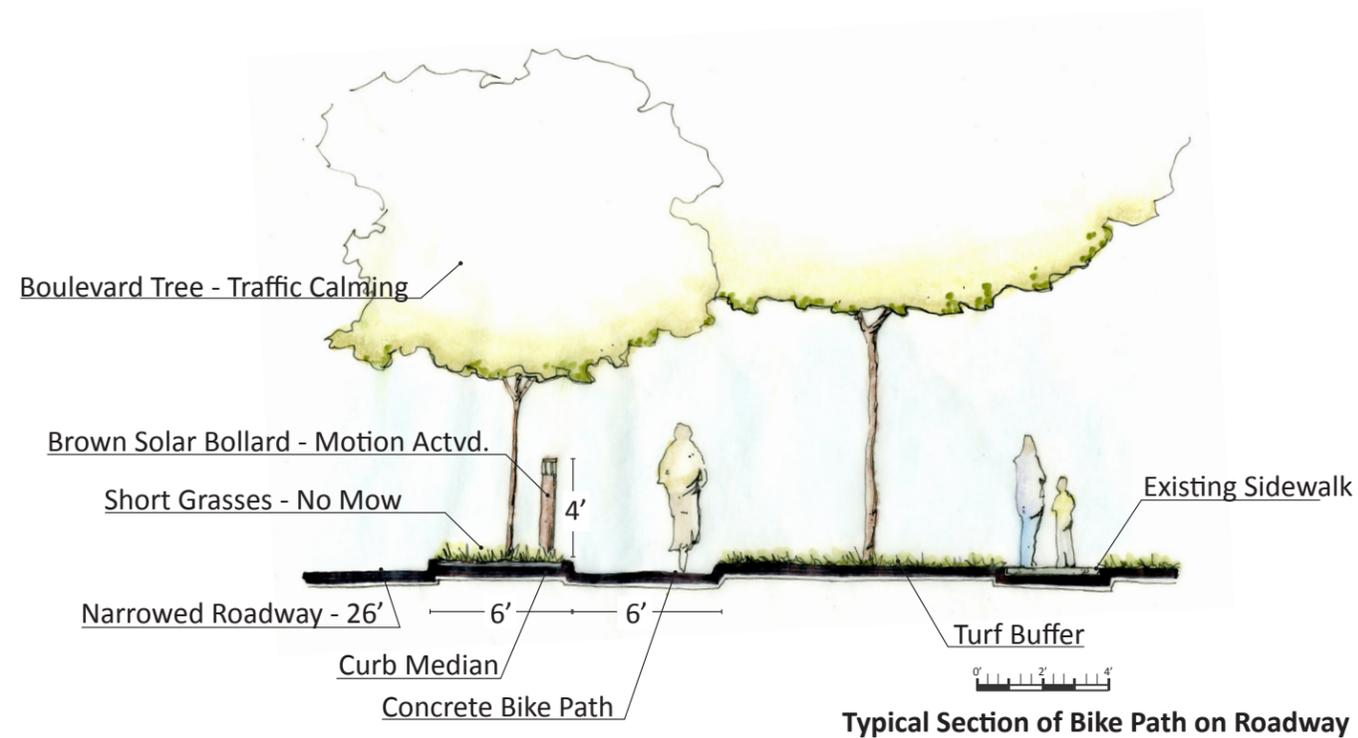
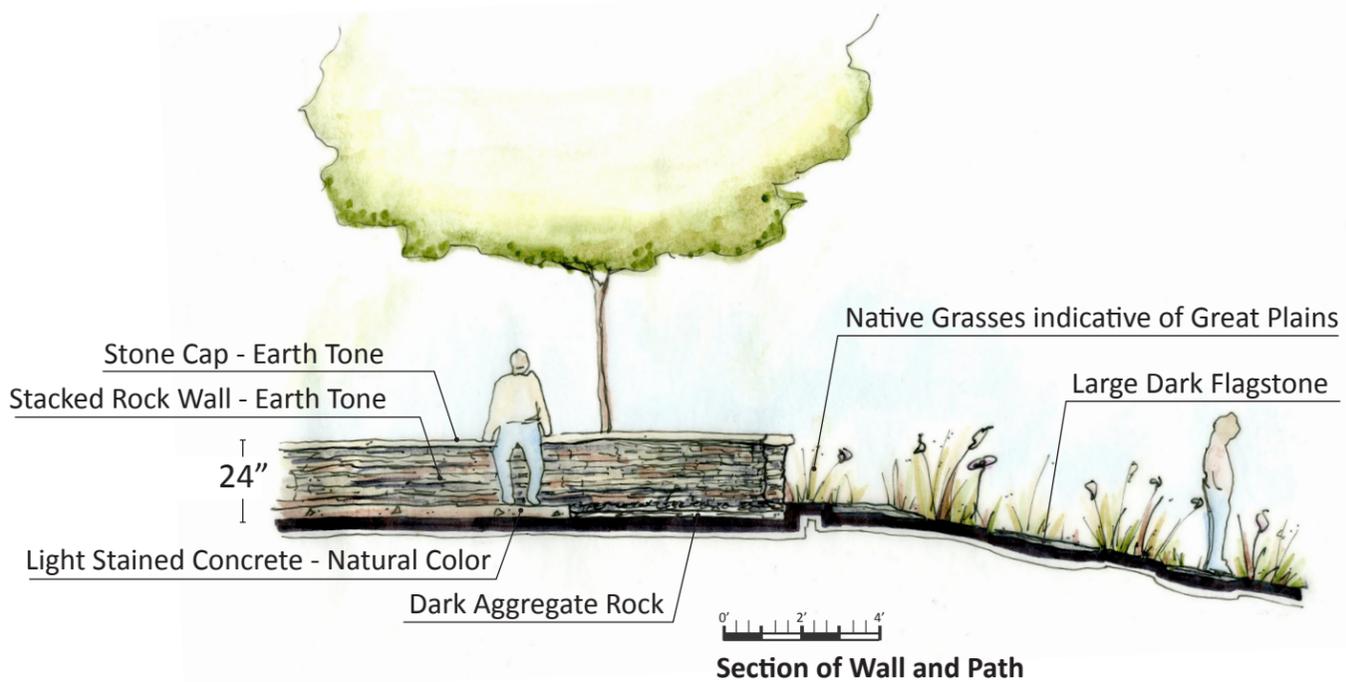


Perspective of Seating Area

The perspective view shows the bike path passing through the resting area. There is a distinct line for mowing. This cuts down on maintenance and creates habitat. This will also help with transpiration and infiltration of the stormwater. The small plaza is sloped to drain into the stormwater channel. The opening at the slope invites users to use the path and interact with the landscape.

The section of the wall and path shows topography and materials of the site. Use of naturalistic materials keep the greenway consistent and function as its own entity. Materials used include stacked rock (facade), stained and stamped concrete, dark colored aggregate, native grasses, and dark flagstone.

The section of biking on the roadway is typical of how all over biking on the roadway functions, which totals about 2 miles. The road is narrowed, and a six foot median buffers traffic. Short, low mow grasses cut on maintenance and trees add security to bikers while calming vehicular traffic. The bike path will be six feet wide. Solar bollards are motion activated and use solar energy cutting costs-including infrastructure.

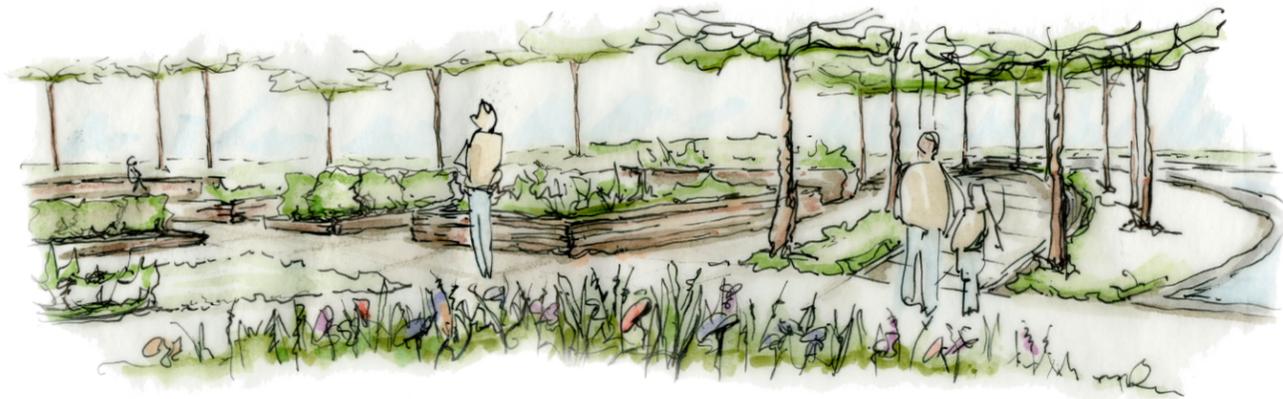


# Milwaukee Trail Park

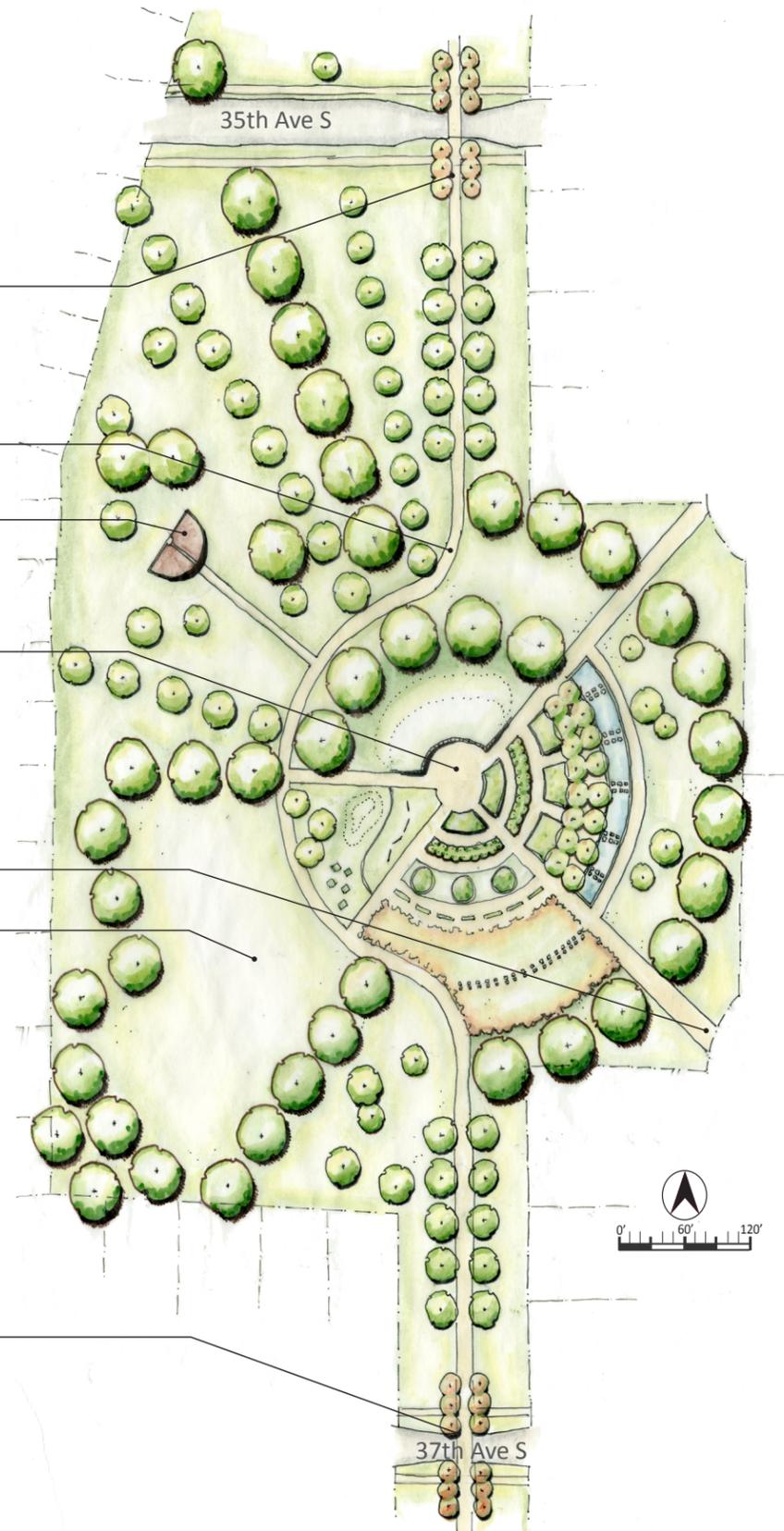
## MASTER PLAN

This park is in the Southpointe neighborhood, which has a population of about 4,000 people. Existing parks include South Point Park, Milwaukee Trail Mini Parks #1, #2, and #3, and Discovery Park, part of the Discovery School. Besides Discovery Park, which includes regular school park amenities, the other parks only have turf and playground equipment. Conditions designed for include existing bike trail, narrow corridor, existing park, and road crossing.

This park is along the Milwaukee Bike Trail. It is unique, since it is situated between private property. This area serves as a destination point for those using the bike trail as well as a gathering area for the neighborhood. Bike traffic is directed around the central gathering area. The area includes a shelter for picnics, a natural playground, community gardens, a tree allee, a ground level water feature, and wildflower patch. Road crossings are consistent as described earlier.



Perspective View of Gardens



Safe Crossing

Bike Trail

Shelter

Community Space

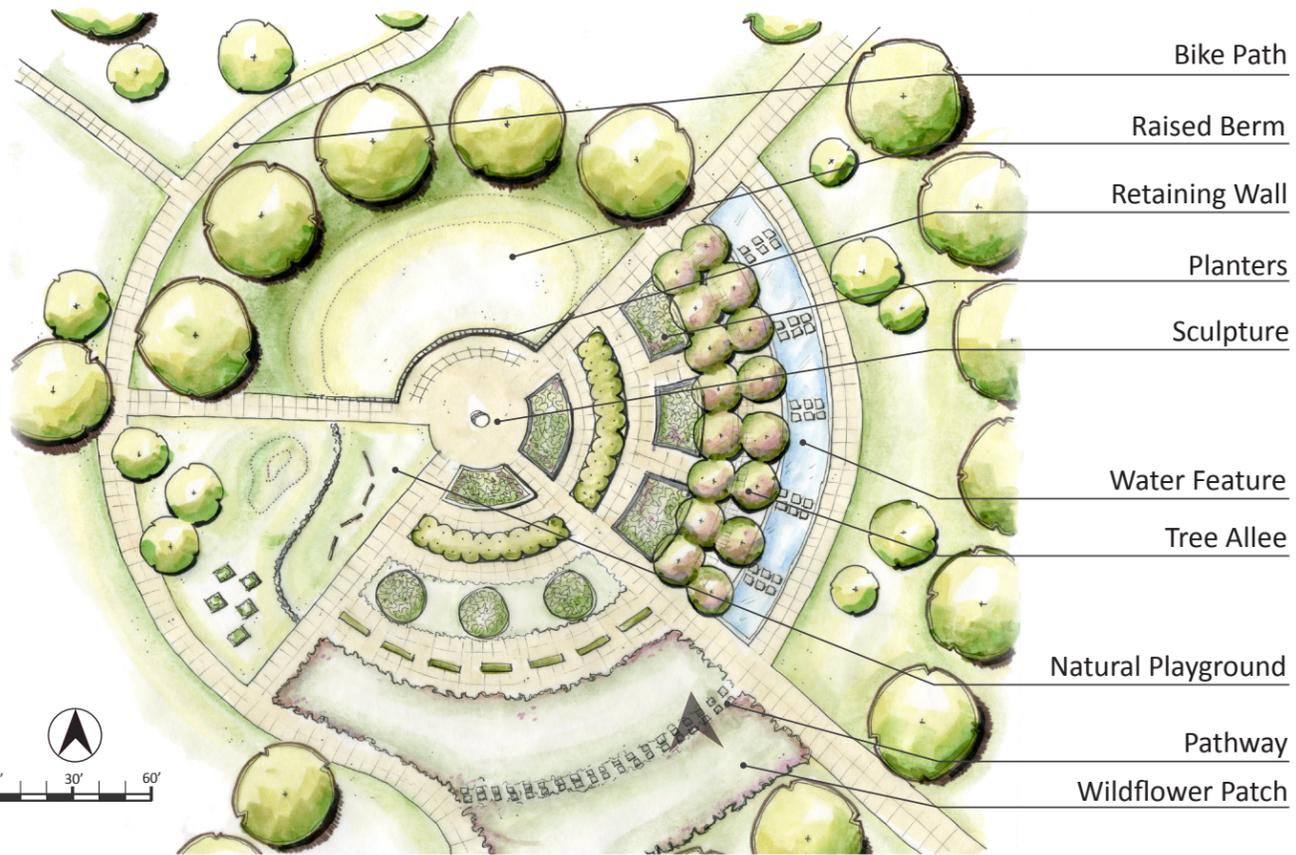
Connection to Walkway

Open Turf

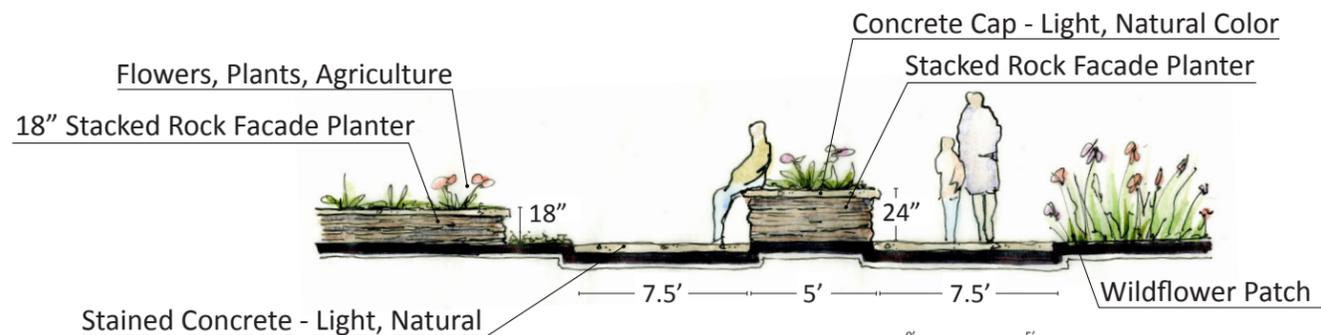
Safe Crossing

# MILWAUKEE TRAIL PARK

## QUALITY AND CHARACTER



Detail Plan of Gathering Area

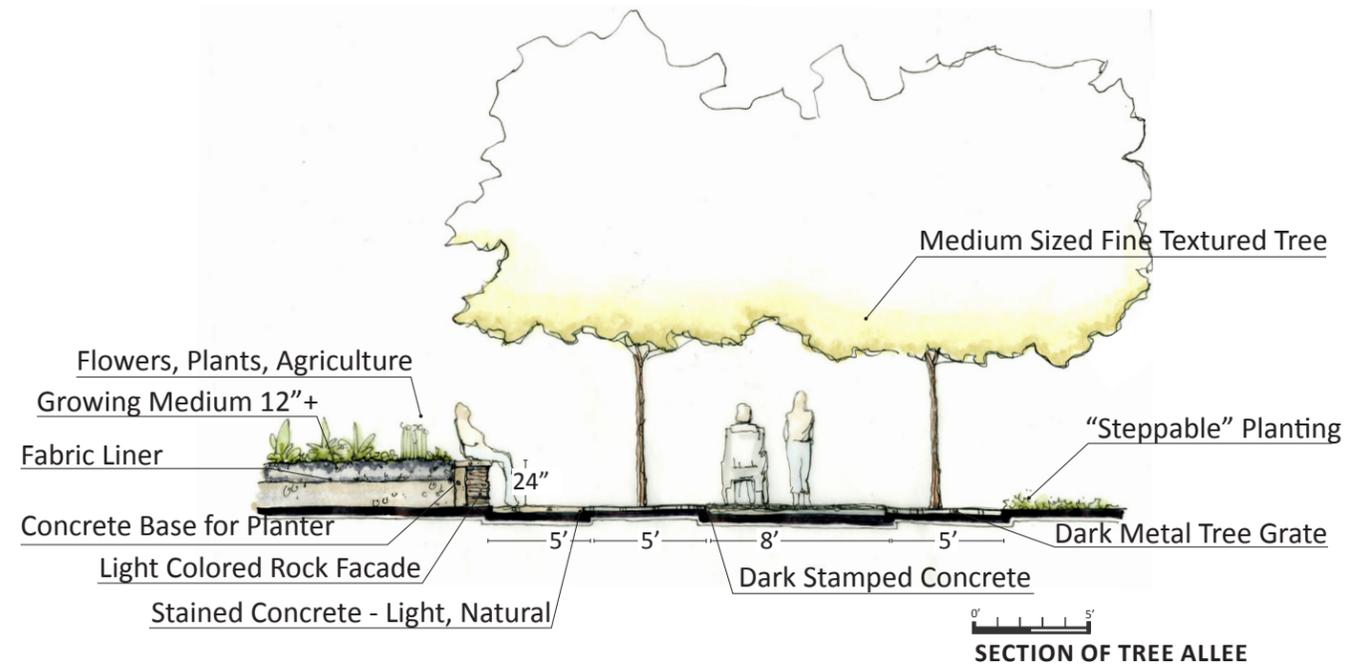


SECTION OF PLANTING BEDS

The bike path arcs around the central gathering area. This area includes a retaining wall with raised berm for seating, creating an area for neighborhood or group meetings or gatherings can be held. The community garden planters can be maintained by the community or community groups, and could contain plants, flowers or agriculture. The water feature and tree allee create and inviting, relaxing space for sitting. The natural playground replaces the manufactured playground equipment and provides an area for children to interact with the environment and see natural processes.

The section of the planting bed shows the spatial qualities of the site. The materials are similar to the bike path, but different colorings separate it slightly. The planters provide areas for seating.

The section of the tree allee shows the tree allee and plating bed. As the other planters, these provide seating and areas for flowers, plants or agriculture.



SECTION OF TREE ALLEE

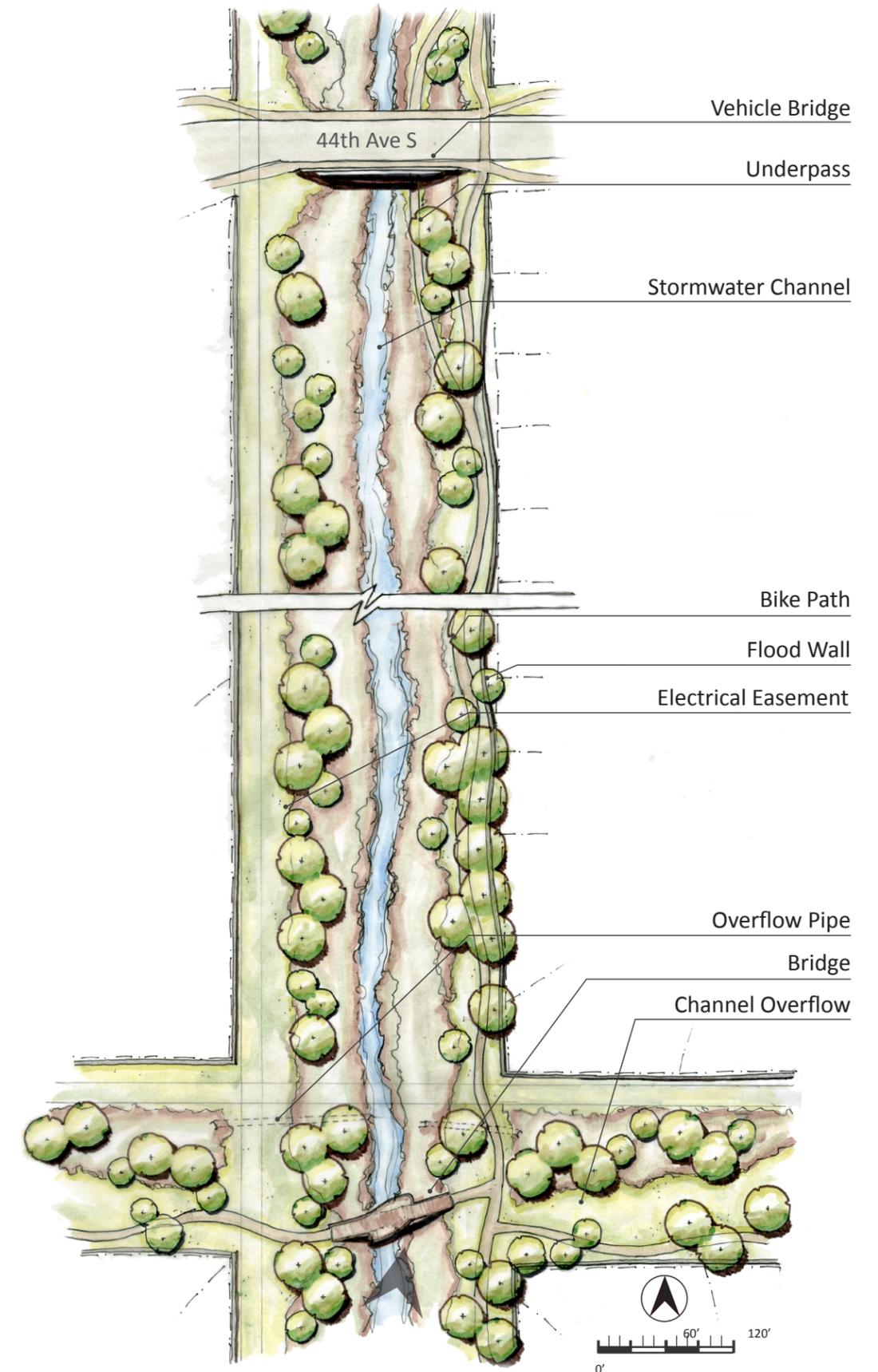
# OSGOOD CORRIDOR

## MASTER PLAN

The Osgood Corridor is located in the Osgood neighborhood. This neighborhood is relatively new, and population is increasing every year. Parks in this neighborhood include the Osgood School Park and the Osgood Park. They have playground equipment and soccer fields. The conditions in this area include an existing bike trail, narrow corridor and special condition of crossing a 13' deep drainage channel.

Large power lines, mown turf and a straight channel exist in this site currently. A wide sidewalk follows below the power lines. It does get use, but only because there is no other choice for residents in the neighborhood. Walking under the power lines is not desirable. This design exemplifies how the site can be an amenity for the area while still allowing an area stormwater and electrical easements.

This area is a passive area, not intended for long stays. The bike path is located on the opposite side of the channel, and trees are placed throughout to block view of the power lines. The space below the lines are kept open for maintenance. This channel gets near full during spring flooding (dependent on weather factors and how quickly snow melts) and if the water level is high enough, temporary dyke protection is erected in areas of this channel. A permanent flood wall is proposed to alleviate the need for annually erecting the dyke and open areas served for the dyke, utilizing the space. The wall also separates private property from the corridor.



# OSGOOD CORRIDOR

## QUALITY AND CHARACTER

### DETAIL PLAN

6' Dark Striped Concrete Mile Marker

Dark Stained Concrete

Wall Lighting

Packed Stone

Stone Seating

Rest Area

Concrete Flood Wall

Solar Bollard

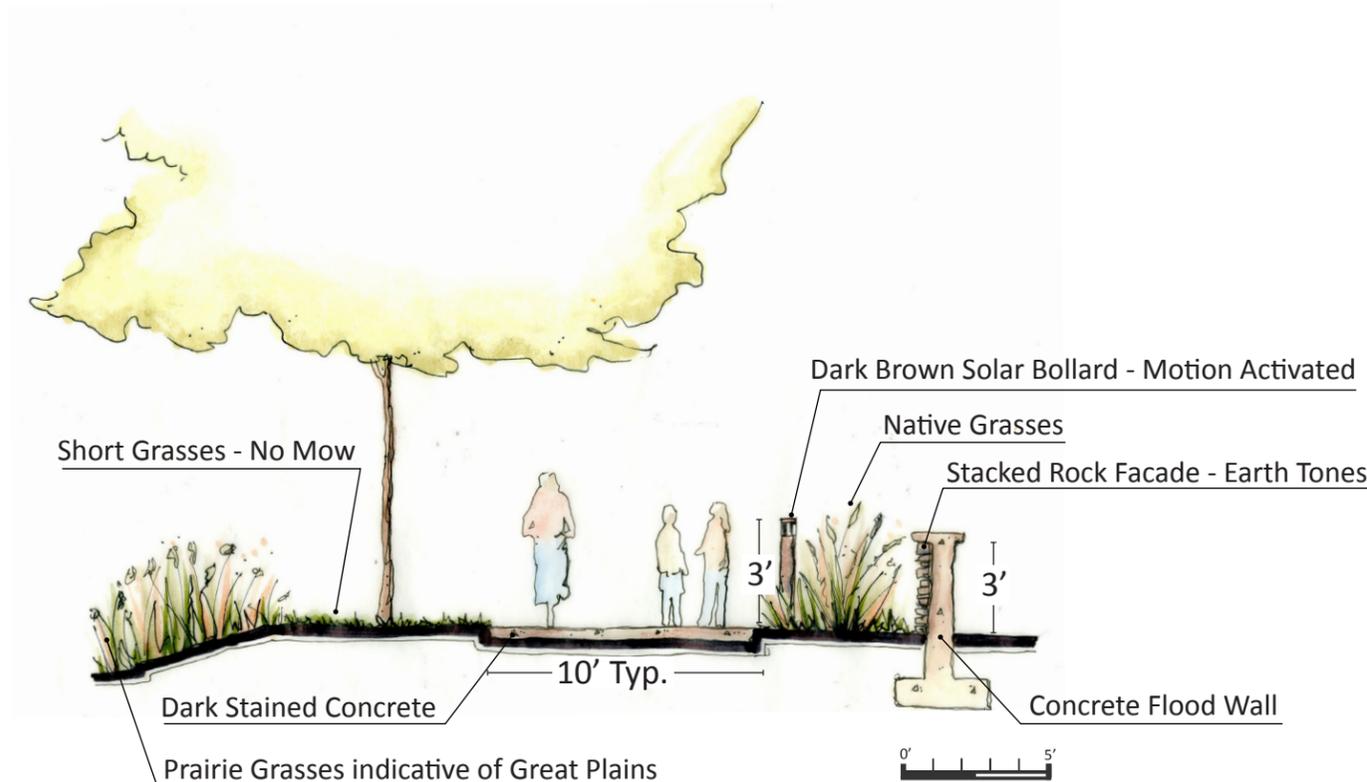


Perspective from Bridge

Since there is no central gathering area, the detail plan shows a resting point along the trail. The resting area has large boulder seating, wall lighting, and solar bollards. The material is a packed rock that is ADA accessible. Trees and plantings create enclosure for the site. There is a no mow line and plant material is native and requires less maintenance. There is a six foot dark striped concrete mile marker that will be consistent throughout the greenway.

The perspective view from the bridge shows how the site looks, with the bike trail being on the east side of the site.

The section shows the spatial character as well as materials of the site. The stacked rock facade, prairie grasses, dark stained concrete, and the brown solar bollards are all consistent with the rest of the greenway.



Typical Section along Bike Path

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## PERSONAL IDENTIFICATION

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“North Dakota State University exists as a human endeavor; a means to accomplish a greater good.”  
- NDSU Theme

MAEGIN A RUDE  
2785 99TH AVE NE TOLNA , ND 58380  
maegin.rude@gmail.com  
TOLNA, NORTH DAKOTA



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## PREVIOUS STUDIO EXPERIENCE

### SECOND YEAR

FALL 2007: KATHLEEN PEPPLER  
Kennedy Court - Fargo, ND  
Walster Hall - NDSU Campus, Fargo, ND  
Klai Hall - NDSU Downtown Campus, Fargo ND

SPRING 2008: MARK LINDQUIST  
Pioneer Park - Valley City, ND  
Alley Park, Point Douglas - Winnipeg, Manitoba, Canada

### THIRD YEAR

FALL 2008: STEVIE FAMULARI, MATT CHAMBERS  
Fargo Dike, Form over Function - Fargo, ND  
Symphonic Alley, Amplifying the Silence - Fargo, ND

SPRING 2009: KATHLEEN PEPPLER  
Battle Lake Park Redesign- Fargo, ND  
Residential Scale Sustainability - Fargo, ND  
Crossroads Community Garden Charette - Fargo, ND

### FOURTH YEAR

FALL 2009: MARK LINDQUIST  
Moody Avenue Riverfront Development - Portland, OR  
Sandy Boulevard Urban Development - Portland, OR

SPRING 2010: STEVIE FAMULARI  
Acid Canyon Remediation - Los Alamos, NM  
HESCO Barriers: Long-term Flood Protection - Fargo, ND

### FIFTH YEAR

FALL 2010: CATHERINE WILEY  
Sheyenne National Grasslands - southeast ND

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# APPENDIX

## CITY OF SAN FRANCISCO'S RECOMMENDATIONS

### Walkability

- Gradually add new development to create mixed use, walkable neighborhoods.
- Reduce traffic speeds on dangerous streets to allow for efficient flow of vehicles while reducing the deadliness of pedestrian/car accidents.
- Get rid of tow-away lanes, so that cars stay on the streets, buffering pedestrians from traffic.
- Widen sidewalks almost everywhere. Make this an ongoing part of the city's public works budget.
- At intersections, make the sidewalk extra-wide (what's known as a "sidewalk bulb") to shorten the crossing distance across the street.
- Eliminate traffic movements that are especially dangerous for pedestrians such as double turning lanes (which tell cars not to stop) and right turns on red (which kill pedestrians while they are in crosswalks).
- Plant street trees where they are missing, and get a lot better at maintaining them.
- Strictly enforce the law against parking cars on sidewalks, to make sure there is a clear passage for pedestrians.
- Turn one-way streets (which encourage drivers to speed) back into two-way streets.

### Bicycling

- Complete the city's comprehensive bicycle network.
- Provide parking for bicycles, which require just a fraction of the space needed to park cars.
- Promote bicycling so people realize it's an option.

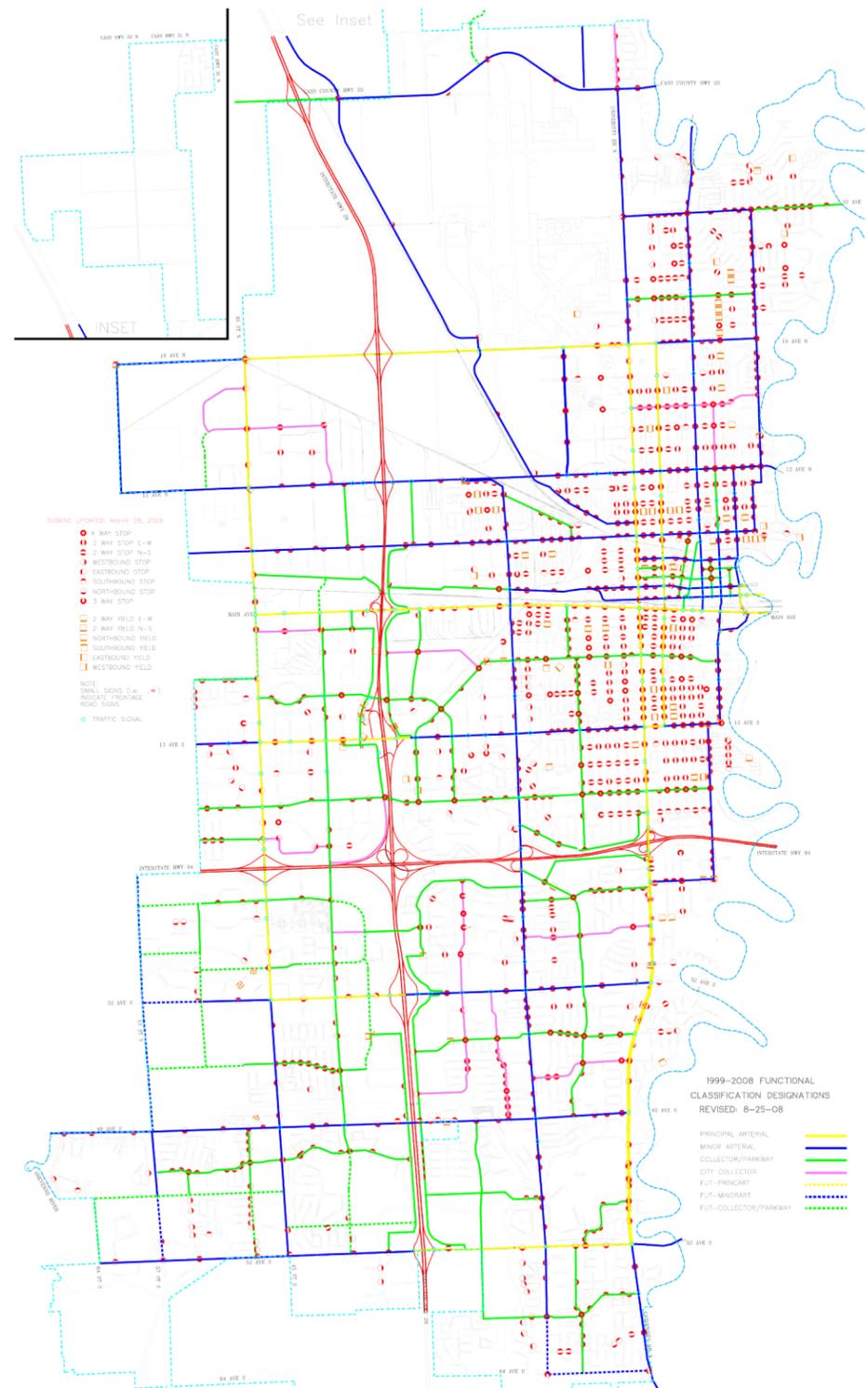
### Street Recommendations

- Streets should be designed so that kids can get to school safely and independently.
- Streets should not be designed by traffic engineers. That task should be done by urban

designers, with the technical assistance of traffic engineers.

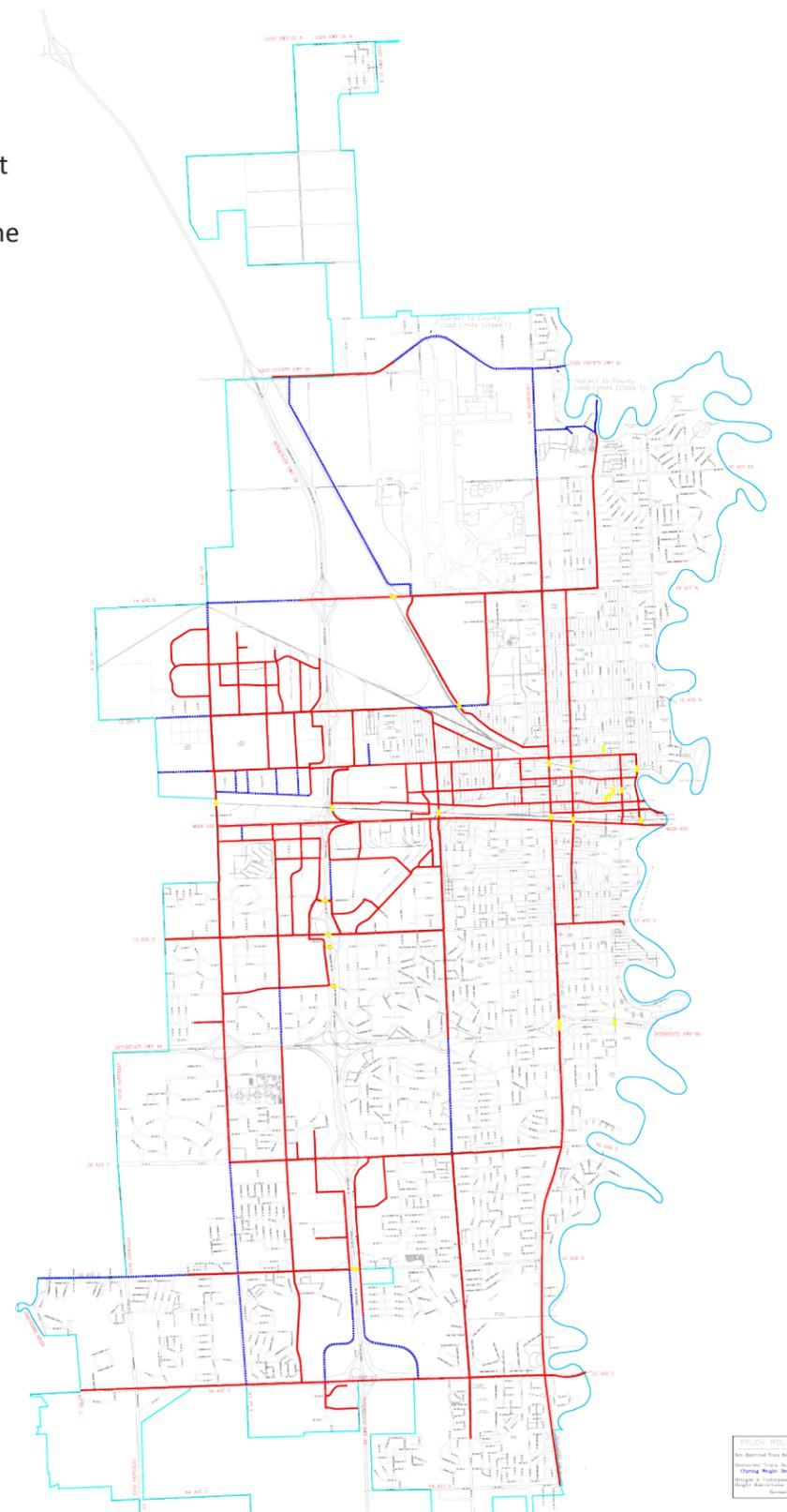
- The city should abandon "level of service" measurements of car congestion as a tool for evaluating street performance. It should instead use multimodal performance measures that take account of pedestrian comfort, the ability to get through an intersection quickly, and bicycle safety.
- Dramatically expand the city's Livable Streets Program.
- Where streets are wider than they need to be, use the extra space to provide amenities that make the neighborhood more livable, such as trees, benches, angle-in parking, and wide sidewalks.

**TRAFFIC STOP**  
 The traffic stop map will aid in determining constraints and opportunities during the design and development phase. This map will serve as a reference to ensure public safety.



Courtesy of the City of Fargo

**TRUCK ROUTE**  
 The truck map shows what roads large trucks should use. This will aid during the design and development stage to show areas of constraints for safety.



Courtesy of the City of Fargo



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