Improving Physical Health

Designing urban environments for better physcial health.

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Landscape Architecture Thesis
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IMPROVING PHYSICAL HEALTH

A Design Thesis Submitted to the
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By

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Table of Contents

Table of Contents

Abstract

Urban environments designed with the pedestrian as the primary user encourage more physical activity and promote lifelong physical health. The obesity rate in the United States for adults "eighteen and older tripled from 8.7% in 1976 to 27.4% in 2008" (Singh, 2011,p98). How communities are designed has a direct influence on how people get around. Urban environments are full of barriers that have caused a decline in physical activity (Frank, 2003). Today urban environments are designed for the automobile, leaving little room for the pedestrian. To improve the physical health of a community, cities must be planned better for pedestrian activities, and physical activity needs to be addressed. An urban community located in St. Cloud, Minnesota will be studied to see how people travel from place to place.

Key Words

Physical Health, Urban Environment, Pedestrian Scale, Landscape Architecture, Physical Activity, Safe Streets

Problem Statement

How can responsible urban design practices encourage physical activity and improve physical health?

Statement of Intent

Typology

This project is an example of an urban community that is designed to encourage physical activity. Spaces will be designed to encourage walking and biking through the connection of existing neighborhoods and major destinations, creating a large, interconnected pedestrian network.

Claim

Urban design, including the expansion of bike paths, sidewalks, and street layouts to promote pedestrian use, can encourage physical activity and improve the health of men, women and children of all ages.

Premise

Walking and biking in urban communities is being inhibited by our physical environment, resulting in a barrier to a more active lifestyle (Frank, 2003). Planners, landscape architects and architects need to start focusing on the pedestrian scale by making people feel safe in the urban environment. Designs should encourage walking and biking to help improve the physical health of residents within an area.

Making an urban environment safe and easy to walk and bike around will encourage physical activity, which will improve a person's physical health. Frank (2003) states that, "significant health benefits can be obtained through moderate activities such as walking and bicycling" (p.40).

Men, women and children of all ages will be drawn to this urban community to improve or increase their physical activity and health.

Statement of Intent

Theoretical Premise

An urban environment that is designed with the pedestrian in mind can increase people's physical activity, which in turn will improve their physical health.

Project Justification

According to Frank (2003), "community design influences human behavior" (p.1). Today many communities don't encourage physical activity for their residents. The environment inhibits physical activity, such as walking, and has become a significant barrier to a more active lifestyle (Frank, 2003). Frank (2003) also states that "Americans do not get enough physical activity to maintain their health over the long run which can contribute to many health problems such as premature death, chronic disease, osteoporosis, poor mental health and obesity" (p.1).

The Proposal

Narrative
User/Client Description
Major Project Elements
Site Information
Project Emphasis
A Plan for Proceeding
Previous Studio Experience
Schedule

Narrative

Growing up, my mom was always trying to incorporate being healthy into our family's daily life. Activities would include going for walks or bike rides. As a child, the bus became my most reliable source of transportation to school. All of the schools that I attended were within one or two miles away, making them close enough to walk or bike to. Yet I didn't walk or bike because the roads to get there were unsafe. Over time I became aware that to get everyday essentials, the only form of transportation was the car.

Moving away from home only reinforced the notion that the town I grew up in does not promote walking and biking. Attending college in a dense urban community, I observed that many more people walk and bike around town on a daily basis. I started to ask myself a few questions. Does the environment we live in promote walking or biking? Did I start to walk or bike more because at a young age I was introduced to exercise and the outdoors? Do I bike and walk more because everything I need is close to my home?

Walking around the streets of almost any town, one can see that people are becoming more and more overweight. According to the Center for Disease Control and Prevention, "no state had a prevalence of obesity less than 20% with 12 states having a prevalence of 30% or more" (U.S. Obesity Trends, 2011). The state of Minnesota had fewer than 10% obese people in 1985, and 24.8% obese people in 2010. With such a large increase many questions arise, such as what has caused the increase in obesity? Is there something we can do to stop the increase? Getting the right amount of exercise and food is important, but does the environment that we live in also have an effect on how we live? If we live in a community that is designed to encourage more physical activity, does the overall physical health of people living in that area improve?

User/ Client Description

Client

City of St. Cloud

Users

Community

These users are of people living in the city. Single people and families make up the residents of the city, with ages ranging from babies to elderly. Many different cultures are also present in the area, and their different needs in terms of recreational spaces and customs will have to be considered. Peak usages will be throughout the summer in the evenings and weekends.

Health Concerned

These users incorporate being healthy into all aspects of their lives by eating right and exercising. Users in this group will vary in age from young adults to the elderly. These people may live in the area or commute to the city for work or shopping. Stores and restaurants located in the community will have to have healthy choices for this group to choose from. Trails and sidewalks will be incorporated for exercising. Peak usage will be year round at all times of the day.

User/ Client Description

Sustainable Orientated

Members of this group use alternative forms of transportation to be sustainable in their everyday lives as well as going to work. Many of the users will vary from young adults to middle age adults. These people currently live in the area. Peak usage will be throughout the year in the morning and evening.

Visitors

These users are people from the surrounding towns who come to St. Cloud to get their shopping done, family members visiting people living in the area, or people passing through town. These users will use the areas found in the urban part of town where the stores and restaurants are located. These users want to drive and park in one spot and have access to multiple locations. Single people as well as families with ages ranging from babies to the elderly, will be the main users of the site. The peak usage of the area will be in the evenings and especially on the weekends.

Physical needs for each of these groups vary. The design will be in accordance with the Americans with Disabilities Act (ADA).

Major Project Elements

Land Use Pattern

"Land use patterns represent the different functions the arrangement of structure and other features within the built environment. This arrangement of features of building, parks and so on determines the degree of proximity between trip origin and destinations" (Frank, 2003,p.137). The map will show the location of the residential, commercial, and recreational area.

Street Design

"Street design can discourage walking or bicycling" (Frank, 2003, p.154), so having a pedestrian orientated streetscape is important to encourage physical activity. Streetscapes and their character makes walking a rewarding, safe and enjoyable experience (Zimney, 2011). Elements that would be included within the streetscapes could be bike lanes, sidewalks, street furniture, and buffer zones. The street scale will have to focus on the pedestrian rather than the automobile. The streets will have to lead to places of importance to the users. All the elements that are found on the street will encourage physical activity.

Major Project Elements

Greenway

To encourage physical movement among the community there needs to be more than just sidewalks. A greenway system throughout the city can connect different open spaces and parks as well as connect to existing trail systems. The greenway will be a multi-use trail that can be used by runners, walkers, bikers, skateboarders, rollerblades, and strollers. The trail could also be used in the winter months for cross country skiing and snowshoeing. The trail will have a hard surface for bikers and skateboarders, and a parallel gravel trail to provide a soft surface for runners.

Green Spaces

Green spaces will be as large areas for more organized physical activity such as field sports, including soccer and baseball. Playgrounds will be added for young children, and picnic shelters will be located for large gatherings to promote people walking to the park. During the winter months parks with hills could provide sledding and snowboarding. Ice skating and hockey can also be utilized to draw people to the park.

Site Information

Region

Minnesota is bordered by Canada to the north, Wisconsin to the east, Iowa to the south, and South Dakota and North Dakota to the wast.

City

St. Cloud is located in central Minnesota, 170 miles northwest of St. Paul. St. Cloud is the center of Waite Park to the west, Sartell to the north and Sauk Rapids to the northeast.

Site Information

Site Location

The City of St. Cloud

Site Importance

In conducting analysis of the city of St. Cloud and through my own understanding of the city, specific sites will be chosen for future design. Pedestrian movement throughout the city is extremely disconnected, creating an unsuccessful and underutilized pedestrian network. In creating a fluid pedestrian system, each of the sites must bridge the gap in the existing pedestrian network. Sites will also be chosen based on their surrounding culture and include residential streets, downtown streets, major corridor streets, arterial streets, and a river street. The hope is to connect all of these areas to create a strong pedestrian network.

Model for this issue

St. Cloud was not designed with the pedestrian as the main focus. The majority of the streets are meant for the automobile. Wide roads are found not only along the main street through town but also in residential neighborhoods. Sidewalks are inconsistent and are located right next to the large highways without buffers. Some of the streets in the residential area and other locations do not have sidewalks. Many of the sidewalks start for a few blocks before abruptly ending, leaving the pedestrian unable to reach their major destination.

Transportation

Residents use automobiles to get to everyday destinations around town. The city bus also brings people from home to work, shopping, and other activities. Walking and biking amenities can be found around town, but are not being used to their full potential. Through research and study of the different areas, a design will be implemented to connect the use of the sites and make them safe for pedestrians.

Project Emphasis

The premise of this project is to investigate how an urban environment can encourage or discourage physical activity. Urban spaces will be studied and research will be conducted to see what encourages movement and discourage movement among people living in the urban environment. The project will also examine the existing infrastructure, land use, culture, how people currently travel, and the physical health of not only small areas, but how those small areas fit into the overall pedestrian network.

The main premise of this thesis will focus on improving the physical health of people by providing a place where people can live, work, and play to encourage walking and biking.

Promotion of multi use streets will be the emphasis of the project. Users of the site will consist of pedestrians, bikers, runners, and roller bladers and skateboarders. During the winter months alternative forms of transportation could be incorporated such as cross country skiing and snowshoeing.

A Plan for Proceeding

Research Direction

The research will be a mixed method of both qualitative and quantitative elements. Research will be conducted in the theoretical premise, project typology, historical context, site analysis, and programmatic requirements.

Theoretical premise research will focus on what obesity is and how it has changed, as well as the physical, mental and psychological benifits of regular physcical activity. Finally I looked at how design of the urban environment can encourage more movement. The historical context will look at how city layouts have changed and how transportation has changed from walking to the automobile in response to the design of the city. The site analysis looks at the existing destinations, roads, trails, park and transportation. The city's history, along with climate and current conditions and how that will affect the final design will also be studied.

Design Methodology

The Mixed Method Model will be used by following the Concurrent Transformative Strategy. Qualitative and quantitative data will be gathered. Interpretation, analysis and results of the data will occur throughout the research process and be presented in both text and graphics.

Quantitative data will include things such as soil type, vehicular and pedestrian traffic, topography, maps, and climate data. Data gathered from both ArcGIS and the City of St. Cloud website maps show the different road types, bus transportation, existing bike/pedestrian trails and parks, and major destinations such as schools, grocery stores and shopping areas. Information was also taken from the 2010 U.S. Census to show the amount of time citizens of St. Cloud spend going to work and theie means of transportation. The ages and racea of city residents were was also gathered. Additional information was gathered through archival searches of the library and NDSU library database as well as online searches.

A Plan for Proceeding

Qualitative data will be gathered throughdirect observation of the site. A photo inventory of the site will be done to show existing strong pedestrian walkways as well as areas that need improvement. A pedestrian rating system will be developed to create guidelines on what areas of town need improvement more than others. Seasonal changes looked at and how they affect the movement of people will also be examined Data that was collected will be presented in both text and graphic illustrations and will help support the final design goals of the project.

Design Process

Research and design will be compiled and documented digitally. Documentation of the design will be in sketches, photos, and drawings.

Upon completion, of the final project will be presented digitally in front of my professor, peers, and visitors. The research, text, and graphics will be filed digitally in the NDSU Library Archive for future viewers.

Previous Studio Experience

Second Year Studio

Fall Semester 2008: Intro to Landscape Architecture
Instructor: Kathleen Pepple
Tea House, Battle Lake

Spring Semester 2009: Parks and Open Space Studio
Instructors: Mark Lindquist, Dominic Fisher
Winnipeg Parks Project, Fargo Street Project

Third Year Studio

Fall Semester 2009: Environmental Art & Site Design Studio
Instructor: Stevie Famulari
Regent, ND Revitalization Project, Snow Symposium, Fargo Analysis

Spring Semester 2010: Community Design Studio
Instructors: Kathleen Pepple, Jay Kost
Roosevelt Neighborhood Project, Campus Planning (UTTC Bismarck, ND)

Fourth Year Studio

Fall Semester 2010: Urban Design Studio
Instructors: Jay Kost, Niki Carlson
Duluth Bayfront Project, Site Design, Zoning

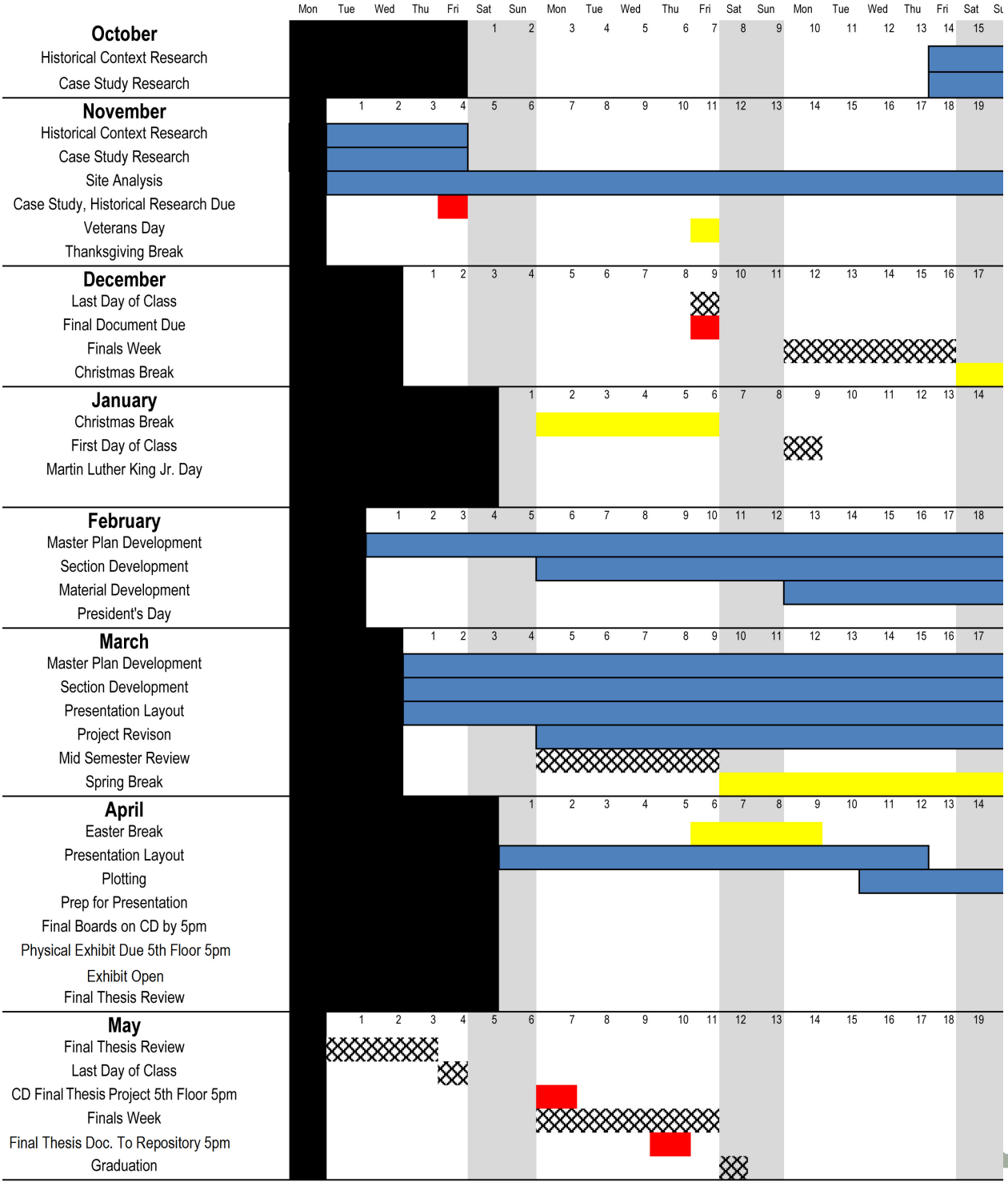
Spring Semester 2011: Environmental Remediation & Plant Design Studio
Instructor: Stevie Famulari
Stormwater Phytoremediation St. Cloud, MN, HESCO Basket

Fifth Year Studio

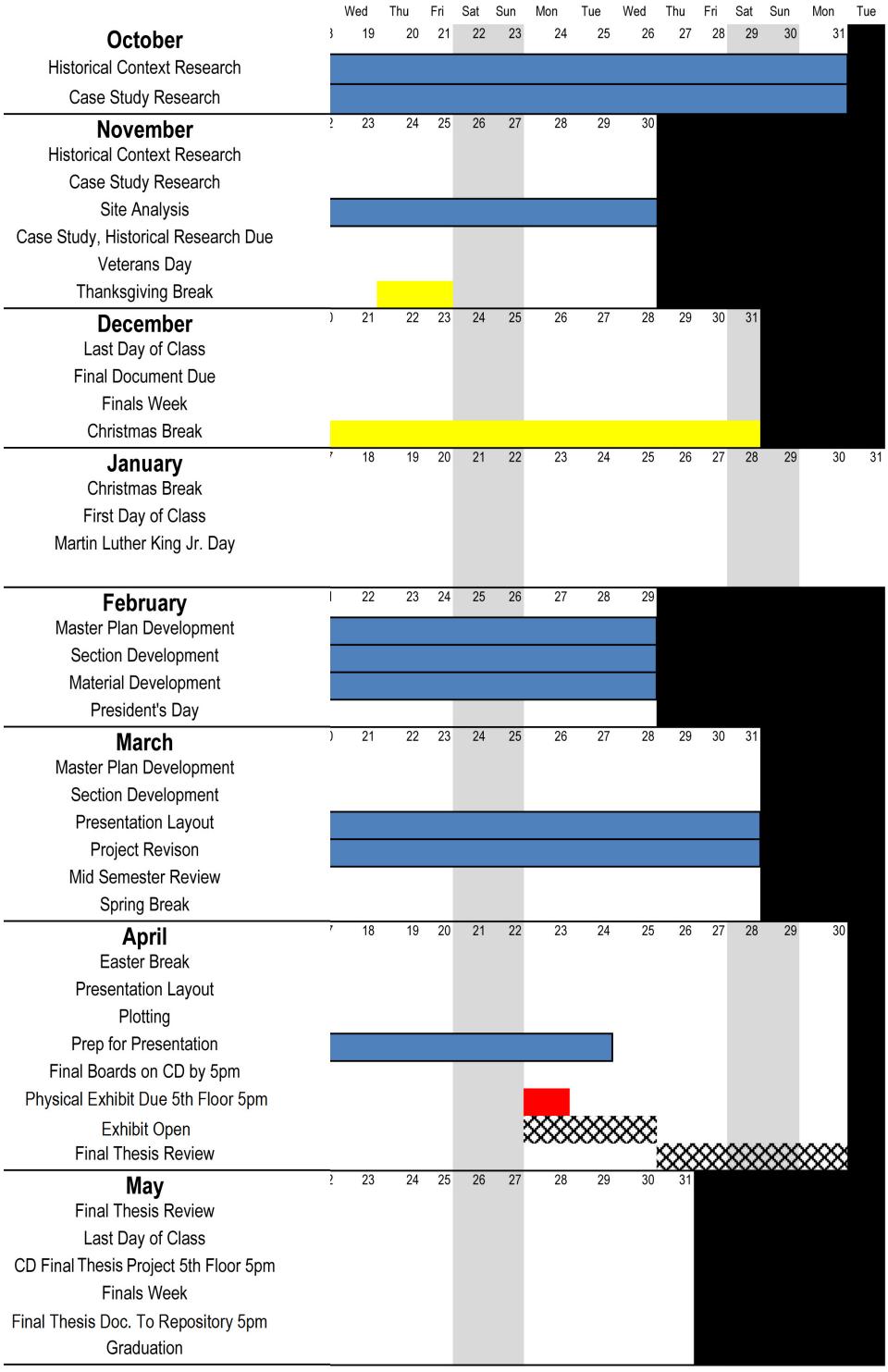
Fall Semester 2011: Environmental Planning Studio
Instructor: Catherine Wiley & Dominic Fisher
Advanced Landscape Planning, Sustainable Tourism Planning, Seattle WA,
Red River Valley Basin

Schedule

Fall Semester Plan For Proceding Schedule



Schedule


Wed Thu Fri Sat Sun Mon Tue Wed Thu Fri Sat Sun Mon Tue
October
19 20 21 22 23 24 25 26 27 28 29 30 31
Historical Context Research
Case Study Research
November
23 24 25 26 27 28 29 30
Historical Context Research
Case Study Research
Site Analysis
Case Study, Historical Research Due
Veterans Day
Thanksgiving Break
December
21 22 23 24 25 26 27 28 29 30 31
Last Day of Class
Final Document Due
Finals Week
Christmas Break
January
18 19 20 21 22 23 24 25 26 27 28 29 30 31
Christmas Break
First Day of Class
Martin Luther King Jr. Day
February
22 23 24 25 26 27 28 29
Master Plan Development
Section Development
Material Development
President's Day
March
21 22 23 24 25 26 27 28 29 30 31
Master Plan Development
Section Development
Presentation Layout
Project Revison
Mid Semester Review
Spring Break
April
18 19 20 21 22 23 24 25 26 27 28 29 30
Easter Break
Presentation Layout
Plotting
Prep for Presentation
Final Boards on CD by 5pm
Physical Exhibit Due 5th Floor 5pm
Exhibit Open
Final Thesis Review
May
23 24 25 26 27 28 29 30 31
Final Thesis Review
Last Day of Class
CD Final Thesis Project 5th Floor 5pm
Finals Week
Final Thesis Doc. To Repository 5pm
Graduation

The Program

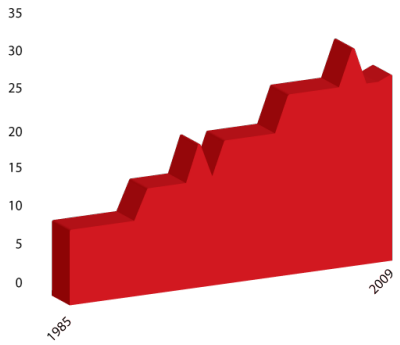
Theoretical Premise Research
Case Studies
Historical Context
Thesis Goals
Analysis Narrative
Site Analysis
Programmatic Requirements

Theoretical Premise Research

Causes and Trends in Obesity

An urban environment can encourage or discourage how much physical activity people do, which in return affects their physical health. With less physical activity more and more people are becoming obese. Obesity is defined as having excessive fat accumulation in adipose tissue and other organs (Ahima, 2011). According to the Center for Disease Control and Prevention, adults having a "body mass index" (BMI) between 25 and 29.9 are defined as overweight, and a BMI of 30 or higher is considered obese. BMI is a calculated number based on weight and height (Defining Overweight and Obesity, 2010). It is estimated that in 2008, 1.5 billion adults aged 20 years and older were overweight and 10% of adults were obese. In 2010 about 43 million children under the age of five were overweight (Ahima, 2011). These numbers have been increasing and are expected to continue to increase if we don't change our environment.

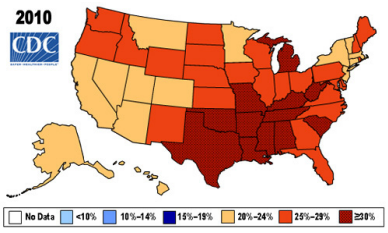
Minnesota Obesity Rate %



(Data from: U.S. Obesity Trends, 2011)

Data from The Center for Disease Control on the rate of obesity for the state of Minnesota shows that since 1985, when the state had a rate of 10% or less, obesity has gradually increased today to 20-24%. In 2010, there were only 14 states that had an obesity rate less than 25%, which included Minnesota, California, Montana, New York, Massachusetts, and Colorado. In contrast, several southern states such as Texas, South Carolina, Mississippi, Alabama, Louisiana, and Oklahoma have obesity rates greater than 30% (U.S. Obesity Trends, 2011). These trends can be seen on the map of the United States pictured to the right. Obesity is a significant health problem occurring acrross the country.

U.S. Obesity Rate %



(U.S. Obesity Trends, 2011)

Theoretical Premise Research

High BMI leads to increased health problems and additional health costs. Physical inactivity contributes to elevated BMI, which increases the chance of chronic diseases. Chronic diseases include cardiovascular disease, cancer, diabetes, and chronic obstructive pulmonary disease, which can lead to premature death. Coronary heart disease is the most common risk factor in a sedentary lifestyle (Frank, 2003). Overweight and obesity are also linked to high blood pressure, gallbladder disease, osteoarthritis, and type 2 diabetes mellitus (Frank, 2003). These chronic diseases are expensive to treat and health care cost have increased by 36% due to diseases associated with obesity. According to the Center for Disease Control, American medical costs in 2008 were as high as $147 billion to treat the overweight and obese. The Center also notes that, on average, an obese person spends $1,429 more on health-related expenses than an average weight person per year (Facts About County-Level Estimates of Leisure-Time Physcial Inactivity, 2008, 2011). In an effort to control cost, we need to look at what has caused the increases in disease.

Children, the elderly, and the poor represent the largest percentage of America's population most affected by the built environment. Children 17 and younger make up a quarter of the population, the elderly (65 and older) about 12% of the population, and the poor 11% (Frank, 2003). Children who do regular activity are less likely to suffer from chronic diseases later in life. By establishing an exercise routine early in life, children are more likely to continue a healthy lifestyle as they grow older and maintain it throughout their lifetime. If a child is considered overweight or obese, they are more likely to stay that way through adulthood; according to Frank (2003) three-quarters of overweight children go on to be overweight as adults.

Theoretical Premise Research

The elderly are one of the fastest growing demographic groups in the United States (Frank, 2003). As a growing population, they will have the greatest impact on how the built environment is designed. The loss of eyesight, hearing, and balance has changed their perception of the built environment, changing their behavior. The car has become the main mode of transportation because it provides a sense of security by separating them from fast-moving cars and the dangers of that walking and using alternative transit.

The poor have a higher risk of mortality, contracting a chronic disease, becoming overweight or obese, or some other health problem (Frank, 2003). In comparison to other groups, the poor face more personal barriers than physical barriers. They tend to have less leisure time or are unable to receive adequate information on physical health and its benefits. Children already have difficultly moving through the built environment, and being poor makes it more difficult to increase physical activity. Poor health and obesity don't just happen. Society has changed as has our built environment, leading to an increase in the number of people in poor health.

Theoretical Premise Research

What has caused the shift in the decline in today health?

Obesity has increased due to both dietary and lifestyle changes. In recent years foods rich in fats and sugars and low in vitamins and micronutrients have been incorporated into our daily diet. Total calorie intake has increased drastically in the past two decades. According to a National Health and Nutrition Examination Survey, there is a close relationship between low levels of physical activity and weight gain in both men and women (Ahima, 2011).

Part of America's unhealthy eating habits is the result of eating away from home. Unhealthy food can be found on the way to and from school and work. Marketing for fast food and soda companies spend billions of dollars, while 5-A-Day fruit and vegetable companies are only spending 2 million dollars on campaigns (Ojeda, 2004). The American environment is pulling people toward unhealthy food choices.

Diet is a major factor in obesity, but the environment also plays a large role in either promoting or preventing physical movement. Residential communities are detached from commercial and shopping areas, making the only means of transportation the automobile. Cities are filled with strip malls, big-box warehouses, and acres of parking lots, which only reinforce the use of the automobile. Roadways are four to six lanes wide creating an expressway for cars amd discouraging any type of pedestrian movement. As a result, Americans are more likely to use their cars rather than walk or bike. Pedestrian amenities, such as sidewalks and crosswalks, have disappeared, and existing sidewalks are disconnected or lead to nowhere, further discouraging pedestrian usage.

Unhealthy Food Stop

Big-Box Parking Lot

Theoretical Premise Research

The built environment affects our health and how much we move, but our home and work life have also contributed to the exponential growth in obesity. Appliances such as microwaves, dishwashers, washing machines, and vacuum cleaners have decreased manual labor around the house. These same appliances have made food preparation more convenient, increasing the amount of food intake. Time that was once used for recreational activities has been replaced with the television. According to Ojeda (2004), watching three hours of TV a week for a year can increase weight by seven pounds. Jobs have shifted from manual or physical labor to technology-based, leading to more sedentary occupations.

Schools are also contributing to the increase in childhood obesity. Physical activity at school used to help compensate for the lack of activity at home. Today, very few children have physical education class more than one day a week. High school students, who used to have PE class five days a week, have seen classes decrease from 42 percent in 1991 to 15 percent in 1996. According to a study done by Ojeda (2004) 79 percent of adolescents don't have PE at all.

Theoretical Premise Research

Benefits of exercise Psychological, Physical, and Mental

Exercise has many side effects, including psychological, physical, and mental benefits. JoAnn Manson, a professor of medicine at Harvard Medical School, points out that exercise lowers the occurrence of heart disease, diabetes, and muscle tissue loss in older adults. It also improves blood flow to the brain, wards off depression, and helps sharpen cognitive functions (Ojeda, 2004).

Exercise has many psychological benefits. Studies have shown that exercise can make a difference in people's mental state. People suffering from depression have felt better after they have participated in some kind of physical activity. Exercise has a calming effect and reduces muscle tension as well as anxiety. Exercise provides an escape from everyday life, counteracting boring tasks or mental exertion that can be found in everyone's life. Self–esteem increases with exercise, and pain and worries have been known to decrease. Normal blood sugar levels can be controlled by exercise, and it helps the brain function better. Finally, exercise can be fun! Dancing, walking a dog, bicycling, playing with children, and gardening can all help strengthen the heart and lungs.

Mental health can also benifit from exercise. 'In Shape' is a program that was developed to help people with severe mental illness by pairing them with a mentor in an exercise program. After working out for a period of time, patients that had bipolar disorder found that their moods were steadier. Studies have also been conducted that show that exercise benefits disorder such as, schizophrenia and severe anxiety disorders. After three months of exercise, symptoms of depression had lessened. Schizophrenics that experience regular exercise experiencedfewer psychiatric symptoms such as social withdrawal and paranoia (Quigley, 2007). Finally, those with a mental health disorder may be able to reduce the amount of medications they take with regular exercise.

Theoretical Premise Research

Physical activity also has many health benefits for all ages. As people age it becomes more important to keep moving. Starting at age 50 muscle mass starts to decline and it's more important than ever to exercise. Studies have shown that just a couple months of strength training helps maintain bone density and helps with balance (Ojeda, 2004). Physical activity can improve health in many ways. The Mayo Clinic has listed several benefits that can be obtained through exercise. Weight control issues can be managed through exercise, as can stroke, metabolic syndrome, type 2 diabetes, certain types of cancer, arthritis, and falls. Muscle strength and endurance can be increased due to physical activity. Exercise delivers oxygen and nutrients to tissues to improve cardiovascular system, which in return boosts energy. Doing a little bit of activity can make falling asleep easier and improved the quality of sleep (Mayo Clinic, 2011). With so many benefits of exercise, an increase in physical activities can benefit the health of everyone.

Significant health benefits can be obtained through moderate activities such as walking and bicycling (Frank, 2003). The U.S. surgeon general recommends a minimum of 30 minutes of physical activity a day; a recommendation only one out of four American adults are meeting (Fenton, 2005). Physical activity needs to be incorporated into everyone's daily life beginning with the physical environment. Studies have shown that formal exercise programs have high dropout rates, and on average people are back to their initial level of inactivity after one or two years (Fenton, 2005).

The elderly can benefit substantially from exercise. Arthritis and rheumatism, reduced muscle and bone mass, declining sensory perception, and slower reflexes are all problems that come with aging (Frank, 2003). However, regular physical activity helps maintain good health, and in the elderly it can also delay the onset of negative health problems. Participating in housekeeping and yard work are both forms of moderate physical activity that have health benefits. In dealing with limitations such as arthritis and heart disease, exercise can increase strength and improve the quality of life. It can make everyday tasks easier and make everyday life feel better.

Theoretical Premise Research

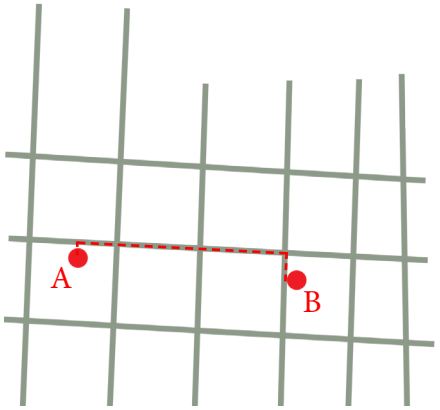
How to design to get people to move

There are many reasons people don't exercise. It may be because they don't have time, or because they don't want to spend money on a gym membership, and in some cases people are just lazy. Many people might not consider the environment we live in and how much it affects the physical activity we get. Physical activity should be an easy choice. For those who don't have the time or money, walkable communities should be designed and should promote physical activity in our daily routine. It will become an easy choice if it is more convenient and fun. For example, driving a car can be expensive, but walking and biking is free.

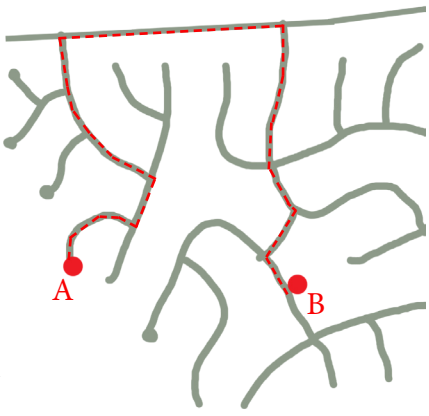
There are four key attributes to get people out of their car to exercise. First, neighborhoods need to be compact and have mixed uses. Second, a network of pathways, trails, bike lanes, and mass transit to allow "active" transportation need to be designed. Third, design should welcome cyclists and pedestrians by providing an umbrella of safety. Finally people need to encourage each other by walking and biking together (Fenton, 2005).

A community that is livable and walkable has a few distinctive characteristics that help promote physical activity and movement. Transportation systems, land use patterns, and urban design characteristics can influence the amount of physical activity one gets. Transportation systems provide links to multiple destinations including housing, offices, shopping, and recreational spaces. A strong system has many possible routes between destinations, providing direct routes to multiple destinations. To help create strong connections land uses need to be well designed. Residential, commercial, and industrial areas should be located in a way to create a strong connection. Residential areas should be located near retail and commercial developments to promote high density. Having a compact built environment can help reduce trip lengths and encourage daily walking and biking. Finally, urban characteristics influence how one perceives the built environment. In choosing transportation options, one will consider more than just how close destinations are. The safety and attractions of the route are equally as important.

Direct Route



Indirect Route



Theoretical Premise Research

Biking and walking paths have very different needs in the built environment to make them feel safe. Pedestrians' needs include safe street crossings, wide sidewalks, and detailed, interesting spaces along the route. Bicyclists like to have a designated bike lane and a wide enough road so they can ride at a relatively safe distance from automobiles. A bike lane that is located near parked cars is not very attractive to bicyclists due to the risk of opening doors. The ideal conditions for recreational biking are to have low traffic volume with as few stops, such as stoplights and stop signs, as possible. A multi-use path or a paved trail is the best system to meet those needs and can also be used by pedestrians and rollerbladers (Frank, 2003).

Outdoor places and neighborhood facilities are where the most amount of physical activity happens. According to Giles-Corti and Donovan 46% of people use neighborhood streets for exercise, compared with only 11% using sport or recreation centers. Neighborhood streets are easy and accessible to one's home, making them popular and logical destinations for both recreational activity and a means to get to places (Lee & Moudon, 2004). Public open spaces, such as parks, trails, and natural areas, are also common places for exercise.

Theoretical Premise Research

As stated earlier, children, elderly, and the poor are the largest demographic and have many barriers that limit their physical activity. Children are limited by how far they can travel on their own considering they cannot drive and depend heavily on their parents for transportation. Children process the environment differently than adults and as a result have difficulty making sound decisions with respect to negotiating that environment (Frank, 2003). One of the biggest barriers is that children are shorter and have trouble seeing over tall objects, such as parked cars or shrubbery. As a result, parents keep their kids close and children's physical activities, such as playing with other children, are limited. Recreational spaces as well as playgrounds need to be placed in areas that have low traffic volume, and are close to home so they are safely accessible without worrying parents. If children need to cross streets they need to be designed for low traffic speeds, because children also use the street as a recreational space. Schools and friends houses are main destinations for children. A route to these places needs to be a high consideration to make it both safe and attractive for children.

Children Activity Area

Just as children are affected by the built environment, so too are the elderly. As the distance between residences and destinations grow, so too does the difficulty of travel. Simple elements such as the timing of street lights are geared toward younger people and not for those who tend to move slower. Walking is the most popular form of transportation for the elderly, and removing barriers that are found in the built environment can increase the options and overall health of the elderly.

Theoretical Premise Research

The last group that is affected by the built environment is the poor. More oftern than not, poor neighborhoods are not equipped with amenities such as sports fields or places for recreation. Living in a poor area of a community can limit the opportunities for employment and commuting, due to limiyrfalternative transportation and automobile access. Fewer trips are taken by the poor to retail, commercial, and personal destinations because of the inadequate connections or long distances between their homes and destinations. In planning people's physical exercise it is critical to connect all parts of town allowing equal transportation options for everyone. Additionally, better transportation systems will also increase employment, retail, and entertainment options while increasing the overall health of residents.

Theoretical Premise Research

Research Summary

Urban environments can be designed to promote health by encouraging movement among residents. I first looked at what is considered to be unhealthy and how the health of America has changed over the years and how it affects children, the elderly, and the poor. Next I looked at what has changed in society as well as our build environment, and how those changes have caused an increase in poor health. Next I looked at how physical activity benefits psychological, physical, and mental health. Finally, I looked at how the built environment encourages or discourages movement and what can be done to promote more activity.

Today more and more people are overweight and obese due to a lack of physical activity. This problem is not only affecting adults; it is affecting more and more children every year. Children need to be introduced to a healthy lifestyle at an early age as they are otherwise more susceptible to gain and carry weight into adulthood. Today, over 50% of the states in the U.S. have an obesity rate higher than 25%. Health problems associated with inactivity include heart disease, high blood pressure, osteoporosis, type 2 diabetes and premature death. It is also costing billions of dollars to treat and care for the obese; costs that can be avoided with more physical exercise.

Theoretical Premise Research

Obesity and poor health don't just happen based on change; there are several reasons for the increase. Diets have changed and we are eating larger servings of food that are high in fats and sugars and fewer foods with vitamins and micronutrients. Healthy food choices are less utilized because fast food restaurants are more convenient. Schools are no longer offering regular physical activity for children. The increase in obesity can also be traced to changes in the built environment. Residential areas are increasingly separated from retail and commercial areas, encouraging people to drive instead of walk or bike. Throughout neighborhoods, sidewalks, pathways, and recreational spaces are disconnected and isolated from each another. Roads have expanded from narrow roadways to six lane expressways designed to move traffic while inadvertently discouraging walking and biking. Manual labor around the house has also decreased with the inventions of appliances such as dishwashers and washing machines. Recreational activity has been replaced by the television and video games. The work environment has shifted from manual labor jobs to more inactive technological jobs. Taken together, it's little wonder people are busier than ever, less active, and struggling with obesity.

Physical exercise has many benefits to our psychological, physical and mental heath. Physical activity has a calming effect and reduces muscle tension and anxiety. People who suffer from depression have reported feeling better after exercising. Self-esteem has been shown to increase while pain and worry decrease with physical activity. Programs have been developed in which exercise was introduced to help people with a mental illness. Participants in the program, with various illnesses, have had fewer symptoms and some have even been able to reduce their typical medications. Doing just 30 minutes of physical activity can have major health benefits for people at any age. Older generations benefit by maintaining bone density, reducing arthritis, and improving reflexes with regular exercise. It is important for physical activity to be incorporated into the daily routine of busy life. Household chores, such as yard work and housekeeping, are easy activities that all ages can used to improve overall health.

Theoretical Premise Research

The environment that people live in influences how much physical activity they get. To make walking and biking to destinations such as work, shopping, restaurants, and recreational uses easier, they should be close to residential areas and have strong connections between those places. Those connections should have multiple routes leading directly to the destination. The urban environment should feel safe and encourage walking by having defined street crossings, low traffic speeds, vegetation, and wide sidewalks that give the street a positive view so people are more likely to walk or bike. Walkers and bikers have different needs when it comes to the environment and movement. Walkers like to have a wide sidewalk and design detail that makes space along the route interesting. Bikers like having a designated lane or a safe route along the road. A multi-use path is a great way to separate walkers and bikers from traffic while promoting other activities such as rollerblading.

Different ages and classes have different environmental needs in terms of physical activities. Children are very limited as to where they can go because they rely heavily on their parents to get places. Children are also shorter and have trouble seeing over tall object so it is important to make street crossings and the traffic view open at all levels. Children's activities should occur in recreational areas that are safe and close to home. Walking is the most common type of physical activity for the elderly and destinations should be close to home with little to no barriers. For the poor to get the most physical activity possible, their neighborhoods should be located near retail and commercial areas that they can walk to. Housing should be mixed with higher income so they are able to work in the area they live in and have access to more resources, such as recreational spaces, as well as health information that they are lacking.

Throughout this paper, it is obvious that the environment has a large effect on how much physical activity people get. Considering a few design details along the streets and where amenities are located, as well as the different ages of people living in an area, can encourage physical activity and in turn improve health.

South Grand Boulevard "Great Street Initiative"

Landscape Architect: Kurt Culbertson, FASLA
Lead Designer: Paul Squadrito, 2011

Design Concept

During the 1920s South Grand Boulevard became the entertainment and business district for St. Louis, Missouri. As the automobile came into the picture and traffic volumes increased, neighborhood retail declined and fast moving, noisy traffic divided the neighborhood. The area became prone to accidents and excessive speeding. The goal of the South Grand Boulevard "Great Street Initiative" was to develop a safer, more walkable setting for smart growth and create a destination, as opposed to a transportation channel, that reflects the diverse, international character of the neighborhood (The 2011 Professional Awards).

The term "Great Streets" describes a streetscape that reflects the character of the neighborhood in which people pass (ASLA 2010 Professional Awards | South Grand Boulevard "Great Street Initiative"). Interaction of people and the promotion of business on the street level helps promotes "Greet Streets." Streets are not just a transportation channel; ideally they are a destination that allow for transit, walkability, recreation, sustainability and safety (ASLA 2010 Professional Awards | South Grand Boulevard "Great Street Initiative"). As with any design, it is important to meet the needs of the community with the final design. Every design decision was compared against 40 different metrics such as pedestrian mobility, noise and light levels, accident and crime rates, employment opportunities, and financial rate of return.

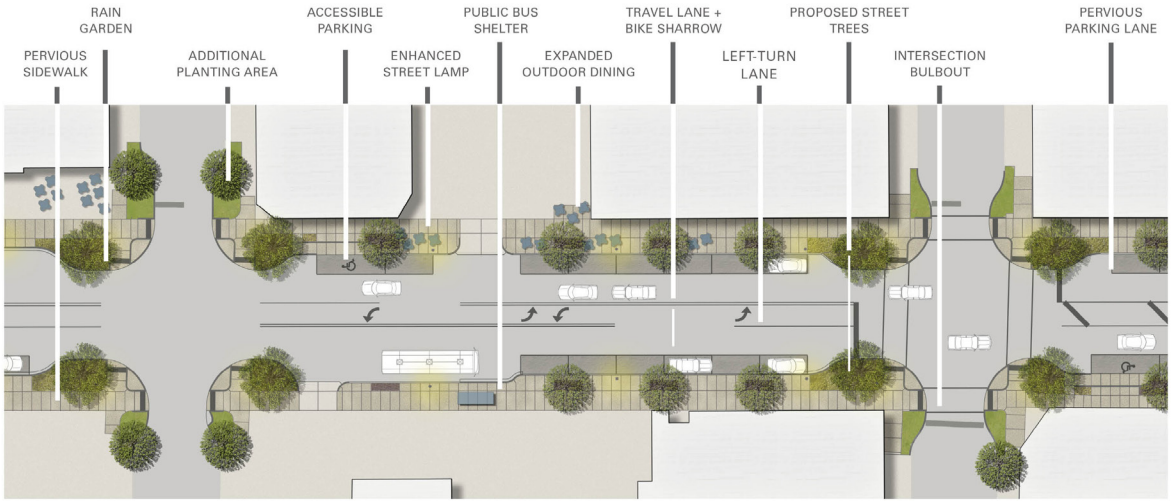
Case Studies: St. Louis, MO

Distinguishing Characteristic

A one-month study was done tracking the existing four-lane road and the consequences of converting it into a three-lane road. A public vote was taken and the three lane configuration was most popular plan. Upon reducing traffic from four lanes to three lanes, vehicular speeds slowed from an average of 45 miles per hour to 32 miles per hour. It was also noted that the noise level dropped eight decibels, making pedestrian conversations at the street level possible (ASLA 2010 Professional Awards | South Grand Boulevard "Great Street Initiative").

Doing a multi-strategy approach, the design team increased the pervious surfaces from 2 percent to 50 percent. Along with rain gardens, porous paving materials were used, making this the first time the St. Louis region used such materials. Sidewalk widths were increased to provide more room for outdoor dining, accessibility, and healthy street trees. Existing material that was removed from the site was reused whenever possible for different projects. New material that was added to the site is made from recycled and local materials. This strategy was to be replicated throughout the city.

Plan of New Street Configuration



(ASLA 2010 Professional Awards | South Grand Boulevard "Great Street Initiative")

Case Studies: St. Louis, MO

As a part of the study, an investigation was also conducted to determine the amount of urban wildlife, such as birds, squirrels, butterflies, and insects that were present in the urban setting. As a result, more native species were planted along the street along with a number of trees to create a large canopy. The increase in planted material will not only help reduce the urban heat island affect and increase stormwater filtration, but also increase the presence of wildlife.

It was also important for materials used throughout the corridor to be inexpensive and durable. Material was to be used in an efficient manner to ensure that these methods could be implemented and utilized throughout the city.

This portion of the street is located in a major ethnic neighborhood district. Emphasis was placed on increasing the amount of space available for seating and outdoor dining, such as closing off an alley to provide additional dining space on the street. New street configuration also made additional space available which helped improve transit stops along the street. With a more efficient design for on-street parking, options increased and smart parking meters provided greater convenience by increasing the amount of turnover during peak shopping and dining times. Along with the reduced noise and improved safety, the new streetscape projected a 74 percent drop in accident rates (ASLA 2010 Professional Awards | South Grand Boulevard "Great Street Initiative"). All of this will enhance the shopping and dining experience. Finally, throughout the corridor several gaps were found and filled with new mixed-use buildings that will increase the amount of activity on the street level.

Increase in Tree Canopy

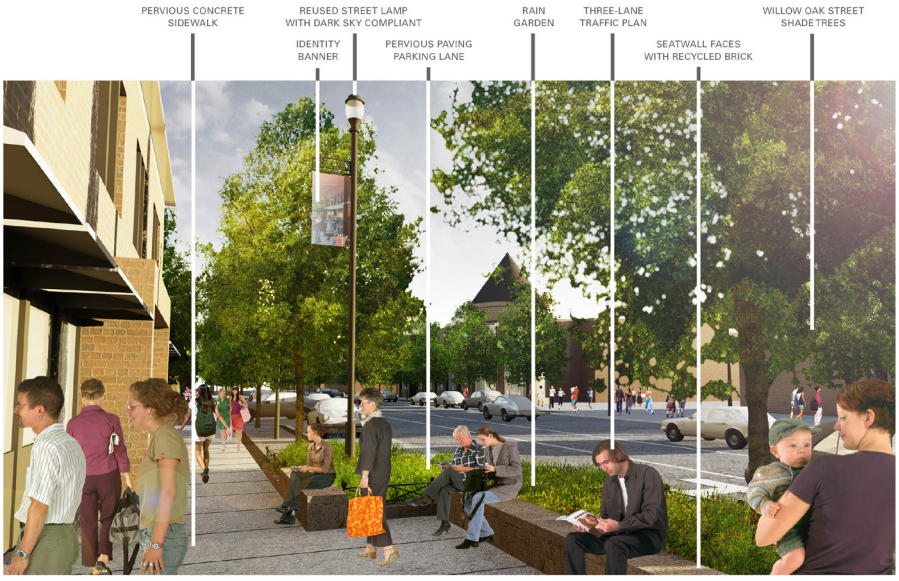
(ASLA 2010 Professional Awards | South Grand Boulevard "Great Street Initiative")

Case Studies: St. Louis, MO

Conclusion

South Grand Boulevard "Great Street Initiative" takes a historical corridor that was only friendly to the automobile and designed it to be a safe and walkable street. This design shows how a few design interventions can take a wide corridor and transform the road into a fully functional, pedestrian streetscape. Reducing the four-lane road to three lanes reduced traffic speeds, making the street safer and reducing noise levels. Expanding the sidewalk and creating bump outs shorten the width of the road, creating less distance for crossing pedestrians. Increasing sidewalk width provides room for outdoor activities and provides a unique experience along the street. The addition of greenery along the corridor can increase walkablity and provides habitat for urban animals.

Newly Expanded Sidewalks



(ASLA 2010 Professional Awards | South Grand Boulevard "Great Street Initiative")

Case Studies: Minneapolis, MN

Minneapolis Pedestrian Master Plan

Designers: City of Minneapolis Public Works Department support from Pedestrian Advisory Committee, Technical Staff Team and Consultant Team, 2009

Design Concept

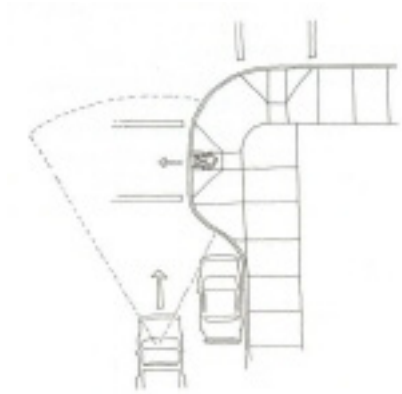
Minneapolis has an extensive sidewalk system that provides great places to walk. In 2007 Minneapolis was rated ninth in terms of walkability out of 50 cities by workers in the community (Minneapolis Pedestrian Master Plan, 2009). The Minneapolis Pedestrian Master Plan has a series of standards and plans as to how the city will improve the existing pedestrian conditions around the city. Conflicts between pedestrians and cars at intersections, along busy streets, streets lacking trees, streets with little buffer zones, maintenance issues related to snow, newspaper boxes and construction zones are all addressed in the plan. Minneapolis created seven goals to help make the city a place that people will want to walk for transportation, recreation, and health. Goals consist of a well-connected walkway system, accessibility for all pedestrians, safe street crossings, a pedestrian environment that encourage walking, a well maintained pedestrian system, a culture of walking and funding, tools and leadership for implementing pedestrian improvements (Minneapolis Pedestrian Master Plan, 2009).

Case Studies: Minneapolis, MN

Distinguishing Characteristic

The first goal of the plan was to have a well-connected walkway system. A well-connected walking system will promote the movement of pedestrians. The system must provide access to origins and destinations while facilitating short walking trips. Minneapolis identified that to have well-connected walkways, the city must have a complete sidewalk network. To maintain the network a block should be between 330 and 660 feet in length (Minneapolis Pedestrian Master Plan, 2009). If a block exceeds 660 feet, a shortcut should be added to reduce the distance. A shortcut could include a bike or pedestrian trail. The last part of promoting a strongly connected walkway system is having wayfinding information placed throughout the city to help pedestrians and bikers navigate the network.

Corner with curb extension.



(Minneapolis Pedestrian Master Plan, 2009)

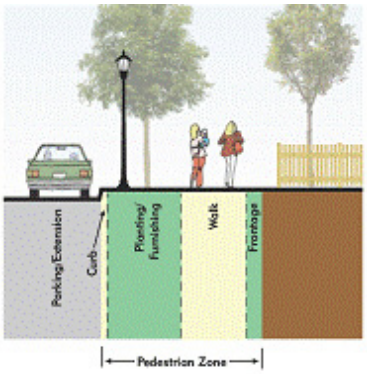
The second goal the city of Minneapolis identified was to remove accessibility barriers to pedestrian facilities. All curbs and ramps should meet the standards of the the American with Disability Act (ADA). Sidewalks should not be cracked, crumbling or heaving because this can make it difficult for walking. If a pedestrian bridge is built it is important to make sure that there are not only stairs, but also a ramp to provide access for all pedestrians. Barriers along the sidewalk should also be removed; this would include elements like narrow sidewalks, poles, or other structures that reduce the width of the sidewalk, making it impossible for a stroller or wheelchair to get through.

The third goal is having safe streets and crossings. Reducing the speed of traffic on the street can make the area safer for pedestrians. Having fewer lanes for pedestrians to cross and eliminating complex intersections can help increase pedestrian movement. Curb extensions shorten the distance that the pedestrian has to cross and improves sight lines between vehicles and pedestrians. The extended curb also provides more space for street furniture, curb ramps, and utilities.

Case Studies: Minneapolis, MN

Minneapolis identified many ways to create a pedestrian environment that promotes walking. Street design should incorporate sufficient space for pedestrians in both the commercial and residential context. The pedestrian zone should be 12-15 feet wide (Minneapolis Pedestrian Master Plan, 2009). Street lighting contributes to personal safety and high-quality pedestrian environments. Minneapolis has lighting that serves both the pedestrian and the vehicle with a combination low-level ornamental lighting and high-level shoebox style lighting. It is important to provide space to promote street life that could include sidewalk cafes, street vendors, and temporary/ flexible spaces for pedestrian activities. Incorporating boulevard trees and other natural landscaping will increase the amount of movement because people like to walk along streets with greenery, as they provides separation from traffic, shade, and shelter from light rain and wind.

Pedestrian Zone: Residential Context

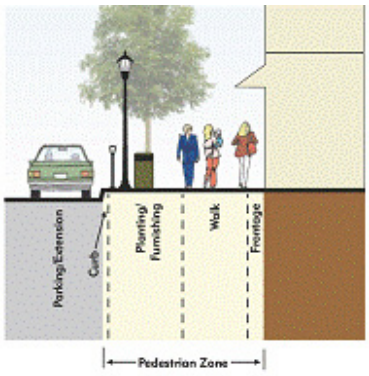


(Minneapolis Pedestrian Master Plan, 2009)

Street lighting for the pedestrian and automobile

(Minneapolis Pedestrian Master Plan)

Pedestrian Zone: Commercial Context



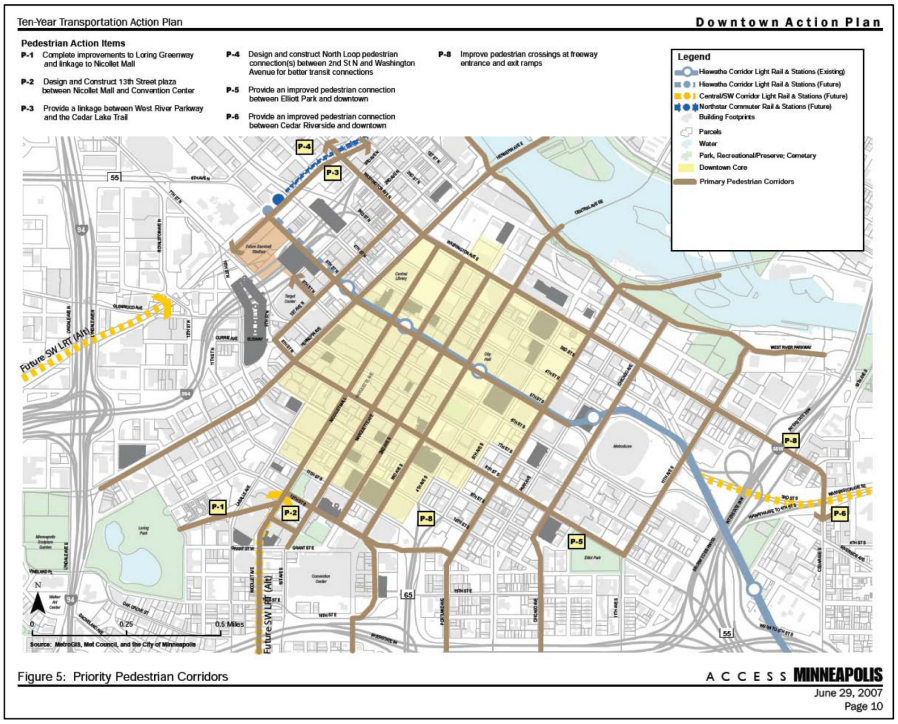
(Minneapolis Pedestrian Master Plan, 2009)

Case Studies: Minneapolis, MN

Conclusion

Minneapolis identified seven design goals that will help improve its strong pedestrian network. After studying all of the goals, the first four design criteria could be implemented in any city to create a strong pedestrian network. To create a strong pedestrian network in an existing city it is important that people can easily walk and find their destinations. Sidewalks should be easy and safe to walk on. When crossing a street pedestrians should feel safe and have a clear view when crossing. The final aspect of a strong pedestrian plan is having an environment that can only be experienced on the street level.

Priority Pedestrian Corridors



(Minneapolis Pedestrian Master Plan, 2009)

Case Studies: Pagosa Spring, CO

Town-To-Lakes Trail

Prepared by: Greenway Team Inc., DHM Design Corporation and Davis Engineering
April, 2011

Design Concept

The Town-To-Lakes Trail is a four mile pathway that connects an existing trail along the San Juan River to Pagosa Lake following the Highway 160 Corridor. The trail moves through an urban area as well as meadows, pastures and, evergreen groves. The multi-use trail system will offer a way for both the residents and visitors to enjoy the pace of the local way of life. Currently, one would find it daunting, hazardous and unpleasant to get around the area without a motorized vehicle (Greenway Team Inc, 2011). The multi-use trail will be a safe, reliable, and pleasant trail that can be used by everyone from children to avid outdoor recreationalists. Strong connections will be made among the community, to the residential areas, schools, and the scenic corridors that have a rich history and interpretive value. Businesses located along the trail, such as restaurants and a shopping center, will benefit from the trail. It will enhance community development as a distinct amenity while increasing property values. Automobile use will be reduced, saving fuel costs and promoting the health of the local community by offering a place that people can walk, run, bike and Nordic ski (Greenway Team Inc, 2011).

PAGOSA TOWN TO LAKES - TRAIL MASTER PLAN
PAGOSA SPRINGS, COLORADO

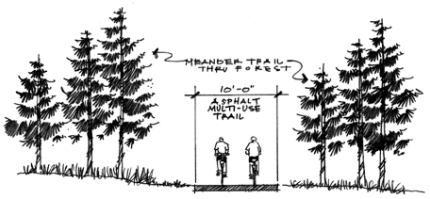
(Greenway Team Inc, 2011)

Case Studies: Pagosa Springs, CO

Distinguishing Characteristic

The Town-To-Lakes Trail has several elements that will help create the best possible connection from Pagosa to the existing San Juan River trail. One of the first elements is the paved multi-use trail. The surfaces will include asphalt and concrete. The paved trail is to be used by pedestrian, bicycles, skates and wheelchairs. The paved trail is to be 10' wide and designed to American with Disabilities Act (ADA) standards. In situations where the trail is along the road, a 5 feet to 10 feet wide landscaped buffer will separate them. Along fences, walls or other obstructions, a 3' minimum buffer will be utilized.

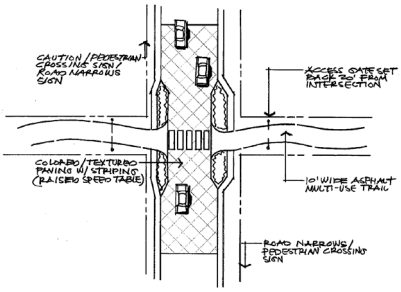
Typical Trail Section



(Greenway Team Inc, 2011)

The second type of trail runs parallel to the roadway. A 10' wide paved surface has a 5 'or more vegetated buffer strip to separate the road and the trail. In areas where the land needs to be held back from the trail a retaining wall will be used. The trail will have a minimum of a 3-foot buffer between the wall and the trail.

Mid-Block Trail Crossing



(Greenway Team Inc, 2011)

The third type of trail design occurs when the pathway intersects with the road. Traffic lights will control the pedestrian crossings at major road crossings. At a pedestrian-only intersection, a "HAWK" will be installed this; a system in which a pedestrian activated light instructs vehicular traffic to stop. When the trail crosses mid-block or in a lower volume street a warning sign and striped crossing will be marked on the pavement. Elements such as "speed bumps" or "speed tables" can be installed to slow traffic down, making it safer to cross the street. At all crossings, access gates are used to allow the bicyclist and pedestrian to pass through but to keep motorists out.

In some instances bicyclists and pedestrians will have to share the road with motorists. In low speed areas, posted at 25 miles per hour or less, a sign will be placed to inform the motorists and a bike lane will be defined by painted white lines or bicyclist symbols on the pavement. In addition, road widths will change to 14 feet to allow more room for the pedestrian or biker.

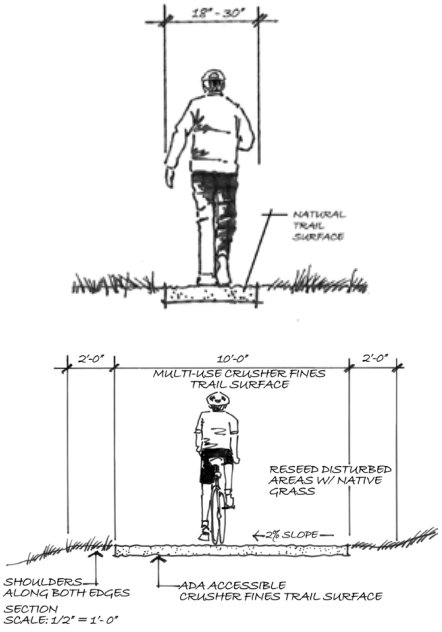
Case Studies: Pagosa Springs, CO

A natural surface trail will also be incorporated among the paved trails to allow different types of uses. A graded dirt surface will be utilized to help control erosion and stabilization. To allow for different users, the trail will range from 18 to 72 inches wide. Users of the natural surface trail will consist of hikers, mountain bikers, all-terrain wheelchairs, and equestrian activities.

Found throughout the trail are different types of signs. Safety signs will address or promote different trail uses and bicycle safety. Wayfinding and directional signs are important so trail users know the different destinations that can be reached and how to navigate to those places. The final sign type is interpretive and displays information about the natural and cultural features as well as the history of the area.

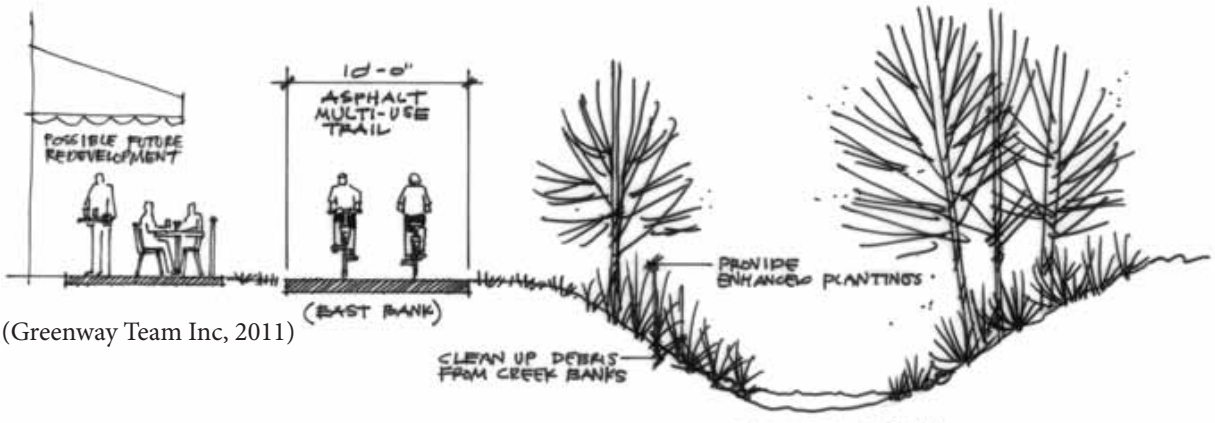
The placement of rest areas and overlooks are very important and will be located within a mile of any point on the trail. Rest areas will have a place for people to sit and, possob;u more important, a restroom facility. Amenities, such as creeks, will be restored and designed into linear parks that will create habitat for local animals. Commercial development with restaurants and shops can be developed along the river with a series of green spaces that have multi-use paths. The paths will cut through developments, which helps create a unique character for the creek.

Natural Surface Trail



(Greenway Team Inc, 2011)

Trail along a Restored Creek



(Greenway Team Inc, 2011)

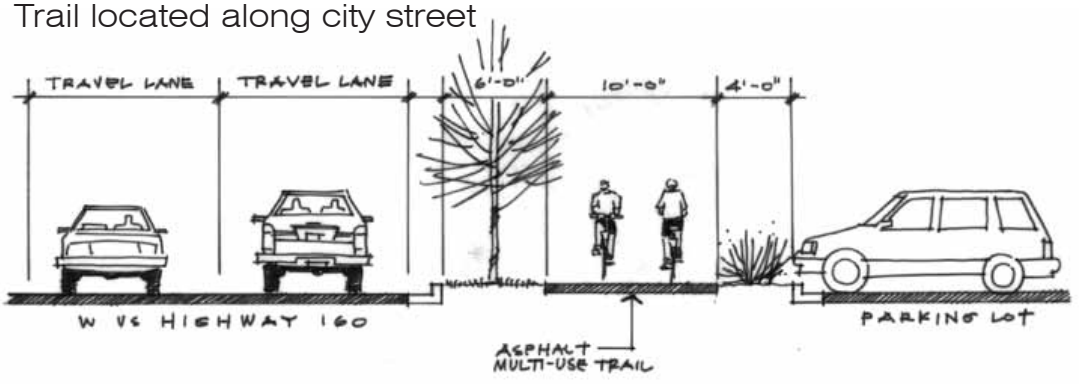
Case Studies: Pagosa Springs, CO

When the trail enters the urban community it will improve the visual character of the street. A 10 feet to12 feet wide shared use trail will be installed along the road. A landscaped median adds character between the road and the trail and will help create as well as a small buffer between the trail and the parking lot. This design will separate pedestrian and motor vehicle traffic, increasing the safety of the trail users.

Conclusion

The two-town trial has a lot of different features that make it unique to the local area, but some of the same ideas can be incorporated in many towns throughout the country. A multi-use path that connects elements of the urban environment to areas outside of town can be attractive to many users. A multi-use path with hard and soft surfaces can be used for many different types of activities and by a number of different people. The trail has also identified safety improvements including traffic lights, a "HAWK" light, bump outs and speed tables in the design. Signs are important as well as rest areas and overlooks to provide attractions along the trail and help navigate users. Finally, the Town-To-Lakes Trail will provide visual character to the town.

Trail located along city street



(Greenway Team Inc, 2011)

Case Studies: Shanghai, China

Gubei Pedestrian Promenade

Landscape Architects: SWA Group
Designed: 2005-2008
Completed: 2009
Area of Promenade: 700 meters in length averaging 60 meters in width

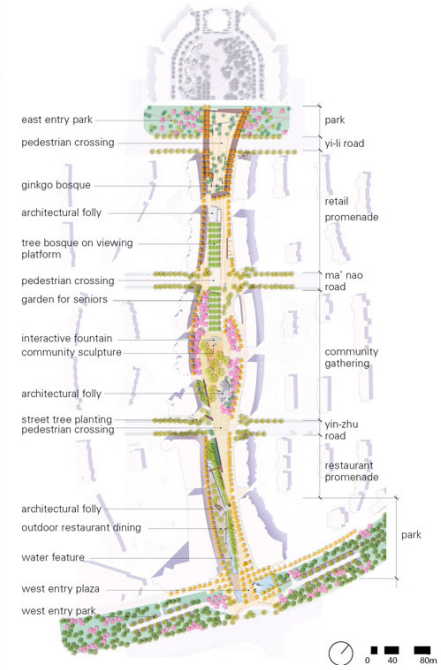
Design Concept

The city of Shanghai, China has a unique approach to the arts and culture; its embraced for its diversity and its desire to reinvent itself on a daily basis (Gubei Pedestrian Promenade by SWA Group « Landezine | Landscape Architecture Works, 2011). Shanghai is a city that embraces sustainable alternatives and has incorporated that philosophy into the design of a pedestrian promenade in the center of the city.

Over time the streets of Shanghai have become multi-lane boulevards, elevated expressways, concentric ring roads, and freeways. Gubei Pedestrian Promenade is a changing district in the urban city of Shanghai with a growing group of international families and young professionals. The area is full of culture. It's important for the pedestrian promenade to provide multi-cultural facilities for the residents. The promenade links adjacent neighborhoods that were not previously connected and provides urban nature.

The design provides an open space that is safe, multi-functional, sustainable, fun, and exciting for all ages through the layering and integration of five distinct considerations. These considerations include cultural infrastructure, environmental sustainability, healthy living, interpretive nature and innovative design. The design considerations create a dynamic urban environment that defines a successful design for urban living in they city (Gubei Pedestrian Promenade by SWA Group « Landezine | Landscape Architecture Works, 2011).

Gubei Pedestrian Promenade Master Plan



(Gubei Pedestrian Promenade by SWA Group « Landezine | Landscape Architecture Works, 2011)

Case Studies: Shanghai, China

Distinguishing Characteristics

Gubi Pedestrian Promenade has five distinct strategies that separate the design from any other pedestrian way. Cultural history is a significant aspect of Shanghai, so elements such as clay roof tiles, porous paving and a curving shape of clay tile mimic local tradition. Sustainability is another element that was important to Shanghai and can be found throughout the promenade. Thousands of trees were added to create an urban forest and in return reduce the overall heat island effect. The tree canopy provides shade and can help reduce heat along the promenade. It was important to incorporate a wide variety of plants at a variety of scales to create a biological diversity. Flexible open spaces provide a place for recreation and outdoor exercise, and it's also a place for social interaction and stress releasing activities such as Tai-Chi, reading, dining, and people watching. Activities such as rollerblading and bike riding can occur throughout the corridor on any particular weekend. With the wide variety of uses and activities, the promenade increases the health of the residents.

Tree Canopy

(Gubei Pedestrian Promenade by SWA Group « Landezine | Landscape Architecture Works, 2011)

Case Studies: Shanghai, China

The large open space with greenery helps reduce the nature deficit disorder that affects children living in a highly urbanized area. Lack of exposure to nature during childhood can develop into a limited respect for their immediate natural surroundings (Gubei Pedestrian Promenade by SWA Group « Landezine | Landscape Architecture Works, 2011). Residents will be educated on capturing stormwater through bioswales and vegetation. The added green space helps support urban wildlife such as birds, insects, and amphibians. The final design strategy is invention. Creative materials were used to make common outdoor elements, such as seating, retail kiosks, and fountains, which are unique to the promenade. For example, a system of benches made of a translucent polycarbonate material that is highly functional, durable and artistic is incorporated with an interactive fountain. The red benches light up at night and the promenade becomes an exciting destination attracting people from all parts of the community (Gubei Pedestrian Promenade by SWA Group « Landezine | Landscape Architecture Works, 2011). Combining all five design strategies makes the Gubei Pedestrian Promenade a unique place in the city of Shanghai that promotes pedestrian movement and interaction.

Translucent Polycarbonate Benches

(Gubei Pedestrian Promenade by SWA Group « Landezine | Landscape Architecture Works, 2011)

Case Studies: Shangai, China

Conclusion

The Gubei Promenade blends modern practices, such as sustainability, with stormwater collection and filtrations, but strong cultural ties can be found throughout the promenade. Urban communities are connected through a large pedestrian area that provides open space for recreation, shopping, dining, and people watching. The street once again becomes a place where the exchange of goods and services can happen and where one can immerse oneself into a foreign land (Gubei Pedestrian Promenade by SWA Group « Landezine | Landscape Architecture Works, 2011).

View of the Promenade

(Gubei Pedestrian Promenade by SWA Group « Landezine | Landscape Architecture Works, 2011)

Case Studies: Summary

Each case study shows how four different cities approached the issue of providing a safe and functional place for pedestrian needs and movement. Each of the design interventions has similar aspects in their approaches yet they have very different solutions to solve the pedestrian movement issues found in each city. Minneapolis identified a wide range of problems found in the urban space and what can be done to solve that particular issue. St. Louis redesigned a historic corridor that can be implemented throughout the city to increase pedestrian traffic. Pagosa Spring designed a multi-use trail system that connects an existing pedestrian pathway to the city. The trail design changes as it goes from the country into the city along major roads and minor roads. Finally, Shanghai uses a large promenade that had sustainable practices and cultural importance to create a large green space to connect existing neighborhoods.

Minneapolis's pedestrian plan includes at the city as a whole and tries to identify elements that can be found throughout the city to create a holistic solution. The design solutions that Minneapolis has proposed can be implemented into any city to encourage pedestrian movement. The walkways must be easy to access and destinations should be within a short walking distance with little obstruction. All four of the case studies showed that connecting places of interest is important to encourage more movement. The various designs connect residential areas to shopping and commercial areas as well as recreational spaces in the forms of parks and trail systems.

Both Minneapolis and the Trails-to-Lake path identified the importance of signage regarding pedestrian circulation and safety. Minneapolis uses kiosks that have maps of the area so travelers can find where they are, where their destination is and the quickest and easiest way. Trails-to-Lake also uses wayfinding and directional signs to help people navigate the system, but they also incorporated informational signs about natural and cultural features of the site to welcome and educate users.

Case Studies: Summary

All four case studies highlight safe street crossing as an important part of promoting pedestrian movement. Both Minneapolis and the South Grand Boulevard showed that reducing the number of lanes that the pedestrian has to cross makes the street safer and easier to navigate. Curb extensions were used in Minneapolis, South Grand Boulevard and Town-to-Lakes Trail. Minneapolis and South Grand used traditional curb extensions at the intersections of roads to shorten the crossing distance. Both utilized an opportunity with the added sidewalk space to incorporate furniture along the street front. The added furniture creates character, and in turn promotes walking. The Lake-to-Trails used a bump out when the trail crossed in the middle of the road. Finally, the bump out reduced traffic speeds on the road and also shortened the distance of the crossing, making it easier and safer to cross.

South Grand Boulevard and Gubei Pedestrian Promenade incorporated greenery into the street not only to provide character but to promote environmental issues. In both South Grand and Gubei, trees provided shade and reduced the urban heat island. They both also added greenery to provide habitat for urban animals and an area for stormwater filtration.

There are many elements that each of the case studies have identified and addressed in order to make safe and attractive pedestrian spaces. Some of those solutions included reducing the number of traffic lanes and the distance to cross the road. Signage found throughout the design can make it easy for pedestrians to travel. Gubei Pedestrian Promenade showcases the culture and how a variety of materials can be used to create a unique pedestrian space. South Grand Boulevard promoted character and interest by restoring a historical street. As this project focuses on St. Cloud, the fundamental design ideas from each case study will be incorporated to create a strong pedestrian network to encourage physical activities.

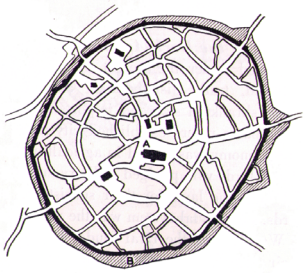
Historical Context

Urban cities have evolved over time to what we see today. Beginning with medieval times, streets were laid out in an irregular pattern. Development in the United States during colonial times regularly consisted of the gridiron plan or the radial plan with diagonal streets that can still be found across the country. As technology and the needs of the people changed streets evolved as transportation choices shifted from walking to gasoline-powered automobiles, which remain the most popular form of transportation today. As a result, the automobile has the strongest influence on the design of streets and the form of city.

We begin with city layouts during medieval times in the 12th and 13th century, leading up to the Industrial Revolution in the 19th century. In the 12th and 13th centuries medieval city streets were laid out in irregular patterns, and tall heavy walls surrounded the town. The irregular patterns of the roads, uses as a defense, were designed to confuse enemies should they invade the city. Noerdlingen's plan exhibits the irregular streets, with a cathedral plaza serving as the focal point for the city. During this time, streets remained inside the confines of the city's walls for protection. As the city expanded, green spaces within the city were often filled with buildings until little space was left in the original walls of the city (Eisner & Gallison, 1963).

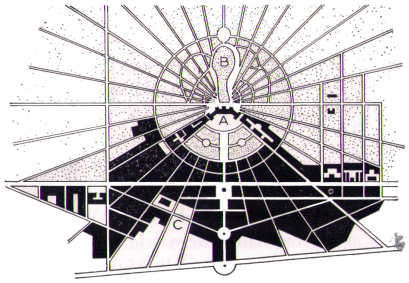
In the 15th century the large walls that surrounded cities were taken down, as they were no longer needed, and cities started to expand outward. Baroque architecture, based out Italy, featured a strong axis point and focal point, with streets and avenues radiating from that point. Focal points included buildings such as churches, castles or monasteries. The city of Karlsruhe is a great example of this particular planning typed. Organized in a radial plan, Karlsruhe's central focal is the Prince's palace, exhibiting the strong power that the monarch had over the city (Eisner & Gallison, 1963).

Noerdlingen Plan



A. Catheral Plaza
B. Moat
(Eisner & Gallison, 1963)

Karlsruhe

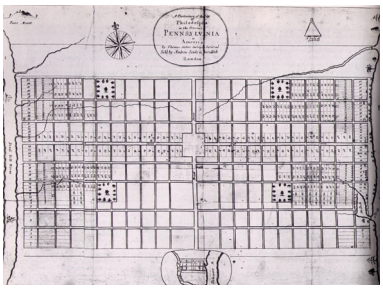


A. Palace
B. Garden
C. Town
(Eisner & Gallison, 1963)

Historical Context

As the United States was settled, cities evolved based on people's needs. In colonial Williamsburg, Virginia (1633). Main Street was nearly 100 feet wide and extended from the college of William and Mary to the capitol (Eisner & Gallison, 1963). Similary, other cities in America were built more for people featuring a without a human scale that was absent in Europe. Often colonial towns were laid out in a gridiron pattern with two streets meeting in the center in the form of a public space. The town was then divided into four quadrants and each of the quadrants had an additional park. Gridiron plans provided unity to the town and were easy to lay out and navigate; Philadelphia is a good example of this type of layout. Modified radial plans were also popular in colonial times. This particular pattern has a central point and roads radiated from the center, similar to Baroque cities, but the angles that were formed were filled with grid patterns. Detroit, Michigan, founded in 1701, is an excellent example of this particular street design.

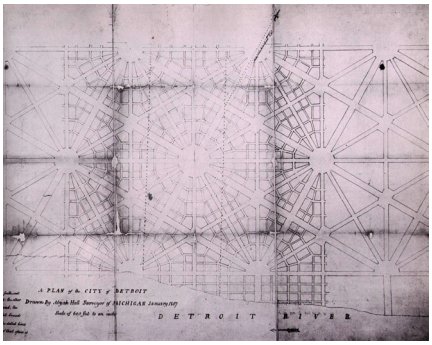
Philadelphia



(Reps, 1965)

Before the Industrial Revolution transportation was a critical part of daily life, and the main modes of transportation were by foot or by horseback (Eisner & Gallion, 1963). Water was also an important transportation source, as rivers, creeks, and bays brought people inland. Trails made by Native Americans further helped the early settlers of America travel. As settlements increased, the first paths would later be used as wagon roads, turnpikes, and eventually railroads. The first hard surface all-weather roads were built between 1792 and 1794, stretching 62 miles from Philadelphia to Lancaster, Pennsylvania (Stove, 1970). Following the Revolutionary War, the demand for better roads increased and within years privately financed roads improved in the form of toll roads. They beganto appear in cities along the eastern coast, but despite their popularity and overcrowding, the roads didn't supply financial return. The federal government stepped in to fund the expansion of a wagon road to the west.

Detroit

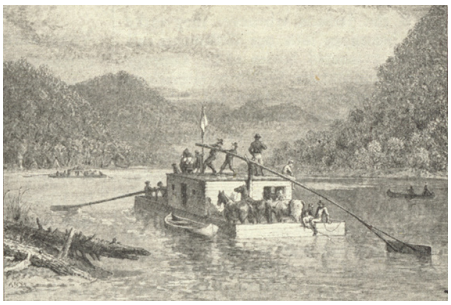


(Reps, 1965)

Historical Context

The Industrial Revolution in the 19th century not only brought change to the layout of cities, but fundamental changes to transportation as well. Evolving uses, which earlier focused on the movement of people, began to expand to the transfer of goods and services. As early 19th century roads were being improved, water transportation was also changing. Water transportation, which included rafts, flatboats, canal boats, and keelboats, was regularly used to navigate waterways. Despite these improvements, movement on the water was impeded during floods and low water as it limited the amount of traffic along the river. In particular, flatboats were used to bring freight downstream because they were cheap and feasible. Conversely, flatboats were never used to bring freight upstream due to the increase in cost (Plover, 1970). In 1809, Fulton built the first steamboat named the Clermont, forever changing the efficacy of water transportation (Eisner & Gallion, 1963). Soon major waterways, such as the Mississippi River, brought fur trade and settlers to the central part of the United States. The Great Lakes also served as a major transportation channel for ore (Baker, 1901).

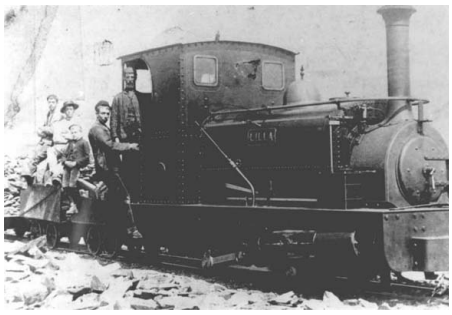
Flatboat



(Lincoln/Net: Mississippi Flatboat)

In 1829 the first railroad lines were laid (Eisner & Gallion, 1963), solving many problems that the early modes of transportation, such as roads and waterways, could not. Railroads could travel in a variety of weather and, unlike water transportation, could travel year round. Railroads also transferred both passengers and freight faster than previous travel. As a result rail lines spread quickly across the country, increasing the number of people living and moving around the country. Factory towns started to cover the land as railroads and ships brought material to cities for industrial uses. These new uses had negative effects on cities. Slums started to form and dense housing led to overcrowding. Pollution of the air and water also started to become a major problem. City streets stayed the same, but the open spaces were filled with buildings, further escalating the problems (Eisner & Gallion, 1963).

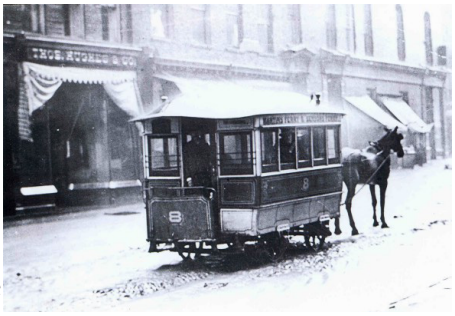
Steam Locomotive



(Rees, Jarman, Gwyn, 2010)

Historical Context

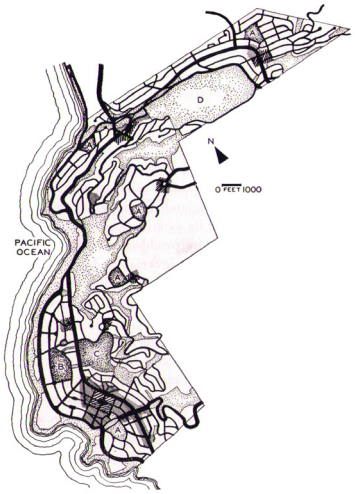
Horse Car



(Newton)

Eventually, population growth and overcrowding cities started to become a problem for transportation. City streets, which were previously used by pedestrians, were congested with horse-drawn carriages. To help reduce overcrowding, horse cars were used and placed on rail lines in 1831. New York City was the first city to have an elevated cable car in 1867, which was later replaced by the steam train in 1871 (Eisner & Gallion, 1963). Cities finally started to see relief when rail lines spread outside of the city, allowing people to escape the city's problems. The 1880s brought the electric street car to the city, replacing the horse car. Chicago was the first to elevate the electric street car followed by New York and Philadelphia. Despite the new inventions traffic was still an issue, and in 1904 New York took the elevated street car and put it underground, creating the first subway (Eisner & Gallion, 1963).

Palos Verdes Estates, California



(Eisner & Gallion, 1963)

New expansion in transportation provided ways for people to escape the city, but the high the cost of land also pushed people out of town. Eventually, people moved out so far that the city was no longer accessible and independent communities started to form. The first residential community was known as Riverside, designed by Frederick Law Olmsted and Calvert Vaux in 1869 near Chicago (Eisner & Gallion, 1963). During this time gridiron streets were popular, but residential community designers believed that grid forms offered little to no return in relationship to the living environment. River Oaks in Houston, Texas (1920) is a community that had a range of lot sizes, with a shopping area and even a golf course located in the residential area. Around the same time as River Oaks, Olmsted and C.H. Chaney developed Palos Verdes Estates in California. The development, at 3,000 acres, features rolling hills in a country setting with lots ranging from a half acre to 30 acres. As a part of the project, 25% of land was used for roads and parkways, 25% for community facilities, such as schools, churches, parks, and libraries, and the remaining 50% was for residential (Eisner & Gallion, 1963). Gradually, more and more residential communities went away from the grid design used and had a more free flowing design with cul-de-sacs.

Historical Context

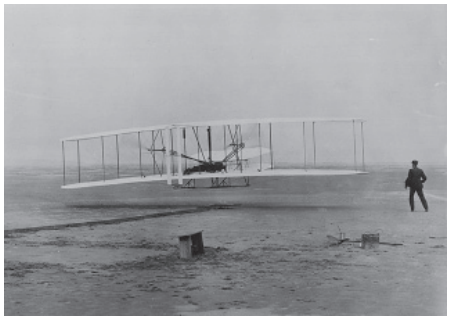
The invention of the combustion engine in 1885 by Gottlieb Daimler helped bring transportation full circle. Pedestrians who had come to rely on public transportation choices like the railroad were free to move individually again. As a result, automobiles quickly became popular across the country. In 1885 there were four cars registered, by 1900 there were 8,000 and by 1960 there were 62 million vehicles on the street (Eisner & Gallion, 1963). As predicted, automobiles started to take people from other services and had a big impact on the design and layout of cities. For those who hadn't relocated from the inner city, automobiles opened up possibilities. According to John F. Stover (1970), "decline in rural isolation, extensive highway construction programs, the rapid expansion of suburbia and an expanding economy based on assembly-line techniques can all be traced to the automobile" (Stover, 1970). In the late 1920s highway trucking and the Greyhound system expanded transportation options to areas that the train couldn't reach, and intercity freight begam to be transported by trucking. By the mid-20th century the automobile became the main mode of transportation and the exit to the suburbs was well underway. Communities similar to River Oaks and Palos Verdes Estates were constructed all over the country. Before long, communities similar to these had Americans attached to their vehicals for work, shopping, and all of their daily needs.

First Automobile

(The Top 5 American Cars of All Time 1917 Ford Model T – Perez Solomon 2.0)

As the automobile grew in popularity, air transportation started in 1903. The Wright brothers, inspired by a toy helicopter, successfully flew their "flying machine" in Kitty Hawk, North Carolina (Stover, 1970). Major expansion of air transport happened during both World War I and II as airplanes helped defend America. The first commercial air travel began in 1936 as people turned away from the train and buses. Today, along with the automobile, air travel continues to be popular, serving thousands of people every year.

First Airplane



(Crouch)

Historical Context: Summary

Throughout history, streets design have evolved from irregular medieval patterns that helped protect cities to the curvilinear forms of suburbs today. During the Baroque period streets radiated from a focal point and were primarily used by pedestrians. As America was settled, cities were laid out in a gridiron pattern that was easy to plan and navigate. Green spaces were incorporated into quadrants of the town, but as cities started to expand the green spaces were often filled in. Walking and horseback riding ware the primary forms of transportation for the first 3,000 years. The Industrial Revolution made public transportation a major part of everyday life. It not only brought new methods of transportation, but also caused changes in urban form. Water transportation increased during this time with the steamboat. Train travel solved many transportation problems, and was also the first step in promoting development outside of the city. Cities also started to become very crowded and expensive. Suburbs, which were located outside the inner city, and problems started arise. The new residential communities had a wide range of lot sizes with shopping and recreational spaces located among the residential areas. In addition, street design started to move away from the gridiron pattern toward an organic road design that provided a variety of living environments. The invention of the automobile and new suburb design increased people's mobility and independence, but today has strained cities due to the indirect needs of vehicles.

As a result, current city development has focused more on redevelopment rather than new development. Cities are still expanding and suburban growth is still happening, but city planning today is beginning to recognize the influence of transportation and streets on our environment (Reps, 1965).

Thesis Goals

Academic

My academic goal for this project is to find relationships between urban environments and physical activity. Research will be carried out to find specific design elements that not only encourage physical activity, but also eliminate elements that discourage physical activity. After concluding my research on the urban environment and how it affects different age groups, this design will help illustrate what is needed in the urban environment to encourage residents to walk and bike. Research and analysis will show how the environment encourages and discourages physical activity. Information taken from the research and analysis stage will help influence the final design and determine what can be done to the existing urban environment to promote movement. Compiling inventory and analysis will confirm that the existing urban environment has disconnections in the pedestrian network. A design will be implemented to make strong connections to encourage physical activity and movement among people of all age ranges living in the area. Skills learned from previous studio experiences and classes will be combined to create a document that is strong in both writing and graphic design.

Professional

My professional goal for this thesis is to create a well-executed project that can be shown outside the university in the professional world. At the conclusion of this project, this document will have all of the elements I have been learning over the years, including hand and computer graphics, computer modeling, writing skills, and environmental problem solving capabilities. Professional presentation skills will be displayed at the end of the semester in the final exhibit. In working through this project, I hope to portray confidence in my design and professional speaking abilities which have been acquired through previous projects. Completing a project of this magnitude will show the time management skills and dedication necessary to execute a well-designed project. At the conclusion of this thesis I hope to showcase my best skills to further my career after graduation.

Thesis Goals

Personal

The personal goals for this project are to fully develop the skills and abilities that I have learned over the last five years in the Landscape Architecture Program, while applying them in a strategic manner that showcases the best design intervention possible. I would like to expand my knowledge and skills in 3D modeling to help exhibit the design intervention. I would like to take the drawing and graphic knowledge t I have acquired and expand those skills by creating and working with new graphics that are used in the professional world. In practicing these new skills and graphics this final project will show my best work. I want to be challenged while doing this project. These challenges will give me experience with problem solving skills and dealing with setbacks. Another goal for this project is to take what I have learned about writing and researching and use it to create a well-edited and comprehensive project. At the end of the year, the final project will be presented in a professional manner.

Analysis Narrative

The city of St. Cloud is located along the Mississippi River in central Minnesota. I have lived in St. Cloud my entire life and I have seen the town change over the last 22 years. I have seen open fields, farmland, and old granite quarry areas paved with roads to allow or new sprawling homes. Areas that were once considered the edge of town have now been absorbed into the city as the town expanded outward. Roads that were once narrow and two lanes have been replaced with wide four-lane streets to accommodate the increasing number of cars.

The expansion of town has many positives. People are walking and biking most often within their neighborhood. Schools may be located within walking distance, but busy roads make walking unsafe for pedestrians, especially children. Over the years various roads have been redone and bike lanes and sidewalks have been added. Pedestrian traffic has increased on the newly rebuilt roads. The main users of the sidewalks and bike lanes are young to middle age adults.

Children would be most unlikely to walk due to the danger of the roads. For example, a bike path or sidewalk is often provided on only one side of the street, making access to the walkways difficult. Worse, construction of the new roads has been piecemeal, resulting in gaps in sidewalks and bike lanes that make it difficult for people to travel to their intended destinations. Pedestrians have to choose between walking without sidewalks or turning around. The safest route to the intended destination may not be the most direct, making the walking and biking distance longer.

Analysis Narrative

A wide multi-use path located near the Mississippi River connects neighborhoods to the downtown area and the local college. Railroad tracks were removed to expand the river trail and create a stronger connection through the city. The trail is used at all times, but primarily in the warmer months of the year. College students use the portion of the trail that is closest to their school. Families with small children, as well as older adults, largely use the trail as it travels through a few neighborhoods. The trail becomes less utilized as it gets further away from the college and neighborhoods. Few are on the trail near the highway and commercial businesses, but for those who are it provides an opportunity for them to bike to work.

Roads that were once narrow and unsafe for pedestrians have evolved into nice wide roads with sidewalks for walking and biking. Speeds along these same streets have increased however, creating an unsafe feeling for pedestrians walking along the roads. Gridiron streets located in the downtown area provide shorter distances for people to walk, but the sidewalks are inconsistent. Scattered around town several sidewalks have been removed. City roads have changed from a grid pattern to curvilinear road systems filled with dead end streets and cul-de-sacs. Without dedicated connections, this design discourages walking and biking due to the increase in distances to destinations.

The commercial area of town is filled with shopping centers, big-box stores, strip malls, and businesses. To support these, four-lane roads have been constructed, but have caused an increase in automobile speeds. Major highways intersect with commercial roads and are very unfriendly to pedestrians. Sidewalks are located right next to the highway, providing little to no buffer from fast-moving cars. Increased speeds, busy intersections, and the location of sidewalks have made walking and biking extremely dangerous or impossible. Conscious of their safety, most people will choose to use their car instead.

Analysis Narrative

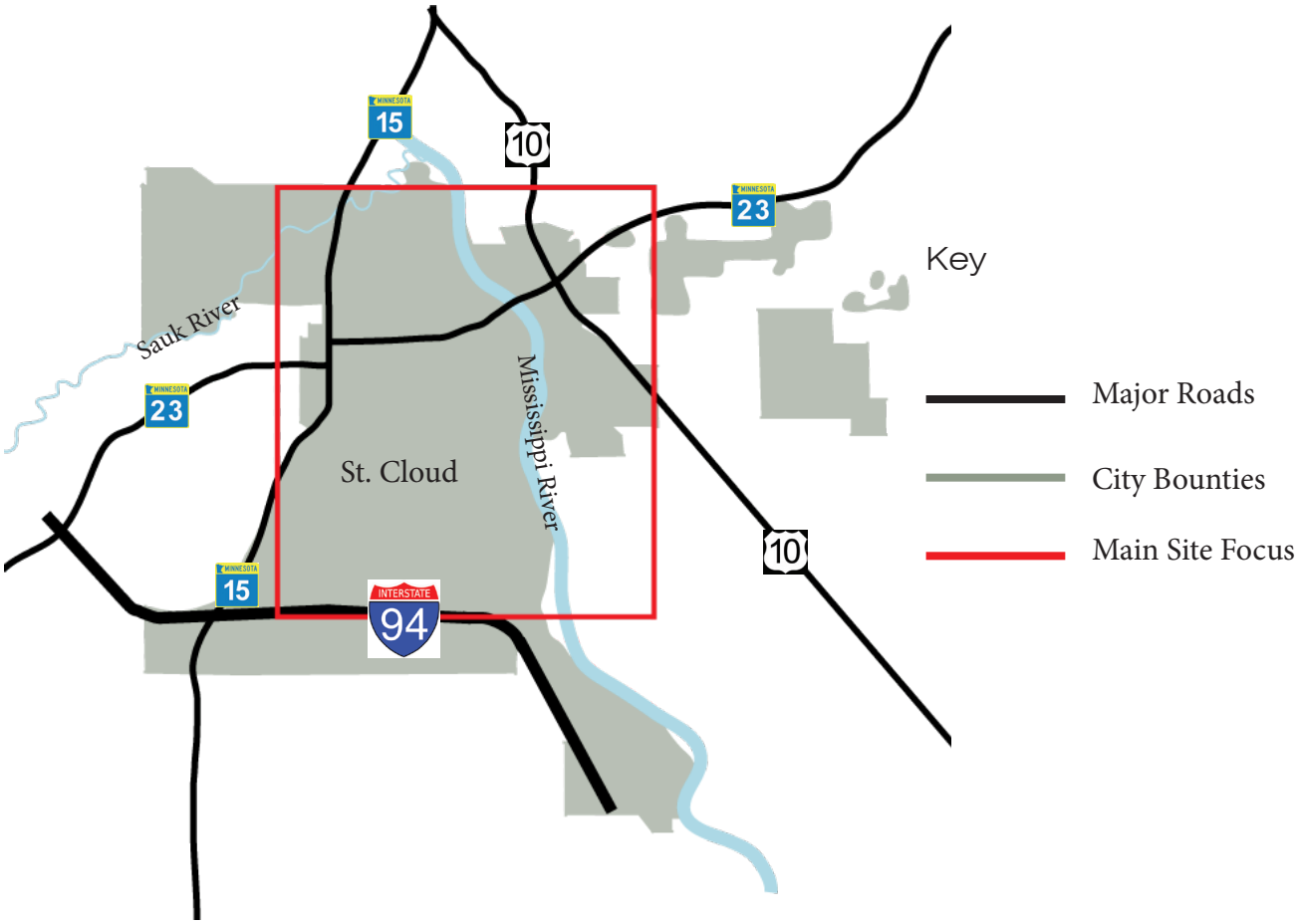
Parks in various size and uses are scattered around town. Most successful parks are located near either the Mississippi River or along the Sauk River. These parks have a path system that brings people from nearby neighborhoods into the parks and people of all ages can enjoy recreational activities together. Small parks, located in some of the neighborhoods, are intended to be used by the local residents. Neighborhood children can easily travel to the parks, further promoting physical movement.

Pedestrian movement changes drastically in the cold and snowy months of the year. Several parks are equipped with ice skating rinks as well as sledding hills that provide a place for activities throughout the winter months. Pedestrian traffic along the street also slows down. Winter plows may not always move the snow far enough off the road and the bike lanes, though not used much in the winter, cannot be accessed. Sidewalks, which are more likely to be used, are not always shoveled making it difficult to walk.

St. Cloud has many great parks as well as schools, shopping, and grocery stores scattered around town, but none of these places are connected to the residential areas of town. Linking all of the parks, schools, grocery stores, shopping areas, and residential areas can create a strong network that will encourage physical activity.

Site Analysis

Site Context Map



Site Analysis

Site History

Before being known as St. Cloud, there were three towns called Upper, Middle, and Lower towns. The towns settled in two deep ravines that joined the Mississippi River (St. Cloud, MN - Official Website - History of the City). In 1856 the three towns officially became one and St. Cloud was born (Dominik & Massmann, 2002). In the early years people in town were farmers, frontier entrepreneurs, tradesmen, and shopkeepers. St. Cloud's early days had little promise socially, economically, or geographically (Dominik, 1978). The river created many opportunities, but river transportation could only be reached in high water. Surrounding towns such as Sauk Rapids had major growth during that time. In 1886 a tornado destroyed Sauk Rapids, which gave St. Cloud an opportunity to become a leader in the community. They were able to establish themselves as the commercial and industrial center of the frontier (Dominik, 1978). The city had major growth with the arrival of the railroad, and in 1868 the first granite quarry was opened (Dominik & Massmann, 2002). Transportation and natural resources helped St. Cloud became one of the state's largest city by the 1900s (St. Cloud, MN - Official Website - History of the City).

During the 1950s the surrounding rural farmland around the city was transformed into residential areas. During that same time, sprawl was happening and businesses were moving away from downtown into large shopping centers that were being built. In an attempt to get people back downtown, the "Ring Road" was developed. The "Ring Road" was opened in the spring of 1973 and a pedestrian-only mall was created by having a one way road that went around the downtown (Dominik, 1978). This created a lot of confusion and didn't help accomplish the goals that the city was trying to reach. In 1995 the "Ring Road" was converted back to two-way traffic (Dominik & Massmann, 2002).

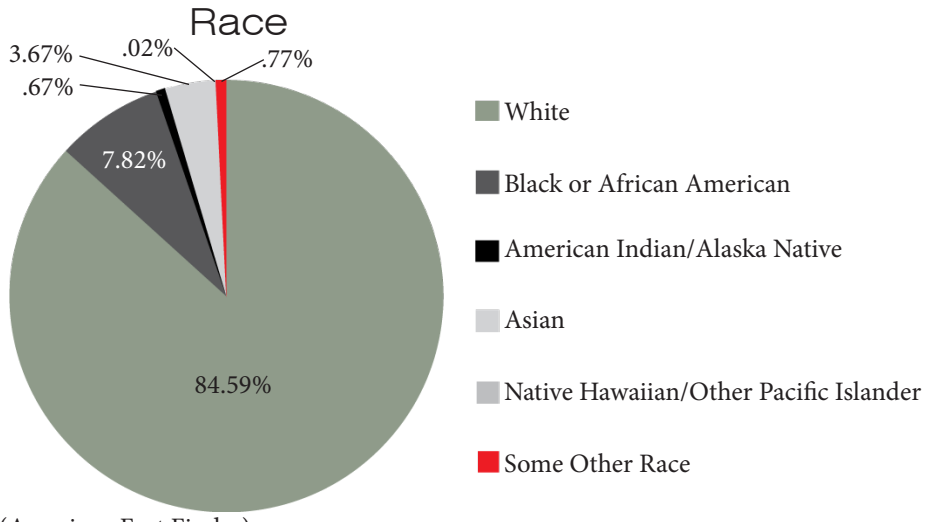
Site Analysis

Demographics

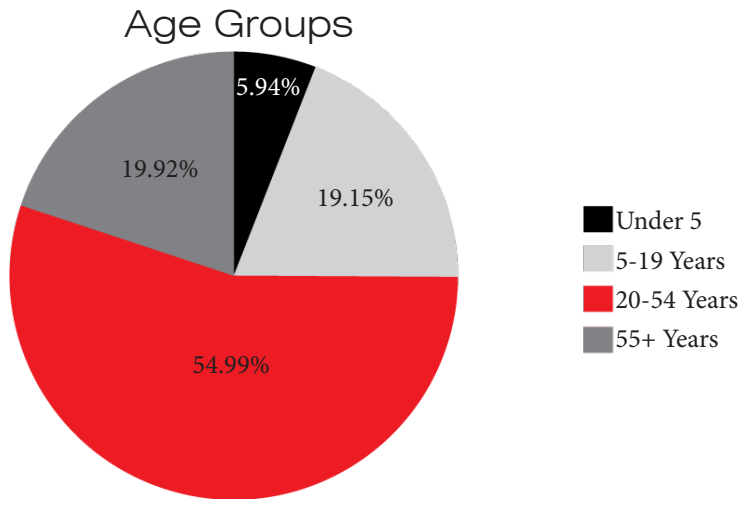
Population: 65,842

Population of Metro Area: 101,249
- Sartell: 15,875
- Sauk Rapids: 12,773
- Wait Park: 6,715

(American Fact Finder)



(American Fact Finder)



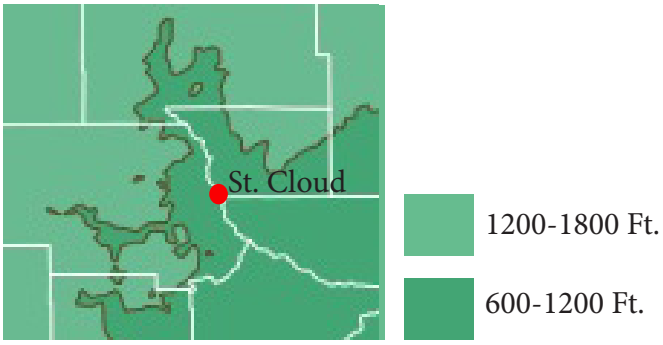
(American Fact Finder)

Site Analysis

Soil- Central Minnesota Sandy Outwash

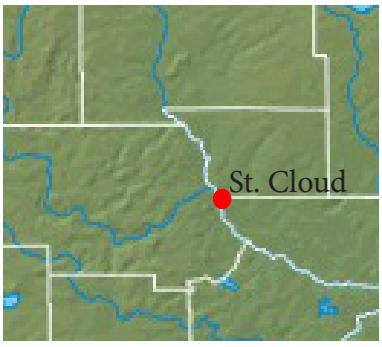
Central Minnesota Sandy Outwash is the type of soil found in the St. Cloud area. The soilconsists of coarse textured outwash with a thin, discontinuous mantle of loamy material. The outwash ranges from 3 feet to more than 100 feet. Central Minnesota Sandy Outwash has two dominant soil orders that consist of Millisols and Histosols (MLRA 91A | NRCS MLRA Region 10)

Topographic Map



(Minnesota Physical Map and Minnesota Topographic Map)

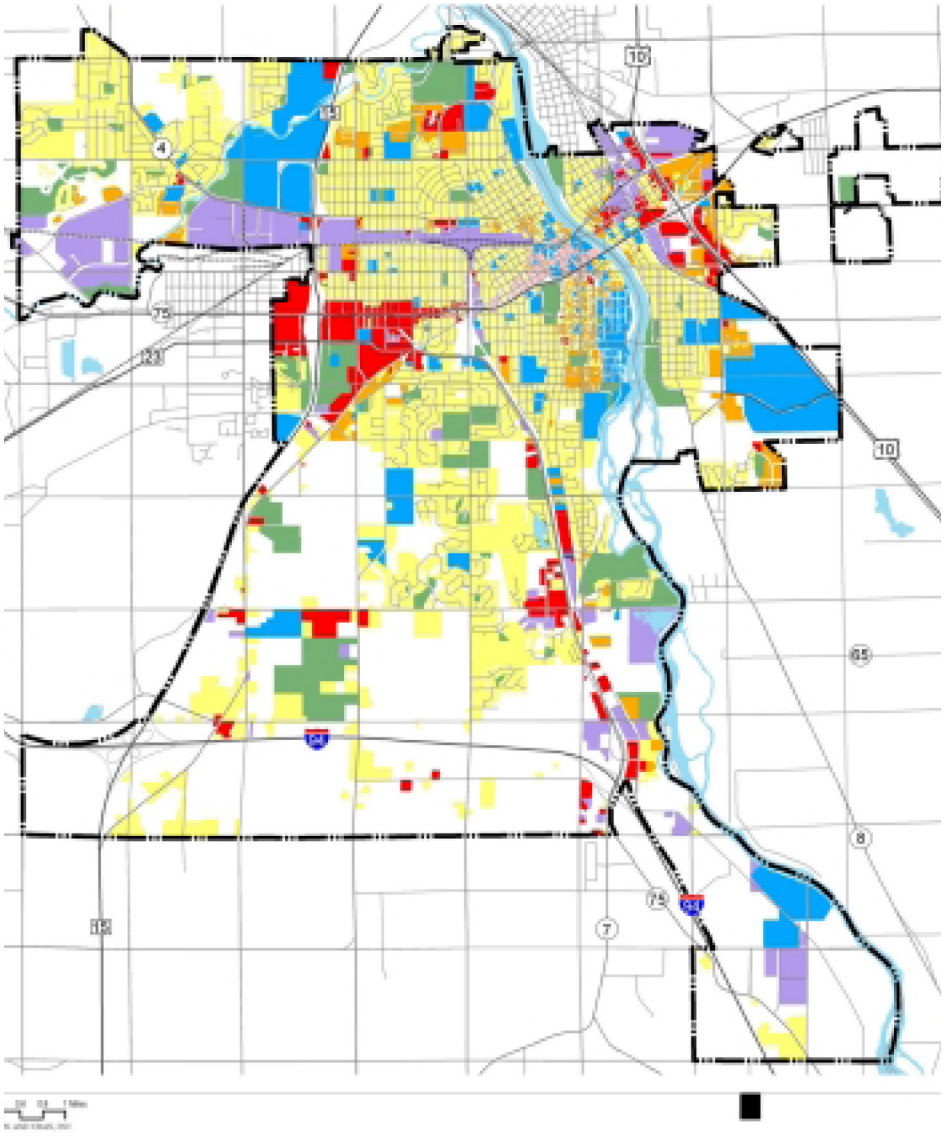
Physical Relief Map



(Minnesota Physical Map and Minnesota Topographic Map)

Site Analysis

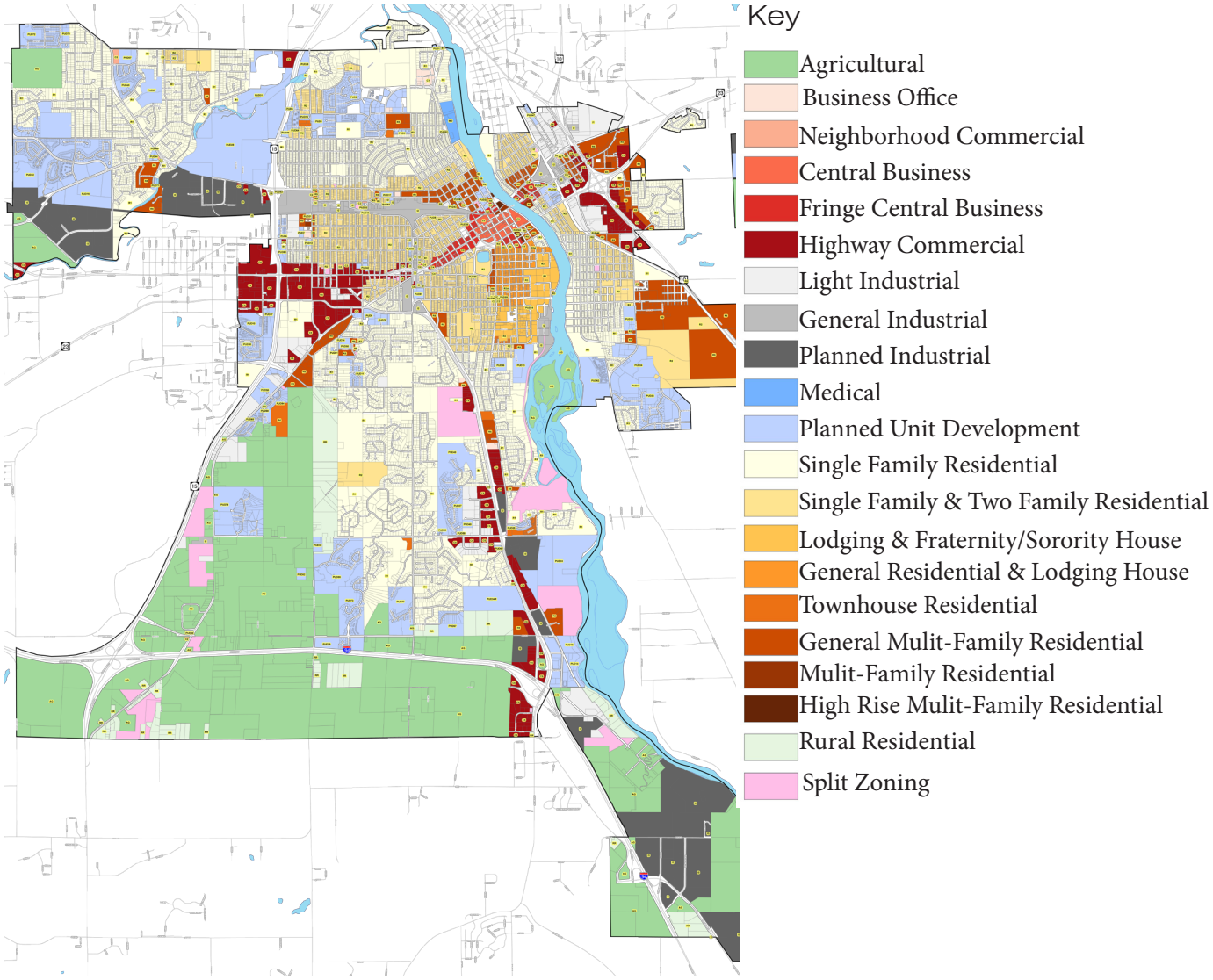
Land Use Map



(St. Cloud, MN - Official Website - Comprehensive Plan)

Site Analysis

Zoning Map

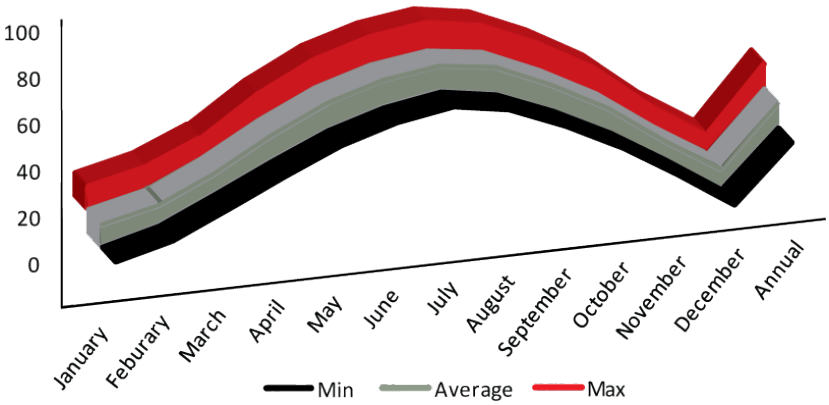


(St. Cloud, MN - Official Website- Land Development Code)

Site Analysis

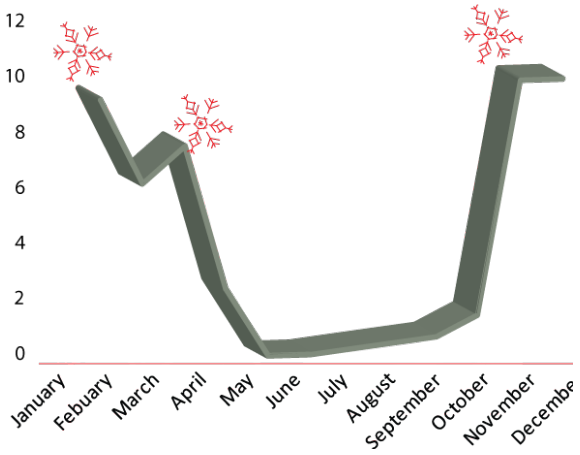
Climate Data

Average Temperature in Degrees



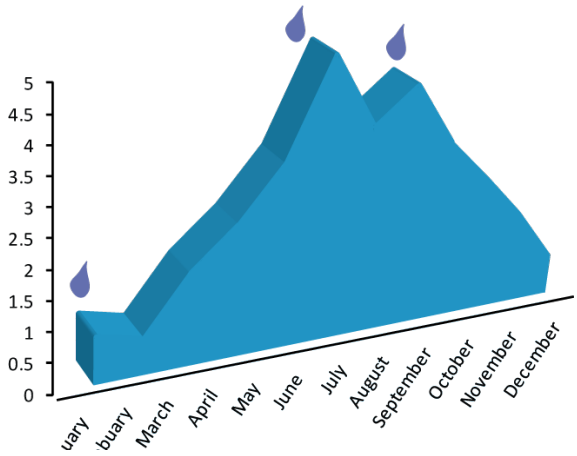
(Data Found at: St. Cloud, Minnesota Average Temperature, 2008)

Average Snow Fall in Inches



(Data Found at: Snowfall Summary - 217294 ST CLOUD WSO AP, MN)

Average Precipitation in Inches

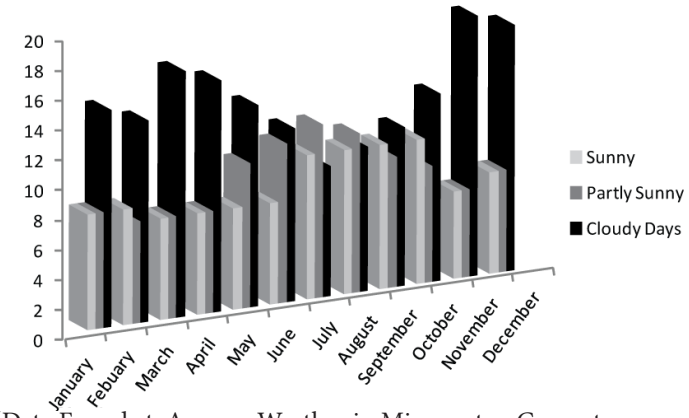


Information based on data from 1971 to 2000.
(Data Found at: Precipitation Summary - 217294 ST CLOUD WSO AP, MN)

Site Analysis

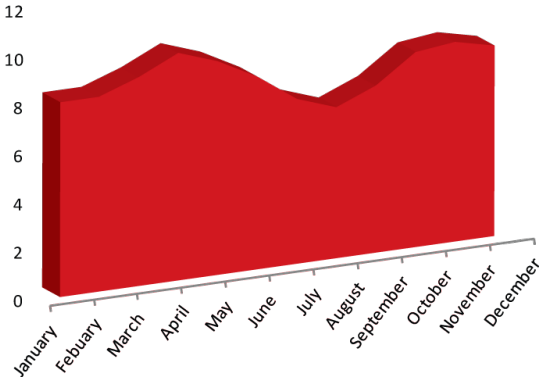
Climate Data

Average Days of Sunshine Each Month



(Data Found at: Average Weather in Minnesota - Current Results)

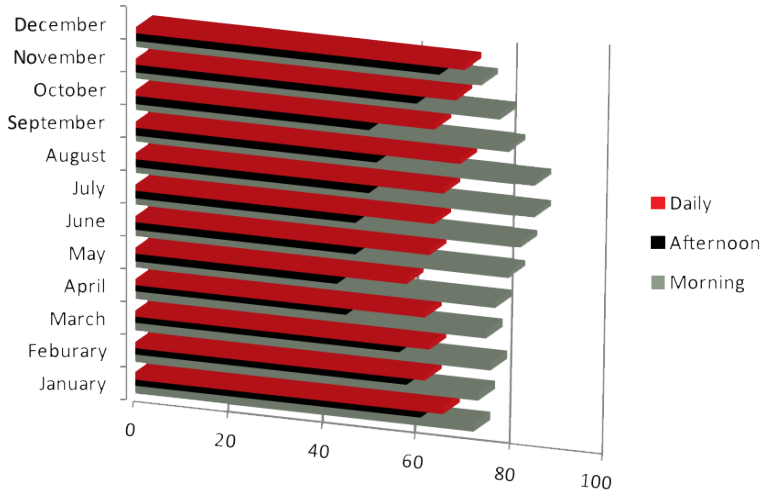
Average Wind Speed Mph



(Data Found at: Wind- Average Wind Speed- (MPH)

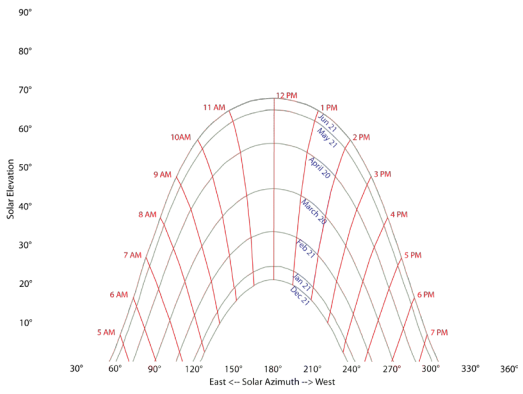
Average Humidity (%)

Daily average taken every 3 hours and morning taken at 6 a.m. and afternoon at 3 p.m.



(Data Found at: Average Weather in Minnesota - Current Results)

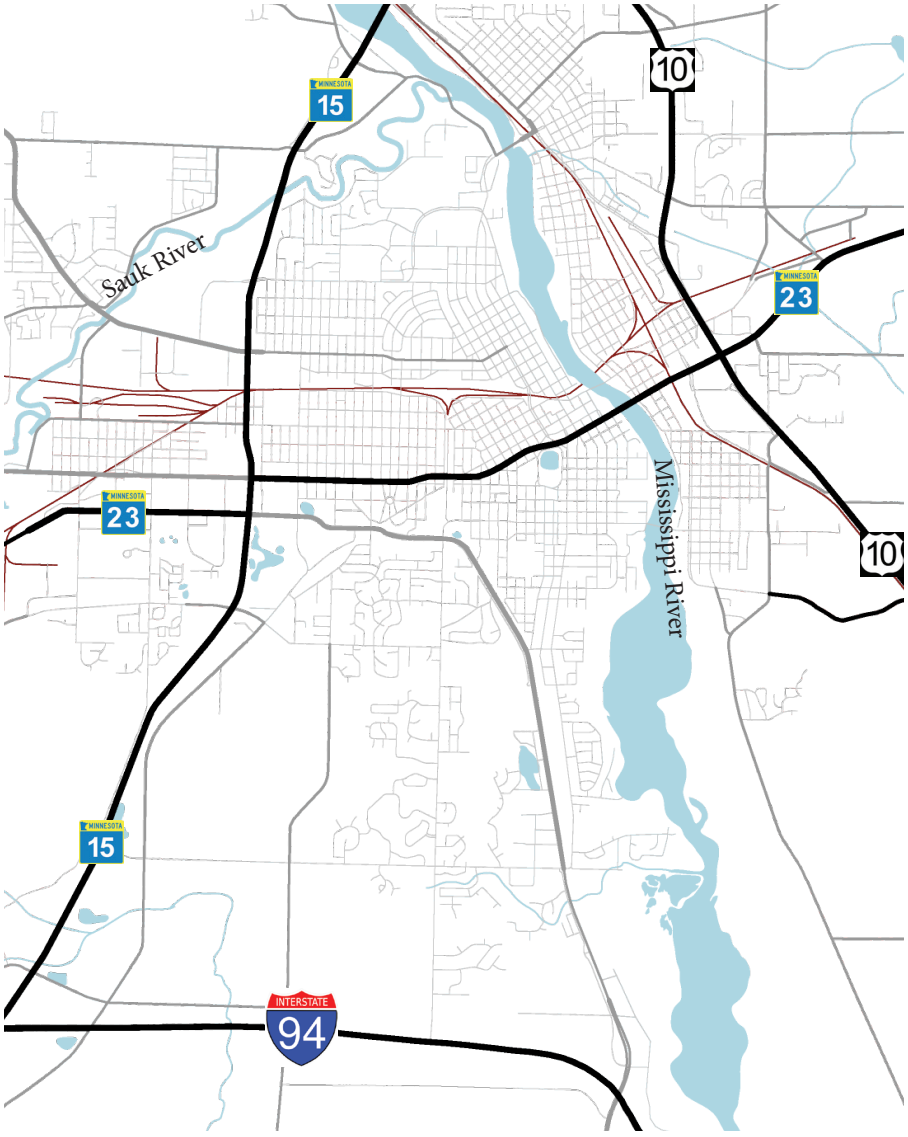
Sun Path



(Data Found at: UO SRML: Sun chart program)

Site Analysis

Traffic Circulation

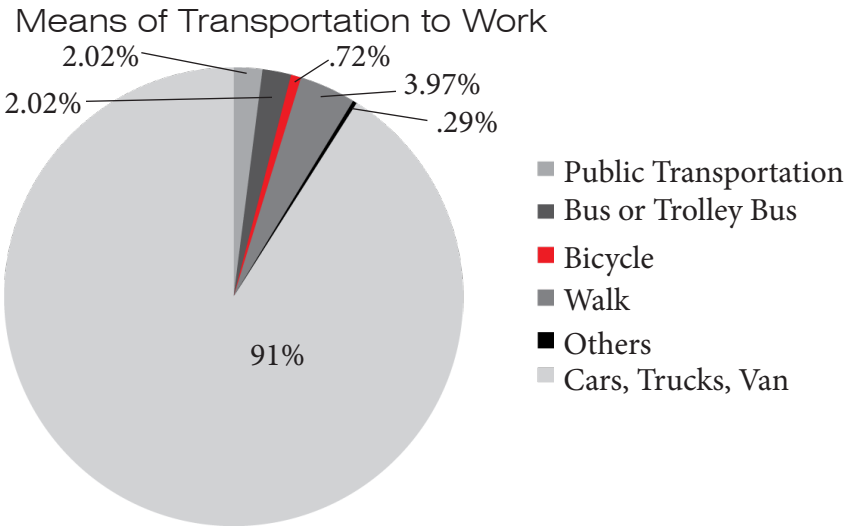


Key

- Major Roads
- County Roads
- Minor Roads
- Railroad

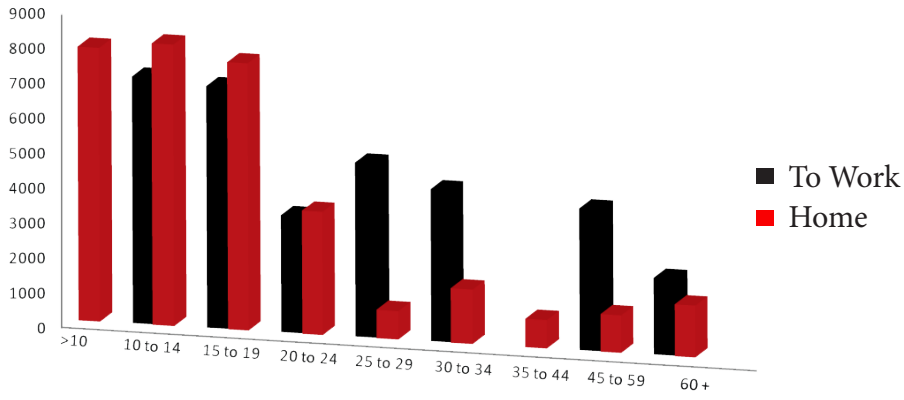
Site Analysis

Transportation Data



(Data Found at: American Fact Finder)

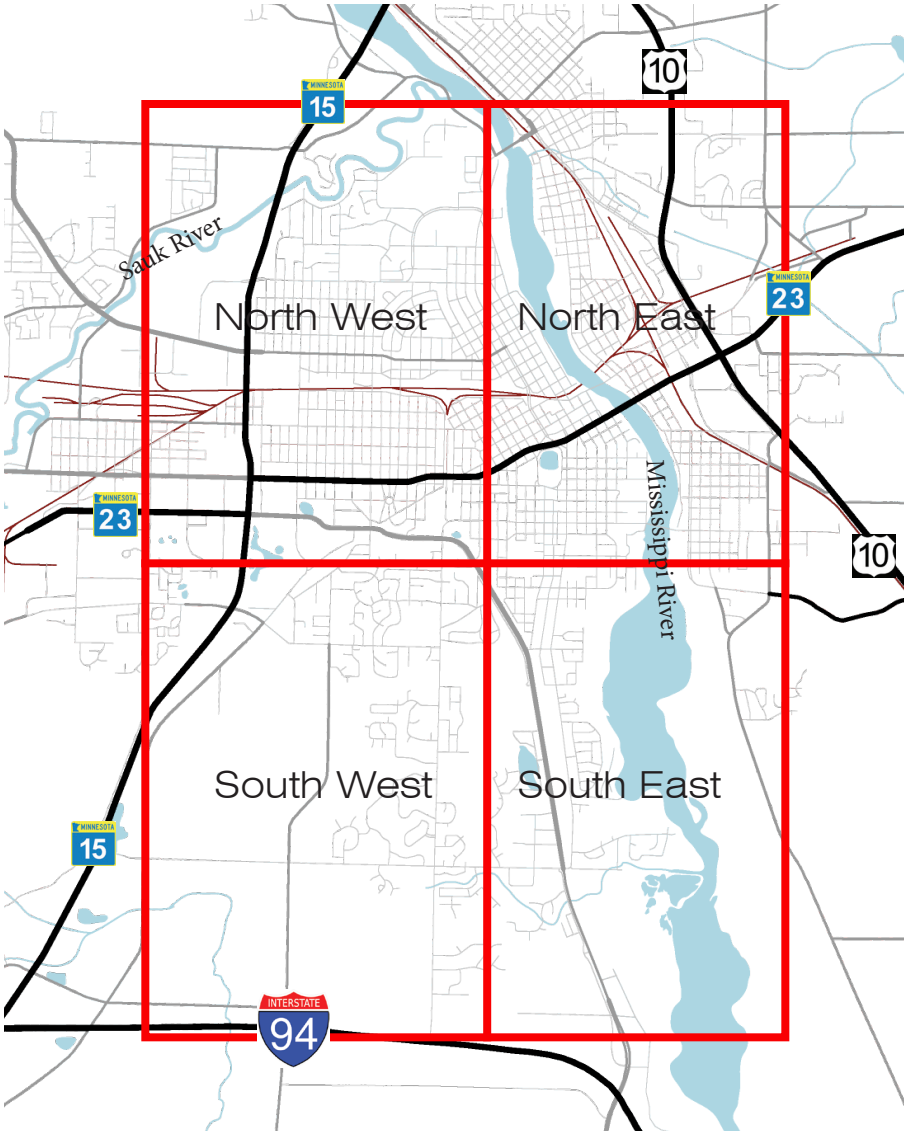
Time Traveling to Work and Home



(Data Found at: American Fact Finder)

Site Analysis

Views



Site Analysis

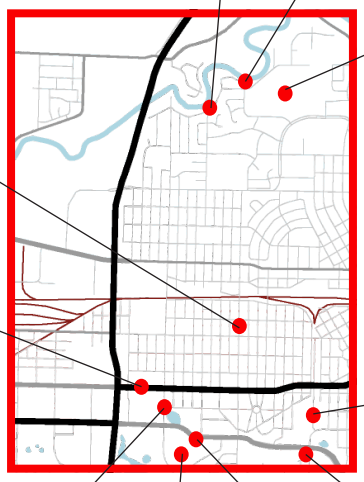
North West

Path along the Sauk River.

Neighborhood path to bring people to nearby parks and trails.

Whitney Park has a dog park, soccer, baseball, softball feilds, and playgrounds.

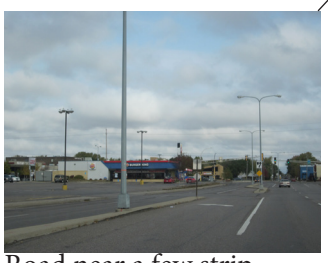
Busy road through town lined with houses.



An extension of the Beaver Island trail that was added near a local grocery store.

Commercial area of town that has four lane wide roads with sidewalks right on the street.

Well-traveled road that has no place for pedestrian travel.



Road near a few strip malls that is wide and unwalkable.

Wide arterial street.

An unfriendly pedestrian intersection that can be found throughout town.

Site Analysis

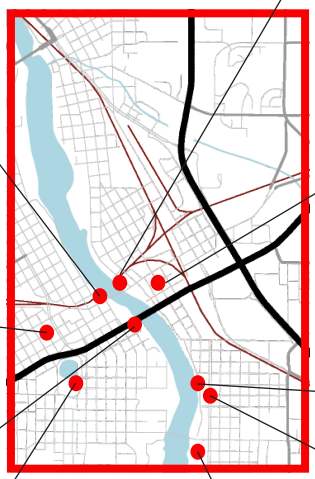
North East

Bridge over the Mississippi River into downtown.

Downtown street.

Major road that goes through the entire town. Downtown region has recently been redone.

Lake George is a park that has been recently restored. Walking trails and playgrounds have been added.



Riverside Park has a splash pad, playgrounds, and a sledding hill in the winter.

Street along the river with sidewalks on both sides of street.

Older neighborhood street near the river.

Munsinger Garden is a flower garden located along the river.

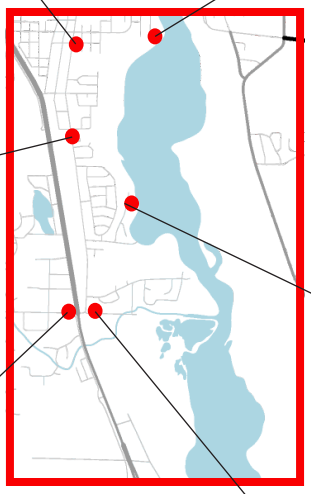
Old road that runs next to Munsinger's with sidewalks on one side, while on the other side the sidewalks are scattered or removed.

Site Analysis

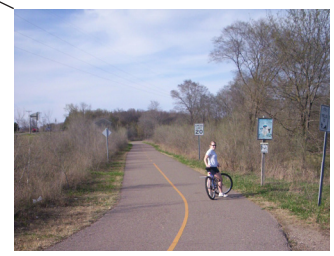
South East

Older residential street near the Jr. High school.

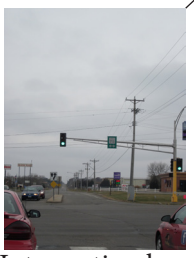
Beaver Island trail along the river near the college.



Wide residential road with a sidewalk right next to the street.



Beaver Island trail.



Intersection by Beaver Island trail with lack of connection from opposite side of the road.

Beaver Island Trail near the business area along Highway 75.

Site Analysis

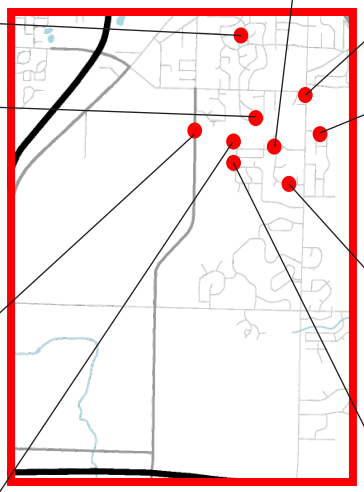
South West

Neighborhood Park with a small pool.

Newer neighborhood street with sidewalks.

City street with bike lane on one side of the street.

Neighborhood trail to elementary school.



Neighborhood street without sidewalks.

Housing near elementary school with no sidewalks to the school.

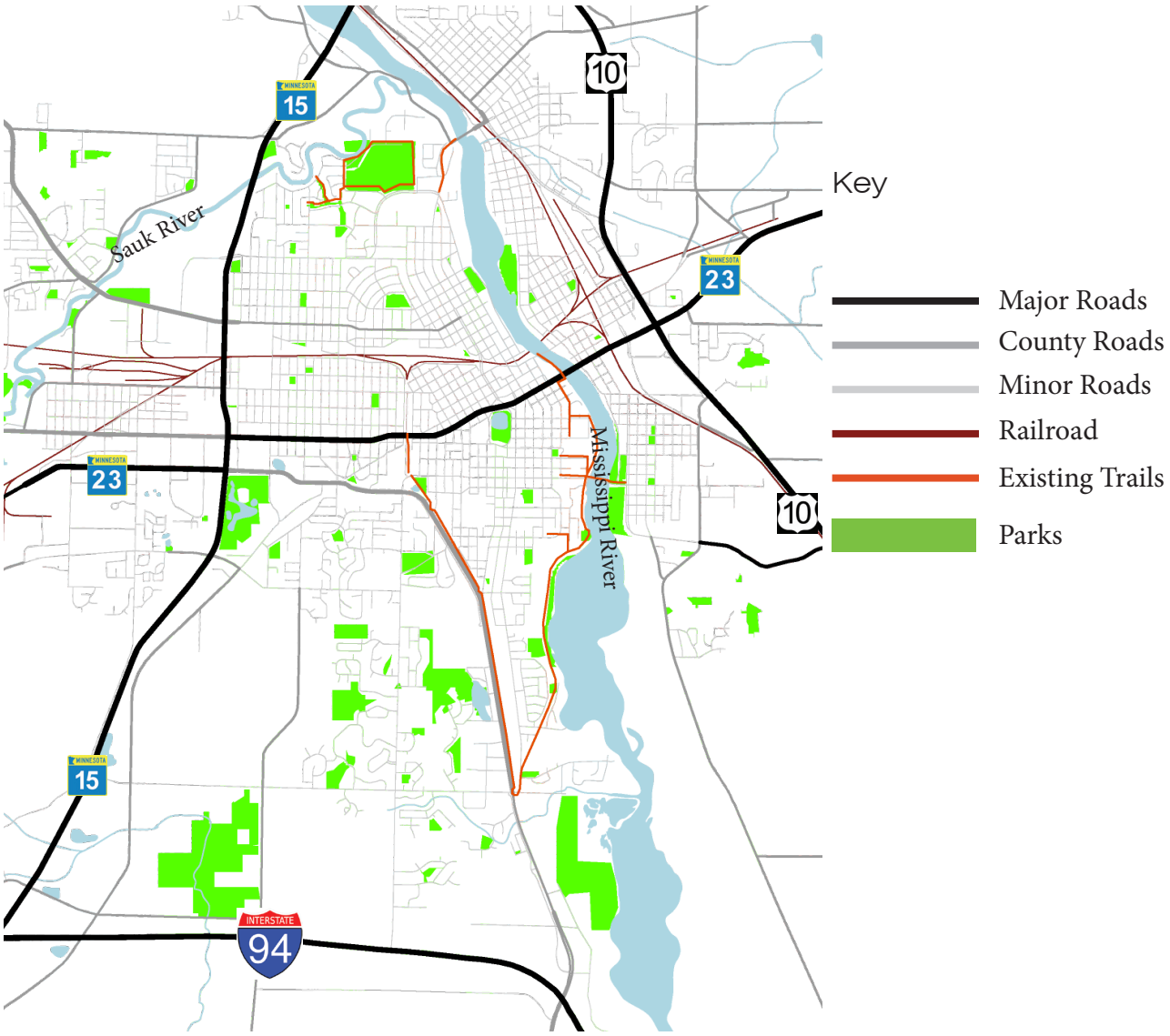
Neighborhood Park.

Natural area near elementary school with a path through the woods.

Trails entering the back side of the elementary school from neighborhoods.

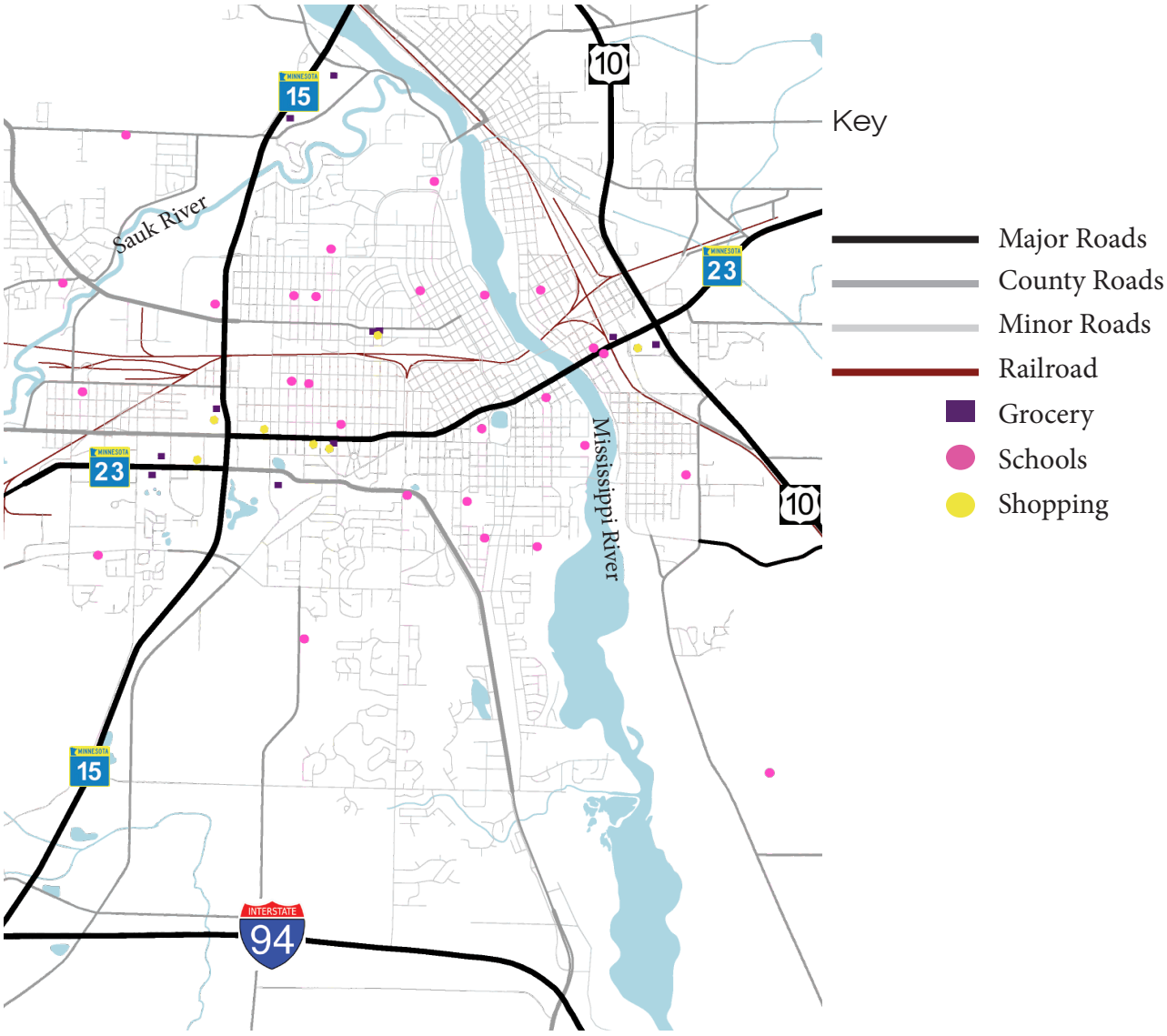
Site Analysis

Existing Parks & Trails



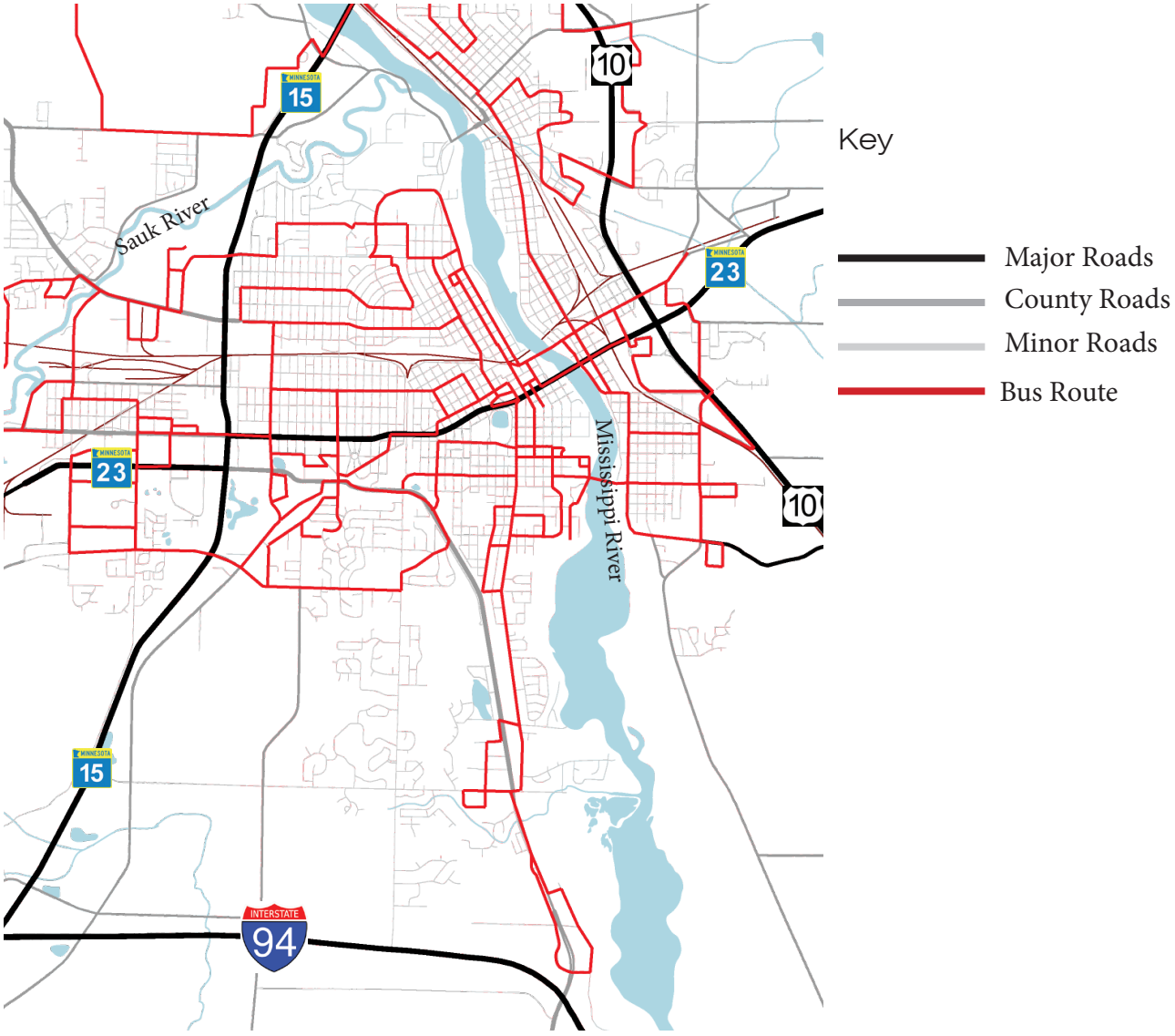
Site Analysis

Major Destinations



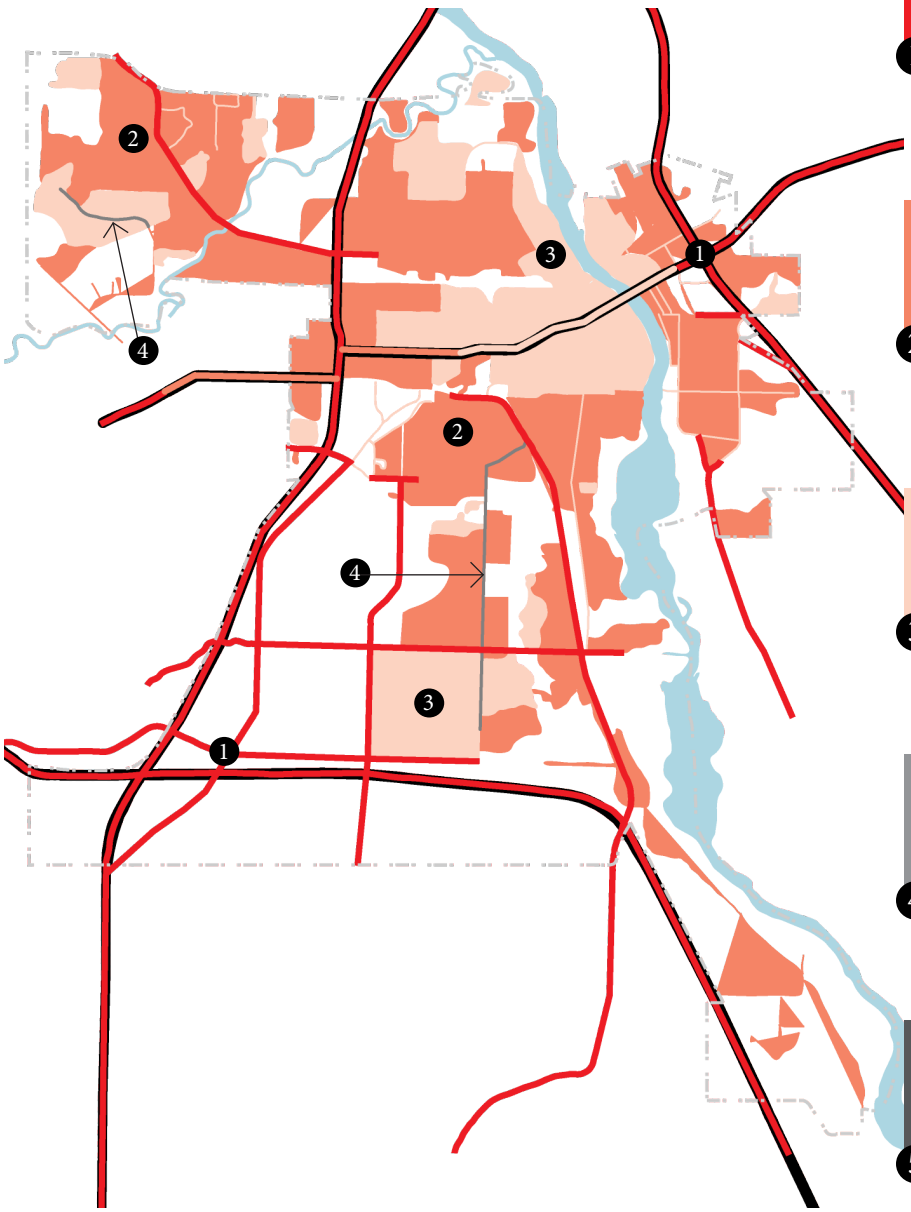
Site Analysis

Public Transportation



Site Analysis

Street Networks



Rating 1:
Roads that are only used for the car, traffic speeds are fairly high.

Rating 2:
Cars and pedestrians/ bikers can use this road. No designated lane/sidewalk and lacks connections.

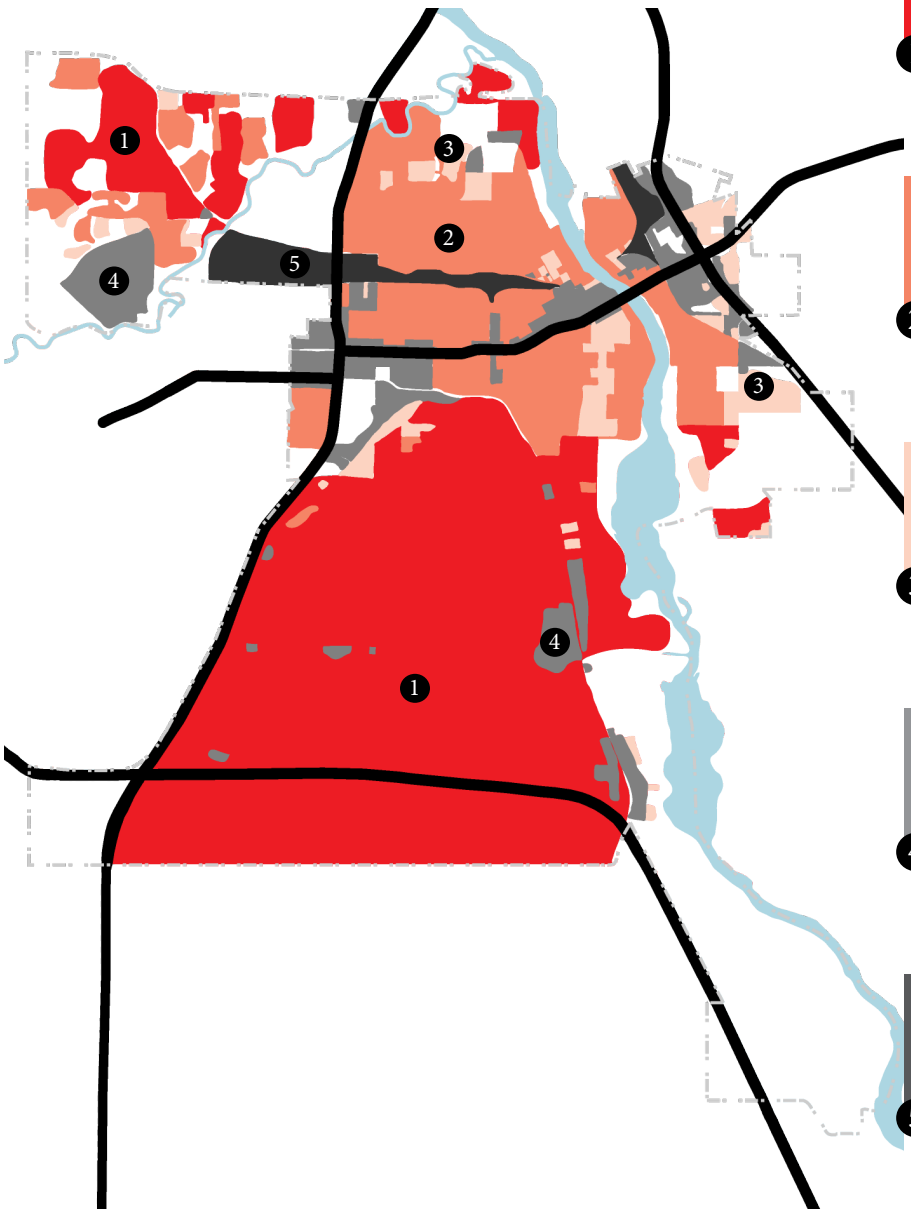
Rating 3:
Roads used for cars and sidewalks or bike lanes located near the streets gpt pedestrians and bikers.

Rating 4:
Roads can be used for cars, bikes, and pedestrians. Street with sidewalks and designated bike lanes.

Rating 5:
High quality roads that are used by cars, bikers, and pedestrians. Well maintained and used daily.

Site Analysis

Density/Land Use Map



Low Density:
1-4 units per acre.
Suburban homes.

Medium Density:
5-15 units per acre.
Downtown houses, older areas of town.

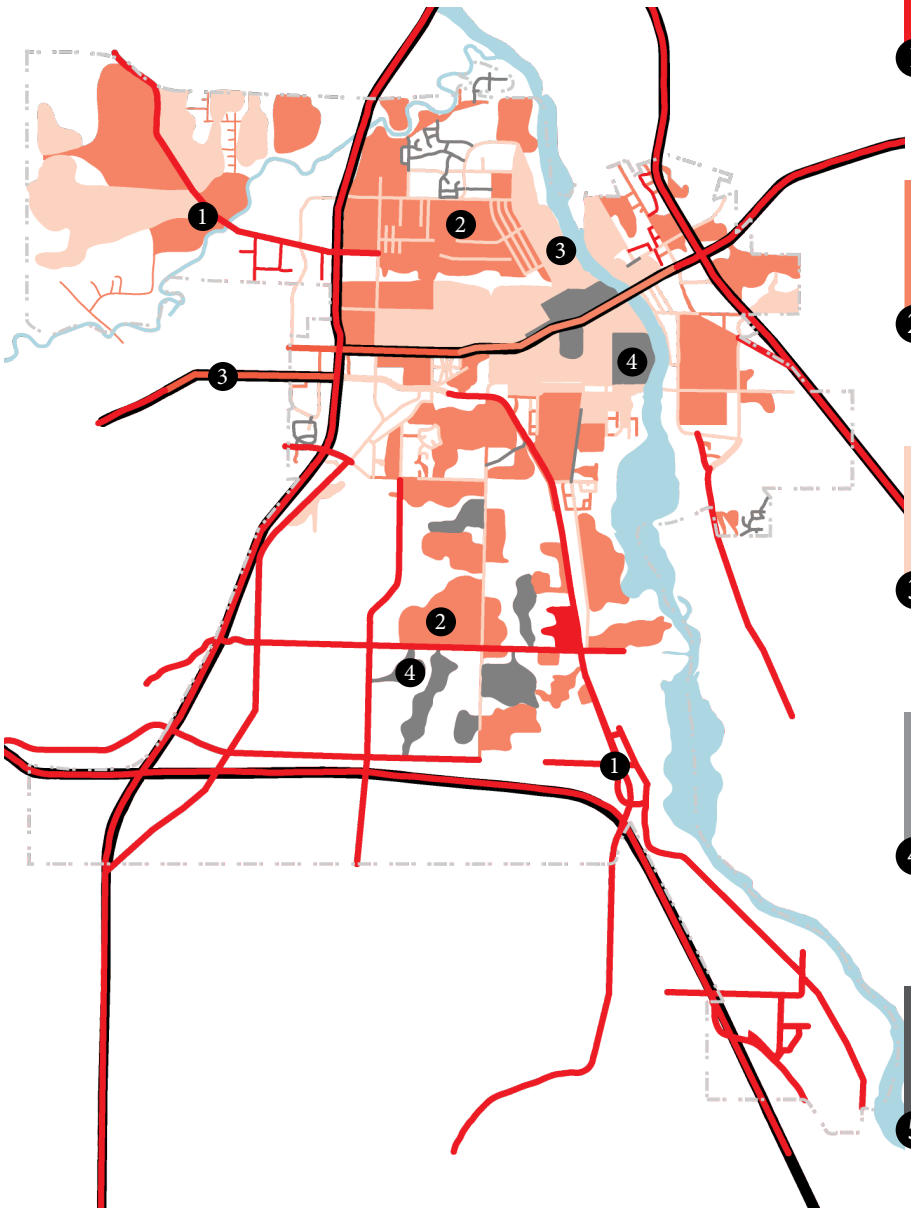
High Density:
15+ units per acre.
Apartment living areas.

Commercial:
Businesses ranging from small to large scale.

Industrial:
Found around railroad with large warehouses.

Site Analysis

Supportive Site Design



Rating 1:
Street doesn't support any pedestrian or bike traffic.

Rating 2:
Street provides room for travel, but it doesn't have built structures for travel.

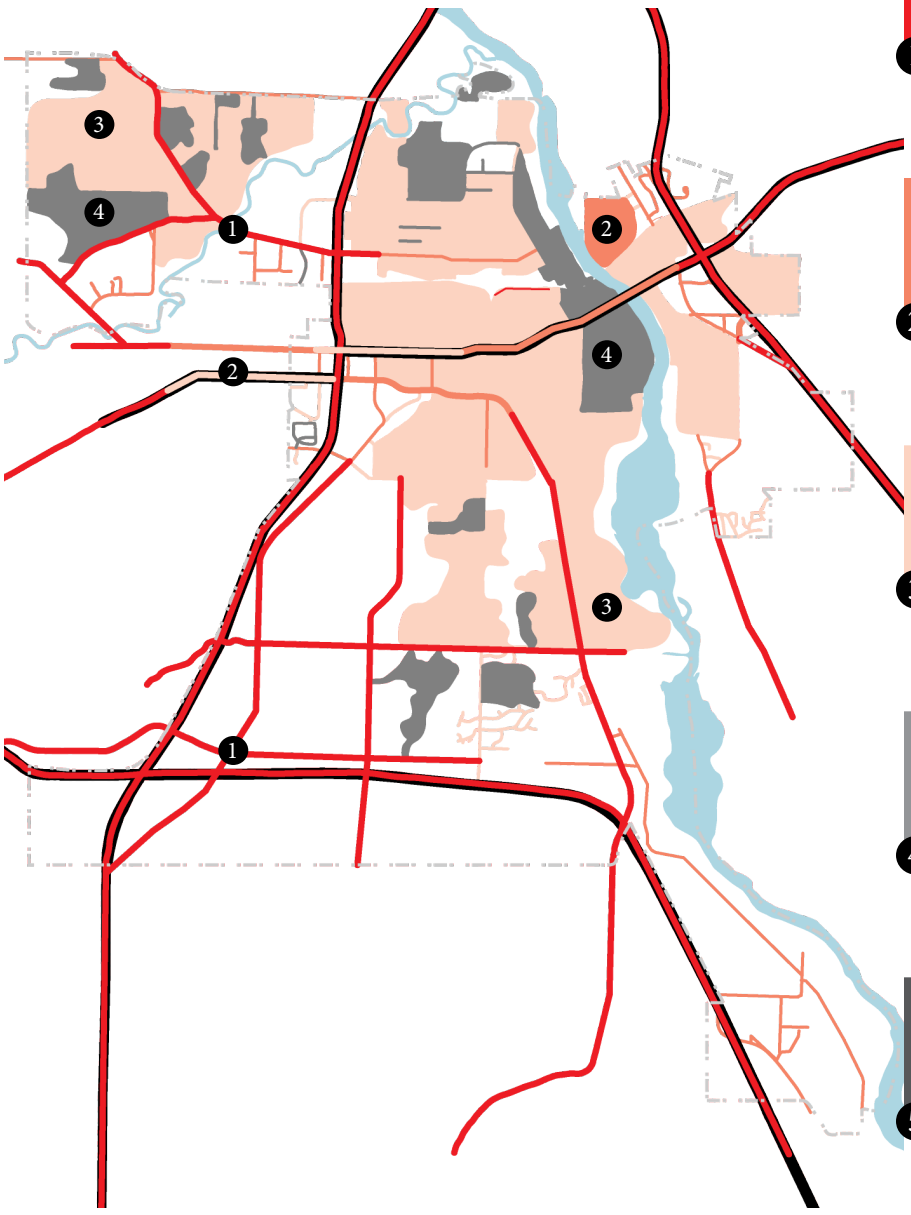
Rating 3:
Supports some pedestrian travel, but lacks close buildings and little to no amenities.

Rating 4:
Supports pedestrian travel with close buildings. Amenities are present, but are scattered along the street.

Rating 5:
Supports pedestrian travel with nearby buildings, benches, public art, and strong character.

Site Analysis

Umbrella of Safety



Rating 1:
Street feels extremely unsafe for walking and biking.

Rating 2:
Streets feel unconformable, but has a light amount of pedestrian traffic.

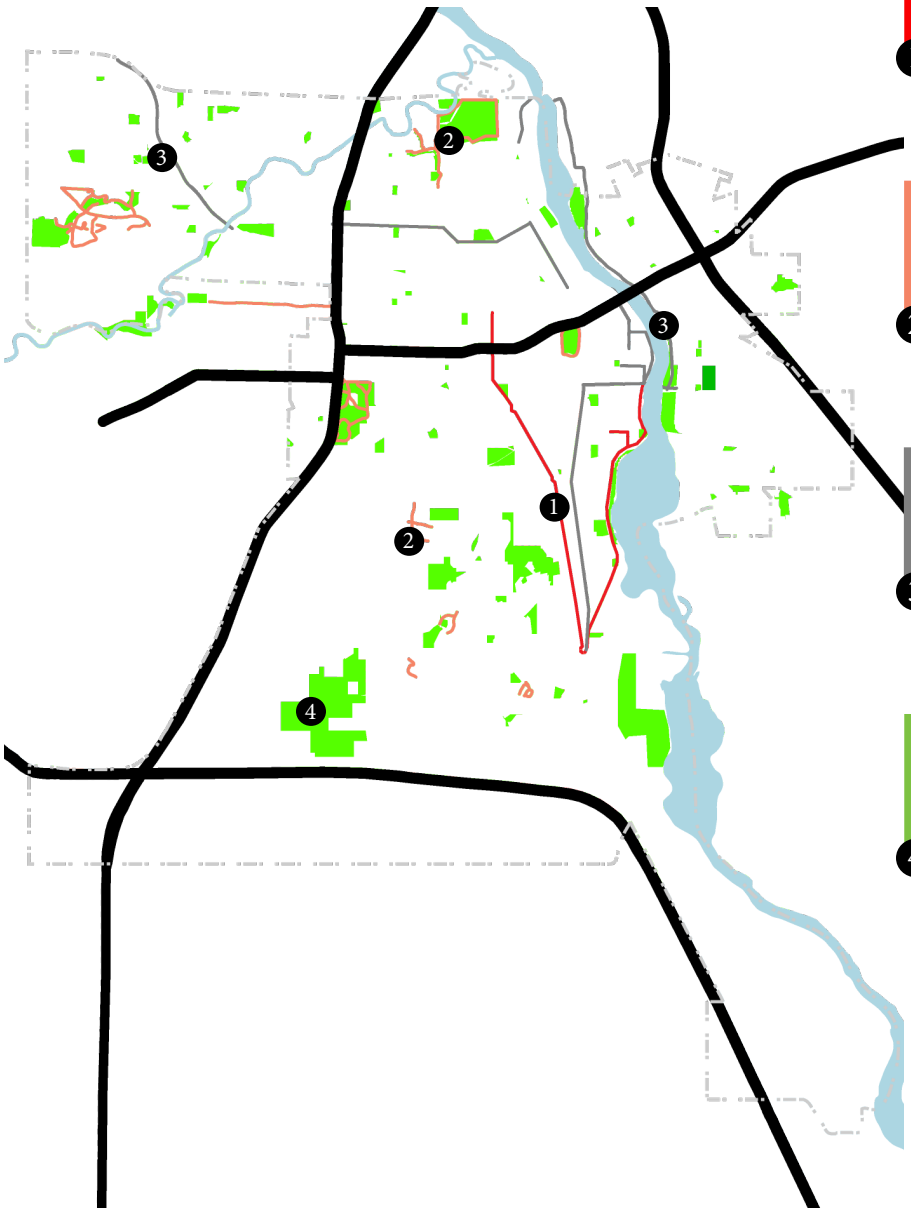
Rating 3:
Relatively safe for both pedestrians and bikers. Slight uneasy feeling, but won't discourage travel.

Rating 4:
Roads can be used for the car, bike and pedestrian. Street with sidewalks and designated bike lanes.

Rating 5:
High quality roads that are used by cars, bikers, and pedestrians. Well maintained and used daily.

Site Analysis

Existing Path Classifications



Bike & Walking Paths:
Separated from vehicular traffic and cannot be used by motorized vehicles.

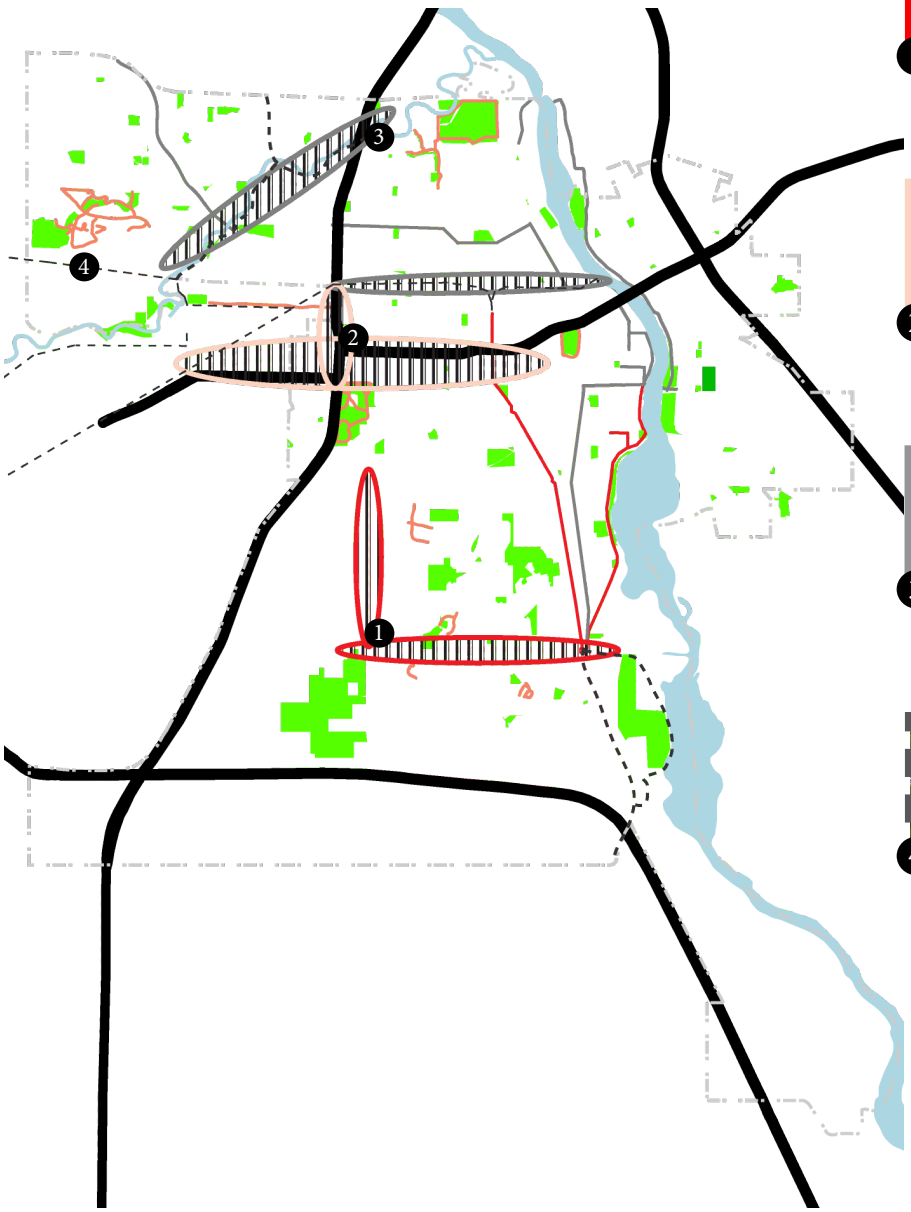
Neighborhood Trails:
Trails help connect neighborhoods and provide a space for recreation.

Bike Routes
These bike and walking trails are marked trails, but they are along sidewalks.

Parks:
St. Cloud has many parks of various sizes located throughout the city.

Site Analysis

Focus Areas



Outline Roads: Fast speed roads located at the edge of town near the newer residential areas.

Main Corridor Roads: Roads located in the center of town with large amounts of traffic and destinations.

Pedestrian Pathways: Trails that are only for pedestrians located along the river and railroad.

Proposed Trails: Trails the city proposed that would connect to regional trails outside the city.

Programmatic Requirements

Explore and design a way to encourage the movement of residents of St. Cloud to increase their physical health.

To improve the street life, sidewalks will be added in both the residential and commercial areas of the city, providing spaces for social interaction. Street furniture will be incorporated along the sidewalks to provide resting spaces and to create a unique experience for residents.

Design the new streets to be scaled to the pedestrian and provide a safe and comfortable place for people to walk and bike.

Design a new street layout with the addition of bike lanes to create a safe place for travel.

A multi-use trail will fill in the missing gaps in the larger trail system in St. Cloud to create a large loop that can bring people around the entire city and connects neighborhoods, commercial areas, and parks.

Design

Concept Design
Master Plan
Final Design
Possible Plants
Final Boards

Concept Design

Overview

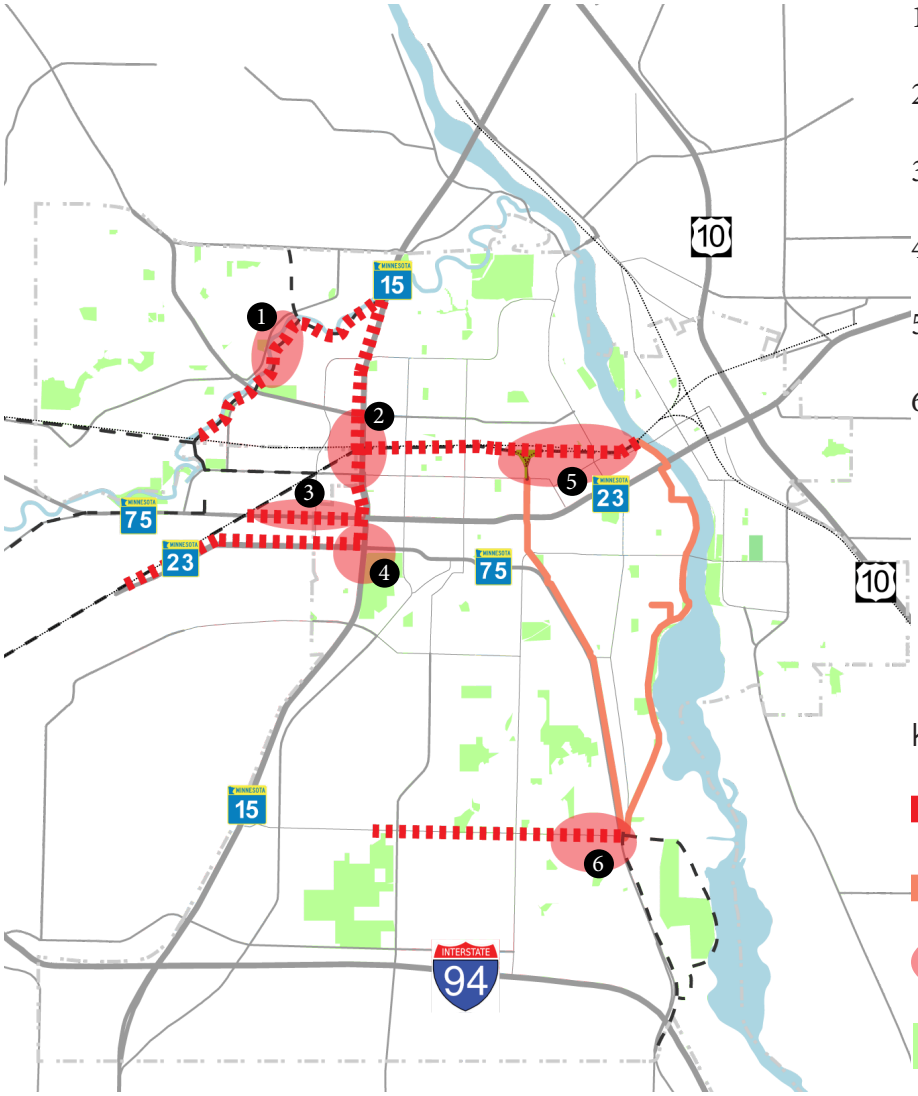
Starting the design phase I studied the analysis maps and found the areas around town that were lower in the rating systems on multiple maps. Looking at the exiting trail map and where the city proposed trails to connect outside of town trails were placed to fill in the large gaps. The concept master plan had six different areas of possible design interventions. Preliminary designs in each of the areas were designed to improve the condition of the area as well as creating unique character along the street. In completing the design concepts a few themes were found and design elements could be implemented in multiple design areas.

Going forward with design I had three main design goals that I wanted to accomplish. The goals included; encourage physical activity among the residents of St. Cloud to improve physical health, create a large continues pedestrian network throughout the city and connect to the greater trail system outside of town and finally encourage as many forms of alternative forms of transportation for all seasons. The design goals keep the final design on track to help answer the problem statement.

Starting the final design phase I knew I wasn't able to design all of the six areas into detail. Looking at the concepts and the themes that were found I was able to choose three final areas to design. The final design areas included Highway 23, 33rd Street and a park along the railroad tracks. Located in the central part of town, Highway 23 is a template for major street corridors and impasses an urban theme. Moving away from the central core of town to the residential area where urban sprawl has taken place is 33rd Street. The design of 33rd Street has a rural theme and is a template for similar roads. The final design of a park located in the central part of town along railroad tracks incorporates both the urban and rural theme to bring both areas of town into one place. The park shows how the existing trail system is connected and what the new railroad trail system would look like. The following pages show the concept master plan as well as the design for each of the six different areas. Follow the design concepts is the final master plan and the final drawings for each of the three areas.

Concept Design

Concept Master Plan



1. River Area
2. Highway 15
3. Highway 23
4. Intersections
5. Railroad
6. 33rd Street South

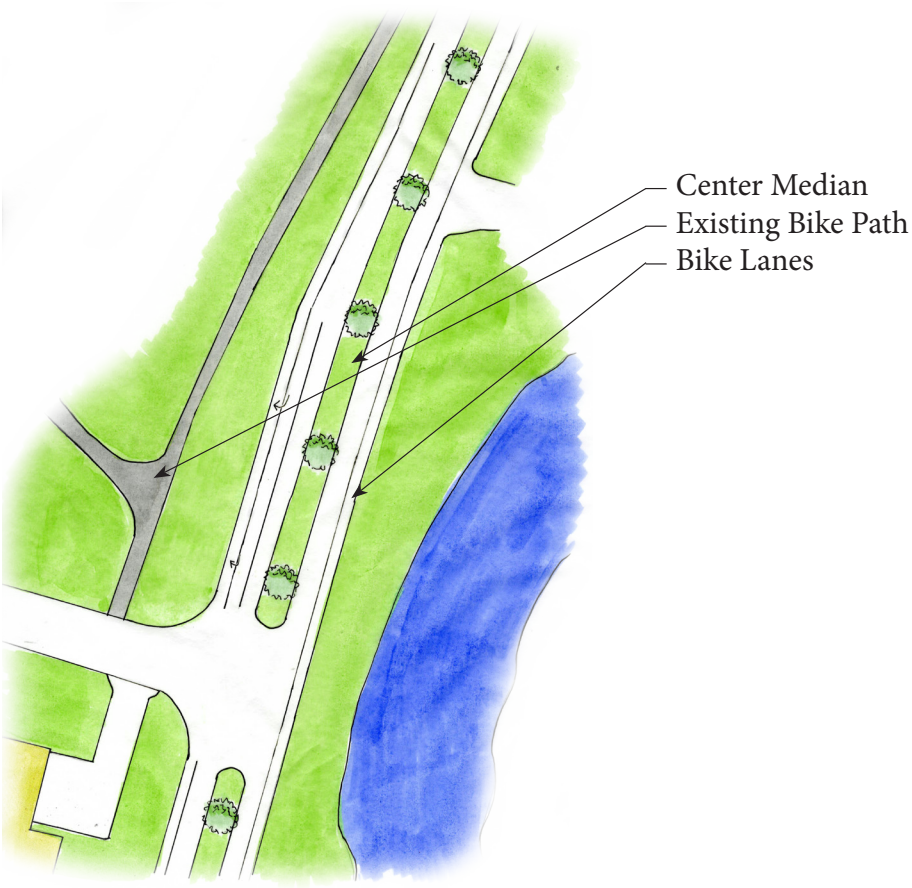
Key

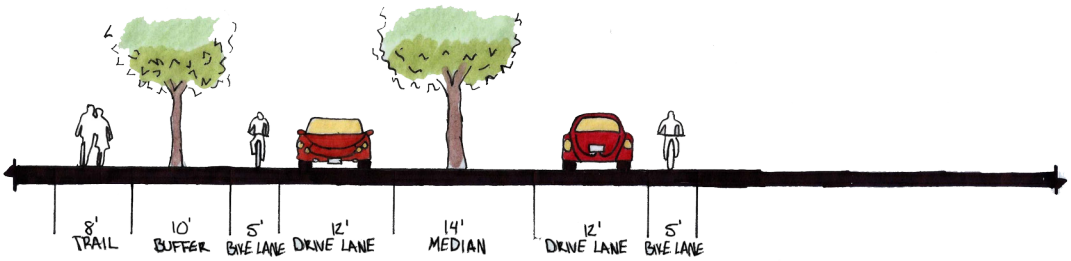
- New Trail Extentions
- Existinig Trail
- Focus Areas
- Parks

In conducting the inventory and anlysis six areas were found that if designed could help create a large network among the city.

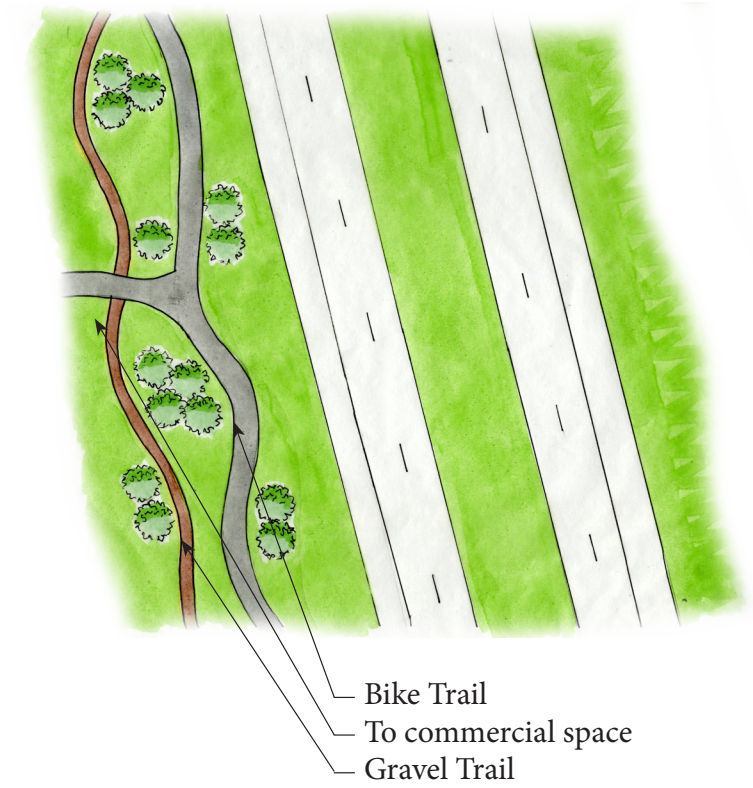
Concept Design

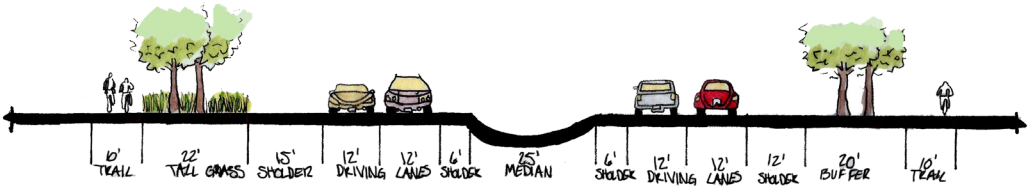
1 River Area



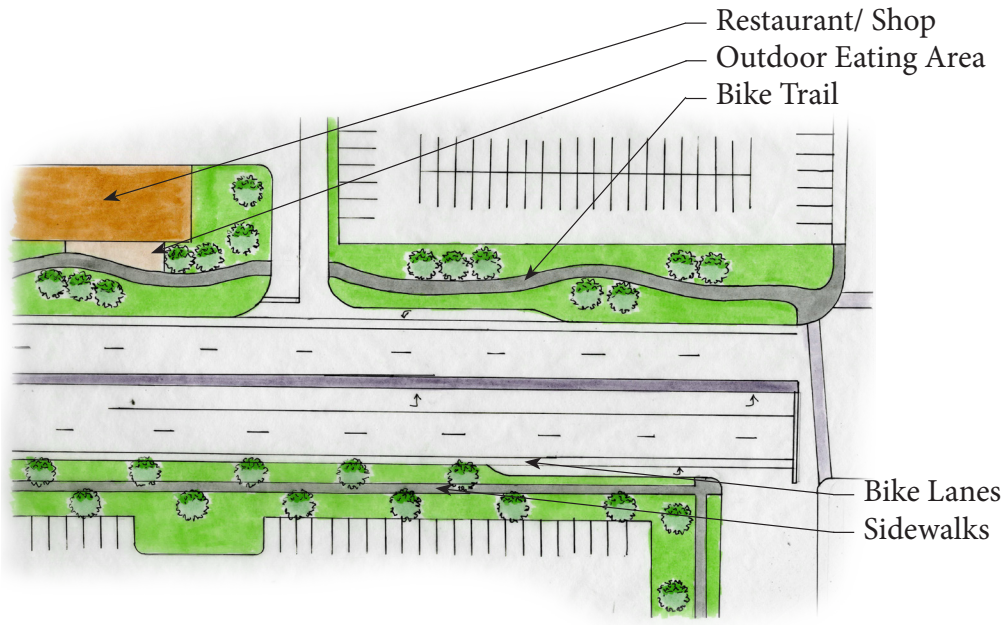


❷Highway 15

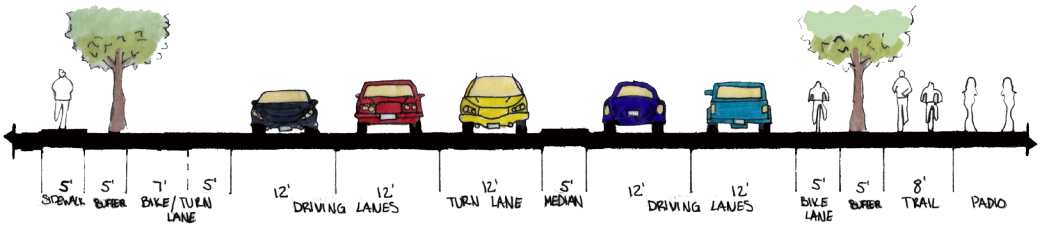

Bike Trail
To commercial space
Gravel Trail


6' TRAIL
22' TALL GRASS
15' SHOULDER
12' DRIVING
12' LANES
6' SHOULDER
25' MEDIAN
6' SHOULDER
12' DRIVING
12' LANES
12' SHOULDER
20' BUFFER
10' TRAIL

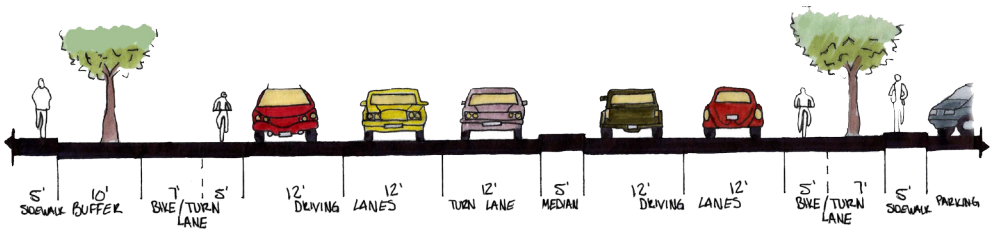
3 Highway 23



Patio Section

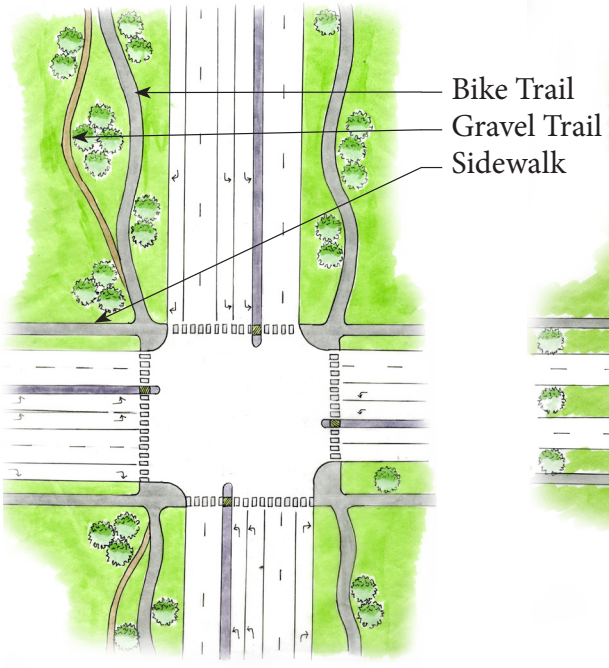


Bike Plans with Buffers

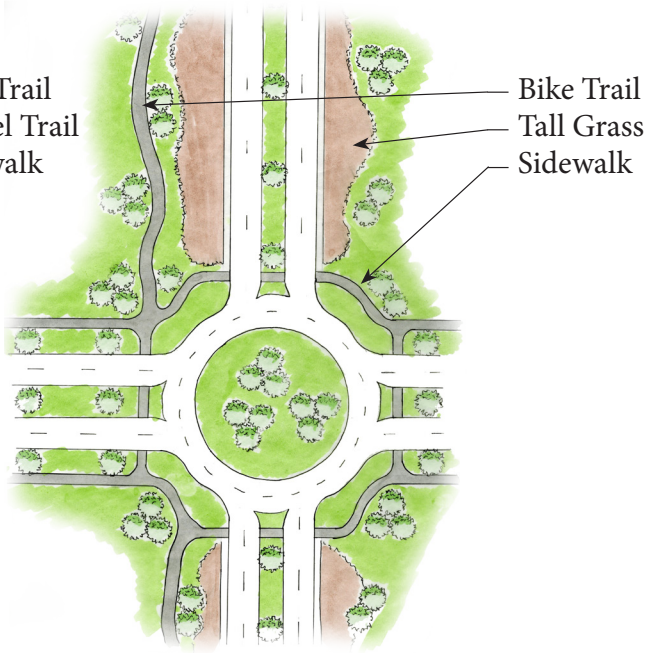


4 Intersections

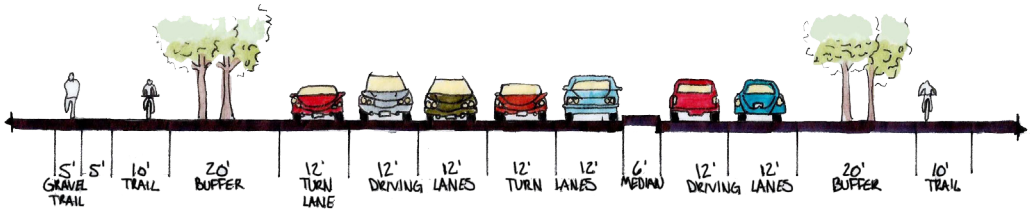
Tight Corner Concept



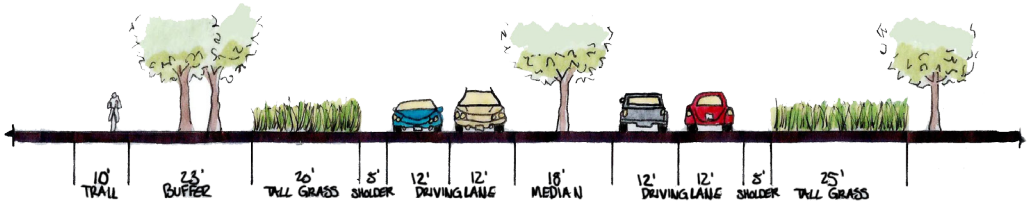
Roundabout Concept



Tight Corner Section

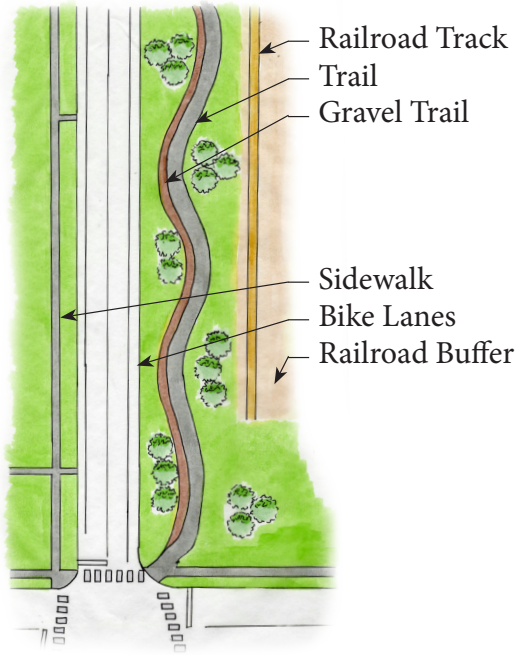


Roundabout Section

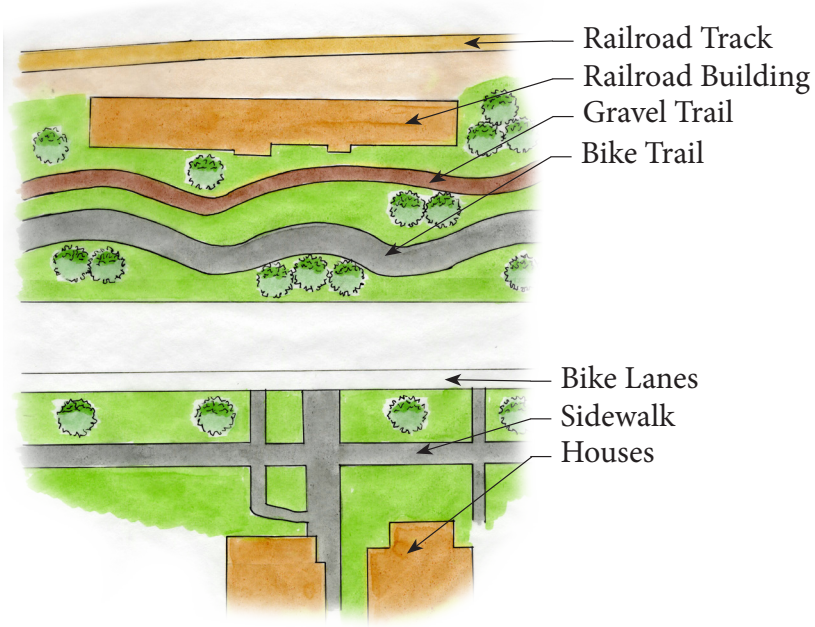


5 Railroad

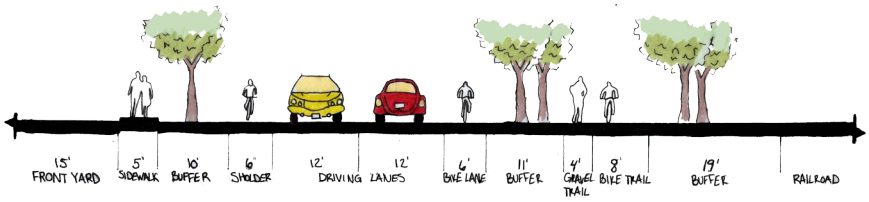
Connection Concept



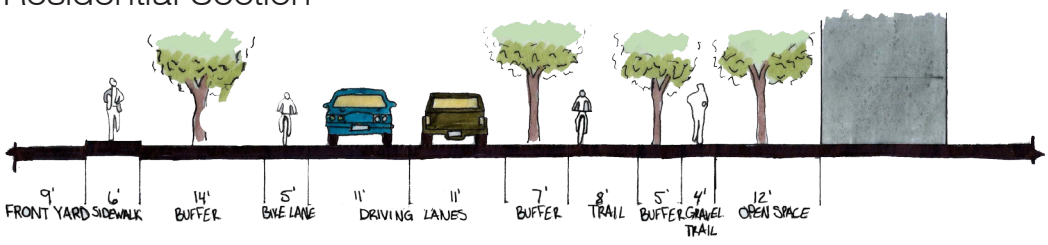
Residential Concept



Connection Section



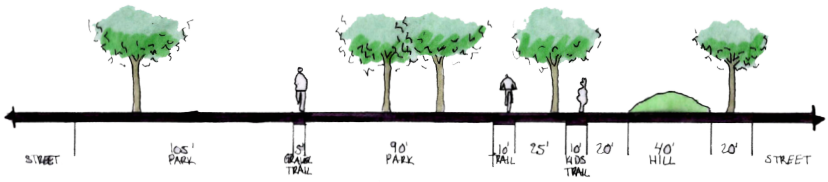
Residential Section



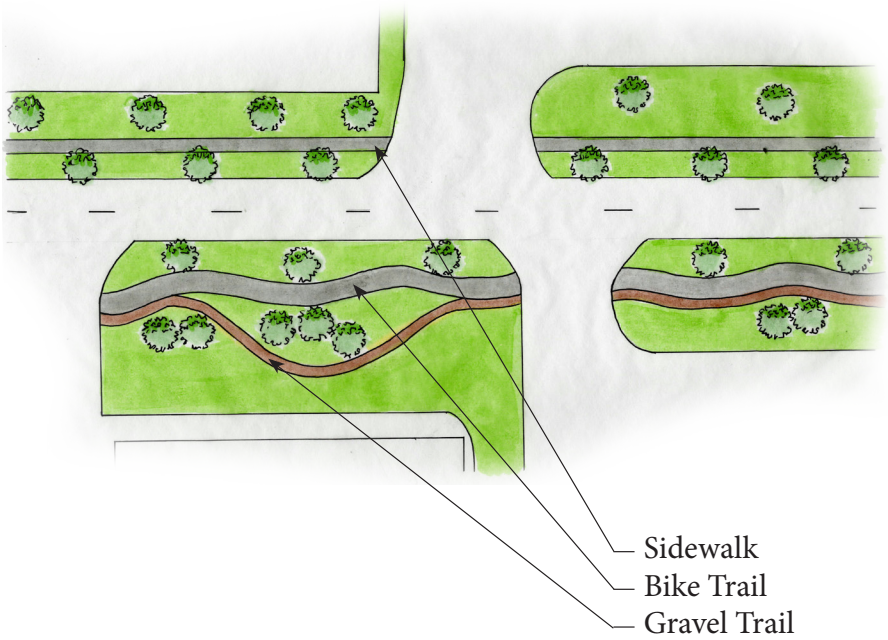
Concept Design

5 Railroad

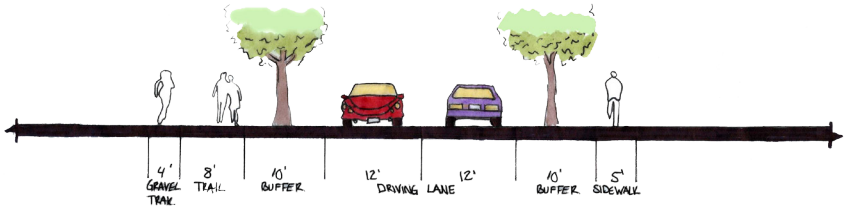
Park Section



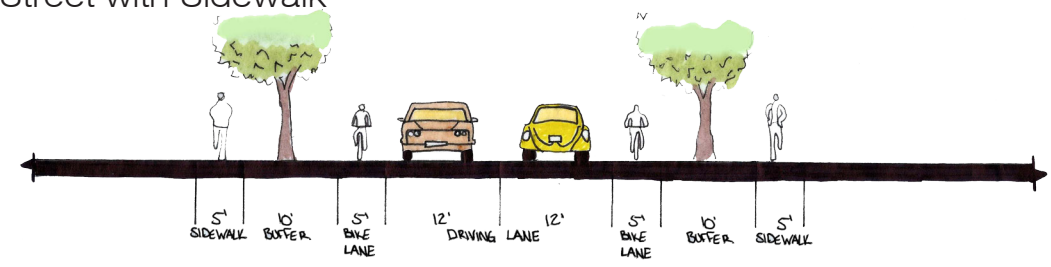
6 33rd Street



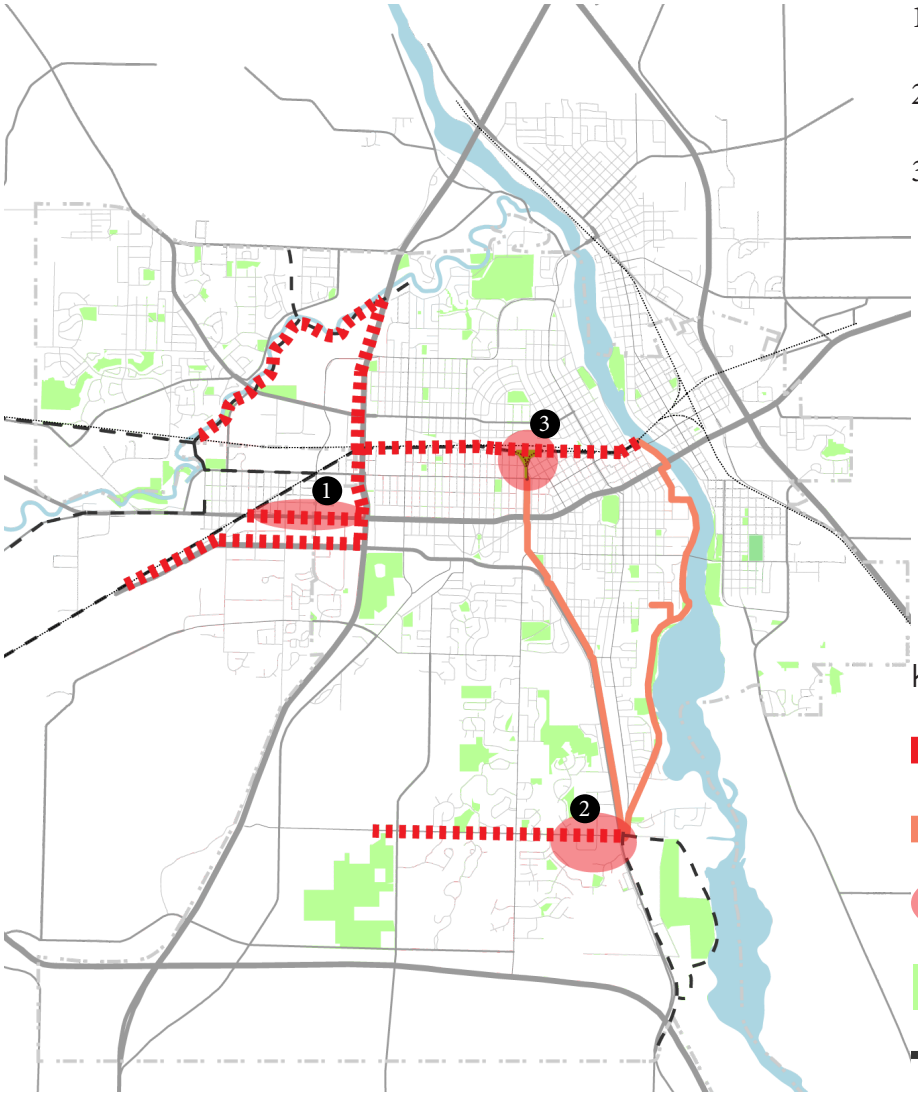
Street with Trail and Sidewalk



Street with Sidewalk



Master Plan



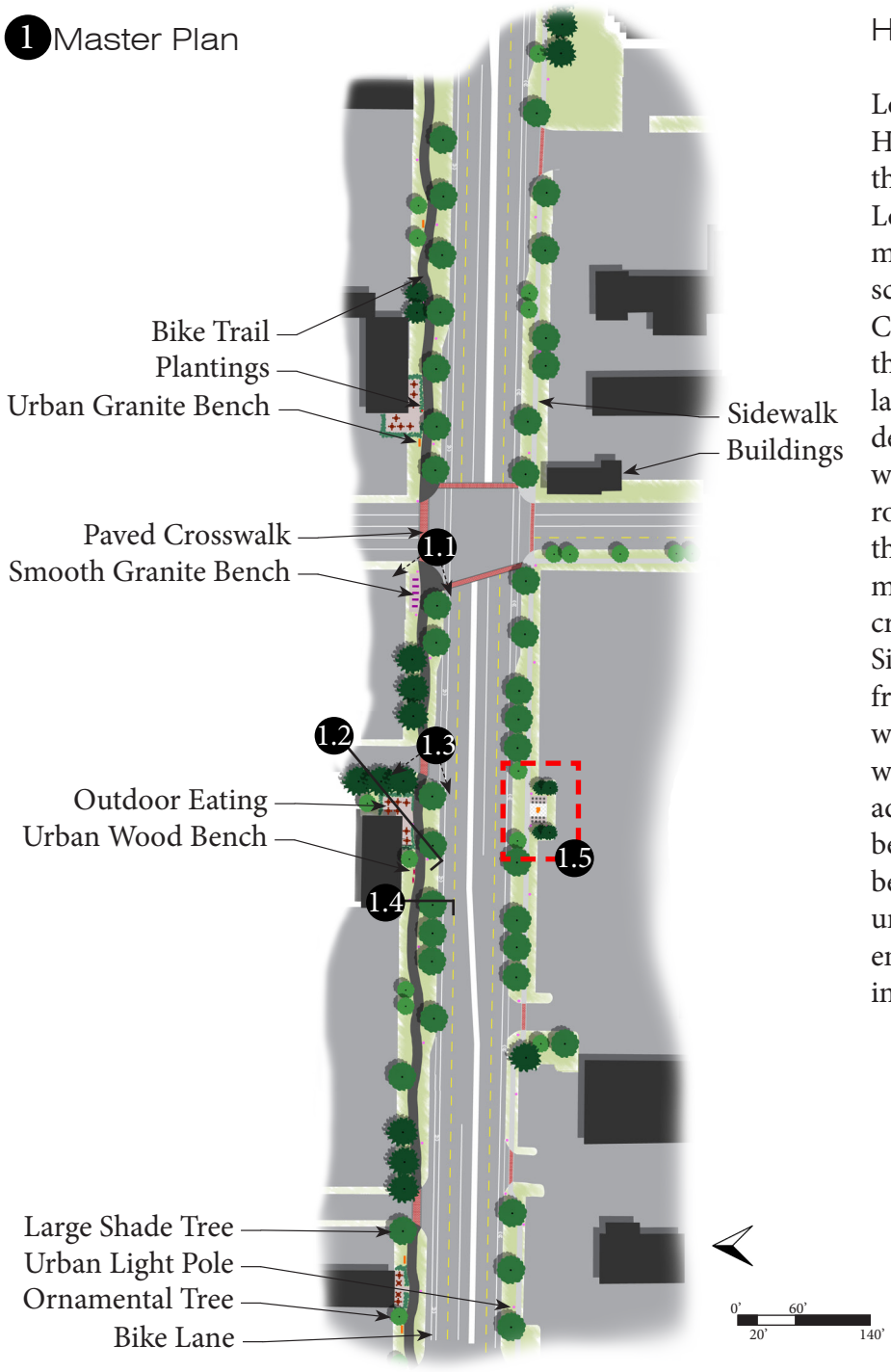
1. Highway 23
2. Railroad Park
3. 33rd Street

Key

- New Trail Extentions
- Existinig Trail
- Desgined Areas
- Parks
- Cities Proposed Trails

Highway 23

1 Master Plan



Highway 23 Narrative

Located in the central part of town Highway 23 is a major corridor that brings people through town. Located along the highway are many major destinations such as schools, restaurants, and shopping. Currently the road is designed for the automobile with wide driving lanes and little sidewalks. The new design of the road incorporates a wide bike trail on one side of the road with a wide buffer zone with the addition of trees. Business moved closer to the trail to help create a street life along the road. Sidewalks were moved away from the road and a buffer zones were created. Wide shoulders were reduced and a bike lane was added. Smooth clean lines can be found in light pole, granite benches and sculpture to create an urban theme. The new design will encourage pedestrian movement in the urban environment.

Highway 23

1.1 Night View of Benches

Left:

Urban Mile Marker

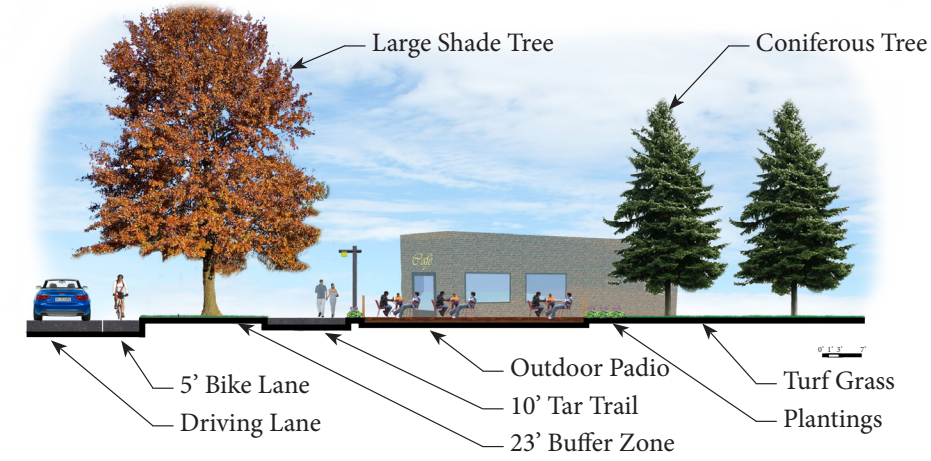
Far Left:

Smooth granite benches and trail markers are found along the trail in the urban area. Lights line the trail for illumination.

1.4 Mile Marker Detail

Highway 23

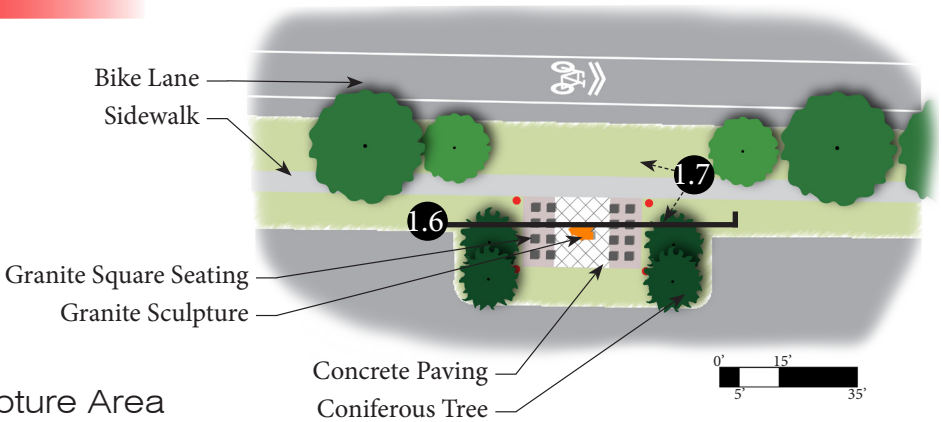
1.2 Fall Eating Section



1.3 Cafe Eating View with Trail

Right:
Pedestrians travel across stamped concrete crosswalk to the meandering bike trail that brings travelers to restaurants with outdoor eating that helps creates a comfortable street life along the road.

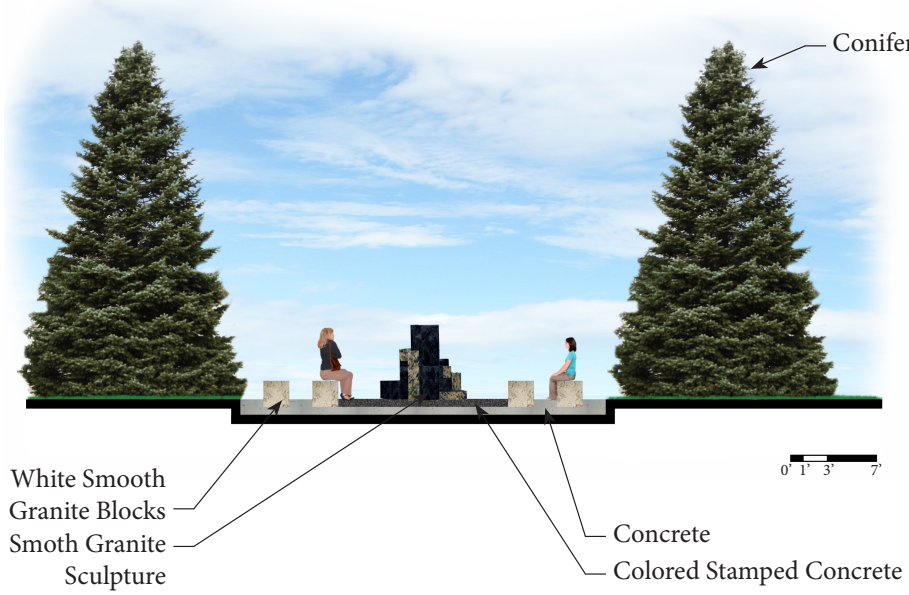
1.5 Sculpture Detail Plan



1.6 Summer View of Sculpture Area

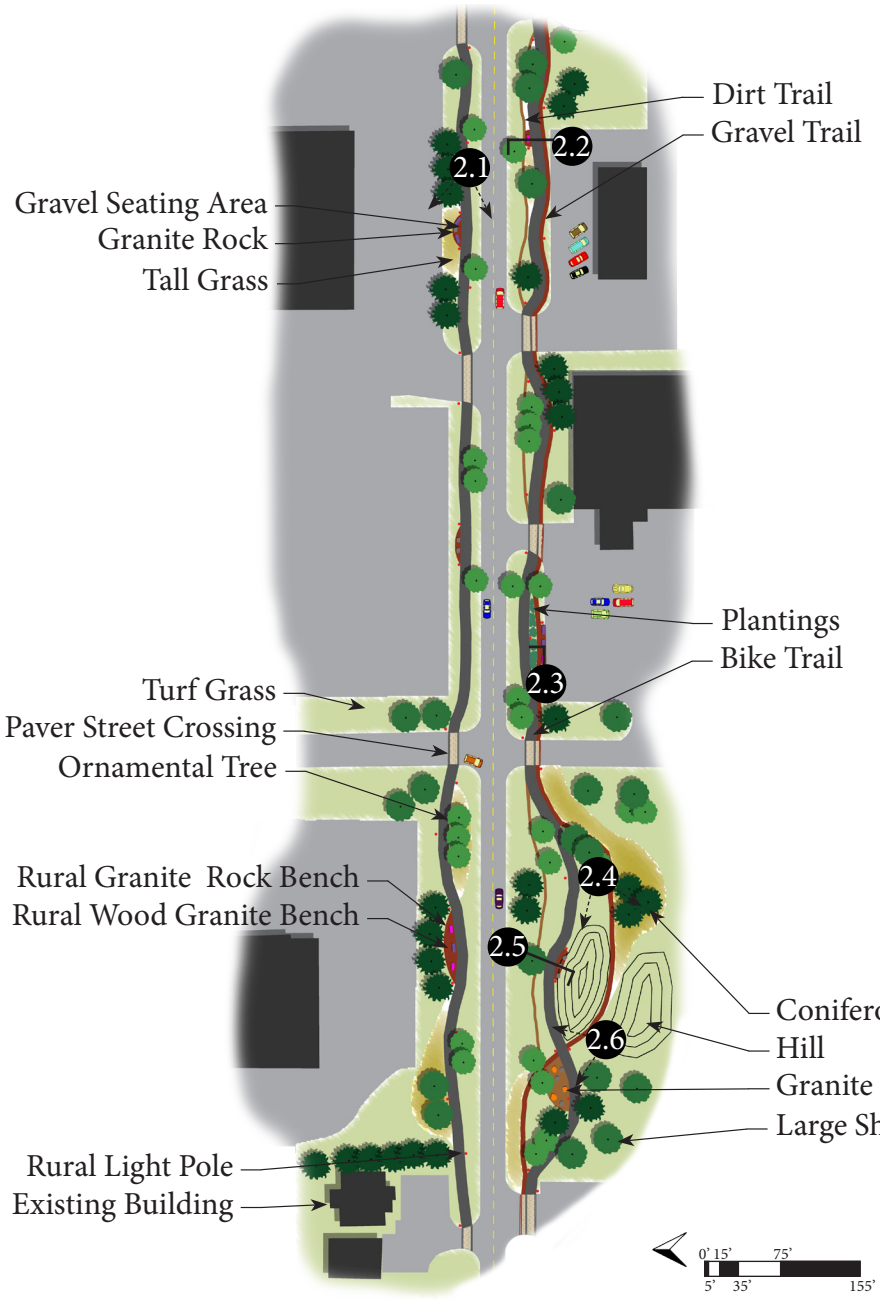
Left:
Smooth white granite blocks provide a place for seating around a granite sculpture.

1.7 Sculpture Section



33rd Street

2 Master Plan



33rd Street Narrative

On the south edge of town 33rd Street a major residential road currently has two lanes with little space for pedestrians. An existing bike trail system will continue along both sides of the road. In addition to the bike trail a dirt and gravel trail will meander in and out of the bike trail on one side. Fluid design in the light poles and natural cut granite benches, rocks and sculptures create a rural theme along the trail. Large granite rock sculptures tell a short history of the cities strong ties to granite. The addition of tall grass, trees and hill provide a different experience for pedestrians as they travel along the trail.

2.1 Trail Seating

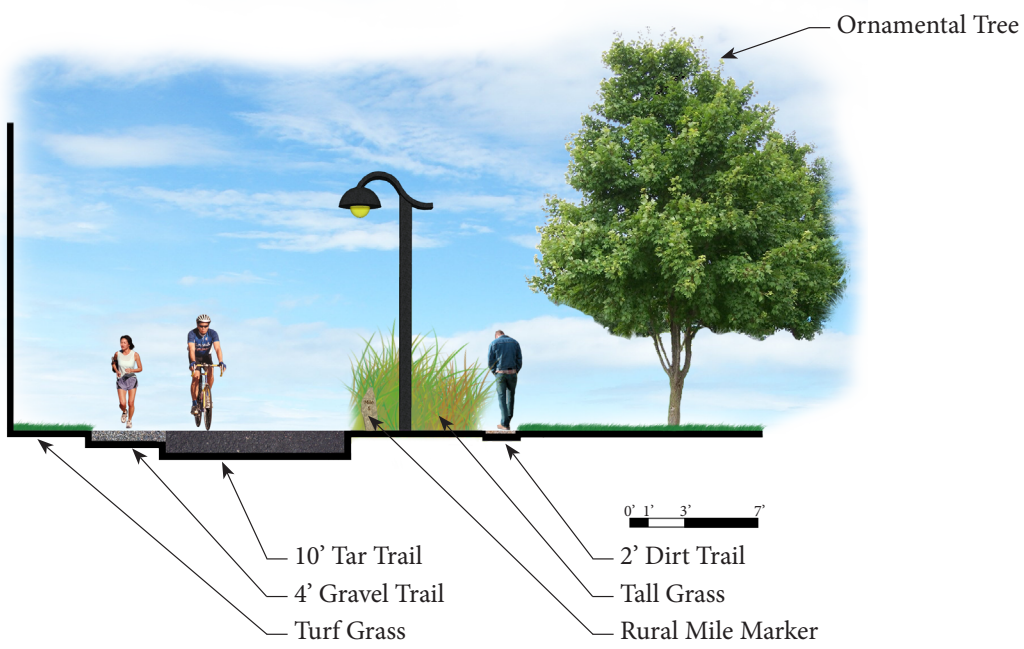
Above:

Rural mile marker

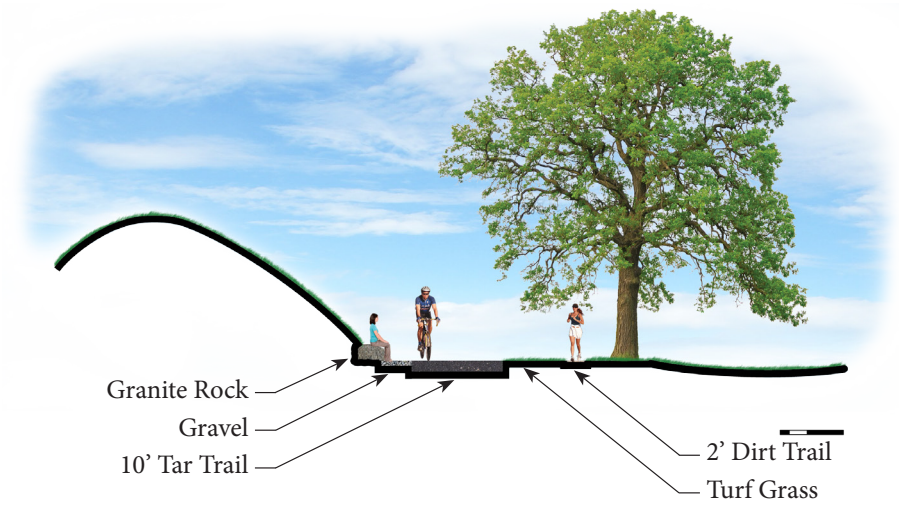
Left:

Tall grass frames out the granite seating area along the bike trail. Along the trail mile markers also made from granite. Trail can be used for biking, walking and rollerblading.

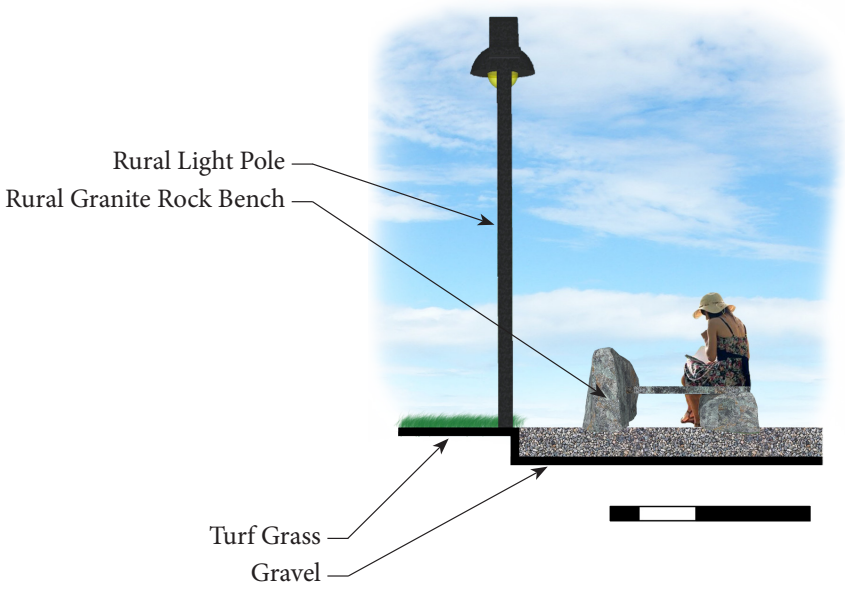
2.2 Milke Marker Section



2.5 Hill Seating



2.3 Bench Detail



33rd Street

2.6 Sculpture View

Above Right:
Example of how the sculpture would be carved.

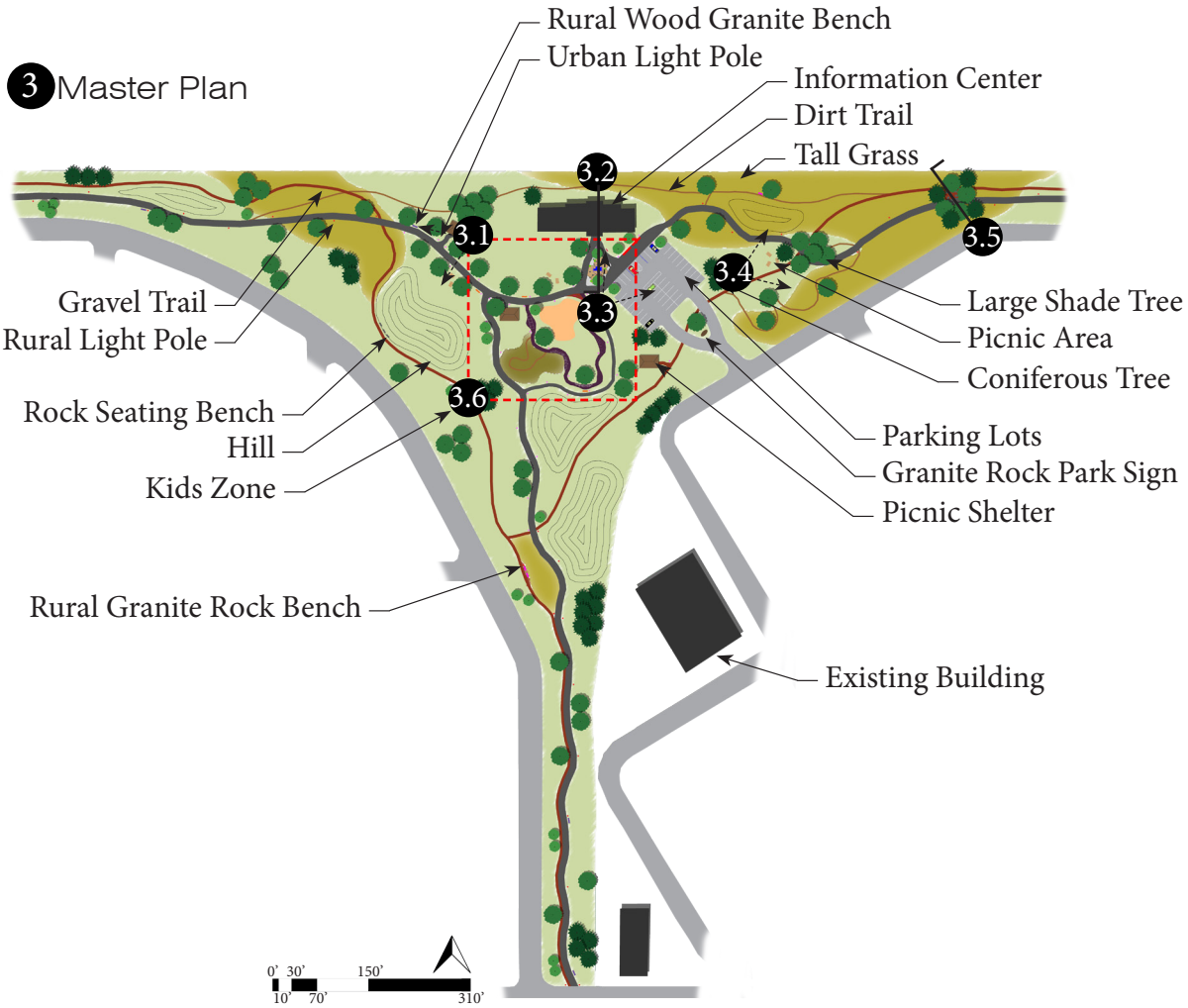
Left:
St. Cloud's strong granite history is carved into large granite rock sculptures. Granite rocks provide places for people to sit along the bike, dirt and gravel trails that weave in and out.

2.4 Winter View

Left:
During the winter the gravel and dirt trails turn into skiing and snowshoeing trails.

Railroad Park

3 Master Plan



33rd Street Narrative

Located along an existing railroad track and in a residential area an 11 acre park was designed to provide a place for physical activity. The trails would continue along the entire railroad tracks and connect to existing bike trails outside of town. Trails from the south would continue into the park and connect into the large trail system. A community building with information about the trails, restrooms, and community rooms will be placed in the existing rail yard building. Located near the information center the urban theme will be found with granite benches, light poles and granite water feature. Moving further away from the center the rural theme will be found in the granite benches, light poles as well with the tall grass and hills. The center of the park is designed to have a variety of activities for kids.

Railroad Park

3.3 Front Plaza Space

Left:
The front plaza space has a granite water feature with black and white granite blocks for seating a long with planters and flowering ornamental trees frame space.

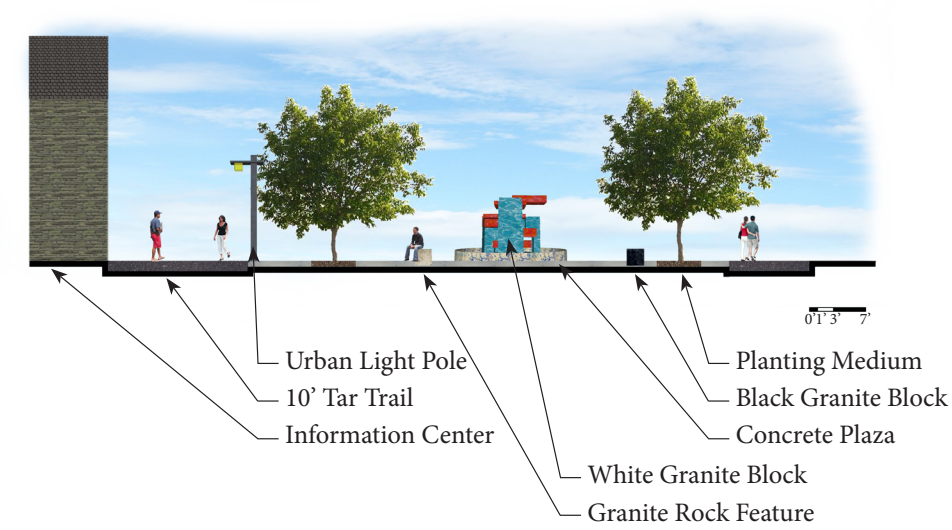
3.4 Fall Picnic

Left:
The fall colors provide a pleasant backdrop for picnics along the tar and gravel trails.

3.1 Raining Picnic Shelter

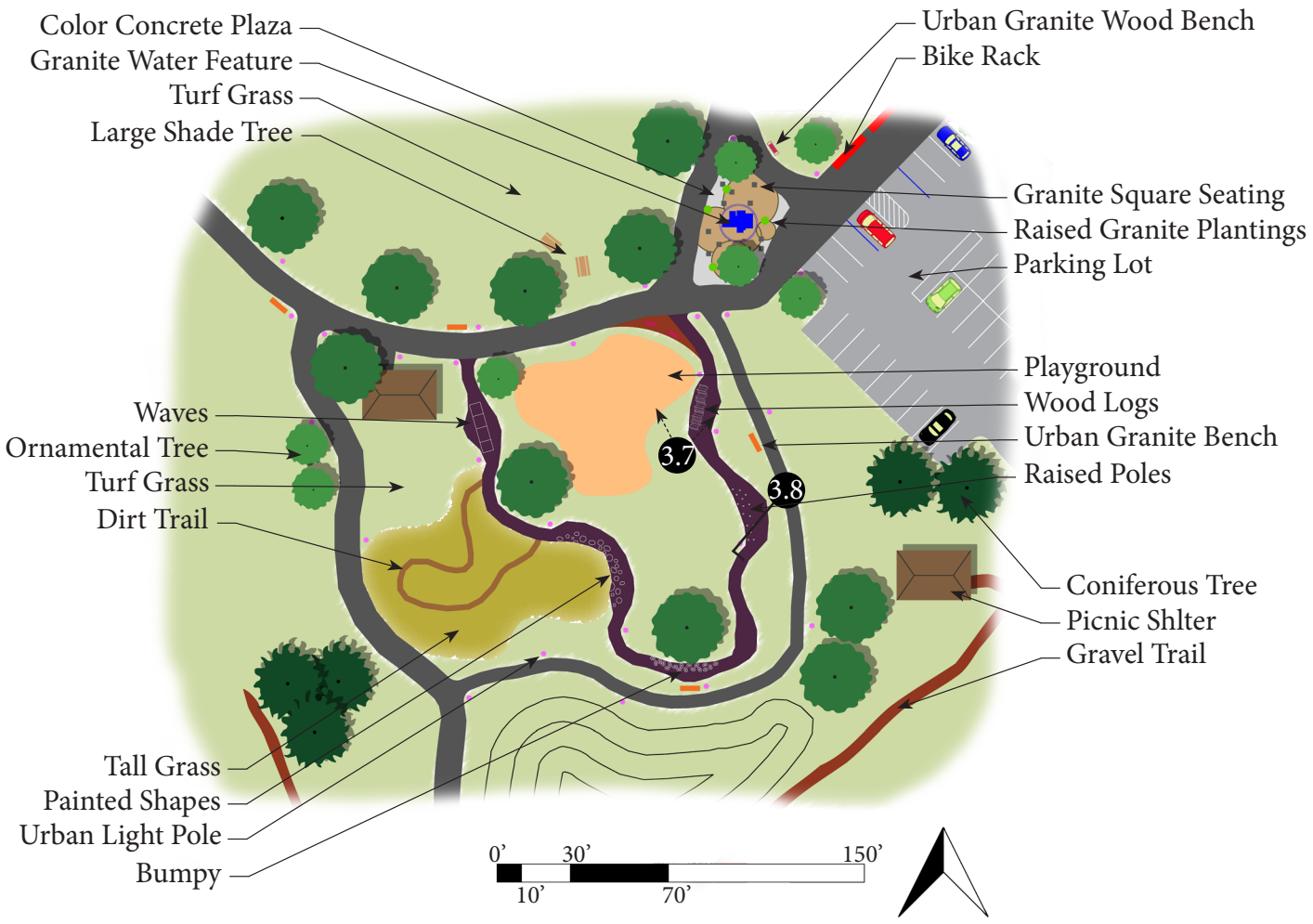
Left:
Large picnic shelters provide a place for group gathering with picnic tables and provide covering in all kinds of weather.

3.2 Water Feature



3.5 Winter Section

3.6 Master Plan: Kids Zone

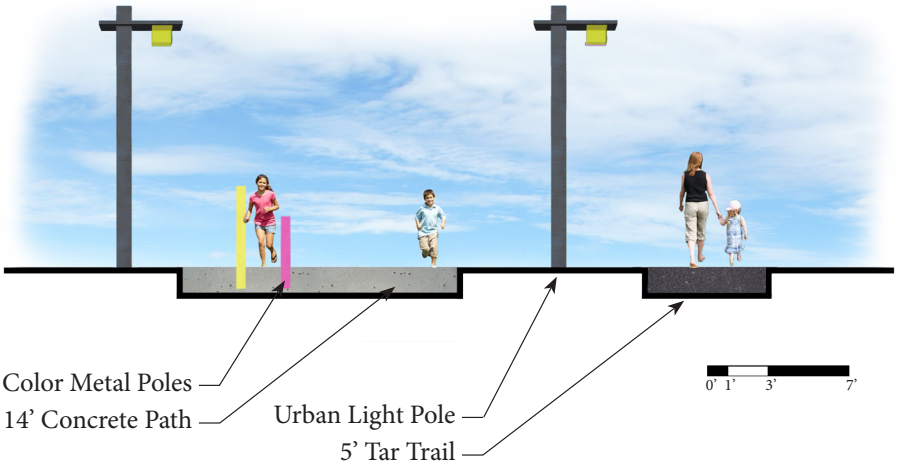


Railroad Park

3.7 Kids Playing Area

Left:
Kids concrete trail has a short logged section for kids to walk and bike over. The center piece of the Kids Zone is a large playground. An existing railroad building was remodeled into an information center with restrooms and large rooms for the community to use.

3.8 Kids Trail Section



Possible Plants

Large Shade Trees

Acer platanoides	Norway Maple
Acer rubrum	Red Maple
Acer saccharinum	Silver Maple
Acer saccharum	Sugar Maple
Celtis occidentalis	Hackberry
Crataegus crus-galli 'Inermis'	Thornless Cockspur Hawthorn
Fraxinus excelsior	European/ American Mountain Ash
Gleditsia triacanthos	Honey Locust-thornless
Gymnocladus dioica	Kentucky Coffeetree
Ostrya virginiana	Ironwood
Quercus macrocarpa	Bur Oak
Quercus alba	White Oak
Phellodendron amurense	Amur Corktree
Tilia americana	American Linden (Basswood)
Ulmus americana ' Lewis & Clark'	Lewis & Clark Expedition Elm
Ulmus minor 'Accolade'	Accolade Elm
Ulmus minor ' Cathedral'	Cathedral Elm
Ulmus minor 'Discovery'	Discovery Elm

Ornamental Tree

Acer ginnala	Amur Maple
Alnus hirsuta 'Harbin'	Prairie Horizon ® Manchurian Alder
Malus x 'Red splendor'	Flowering Crab-Red Splendor
Malus x 'Radiant'	Flowering Crab-Radiant
Phellodendron amurense	Amur Chokecherry
Pyrus ussuriensis 'MorDak'	Prairie Gem® Pear
Syringa reticulata	Japanese Tree Lilac

Possible Plants

Coniferous Trees

Picea glauca var. densata	Black Hills Spruce
Picea pungens var. glauca	Colorado Blue Spruce
Pinus resinosa	Red Pine
Pinus strobus	White Pine
pinus sylvestris	Scotch Pine
Pseudotsuga menziesii var. glouca	Rocky Mountain Douglas-fir

Tall Grass

Andropogon gerardi	Big Bluestem
Schizachyrium scoparium	Little Bluestem
Bouteloua curtipendula	Sideoats Gama
Panicum virgatum	Switch Grass
Sorghastrum nutans Indian Grass	Indian Grass

Improving Physical Health:

Designing urban environments for better physical health.

Site Location

Current Site Images

Image to the Left:
1. Major residential street with sidewalk
2. Highway 23 sidewalk with wide shoulder
3. Highway 23 sidewalk with parking lot
4. Existing conditions of 33rd Street South
5. Existing bike trail along river
6. Existing rail road yard area
7. Ditch along 33rd Street South

North Dakota State University
Landscape Architecture Thesis 572
Sarah Mauel
Jay Kost, Advisor
AutoCAD, SketchUp, Indesign, Illustrator, Photoshop, GIS

Analysis

Existing Pathway Map: Shows the existing bike trails and parks throughout the city. Large gaps were found in the existing trail system.

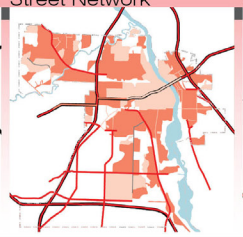
Street Network Map: Shows how well the existing conditions of the street create a large pedestrian network. Can the roads be used by both automobiles and pedestrians?

Supportive Site Design Map: Shows how well the streets are designed to accommodate bikers and pedestrians.

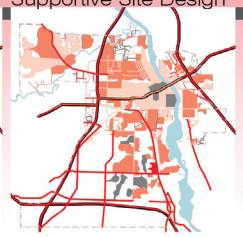
Umbrella Safety Maps: Shows the areas of the city where the pedestrians feel safe walking and biking along the street.

Existing Pathways

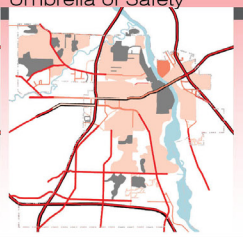
Street Network



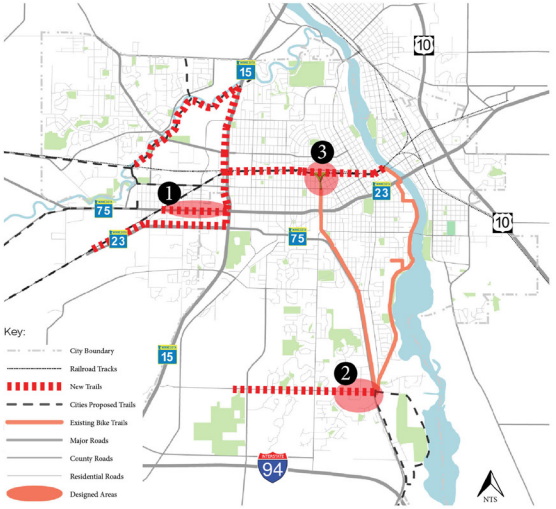
Supportive Site Design



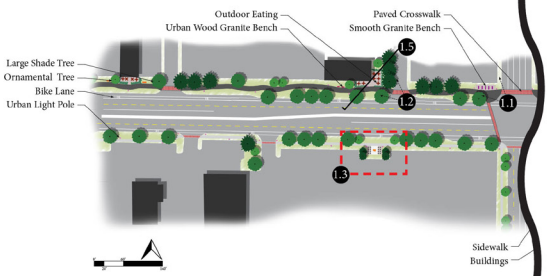
Umbrella of Safety



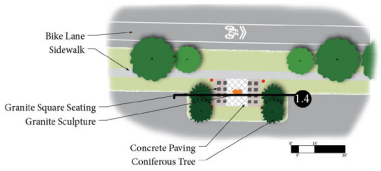
Master Plan

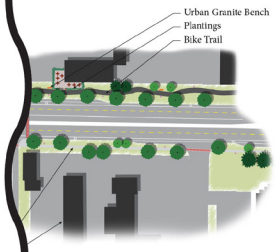


1 Highway 23



1.3 Sculpture Detail Plan





1.1 Night View of Benches

Above: Smooth granite benches and trail markers are found along the trail in the urban area. Lights line the trail for illumination.

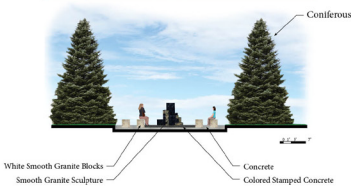
1.2 Cafe Eating View with Trail

Above: Pedestrians travel across stamped concrete crosswalk to the meandering bike trail that brings travelers to restaurants with outdoor eating that helps creates a comfortable street life along the road.

Highway 23 Narrative

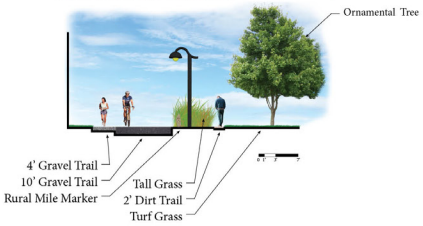
Located in the central part of town Highway 23 is a major corridor that brings people through town. Located along the highway are many major destinations such as schools, restaurants, and shopping. Currently the road is designed for the automobile with wide driving lanes and little sidewalks. The new design of the road incorporates a wide bike trail on one side of the road with a wide buffer zone with the addition of trees. Business moved closer to the trail to help create a street life along the road. Sidewalks were moved away from the road and a buffer zones were created. Wide shoulders were reduced and a bike lane was added. Smooth clean lines can be found in light pole, granite benches and sculpture to create an urban theme. The new design will encourage pedestrian movement in the urban environment.

1.4 Sculpture Section



1.5 Fall Time Eating Section

2.1 Rural Mile Marker



33rd Street Narrative

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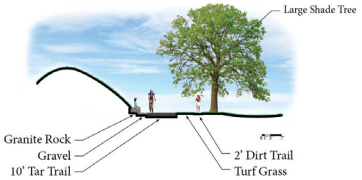
2.2 Hill Seating

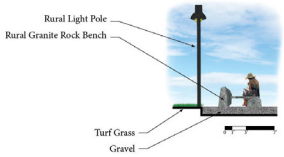


Rural W

2.3 Winter View

Left: During the winter the gravel and dirt trails turn into skiing and snowshoeing trails.

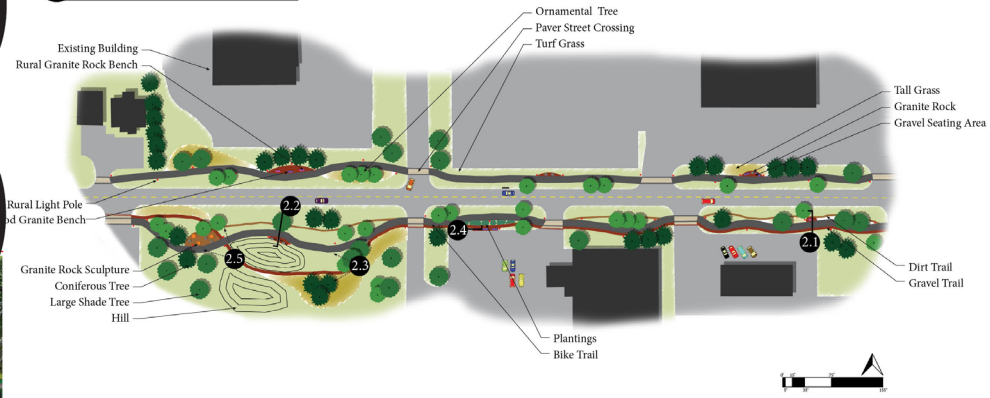
2.4 Bench Detail



2.5 Sculpture View

Above: St. Cloud's strong granite history is carved into large granite rock sculptures. Granite p provide places for people to sit along the bike, dirt and gravel trails that weave in and out.

2 33rd Street



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Andropogon gerardi	Big Bluestem
Schizachyrium scoparium	Little Bluestem
Boutelous curtipendula	Sideoats Gama
Panicum virgatum	Switch Grass
Sorghastrum nutans Indian Grass	Indian Grass

3 Railroad Park

3.1 Fall Picnic

Above: The fall colors provide a pleasant backdrop for picnics along the tar and gravel trails.

3.2 Winter S

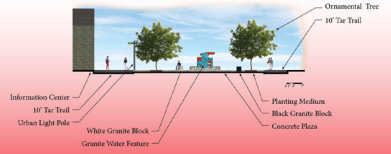
Railroad Park Narrative

Located along an existing railroad track and in a residential area an 11 acre park was designed to provide a place for physical activity. The trails would continue along the entire railroad tracks and connect to existing bike trails outside of town. Trails from the south would continue into the park and connect into the large trail system. A community building with information about the trails, restrooms, and community rooms will be placed in the existing rail yard building. Located near the information center the urban theme will be found with granite benches, light poles and granite water feature. Moving further away from the center the rural theme will be found in the granite benches, light poles as well with the tall grass and hills. The center of the park is designed to have a variety of activities for kids.

3.5 Raining Picnic

Above: Large picnic shelters provide

3.4 Water Feature



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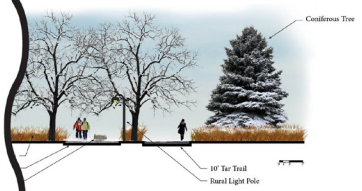


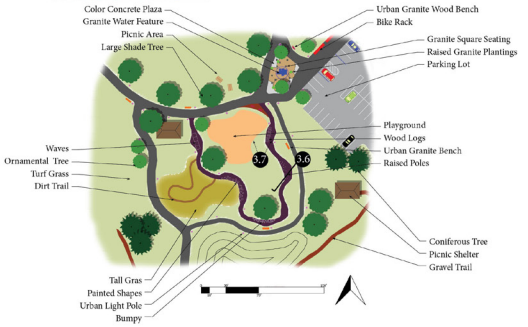
Shelter

place for group gathering with picnic tables and provide covering in all kinds of weather.

Kids Zone Narrative

In the center of Railroad Park is a designated kid's activity zone. Located in the center of the zone is a large playground and a trail with five different types of activities. The trail design includes a wooden log section, different color poles to weave in and out of, raised color bumps, painted colored shapes, and a rolling wave. Kids can explore the tall grass using a dirt trail. A picnic shelter is available for community use. Small picnic places can be found throughout the area. Large open green spaces are found throughout for activities. A large hill adds interest to the space to play and sled on.

3.3 Kid's Zone



3.6 Kids Trail Section

3.7 Kids Playing Area

Above: Kids concrete trail has a short logged section for kids to walk and bike over. The center piece of the Kids Zone is a large playground. An existing railroad building was remodeled into an information center with restrooms and large rooms for the community to use.

Reference

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