



Chelsea Akers

# Revitalizing Small Scale Urban Corridors



# Revitalizing Small Scale Urban Corridors

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

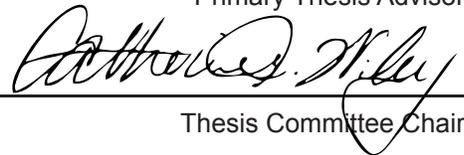
**By  
Chelsea R. Akers**

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



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Primary Thesis Advisor



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Thesis Committee Chair



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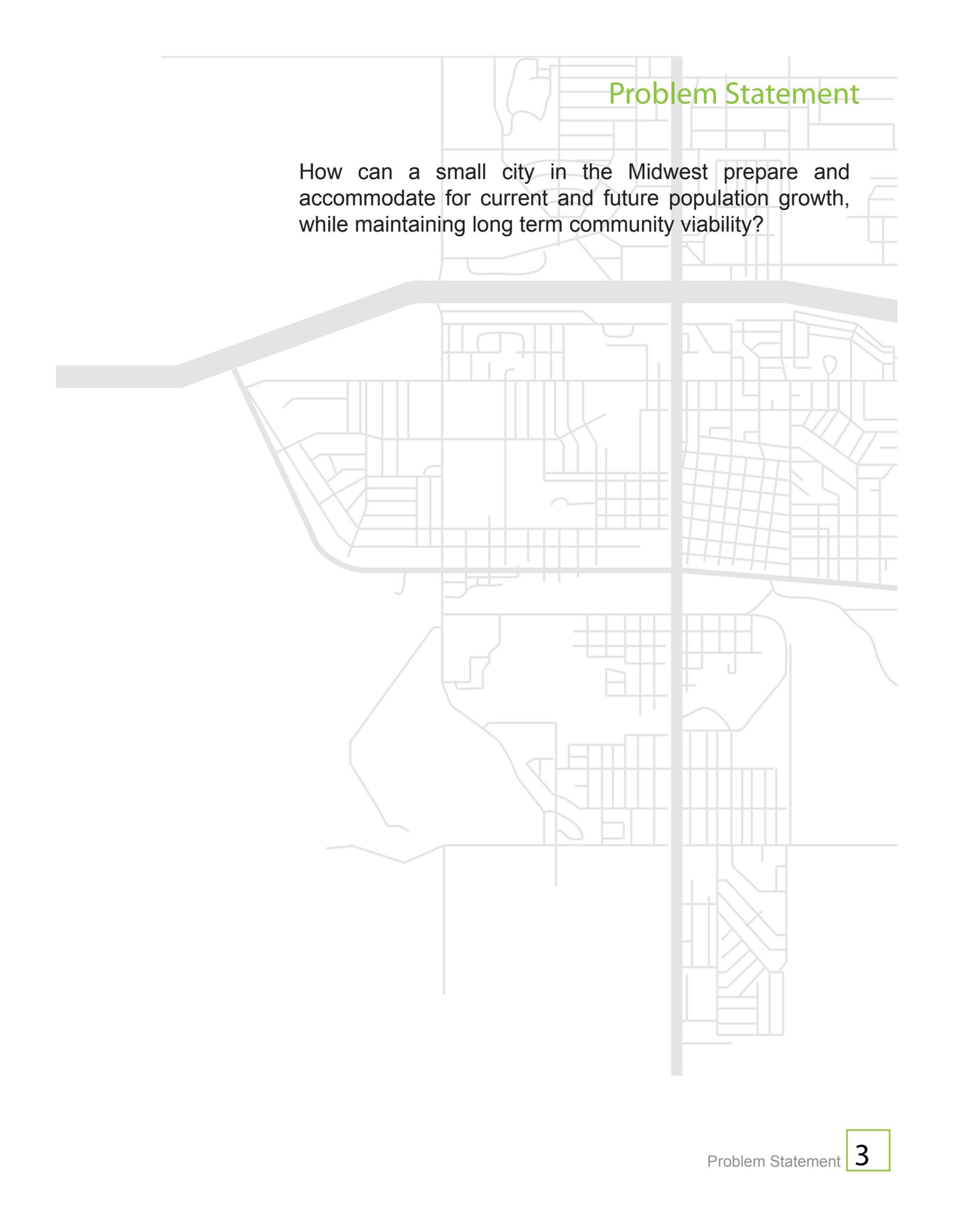


When people visit a small town or city in the Midwest, they will probably notice a sense of pride in the community. However, when rapid change, whether it is long, or short term, impacts the community, it can leave the residents of the town feeling disconnected from their familiar surroundings. Multiple small cities and towns in western North Dakota, including Williston, Killdeer and Dickinson, along with many others, have experienced rapid growth and change due to recent oil activity. By examining the city of Dickinson and addressing the recent housing conflicts, higher traffic volumes and city expansion, I will help maintain the long term viability of the town, setting an example for other small cities.

**Key Words:**

Viability | Population Growth | Housing Conflict | Traffic Volumes | Expansion



The background of the page is a light gray line-art map of a city. It features a grid of streets, a river or canal winding through the center, and a prominent road or highway running horizontally across the middle. The map is partially obscured by the text and header.

## Problem Statement

How can a small city in the Midwest prepare and accommodate for current and future population growth, while maintaining long term community viability?



# Statement of Intent

## Typology

Small Scale Urban / City Design

## Claim

A downtown revitalization, using small scale urban design to accommodate for rapid population growth, increased pedestrian and street traffic, housing conflicts and city expansion.

## Premise

Together, city planners and landscape architects can provide small cities in western North Dakota a better sense of community viability by accommodating for population growth, increased pedestrian and vehicle traffic and city expansion.

Small cities in the Midwest can maintain long term community viability and accommodate for population growth by implementing new policies for population growth, housing and vehicle traffic.

Small cities in the Midwest will be better prepared for future population growth while also accommodating their current population. They will also be prepared to protect the long term community viability.

Rapid population change, whether permanent or temporary, is a major issue. If it is not dealt with in a constructive manner, cities long term viability could be in jeopardy.

## Project Justification

The Bakken Shale deposit, covering parts of Montana, North Dakota and South Dakota, is one of the largest oil deposits in the continent (Bakken Oil Shale). According to the *Wall Street Journal*, "It is a profitable field and has turned into one of the fastest growing oil-producing areas in the U.S." (Casselmann, B.) The Bakken oil reserve has recently brought hundreds of thousands of people to the Midwest. Because of this rapid population increase, cities are thriving and businesses are growing. However, with additional businesses and people, conflicts arise. Cities can be pressed for space and have a need for expansion. Cities need to prepare for current and future population growth, in order to maintain their viability.



I grew up in a small city with a population of approximately 16,000 people. As a child, my parents allowed me walk to the local parks and ride my bicycle to school a mile away. They were comfortable with this because there was a sense of viability and comfort within the community. We knew our neighbors on a personal level, and we could not make a trip to the local grocery store without running into someone we knew.

When I return to my hometown, the city of Dickinson, I do not feel the same level of comfort as I once did. My once reserved and humble city is now loud, rowdy and potentially unsafe.

This thesis will examine the effects an oil boom can have on a community and determine if this is what is the cause of the discomfort the residents of Dickinson are feeling. It will explore the potential for future community viability by incorporating affordable housing, new pedestrian corridors, redefined business fronts, public green spaces and better accommodate for current and future change.



# Client/User Description

## **Clients**

The City of Dickinson, North Dakota

## **Users**

Business owners will be provided with the opportunity to redefine their storefronts. This will present more revenue opportunities by drawing consumers into their businesses.

## **Residents**

The residents of Dickinson will be provided with new, affordable downtown living opportunities. They will be closer to grocery stores, shopping, dining and places to work.

## **Community**

The residents of Dickinson will benefit from new amenities. Including new businesses and storefronts, additional housing opportunities, widened pedestrian corridors and new streetscapes.

## **Students**

Dickinson University brings thousands of students to the town every year (Minn. Public Radio). With the prices of rental properties at an all time high, hundreds of students cannot afford to live in town. The university has limited dorm space and students are packing into small apartments. Affordable, permanent housing is an effective solution for the city's future.

All new designs will comply with The Americans with Disabilities Act.



# Major Project Elements

## **Housing**

The city of Dickinson is growing, and affordable housing is in demand. Currently, the average rate of a two bedroom apartment in Dickinson costs between \$1,700 and \$2,275 per month (Minn. Public Radio). Four years ago, apartment rates in Dickinson averaged about \$460 to \$800 per month (Apartments). The city is currently experiencing a record high in the percentage of homelessness. According to Michael Carbone, executive director of the North Dakota Coalition of Homeless People, North Dakota's homelessness has increased by nearly 20% in the last two years. New, affordable housing will benefit single families, individuals and college students.

## **Pedestrian Corridors / Streets**

The downtown area has the potential to be a beautiful, walkable place. It is home to small businesses, restaurants and many other amenities. However, the sidewalks of Dickinson are narrow and cracked, and some of the business storefronts are in need of renovation. By widening sidewalks, creating a safe distance from traffic and providing the right amount of vegetation, the streets of Dickinson will once again become a walkable, enjoyable area.

The streets of downtown Dickinson are currently a reasonable width for people walking on the sidewalks to feel safe. However, with all the additional traffic, people do not always follow the speed limits. It is important for pedestrians to feel safe in their environment, and action must be taken to slow traffic. For example, by narrowing the streets, and possibly adding a median, vehicle traffic will have to move at a slower rate, making the area safe for pedestrians.

## **Destination Areas**

The revitalized downtown area will not only be a place to work, shop and live; it will be a destination. When people visit the new downtown, they will feel a sense of place that they cannot find anywhere else in the city of Dickinson. New storefronts and additional businesses, along with newly added green space, will redefine Dickinson, giving the community a sense of viability and place.

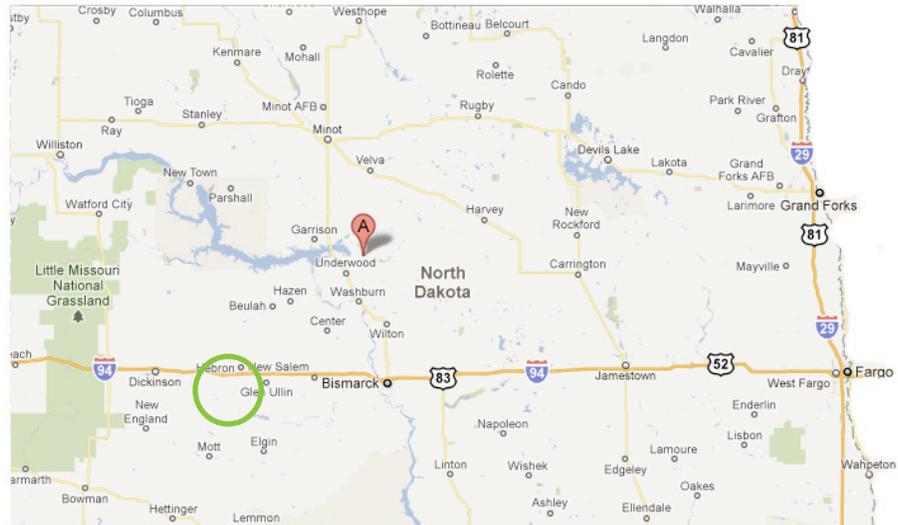
# Site Information



# Site Information

## Region

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



## ND Demographics

Population: 646,844  
Land Area: 68,975.93 sq. miles  
Counties: 53  
Persons/Sq. Mile: 9.31  
State Bird: Western Meadowlark  
State Tree: American Elm  
State Grass: Western Wheat grass  
(N.D. Demographics)

## City Context

Population 18,000

Dickinson is a small city, located in western North Dakota. A few years ago it was not uncommon to see people walking and biking to various destinations. However, since the city has grown, a sense of community, that once existed, seems to no longer exist. Incorporating affordable housing, safe pedestrian corridors and destination areas, such as restaurants, boutiques and other amenities will help restore the viability of the City. (Dickinson Demographics)



## Project Emphasis

The main goal of this project is to research and determine the effect that an oil boom can have on a community and help it better accommodate for current and future change. This project will examine the city of Dickinson, how it has functioned in past years, and how it is handling in its current situation. A better understanding of the Dickinson and its past, will determine how the city can thrive during an oil boom and maintain long term viability.

The design emphasis of this project is to incorporate a sense of place in the downtown area of Dickinson. Incorporating affordable housing, safe pedestrian corridors and destination areas, such as restaurants, boutiques and other amenities will help restore the viability of the City. It will increase business revenue and provide affordable housing to those who cannot afford current housing.



# Plan For Proceeding

## **Research Direction**

This project will use a mixed-method approach to gather qualitative and quantitative research. Research will be conducted to address site analysis, historical context, the project typology and the theoretical premise.

## **Methodology**

The types of methodology used in this thesis will include mixed methods of qualitative and quantitative research to follow a concurrent transformative strategy, guided by the theoretical premise. The quantitative research will include data gathered from archives and publications, as well as statistics and other data. The qualitative research will primarily include site analysis. This will be obtained through site visits and personal interviews. Other methodologies this project will also use include; graphic and digital analysis, case studies and interviews of city officials and local business owners.

Integrating, analyzing, interpreting, and reporting of the data results will occur at several stages in the design process and will be presented in both text and graphics.

## **Documentation of Design**

This project will be compiled in a digital format. Contents of the finished project will include sketches, renderings, research, graphs and photos. The final document will be presented digitally. The finished document will be preserved and made available to other students via hard copy or digital file available through the North Dakota State University Library web site.

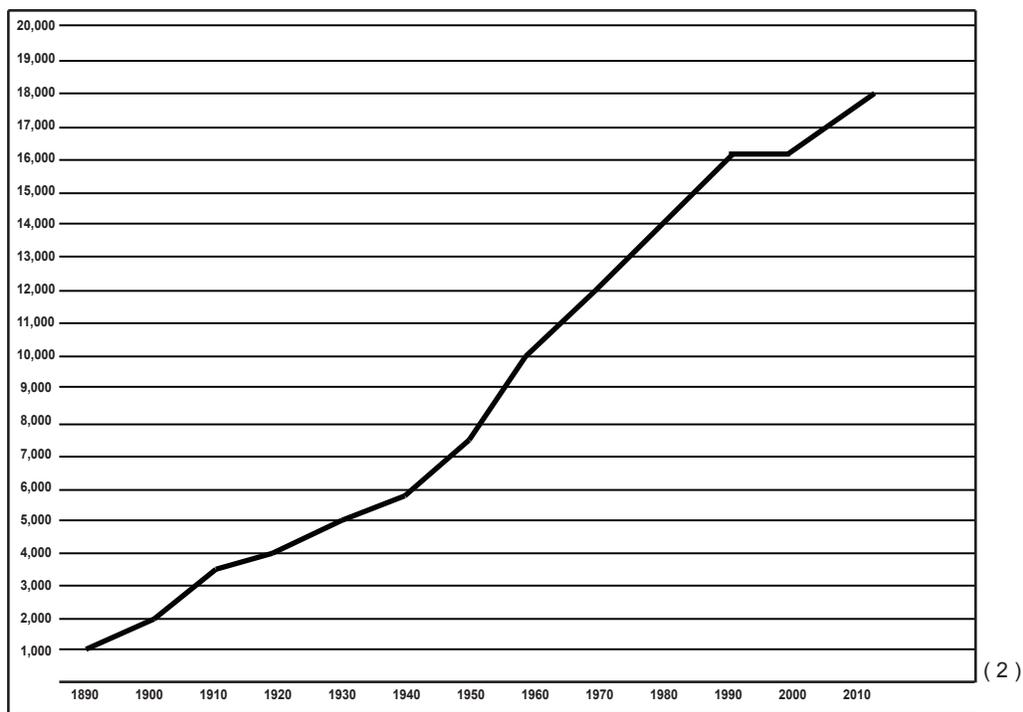


# TYPOLOGICAL RESEARCH

## Increased Assaults

After being established in the 1800s as a railroad town, Dickinson has grown into a regional center for living and visiting. Dickinson offers a wide variety of activities such as art, museums, a golf course, 24 public parks and other entertainment, making it an excellent tourist destination. The area also provides some of the best hunting and fishing in the country.

Residents who live in Dickinson love the area. They feel safe in their community and enjoy everything the city has to offer. One thing the city offers, that not many other cities can offer in this economy, is a large, steady job market. North Dakota has the lowest unemployment rate in the nation, at only 3.5%. (Peters, M) Because of this, Dickinson has experienced a increase in population .

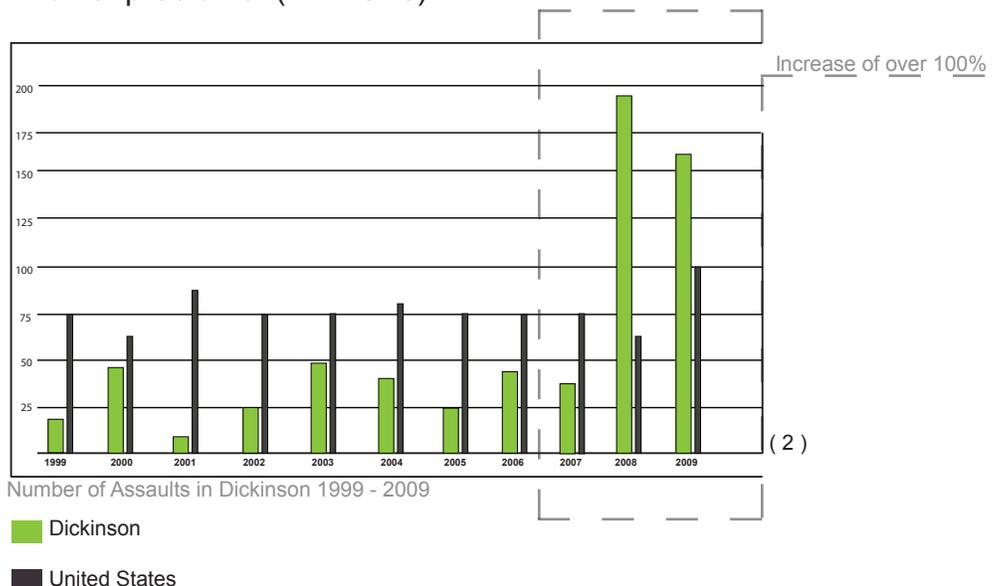


Dickinson Population Graph 1890 - 2010

Western North Dakota has recently been a popular topic of discussion. Areas of North Dakota, such as, Williston, Dickinson, Killdeer and many other places have been plagued by “oil fever.”

Although the discovery of the Bakken Shale, located in western North Dakota has brought millions of dollars of revenue to the state, it also brings headache. According to the permanent residents of the state, “service and supplies have never been tighter.” The oil industry has brought many new people to area, creating longer lines at restaurants, picked over shelves at the local stores and increased traffic. Housing is also becoming an issue. “City officials are estimating the need to build new homes for 23,000 new, permanent residents in the northwest.”(Boyd, D) According to Charles Groat, professor at the University of Texas, “Small towns like Williston [and Dickinson] can be burdened by an oil boom with all the workers, roads, trucks and pipelines. And then you have all the community services that have to be provided – law enforcement, education and child care. It turns into a real bonanza in terms of income, but it becomes an environmental effect that people aren’t used to experiencing.” (National Public Radio News)

Another concern many people are having within the community is the level of safety. With increased population comes increased crime. In the last three years the numbers of assaults is alarming with over a 100% increase.(Dickinson Census Data) Darianne Johnson, an employee at the Domestic Violence and Rape Crisis Center told the *Dickinson Press* that there has been “a drastic increase in the number of violent cases in Western North Dakota.” She also says that over 75% of them are “oil-field related”. However, She also says that she cannot blame all of the problems on the oil industry. She believes that “when there is an influx of people, there is an influx of problems.”(KX News)



# Security & Site Design

According to Leonard Hopper and Martha Droge, authors of *Security and Site Design*, a landscape architectural approach to design implementation is key to designing safe environments. (Hopper, Leonard J) By implementing general security design solutions, such as building security zones, and zone prototypes, the outdoor environment becomes much more safe and inviting. Security should be incorporated into the design of the streetscape at the beginning of the design. It should not look like a streetscape that has just added security.

## **Building Security Zones**

[ Zones 1 & 2 ]

The building security zones include the interior of the building itself and the outdoor building perimeter. They are exclusively related in the architecture of the building.

## **Zone Prototypes**

These prototypes refer to the areas surrounding buildings. They relate to the public and the surrounding buildings.

## **The Building yard**

[ Zone 3 ]

The building yard is the public space directly outside the building, between the building wall and the sidewalk. The design of this space should relate to the building itself, and the security measures should match the surrounding area. Pedestrian circulation should not cross the pedestrian access area of the building. It is important to keep the two pathways separate to ensure the safety of pedestrians. It is also beneficial to use raised planters as a buffer to separate vehicles and pedestrians. It is also important to incorporate lighting, trees and furniture into the streetscape. Light will help people see in the evening, making business profitable both day and night, while street furniture will give people the opportunity to rest. These things will not only help people feel secure, they will also attract business.

## **The Sidewalk**

[ Zone 4 ]

The sidewalk is usually located between the building yard and the curb. It is important to connect the sidewalk design to the character of the adjacent street design. Like the building yard zone, it is important to incorporate security. This can be done with the use of light, street furniture and buffers. The use of these buffer materials is also a great way to attract people to the area; however, they should not impede on pedestrian circulation.

## **Curb Lane**

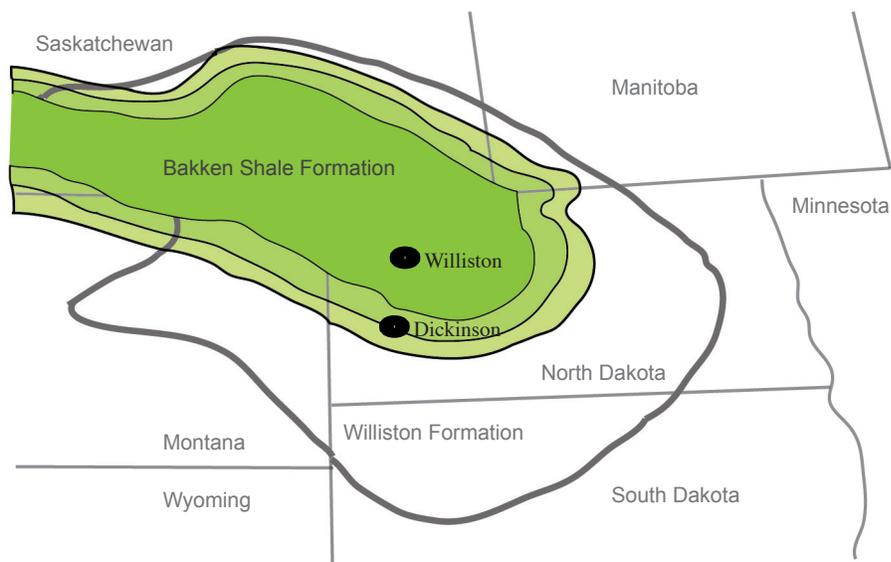
[ Zone 5 ]

The curb lane, or the parking lane, is located directly next to the curb. If the area is a high security risk area for security, avoid letting vehicles park there. This can be accomplished by incorporating a large planting box. It can also help to shade the area if large plantings, such as trees, are incorporated. Planting boxes will also help eliminate loading and unloading zones, which can be unappealing to people in the area.

## The Bakken Shale Formation

The Bakken Shale Formation is located in the Williston Basin Formation in the northern part of the United States. It occupies North Dakota, Montana and part of Canada. Geologists have known about this shale formation for quite a few years now, but until recently there has not been any reason to drill in this location. Until recently, natural gas and oil have been made readily available to consumers at low prices. In 2008, oil prices reached \$145 a barrel, hitting an all time high. (bakkenshale) This is when oil corporations started moving their companies to the Midwest in search of the mineral rights to the land to began drilling.

The Bakken Formation is a deposit of shale deep below the Earth's surface that contains oil and natural gas. The shale consists of sedimentary rock made of solid Kerogen material. These Kerogen materials, when heated are transformed into a liquid state. The Bakken Oil Shale, like all other shale deposits in the World, was formed millions of years ago. It was formed by organic material and silt left behind by lakes and other bodies of water.



Map of Bakken Oil Shale Location

- Bakken Shale Formation
- Williston Formation

The Bakken Shale is predicted to contain billions of barrels of oil. This makes it the largest oil discovery in the United States next to the Arctic National Wildlife Refuge in Alaska. (oilshale)

Because the shale is made of solid material, extracting it is a difficult and expensive process. To extract the mineral, the solid matter must be mined from the ground and heated. This is called retorting. (bakkenshale)After mining, or retorting the shale, the mineral needs to be separated and collected. Another method of extracting the mineral is by horizontally drilling it out of the ground. This method is done by heating the matter to high temperatures while it is still in the ground. It is then pumped out of the ground by the use of large wells. This is the most common form of oil extraction used in the United States.

Within the next 30 to 40 years, the Bakken Shale is predicted to become the largest available oil reserve in the world (oilshale).

The lifespan of the Bakken Shale is predicted to last well past 2020 (oilshale). Currently, new wells are being implemented every day. North Dakota has one of the lowest unemployment rates in the nation in the country because the shale is creating millions of new, high paying jobs in the area. It is also bringing many new people to the area.

# Dealing with Community Disruption

Rapid population growth in the United States is not a new trend. It dates back to the gold rushes of the 19th century. According to Jane Kassover, “the United States contains enough [underground] coal and oil to produce fifteen million barrels of synthetic oil per day, for 175 years.”

As consumers, we use our Earth’s natural resources to survive, however, with mineral discovery, comes an alarming amount of concerns. The largest concern being rapid population growth. According to Jeffery Jacquet, author of *Energy Boom Towns and Natural Gas*, “with a rapid increase in population, we see an increase in community disruption.” Although it seems unfair to suggest that a rapid increase in population brings disturbance and chaos to a community, it is almost always the case. This is because small cities and rural communities have a sense of shared pride. They share a sense of history, ethics, religion and identity. The social impact on the current residents of the town can sometimes seem unbearable. Their once quiet, friendly town is now full of new faces, higher traffic volumes and crowded grocery stores. Some people feel as though they are forced to lock their doors for the first time in their lives. Added stresses to the community include a shortage of physicians and medical personnel, law enforcement, housing, childcare and schools.

Hardship does not only come to the original residents of the town. Newcomers are finding the transition equally stressful. Some are forced to live in substandard housing due to a shortage of available housing, and they are sometimes viewed as the “bad guy” for being the reason the community has added stress.

According to Jeffery Jacquet, author of *Energy Boom towns and Natural Gas*, Added stresses of communities hit by rapid population growth, often see an increase in divorce, alcoholism and suicide. (Jacquet, J.) This being the case in Gillette, Wyoming. In 1880, a newspaper article coined the term, “The Gillette Syndrome” referring to the added stresses boom towns experience due to rapid population growth. (Mitchel, K.)

Added community stress weakens a city. With proper management strategies and planning, the negative results may be improved. According to Jane Kassover, by incorporating well planned human services and programs to relieve the stresses of change, building on existing resources and providing a sense of community, one can reduce the negative impact. (Kassover, J.)

Sense of Belonging



Potential



Availability of Positive Coping Mechanisms



Sense of Community



Utilization of Available Resources

## How it Relates

Over the years, the city of Dickinson has experienced an annual steady population increase. This is because the city has a lot to offer; such as art, museums, a golf course, 24 public parks and other entertainment. The area also provides some of the best hunting and fishing in the country.

However, recently, the town's population has increased so rapidly, that drastic measures must be taken before things spiral out of control. The discovery of the Bakken Shale has brought millions of dollars of revenue to the state, however, it is also bringing headache. The oil industry has brought many new people to area, creating longer lines at restaurants, picked over shelves at the local stores and increased traffic. Another concern many people are having within the community is the level of safety. With increased population comes increased crime. In the last three years the numbers of assaults is alarming, with more than a 100% increase. (Dickinson Census Data)

With the recent increase in the number of assaults in Dickinson, it is important to address the issue of safety. By widening sidewalks, providing street furniture and providing adequate lighting, the public spaces of town will become safe again. By implementing general security design solutions, such as building security zones, and zone prototypes, the outdoor environment becomes much more safe and inviting.

When rapid change comes to a community, it is important to keep the citizens of the town feeling connected to their city. It is also important to make the new residents of the city, whether permanent or temporary, feel connected as well.



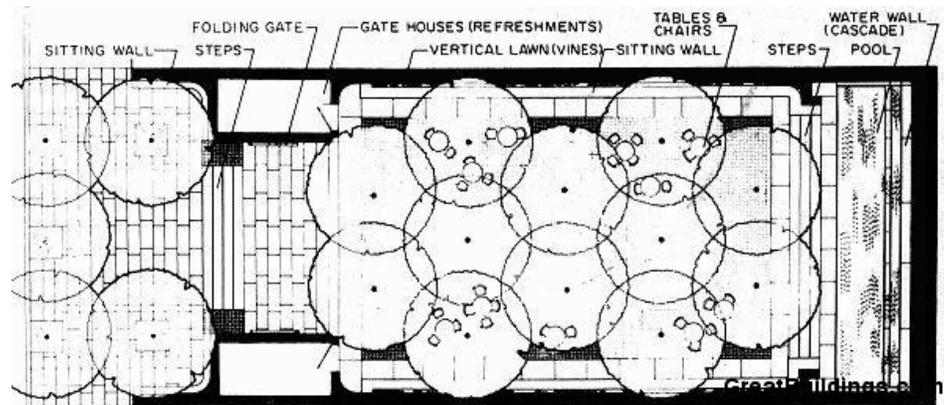
# CASE STUDIES



## Paley Park [ Public Open Space ]

Paley Park is located on 53rd street, between Madison and Fifth Avenue in New York City, New York. It was designed by CBS chairman, William Paley. After being completed in 1967, it quickly became one of the most successful small, urban spaces.

( Placemaking for Communities )



( Zion and Breen )

The small pocket park is located directly off the street. This encourages people to enter and enjoy the amenities the park has to offer. Some of these amenities include; movable tables and chairs, which allow people to move and sit where they prefer, a waterfall, which is the focal point of the park and provides slight noise that drowns out the sounds of the city and trees throughout the park provide shade from the summer sun. The walls of the 4200 square foot park are lined with ivy, which conceal the brick facades of the high rise buildings.

The downtown area of Dickinson could greatly benefit from a park similar to Paley Park. The park would offer residents of the community a place to relax and get away from the hustle and bustle of the busy community.



( Zion and Breen )

## SW1 [ Urban Living ]

SW1, a community in Brisbane, Australia, is a very successful urban living space. The area features conveniences, such as shops, offices, apartments and houses, all within walking distance from the city. In this area the pedestrian comes first. Most of the parking is underground and the streets are either completely walkable, without vehicular traffic, or very narrow, making them uninviting to vehicles. Sarah Gaventa, a writer for *Landscape Architecture Magazine*, calls the place “a legible, livable and environmentally friendly island.” The streets are lined with buildings made of quality materials and plantings. The open spaces and walkways are inviting and beautifully maintained, making the area a hot spot for visitors and residents of the community.



(Gaventa, Sarah. 2011)

It is evident that a project is successful when the occupants of the area talk about how much they love it. Sarah Gaventa writes about how complete strangers came up to her to tell her “how fabulous it is to work / eat / live / sit / drink here.” (Gaventa, Sarah. 2011) The area is also filled with dense plantings that create a variety of secluded open spaces. Together with lighting, the plants make the area feel secure, and people feel comfortable in their surroundings.

The housing in the area is immaculately beautiful as well. Each individual house has its own private deck on the front and the back. The houses also have a private walkway to an open community garden that only the home owners can enjoy. This community garden space offers people a space to grow their own produce, reducing the need to travel to the local grocery store.

The community is the perfect balance of green, community space and mixed-use infrastructure. The area is loaded with sub-tropic beauty and native plants. It is located near South Bank, giving a view to the city's busy port and beautiful water. In 2011, the SW1 community won the 2011 AILA Queensland Medal for urban design. (Gaventa, Sarah. 2011)



(Gaventa, Sarah. 2011)



The project was designed by landscape architect, Gamble McKinnon Green

## Butte, Montana [ A Mining Town ]

Butte, Montana was settled in the 1860's. It quicker became a major copper mining town, and by 1900 they had produced more material than any other mining town in the world. (Ogle, G. E) By 1910 Butte had the most ethnically diverse population and influential labor market, the largest red light district and the highest wealth per citizen than any other town in America.

By 1870, Butte's population was growing larger every day. The town's population hit an all time high of more than 100,000 people in 1910. To accommodate for the influx of people new to the area, Butte rapidly expanded. A downtown was built, primarily of small, brick buildingst hat still exist today.



( Butte Montana CVB )

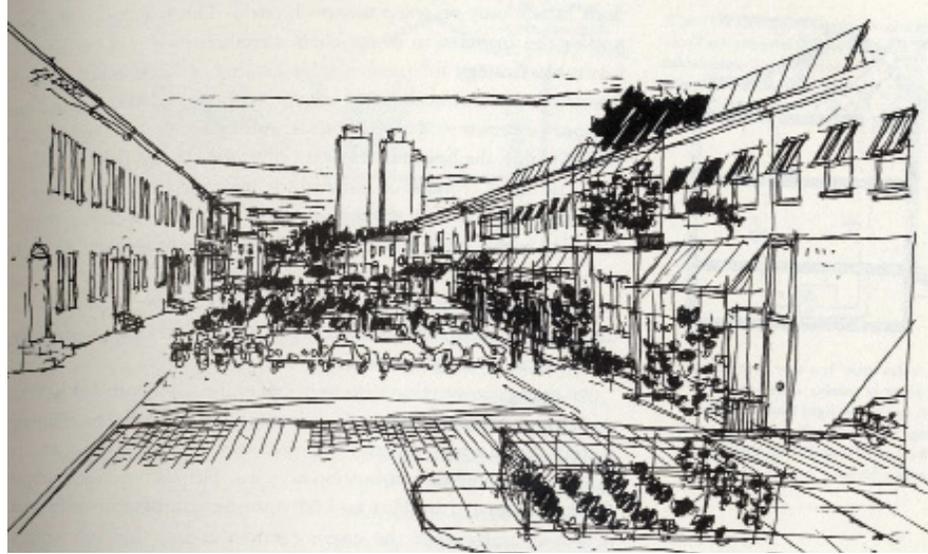
Butte remained a mining city into the 1950's, however, in the late 1900s the Superfund Act declared Butte the worst superfund site in the United States. The area became a superfund site because of all the metals that were left behind. The metals had leaked toxic chemicals into the ground and nearby rivers and streams which had eventually leaked into the town's water table. In 1977, the ARCO Mining Company took over all mining operations in the town, however, by 1983, because of the severity of the toxic chemicals in the ground and water, all mining operations were temporary paused. (Guide to Butte) It did not take long for mining to start again, and within the same year, mining operations began in full force, only this time using strip mining methods.

Today, with a population of 33,892, Butte is still a mining community, but on a much smaller scale. Although things are much different in the town, many of the historic, brick buildings remain. However, with a dramatic decrease in population, many of the original buildings downtown are empty. There are also abandoned mining rigs on the outskirts of the town, some as close as three or four miles from downtown.

Butte experienced a much more drastic population increase than Dickinson, However, the experiences are similar. In the 1910's when Butte experienced its influx in population, the city dealt with the situation the only way it knew how : expansion. For Butte, expansion may have worked at the time,however, now, with nearly a third of the population it had 80 years ago, there is a lot of unoccupied infrastructure. The city of Dickinson is also experiencing a rapid increase in population, and it is currently expanding as well. While expansion is necessary, the city has to be careful in how they do it. If the city expands to much to quickly, in 40 years they may find themselves in the situation as Butte, Montana with unoccupied infrastructure and abandoned wells.



The planners transformed all north and south streets to provide single lane traffic, with parallel parking on both sides. All east and west streets were designed to accommodate moving traffic with minimal drop off lanes and emergency access areas. Parking is accommodated by the north and south running streets and by additional concentrated parking lots.



( Ryn, S., & Calthorpe, P. (1986) )

The new streets have greatly improved the area, and they also help solve the issue of safety. The south neighborhood of Grey's Ferry is known to have higher crime and poverty levels than its northern neighbor.

The community has also started an "urban garden program" that assigns vacant lots as community garden spaces. In Grey's Ferry, these urban gardens are in vacant lots, backyards, sidewalks, greenhouses and rooftops. Studies have shown that these urban garden programs have greatly decreased the numbers of assaults and improved resident morale in the area.

Residents of the neighborhood have also helped decrease their carbon footprint on the Earth while improving the overall aesthetic value of their homes. By incorporating things as simple as storm windows, attic insulation, and replacing the caulk around doors and windows, people have drastically increased their energy efficiency.

## How These Studies Relate

The Bakken Shale deposit, covering parts of Montana, North Dakota and South Dakota is one of the largest oil deposits in the continent. According to the *Wall Street Journal*, “It is a profitable field and has turned into one of the fastest growing oil-producing areas in the U.S.” The Bakken oil reserve has brought hundreds of thousands of people to the Midwest area. Because of this rapid population increase, cities are thriving and businesses are growing. However, with additional businesses and people, conflicts arise. Cities can be pressed for space and have a need for expansion. Cities need to prepare for their current and future population growth, and maintain their communities’ viability.

Part of maintaining the viability in Dickinson is to address the current problems involving housing conflicts, higher traffic volumes and making the residents feel connected to their city. Another important issue to address is that of safety and security.

Other communities, such as SW1, in Australia and Grey’s Ferry in Philadelphia have dealt with similar issues in the past. The neighborhood of Grey’s Ferry, in Philadelphia, had issues with high crime rates and poverty levels. To solve these issues, city planners transformed all the streets to only provide single lane traffic with parallel parking. The new streets in the area benefited the area by increasing pedestrian activity. Planners also incorporated well lit, public green space to help make the pedestrian feel secure in the area.

SW1, a neighborhood in Brisbane, Australia, had a similar design challenge. To help create a pedestrian friendly area, full of mixed-use buildings and public open space, the planners made most of their streets accessible to pedestrians only. Much of the neighborhood is covered in dense vegetation, creating many semi-private areas away from the noise of the city. Brisbane is also a port city, so being located next to the water, the neighborhood has many framed views of the ocean.

The city of Dickinson is not located near water or on a port, however, a design similar to the design in Brisbane or Philadelphia could greatly influence Dickinson. Dickinson does not have the current population to support a design as large as the designs in these neighborhoods, but something similar, on a much smaller scale ,would work great. If Dickinson could have a couple streets only accessible to pedestrians, they could house farmers markets, parades, and gathering spaces. It would also help the downtown area aesthetically. By planting semi-dense vegetation, the area would be protected from the sun and the elements. These new amenities would bring people to the area and help the area feel safe.



# HISTORICAL CONTEXT

## The History of the Oil Industry in America

In the 19th century, the industrial revolution brought rapid change. The iron and steel industry spawned new construction and the railroad started to connect a majority of the country. After the discovery of oil in Texas the oil industry took off. A year after the discovery of the spindletop, more than 1500 new oil companies had been created. In the 20th century, oil became the number one fuel in America.

Oil is a fossil fuel, it is formed in the Earth's crust over millions of years. Because it is a fossil fuel, it has been around for thousands of years. Drilling for oil dates as far back as the year 1264, as noted by Marco Polo. (San Joaquin. 2011) It is said that Native Americans used it for a variety of remedies - some even drank it hoping it would cure digestive issues. (Spindletop. 2011) In 1543, Spanish settlers found oil on the coast of the United States and it is said that they used it to waterproof their ships. (Spindletop. 2011)



Boom Town, 1900's

( McGovern.)

By the 1850s, oil had begun to be sold commercially. The oil was collected by skimming it off lakes and rivers, after it had been leaked from the ground. (Spindletop. 2011) It was primarily used for fuel in kerosene lamps, so the demand wasn't as high as it is today. The first known oil company originated in Titusville, Pennsylvania, and was called The Pennsylvania Rock Oil Company of Connecticut. (Wall, B. H.)

Many wells started to appear around the United States, but they were primarily located on the East Coast, and primarily in Pennsylvania. People began rushing to the East Coast and like many gold rush towns in the western states, Pennsylvania quickly became full of new towns, with people searching for oil. In August of 1859, the largest well hit oil in Titusville, Pennsylvania (Spindletop. 2011). Until the discovery of the Spindletop in Texas, in 1901, Pennsylvania produced over half of the world's oil.

After the discovery of the large oil shale in Pennsylvania an entrepreneur by the name of John D. Rockefeller quickly rose to fame. In 1859 he and a partner started a commission business. Within a few years, he had bought out his partner and started The Standard Oil Company. He quickly started his own monopoly by buying out other companies, and merging with his competitors. His business, The Standard Oil Company, became the major oil refining firm in the state by 1870. (Wall, B. H.)

Another major oil producing state in the United States was Texas. Corsicana became the first area to produce oil in the state when two local businessmen, John Galey and James Guffey, hit oil when they



1860's Oil Well, Pennsylvania  
( History of the Oil Industry.)



Spindletop Well, Texas  
( History of the Oil Industry.)

were drilling for water. Unlike many of the others who simply ignored the oil, they decided to form the Corsicana Oil Development Company in 1896, to make a profit. However, the wells produced minimal amounts of oil, averaging about 25 barrels a day. Soon the two businessmen gave up on the their oil business, and sold their investment. Shortly after, however, the Corsicana field had produced over 2 million barrels of oil by 1900. (Spindletop. 2011)

After the Corsicana Oil Field had started to produce an abundance of oil, Patillo Higgins, a mechanic and geologist, asked John Galey and James Guffey if they would like to give oil another shot. He knew of a large hill, located in southern Texas, that was formed by underground salt. They accepted his offer and together, the three of them worked for months, drilling the well. Finally, after months of drilling, with no luck, they hit oil in 1901. Until then, Pennsylvania had been the primary oil producing state in the United States.

The oil shot out of the air like a cannon, and ended up producing almost 100,000 barrels of oil per day - more than any other oil producing well in the United States, combined. (Spindletop. 2011) Like many other “oil boom towns,” the population of Beaumont, the city located near Spindletop, experienced an extreme increase in its population. Soon Spindletop was accompanied by hundreds of other wells, owned by more than 100 different oil companies. Some of these companies that were formed because of the oil near Spindletop include Ameco and Exxon.



John D. Rockefeller  
(Encyclopedia of Arkansas)

Rockefeller’s company, and his wealth, grew into the 1900s. However, by 1911, the Supreme Court ruled that The Standard Oil Company was a monopoly, and ordered Rockefeller to split the company into 34 separate companies. (Wall, B. H.)



(Oil Industry Art)

In the 1930's, America was hit with a decline in the price of oil - about 10 cents per gallon. This caused chaos in the industry. However, World War II sparked the price of fuel again. The war required the need for explosives such as TNT, jet fuel for army vehicles and tankers and synthetic rubber. Because of the dramatic requirements of oil during World War II, there became a high demand. In the 1960s, production of oil slowed in the United States but demand grew even higher. Soon the United States began looking to other nations, such as the Middle East, for oil to import.



Oil Well in Western North Dakota  
(USATODAY)

After the Industrial Revolution, and the mass production of the automobile, the United State's demand for oil skyrocketed. Because of this, OPEC (the oil shale deposit beneath Iran, Iraq, Kuwait, Saudi Arabia and Venezuela) gained control of oil-related power. Between 1948 and 1972, US consumption of oil grew from 5 million barrels per day to more than 16 million barrels per day. It wasn't only the United States that dramatically increased their oil consumption. Europe increased its consumption by 16%, and Japan increased its consumption by 137%. (Black, B.)

By 1973, the price of oil in the United States increased 40%. In many cities, it was not uncommon to see long lines at gas stations or signs reading "out of gasoline". 1973 was also the start of the Arab Oil Embargo, which caused world-wide chaos. The Arab Oil Embargo occurred when the Arab states ceased the export of oil to America and Europe because of their support of Israel during the Yom Kippur War. (Arab oil embargo) Though the Embargo only lasted a year, it left a lasting impression on the US. Because of the Arab Embargo, the modern environmental movement began. This led to the perseverance of natural resources.

The United States' consumption of oil continued to increase into the twentieth century, even when prices hit record highs. It is estimated that the world's oil reserves may start to run dry by the year 2050; however, only recently has American consumption started to slow. It is estimated that during the petroleum era, the United States alone has consumed about 800 billion barrels of oil. (Arab oil embargo)



# Thesis Goals

## **Academic**

The academic goal for this project is to contribute valuable insight into the effects an oil boom can have on a community, and determine how landscape design can help it better accommodate current and future change. This project will examine the city of Dickinson and the people who live there, how it has functioned in past years, and how it is coping in its current situation. A better understanding of Dickinson and its past, will determine how the city can thrive during an oil boom and maintain long term viability.

## **Professional**

The professional goals of this thesis project are to establish a well defined, professional project that can be shown to professionals in the field of landscape architecture and potential employers. I also intend for this thesis document to be made public for other students to aid in their landscape design research.

## **Personal**

The personal goals of this thesis project are to demonstrate the design and research skills I have acquired over the last five years and apply them to a comprehensive study.



## Site Inventory & Analysis

Driving west on the interstate to Dickinson, North Dakota, there is not much to see. However, ten miles east of Dickinson, along the right side of the road, there is a giant sculpture. The sculpture is titled “Geese in Flight,” and it is made of brass and tin. The sculpture is one of many along the Enchanted Highway, which runs north and south through North Dakota. Whenever I see this sculpture I am reminded of Dickinson, my hometown.

When you pull off the interstate, and drive west along Villard, the main street of the town, you see a lot of large businesses, such as car dealerships, welding supply stores and a John Deere dealership. Once I reach the downtown area of Dickinson, I start to see more traffic. Villard is lined with brick buildings to the right. These buildings are home to many restaurants and businesses, including an upscale restaurant, diners, multiple banks, a drug store, a frame shop and other unique stores. To your left is an old train station. Although the building is no longer used as a train depot, it is well maintained. On both sides of the old train depot, there is parking. Driving around the area of Downtown Dickinson, I see many people. People are walking their dogs, shopping, eating and visiting. The area offers something for everyone, whether it be men, women, children or college students.

As I drive north along 3rd Avenue, I pass through one of the residential neighborhoods of town. It is an early fall afternoon, and I see the beautiful fall trees with their orange, yellow and brown leaves. I think to myself how beautiful it would be if these same trees were downtown, and how colorful the area would be if there was more vegetation. As I leave the residential neighborhood, I keep driving north. I am now in the heart of town, where all the commotion is. The road has switched from single to double lanes and the speed limit has jumped to 35 mph. The streets are much busier than they were downtown, and everyone seems to be in a hurry. The north section of town is where the larger businesses are located: stores, such as Walmart, the mall, fast food restaurants and grocery stores.

I have never thought about my hometown as I did today. I have never thought about the character of the different areas of town, and how they each provide a different sense of place. Both areas provide services such as restaurants, shopping and leisure activities, however, downtown is a quiet place, while the north part of town is busy and fast paced.

# Building Density



The downtown area of Dickinson is moderately dense. The main street, Villard, has the highest density. Each city block measures 370 feet by 370 feet and contains between four to twelve buildings. About 98% of the buildings are in operation. Buildings in the area include various shopping stores and restaurants, a grocery store, a gym, a car repair shop and a post office. There is also a small plaza on the corner of Sims Avenue and Villard Street. The plaza measures 55 feet by 55 feet.



(1)

The buildings downtown are close together and between two and three stories high. The street level buildings contain shops and restaurants, and a few of them contain apartment units on the second and third floors.

Most of the buildings downtown are made of brick and have been around for many years. The brick gives the area a rustic feeling, creating a sense of place. Most of the buildings have been maintained well, however, there are a few in the area that could use a renovation.



(1)

The sidewalks downtown are wide, roughly ten feet. However, they do not contain a boulevard zone or a vegetation buffer from vehicular traffic. There are not many trees or shrubs in the area either. Incorporating vegetation, such as trees, shrubs and grass into the site will make it feel more inviting, as well as add color to the area.

## Shade, Water & Character

The area does not have an abundance of street or shade trees, so the area is illuminated by the sun during the day. At night, the moon, along with a couple of artificial street lights, provide light for the area. Although the area is not a dark place, it could benefit from the addition of more artificial light sources.

The only vegetation in the area is located in the plaza, on the corner of Sims Avenue and Villard Street. The plaza contains a total of four small, ornamental trees and a water feature. The water feature is a medium sized fountain. The plaza also contains seating elements, shrubs, flags, trash receptacles and lighting.



(1)

Natural light provides adequate lighting to the site during daytime hours. Street lights provide light in the evening.

With the increase in population, downtown Dickinson is a popular place. There are many unique shops and restaurants that bring people to the area. It is not uncommon to see an abundance of people shopping, eating, meeting or visiting the area.

Because of the additional people in the area, some of the streets and sidewalks are starting to show signs of distress. There are a few areas of sidewalk that are cracked and broken. Although the sidewalks are wide, they feel uncomfortable. Villard Street, one of the main streets in the city, is six lanes wide in some areas. The city is experiencing higher traffic volumes with the increase in people, and the wide street is necessary to accommodate for the high traffic volumes. However, some sort of buffer between the sidewalk and traffic is needed.



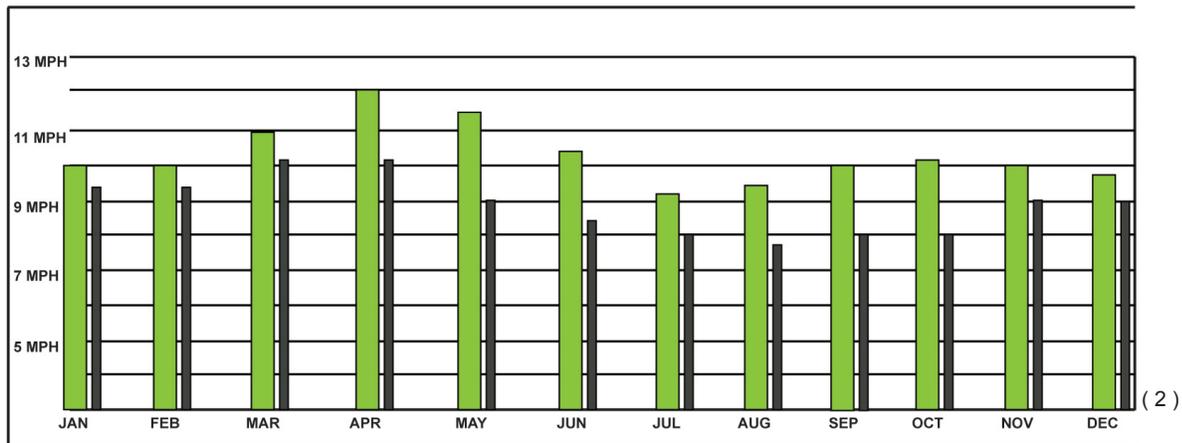
(1)

Relationship of the sidewalk, curb and street.

# Wind

The Midwest is generally more windy than the rest of the United States because it is a relatively flat area. This is the case in Dickinson. On average, the amount of wind is stronger than that of other cities in the United States.

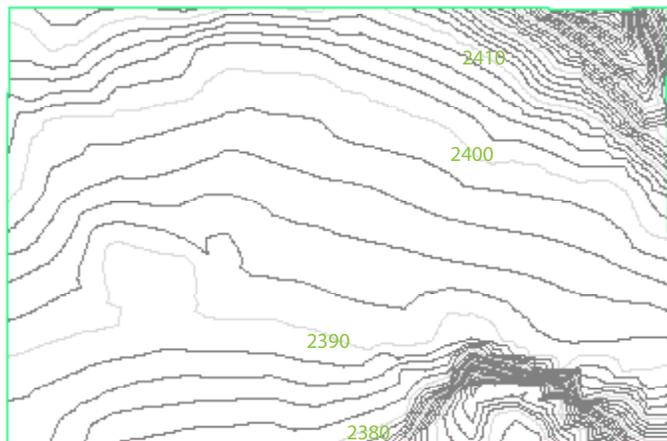
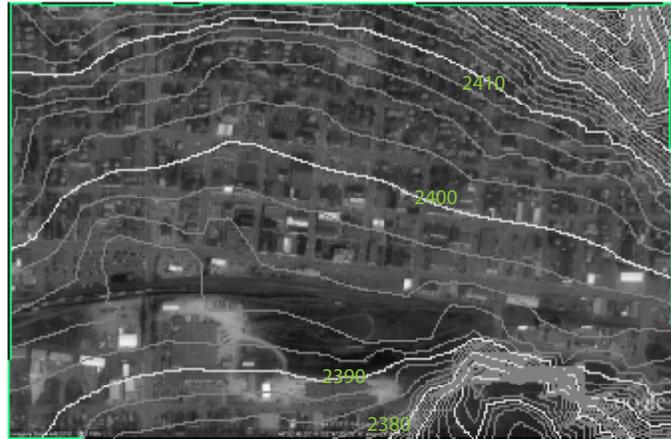
Because the downtown area of Dickinson does not have many trees, strong winds are noticeable in the area; however, some of the higher buildings provide some protection.



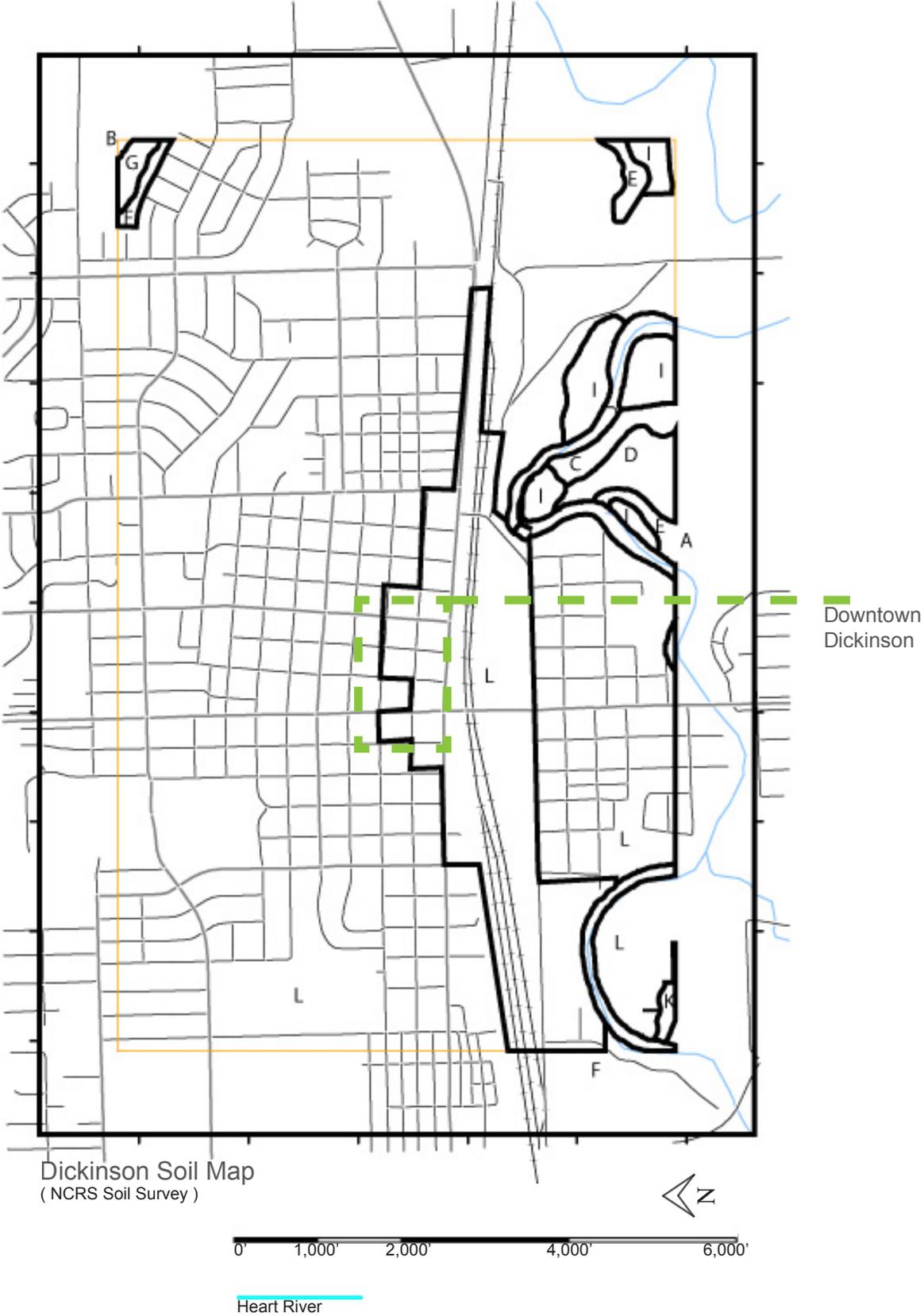
Wind Speed

- Dickinson
- United States

# Topography



# Soils, Water & Drainage



Dickinson Soil Map  
( NCRS Soil Survey )



0' 1,000' 2,000' 4,000' 6,000'

Heart River

Downtown  
Dickinson

A	<b>Janesburg fine sandy loam</b> 0 to 6 percent slope   Well drained   No Flooding		
B	<b>Vebar-Flasher complex</b> 6 to 9 percent slopes   Well Drained   No Flooding	<b>.5</b>	<b>Acres</b>
C	<b>Vebar-Parshall fine sandy loam</b> 3 to 6 percent slopes   Well Drained   No Flooding	<b>11</b>	<b>Acres</b>
D	<b>Parshall fine sandy loam</b> 0 to 2 percent slopes   Well Drained   No Flooding	<b>18.5</b>	<b>Acres</b>
E	<b>Cabba-Amor loam</b> 15 to 50 percent slopes   Well Drained   No Flooding	<b>10.9</b>	<b>Acres</b>
F	<b>Amor-Arnegard loam</b> 0 to 3 percent slope   Well Drained   No Flooding	<b>5.2</b>	<b>Acres</b>
G	<b>Amor-Shambo loam</b> 3 to 6 percent slopes   Well Drained   No Flooding	<b>5.2</b>	<b>Acres</b>
H	<b>Straw loam</b> 0 to 2 percent slopes   Well Drained   Rare Flooding	<b>.4</b>	<b>Acres</b>
I	<b>Trembles fine sandy loam</b> 0 to 2 percent slopes   Well Drained   Occasional Flooding	<b>42.5</b>	<b>Acres</b>
J	<b>Banks-Trembles fine sandy loam</b> 0 to 2 percent   Excessively drained   Frequent Flooding	<b>14</b>	<b>Acres</b>
K	<b>Manning-Schaller-Wabek complex</b> 6 to 25 percent slopes   Excessively drained   No Flooding	<b>3.1</b>	<b>Acres</b>
L	<b>Urban land-Ustorthents complex</b> Well Drained	<b>1,316.3</b>	<b>Acres</b> No Flooding
	<b>Water ( Heart River )</b>	<b>20.4</b>	<b>Acres</b>

# Vehicle & Pedestrian Traffic



Majority of the pedestrian traffic occurs in the downtown area.

# Visual Form & Site Photos



Sims & Villard | Viewing East



Sims & Villard | Viewing West



Sims & Villard | Viewing North



Sims & Villard | Viewing North



Sims & 1st ST. W | Post Office



Villard | Viewing North



Between 1st ST. W & Villard



1st ST. W & Sims



Sims & Villard | Viewing West



2nd ST. W & 1st AVE. W | Viewing East



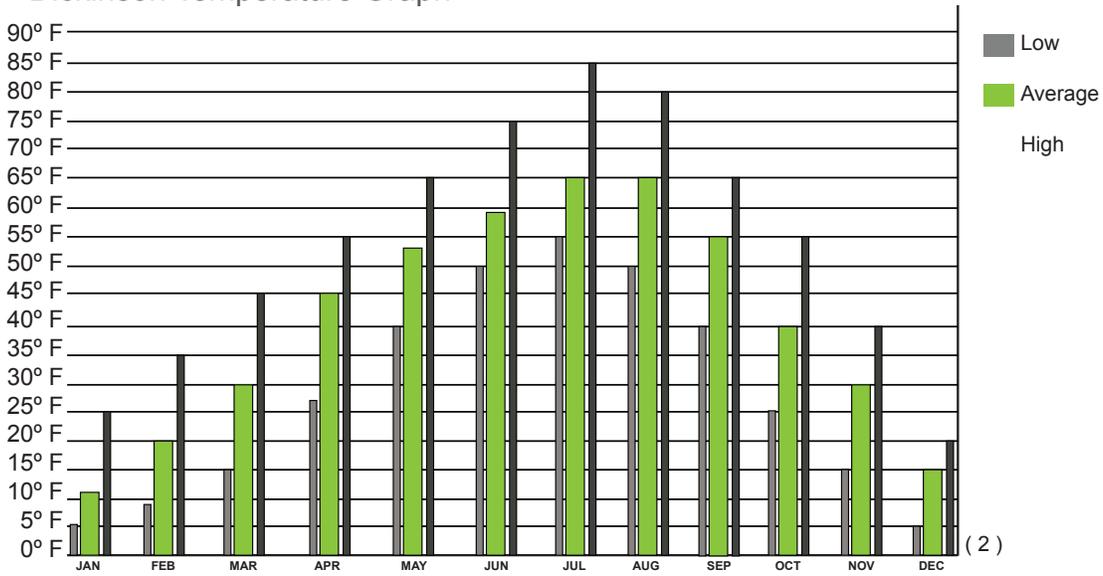
2nd ST. W & 1st AVE. W



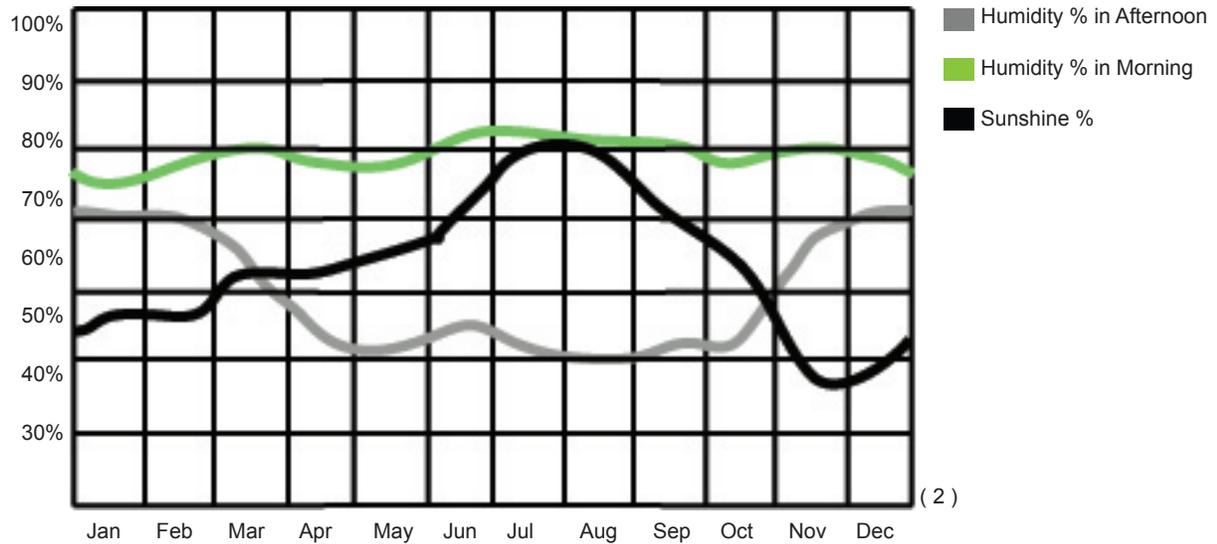
2nd ST. W & 1st AVE. W | Viewing south

# Climate Data

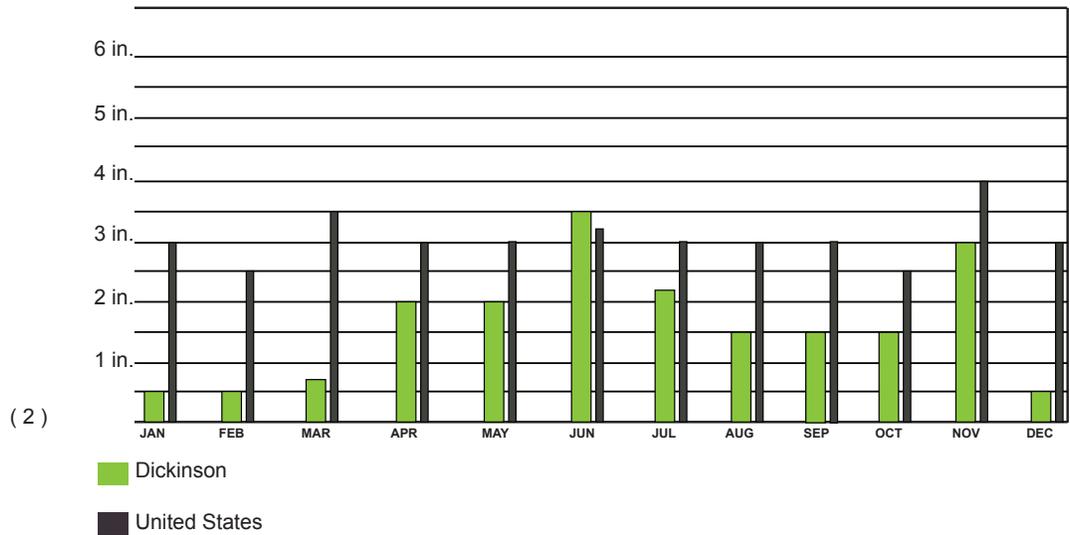
Dickinson Temperature Graph



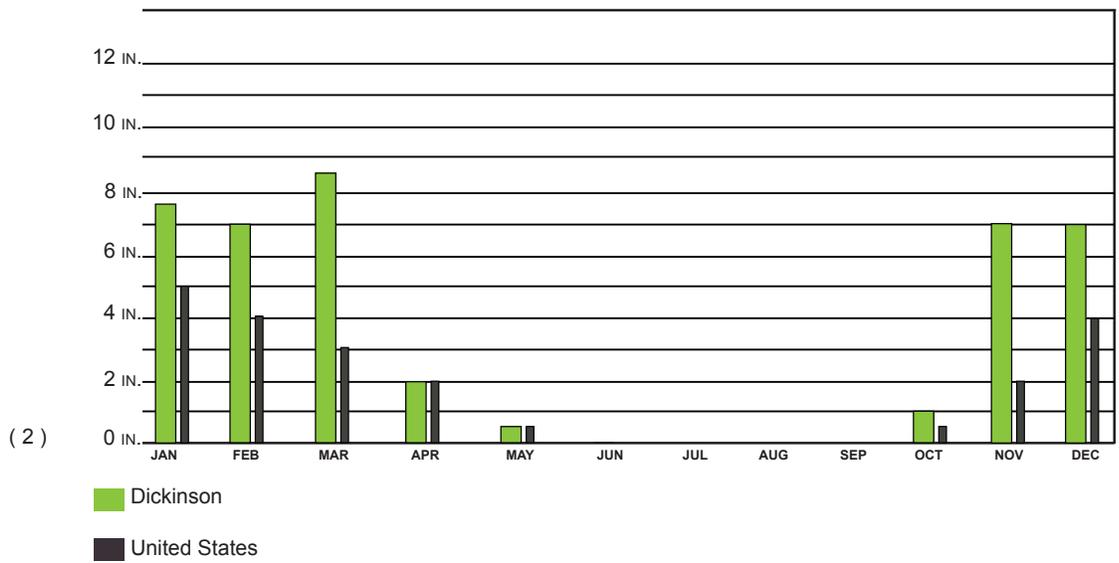
Dickinson Humidity & Sunshine Graph



Dickinson Precipitation Graph



Dickinson Snow Graph



# Zoning Districts



Downtown Dickinson Zoning Map  
( City of Dickinson )

-  High Density Residential District
-  Downtown Commercial District
-  General Commercial District

## Programmatic Requirements

This project will examine and research the effects an oil boom can have on a community and help it accommodate for the future. The main goal of this project is to create a community design that will provide the citizens of Dickinson with a sense of place and provide them with an area that they are happy to call their own.

Downtown will be the site for this community design intervention. It measures 2,486,000 square feet and consists of 18 city blocks. Downtown has the highest commercial density in town and offers a variety of stores, restaurants and other amenities. The downtown revitalization will include a new plaza or park, pedestrian friendly streets and sidewalks and affordable housing.

It is also important to incorporate pedestrian walkways from other popular areas of the town, such as nearby parks and neighborhoods, into the downtown area.

The revitalized downtown area will not only be a place to work, shop and live; it will be a destination. When people visit the new downtown, they will feel a sense of place that they cannot find anywhere else in the city of Dickinson. New storefronts and added business, along with newly added green space, will redefine Dickinson, giving the community a sense of viability and place.

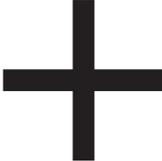


# DESIGN DEVELOPMENT

Highest traffic and pedestrian circulation

Existing plaza and vegetation

Highest retail and restaurant density



Little space for infill

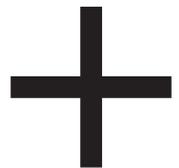
Main thoroughfares



# Important Streets



Provide housing and added retail  
Redevelop currently unused spaces  
Create a better streetscape



High cost to build

Time vs. need



Limited Space for parking

# Infill Opportunities



Both Dickinson State University and The heart River are less than 1 mile from the corner of Sims and 1st ave.

Possible design intervention for safe crossing of railroad



Crossing of railroad and busy streets



# Distances







**A** New 3 story, mixed-use buildings offer affordable housing, shopping and job opportunities for people to live, work and play in the area.

**B** Courtyard provides views of Sims Avenue, relaxation and shade.

**C** The water feature in the courtyard adds aesthetic value and sound to drown out the noise from the street.

**D** Villard Street is now more narrow to provide a safe pedestrian environment.

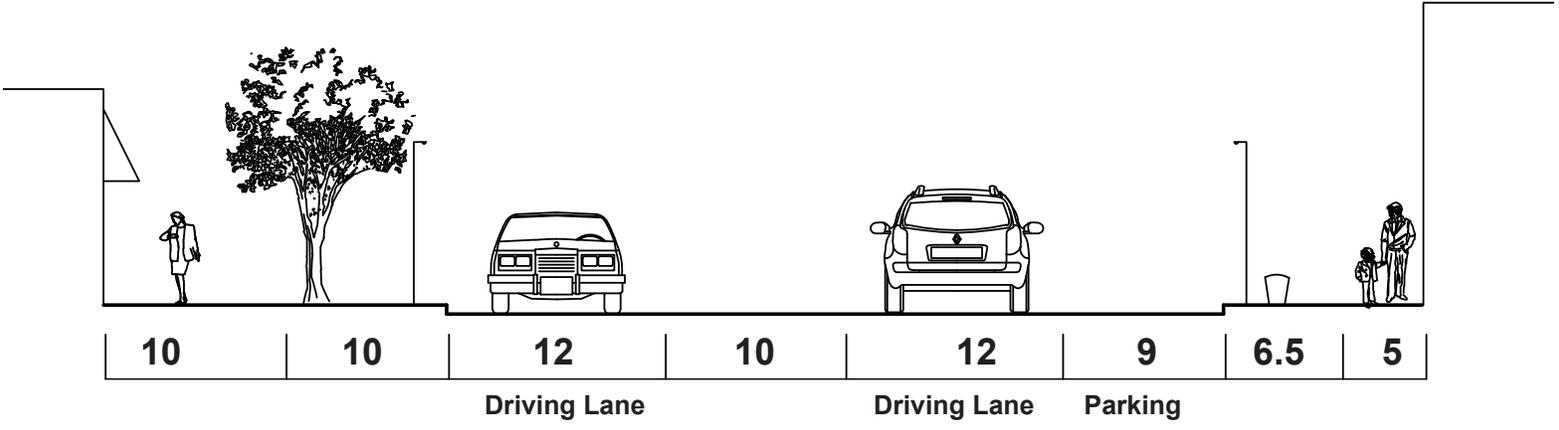
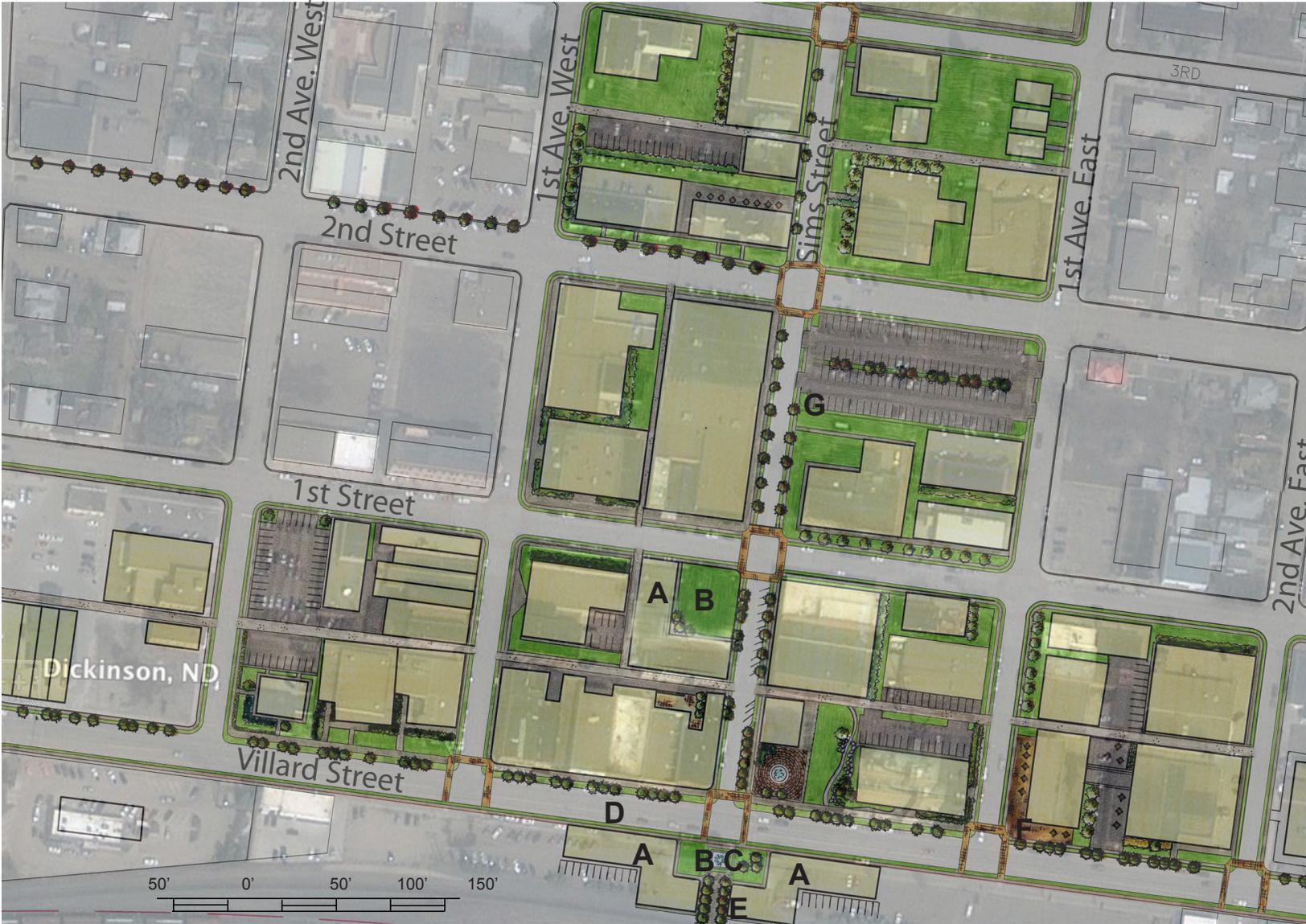
**E** The courtyard leads to a possible green way connection for a safe railroad crossing. It would connect to the existing park trail system.

**F** Outdoor seating areas for local cafes and restaurants will provide increased business revenue for merchants and provide people with a unique outdoor experience.

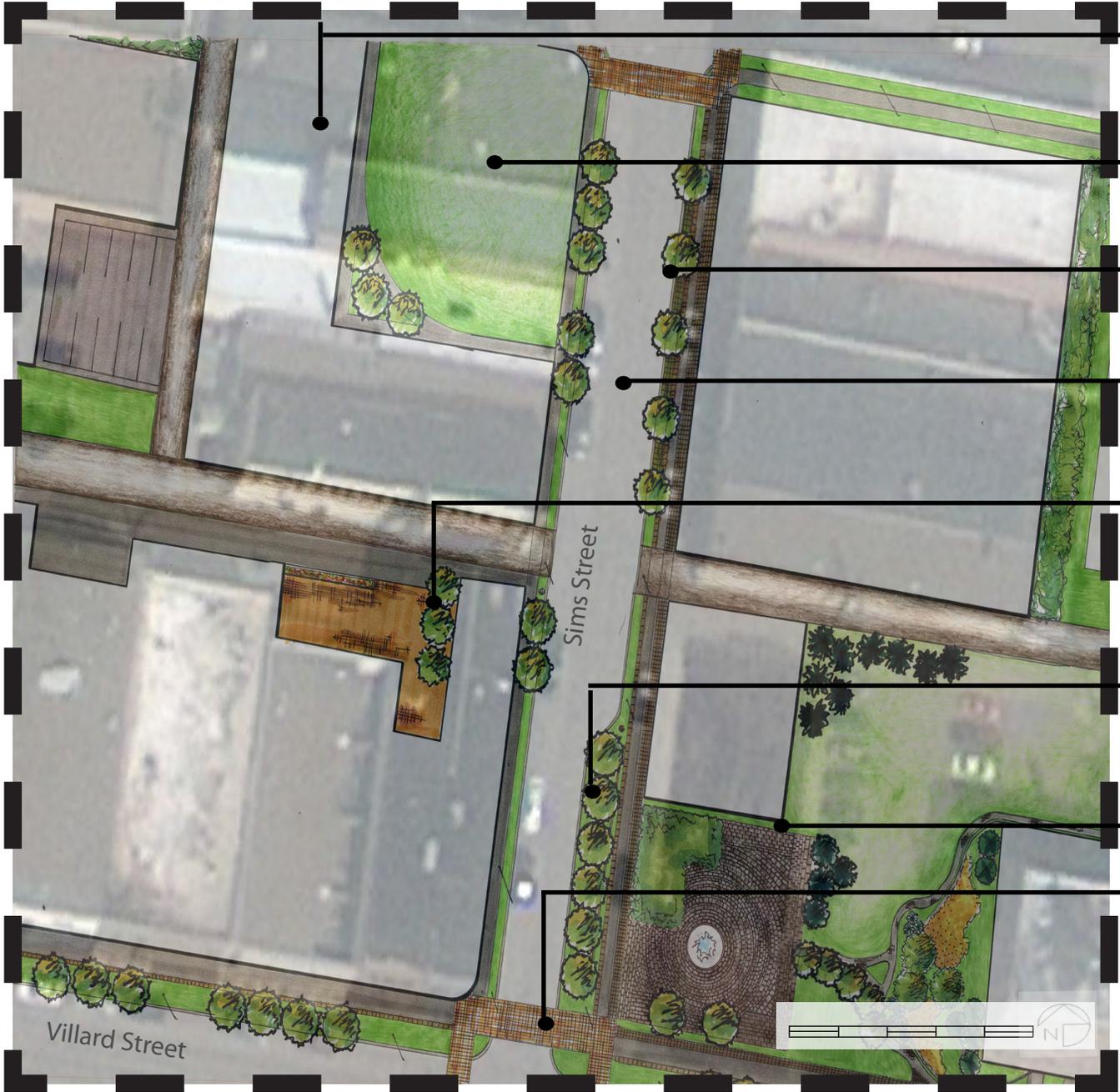
**G** New street trees provide shade and a safe barrier from the street.



# Master Plan



Proposed Street Section [ Villard ]



## Details of Plan

New 3 story, mixed-use buildings incorporate affordable housing, shopping and job opportunities.

Courtyard provides views of Sims Avenue, relaxation and shade.

New street trees provide shade and a safe barrier from the street.

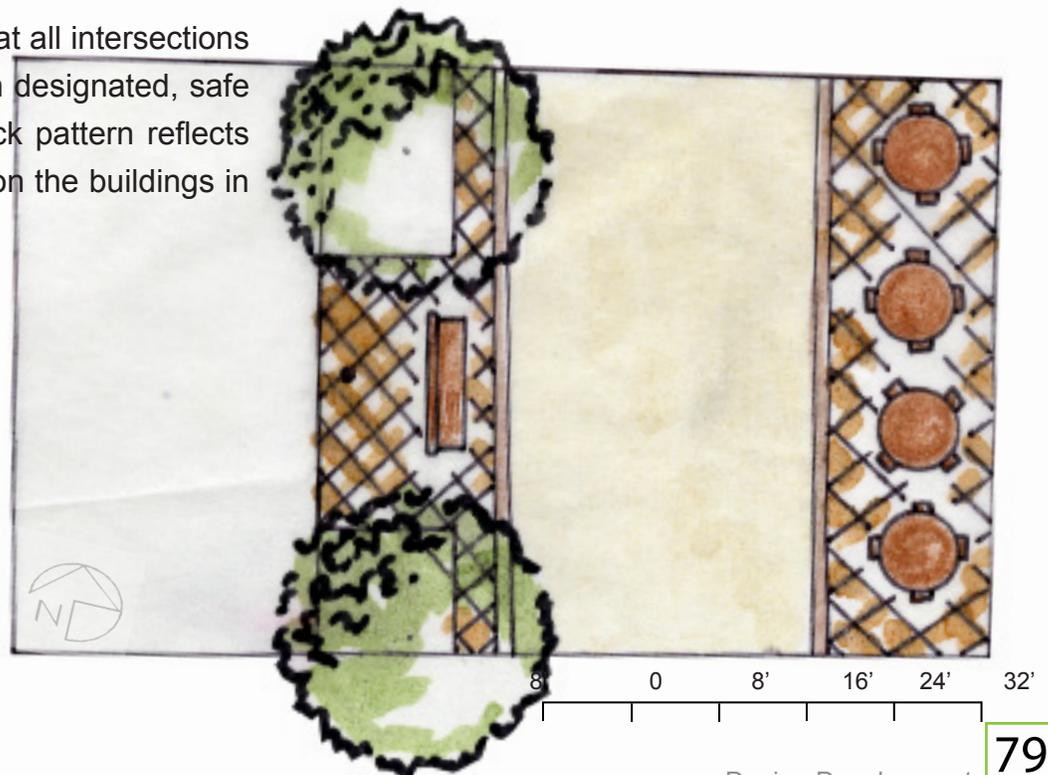
Sims Ave. is now more narrow to provide a safe pedestrian environment.

Outdoor seating areas for local cafes and restaurants will provide increased business revenue for merchants and provide people with a unique outdoor experience.

Extra wide boulevard provides angled parking and opens views to the existing plaza on the corner of Sims and Villard.

### Existing Plaza

Unique paving patterns at all intersections provide pedestrians with designated, safe crossing areas. The brick pattern reflects the historical character on the buildings in the area.





Viewing North-West - Corner of Sims and 2nd Street  
Alternating Linden and Amur Maple trees will be used to signify  
the greenway connection from Sims to Dickinson State University.



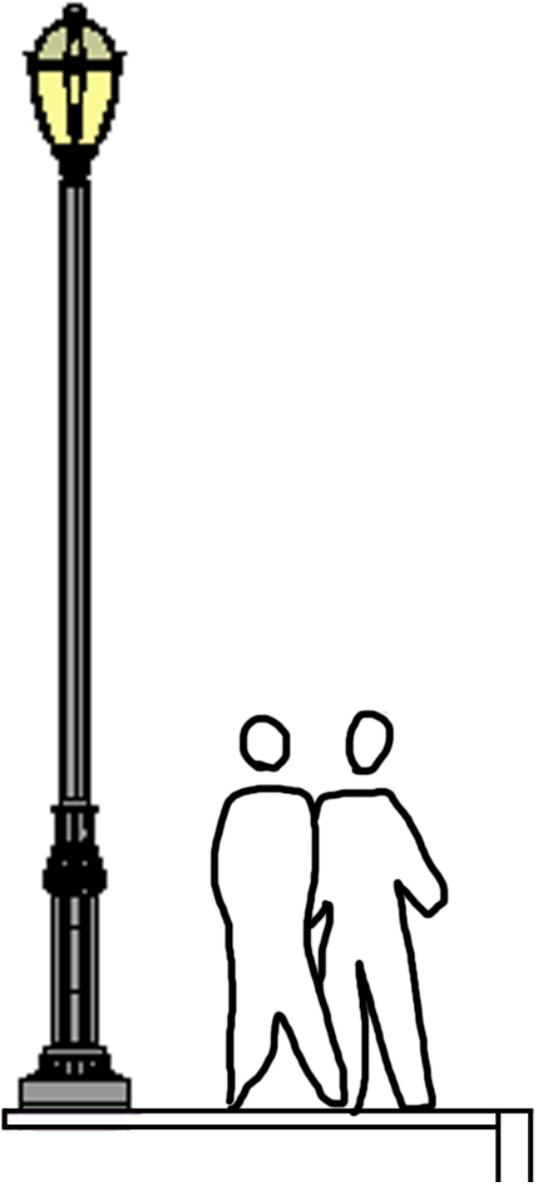
Viewing West - Down Villard Street.

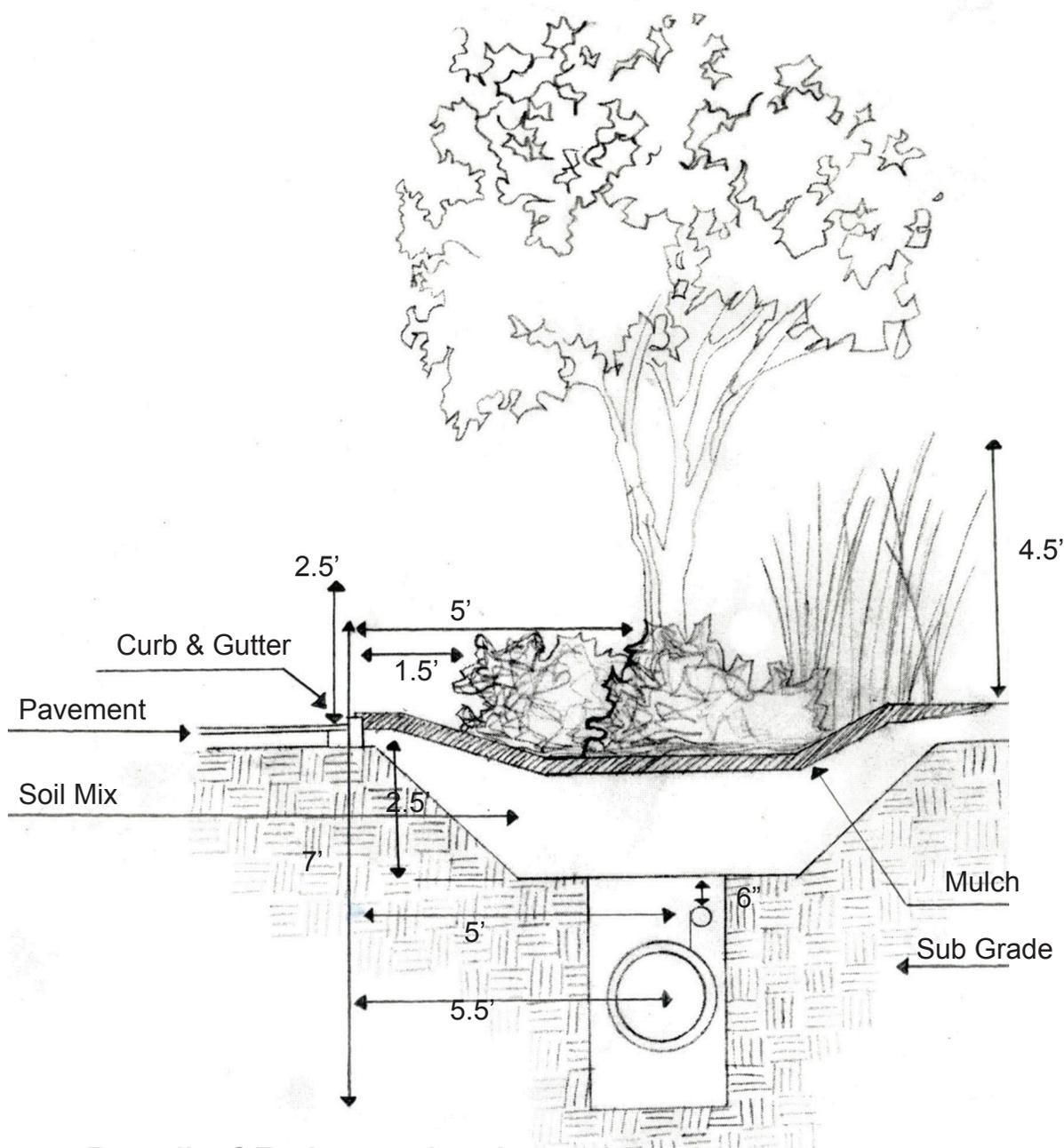
This image shows the building and street relationship of Villard Street. This street is occupied with restaurants, bars, and stores. The wide sidewalk allows people to walk comfortably, away from traffic. Street lights provide way finding when it is dark and seating is provided for those who want to rest.



### Viewing south - down Sims Avenue.

The downtown area will be used during all seasons. The wide boulevard provides an open view to the existing plaza. Because the plaza is no longer hidden by parked cars, It will be a popular destination. The boulevard will also serve as an area to deposit large amounts of snow during colder months.





Detail of Rain garden in parking lot.

## Design Detail and Materials



Birds eye view of the new downtown area. Patterns of different tree species will provide color and wayfinding in the area. Pedestrian scale streets and sidewalks make the area a destination area that can be used year-round.



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\*All Images ( 1 ) Taken by Chelsea Akers

# Previous Studio Experience

## Second Year



Fall 2008  
Kathleen Pepple  
Landscape graphics

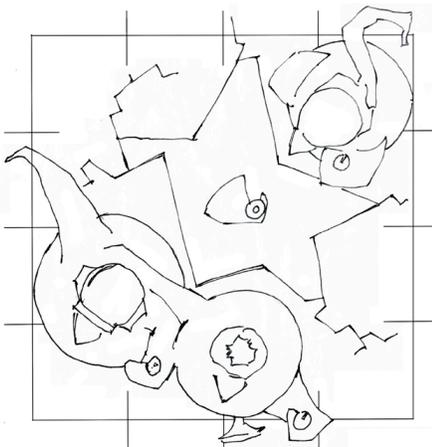
Halvorson Park | Battle Lake, MN



Spring 2009  
Mark Lindquist  
Parks and public space design

Halvorson Park | Battle Lake, MN

## Third Year

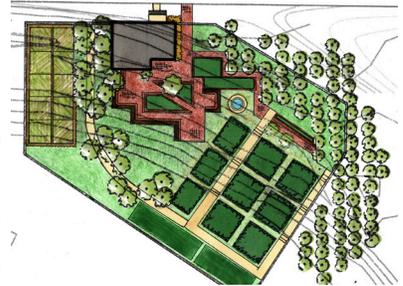


Fall 2009  
Stevie Famulari  
Environmental art and site design

Snow Sculpture | Winnipeg, Canada

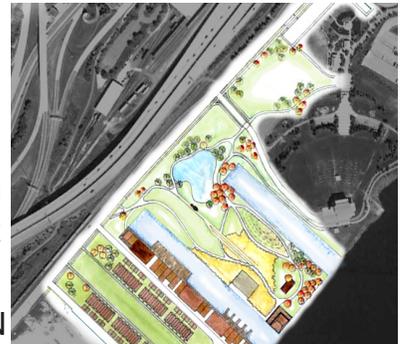


Spring 2010  
Kathleen Peple  
Community Design  
Research Garden | Bismarck, ND



## Forth Year

Fall 2010  
Jay Kost  
Urban Design  
Urban Design | Duluth, MN



Spring 2011  
Stevie Famulari  
Environmental remediation and plant design  
Phytoremediation | Mandan, ND



## Fifth Year

Fall 2011  
Dominic Fischer  
Environmental Planning  
Red River Basin | Otter Tail County





# Personal Identification

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My education at North Dakota State University has been a great experience. It has taught me how to understand the world of landscape architecture and prepared me for work in the field. The professors who have guided me through my journey and the friends that I have made along the way have made these last five years an experience I will never forget.



## Top 20 Oil Countries

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Country	Proven Resources ( Billion Barrels )	Daily Production ( Million Barrels )
Saudi Arabia	262	10.1
Iran	126	4.2
Iraq	115	2
Kuwait	101	2
Venezuela	77	3
Russia	60	9
Libya	39	1.6
Nigeria	35	2.5
<b>United States</b>	<b>30</b>	<b>7.7</b>
China	18	3.5
Qatar	15	1
Mexico	14.6	3.8
Algeria	11.8	1.9
Brazil	10.6	1.8
Kazakhstan	9	1.2
Norway	8.5	3.2
Azerbaijan	7	.3
Oman	5.5	.98
Angola	5.4	.08
<b>Total</b>	<b>1,111</b>	<b>82</b>

Maugeri, L. (2006)