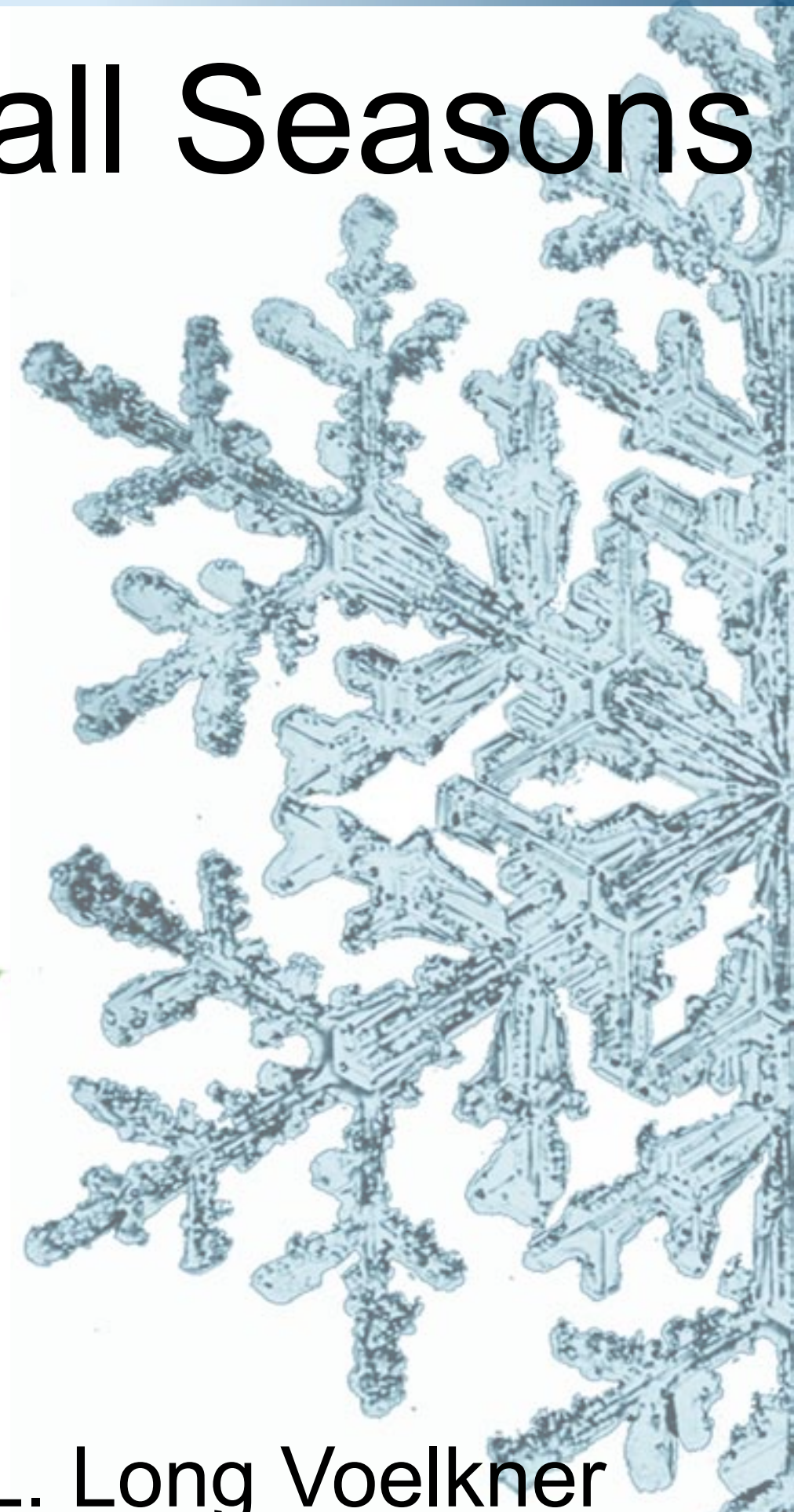


# Design for all Seasons



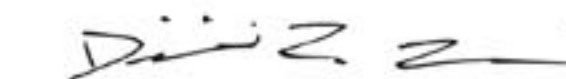
Megann L. Long Voelkner

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

By

Megann L. Long Voelkner

In Partial Fulfilment of the  
Requirements for the Degree of  
Landscape Architecture



Primary Thesis Advisor



Thesis Committee Chair

May 2012

Fargo, North Dakota



# Permission Rights

By signing and submitting this license, I (Megann L. Long Voelkner) grant to North Dakota State University (NDSU) the non-exclusive right to reproduce, translate (as defined below), and/or distribute my submission (including the abstract) worldwide in print and electronic format and in any medium, including but not limited to audio or video.

I agree that NDSU may, without changing the content, translate the submission to any medium or format for the purpose of preservation.

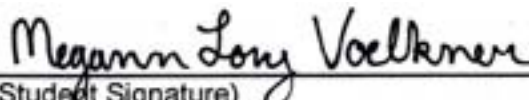
I also agree that NDSU may keep more than one copy of this submission for purposes of security, back-up and preservation.

I represent that the submission is my original work, and that I have the right to grant the rights contained in this license. I also represent that my submission does not, to the best of my knowledge, infringe upon anyone's copyright.

If the submission contains material for which I do not hold copyright, I represent that I have obtained the unrestricted permission of the copyright owner to grant NDSU the rights required by this license, and that such third-party owned material is clearly identified and acknowledged within the text or content of the submission.

IF THE SUBMISSION IS BASED UPON WORK THAT HAS BEEN SPONSORED OR SUPPORTED BY AN AGENCY OR ORGANIZATION OTHER THAN NDSU, I REPRESENT THAT I HAVE FULFILLED ANY RIGHT OF REVIEW OR OTHER OBLIGATIONS REQUIRED BY SUCH CONTRACT OR AGREEMENT.

NDSU will clearly identify my name(s) as the author(s) or owner(s) of the submission, and will not make any alteration, other than as allowed by this license, to my submission.

  
(Student Signature)

5/05/2012  
(Date)

# Table of Contents

II	Project Title and Signature Page
IV	Permission Rights
VI-VIII	Table of Contents
1	Thesis Abstract
2	Problem Statement
<b>4-7</b>	<b>Statement of Intent</b>
6	Project Typology
6	Claim
6	Premises
6	Theoretical Premises Unifying idea
7	Project Justification
<b>8-24</b>	<b>Thesis Proposal</b>
10	Narrative
11-12	User/Client Description
13	Major Project Elements
14-20	Site Information
14	Region
15	City
16	Design Site
17	Site Viewing Zones
18-20	Site Views
21	Project Emphasis
22-23	Plan for Proceeding
24	Previous Studio Experience
<b>26-85</b>	<b>Thesis Program</b>
29-36	Theoretical Research
37-38	Theoretical Research Summary
41-49	Case Studies
41-42	Winnipeg, Manitoba, Canada
43-44	Festival du Voyageur
45-46	Duluth, MN
47-49	Copenhagen, Denmark

# Table of Contents

50-51	Case Studies Summary
53-58	Historical Context
60-61	Thesis Goals
36-64	Inventory Narrative
<b>66-96</b>	<b>Inventory and Analysis</b>
66	History
67	Lake Bemidji
68	Lake Uses
69-70	Climate Data
71-72	Sun and Shading
71	<i>Winter</i>
72	<i>Summer</i>
73	Topography
74	Soils
75	Vegetation
76	Roads and Trails
77	Parking
78	Lighting
79-80	Building Inventory
81	Utilities
82	Zoning
83	Demographics
84	Connections
85	Current Event Buildings
86	Movement on Site
87-88	Special Events
89-90	Places of Interest
91-92	Winter Uses
91	<i>Land Uses</i>
92	<i>Lake Uses</i>
93-96	Site Analysis
94	<i>Library Park</i>
95	<i>Pamida</i>
96	<i>South Lake Shore</i>
97-98	Programmatic Requirements

# Table of Contents

<b>101-104</b>	<b>Preliminary/Concept Planning</b>
101	Concept 1
102	Concept 2
103	Concept 3
104	Preliminary Master Plan
<b>107-109</b>	<b>Master Plan</b>
107	Full Site Plan
108-109	Paul and Babe Waterfront Park
<b>111-131</b>	<b>Master Plan Details</b>
111	Mississippi River Boardwalk
112	Snowball Park
113	intersections
114	Paul Bunyan Dr. Median
114	Paul Bunyan Bike Trail
115	Road View
116-120	Paul and Babe Waterfront Park
116	<i>Paul and Babe Waterfront Park</i>
117	<i>Summer</i>
118	<i>Fall</i>
119	<i>Winter</i>
120	<i>Spring</i>
121-122	Constructions Details
123-124	Paul and Babe Statues
125-126	Lighting Plan
127	Lighting Materials
128	Docks
129	Bench Walk
130	Shoreline Stabilization
131	Potential Plants
133-135	References
136-138	Image References
140	Personal Information

# Abstract

This design project examines how a landscape design can activate a small-scale Midwestern city's outdoor use and tourism potential during the winter season. In the city of Bemidji, MN, the winter season can start as early as October and continue into late March. This prolonged weather can cause Seasonal Affective Disorder (SAD) in people. One of the recommended treatments for SAD is to increase outdoor activity. The premise behind this project is that if Bemidji's landscape was more functional and appealing during the winter season, it would encourage the residents of Bemidji to increase their outdoor activity during the winter. In the city of Bemidji, six different winter events bring people from the community, the region, and the world to the area. If Bemidji's landscape design was better integrated and appealing during the winter season, more of the event participants would be inclined to remain in the area and explore the city.

Keywords: winter, urban design, SAD, dual purpose landscapes, seasonal design, Waterfront Design, Streetscape

# Problem Statement

Can a landscape design activate a small-scale Midwestern city's outdoor use and tourism potential during the winter season?

# Statement of Intent



**The Project Typology**

A multi-seasonal waterfront and streetscape design for a small-scale Midwestern city.

**The Claim**

That a small-scale Midwestern city, through a landscape design, can enhance the potential for tourism and promote outdoor activity during the winter season. The actors working on this project include landscape architects and city planners. The action would be to design a winter landscape for Bemidji, Minnesota.

**Premises**

In this project the landscape architects and city planners are responsible for designing a landscape that can increase outdoor activity in the community of Bemidji, Minnesota, with a winter season longer than three months, as well as enhance tourism potential by attracting people visiting the area to the downtown area where shops and restaurants are located.

**Theoretical Premise/Unifying Idea**

A year-round urban landscape design will promote outdoor activity and enhance tourism potential during the winter season in a small-scale Midwestern city.



## Project Justification

In Midwestern climate cities like Bemidji, MN, winter can be the longest season of the year. It can start as early as October and last until April. During this time the temperatures can go as low as -45 degrees Fahrenheit with wind chills making it feel colder still, and there are days when more than 6 inches of snow falls (1). During these weather conditions people can become affected by Seasonal Affective Disorder (also called SAD). SAD is a form of depression that occurs at the same time every year, generally during the winter. Some factors that may increase a person's risk for SAD are genes, hormones, body temperature and the amount of light a person is exposed to daily. Although many of these factors cannot be controlled, there are measures that one can take to reduce the SAD symptoms. These include making the environment bright and sunny, exercising regularly, and getting outside (2). If people had an interesting landscape surrounding them, they may be more likely to attempt these methods and reduce SAD symptoms.

In Bemidji, MN tourism plays a large role in the economy of the city. During the winter season, although Bemidji has six different special winter events, the amount of tourist money the city receives decreases. A city that has increased the amount of winter tourism and has a similar climate to Bemidji is Winnipeg, Canada. The Festival du Voyageur is a 10 day province-wide celebration that honors the voyageurs' spirit by placing an emphasis on the beauty of winter and historical activities. This event brings in more than 100,000 people over 10 days (3). This shows that tourism doesn't have to stop during the winter season, and that if Bemidji could better support the winter events already in place, the potential for making money during the "off-season" would be there.





Growing up in northern Minnesota, winter was always the longest season of the year. Snow in Bemidji could come as early as the beginning of October and last until late April. I loved it. I was and still am a minority in my enjoyment of the winter season.

The majority of the people that I grew up with had very different views on winter. The first snow was amazing, as long as it came after Thanksgiving. Snow at Christmas was amazing, as long as it did not storm and mess with holiday plans to travel to the tropics. Any snow that was still on the ground after the end of February? If angry words and hurtful stares could melt snow it would be melted in less than an hour.

This attitude toward winter always confused me, so when people would complain about the winter I would ask them why they disliked it so much. The number one answer that I got was that there was nothing to do. Since I had many activities to do during the winter I started to wonder if it was that they did not have anything to do or they did not have a convenient place to do things. During the summer months, downtown Bemidji would have people walking through the streets or by the lake, but during the winter there was hardly anyone outside. I believe that if there was something to spark people's interests downtown during the winter, more people would be willing to brave the freezing winds and walk outside like they do during the summer.

During January, Bemidji has a week-long winter event called Brrrrmidji Polar Daze. The idea is one very similar to the Festival du Voyageur in Winnipeg, Manitoba, Canada. The major difference between the two is the number of people that each festival receives. Winnipeg's Festival du Voyageur brings in people who stay for the entire week, while Bemidji's Polar Daze only brings in people who tend to stay the day or maybe two if they are interested in two events. Again I wondered if people just did not have enough activities to entice them to stay longer, especially in the downtown area. I believe that if there was more interest in the downtown landscape during the winter season, more people would be willing to stay and explore the city like they do during the summer.

The idea of this design project is to take those beliefs and apply them to the city of Bemidji, MN in an effort to create a uniquely urban winter wonderland.

"It's a beautiful sight, we're happy tonight. Walking in a winter wonderland".  
Winter Wonderland Song lyrics  
(Bernard & Smith, 1934)

## Client

The client is the city of Bemidji, MN.

## Users

### Outdoor Enthusiasts

These users enjoy being able to actively participate in the outdoors. This participation can range from outdoor recreational sports, alternative means of transportation or a desire to be outside. The number of people included in this user group varies by activity and season, with the peak user times in the middle of the day during the summer season. Parking requirements for this user group can be modified to reduce the number of car spaces needed but increase the amount of space needed to park alternative means of transport, such as bikes, snowmobiles, water vehicles, or cross-country skis.

### Out-of-City Tourists

These users are mostly people coming to Bemidji to participate in a scheduled event such as Polar Daze, 4th of July fireworks, or the Dragon Boat Festival. This user group also includes people coming to enjoy an attraction specific to the area: for example, Rutgers Lodge on Lake Bemidji. This group has the additional requirements of parking, access to restaurants for meals, and access to hotels/resorts to spend their nights. The number of people included in this user group varies by season and event with, peak user times during the summer season and holiday events.

## In-City Event Participants

These users are people who live in the city of Bemidji and participate in the scheduled events. The number of people in this group varies according to the activity and there is not a peak user time. People in this user group can attend major scheduled events and, due to their proximity to the city, can also attend minor events such as the Old Car Show, the Home, Boat and Travel Show, or the Beltrami County Humane Society Dog Walk. Parking is used for a majority (90%+) of this user group, although alternative modes of transportation could be encouraged for this group. A sub-group that exists in this user group includes the college students who attend some of the major scheduled events during the school year.

## Community

These users are the people who use the space on a regular basis year-round. This includes the 13,431 people living in Bemidji (U.S. Census Bureau. 2010. Retrieved October 1, 2011). The peak user times associated with this user groups are weekends during the summer season. Other peak times can also include weekends year-round, scheduled events, or special events in the downtown area, which could include a play at the Chief Theater. Parking is used for a majority (90%+) of this user group, although alternative modes of transportation could be encouraged for this group. A sub-group that exists in this user group includes college students who are located within two miles of the historic downtown area of Bemidji.

## Year-round Landscape/ Streetscape

While keeping the character of Bemidji's Historic Downtown, add or change elements to provide year-round interest. The focus will be on the winter season for material choices, plantings, and pedestrian areas.

## Year-round Lakefront Design

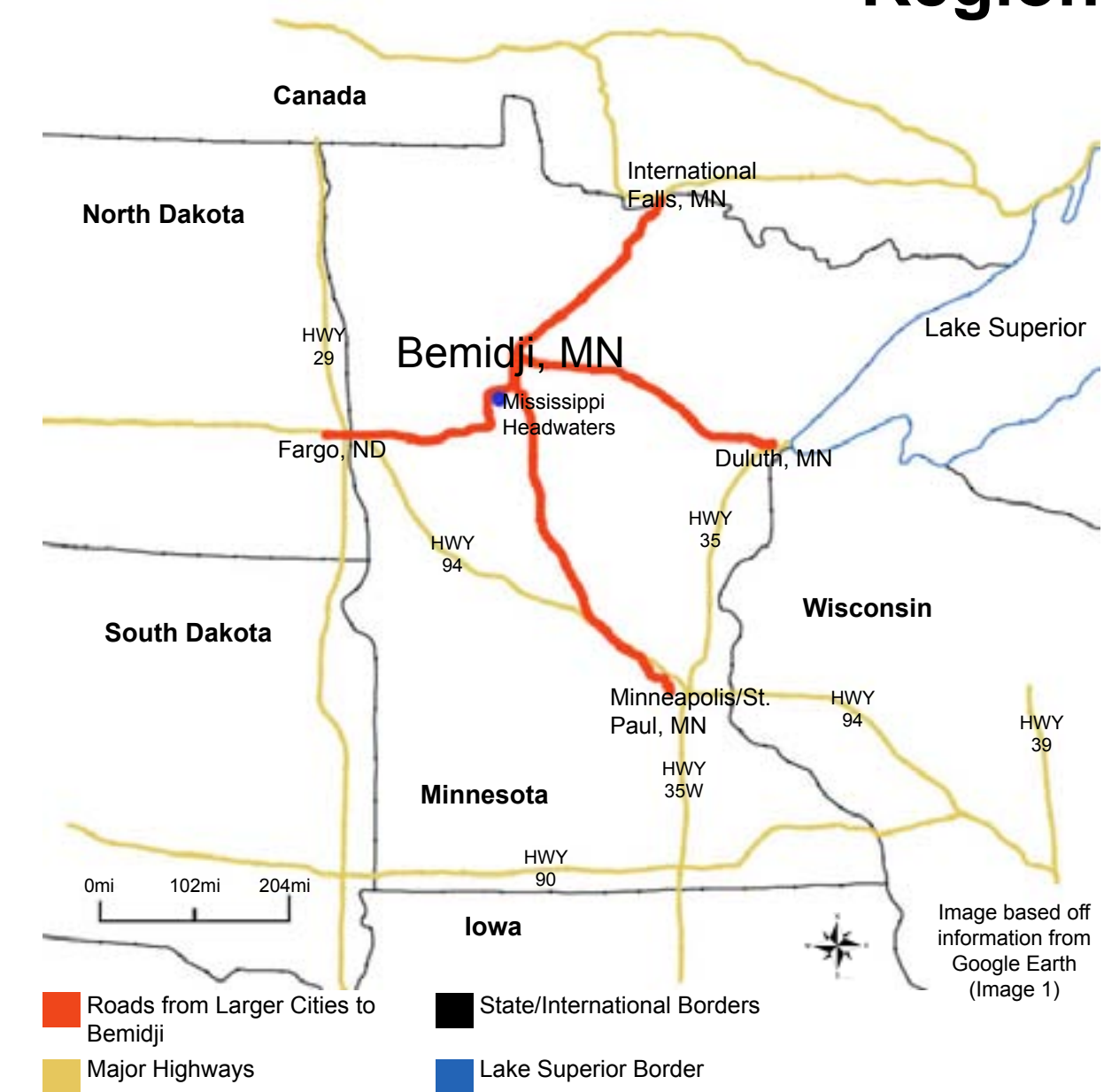
Design with elements that will provide year-round interest. The focus will be on the winter season for material choices, plantings, and pedestrian areas. The lakefront will need to keep a balance of open space for events and filled space for groups of plantings or built objects.

## Winter Event Design

This will be the area to create a solely winter landscape located along the lakeshore. For this area there may be several design options that could be created based on an event or guidelines that each event must follow when setting up the spaces.

## Connection to Sanford Center

Design with elements that will provide year-round interest. The winter design elements for this area need to create enough interest that people would want to walk along the lakeshore in below freezing weather. The focus will be on the winter season for material choices, plantings, and pedestrian areas.



## Region

Bemidji is located in Northern Minnesota. Minnesota is bordered by Canada to the north, North Dakota and South Dakota to the west, Iowa to the south, and Wisconsin and Lake Superior to the east. Minnesota has a population of 5,303,925, has a land area of 79,610.08 square miles and has 66.6 persons per square mile according to the 2010 U.S. Census (U.S. Census Bureau. 2010. Retrieved October 1, 2011). Minnesota is known as the Land of 10,000 Lakes but in actuality has 11,842 lakes (10+ acres), 6,564 natural rivers and streams, and 9.3 million acres of wetlands (Minnesota DNR. Retrieved September 28, 2011). The headwaters of the Mississippi River are in Itasca State Park in Northern Minnesota.

# Site Information

## City



Site Location

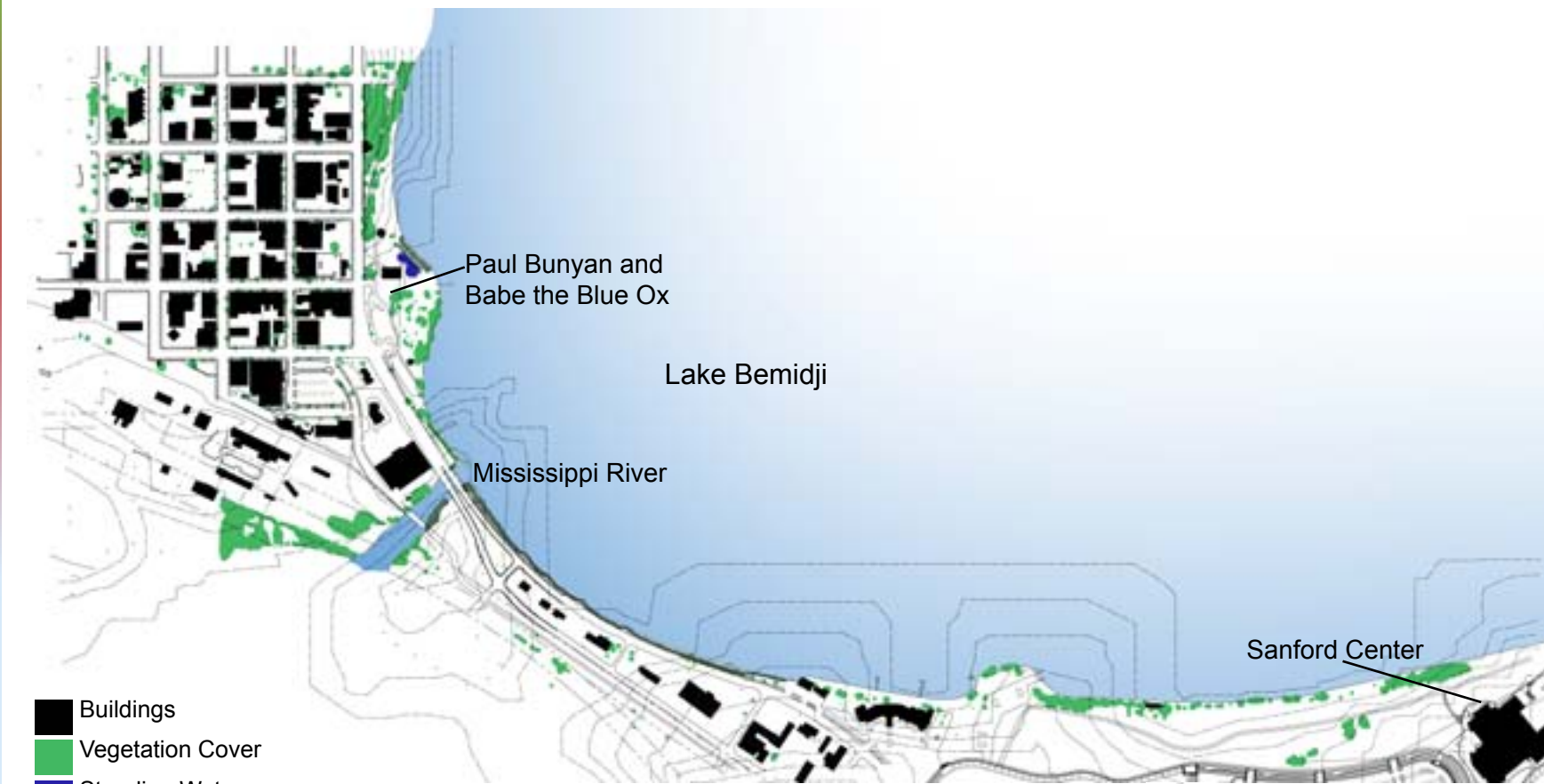
Image based off information from Google Earth (Image 2)

## City

Bemidji has a population of 13,431 (U.S. Census Bureau. 2010. Retrieved October 1, 2011 ). The city is known as the First City on the Mississippi and the hub of North Central Minnesota. Bemidji is home to Paul Bunyan and Babe the Blue Ox as well as Bemidji State University. The city is located primarily around the south end of Lake Bemidji.

# Site Information

## Design Site



- Buildings
- Vegetation Cover
- Standing Water

Image based off information from Google Earth and City of Bemidji (Image 3)

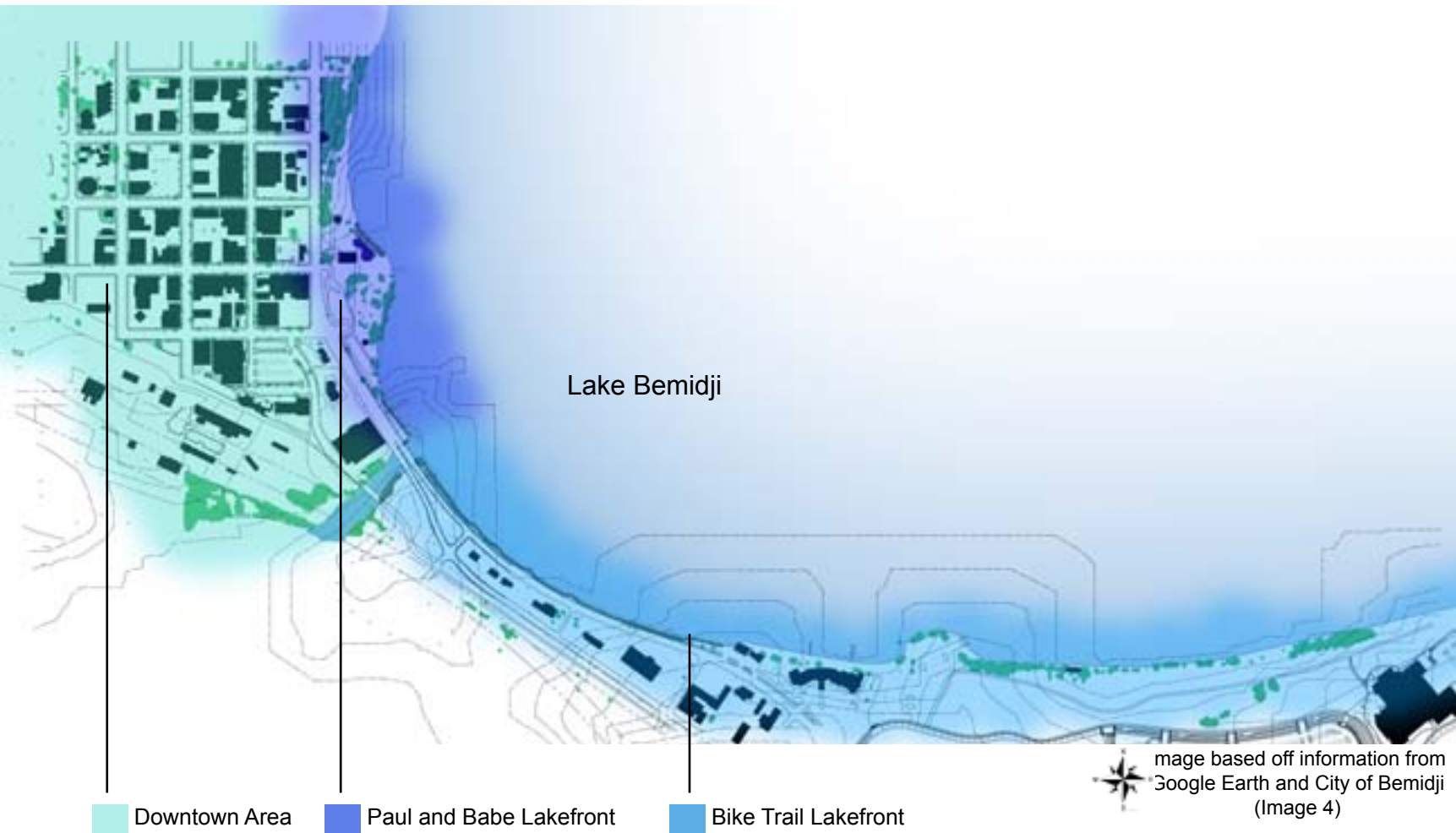
## Site

The design site will include the Historic Downtown of Bemidji and the south lakefront between the Historic Downtown and Lake Bemidji.

This particular site was of interest to me because of the wide variety of attractions that the site and the entire city of Bemidji already offers. These attractions include the lakefront, Paul and Babe, and various events scheduled year-round. This site was also of interest due to the long winter season, which can start as early as October and end as late as April, and the number of activities people can participate in during those months. Some of these activities include cross-country skiing, snowshoeing, ice fishing, ice skating, hockey, sledding, and snowmobiling. What also makes this site unique compared to other potential sites is the variety of land uses that are located in this site. These uses include the waterfront, storefront with mixed residential, green spaces that double as event gathering spaces, areas for alternative transportation, and well-known landmarks. The site is bordered by Paul Bunyan Drive Southeast, Lake Bemidji, 1st Street Southeast, Mississippi Avenue Northwest, and 6th Street Northwest.

The major road running through the site is Paul Bunyan Drive Southeast. There is one bike trail located along the shore of Lake Bemidji.

# Site Information



In order to show views from the site most effectively, the entire site has been broken down into three different zones. The first zone is the Downtown area, which is comprised of the blocks between Paul Bunyan Drive, Irvine Ave., the Mississippi River, and 6th St. The second zone is the Paul and Babe Lakefront, which includes the lakeshore from the Mississippi River, Library Park, and Paul Bunyan Drive. The third zone is the Bike Trail Lakefront, comprised of the bike trail and lakeshore between the Mississippi River and the Sanford Center

# Site Information Downtown



(Image 5) Beltrami Ave.

Most of Bemidji's downtown is comprised of early 1900's two-story brick buildings that are built wall to wall. Many of the buildings still have residential apartments on the second story, though in some buildings the apartments have been converted into office spaces. The majority of the streets have on-street parking and deciduous boulevard trees.



(Image 6) Downtown Bemidji Sculpture Walk

Throughout downtown Bemidji is a sculpture walk that has pieces primarily located on the street corners. The unique thing about Bemidji's sculpture walk is that the pieces are changed regularly, either by changing locations or being replaced by a new piece.



(Image 7) Residences in Bemidji

On the outer blocks of the downtown zone there are a few single family residential homes. These homes are separated into two types: those that still function as residences and tend to be rundown, or those that have been converted into office buildings and tend to be more upkept houses. Like most of downtown, the houses are mostly two stories.



(Image 8) Chief Theatre

The most historic building in Bemidji is the Chief Theatre. Originally the town's movie theater the Chief Theatre now hosts the Paul Bunyan Playhouse. A mix of local actors and professional actors perform plays throughout the year with special notice to the summer schedule where as many as five full plays are performed over three months.

# Site Information

## Paul and Babe Lakefront



(Image 9) Bridge over the Mississippi River

The boundary between the two lakefront zones is the Mississippi River. Bemidji is known as the "First City on the Mississippi" and is the sister city of New Orleans, the last city on the Mississippi. When the new streets were put in along with the new bridge, an ornamental feature labeling the Mississippi was added.

Along the lakefront there is a steep hill that is used for sledding in the winter. At the top of the hill is Library Park, a small park connected to Carnegie Library and the location of the annual Art in the Park event. Unfortunately during the summer months the area by the lake is mostly unused due to the large number of geese and their droppings.



(Image 10) Waterfront and Carnegie Library

The most iconic landmark in Bemidji is the statue of Paul Bunyan and Babe the Blue Ox. A popular picture-taking place for tourists, the courtyard in front of Paul and Babe is also the location for many of the events held both in the summer and winter months.



(Image 11) Paul Bunyan and Babe the Blue Ox

A public boat landing and secondary pavilion are located near the inflow of the Mississippi River into Lake Bemidji. Because of the proximity to the busy boat landing and the proximity to the failing shoreline, this pavilion is rarely used for any purpose other than a quick rest stop or quick lunch break for people going elsewhere.



(Image 12) Waterfront Pavilion

# Site Information

## Bike Trail Lakefront



(Image 13) Lakeshore near the Bike Trail

The shoreline along the bike trail has been planted to try to restore the natural lakeshore. Along the bike trail there are bump-outs where people can stop to view the lake or view the sculptures located along the bump outs.



(Image 14) Paul Bunyan Bike Trail

With the completion of the Sanford Center, the bike trail that had been in the plans for the city for years was finally completed between Lincoln Elementary School and Paul Bunyan Drive.



(Image 15) Bike trail looking toward Bemidji

The bike trail has a mixture of new and old borders along the lakeside of the trail. The new border was added within the last 10 years and the old border was added by the Civilian Conservation Corp (CCC) groups that worked in the area.



(Image 16) Bike trail and the Sanford Center

The major area of focus for this design project will be winter Urban Landscapes and Streetscapes.

A secondary area of study will be the mental and physical health benefits of outdoor activity during the winter season.

An additional area of study will be dual use landscapes to ensure that a majority of design elements incorporated into the final design will be both functional and aesthetically pleasing during the summer and winter seasons.

## Research Direction

Using a mixed method approach of quantitative and qualitative analysis, research for this project will be conducted in these areas: the theoretical premise/unifying idea, project typology, historical context, site analysis, and programmatic requirements.

## Design Methodology

A mixed method that will be employed for this project and will follow a Concurrent Transformative Strategy. Quantitative data, in the form of statistical and scientific data, and qualitative data, in the form of site observations, interviews, and archival searches will be collected concurrently. Information will be analyzed and presented in the form of text and graphics.

## Plan for Documenting the Design Process

All of the research and design for this project will be compiled and documented digitally through an InDesign generated booklet. The design process will be documented with a collection of sketches, detailed drawings, photographs, research-based graphics, and all research findings. The interval used for collecting will be by the completion date of a category. A schedule/work plan for the spring semester includes:

Analysis and Research completed by February 7th, 2012  
Mid Semester Thesis reviews March 6th and 8th, 2012  
Final design completed by March 28th, 2012  
Display Boards completed by April 16th, 2012  
Digital Presentation completed by April 16th, 2012  
Final Thesis Document completed by May 3rd, 2012  
Uploaded to Library website by May 3rd, 2012

At the conclusion of the project, the final product will be presented through display boards of the required size, through a visual and oral digital presentation, and a hard copy of all the research, text, and graphics. A digital file of the completed project will be available at NDSU's Library Archive for future viewing.



# Plan For Proceeding Schedule

# Previous Studio Experience

September							October							November							December						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
				1	2	3						1			1	2	3	4	5					1	2	3	
4	5	6	7	8	9	10	2	3	4	5	6	7	8	6	7	8	9	10	11	12	4	5	6	7	8	9	10
11	12	13	14	15	16	17	9	10	11	12	13	14	15	13	14	15	16	17	18	19	11	12	13	14	15	16	17
18	19	20	21	22	23	24	16	17	18	19	20	21	22	20	21	22	23	24	25	26	18	19	20	21	22	23	24
25	26	27	28	29	30	23	24	25	26	27	28	29	27	28	29	30	25	26	27	28	29	30	31				
							30	31																			

SOI, Proposal, Program

## Second Year

Fall 2007- Kathleen Pepple  
 Kennedy Court- Fargo, ND  
 Walster Hall- NDSU Campus, Fargo, ND  
 Klai Hall- NDSU Downtown Campus, Fargo, ND

Spring 2008- Mark Lindquist  
 Pioneer Park- Valley City, ND  
 Aboriginal Park, Point Douglas- Winnipeg, Manitoba, Canada

## Third Year

Fall 2008- Stevie Famulari, Matt Chambers  
 Fargo Dike, Form over Function- Fargo, ND  
 Symphonic Alley, Amplifying the Silence- Fargo, ND

Spring 2009- Kathleen Pepple  
 Battle Lake Park Redesign- Battle Lake, MN  
 Residential Scale Sustainability- Fargo, ND  
 Crossroads Community Garden Charette- Fargo, ND

## Fourth Year

Fall 2010- Jay Kost  
 Duluth Waterfront Urban Development- Duluth, MN

Spring 2011- Stevie Famulari  
 80-Acre Landfill Phytoremediation Project- Bemidji, MN  
 HESCO Barriers: Long-term Flood Protection- Fargo, ND

## Fifth Year

Fall 2011- Dominic Fischer  
 Red River Basin- Eastern ND, Western MN, Northeastern SD

## January

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
Revisions and Edits						
8	9	10	11	12	13	14
Research and Analysis						
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

## February

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
Design Development, Design Schematic						
26	27	28	29			

## March

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
Final Designs and Drawings						
18	19	20	21	22	23	24
25	26	27	28	29	30	31

## April

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
Booklet and Presentation Boards						
15	16	17	18	19	20	21
Digital Presentation						
22	23	24	25	26	27	28
29	30					

## May

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

## June

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

(Image 17).

# Program





Theoretical/Unifying Idea

Designing for a winter city poses a series of challenges that must be overcome in order to handle the demands of the weather and still fully utilize all the positive opportunities that the winter season brings. Currently in North American culture the winter season is often dreaded due to the perceived increase in inconvenience, costs, and discomfort. In order to overcome this attitude, northern climate cities must adopt a positive attitude and fully embrace the winter season as well as apply creative planning approaches to solve weather-related issues. Most of the weather-related issues deal with snow, ice, and wind and as such mitigating the effects of snow, ice, and wind is the first priority for the design of a winter city.

## Site Design

### *Density*

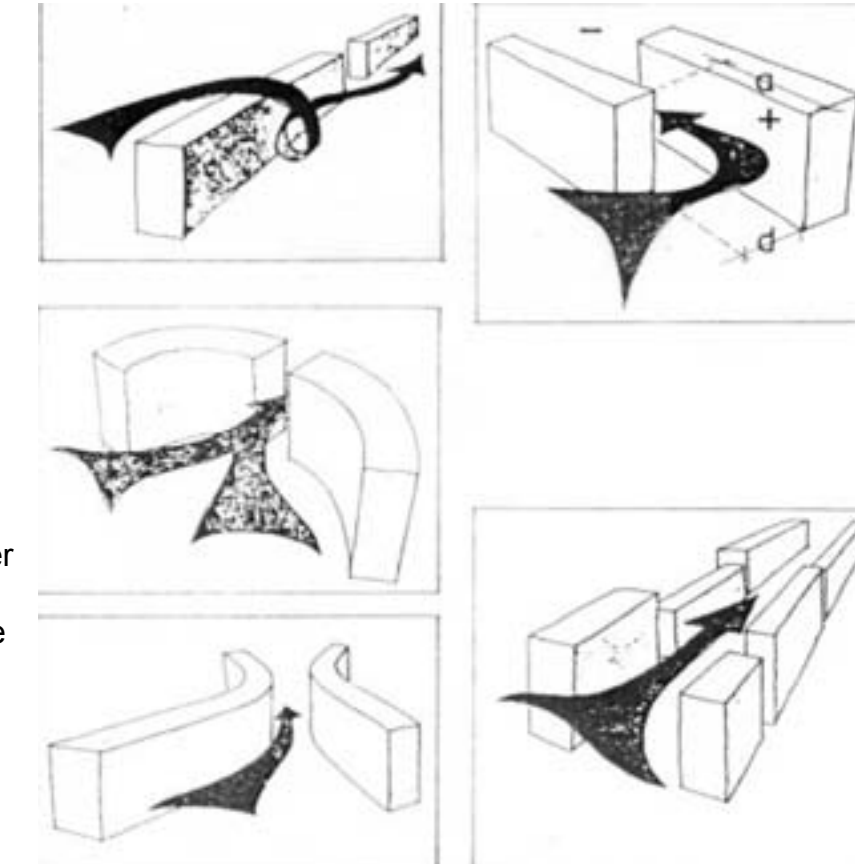
The site design components and resulting recommendations of the density of the built structures, building orientation and road design provide the building blocks for a successful winter city. The density of a winter city becomes an important component because “A compact city uses space efficiently, allows people to walk between places, and ensures that streets and public open spaces are sheltered from the wind” (McGuire, 2000). Having compact, mixed use neighborhoods reduces the distance that people have to travel to stores and services, making alternative modes of transportation, such as walking or biking, feasible even in the winter. This increase in opportunities to utilize alternative modes of transportation will provide people with necessary additional outdoor activity times and increase their health during the winter months (Bergum and Beaubien, 2009).

### *Building Orientation*

The next component of site design, which can have an impact on both the buildings and the public, is building orientation.

In the article “Living in Harmony with Winter,” Patrick J. Coleman, a principle and town planner of the U.P. Engineers and Architects in Houghton, Michigan, provided a list of guidelines and recommendations for each of the components of a site design in a winter city. For the issue of building orientation he provided the following list of recommendations:

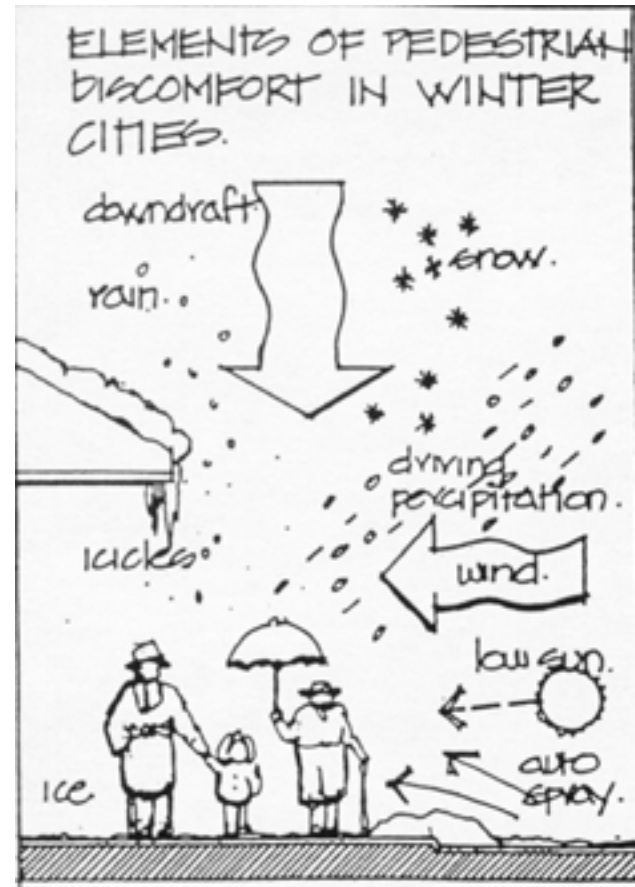
- Utilize solar radiation in the orientation of buildings and outdoor spaces and provide a southern exposure to maximize the penetration of heat and sunlight.
- Avoid or minimize development on north-facing slopes. Buildings sited on the north-facing slope cast long shadows, significantly reducing the ability to utilize solar radiation for heat. In contrast, buildings on a south-facing slope can be sited more densely due to the shortened length of the shadow.
- Use buildings to protect outdoor spaces, such as pocket parks, from prevailing winter winds.
- Avoid building orientations which will create a wind tunneling effect.
- Avoid creating public spaces for winter use in areas that are shaded from the sun. (Coleman, 2008)



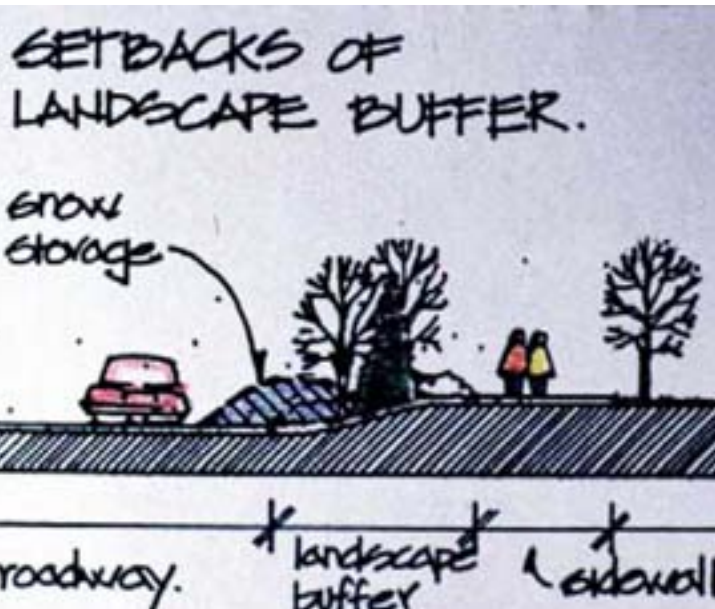
(Image 18) Gandemer's Principles, Air flow patterns between buildings.

These recommendations will improve the quality of the public use spaces by mitigating the effects of snow, wind, and ice, and will also mitigate energy costs for heating buildings.

Building orientation will also have an effect on how snow accumulates in the city, because although temporary relief from blowing snow can be provided through the use of snow fences, the design of buildings is the most effective deterrent for the problems caused by snow (Kuismanen, 2005).



(Image 19) Elements of pedestrian discomfort in the winter.



(Image 20) Set backs of landscape buffers and areas for snow storage.

According to Kuismanen (2005) within cities, “snow will accumulate most if the building is located with the cross direction against the dominating wind direction. A longitudinally placed building will not hold snow, if the angle in respect to the dominating wind direction is less than 30 degrees. When meeting an obstacle, snow will accumulate, when the flow rate slows down by 30-50%. On the windward side of the building a whirl is created, which causes the accumulating of snow and a snow-bank is created close to the wall of the building to the distance, which measure is 1.3 or about 1.5 times wall height of the building” (Kuismanen, 2005).<sup>\*</sup> Buildings that are placed at a 45 degree angle to the dominating wind direction have the most success in mitigating the effects of snow and wind.

### Road Design

Road design in winter cities depends as much on the city’s design as on the policies governing snow and ice removal during the winter. Design guidelines for winter city roads include some of the following: designing curbs with gentler slopes as opposed to sharp corners to accommodate snow plows, designing sidewalks to be separate from roadways to protect pedestrians from snow and slush spray from passing cars, providing raised crosswalks to prevent snow accumulation and ice sheets from poorly drained snowmelt, provide landscaping to act as wind buffers in areas as needed and provide low level, non-glare lighting along the walkways to add color and warmth (Bergum & Beaubain, 2009). These guidelines focus on providing areas that make the pedestrians using the walkways feel comfortable and safe during the winter months. Other guidelines for road design deal directly with the policies of snow removal. These guidelines include: providing space adjacent to the road for snow removal so that the snow does not encroach on the sidewalks (bike lanes can be used for snow removal as long as there is not a large population of winter bike commuters), and making it a priority to clear sidewalks and/or bike lanes before clearing the street (Bergum & Beaubain, 2009).

<sup>\*</sup> (Børve p. 48-49, Glaumann & Westerberg p. 138-141) In Text Reference

The policy of clearing bike lanes before the streets provides an invitation to the public to use these areas immediately, thus encouraging alternative means of transportation (Villadsen, 2010). Another option for snow removal on pedestrian walkways or bike lanes is to leave the snow in place so the paths may be groomed for a winter-only mode of transportation, such as cross-country skiing, snowshoeing, or snowmobiling. In addition, walkways can also be formed in areas otherwise unusable in the summer months, such as a frozen lake or river for an ice skating trail.

An alternative option to focusing on providing walkways that are exposed to the elements in northern climate cities is to create a system of underground, above-ground or through-building walkways. The advantage of these types of walkways is that there is no exposure to the elements of snow or wind, so people who might normally not take the time to walk to a destination now have no reason not to. The disadvantages of these types of systems are, according to Patrick J. Coleman in the article “Pedestrian Mobility in Winter,” that they “often reduce street level animation and life, and create negative impacts on street level retail establishments. Retail becomes focused inward, rather than making the street an interesting place. And is widely recognized that street animation is a vital component of a healthy downtown” (Coleman, Pedestrian Mobility in Winter). In current American society, these types of walkway systems are often seen as the better solution because of the problems with outdoor winter walkways. Some of these problems include the perceived cost of maintaining the sidewalks during the winter, the liability issues that could occur if someone were to slip and fall on a slick sidewalk, and the belief that people do not want to walk in the winter. (Coleman, Pedestrian Mobility in the Winter) However, if a city were to place priority on using outdoor sidewalks in the winter, the liability issue would be less because the walks would be well maintained, making it less likely for a person to slip and fall, and because the sidewalks would be cleared, people would be more willing to walk outdoors.



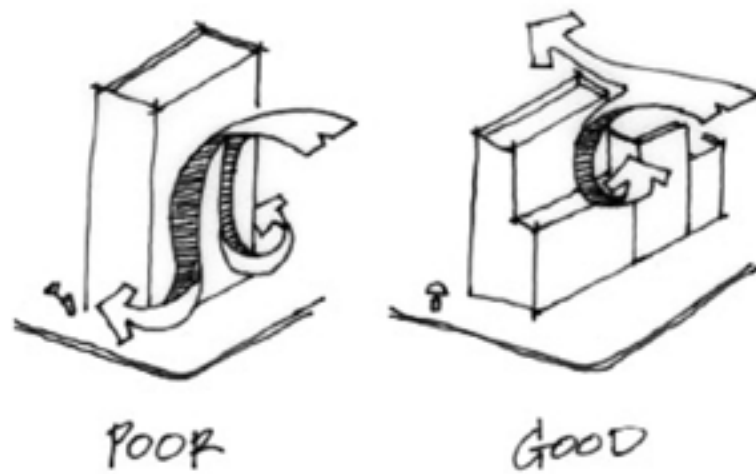
(Image 21) The skywalks in Duluth, MN create warm, safe locations for city residents to walk during the winter months.

Connected to the policies of snow removal are the design considerations related to snow removal. The biggest of these is ensuring that there is adequate space in a convenient location for the snow once it is removed from the streets and sidewalks. To speed up the snow removal process it is recommended that there be several smaller areas for snow storage as opposed to one large area. The use of technology is also important for the snow removal process. By using snow-melt systems in high traffic walkways and sloped areas, there can be spaces that do not require as much time and effort to physically remove the snow but still allow the public to use these spaces as soon as possible (Coleman, Pedestrian Mobility in the Winter).

## Building Design

Following the layout of the site design, the design of the individual buildings needs to be considered. The recommendations that Patrick J. Coleman had in the "Living in Harmony with Winter" article were:

- Design building surfaces to help reduce wind speed by incorporating balconies, stepped facades, or irregularities into the building's exterior
- Cover ramps or stairs to protect them from snow and ice
- Provide handrails for all public and private walkways that exist on slopes
- Design roofs to account for snow and ice accumulation and to prevent snow and ice from shedding onto parking areas or pedestrian walkways
- Create transition areas at building entrances to provide patrons with an area to shed snow prior to entering the building
- Provide shelters of wind blocks in areas that serve as outdoor gathering spaces. (Coleman, 2008)



Source: City of Fort St. John

Stepping back upper storeys of a building creates a swirl chamber that reduces the impact of the wind at street level

(Image 22)

In addition to the above recommendations, the "Smart Growth and Winter City Design" article also recommends, as a way to prevent snow from drifting into building entrances, using vegetation, berms, and swirl chambers. Many of the recommendations for individual buildings deal with requiring the designers to take extra steps to ensure the public's safety and comfort during the winter season (Bergum & Beaubien, 2009).

## Landscape Design

The landscape plan can also affect the comfort and usability of outdoor spaces in the winter. One potential way to use vegetation is to create "outdoor rooms" using trees and berms to shelter exposed areas from the prevailing winds. In spaces like these, a three meter high planting can reduce a near gale force wind to a moderate breeze from the windshield (the planting) and to a distance of 60 meters. At the same time the same planting barrier can cause the temperature to increase by one to five degrees Celsius (Steinsvik, 2004).

Vegetation can also affect a microclimate within a city. For example, deciduous trees planted on the southern face of a building or outdoor area provide shade in the summer (when the leaves are present), while still allowing sunlight to filter in during the winter (when the leaves have fallen). Coniferous vegetation should be used on the north and west sides to protect the area from prevailing winter winds. It is also important to select landscape plants that are sturdy enough to handle the snow load in the area as well as ones that are appropriate for snow storage areas (Coleman, 2008).



(Image 23) The brightly colored houses in Longyearbyen, Norway provide a welcome relief against the whites, grays and browns of winter.

## Materials and Aesthetics

In the winter, the materials and aesthetics of the city also have an effect on how people behave. Material choices should be appropriate for use in a winter city. For example, furniture that is for use outdoors should be constructed using materials such as wood, polyethylene or vinyl-coated metals, all materials that can handle rapid changes in temperatures and the freeze-thaw cycles present in northern climate cities (Coleman, 2008).

Adding small touches to an existing summer landscape to make it usable during the winter months can also be done using appropriate materials. One example of this has been done in Copenhagen, Denmark, there they continue to use the outdoor café's year-round by adding small portable fire pits, heat lamps, and blankets around the tables (Villadsen, 2010). By adding these small material touches people are more willing to enjoy the outdoor spaces for more of the year

Using color and lighting treatments when designing buildings and landscapes in order to offset the darkness and monotony of the winter season can also help prevent seasonal affective disorder (also called SAD).

SAD is a form of depression that occurs in about 6% of the population. Symptoms tend to start in the fall and may continue into the winter months and include depression, hopelessness, anxiety, loss of energy, a heavy "leaden" feeling in the arms or legs, social withdrawal, oversleeping, loss of interest in activities, appetite changes, weight gain, and difficulty concentrating (2).

Currently the specific causes of SAD remain unknown, although there are a few factors that doctors think may contribute.

These factors include the reduced level of sunlight in the fall and winters affect on the body's internal clock, a drop in serotonin which is a brain chemical that affects mood, and a disruption to the balance of the natural hormone melatonin, which affects sleep patterns and mood. To treat the symptoms of SAD, a doctor may prescribe one or more options. Two include increasing exposure to light, either by increasing time outdoors during the daylight hours or by using a light box to mimic the effects of sunlight. It is important to take extra care during the winter months when exercising outside to protect your health (2).

Some suggestions for winter exercise include: dress in layers, protect your extremities such as hands and feet, drink fluids to replace the fluids lost when shivering, and be aware of the wind-chill factor. The other treatment options are traditional therapy and antidepressant medication (2).

Designing a winter city to have outdoor activities, colors, and lights can help mitigate the potential for people living in the city to have seasonal related health issues, thus making the city a more enjoyable place to live. Increasing the public's contribution to a city's designed spaces through public art or snow and ice sculptures will also increase the public's interest in being active participants in the city, which will then increase their health during the winter months. Another way to add color into a winter landscape is to add vegetation that has a unique winter feature. A good example of this is Redosier Dogwood. This shrub has bright red branches during the winter months and provides a spot of bright color in an otherwise monotonous environment.



(Image 24) By dressing appropriately, people can experience new activities such as snowshoeing in the outdoors during the winter.



(Image 25) Combining two important aspects of winter design: bright colors and an active individual interest.

# Theoretical Research Summary

Winter in a northern climate provides many activities to enjoy throughout the season. A greater appreciation of the indoors and the arts, culture, and social activities associated with the indoors is one positive aspect of the winter season, but there are also many things to appreciate in the outdoors.

Outdoor recreational activities such as cross-country skiing, ice skating, snowmobiling, hockey, ice fishing, snow-shoeing, downhill skiing, and snowboarding are all options that are only possible to enjoy during the winter because each needs snow or ice (Coleman, 2008). The uniqueness of the season brings the potential for special events and festivals connected to winter and provides a new art medium (snow and ice) for anyone to use. Winter also brings a greater appreciation of the natural beauty of the area as trees and buildings become accented by snow and ice.

Despite many positive aspects of the winter season, northern climate cities are forced to become more competitive than their southern climate counterparts to remain economically viable in today's society. By designing cities for the northern climate or, in the case of this design project, redesigning for the northern climate, cities can become more inviting in the winter season.

For this design project, understanding the base components of a winter city design is vital. Some of the recommendations for these components, such as vegetation and materials/aesthetics, can be incorporated into the final design without having to drastically change the already established layout of downtown Bemidji. The recommendations for the components of site density, building orientation and design, and road design will be a challenge to incorporate into the established downtown.

# Theoretical Research Summary

Using the components of a winter city design, designers can lay out a city with areas that can be enjoyed more fully by the city's residents during the winter. People who have the option of an enjoyable outdoor space in the winter will be less likely to suffer from Seasonal Affective Disorder, and as a city's residents become more active outdoors, this will improve the health as well as the happiness of the city.

Having well-designed spaces for winter use can also bring in more people to the community because there are more opportunities for outdoor activities. Having more people come into the community will give the local businesses an economic boost and enhance the city's ability to attract new businesses and residents. As a city, Bemidji could benefit from all of these positive improvements, and it is a goal of this project to create a design that provides the opportunities for these improvements through the use of the winter city design components.





**Case Studies**

# Case Study Winnipeg, Manitoba, Canada



The city of Winnipeg is the capital and largest city in the province of Manitoba, Canada, at a latitude of 49 degrees N. The city was originally settled in 1783 by fur traders and was quickly turned into a premier post for the Hudson Bay Company. The winter climate in Winnipeg is cold, dry, and windy. Normal January temperatures averages in Winnipeg range from  $-21.7^{\circ}\text{C}$  ( $-7^{\circ}\text{F}$ ) to  $-13.9^{\circ}\text{C}$  ( $7^{\circ}\text{F}$ ). The coldest temperature recorded in Winnipeg was  $-47.8^{\circ}\text{C}$  ( $-54.0^{\circ}\text{F}$ ) on December 24, 1879. The extreme weather makes it difficult for public spaces to be enjoyed year-round. One area in Winnipeg that functions as an all-season gathering space is The Forks (4).

The Forks can best be described by the mission statement formed in 1987 by the Forks Renewal Corporation, "The Forks shall be developed as a 'Meeting Place,' a special and distinct, all-season gathering and recreational place at the junction of the Red and Assiniboine Rivers, through a mixed-use approach including recreational, historical and cultural, residential, and institutional and supportive commercial uses" (5).

The Forks is a collection of indoor and outdoor spaces such as open areas, plazas, canopy covered areas, trails, and market places that can all be used in either the summer or winter months. Attracting over four million visitors each year, The Forks is the number one tourist attraction in Winnipeg (6).

One of the most successful all-season gathering places in The Forks is the Forks Market Plaza, located in the heart of The Forks. In the winter, The Forks Market Plaza is transformed into Winnipeg's own version of the Rockefeller Center. An artificially cooled skating rink, music, and Christmas lights in the canopy above invite families, tourists and couples to skate longer into the season. In the summer The Forks Market Plaza features fountains, canopies, dancing programs, and open areas that double as performance spaces (5).

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1 The Forks Market</li> <li>2 The Forks Tower</li> <li>3 The Forks Market Plaza</li> <li>4 Visitor Services - The Forks Ambassadors/Historic Caboose</li> <li>5 The Forks Historic Port</li> <li>6 River Spirit/Splash Dash Water Bus</li> <li>7 The Assiniboine Riverwalk</li> <li>8 The CN Main Line</li> <li>9 Union Station</li> <li>10 Citytv</li> <li>11 Manitoba Theatre for Young People (CanWest Global Performing Arts Centre)</li> <li>12 Arrival Square</li> <li>13 Gateway to Festival Park</li> <li>14 The Provencher Bridge</li> <li>15 Scotiabank Stage</li> <li>16 Environment Canada Automated Weather Station</li> <li>17 Pan Am Cauldron</li> <li>18 Johnston Terminal</li> <li>19 Explore Manitoba Travel Idea Centre</li> <li>20 The Forks National Historic Site of Canada</li> <li>21 The Path of Time Sculpture - Marcel Gosselin</li> <li>22 Prairie Garden</li> <li>23 The Forks National Historic Site Amphitheatre</li> <li>24 Buskers Lookout</li> <li>25 The Forks National Historic Site Dock</li> <li>26 Gambling Decks - Robert Houle</li> <li>27 Manitoba Children's Museum (Kinamen Building)</li> <li>28 The Archaeological Preserve/Prairie Garden</li> <li>29 The Wall Through Time</li> <li>30 Dodens Celebration Circle</li> <li>31 Balance of the Spirit Within Rock - Natalie Postad Desjarlais</li> <li>32 The Forks Historic Rail Bridge</li> </ul> | <ul style="list-style-type: none"> <li>33 South Point</li> <li>34 Junction of the rivers "The Forks"</li> <li>35 Red River Riverwalk</li> <li>36 Inn at the Forks</li> <li>37 Muddy Waters Smokehouse</li> <li>38 Parkade</li> <li>39 Esplanade Riel</li> <li>40 Sugar Mountain Express</li> <li>41 Broadway Promenade</li> <li>42 Peace Meeting Site</li> <li>43 All Aboard</li> <li>44 Skateboard Plaza</li> <li>45 Bays Beach Club</li> <li>46 Muddy Waters Patio</li> </ul> |
|---|---|
- 
- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>Bank Machine</li> <li>Bus Stop</li> <li>Elevator</li> <li>Handicap Parking</li> <li>Historical Information</li> <li>Information</li> <li>Mailbox</li> </ul> | <ul style="list-style-type: none"> <li>Parent/Family Room</li> <li>Parking</li> <li>Phone</li> <li>Washrooms</li> <li>Water Fountain</li> <li>Wheelchair Ramps</li> </ul> |
|--|---|

(Image 28) The Forks Master Plan.

# Case Study Winnipeg, Manitoba, Canada

Overall, the success of The Forks is illustrated through the number of attractions and 200 events that are held there each year, such as the Arctic Glacier Winter Park, Assiniboine Credit Union River Trail, the Scotiabank Family New Year's Eve, and Warming Huts Design Competition (5). This successful component is also one of The Forks more unsuccessful components. The area is always busy with some sort of planned program, and many are larger festival events or concerts. With so many events always happening there is a limited amount of quiet space, and I personally have to wonder if the space would be able to stand without the additional programs to support the area.

Another successful component of The Forks is the network of walkways that connects all of the areas together, as well as a second walkway that borders the river and provides views of the water. In the winter, 1.2 km of these walkways are transformed into skating trails that connect all areas of the Arctic Glacier Winter Park event held within The Forks together (5).

In Bemidji, an area like The Forks could be added to the waterfront park near the Paul Bunyan and Babe the Blue Ox statues. Taking components like the trails connecting smaller areas within a larger area, adding restaurants and stores close to the open park areas, having many events throughout the year all held in the same location, and designing areas for all-season use will give the waterfront area by Paul and Babe more of an identity and use than it currently has.



(Image 27) During the winter The Forks amphitheater becomes an arena where fans gather to watch amateur hockey games.



(Image 28) The Forks Market Plaza at night during a dance.

# Case Study

## Festival du Voyageur



(Image 29) A snow sculpture from the snow and ice sculpture contests during the Festival Du Voyageur.

The Festival du Voyageur is Winnipeg's winter carnival. The carnival was founded in 1969 by a group of Saint-Boniface entrepreneurs in Winnipeg's French Quarter. Originally, the festival was a three-day event and it has now evolved into a 10-day, province-wide celebration of "sights, sounds, snow and spirit" (7). In honor of the Voyageur spirit of the fur traders who established the Red River Colony, The Festival du Voyageur's emphasis is on "the beauty of winter," with many different historical, educational, and entertaining activities (7).

The festival has had four different locations over the years, and each time it had to change locations the festival had become too crowded to fit into the its present location at the time. Currently, the festival is located on 233 Provencher Boulevard in the heart of Saint-Boniface, and now includes a store where merchandise for the festival can be purchased year-round. The festival now brings in more than 100,000 people over the ten day event and more than 12,000 students to its school programs (7).

The Festival du Voyageur has many different events throughout the 10 days. Some of these events include musical acts at different trading posts, jigging contests, fiddling contests, beard growing contests, different themed food nights/mornings, snow/ice sculpture contests, and educational programs for every school age (7).

# Case Study

## Festival du Voyageur

The festival in Winnipeg serves as an example of how successful a winter gathering can be, both economically and culturally. This example can be applied to further improve the comparable festival already in place in Bemidji, the Brrrrmidji Polar Daze. Like the Festival du Voyageur, the Brrrrmidji Polar Daze is a winter festival that takes place over several days and has a wide variety of activities, both inside and outside, that all ages can enjoy. What is different from the Festival du Voyageur is mainly the lack of a theme and the difference in size, with the Festival du Voyageur being much larger.

To help improve the Brrrrmidji Polar Daze, one thing that can be incorporated from the Festival du Voyageur into the final design is to have a designated space for the festival's headquarters and most of the activities. Currently the activities for Brrrrmidji Polar Daze are scattered around the entire city. This makes it hard for participants to always know what is going on and where things are happening unless they have the time to check the schedule on the Internet beforehand. Having a designated space would allow people more spontaneity in participating in the festival activities and would increase the number of participants in each activity.



(Image 30) "Voyageurs" sitting around a fire during the Festival du Voyageur.

# Case Study Duluth, MN

Duluth is located on the shores of Lake Superior in Northern Minnesota. The latitude of the city is 46 degrees N. Like many of the cities in this surrounding area, Duluth was founded as a trading port in 1659. However, Duluth was not made a permanent settlement until the 1850s, when copper and iron ore mining and shipping became the driving economies in the city. The winters in Duluth are long, snowy, and very cold. Temperatures are often below 0 degrees Fahrenheit (-18 degrees Celsius) for periods of weeks, and a normal winter brings a constant snow cover from November to April (8). The moist cool air that comes over Lake Superior causes the snow to fall more heavily in the city, bringing up to a foot during a storm while areas 50 miles inward from the lake receive a fraction of the snow from the same storm system (8).

Being on the shore of Lake Superior gives Duluth a strong sense of place. To enhance this sense of place Duluth has added a park/trail system that borders four miles of the lakeshore in downtown Duluth. This park/trail system is part of a network connecting the other parks in Duluth as well as connecting the various retail stores and restaurants along the lakeshore.

The lakeshore trail is very good at connecting all the major landmarks that are located by the lake. Visitors coming to Duluth who want to see as much as possible in a single day but don't want to drive their car every few blocks to see something new can take the trail and see all of it. The trail starts at the Bayfront Park, now home to the most famous winter attraction in Duluth (Bentleyville, a Christmas lights display), passes by museums, memorials, the famous lift bridge, historic buildings, and parks before finally ending at Lakeside, one of Duluth's easternmost neighborhoods (9). While walking on this trail, one would see everything Duluth has to offer.

# Case Study Duluth, MN

As previously mentioned, Bentleyville, the most famous winter attraction in Duluth, is located along the lakeshore trail system. This is a relatively new location for Bentleyville. The Christmas lights display was moved there in 2008 and has been so successful in that location that the original one-year contract was expanded to a three-year contract in 2010 (10).

To make the system more accessible to a wider variety of people, there are two separate trails that run parallel to each other. One is a classic boardwalk located closest to the water for pedestrians, and the other is a paved bike lane for bicyclists, rollerbladers, and skateboarders. Along the trail there are also numerous benches where people can rest and the entire shore is lined with large rip-rap boulders that children (and adults) enjoy climbing. Although this system is extremely successful in the summer months, the amount of activity on the trails drastically decreases during the winter months. The reasons for the change in activity levels are due to the strong cold winds that come in from the lake and that there are few areas along the trail that have a windbreak. This is a challenging problem to overcome, however, because if there were windbreaks along the trail that would also mean that there were areas where the lake would not be visible, which would then cause more people to avoid the area with the windbreak in the summer.

Similar to Duluth, the lakeshore of Bemidji has a combination of retail shops, restaurants, and landmark attractions that people come to see. Unlike Duluth, Bemidji does not currently have a unique trail that provides connections between these areas. Along the lakeshore there is a bike trail, but it is separated from the lake by a fence and from most of the stores and restaurants by a busy road. Due to Bemidji's size and some of the space constraints, creating a trail system exactly like Duluth's would be impossible. However, taking ideas from Duluth and incorporating them into Bemidji's trails could lead to a more successful lakefront along Lake Bemidji.



(Image 31) The many attractions that Duluth has to offer along the 4-mile Lakefront Walk.



(Image 32) One of the best views of Duluth. Bentleyville is in the foreground and the famous aerial lift bridge is in the background.

# Case Study Copenhagen, Denmark

Copenhagen Bicycle Traffic Flow 2006



(Image 33) Routes bicyclists take in Copenhagen and the number of bicycles and scooters on a weekday between 06:00-18:00.

The city of Copenhagen is the largest city, as well as the capital, of Denmark. The city is located at a latitude of 55 degrees N, and was named the capital city during the 15th century. During the winter, weather in Copenhagen is “dependent on which latitude the Atlantic Low Pressure Centre takes. With a stable high-pressure system around the Alps, the low pressure from the southwest moves toward southern Scandinavia and northern Germany, producing above-freezing temperatures day and night. When a stable high-pressure system sits over Denmark or the lands to the northeast (such as Finland or Russia), the mild Atlantic winds from the southwest are blocked, allowing polar winds to cover the area, and the temperature dips to below freezing (rarely below  $-5$  degrees C (23 degrees F) during the day and  $-12$  °C (10 °F) during the night). If the European continent experiences cold due to the eastern Russian winds, which rarely occurs, it can “freeze from the south” (wikipedia.com). The Atlantic Low Pressure Centre causes Copenhagen to have unstable and constantly changing weather in all four seasons. The city’s proximity to the Atlantic Gulf Stream causes the average temperature to be five degrees higher than the average for the latitude of 55 degrees N, and also causes the snow to turn to rain more often than not and causes what snow does fall to melt quickly (11).

Copenhagen is recognized as one of the world’s most environmentally friendly cities. Part of the reason for this recognition is that 37% of the city’s residents commute to work by bicycle, and in total these residents bike a full 1.2 million km per day (1 mi) (Villadsen, 2010). The firm of Gehl Architects, a Danish architecture and urban planning firm, has had a large impact on the planning of Copenhagen since 1968, when the first pedestrian street was created. Gehl Architects focuses on designing areas of Copenhagen as public spaces that can be used in all seasons. In a presentation at the Montreal Urban Ecology Center, an architect from Gehl Architects spoke on the design and policy guidelines that Copenhagen has implemented that have improved the winter use of outdoor spaces in the city.

# Case Study Copenhagen, Denmark

In the presentation, the architect from Gehl talked about the successful changes that have been made to the culture surrounding winter outdoor activity in Copenhagen through the examples of outdoor café seating. By providing “invitations” to the public through the use of increased lighting, heating systems (heat lamps or coal fires, for example), and blankets at all the cafés, people started using the café’s more (Villadsen, 2010). A study done by Gehl’s research teams showed that in Copenhagen the numbers of café chairs increased 61% from 1986-1995, and an additional 47% from 1995-2005. Now in the city, the season for outdoor eating has increased so much that permits for outdoor cafes are given for the time period of April-December (Villadsen, 2010).

The architect from Gehl also discussed improvements to the biking culture in Copenhagen. In the city 30 years ago, very few people biked in Copenhagen; however, now with several design and policy interventions, 37% of the general population commute to work by bicycle and of those 37%, 70% continue to use bicycles as the primary mode of transportation throughout the winter (Villadsen, 2010). Some of the design interventions to encourage biking in Copenhagen include: adding bike lanes and sidewalks to as many streets as possible, adding four inches of height difference between the different transportation pathways, and designing cross walks to be level for pedestrians instead of cars (Villadsen, 2010). Policy changes were also put in place to improve the biking culture of Copenhagen. Some of these policies include: making the pedestrian’s comfort and ease of use the priority over the automobile, widening the bike lanes to encourage the new fad of “bike cars,” creating a secondary set of traffic lights for bikes and public transportation that give them the advantage over cars (because of this, 70% of people surveyed said the reason why they choose to bike to work is because it is the fastest, most convenient mode of transportation), and making sure to clear the bike paths before the roads (Villadsen, 2010).



(Image 34) Rush hour takes on a new meaning in Copenhagen.

# Case Study

## Copenhagen, Denmark

The aspect not addressed anywhere in the presentation were the aesthetics and landscape factor that could help add to winter use in a city. All of the design interventions recommended to the city of Copenhagen revolved around the structure and use of a built environment. To make a city look as good as it functions, additional items, like landscaping, art, or color, would need to be taken into consideration as much as the structural components of the built items.

In Bemidji, like many northern climate cities, I have observed a cultural dislike for the winter season. The biggest lesson learned from Copenhagen is that a culture can be changed if there is a reason or desire to change. Currently in Bemidji there is not a base for an intervention facilitated through outdoor cafés like there was in Copenhagen but there is a strong bike culture in the summer months that could be expanded into the winter months. To facilitate this expansion, Bemidji would have to make changes to the current design of streets and bike lanes by rerouting some and adding more bike lanes in other areas. Bemidji would also have to change its current snow removal policy for the bike lanes, which is currently to not remove any snow, to a policy that would make clearing bike lanes a priority.

# Case Studies

## Summary

The results from the case studies show how northern climate cities can interact with the winter weather in a variety of ways. In Winnipeg, winter brings a second use to the areas in The Forks. Open plaza spaces that in the summer months would hold concerts or be used as gathering spaces are transformed into skating rinks. The frozen river, which in many other cities would be ignored, becomes a new network of trails for people to use and to see the city from a different perspective. Winter is celebrated during the Festival du Voyageur, and this celebration attracts people from all over the region as well as the city. Copenhagen has changed its own cultural interactions with winter by providing “invitations” to people to encourage them to stay outside throughout the year. Copenhagen also changed the priorities of the city to ensure that the people who wanted to be outside, like the individuals who commute to work on bicycle, have the ability to do so. Duluth shows how connecting areas of interest can bring in new winter attractions that, in turn, bring in even more people to explore the downtown.

Although each of the case study locations are northern climate cities, the winter weather patterns in each location are drastically different. The differences in the weather patterns result in differences in how the residents of the city respond to the winter. In Winnipeg, where the winters are cold, windy, and dry, city residents choose activities that require them to move around in an effort to stay warm. In Copenhagen, where the winters are cool and wet, city residents are willing to partake in stationary activities, such as eating at an outdoor café, as well as participate in physical activities. In Duluth’s winter climate, the area closest to the lake is the hardest to enjoy during the winter, and many people respond by not using the lake walk. Being aware of the type of winter climate present in the area can inform the types of activities that people would be willing to explore in the winter.

# Case Studies Summary

My design project can take inspiration from all of these case studies and apply it to the city of Bemidji to increase the appreciation and outdoor use during the winter season. The climate and location of Bemidji allow for the potential to incorporate the ideas from the case studies into the final design. Like Winnipeg and Duluth, Bemidji borders a waterfront. This area could have elements similar to The Forks, the Duluth lake walk, and could serve as the primary location for the Brrrrmidji Polar Daze. Based on the number of bikers during the summer months in Bemidji, there is a strong potential to increase the biking community in the winter months like Copenhagen has done. Overall, Bemidji has the potential to create areas along the lakefront and downtown that would be usable and enjoyable in the winter season.



## Historical Context

What is a city? For each individual the answer to that question depends on specific criteria that they form for themselves. In "The City Shaped", Spiro Kostof, provides a list of eight criteria that he feels are the fundamental premises that form a city. Reading through these premises I found two that I feel fit my personal idea of what a city is and also apply to the city of Bemidji. The first of these premises is that "cities are places where a certain energized gathering of people takes place. This has nothing to do with size of absolute members: it has to do with settlement density" (Kostof, 1991). The second premise is "cities are places favored by a source of income- trade, intensive agriculture and the possibility of surplus food, a physical resource like a metal or a spring (Bath), a geomorphic resource like a natural harbor, or a human resource like a king" (Kostof, 1991). Both of these premises can also relate to another important aspect of cities, they are dynamic. Throughout history, cities have all experienced individual changes of population or economics and social/cultural changes that have altered the form of cities worldwide.

The early history of cities is deeply intertwined with the religious cultures of the area. Places where mystical physical presences were explained through holy ritual drew people who were attracted to the sacred power of the area. Once this base of people had arrived, a city would form around the ceremonial center. The form of the city was also dependent on the culture of the area. Two good examples of this are early cities in China and India. In China, each of the cardinal directions had a different color and meaning associated with it. For example, the North was considered dark and unpropitious and should be a direction that was guarded against. Cities were then laid out as quadrants created by the four directions cross, with smaller and smaller boxes being formed from each addition of the four directions cross (Lynch, 1984).

Through this form the hierarchy of religious and civil power had their proper locations, proper colors, and proper building materials. Also important in the form of cities in China was a symmetry from the right to the left (Lynch, 1984).

Indian cities that formed around a ceremonial center also used forms significant to their culture to create a city. The typical form found was a Mandala, which is a set of enclosing rings divided into squares with the most powerful point at the center. Cities were formed as a series of squares in ever-increasing areas all having the same ceremonial location as the center. Pathways within and around these squares would be created to direct the flow of movement in a clockwise direction around the ceremonial center (Lynch, 1984).

Along with religion, the early history of cities was influenced by conflict and defensive maneuverability. In the Greek colonies of the fourth and fifth centuries, the layout would be a series of long narrow blocks repetitively laid over the terrain. Surrounding these blocks would be a defensive wall that followed the contour lines of the terrain and often had no relation to the repetitive nature of the blocks (Lynch, 1984). Roman military camps also followed a similar form. Defensive walls would have access points on the four cardinal directions with a meeting point in the center where the access points would intersect. Within each of the quadrants, buildings would be laid along lines parallel to the access roads. These military camps were designed so a camp could be thrown together for a single night's rest or become a permanent town. This form of simple regular block and lot divisions became the base for the new towns of the twelfth and thirteenth centuries (Lynch, 1984).



In 1573, with the proclamation of the Laws of the Indies, the Spanish Emperor brought the grid-based form of cities from Europe to America by giving directions for how new cities were to be built. The laws gave requirements for “site selection, the layout of an orderly square grid of street and blocks, their orientation, the form of the central plaza (which was to be surrounded by public buildings and the houses of the wealthy), the segregation of noxious activities, the form of the wall, the disposition of common lands, the distribution of city lots and farms and even the uniform style of buildings” (Lynch, 1984). This practical handbook of requirements governed the design of hundreds of towns over a period of 250 years. This trend, motivated by land speculation and land allocation, continued through to the 1900’s (Lynch, 1984).

During the late 1800s and into the early 1900s, cities went through a period of reform. The need for this reform came with the poor expansion of the larger cities in America. During the 1870s, people began moving to the cities in greater and greater numbers and the cities began to change from a controlled grid to patchwork areas as people came in and claimed what land they could. This led to a booming industrial economy for the cities, spreading slum areas and congested roads and central spaces (Scott, 1969). Early in the 1900s the first steps towards modern city planning were taken to manage the chaos of these expanding cities. Large cities such as Boston and New York set up regulations for the layout of the cities and those who did not follow these regulations faced legal and financial consequences (Scott, 1969).



FIGURE 6.5. William Birch, plan of the City of Philadelphia, 1800. Birch has embellished the map with the city seal, which connects the gridded plan to urban prosperity. (The Library Company of Philadelphia)

(Image 35) Plan of the city of Philadelphia 1800. (The Library Company of Philadelphia)

As cities were being reformed, governments (both federal and local) were collecting lands and adding parks bringing in the time period of “city beautiful”. Designers during this time, inspired by cities like Paris, looked at what could be added to cities besides buildings. Streets were reworked to include greenery along the boulevards and the newly acquired park lands within a city were designed to be connected through a series of greenways. Art also became an addition to the cities. In response to this increased beautification, city officials also began creating programs for cleaning the city, because as the *Chicago Post* mentioned, “what is the use of buying \$1,000,000 worth of public works or art annually while our anti-smoke ordinances are violated every hour of the day and our streets are never half cleaned?” (Scott, 1969).

By the 1920s America was predominantly an urban nation for the first time in its history. A survey showed that 51.4% of the population lived in areas that had 2,500 or more people (Scott, 1969). As more and more people continued to move in to the cities another problem started to arise, which was the lack of order in where buildings should be located. Businesses such as mechanical shops would open in the middle of a residential neighborhood and there was nothing the angry homeowners could do about it. In an attempt to fix this problem, city planning took on a new facet to further shape how cities were laid out, and implemented zoning laws. (Scott, 1969)



(Image 36) A sign celebrates the exponential growth of the suburb.

In the 1950s the current city problem of suburban spread began. Following the war and depression driven times of the 20s, 30s and 40s, Americans were in the mood for a safe, stable environment and flocked to the suburbs. City planners, on the other hand, went through a “period of self-critical adjustment to the dynamism of the suburban boom, the growing intensity of social and environmental problems in the central cities and the imperatives of important new programs affecting urban areas” (Scott, 1969). Zoning in cities changed at this time to further accommodate the automobile by adding more on street parking to the inner cities and to offer more flexibility to the city as an attempt to improve the failing inner cities as people continued to move away (Scott, 1969).

Current issues with cities are suburban sprawl and issues of sustainable design. A solution to deal with sustainability issues of a city is being found in the field of Landscape Urbanism. This field was a response to the traditional approach to urban design that is typically concerned with building materials, orientation, height, scale, utilities, and circulation, and views outdoor spaces as fillers that provide “soft” relief to the “hard” streets and buildings. The objective of Landscape Urbanism is “to create seamless green urban fabric in which traditional urban dichotomies between positive and negative as well as hard and soft, are rendered obsolete” (Bunster-Ossa, 2001). The hope in this field is that by paying more attention to the design of outdoor green spaces the economic and environmental viability of urban areas can be enhanced. With the addition of fields like this one, cities will continue to be reshaped and restructured into the future.

Like many early American cities, Bemidji is based on a grid pattern. In 1896, the main street (Lake Boulevard) of downtown Bemidji was first formed, and is currently Paul Bunyan Drive. The streets that were added in the following years follow the traditional grid pattern of east-west streets intersecting with north-south streets orientated along the shore of Lake Bemidji. Although this is the area of my design site, it is interesting to note of the development of Bemidji outside of this area because the style changes. As Paul Bunyan Drive leaves the lakeshore going out of town, the grid form of the city leaves and turns into a linear-based form. All of the major buildings in northwest Bemidji are within a one “block” distance back from the main road, and as Bemidji continues to grow, this is the continuing trend as opposed to filling in areas between the main road and the residential areas.

The residential expansion of Bemidji is also unique when compared to national trends. While many cities in the United States have problems controlling suburban sprawl, Bemidji has had issues filling newly created housing developments. The most successful new housing developments have been created in areas close to the high school and along the lake. However, even some of these have had problems being filled. A developer purchased a plot of land along Lake Bemidji in 2000 with the intention of building six houses around a small cul-de-sac. As of 2011, two houses have been built in that development. This lack of interest in housing developments does not mean that people live in the “inner city” though. In Bemidji there is a Northwoods culture, and many families who can, choose to live in single family homes outside of town where they have a closer connection to nature.

Bemidji is a unique small-scale city that, while originally built with a traditional layout, has in recent years changed layouts to a linear form and has avoided the nation wide problem of suburban sprawl.

A thesis design project is the final compilation of what I have been working for from the beginning of the studio classes. The final design is what I can look at to see just how far they have come in their academic career, and a complete final project may provide the beginning to a new professional career. To be successful in the final design, the abilities to analyze a problem and portray that analysis through graphics and text are tested. The results of these tests can influence the academic, professional, and personal environments.

The academic goals for this design project involve taking a challenging topic and applying what I have learned in the past five years of classes to create a unique solution. In this project I am taking a passion of mine, the winter season, and applying this passion creatively to a problem. By doing this I hope to advance my own research skills as well as create an end result that could provide a useful research tool for others interested in the topic of winter design. It is important for me to improve my own research skills for the goal of continuing my education. Doing this project will show what my strengths and weaknesses are and helps me be better prepared for future advanced educational opportunities.

In terms of the professional environment, my goal for this design project is to spark the interest of potential employers. In this project I hope to show employers my ability to think outside the box and find the problems that others may overlook. Northern climate cities have the dual challenge of creating a city that functions in the summer months and creating a city that is comfortable and functional in the winter months as well. This need for duality in the city is something often overlooked by planners. My project also has the potential to open a wider variety of professional options than I had originally considered. In the past five years, I have had little interest in urban design/planning; by working on this design project my interest in this facet of Landscape Architecture has increased and has pushed me to consider urban design/planning as a professional career.

On a personal level, I have two main goals for this project. The first goal is to complete a project that pushed me outside of my comfort zone. In the past five years I have had little interest in the field of urban design/planning due to my dislike of cities. By choosing a topic that has roots in urban design, I am challenging myself to work within the constraints of a topic that I previously would have disliked on principle. I also hoped to challenge myself by taking on a problem that few might recognize as a problem. This has proven to be a true challenge, but has helped me accomplish my second goal, which is to feel a sense of pride and accomplishment for my project when the project is over. I feel this is an important goal because if I feel pride in my design there is a greater chance that the project will create interest and awareness for others.



## Inventory and Analysis

Within the design site there are two areas that will define statements of the final design for this project. These two areas are the downtown and the waterfront. Both of these areas show their history. The streets of downtown give the feeling of a quaint, old, small town of yesteryear, but the city still contains more than 12,000 people. The feel of the waterfront is constantly changing based on the surrounding events. When there is a large event happening, such as Night We Light, the waterfront is busy and full of life, but if there is not an event, the waterfront feels isolated and abandoned. Because of this dichotomy of almost dual personalities within each location, I asked four residents of Bemidji to describe each area in one word.

Kurt, a teacher at Bemidji Middle School, describes the downtown as “dying” and the waterfront as “central”.

Ann, a member of the Bemidji School Board, describes the downtown as “struggling” and the waterfront as “improving”.

Erik, a college student who grew up in Bemidji, describes the downtown as “rustic” and the waterfront as “open”.

Kaila, a junior at Bemidji High School, describes the downtown as “diverse” and the waterfront as “eventful”.

Looking at the responses written out this way, in chronological order of age, it was interesting to see how the people who have lived in Bemidji the longest see the downtown as a dying place, yet to the younger generations the same characteristics that could be described as “struggling” are described as “rustic.” It was also interesting to see that everyone used a positive word to describe the waterfront. Personally, I believe this is because in Bemidji people feel a connection to the lake. When asked what their favorite things were about Bemidji, all four of the individuals said the lake.

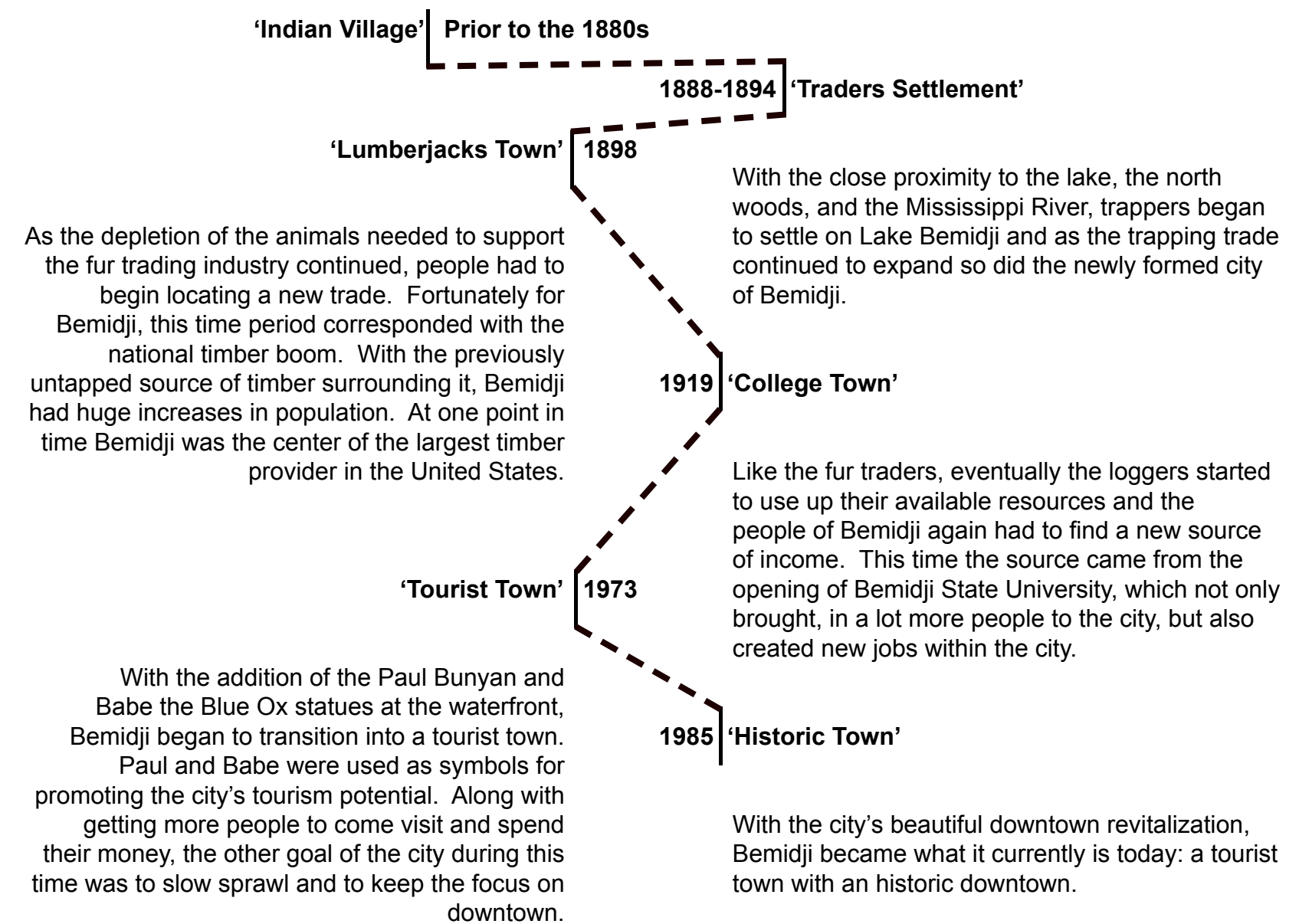
The other common factor mentioned as a favorite aspect of the city was the of culture and art appreciation that Bemidji displays in the downtown. As mentioned in previous sections, there is a sculpture walk in Bemidji that shows the talents of local artists and also provides more character to the city; sometimes maybe even a little too much character depending on the vision of the artist. Like Montreal embracing their French heritage and having dual signage for English and French speakers, Bemidji is also trying to embrace the Native American culture in the area with the addition of the Chippewa language to signs in the downtown.

The addition of the bike trail along the lake has provided the opportunity for people to experience a connection to the lake without ever having to go into the lake. The bike trail and the Sanford Center are the most recently built areas within my design site. As new structures, they lack the character found in the more established locations of the downtown and waterfront. However, this is also the area that shows the most flexibility for the future. Currently there is a plan for developing the area, but these plans may change depending on the public’s continued input or dissatisfaction.

# Site Information

## Site History

The timeline of Bemidji's history\* can be broken down into periods of turning points that each formed a new economic base for the city to build its identity around.



\* Information taken from (12)

# Site Information

## Lake Bemidji

# Site Information

## Lake Uses

### Types of Fish in Lake Bemidji

Based on a survey done in 2006 (14)

- Black Crappie
- Bluegill
- Brown Bullhead
- Burbot
- Common Shiner
- Hybrid Sunfish
- Largemouth Bass
- Muskellunge
- Northern Pike
- Pumpkinseed
- Redhorse
- Rock Bass
- Shorthead Redhorse
- Tullibee (Cisco)
- Walleye
- White Sucker
- Yellow Bullhead
- Yellow Perch

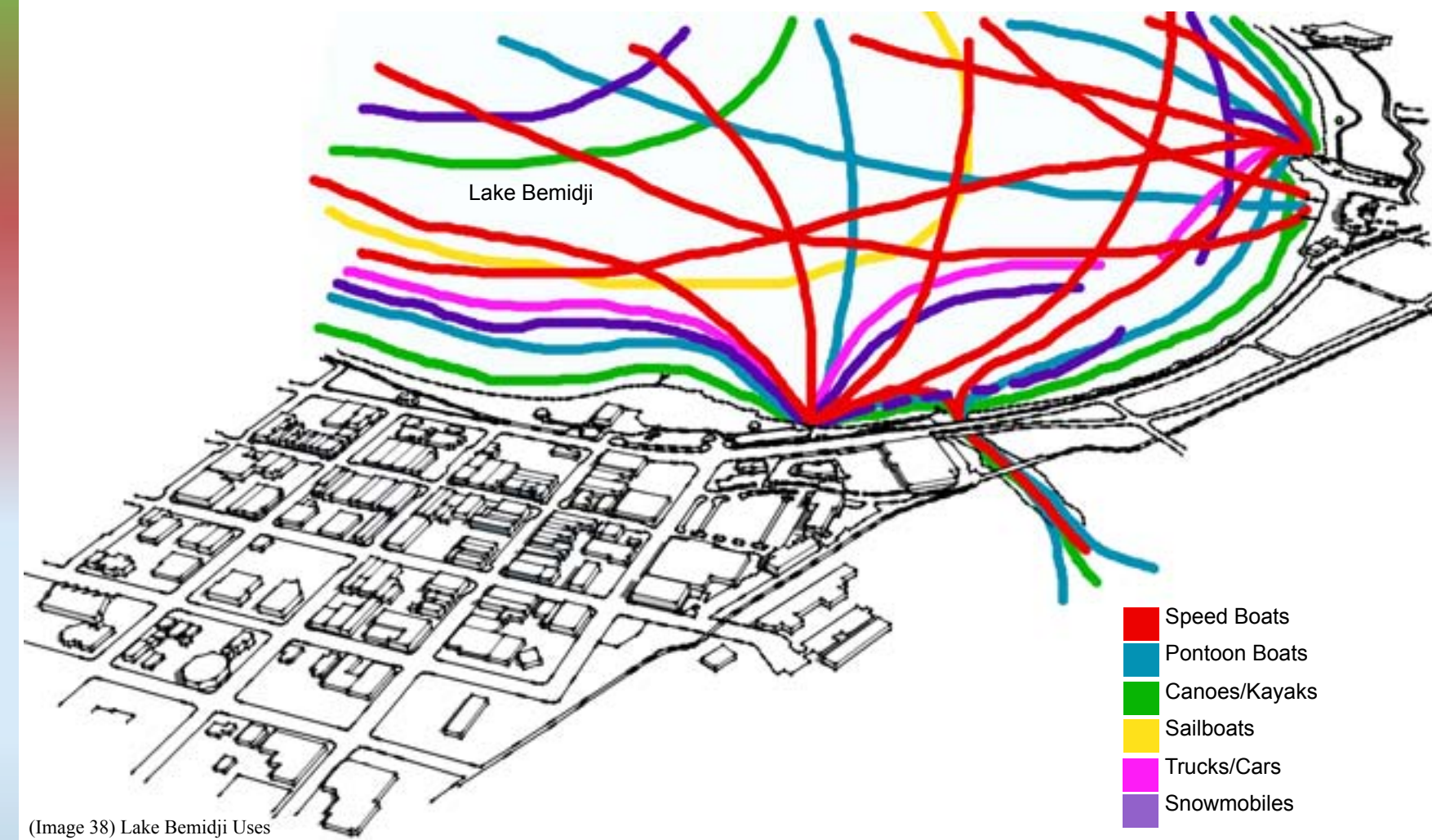
### Activities on Lake Bemidji

- Boating
- Tubing
- Water Skiing
- WakeBoarding
- Sail Boating
- Jet Skiing
- Canoeing/kayaking
- Fishing
- Sail Boarding
- Scuba Diving
- Dragonboat Festival
- Ice Fishing
- Snowmobiling
- Ice Skating
- Cross-Country Skiing
- Dog-Sledding

Average Day Lake Bemidji  
 Freezes Over: November 26  
 Average Day Ice goes off  
 Lake Bemidji: April 26

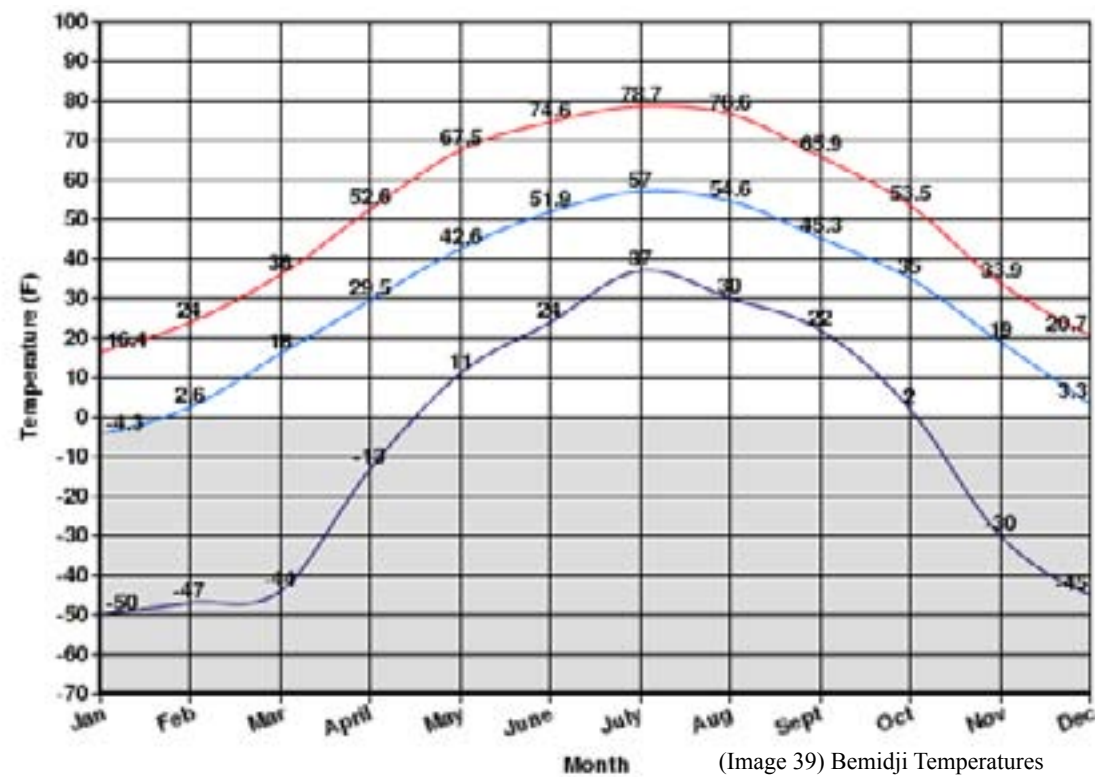


Lake Bemidji is a 6,420 acre lake with a maximum depth of 76 feet. Over 396,000 acres of the Upper Mississippi watershed drain into Lake Bemidji. There are six public accesses around the lake (13). The presence of the lake has always had an impact on the city and the city's residents. One of the original reasons the city was settled where it is today is because of the proximity to the lake and the Mississippi River. In today's culture, the lake still captivates people. Residents and tourists alike use the lake for a variety of recreational activities during the winter and summer months.



This diagram shows some of the lake uses listed on the previous page conceptually mapped out to show the amount and common paths of traffic. The lake culture is an essential element to the city of Bemidji. Being able to connect this project's designs to the lake is going to be a key element for how successful the design will be to the users of the city.

# Site Information Climate Data



■ Average High Temperature  
■ Average Low Temperature  
■ Record Low Temperature

Average Mean Annual Temperature: 37.2 F

Average Annual Humidity: 47%

Sky Conditions in a Month (# of Days)			
Month	Clear	Partly Cloudy	Cloudy
January	7	7	17
February	7	6	15
March	6	8	17
April	6	8	15
May	7	10	15
June	5	11	14
July	8	13	10
August	8	12	10
September	7	9	14
October	8	8	16
November	5	6	19
December	6	6	19

Humidity Levels (%)		
Month	Morning %	Afternoon %
January	76%	72%
February	76%	70%
March	79%	67%
April	77%	57%
May	76%	53%
June	82%	60%
July	86%	60%
August	88%	61%
September	87%	64%
October	82%	64%
November	83%	73%
December	80%	75%

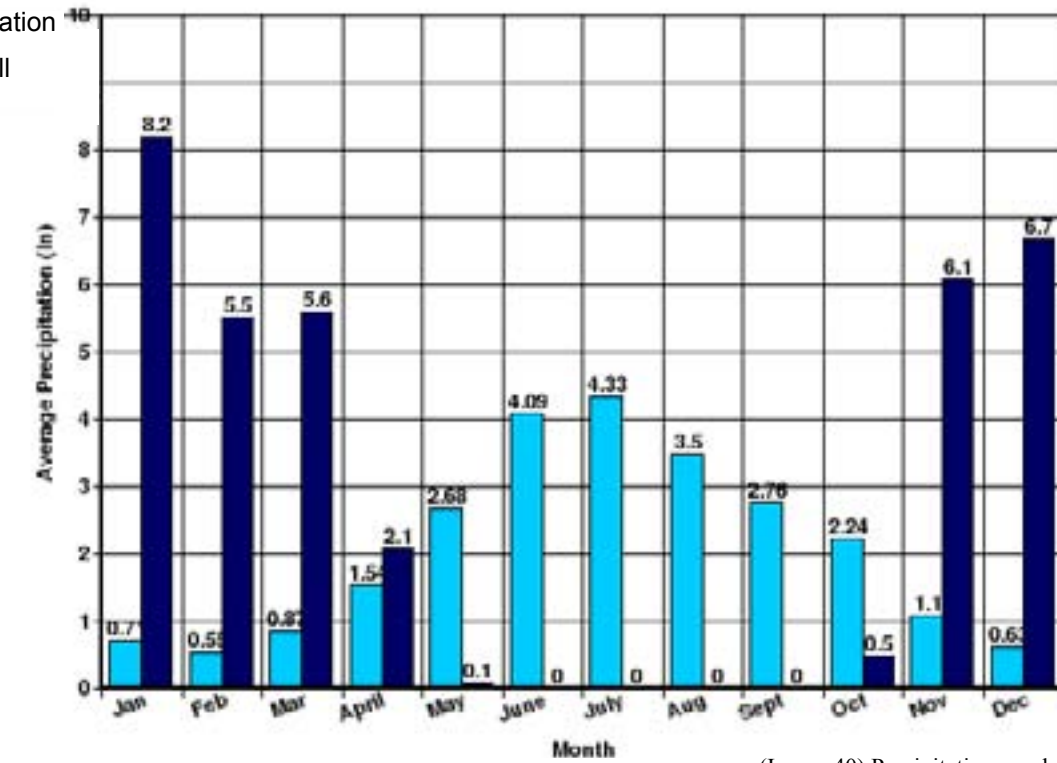
# Site Information Climate Data

■ Average Precipitation  
■ Average Snowfall

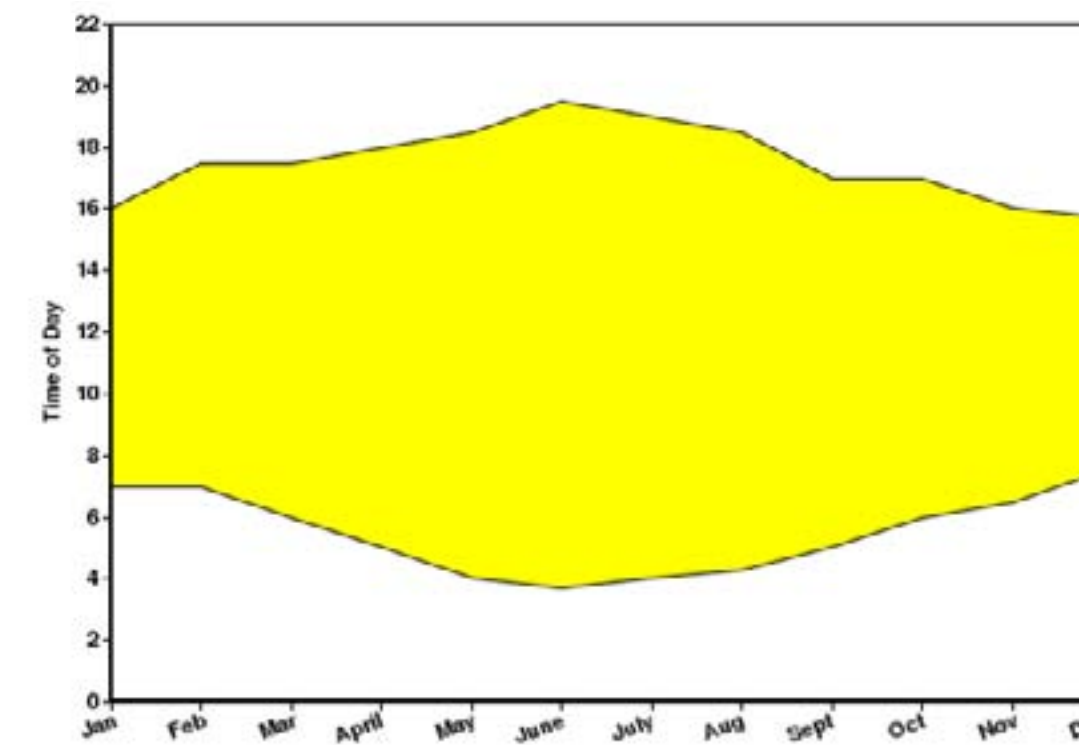
Average Annual Rainfall: 23.8"

Average Annual Snowfall: 41.1"

Winds are from the N-NW in the winter months



Avg. Wind Speeds (mph)	
Month	Wind Speed
January	10.9 mph
February	11.0 mph
March	11.4 mph
April	11.7 mph
May	11.4 mph
June	10.2 mph
July	9.0 mph
August	9.3 mph
September	10.1 mph
October	10.9 mph
November	11.1 mph
December	10.7 mph

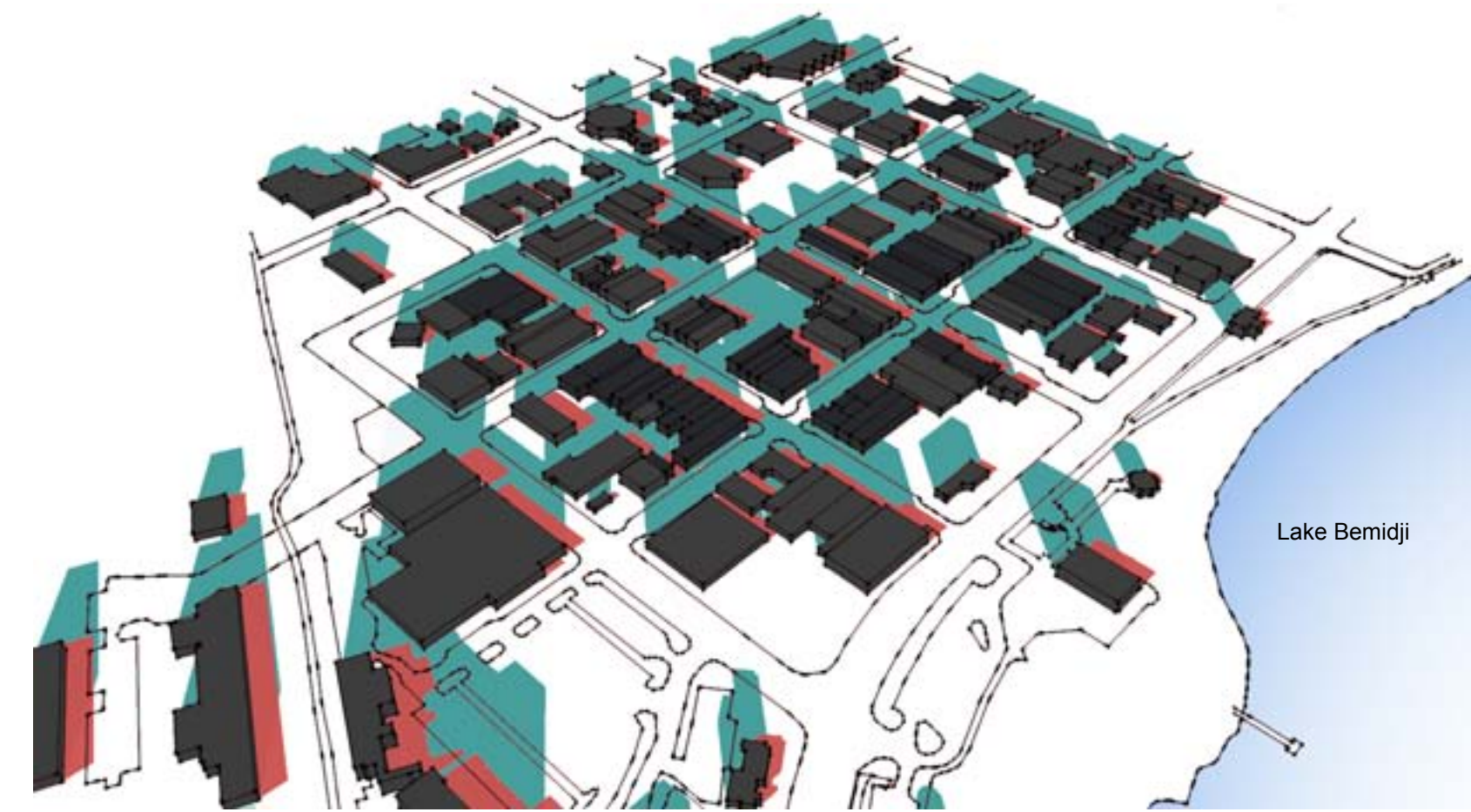
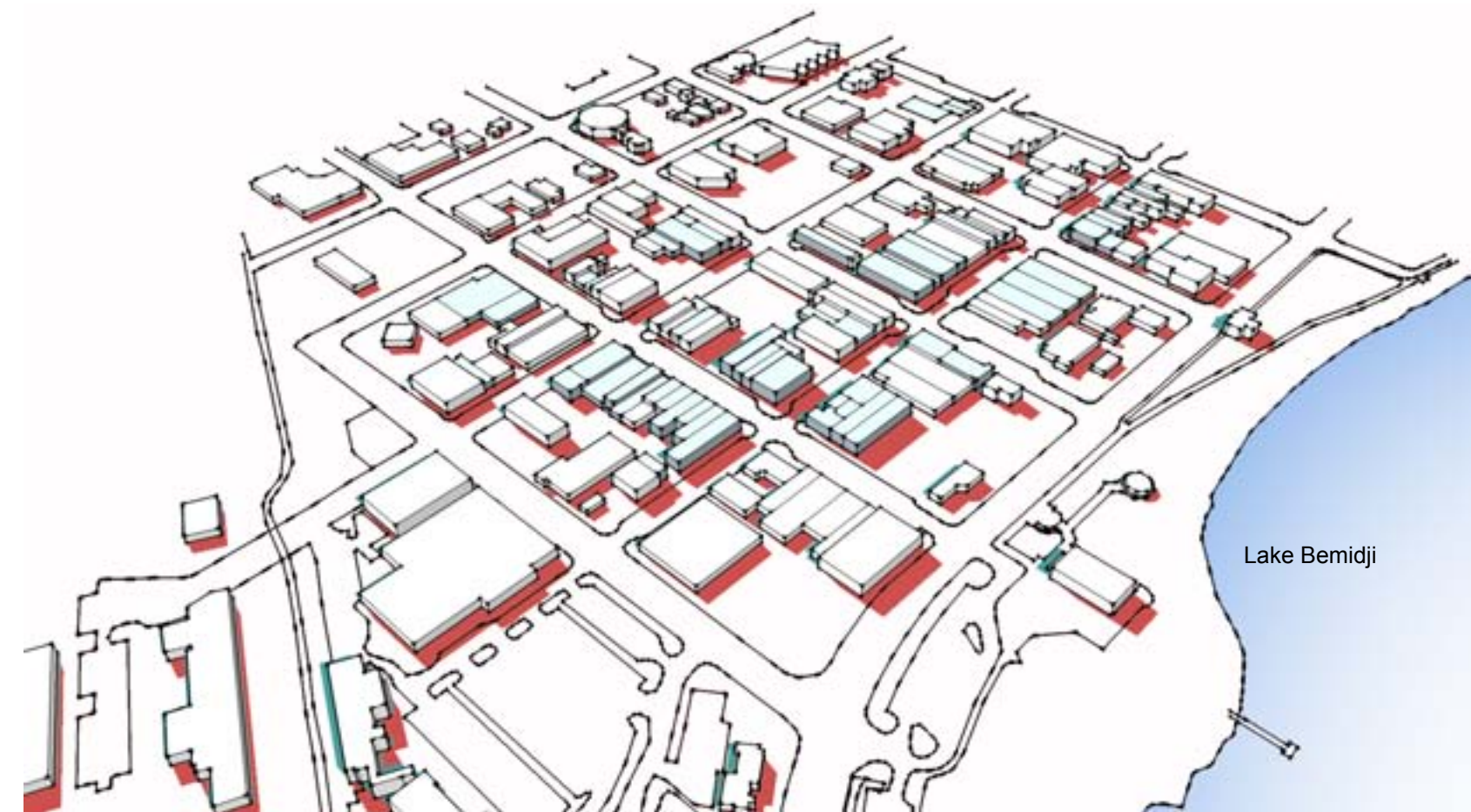


(15)



# Site Information Summer Shading

# Site Information Winter Shading



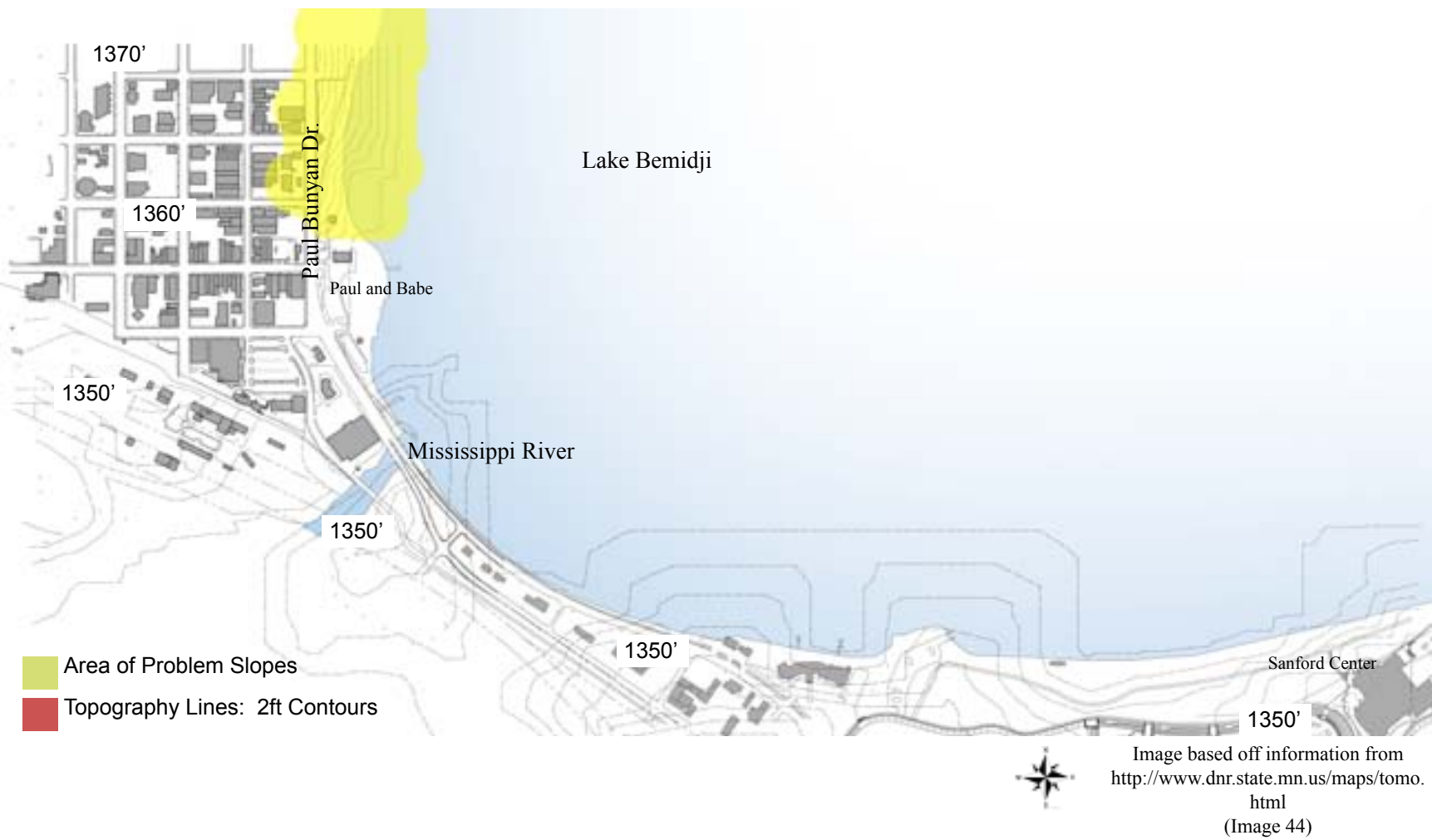
(Image 42)  
Shadows on June 21  
■ Shadows present at 8:00 a.m.   
 ■ Shadows present at Noon   
 ■ Shadows present at 5:00 p.m.

(Image 43)  
Shadows on December 21  
■ Shadows present at 8:00 a.m.   
 ■ Shadows present at Noon   
 ■ Shadows present at 5:00 p.m.

During the winter and summer months shadows have a large impact on an individual's comfort within the city. In the summer, shadows create microclimates of cool temperatures that provide relief from the summer heat. Areas that will be further designed in this project need to have a balance of cool in the summer and warm in the winter. Sun angles in the summer cause the shadows to be smaller throughout the day and create shorter periods of nighttime. The above diagram shows the shadows on June 21 at 8:00 a.m. and 5:00 p.m. The shadows for noon cannot be shown because the sun is directly overhead at this time and the resulting shadow is miniscule.

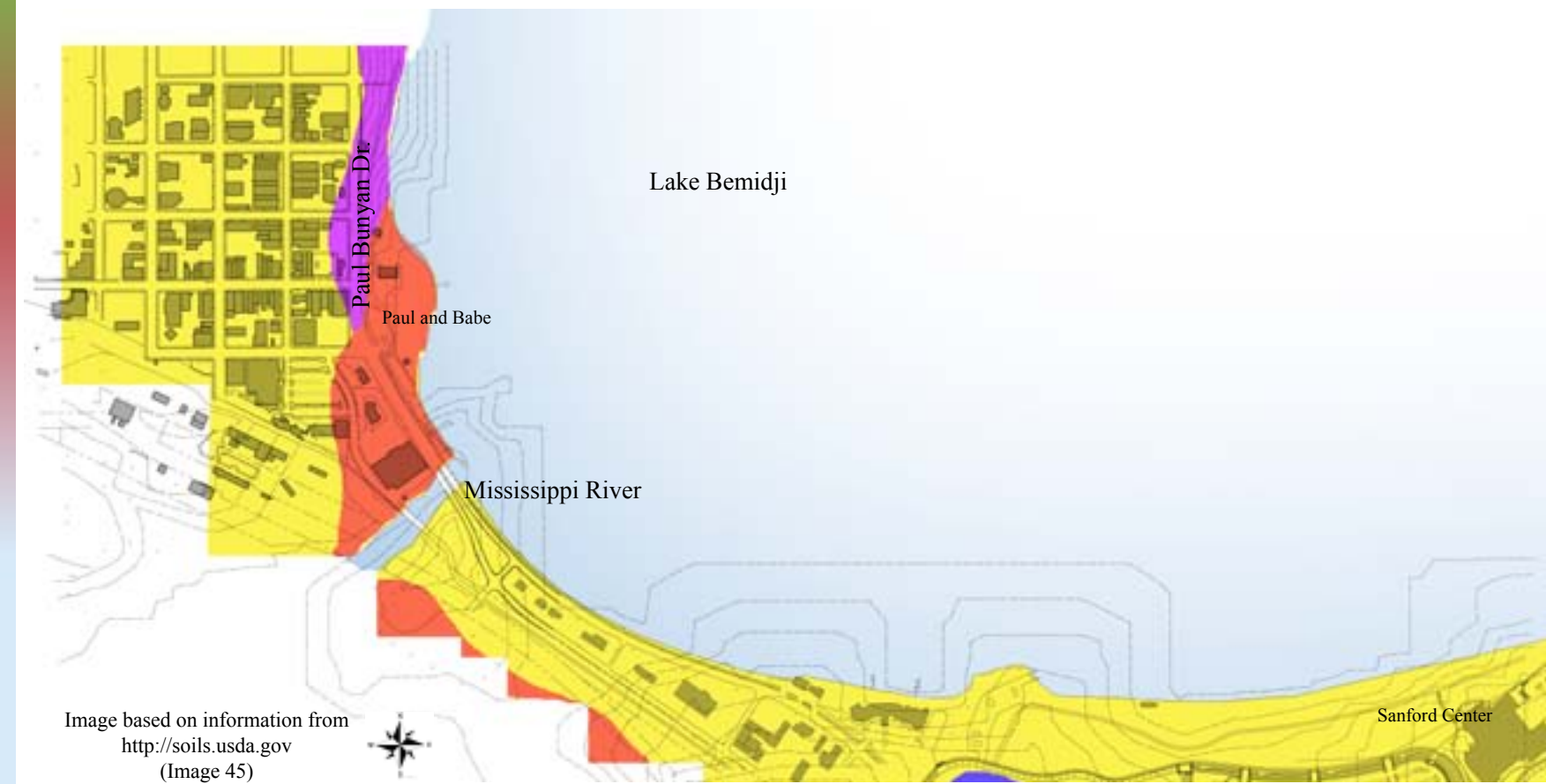
During the winter and summer months shadows have a large impact on an individual's comfort within the city. In the winter shadows can create microclimates of even cooler temperatures that people wish to avoid. Areas that will be further designed in this project need to have a balance of cool in the summer and warm in the winter. The amount of daylight in the winter is significantly less than in the summer, so using the sunshine when it is out is important to the health of the city's residents. Sun angles in the winter causes longer shadows throughout the entire day and create longer periods of nighttime. The above diagram shows the shadows on December 21 at 8:00 a.m. and noon. The shadows for 5:00 p.m. cannot be shown because the sun has set by that time of day.

# Site Information Topography



From the Mississippi River the onsite elevation increases 32 feet to the west and up to 18 feet to the east. The lowest elevation is 1340 feet, located at the Mississippi River, and the highest elevation is 1372 feet located at the north end of Minnesota Avenue NW. Onsite there is only one location that has enough slope to cause future challenges for the city and the future design in this thesis project. This area is located along the shore of Lake Bemidji by Library Park. Currently the area is used as a sledding hill in the winter months and has little to no use in the summer months. Improving the design of this area will increase the winter and summer activity by providing a defined purpose to the area.

# Site Information Soils



Murkey Muck	Urban Land/Comant Complex	Urban Land/Greycalm Complex: 1-6% slopes	Urban Land/Greycalm Complex: 6-12% slopes
Landform: Bogs on Outwash Plains, Bogs on Lake Plains	Landform: Outwash Plain	Landform: Outwash Plain	Landform: Outwash Plain
Drainage: Poor Drainage	Drainage: Poorly Drained	Drainage: Somewhat excessively Drained	Drainage: Somewhat excessively Drained
Parent Material: Herbaceous organic material over sandy glaciolacustrine deposits	Parent Material: Sandy Glaciolacustrine Deposits	Parent Material: Outwash	Parent Material: Outwash
Depth to Water Table: 0 inches	Depth to Water Table: About 6 inches	Depth to Water Table: Greater than 80 inches	Depth to Water Table: Greater than 80 inches
(16)	(16)	(16)	(16)

# Site Information

## Vegetation

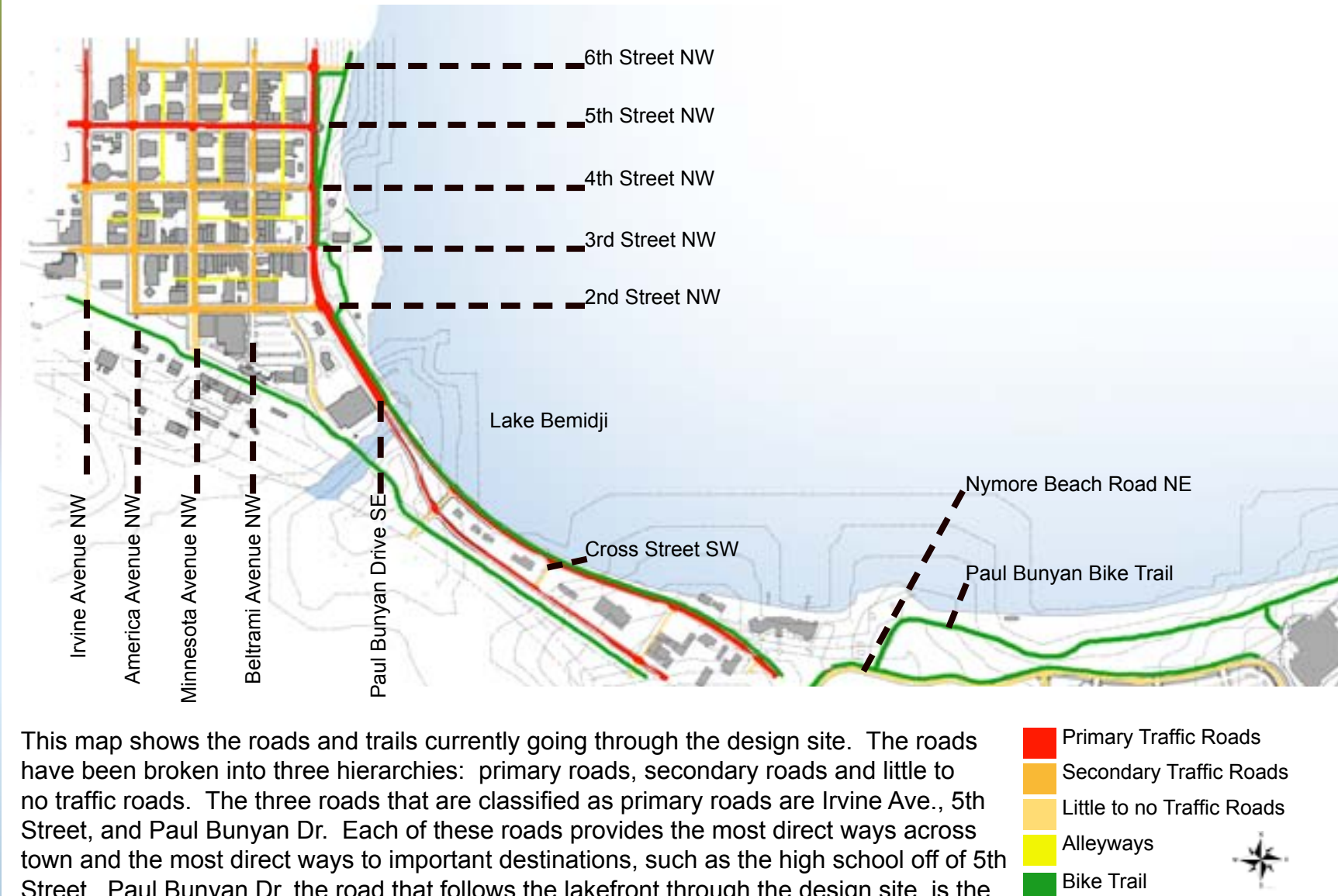


This diagram shows the vegetation in the design site. Vegetation in the site is generally either in small patches/individual plantings or large groupings. The small patches/individual plantings are found throughout the entire site along the roads and in the open areas. The large groupings of vegetation are primarily located at the waterfront by the Paul and Babe statues, along the lakeshore and along the shoreline of the Mississippi river. Along the lakeshore next to the bike trail east of the Mississippi River, the Department of Natural Resources (DNR) has been working on planting natural lakeshore vegetation to help with shoreline stability. Expanding the natural plantings along the shore west of the Mississippi River would improve shoreline stability and decrease the amount of ice heave.

The area of standing water is a storm water basin that treats a 16 acre watershed. Before this was constructed, all of the runoff now being collected was funneled directly into Lake Bemidji. The proximity to the visitor's center offers strong educational potential, but there is currently only one small sign explaining the reason for the basin's location. There is no winter use connected with the basin.

# Site Information

## Roads and Trails

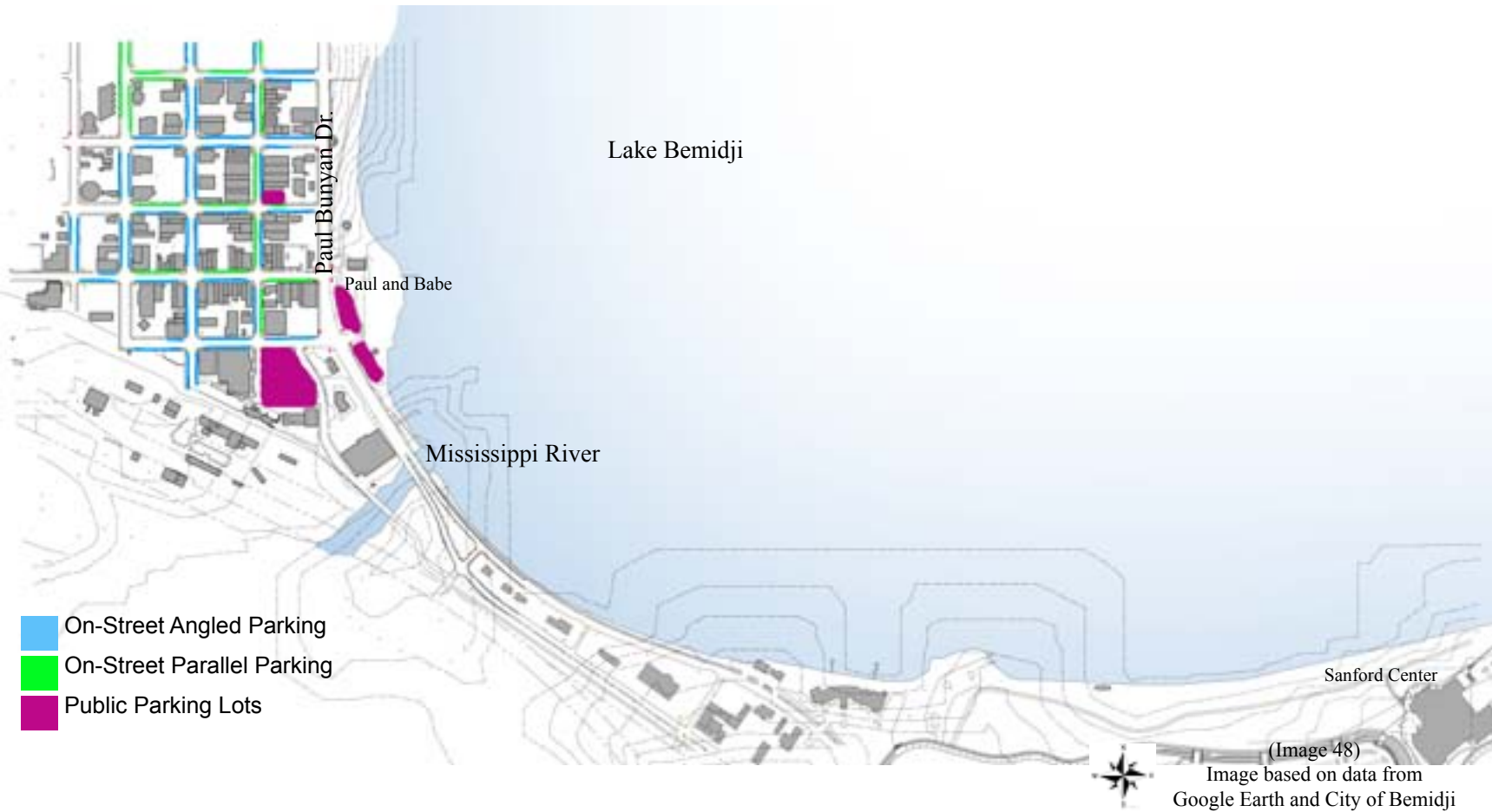


This map shows the roads and trails currently going through the design site. The roads have been broken into three hierarchies: primary roads, secondary roads and little to no traffic roads. The three roads that are classified as primary roads are Irvine Ave., 5th Street, and Paul Bunyan Dr. Each of these roads provides the most direct ways across town and the most direct ways to important destinations, such as the high school off of 5th Street. Paul Bunyan Dr. the road that follows the lakefront through the design site, is the only four-lane road of the three primary streets. The secondary streets, while only having slightly less traffic flow than the primary streets, do not provide access across town or to important destinations. These streets are mainly used to get to specific locations in downtown.

There are two bike trails that currently run through the design site. Along the backside of the downtown buildings is a little known bike trail that connects in the east to a trail going to Cass Lake, MN. The Paul Bunyan trail by the waterfront circles the lake and connects to the State Park trails as well as a trail going to Thief River Falls, MN on the north side of Lake Bemidji. Currently the Paul Bunyan Trail has a lack of definition once it crosses over the Mississippi River into downtown. Fixing this lack of definition to provide a better connection to the west can become a component of this design project.

# Site Information

## Parking



This diagram shows the location of parking within the design site. Within the historic section of downtown there is a combination of parallel and angled parking on almost every block. The on-street parking has a time limit of 90 minutes. On an average day in Bemidji, it can be difficult to find a parking spot along the street. However, this does not stop people from parking in front of one location and then driving a couple blocks so they may park in front of a second location. There are four public parking lots within the design site. On an average day in Bemidji, most of these lots have very few cars parked in them. The parking that is available and not being used provides an opportunity to remove a portion of the on-street parking. This would create a need for people to use the public parking lots and have to walk to their destinations as opposed to parking directly in front of the location.

# Site Information

## Lighting



This diagram shows the location of existing lighting within the design site. Currently there is good lighting within the historic section of downtown, but few lights along the lakeshore. Expanding the lighting to the lakeshore would allow for longer use periods during the winter months when the sun sets as early as 5:00 p.m. During the winter there is seasonal lighting added to the trees downtown and to the waterfront trees. In recent years the amount of seasonal lighting used by the city has decreased due to high costs.

# Site Information

## Building Inventory



This diagram shows the locations and types of buildings within the design site. In the site there are two educational buildings, four churches, six single family residential houses, nine mixed use (goods and services on the first floor and residential on the second floor), 11 public/county buildings, 11 empty buildings, and approximately 122 buildings for goods and services. The large number of goods and services located in downtown Bemidji is what keeps people coming to the area and prevents it from dying out completely. On the next page there is a list of the businesses in the downtown area of Bemidji.

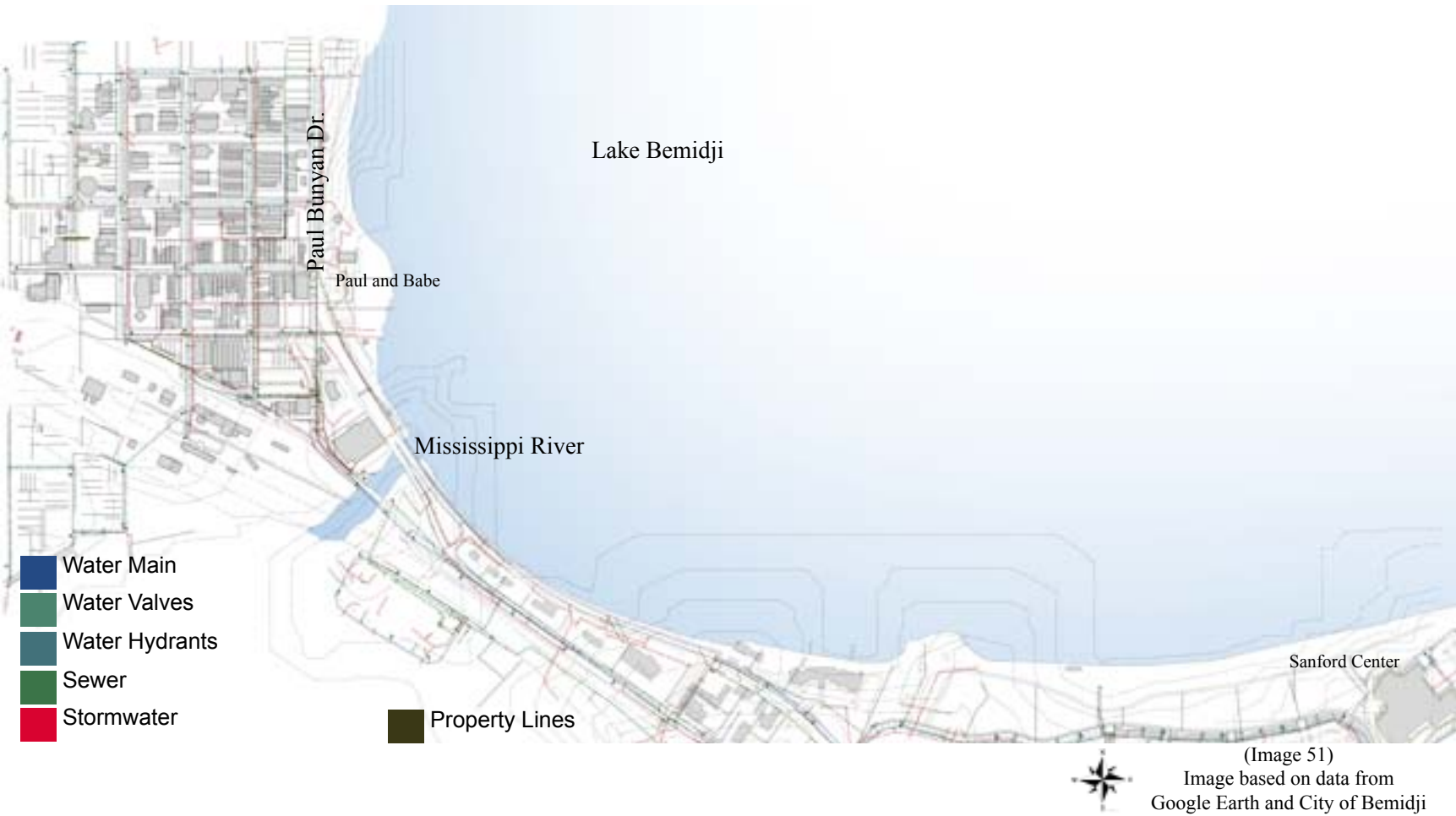
# Site Information

## Building Inventory

Below is a list of the downtown businesses.  
(List is current as of December 2010)

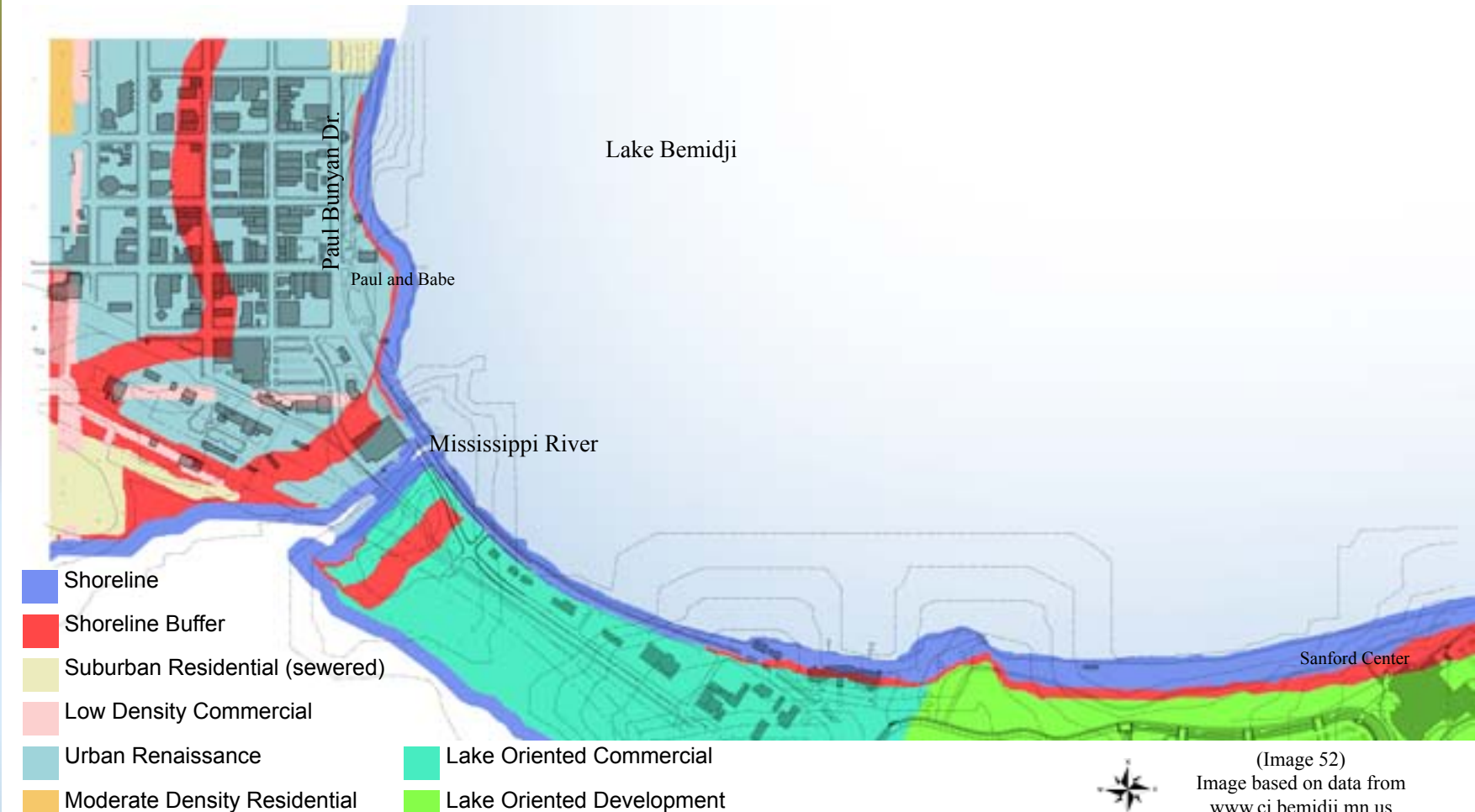
- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>Ace On The Lake</li> <li>Bemidji Appraisal Service</li> <li>Bemidji Area Chamber of Commerce</li> <li>Bemidji Cooperative Assn</li> <li>Bemidji Health &amp; Wellness Center</li> <li>Bemidji Design Center</li> <li>Bemidji Woolen Mills</li> <li>Big North Distribution, INC</li> <li>Brigid's Cross Irish Pub</li> <li>Cabin Coffeehouse and Cafe</li> <li>Carpenter &amp; Wangberg, PA</li> <li>Century 21</li> <li>City of Bemidji</li> <li>Classic Cuts Hair &amp; Body Salon</li> <li>Deerwood Bank</li> <li>EAPC Architects &amp; Engineers</li> <li>First National Bank</li> <li>Formalities</li> <li>Grimes Realty</li> <li>Hair Teasers</li> <li>Harmony Food Coop</li> <li>Haskell Law Firm, PLLC</li> <li>Headwaters Science Center</li> <li>HRDC</li> <li>Ink Spot Press</li> <li>Iverson Corner Drug</li> <li>KD Floral and Gardens</li> <li>Keg-N-Cork</li> <li>Kelsey's Jewelry</li> <li>Ken K Thompson Jewelry</li> <li>Kenny's Clark &amp; Goodyear</li> <li>Kraus-Anderson Construction</li> <li>Kraus-Anderson Realty Co</li> <li>Krigbaum &amp; Jones, LTD</li> </ul> | <ul style="list-style-type: none"> <li>Lake-N-Woods Realty</li> <li>Looking Glass Beauty Salon</li> <li>Lucachick Architecture Inc</li> <li>McKenzie Place</li> <li>Midcontinent Communications</li> <li>Miller McDonald, INC</li> <li>Minnesota Nice Cafe</li> <li>Minnesota Public Radio</li> <li>MJ Architectural Studios</li> <li>Morell's Trading Post</li> <li>Murray Surveying</li> <li>North Country Dental</li> <li>Northern Engineering and Consulting, Inc.</li> <li>Northern Surplus / Northern Outdoors</li> <li>Northway Services of Bemidji</li> <li>Otter Tail Power Co</li> <li>Paul Bunyan Broadcasting Co.</li> <li>Paul Bunyan Playhouse</li> <li>Pine Country Insurance</li> <li>Properties West of Bemidji</li> <li>Raphael's Bakery</li> <li>Renaissance Hearing Ctr, Inc.</li> <li>Riverwood Bank</li> <li>Stellher Human Services</li> <li>Super 8 Motel</li> <li>Tea &amp; Gift Shoppe</li> <li>Third Street Optical</li> <li>TJ Studio</li> <li>TK's Closet</li> <li>Twice But Nice</li> <li>Wells Fargo Bank Minnesota</li> <li>Widseth Smith Nolting</li> <li>Wild Hare Bistro &amp; Coffee Shop</li> <li>Your Mom's Tattoo Atelier</li> </ul> |
|--|---|

# Site Information Utilities



This diagram shows the location of the utilities that are in place within the design area. These utilities include: water main, sewer, storm water sewer lines, the location of water valves and the locations of water hydrants. This map also shows the property lines existing on site. Along the south side of Paul Bunyan Drive (specifically in between Lake Bemidji and Lake Irvine) there is a wastewater treatment facility that is still operating.

# Site Information Zoning

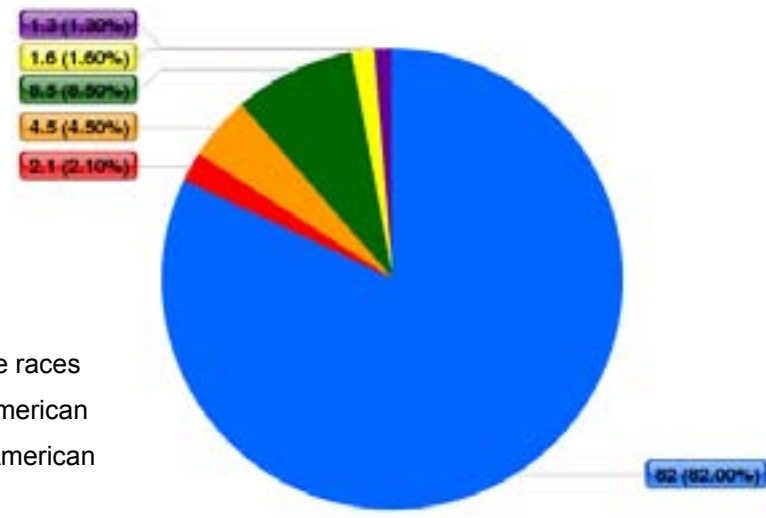


This diagram shows the zoning boundaries within the site. The three main zones that take up more than 80% of the site are Urban Renaissance, Lake Oriented Commercial, and Lake Oriented Development. The Urban Renaissance covers the entire downtown area including the waterfront park where the Paul and Babe statues are located. The two most important zones for this design project are the Urban Renaissance zone, which will have the most restrictions for new built structures, and the Lake Oriented Development Zone which will have the least amount of restrictions for new built structures.

# Site Information

## Demographics

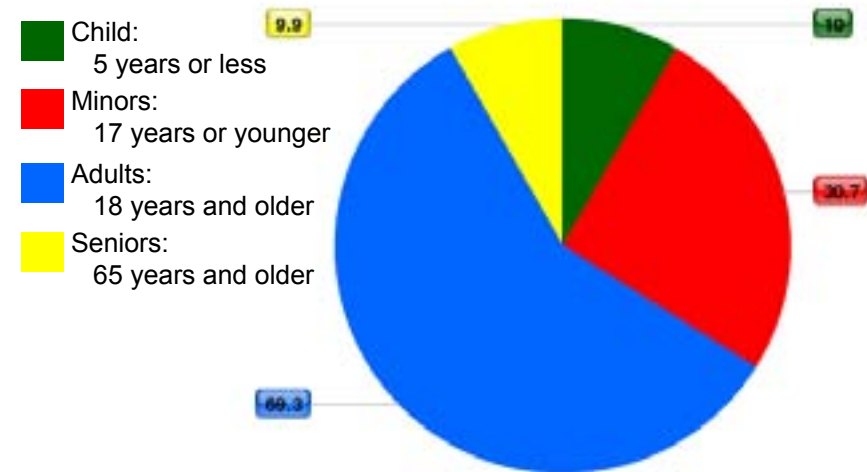
### Races in Bemidji



(Image 53)  
Pie chart of Races in Bemidji

### Ages in Bemidji

Median Resident Age: 27.6 yrs



(Image 54)  
Pie chart of Resident's Ages in Bemidji

Males: 6,399 (46.5%)  
Females: 7,350 (53.5)

Estimated Median Household Income (2009):  
\$34,998 Increased from \$28,072 in 2000

Average Household Size:  
2.2 people

Population Density:  
1,167 people per square mile

The most common travel time to work for people in Bemidji is 5-20 minutes. The mean time to work is 16 minutes. The majority of people drive in a car by themselves to get to work.

Most common industries in 2005-2009 (%)

Males:

- Educational services (18%)
- Retail trade (15%)
- Health care and social assistance (8%)
- Wholesale trade (7%)
- Arts, entertainment, and recreation (6%)
- Construction (6%)
- Transportation and warehousing (6%)

Females:

- Health care and social assistance (31%)
- Educational services (18%)
- Retail trade (12%)
- Accommodation and food services (10%)
- Other services, except public administration (6%)
- Professional, scientific, and technical services (4%)
- Public administration (4%)

Common Ancestries: German (29.2%), Norwegian (22.9%), Swedish (8.9%), Irish (8.8%), English (6.6%), and French (5%)

(1)

# Site Information

## Connections

One important cultural connection to my site is the proximity of Bemidji State University. The college is located approximately five minutes north of the design site along the shores of Lake Bemidji. BSU has a lot of community and local business support, going as far as businesses re-recording radio commercials to wish the college well during important events such as national hockey games or graduation. This support is physically shown through signs in windows or clothing stores selling BSU apparel. The proximity to the college also means that there are a high number of students visiting the design site for the coffee shops and bars/pubs located in the downtown

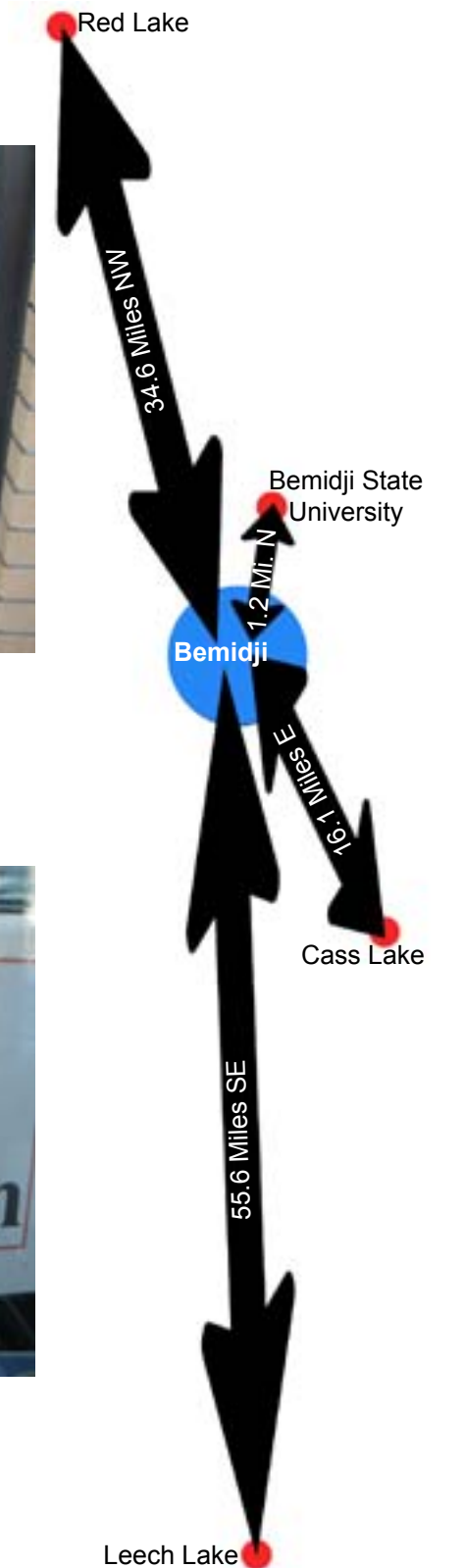


(Image 55) BSU Sign

Another important cultural connection to my site is the Native American culture. One reason this culture is important is due to the history of the city, since it was originally an Indian Village. The other reason this culture is important is due to the proximity to Red Lake (34.6 miles NW), Cass Lake (16.1 Miles E), and Red Lake (55.6 Miles SE). One way that this culture has been shown recently in Bemidji is through the introduction of dual language signs in many stores, like the sign in the picture to the right, the two language are English and Ojibwe.



(Image 56) Example of Ojebwe Language



(Image 57) Connection Locations

# Site Information

## Current Event Buildings



(Image 58) Carnegie Library

The Carnegie Library was built in 1909. It is located on Paul Bunyan Drive and 5th Street. Recently the city has decided that the current location has several hazards connected to it. The most problematic of these hazards is the proximity to Paul Bunyan Drive and the lack of a setback from the sidewalk. Currently there is approximately 3-4 feet between the road and the stairs leading to the door. Because of the historic nature of the building, it was added to the historic register in 1980, and the city has begun doing a comparison study to examine the possibilities of redesigning the Paul Bunyan Drive, relocating the Carnegie Library, or having the Library torn down.



(Image 59) Pamida

The Pamida store located on the Mississippi River is another building that has a lot of current interest. In 2012, Pamida will close and the city will have to decide what will be done with the building and property it sits on. The issues with this area are that the store is currently sitting on the exact location of the original trading post that settled the city of Bemidji and is also the location of an Indian and Settlers burial ground. Many people are concerned that having a building located there is disrespectful to those who are buried there. One potential option for the site is for the Headwaters Science Center to move into the building and create a connection to the lake using an underpass beneath the Mississippi River Bridge.

# Site Information

## Movement on Site



This diagram shows the direction of traffic and movement of pedestrians within the design site. Prior to 2004, Paul Bunyan Drive was a two-way street that ran along the shoreline, with a second parallel two-way street running behind the buildings near the lake. When the new bridge of the Mississippi River was completed, the city chose to convert those two parallel streets into two lane, one-way streets. The traffic going west into the city runs along the lake shore and the traffic going east out of the city runs behind the buildings. All the other roads in the design site (and in the city of Bemidji) are two-way streets. Within the site, pedestrians move freely in any direction along the sidewalks. The crossing areas for pedestrians are marked in red on the map. Within the downtown blocks all of the pedestrian crossing areas have stop signs for automobile traffic. Ignoring special events or festivals, there are three locations on site that have regular, constant congestion of people. These areas are the Visitors Center/Paul and Babe at the lakefront, the public boat landing next to the Mississippi River and the Sanford Center. One potential reason for the lack of connection between the gathering areas and special events sites is that there is no design to the areas where special events are held. These areas have the potential to bring more people into the downtown area if designed further in this project.



# Site Information

## Special Events



(Image 61)



(Image 62)



(Image 63)



(Image 64)



(Image 65)

One of the reasons for choosing Bemidji as the site for this project is the wide variety of events that are held throughout the entire year, specifically the six different events held in November-February.

### Night We Light

The Night We Light is an annual event held the day after Thanksgiving. This event has two components that comprise the evening of activities. The first component is a parade that runs down three blocks of Beltrami Avenue. Featured in the parade are local community groups and businesses, the local police and fire station, veterans groups, and a community member playing Santa at the end of the parade. Usually the parade has enough participants that it lasts for an hour. Following the parade the second component of the evening, the lights countdown, begins. Everyone gathers in the courtyard space in front of the Paul Bunyan and Babe statues and does a group countdown to turn on the Christmas lights that decorate the trees along the waterfront by Paul and Babe (17).

### Madrigal Dinners

The Madrigal Dinners are a re-creation of a 15th century English feast located at Bemidji State University annually in December. This event is hosted by the music and theater students at Bemidji State University who provide the entertainment, which is usually music and comedic shows, while dressed in costumes from the 15th and 16th centuries. While the students are performing, the participants get to enjoy a catered meal. The Madrigal Dinners is the only winter event in Bemidji that requires purchasing a ticket (17).

### Santa Lucia Festival

To celebrate the Swedish heritage that is common in the surrounding areas, a traditional Scandinavian Festival of Lights is held each year on December 13th. This event, which can attract as many as 400 people, involves a crown of candles procession with a member of the community being chosen to act as the Santa Lucia and a customary Scandinavian breakfast of cold cuts and cheese, potato sausage, Swedish meatballs, and pickled herring. 2006 marked the 30-year anniversary of this event in Bemidji (18).

# Site Information

## Special Events

### Brrrrmidji Polar Daze

This week-long festival in January is the largest of the six winter events in Bemidji. Over the course of the week there are a variety of activities across town that people can participate in. Some examples of these activities include the "Taste of Northern Minnesota" potluck, snow and ice sculpture competition, concerts, broomball games and tournament, speed skating, hockey tournament, golf on ice, snowshoeing, ice skating and cross-country skiing under the stars, and the 5K Polar Challenge walk/run. The final activity at the end of the week is the Polar Plunge (17). For this activity hundreds gather on Lake Bemidji to wait their turn or to watch people, 61 in 2010, jump into the lake through a large hole cut out of the ice (19).

### Annual Logging Days

The Annual Logging Days event is held in February at Buena Vista Ski Area, which is located 13 miles north of downtown Bemidji, and allows people the opportunity to explore the logging history of Bemidji. Here people can see how logging was accomplished in the past through various demonstrations. Other "lumberjack" activities that take place during Logging Days are sleigh rides, wood carving exhibits, music, saw and ax chopping and throwing competitions and a pancake or "Flapjack" feed (20).

### Minnesota Finlandia Ski Race

Held in February, the Finlandia Ski Race has been called the "Nordic Festival of the North." This ski race offers a course that is both challenging and yet fun enough to attract more than 600 international and local skiers whose skills range from professional racer to young child having fun. This event is also held at and around Buena Vista Ski Area, but also brings people into downtown looking for a place to stay for a few nights around the race (21).

### Summer Events:

May Pole Dance, 4th of July parade, carnival, fireworks, Dragon Boat Festival, Home, Boat and Travel Show, Antique Car Show, Take a Kid Fishing, Art in the Park



(Image 66)



(Image 67)



(Image 68)



(Image 69)



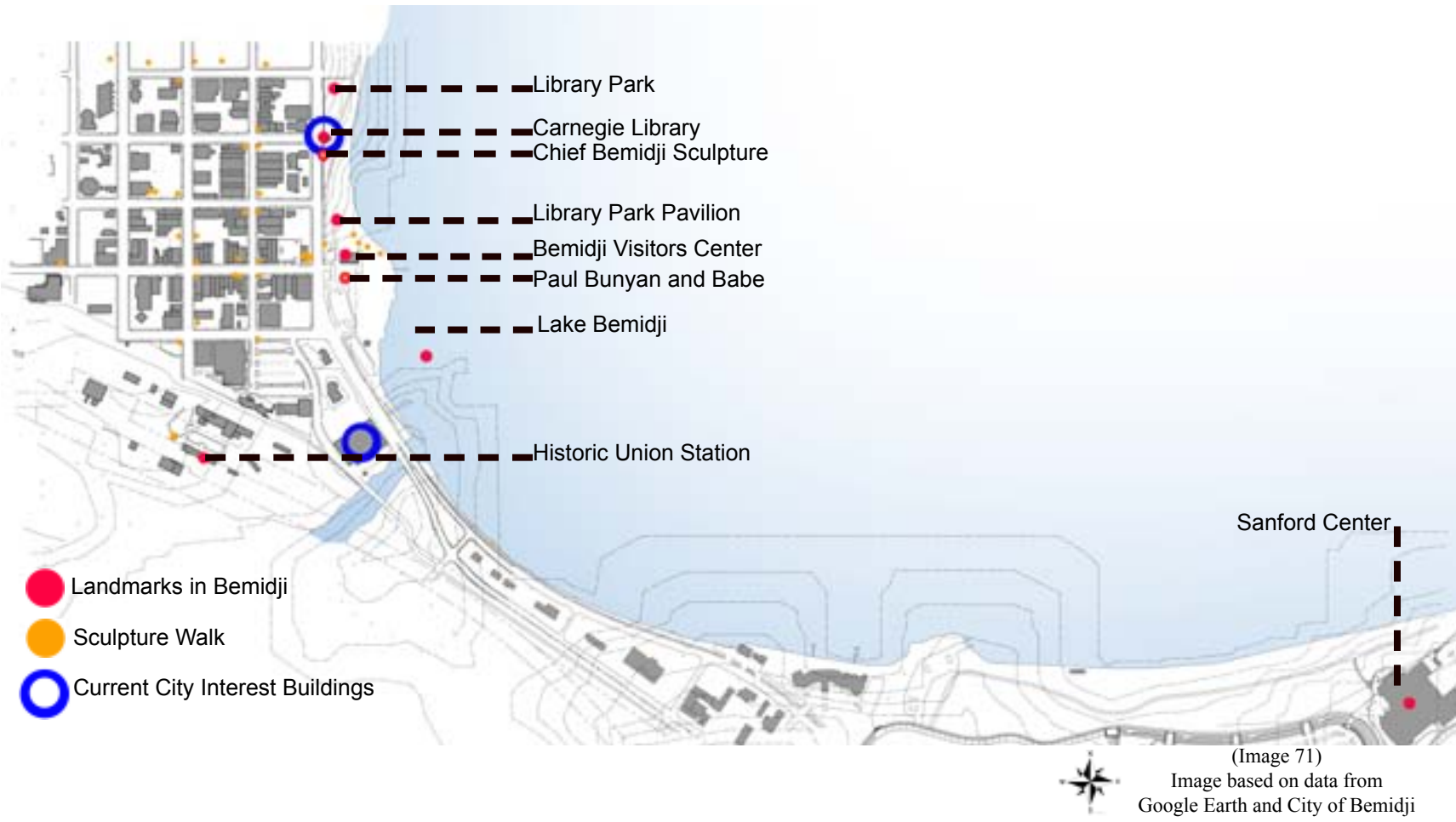
(Image 70)

# Site Information

## Places of Interest

# Site Information

## Places of Interest



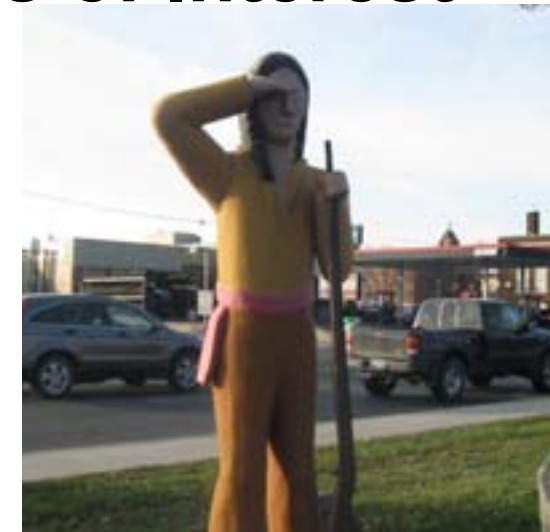
This diagram shows the major landmarks of Bemidji in the design site that people may take the time to see when they visit the city. These landmarks range from historic buildings, sculptures, and natural features like the lake. This diagram also shows the locations of the sculptures that are part of Bemidji's Sculpture Walk. The Sculpture Walk in Bemidji is unique compared to others due to two components. The first component is that the art pieces, with the exception of the three Indian sculptures and Paul and Babe, are made by local artists. The second unique component of the sculpture walk is the transformative nature. Pieces in the walk are swapped or relocated to other areas of town on a regular basis. The temporary nature of the Sculpture Walk has the potential to serve as an inspiration for other areas within the city and also has the potential to showcase the seasons if the pieces were changed at set times during the year.



(Image 72) Library Park



(Image 73) Carnegie Library



(Image 74) Chief Bemidji



(Image 75) Library Park Pavillion



(Image 76) Visitors Center



(Image 77) Paul and Babe



(Image 78) Lake Bemidji



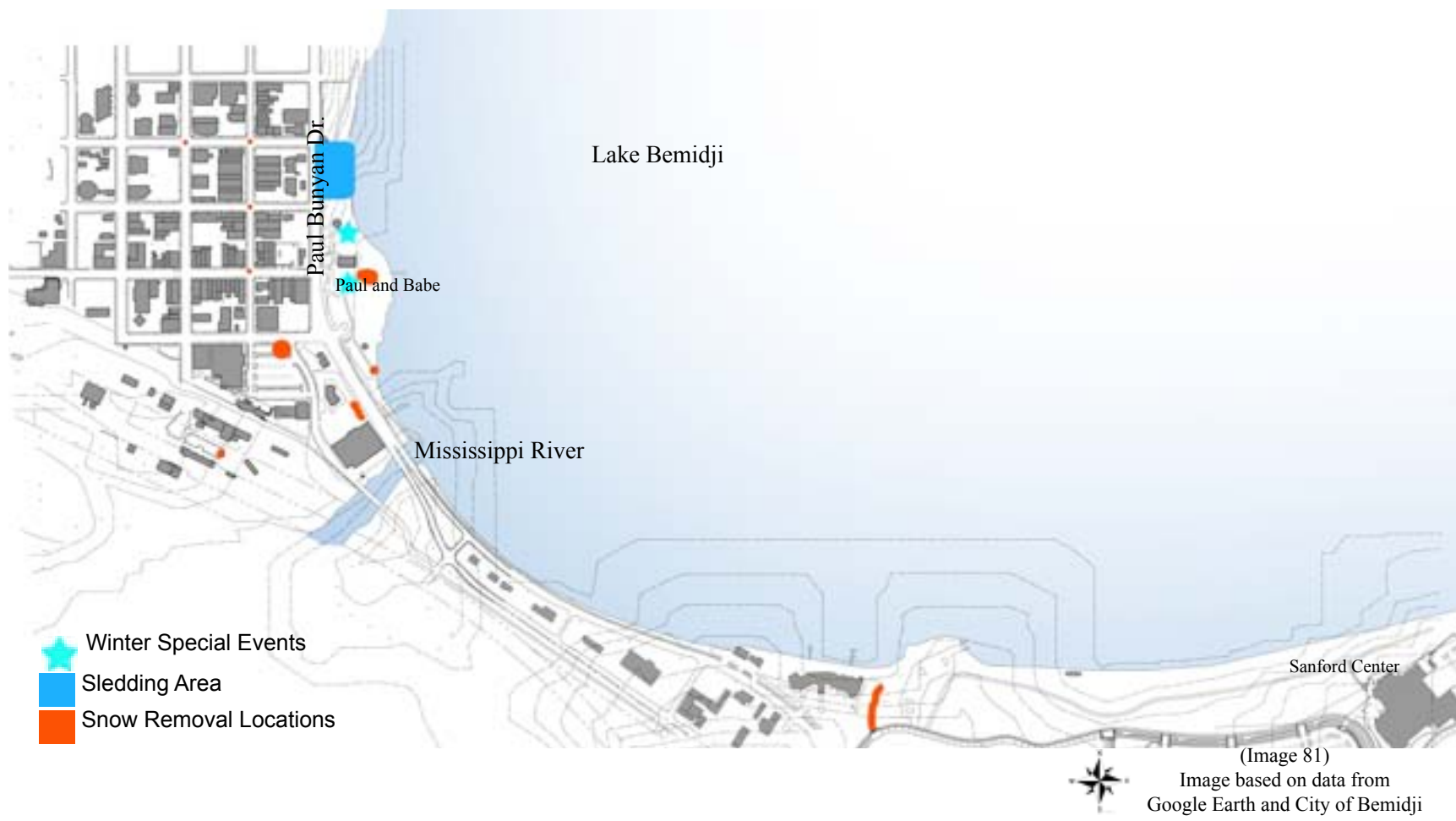
(Image 79) Historic Union Station



(Image 80) Sandford Center

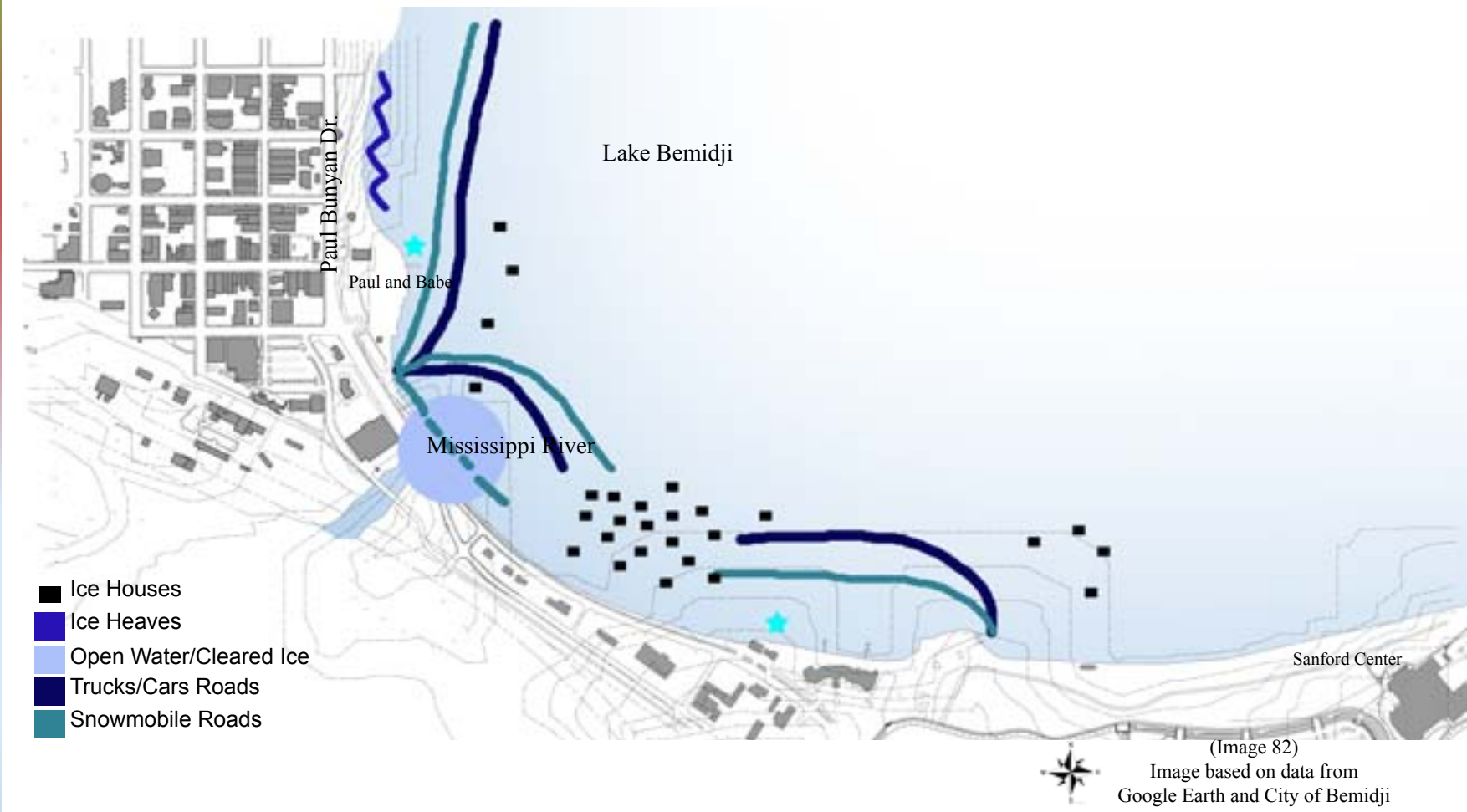
# Site Information

## Land Winter Uses



# Site Information

## Winter Uses

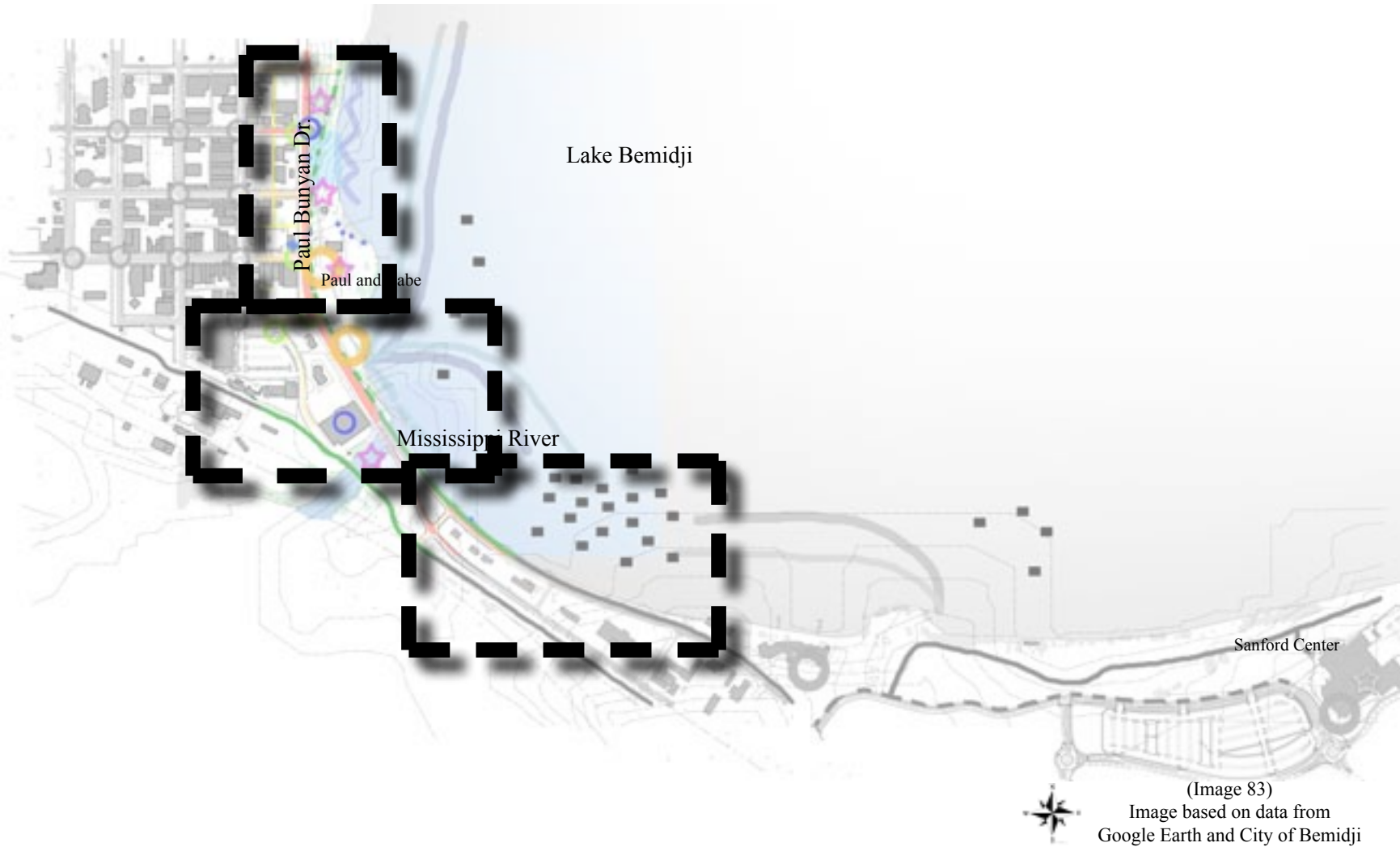


This diagram shows the uses of the design site specific to the winter season. Within the historic section of downtown, there are few winter specific uses other than areas used for snow removal. These are areas that should be looked at more closely and redesigned for improved safety and melting. Along the lake there are more winter specific uses including several winter events and sledding at Library Park.

Lake Bemidji itself has many winter specific uses occurring on the lake. Cars going out onto the lake create roads leading to ice fishing communities and to the area in front of Bemidji State University that turns into an additional parking lot for the students. The inflow of the Mississippi River becomes an area that is avoided by trucks as much as possible (there are still at least two that fall in per year) and is skipped over by daredevils on snowmobiles. One of the more unique winter uses to the lake are the communities of ice houses of gather every year. One of the largest that gathers on the lake is the community located north of the bike trail along the south shore of Lake Bemidji. This provides an unique area to design further to connect the communities of Ice Houses to the city of Bemidji.

# Site Analysis

## Site Locations



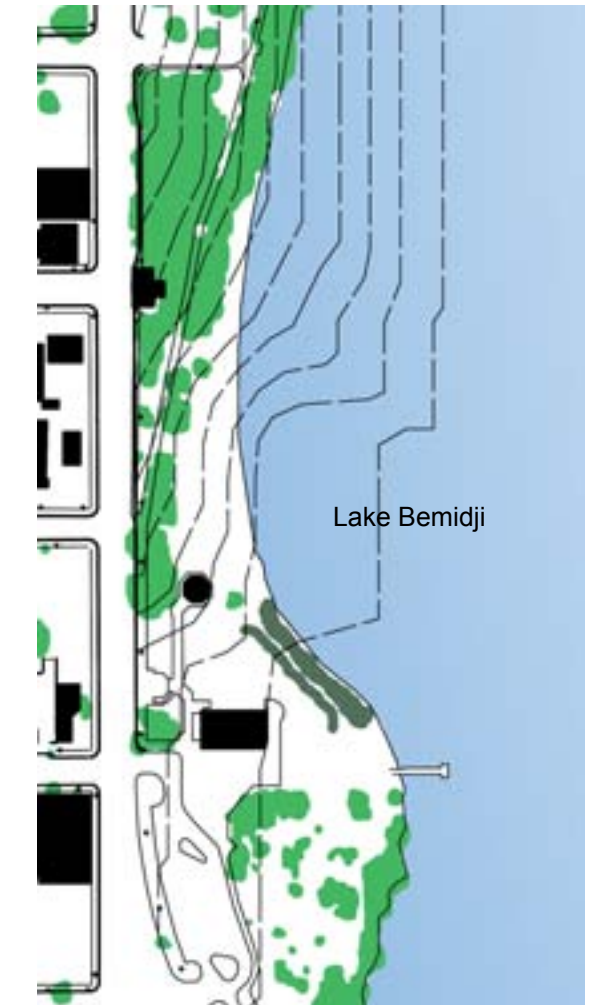
(Image 83)  
Image based on data from  
Google Earth and City of Bemidji

# Site Analysis

## Library Park



(Image 84) Analysis Map: Library Park



(Image 85) Analysis Map: Library Park

### Library Park:

Already has many events and winter uses connected with the site.

Has the steepest slope of the entire site area.

Has the highest number of people visiting due to Paul Bunyan and Babe the Blue Ox.

Has little design to the layout of buildings and events.

### Design Goals:

Design for increased winter use outside of special events.

Create a landscape that creates unique areas for the special events held on site.

Re-establish an area of interest behind the statues of Paul Bunyan and Babe the Blue Ox.

Stabilize the lakeshore to prevent ice heave damage.

This diagram shows the areas that, based on all of the inventory maps, would be the best locations to further design for this project.

# Site Analysis Pamida



(Image 86) Analysis Map: Pamida

## Pamida:

- Has very few interactions on site currently.
- Has a unique history relating to the city and Native American Culture.
- Has no winter specific uses.



(Image 87) Base Map: Pamida

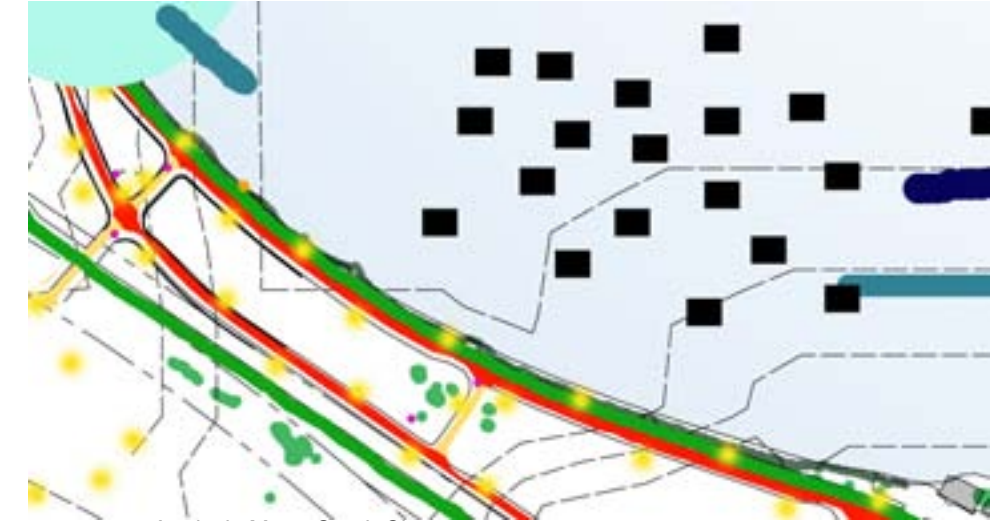
## Design Goals:

- Create a hub for winter gathering with close connections to the lake.
- Create a landscape through the science center with connections to the river and lake.
- Create a designed underpass beneath the Mississippi River bridge.
- Reduce the size of the parking lots on site.

# Site Analysis South Lake Shore

## Lake Front and Paul Bunyan Bike Trail:

- Has the best potential for connections to the lake in the winter.
- Located close to the community of ice fishing houses.
- Is the site with the least amount of design and the fewest connections to downtown.
- Has open views to Lake Bemidji.



(Image 88) Analysis Map: South Shore

## Design Goals:

- Create interactions with the ice house community.
- Increase the winter use of the Paul Bunyan Bike Trail.
- Create visual interest along the lake during the winter and summer months.
- Provide more direct connection to Lake Bemidji from the Bike Trail.



(Image 89) Base Map: South Shore

## Special Interest Buildings

Carnegie Library  
Move to a new location for safety.  
Connect to the outdoors with seating/courtyard.

Pamida  
Use for the Headwaters Science Center.  
Reduce Parking, add park space, river connections

## Key Intersections

Paul Bunyan Dr. and 1st St.  
Entry to the waterfront and Paul and Babe

Paul Bunyan Dr. and 2nd St.  
Exit for the waterfront and Paul and Babe

Paul Bunyan Dr. and 5th St.  
Entry to the North waterfront

## Continuation of Paul Bunyan Bike Trail

Connect from Mississippi River to North of  
Library Park. Use materials of existing bike path to  
create a continuous path

## Connection to the Lake and River

Missing close/direct pedestrian access  
Add along the south shore to get more people  
to walk along the lake. Create connection to  
Mississippi River by Science Center for  
education and special events

## Shoreline Stabilization

Rock Shoreline  
Scale for Seating. Protects against Ice Heave

Ground Cover Shoreline  
Keep Geese out of the park. Protects against Ice heave

Woody Plant Shoreline  
Already in place in areas of the site

## Winter/Summer Park

Sledding  
Expand for winter use. Lake/Special event Viewing in  
spring and summer

Library Park  
Find a winter use, currently has none

Snowball Park  
Use berms, trees, paths and seating as barriers

## Winter Event Lake Use

Boot Hockey, Hockey, Broomball  
Create areas for temporary rinks near special events

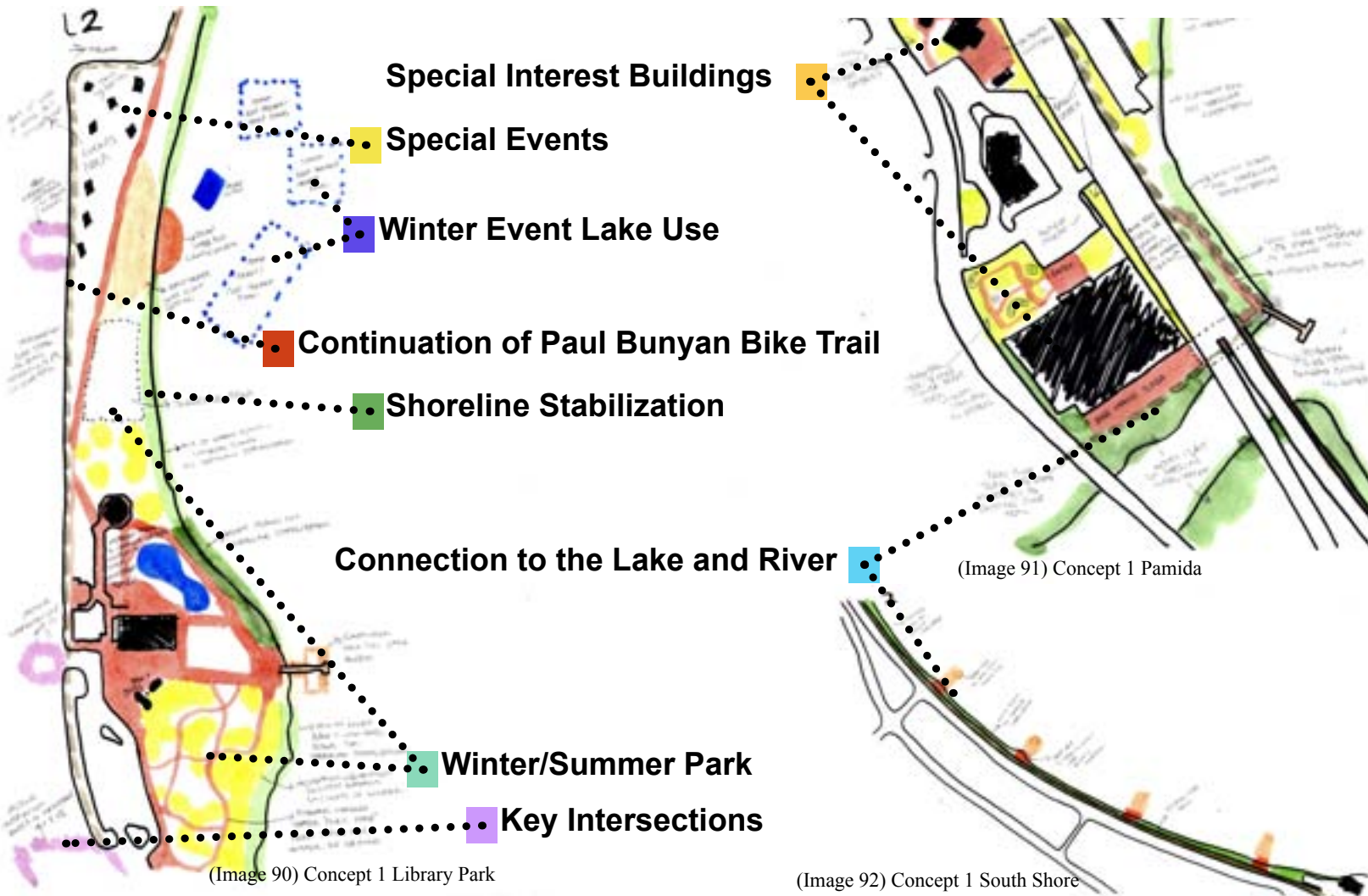
## Special Events

Elements Needed:  
Food Booths, Open Space, Lake Access,  
Stage/Pavilion, Vegetation



**Preliminary/Concept Planning**

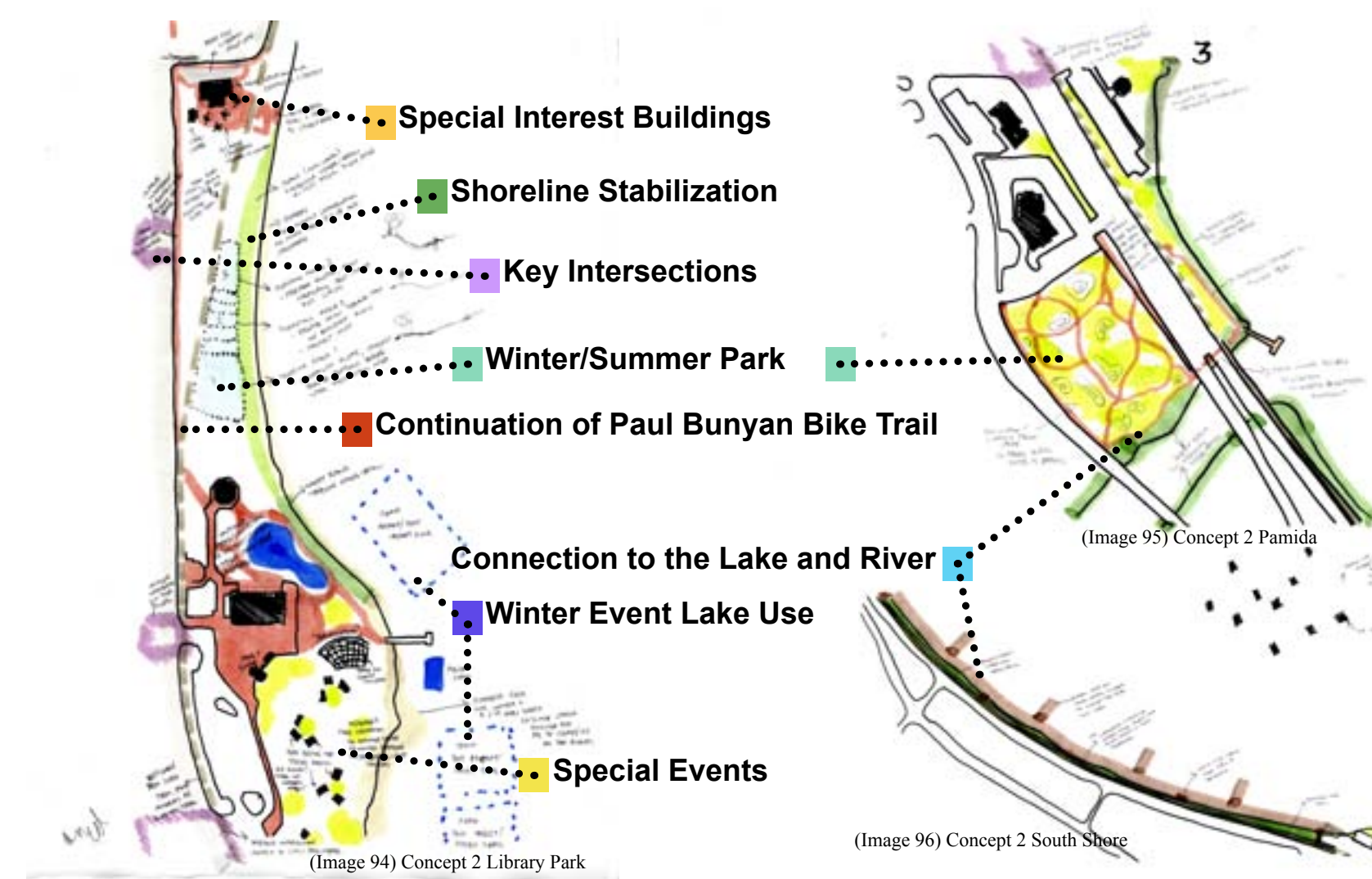
# Concept Plan Example One



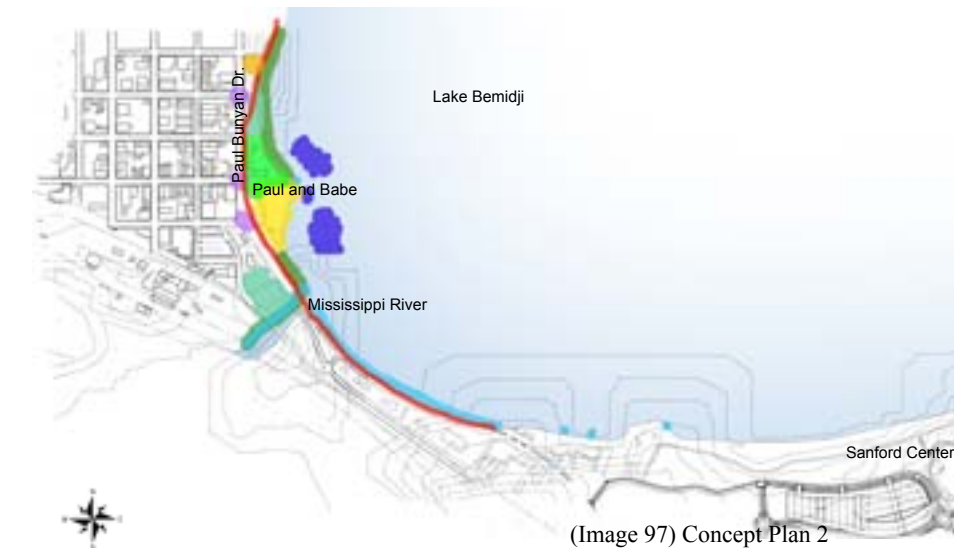
In the first Concept Plan, I placed the special events area in the north end of Library Park. Currently this is where several of the special events are held through-out the year also a large multi-season park can be added behind Paul and Babe. I used three different techniques for shoreline stabilization: Large Boulders, Grasses and Shrubs. I moved the Carnegie Library to the corner of Paul Bunyan Dr. and 1st St.. Pamida has been converted into the new Headwaters Science Center with riverside trails connecting to a bridge underpass. Along the south shore I added small docks for non-motorized boats to dock.



# Concept Plan Example Two

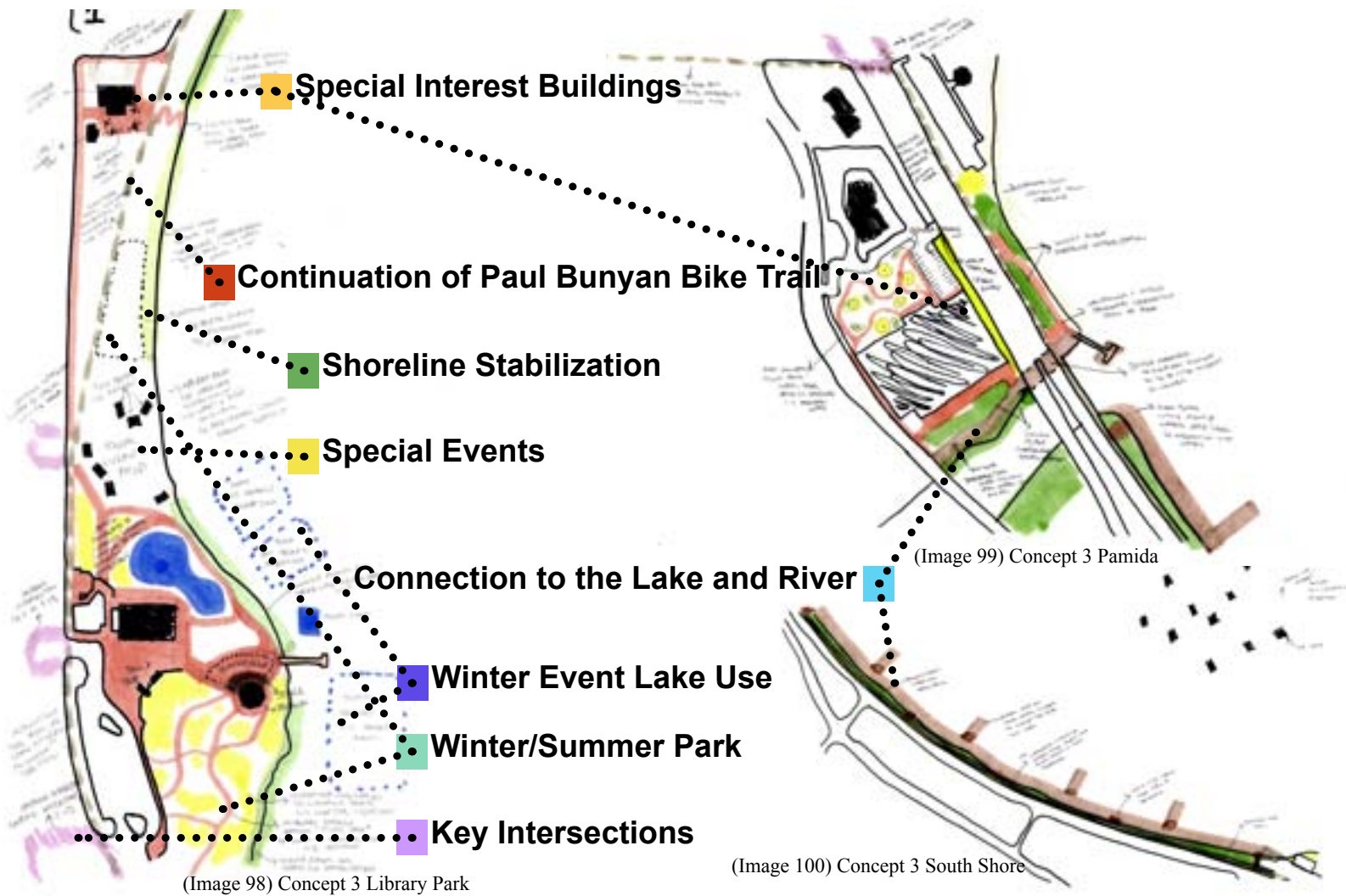


In the second Concept Plan, I placed the special events area behind the statues of Paul Bunyan and Babe the Blue Ox. In the past this has been an area for gathering and events but is now currently run-down and over-grown. I used three different techniques for shoreline stabilization: Large Boulders, Grasses and Shrubs. I moved the Carnegie Library to the north end of Library park and removed Pamida. In the place of Pamida I created a multi-seasonal park. Along the south shore I added a boardwalk at water level with small docks for non-motorized boats to dock.

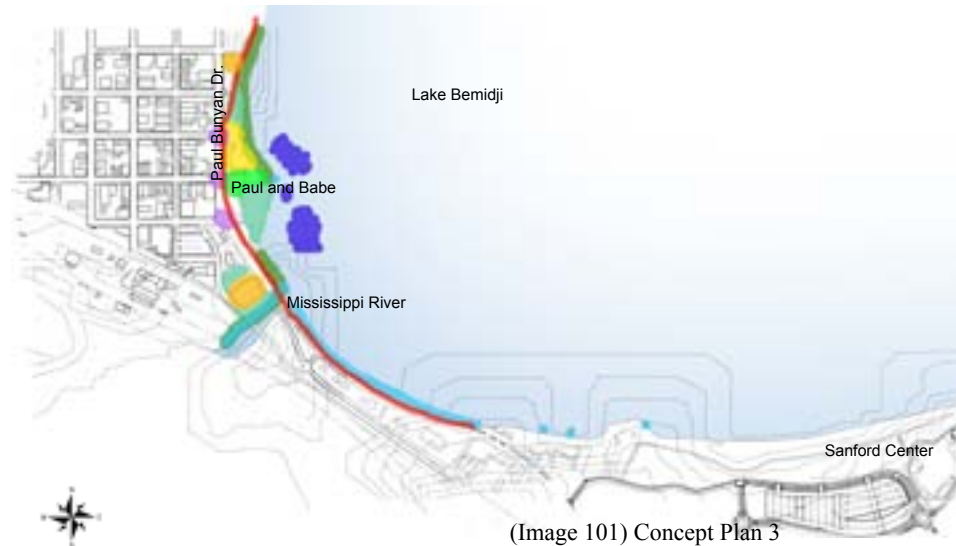




# Concept Plan Example Three



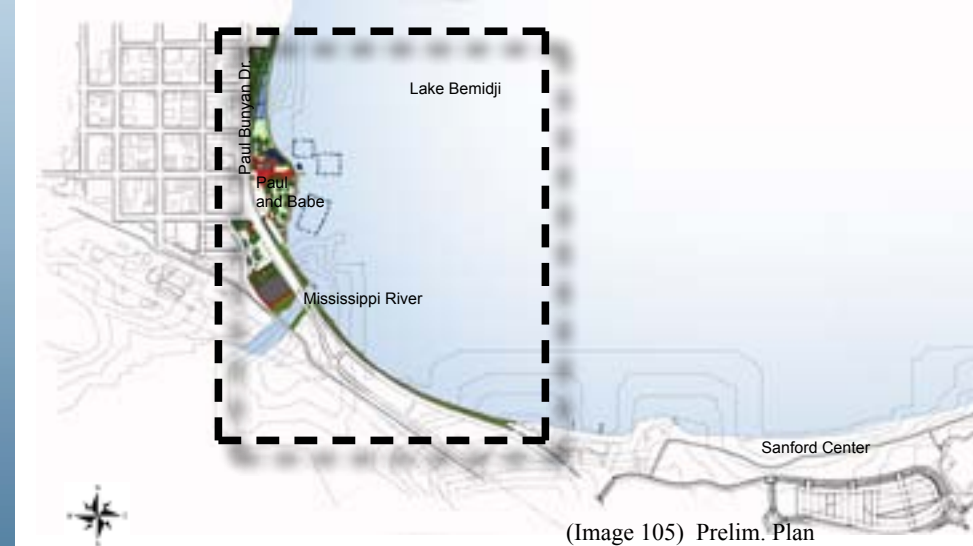
In the third Concept Plan, I placed the special events area between Library Park and Paul and Babe. This location would centralize the events and create two multi-season parks to the north and south of the events. I used three different techniques for shoreline stabilization: Large Boulders, Grasses and Shrubs. I moved the Carnegie Library to the north end of Library park and converted Pamida into the new Headwaters Science Center with a riverside boardwalk connecting to a bridge underpass. Along the south shore I added a boardwalk at water level with small docks for non-motorized boats to dock.



# Preliminary Master Plan



In the Preliminary Master Plan, I placed the special events area behind the statues of Paul Bunyan and Babe the Blue Ox. I also added food booths and a new pavilion to this area. I used three different techniques for shoreline stabilization: Large Boulders, Grasses and Shrubs. I moved the Carnegie Library to the intersection of Paul Bunyan Dr. and 1st St. and converted Pamida to the new Headwaters Science Center with a riverside boardwalk connecting to a bridge underpass. I added a water level boardwalk to the south shore with small docks for non-motorized boats to use.





**Master Plan**

# Master Plan Full Site Plan



(Image 106) Final Master Plan Full Site

Using the programmatic regulations and the concept/preliminary plans, I further narrowed down the design site to the waterfront park surrounding Paul Bunyan and Babe the Blue Ox and south of there to the Mississippi River. The above graphic shows the final master plan as it relates to the original site that I started working with. The next page shows a blow up of the master plan with all of the programmatic regulations labeled along with the feature that fulfills the regulation. For example, to connect with the lake and river new docks have been added and old docks have been improved. The page following the blown up master plan show the design area in a bird's eye perspective and shows how the programmatic regulation of "winter event lake use" has been fulfilled.

# Master Plan Paul and Babe Waterfront Park



(Image 107) Final Master Plan

- **Key Intersections**  
"Lumberjack Plaid" at Intersections  
Pavers Crosswalks
- **Use in Every Season**  
Shaded Picnic area/ Event Overflow
- **Shoreline Stabilization**  
Shrubs, Grasses, and Large Boulders
- **Use in Every Season**  
New "Lumberjack Plaid" Courtyard
- **Special Events**  
New Pavilion/Stage
- **Paul Bunyan and Babe the Blue Ox**
- **Special Events/Use in Every Season**  
Paul and Babe Waterfront Park
- **Special Events**  
"Ice House" Food Booths
- **Continuation of Bike Trail**  
Raised bike trail at intersections
- **Special Interest Buildings**  
Carnegie Library
- **Connection to Lake and River**  
New Dock
- **Shoreline Stabilization**  
Large Boulders
- **Special Interest Buildings**  
Science Center (Pamida)
- **Connection to Lake and River**  
Mississippi River Fishing Pier
- **Use in Every Season**  
"Snowball Park"
- **Use in Every Season**  
Mississippi River  
Bridge Underpass
- **Connection to Lake and River**  
River Boardwalk

# Master Plan

## Paul and Babe Waterfront Park



### Winter Event Lake Use

Hockey Rink, Curling Rink, Hockey Rink, Broomball Rink, Ice Fishing Communities

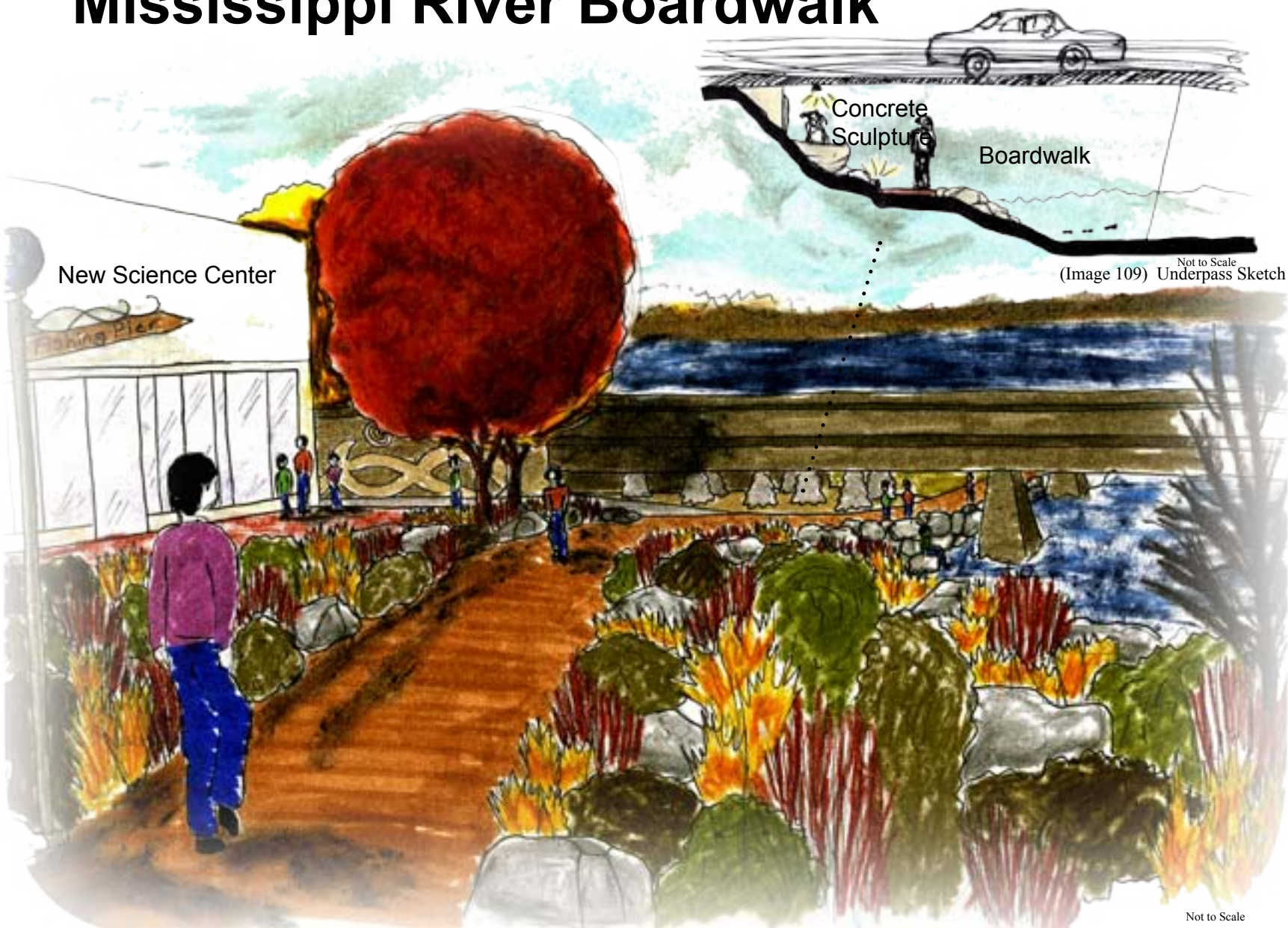
(Image 108) Bird's- Eye Perspective



# Master Plan Details

# Master Plan Details

## Mississippi River Boardwalk



Mississippi River Boardwalk  
Hybrid docking material

Mix of shrubs, grasses, large  
boulders for shoreline stabilization

To provide a connection to the Mississippi River, a boardwalk will be added running parallel to the shore of the Mississippi River on the southeast side of the new Headwaters Science Center. The boardwalk will be placed between two sections of shrubs, grasses, and large boulders being used for shoreline stabilization. The science center can use the boardwalk as a location for educational signs about the river. During the winter this will be one of the few places that will provide the opportunity to view open water, however, in the spring there is the potential for the boardwalk to be flooded. To connect the Headwaters Science Center to Lake Bemidji, the boardwalk creates an underpass beneath the Mississippi River Bridge. Along the boardwalk in the underpass area, concrete sculptures that celebrate the northlands and/or Bemidji will be added to provide visual interest.



# Master Plan Details

## “Snowball Park”



On the west side of the new Headwaters Science Center a multi-seasonal use park has been proposed. During the warmer seasons, the park can be used by individuals as a gathering space for picnics, games or small group meetings. The science center can also make use of the park for outdoor demonstrations or programs. The park is also large enough that the science center can also use it for fundraiser events or the many carnivals that they host each year. During the winter season the primary use of the park will be for snowball “fights”. The paths, trees, berms, and holes that make-up the park will provide barriers that people have to maneuver around during their snowball fights. Signs will be included at the entrances to the park stating the use and rules in an effort to keep the park public safe during the snowball fights.

# Master Plan Details

## Intersections



(Image 113) Detail Plan

To improve the safety for pedestrians crossing over Paul Bunyan Dr., the main 4-lane street running through the site, the intersections have been redesigned. One change to the intersections is the materials used for the crosswalks. Currently the crosswalks are defined by painted strips, in this design stone pavers will be used for the crosswalks to define the area that pedestrians will be using when crossing the street.

The intersections also have had a material change to draw the drivers attention to the intersection. For the intersections center a stamped and stained concrete in the pattern of "Lumberjack Plaid". This pattern is repeated throughout the site in courtyards and patios.



**Stamped Concrete for Intersections**

(Image 114) Stamped Concrete



**Stone Pavers for Crosswalks**

(Image 115) Stone Pavers

### Intersection Detail Plan

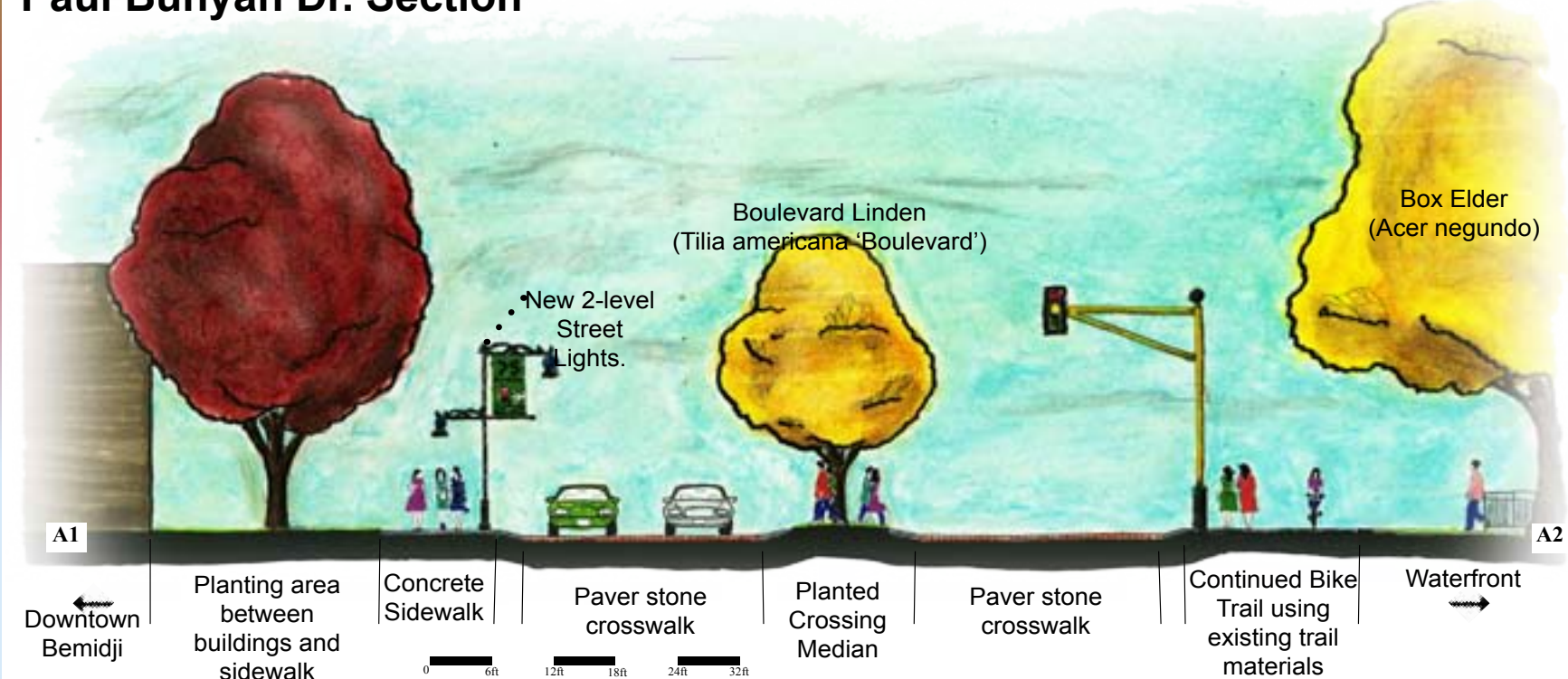


(Image 116)

# Master Plan Details

## Paul Bunyan Dr. Median Paul Bunyan Bike Trail

### Paul Bunyan Dr. Section



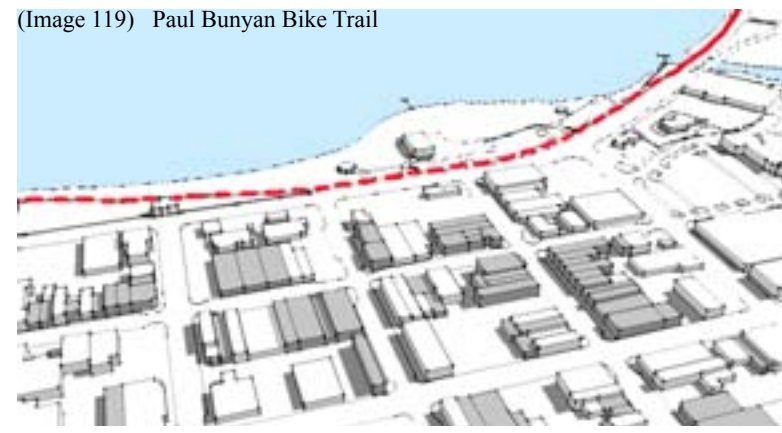
(Image 117) Paul Bunyan Dr.

In addition to the changes made to the intersections, an additional safety measure has been taken when crossing Paul Bunyan Dr. at 3rd St. This intersection is the main pedestrian access to Paul and Babe from the downtown and currently requires people to cross four lanes of traffic. For this design a planted median will be added to the middle of Paul Bunyan Dr. for half of the distance between 3rd St and 4th St. The addition of the median will reduce the distance that people have to walk at a time in order to cross the street and the addition of trees to the middle of the street will cause drivers to slow down.



(Image 118)

The Paul Bunyan Bike Trail, which currently ends at the Mississippi River, will be continued north through the site. In order to create a continuous trail the materials that are being used on the existing trail will be used for the new trail. In addition, the bike trail will remain raised to curb level at the intersections of 3rd St. and 2nd St. instead of cutting down to road level.



(Image 119) Paul Bunyan Bike Trail

# Master Plan Details

## Road Views

View on Paul Bunyan Dr.



Not to Scale

Way finding Sign Pole

Mix of Deciduous and Evergreen Trees for summer and winter interest

"Lumberjack Plaid" Intersection Detail

Crosswalk Pavers

(Image 120) Paul Bunyan Dr. Perspective

View on 3rd St.



Not to Scale

New Street lights with space for city/event banners

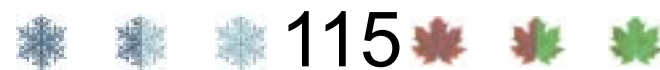
Downtown Bemidji Information Sign

Raised Bike Trail

Paul Bunyan and Babe the Blue Ox

Additional Street Trees

(Image 121) 3rd St Perspective



115

# Master Plan Details

## Paul and Babe Waterfront Park

### Visitors Center Section



B1

B2

Not to Scale

New Pavilion/Stage

New Stamped Concrete Courtyard

Visitors Center Patio

(Image 122) Visitors Center Section

Visitors Center

### Building Section



C1

Not to Scale C2

New Pavilion/Stage

Paul Bunyan and Babe the Blue Ox

"Ice House" Food Booths

Food Booth Sketch

(Image 123)

(Image 124) Building Section



(Image 125)

Paul and Babe Waterfront Park will be the new location for all of Bemidji's special events to be held. Located around and behind the statues of Paul Bunyan and Babe the Blue Ox the addition of several structures will be added for the events and give this location a sense of being a permanent location. One of these structures is a new pavilion/stage for event announcers and winners to use. The stage is also large enough to host small concerts or plays during the warmer months. The other structures that are being added are food booths that have been designed to look like ice houses. This design will provide a connection to the winter during the warmer seasons and a connection to the ice fishing communities in the winter season. Of the 12 food booths that are being added, most will only be open during the special events but a few (1-3) may remain open to serve seasonal refreshments or to sell souvenirs.



116

# Paul and Babe Waterfront Park Summer



Not to Scale  
(Image 126) Waterfront Park; Summer

## Summer

### Festivals:

- Art in the Park
- 4th of July Carnival
- Downtown Days
- Dragon Boat Races
- Rubber Ducks Race
- Take a Kid Fishing
- Auto Club Car Show

In the summer months many of the events require display tents being set up. The large open area behind Paul and Babe will have enough space for these tents. If needed there is overflow space north of the Visitors Center.



(Image 127)

# Paul and Babe Waterfront Park Fall



Not to Scale  
(Image 128) Waterfront Park; Fall

## Fall

### Festivals:

- Lumberjack Days
- Wild Game Feed
- "Deer Camp"
- Back-to-School Bar-b-que

The fall season provides an opportunity for festivals and informal gatherings of people to celebrate the north woods culture.



(Image 127)



# Paul and Babe Waterfront Park

## Winter



Not to Scale  
(Image 129) Waterfront Park; Winter

### Winter

Festivals:

- Night We Light
- Brrrrmidji's Polar Daze
- Season-long Broomball Tournament
- Mini-Finlandia
- Take a Kid Ice Fishing
- Snow Sculpture Garden

In addition to the Paul and Babe Waterfront Park being used for winter activities the lake directly adjacent from the park can have temporary hockey, boot hockey, broomball, and curling rinks through the winter season.



(Image 127)

# Paul and Babe Waterfront Park

## Spring



Not to Scale  
(Image 130) Waterfront Park; Spring

### Spring

Festivals:

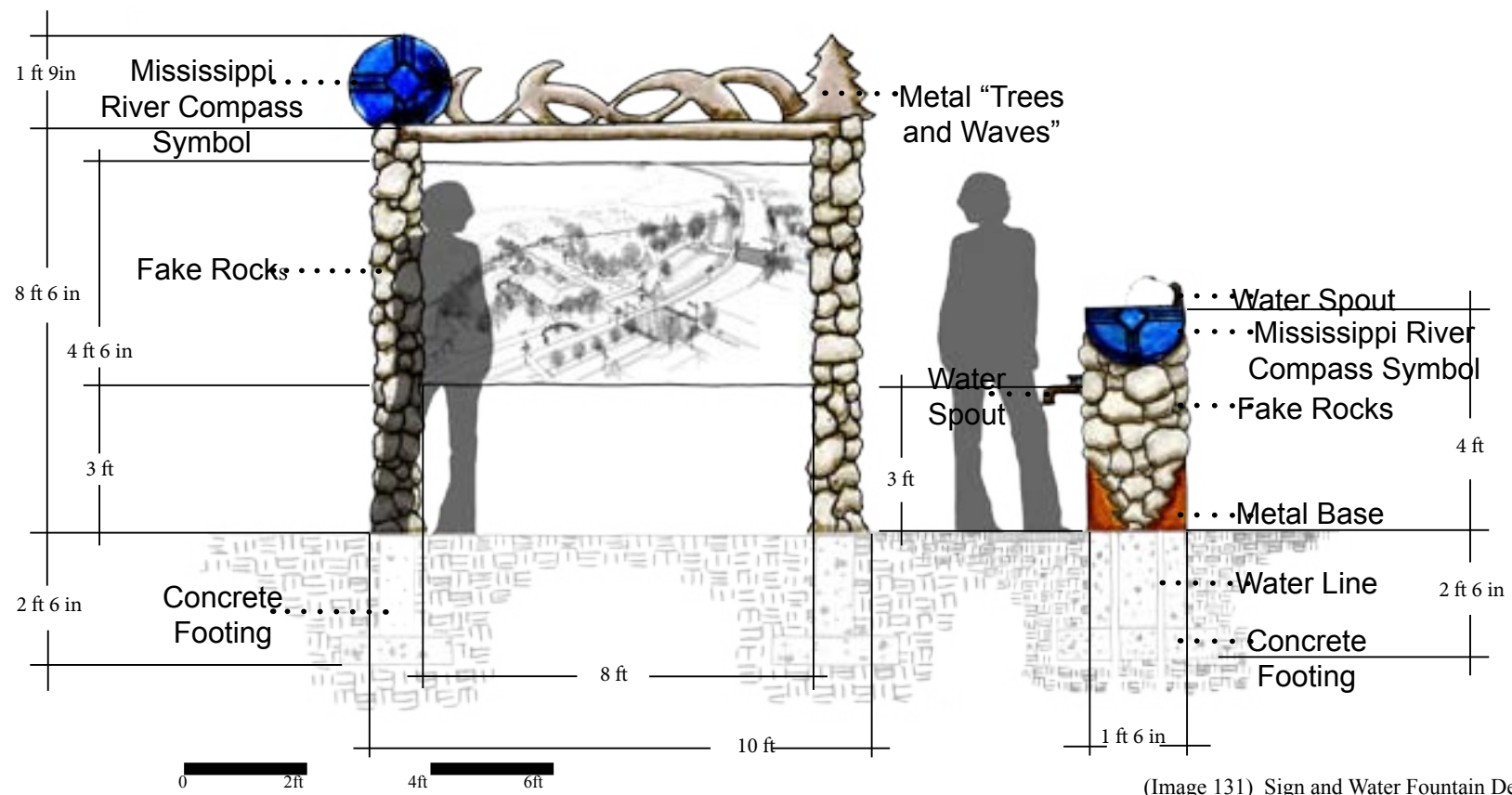
- Ice Out!
- 1st Day of May
- Boat Show
- Plant Bemidji Beautiful
- Beltrami Humane Society Dog walk
- Fishing Opener Countdown
- Earth Day

By keeping a portion of the Paul and Babe Waterfront Park open, people have the opportunity to create their own activities such as having a picnic or a frisbee or soccer game.



(Image 127)

# Master Plan Details Construction Details



**Information Sign**

**Water Fountain**

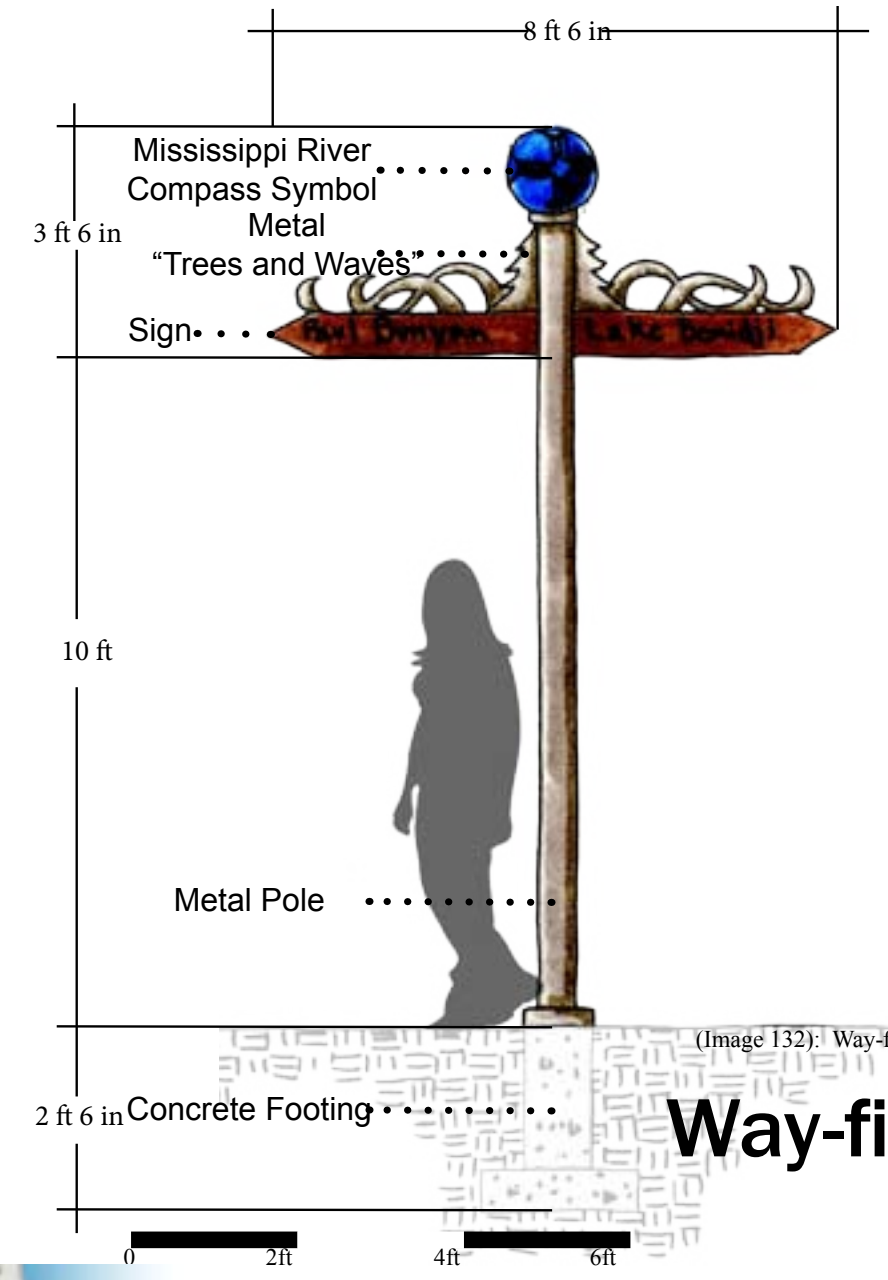
(Image 131) Sign and Water Fountain Detail

By placing the special events around and behind the statues of Paul and Babe, the Waterfront Park will become the primary gathering place for downtown Bemidji. Because of this it is important to include details like the new information signs that will have maps and information about Bemidji and the Waterfront Park. The signs will have fake rock posts supporting a metal sculptural pieces inspired by the northwoods, waves on Lake Bemidji, and the compass symbol incorporated into the Mississippi River bridge on the top. The water fountains have a top spout and bowl as well as a second spout on the side for pedestrians and bikers to fill waterbottles at. The fake rock, compass symbol and metal inspired northwoods design is repeated in the body of the water fountain.



(Image 125)

# Master Plan Details Construction Details



**Way-finding Signs**

(Image 132) Way-finding Detail

In addition to the Information Signs and Water Fountains, Way-Finding Signs such as the one above will be added to Paul and Babe Waterfront Park. These signs feature the same metal sculptural work inspired by the northwoods, waves on Lake Bemidji, and the compass symbol from the Mississippi River bridge. In addition the post and sign parts of the sign will also be in metal. These signs will point in the direction of an important landmark in downtown Bemidji such as; Paul and Babe, Lake Bemidji, the Carnegie Library and Visitors Center to name a few.



(Image 125)

# Master Plan Details Paul Bunyan



Not to Scale  
(Image 133) Seasonal Lighting Perspective

# Master Plan Details Babe the Blue Ox



Not to Scale  
(Image 133) Seasonal Lighting Perspective

# Master Plan Details

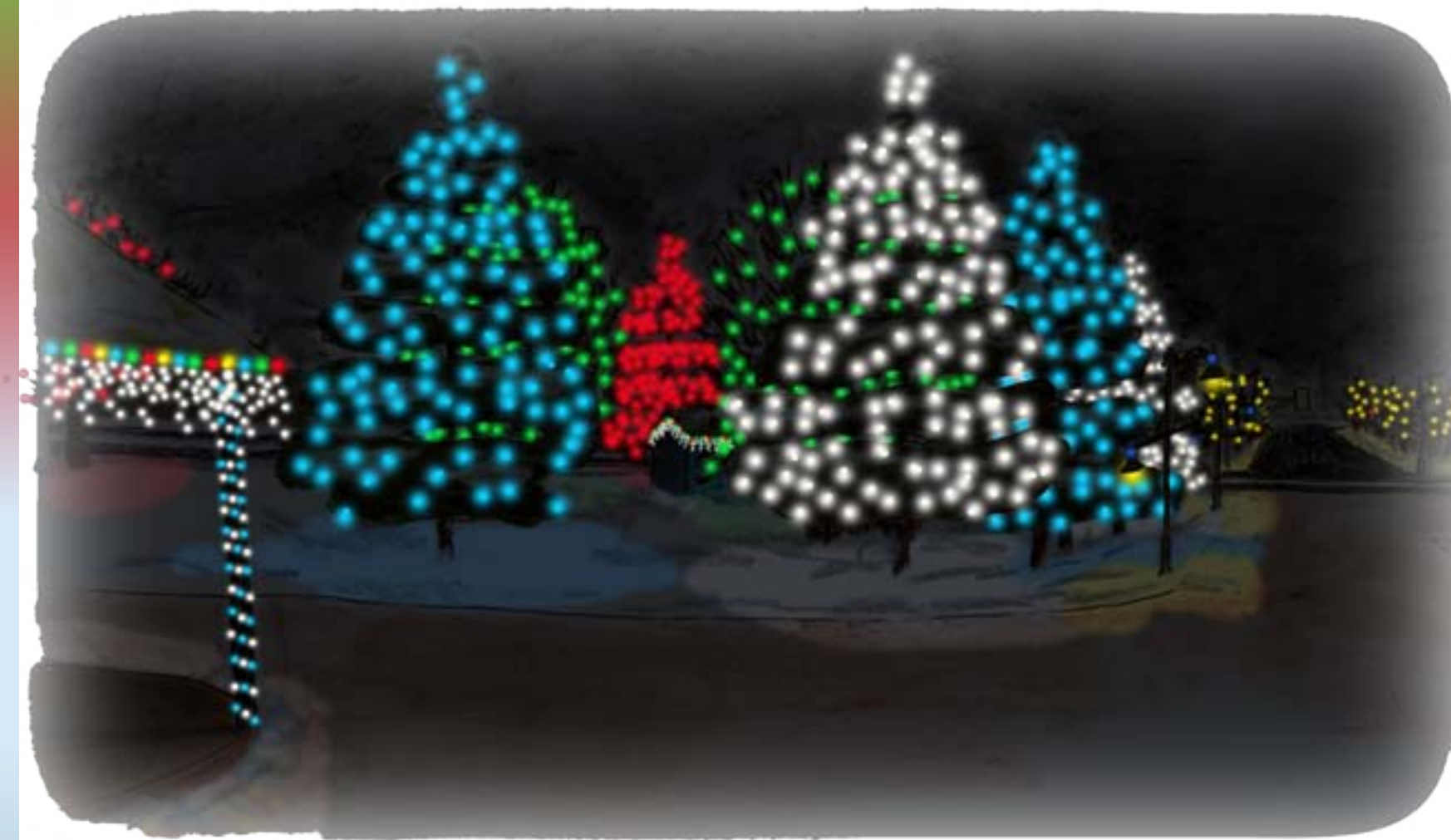
## Lighting Plan



(Image 134) Seasonal Lighting Plan

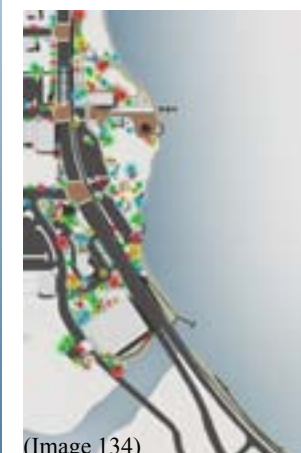
# Master Plan Details

## Lighting Plan



Not to Scale

(Image 135) Seasonal Lighting Perspective

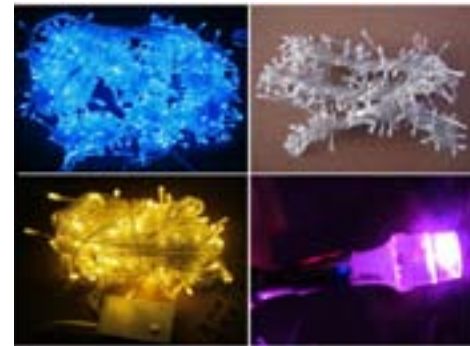
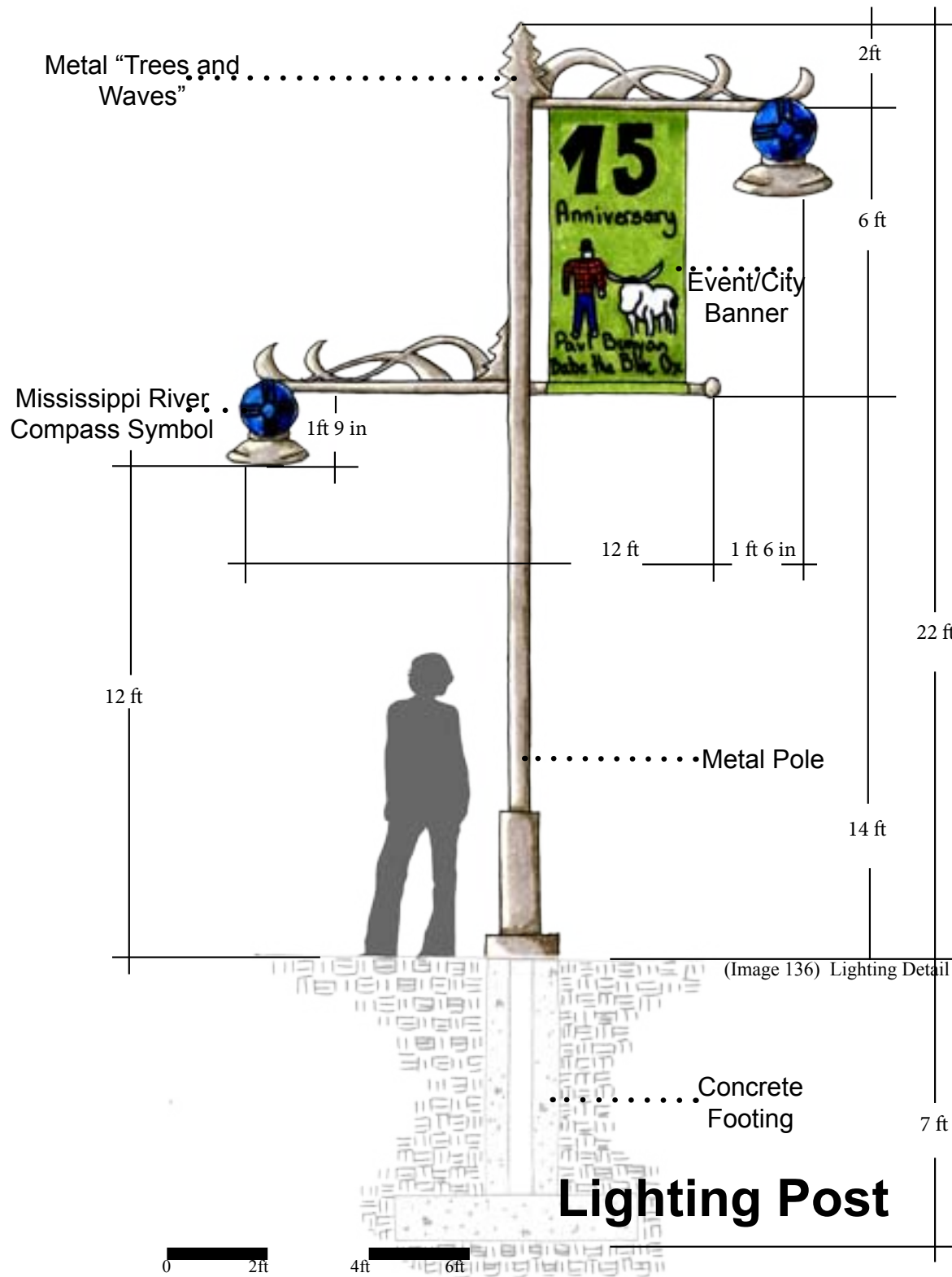


(Image 134)

Another seasonal element of this design is the use of seasonal lighting. Currently in Bemidji there is a small section of the waterfront where seasonal lights are displayed every year. This design will expand the area where lights are displayed to both the east and west sides of Paul Bunyan Dr. and also further south of the Visitors Center. This design also will increase the amount of colored lights being used in the display. The increase in the amount of colored lights will provide a welcome relief to the usual palette of grays, whites, and browns that are the typical colors found in the winter.

# Master Plan Details

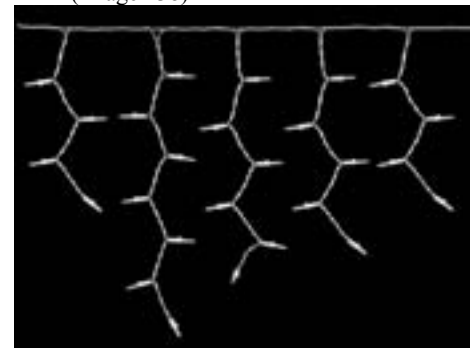
## Lighting Materials



Individual Color LED Lights (Image 137)



Multi-Color LED Lights (Image 138)



Icicle LED Lights (Image 139)

Shown above are some examples of the types of seasonal lighting being used.

New lighting posts that incorporated the same materials and details as the information signs, water fountains, and way-finding signs will be added to the downtown and waterfront park.

### Lighting Post



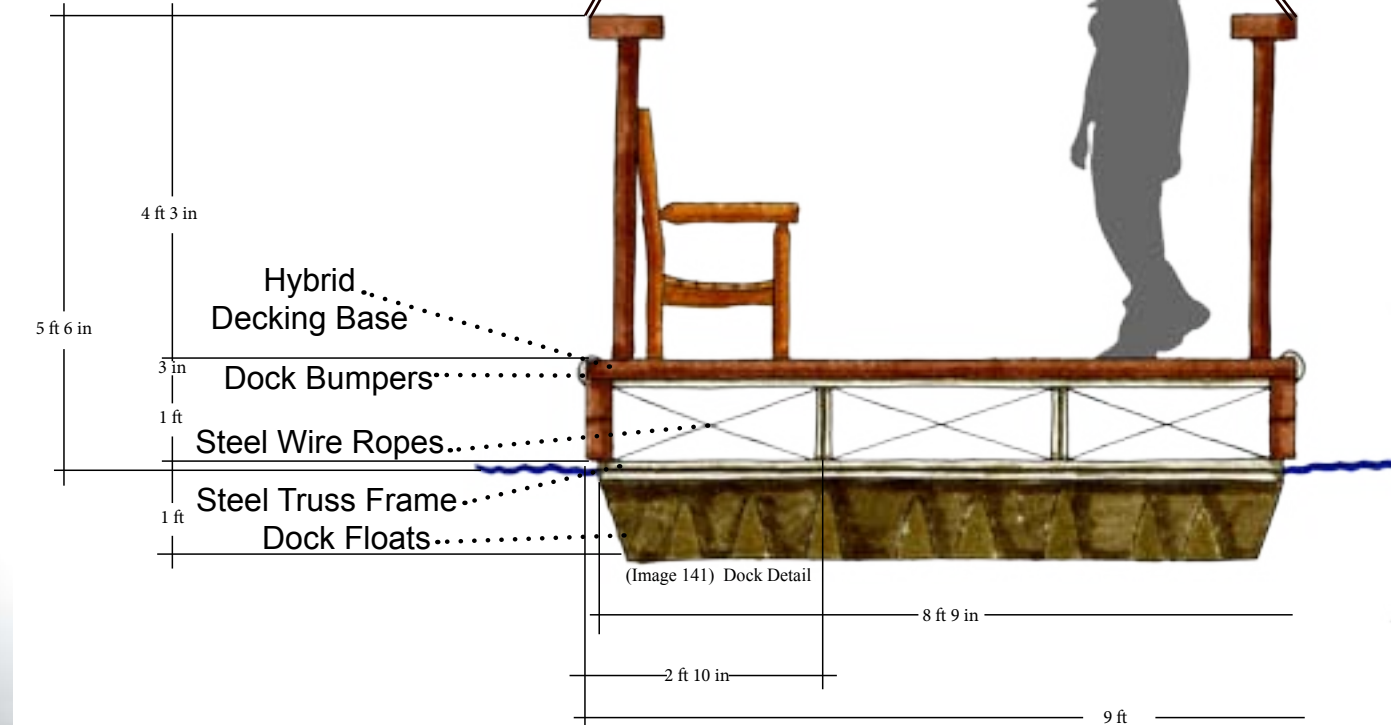
# Master Plan Details

## Docks

### Dock Section

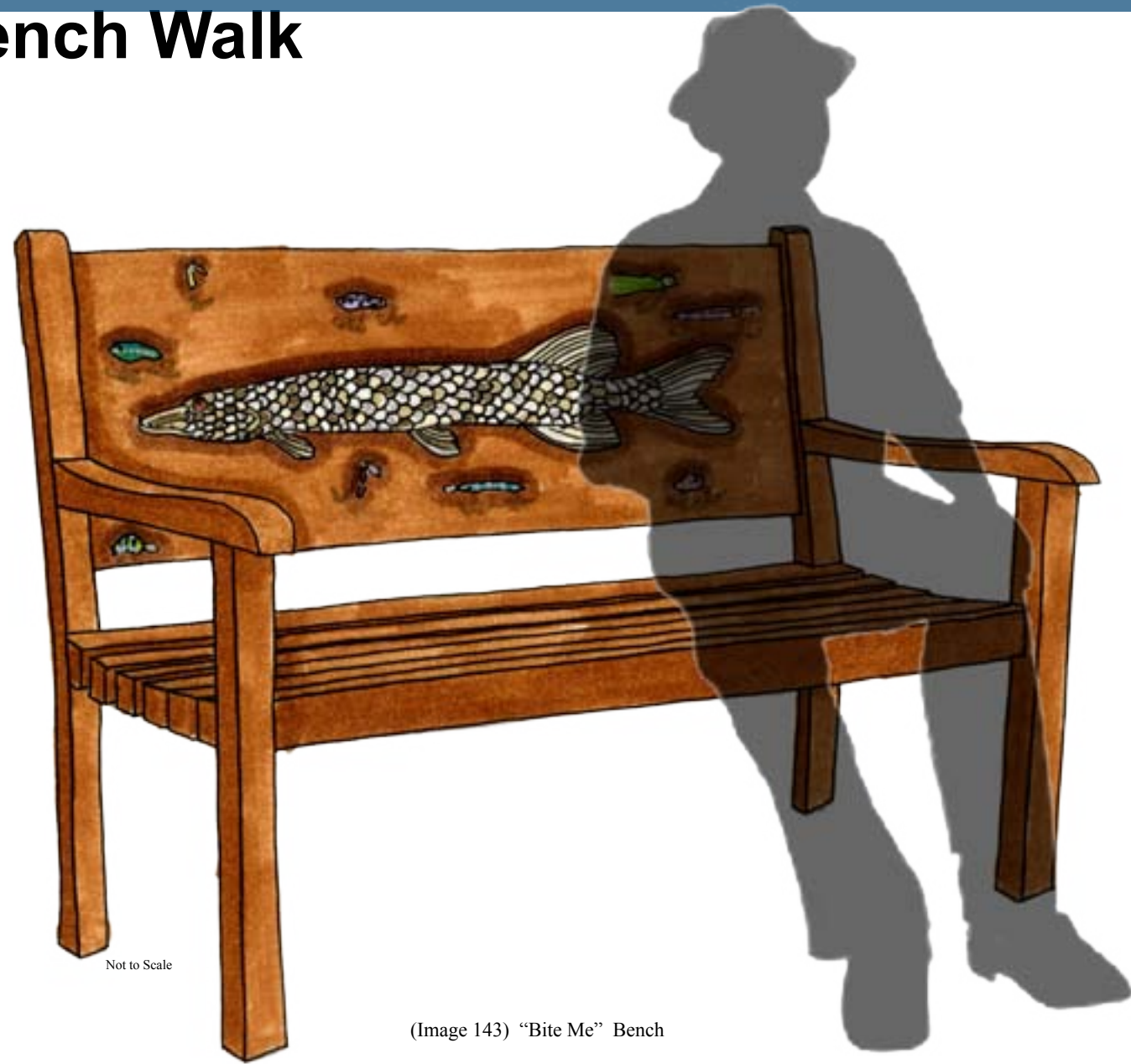


### Dock Materials



# Master Plan Details

## Bench Walk



(Image 143) "Bite Me" Bench

When designing the new docks one consideration was that there was enough space to include a seating area that would become the new "bench walk", a practical continuation of the downtown sculpture walk. For this idea local artists would take the back portion of a bench and (while following certain criteria to ensure safety) create an art-piece connected to Bemidji or the surrounding areas that would then be added back onto the bench when completed. The backs of the benches would act as the sculptures in the downtown sculpture walk and like the sculptures can be interchanged and moved around. In the above bench a fish made of different types of metal scales is surrounded by real fishing lures (with the hooks removed) embedded into the wood and the hooks to the lures have been carved into the wood. This bench is titled "Bite Me".



(Image 142)

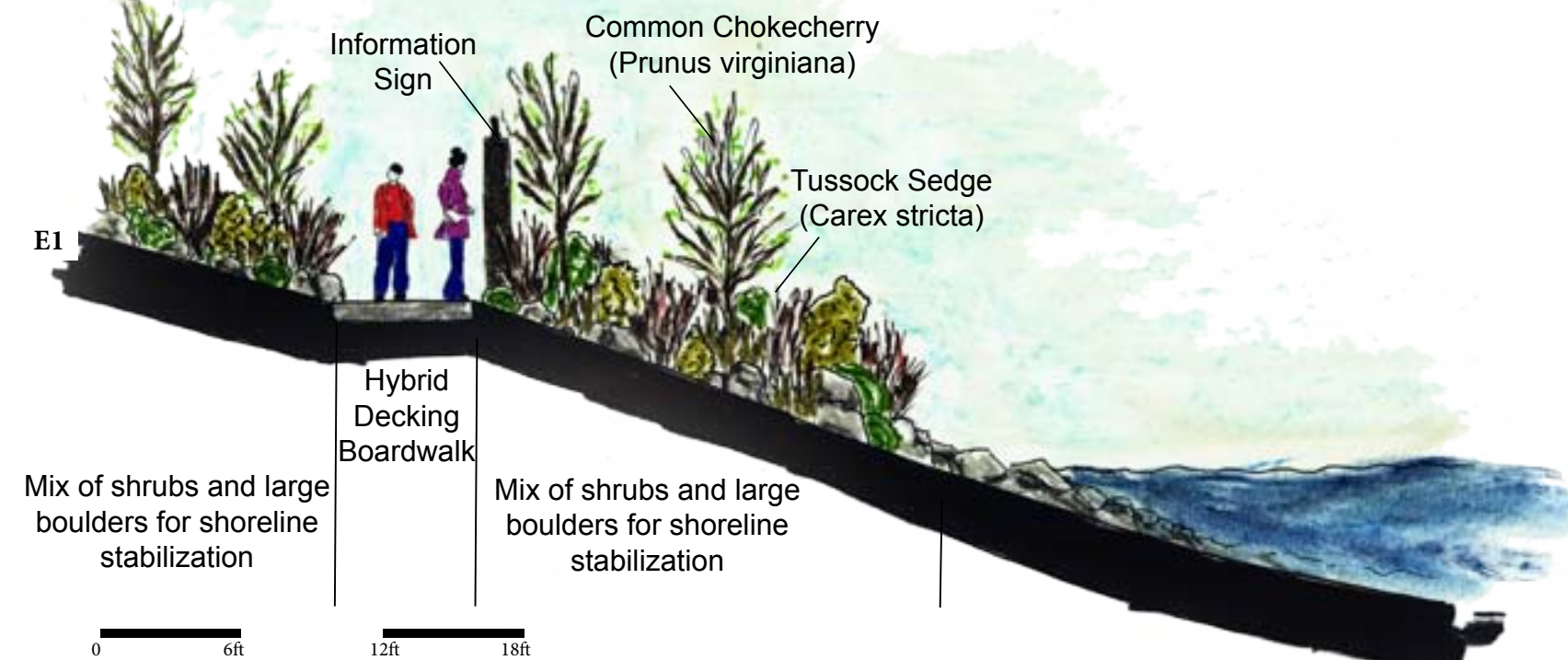
# Master Plan Details

## Shoreline Stabilization



(Image 144) Shoreline Stabilization

### Shoreline Stabilization Section



(Image 145) Shoreline Section



(Image 146)

Currently the shoreline in the site is being overturned every winter and spring season. In an effort to mitigate this problem, along the entire shoreline of the site one of three techniques has been used to stabilize the shoreline. One method is using large boulders similar to the shores of Lake Superior in Duluth, Minnesota. This technique is being used on the shores closest to the special events area to save on space and provide addition seating/activities. Another technique is to combine the large boulders with grasses, and the third technique that is being shown in the section above combines the large boulders, grasses and shrubs. In addition to stabilizing the shoreline using any of these techniques will also help solve the goose problem that the waterfront area currently has by making it more difficult for the geese to climb up the shorebanks.

# Master Plan Details

## Potential Plants

**Silver Maple**  
*Acer saccharinum*  
[www.stpaulphotos.com](http://www.stpaulphotos.com)



**Regent Service Berry**  
*Amelanchier alnifolia* 'Regent'  
[www.connon.ca](http://www.connon.ca)



**Northern Red Oak**  
*Quercus rubra*  
[www.zoologirl.wordpress.com](http://www.zoologirl.wordpress.com)



**Common Hackberry**  
*Celtis occidentalis*  
[www.hulsnursery.com](http://www.hulsnursery.com)



**Sugar Maple**  
*Acer saccharum*  
[www.deskpicture.com](http://www.deskpicture.com)



**Common Chokecherry**  
*Prunus virginiana*  
[www.wildflowerchild.info](http://www.wildflowerchild.info)



**Quaking Aspen**  
*Populus tremuloides*  
[www.martinspribble.com](http://www.martinspribble.com)



**Glossy Black Chokeberry**  
*Aronia melonocarpa*  
[www.nmgrassmasters.com](http://www.nmgrassmasters.com)



**Boulevard Linden**  
*Tilia americana* 'Boulevard'  
[www.melissacmorris.blogspot.com](http://www.melissacmorris.blogspot.com)



**Dwarf Mugo Pine**  
*Pinus mugo pumilio*  
[www.hasselman.com](http://www.hasselman.com)



**Paper Birch**  
*Betula papyrifera*  
[www.johnsonmatel.com](http://www.johnsonmatel.com)



**White Clover**  
*Trifolium repens*  
[www.hear.org](http://www.hear.org)



**Black Spruce**  
*Picea mariana*  
[www.cas.vanderbilt.edu](http://www.cas.vanderbilt.edu)



**Tussock Sedge**  
*Carex stricta*  
[www.michigannature.wordpress.com](http://www.michigannature.wordpress.com)



**Red Pine**  
*Pinus resinosa*  
[www.botit.botany.wisc.edu](http://www.botit.botany.wisc.edu)



**Common Milkweed**  
*Asclepias syriaca*  
[www.deercreekdam.com](http://www.deercreekdam.com)



- Bergum, Carol. And Lee Ann Beaubien. "Smart Growth and Winter City Design". Planning for Opportunities: Smart Growth St. Albert. Bulletin 14. October 15,2009
- Bernard, F. & Smith, R.B. Original Songwriters for "Winter Wonderland" Christmas Song. 1934
- Bunster-Ossa, Ignacio. "Landscape Urbanism". Urban Land. July 2001
- Coleman, Patrick J., "Living in Harmony with Winter". The Urban-Rural Connection. Michigan State University. Winter 2008.
- Coleman, Patrick J. "Pedestrian Mobility in Winter".
- Headwaters Regional Development Commission and the Beltrami Soil and Water Conservation District. "Beltrami County Water Plan". May 2002.
- Jacobs, Jane. "The uses of Sidewalks: Safety". The Death and Life of Great American Cities. Copyright 1961
- Kostof, Spiro. "The City Shaped". Boston: Little Brown. Copyright 1991
- Krieger, Alex. And William Saunders. "Urban Design". Minneapolis: University of Minnesota Press. 2001
- Kuismanen, Kimmo. "Influence of Climate on the Design of Houses". 2005
- Lynch, Kevin. "Good City Form". The MIT Press. Copyright 1984.
- McCullough and Kelbaugh. "Writing Urbanism". Routledge, Copyright 2008.
- McGuire, Robert. "Winter City Guidelines and Snow Policies" City of Fort St. John. 2000
- McKechnie, Beth. "Influencing Travel behavior in a Winter City".
- Minnesota Department of Natural Resources. Lakes, river, and wetland facts. Copyright 2011 Minnesota Department of Natural Resources. Retrieved on September 28, 2011 from <http://www.dnr.state.mn.us/faq/mnfacts/water.html>

- Planning Advisory Service (PAS). "Land Use and Design for Cities in Northern Climates" Information and resources packet.
- Scott, Mel. American City Planning Since 1890. University of California Press. Copyright 1969
- Steinsvik, Rose Marie. "Playground in Kindergartens Schools and Residential Areas" February 2004
- Synnes, Kristine J. and Rene' C. Akre. "Anchorage, Alaska: Exploring Color in an Urban Frontier" Anchorage IAMNC Conference. 2004.
- U.S. Census Bureau- American FactFinder. Data from U.S. 2010 Census. Retrieved October 1, 2011 from <http://quickfacts.census.gov/qfd/states/27000.html>
- U.S. Census Bureau- American FactFinder. Data from U.S. 2010 Census. Retrieved October 1, 2011 from <http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>
- United State, Forest Service. "Development Planning: Winter Sports Resorts". Department of Agriculture, Forest Service, 1973 i.e. 1976
- U.P. Engineers and Architects, Inc. "City of Houghton Walkability/Pedestrian Plan". September 2002
- Villadsen, Kristin S., "Designing Streets as Public Spaces in Northern Climate Cities". Presentation from a conference in Montreal. February 2010.
- Winnipeg Master Planning and Renewal Project. Compiled by the students of Architecture and Landscape Architecture 471, Fall Semester 1993.
- [http://en.wikipedia.org/wiki/Bemidji,\\_Minnesota](http://en.wikipedia.org/wiki/Bemidji,_Minnesota)
- <http://www.ci.bemidji.mn.us/>
- <http://www.bemidji.org/>
- <http://www.visitbemidji.com/>
- <http://www.co.beltrami.mn.us/>



# References

- (1) <http://www.city-data.com/city/Bemidji-Minnesota.html>
- (2) <http://www.mayoclinic.com/health/seasonal-affective-disorder>
- (3) [www.festivalvoyageur.mb.ca](http://www.festivalvoyageur.mb.ca)
- (4) [www.wikipedia.org/wiki/Winnipeg](http://www.wikipedia.org/wiki/Winnipeg)
- (5) [www.theforks.com](http://www.theforks.com)
- (6) <http://www.tourismwinnipeg.com/>
- (7) [www.festivalvoyageur.mb.ca](http://www.festivalvoyageur.mb.ca)
- (8) [www.wikipedia.org/wiki/Duluth\\_Minnesota](http://www.wikipedia.org/wiki/Duluth_Minnesota)
- (9) [http://www.superiortrails.com/duluth\\_lake.html](http://www.superiortrails.com/duluth_lake.html)
- (10) [www.bentleyvilleusa.org](http://www.bentleyvilleusa.org)
- (11) [www.wikipedia.org/wiki/Copenhagen](http://www.wikipedia.org/wiki/Copenhagen)
- (12) <http://www.lakesnwoods.com/BemidjiHistory.htm>
- (13) [http://en.wikipedia.org/wiki/Lake\\_Bemidji](http://en.wikipedia.org/wiki/Lake_Bemidji)
- (14) <http://www.dnr.state.mn.us/lakefind/showreport.html?downum=04013002>
- (15) <http://www.visitbemidji.com/local/weather.html>
- (16) <http://soils.usda.gov>
- (17) <http://visitbemidji.com/specialevents/index.html>
- (18) [http://news.minnesota.publicradio.org/features/199812/15\\_robertson\\_santalucia.mf](http://news.minnesota.publicradio.org/features/199812/15_robertson_santalucia.mf)
- (19) <http://bemidjipioneer.com/event/search/order/date/keywords/polar%20daze>
- (20) <http://www.bvskiarea.com/loggingdays.html>
- (21) <http://www.minnesotafinlandia.com/>
- (22) [www.bemidjidda.com](http://www.bemidjidda.com)

# Image References

- Image 1, 2, 3, 4, 45, 48, 49, 50, 70: Google Earth, search for Bemidji, MN
- Image 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 46, 47, 48, 49, 51, 52, 53, 56, 57, 58, 59, 60, 61, 62, 71, 72, 73, 74, 75, 76, 77, 78, 79, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 140, 141, 142, 143, 144, 145, 146:  
Copyright Megann Long Voelkner, 2011
- Image 17: [www.annystudio.com](http://www.annystudio.com)
- Image 18: Influence of Climate on the Design of Houses. Figure 3.7, page 18.
- Image 19: City of Houghton Walkability/Pedestrian Plan. Page 6.
- Image 20: City of Houghton Walkability/Pedestrian Plan. Page 8.
- Image 21: [www.picasaweb.google.com](http://www.picasaweb.google.com)
- Image 22: Smart Growth and Winter City Design. Figure 1. Page 3.
- Image 23: [www.en.wikipedia.org](http://www.en.wikipedia.org)
- Image 24: [www.vtstateparks.blogspot.com](http://www.vtstateparks.blogspot.com)
- Image 25: [www.theplanetd.com](http://www.theplanetd.com)
- Image 26: [www.theforks.com](http://www.theforks.com)
- Image 27: [www.dance-travel.com](http://www.dance-travel.com)
- Image 28: [www.picasaweb.google.com](http://www.picasaweb.google.com)
- Image 29: [www.picasaweb.google.com](http://www.picasaweb.google.com)
- Image 30: [www.iansmartphotography.com](http://www.iansmartphotography.com)
- Image 31: Visit Duluth Map. Found at <http://www.decc.org/parking-directions/maps.html>
- Image 32: [www.tonyrogersphotos.com](http://www.tonyrogersphotos.com)
- Image 33: [www.copenhagenize.com](http://www.copenhagenize.com)

# Image References

Image 34: [www.livablestreets.info](http://www.livablestreets.info)

Image 35: Lecture slides: City of Grids Page.22.

Image 36: Lecture slides: Context for Change. Page 43.

Image 37: Lake Bemidji Depth map from <http://myfishingpals.com/Minnesota-Lake-Maps/bemidji.pdf>

Image 39: <http://www.usclimatedata.com/climat.php?location=USMN0064>

Image 40: [http://en.wikipedia.org/wiki/Bemidji\\_Minnesota](http://en.wikipedia.org/wiki/Bemidji_Minnesota)

Image 41: <http://www.climate-charts.com/USA-Stations/MN/MR210643.php>

Image 42: Shadows on June 21. Autocad map of the site brought into Sketchup

Image 43: Shadows on December 21. Autocad map of the site brought into Sketchup

Image 44: Topography Map. <http://www.dnr.state.mn.us/maps/tomo.html>

Image 45: Soils map. <http://soils.usda.gov>

Image 53: Races in Bemidji Chart. <http://www.city-data.com/city/Bemidji-Minnesota.html>

Image 54: Ages in Bemidji Chart. <http://www.city-data.com/city/Bemidji-Minnesota.html>

Image 63: [www.flickr.com](http://www.flickr.com)

Image 64: [www.site.lieliu.com](http://www.site.lieliu.com)

Image 65: [www.mnprivatecolleges.org](http://www.mnprivatecolleges.org)

Image 66: [www.whitebirchresort.net](http://www.whitebirchresort.net)

Image 67: [www.bemidjipioneer.com](http://www.bemidjipioneer.com)

Image 68: <http://www.bvskiarea.com/loggingdays.html>

Image 69: [www.ericwithac.blogspot.com](http://www.ericwithac.blogspot.com)

Image 70: [www.visitbemidji.com](http://www.visitbemidji.com)

Image 80: [www.bsubeavers.com](http://www.bsubeavers.com)

# Image References

Image 114: [www.stampedconcretebuffalony.com](http://www.stampedconcretebuffalony.com)

Image 115: [www.paragonpavers.tripod.com](http://www.paragonpavers.tripod.com)

Image 137: [www.royoled.en.made-in-china.co](http://www.royoled.en.made-in-china.co)

Image 138: [www.tootoo.com](http://www.tootoo.com)

Image 139: [www.santatheclaus.com](http://www.santatheclaus.com)

Image 147: All the plant images have the website referenced directly beneath the plant's scientific name

Image 148: Copyright to Erik Lundin. 2009.

“If we all did the the things  
we are capable of doing,  
we would literally astound  
ourselves”

~Thomas A. Edison

Megann L. Long Voelkner  
937 44th St. S Apt. 205  
Fargo, ND 58103  
(218) 368-2695

(Image 148)



[megann.longvoelkner@my.ndsu.edu](mailto:megann.longvoelkner@my.ndsu.edu)

Bemidji, MN



140



