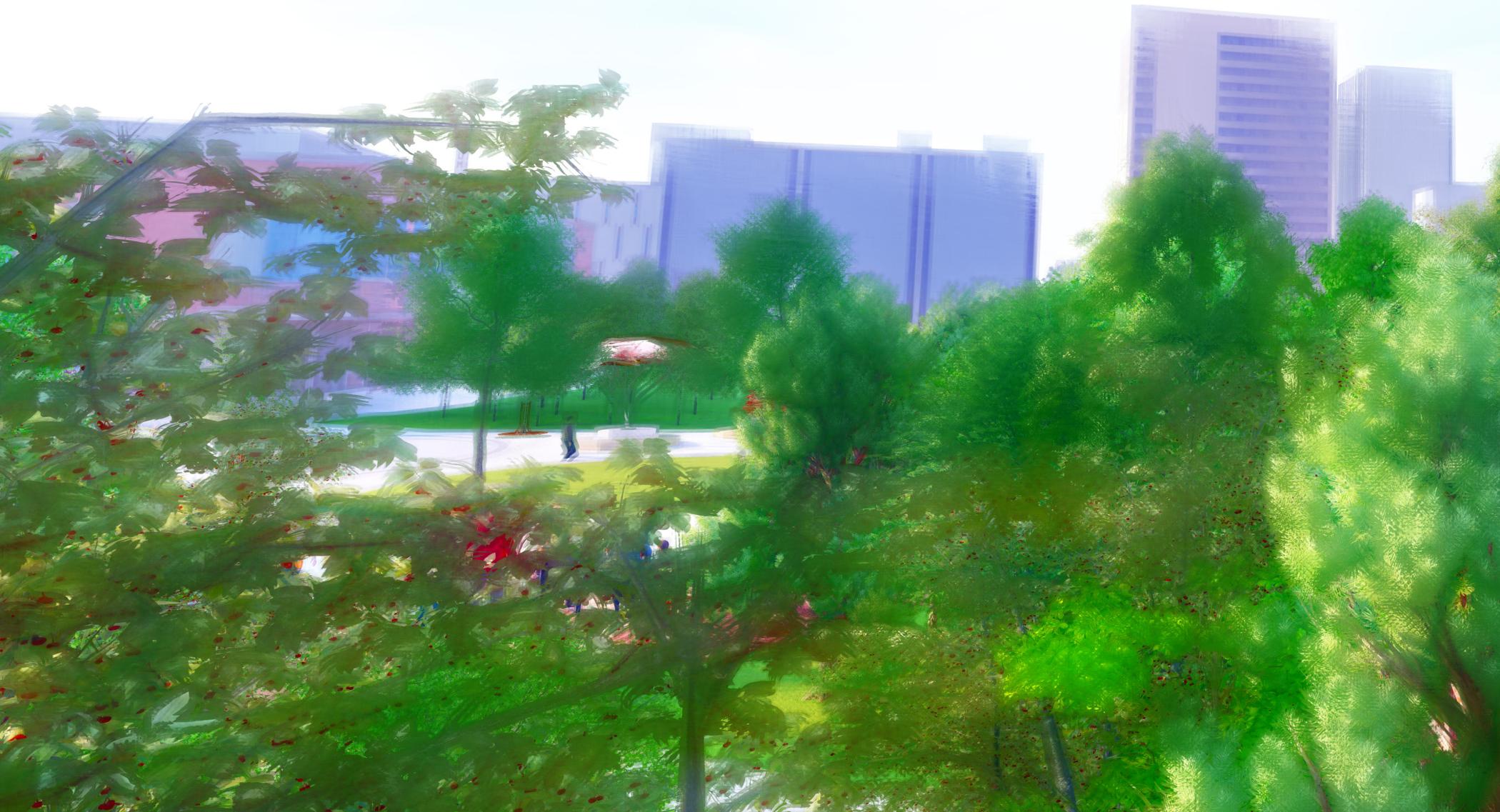


# ***Diverse Growth***



# ***Diverse Growth***

Exploring Symbiotic Tree-Human Relationships in  
Landscape Ecosystems to Inspire Diversity in Urban Tree Plantings  
at Civic Center Park in Fargo, North Dakota

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

By  
*Colin Ceason*

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

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May, 2022  
Fargo, North Dakota

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# *Thesis Proposal*

# Thesis Abstract

Trees and humans have a symbiotic relationship, trees provide beauty, protection, and economic gains for humans and we take care of them to live fruitful lives. They can often have multiple humans or even animal caretakers to help sustain the environment around them. Much like humans, trees have uncontrollable pandemics causing death in trees. Chestnut Blight of the turn into the twentieth century, Dutch Elm Disease in the mid to late century and more recently the rapid spread of Emerald Ash Borer currently devastating North America. These pandemics create gaps in canopies leading to lower heating and cooling efficiency, and lesser aesthetics in urban environments. After years of study there are now guidelines of how to create a diverse and sustainable ecosystem. While it may be impossible to predict what species will be in nature's cross-hairs next, through sustainable diversity we can hedge our bets to lessen the effects tree of pandemics to protect our urban and even natural ecosystems. Diverse Growth is a landscape initiative to introduce northern native tree species to Fargo in the form of an educational landscape arboretum and urban farm initiative that builds on ideas already accepted by the greater community and natural environment alike.

# The Thesis Narrative

Plants are a visual connection between buildings and their exterior tenets. I have had a fascination with how humans incorporate trees into our built environment. But developers mostly look for the cheapest and most common tree species when building communities.

How can diversity in tree planting help prevent mono-culture disasters within ecosystems? We all should know about the emerald ash borer, but this is just the most recent widespread ecologically devastating issue that comes from having tree mono-cultures. By researching these ecological disasters we will be able to calculate how much these events cost taxpayers and landowners.

I want to start by studying these events to further understand the issue. Then research tree species and cultivars to see if there are more resilient trees available or previously overlooked species that should be brought to recognition to be advised for urban planting. But not just the traits of these plants but also how they co-inhabit areas. By looking at established ecosystems we can predict the effectiveness of plants and how they help each other thrive. There are also many research arboretums that have scores of data on the performance of trees in many different environments. This research has the potential to help save individuals and city forestry departments from mass tree replacements in the future.

# The Project Typology (building or landscape typology) (or Precedent)

This project will encompass many facets of urban plantings. First being a plaza arboretum, curated natural spaces, and urban arboriculture. Precedents and case studies include; the current farming groves of the nearby Sodbuster Monument & Library Plaza, Como Park in Minnesota for its wonderful arboretum styled park space and diverse gardens, Ballerup Boulevard in Denmark with comprehensive symbiotic roadway construction, Zuccotti Park in New York using trees to frame views and offering dappled shade, and Olympic Sculpture Park in Washington with its cleverly placed art sculptures, planted bridges, and natural spaces.

# Research 1

## Studies into Landscape Tree Pandemics: Taking Inventory of Cities' Counters to Emerald Ash Borer in the Upper Great Plains

Colin James Ceason  
North Dakota State University  
Strategies in use to Combat EAB

The effects of emerald ash borer have been widespread and there are different ways to prepare and counter its devastating effect on forestry, once EAB is threatening to reach cities with ash trees it costs minimum one hundred dollars a year to treat and inspect ash trees and that EAB is has already caused the mortality of over 60 million trees and an estimated \$280 billion in damage.

Investigating how communities have responded to this natural disaster to see what municipalities procedures and policies municipalities are initiated throughout the pandemic and what are the current hot zones and threatened areas policies. Some initiatives include, inspecting trees for disease, costly treating of high valued trees, and felling of Ash trees in large numbers.

This study will focus on using government forestry data to compile strategies being implemented or in place by cities around the upper Midwest centered on the state of Minnesota. Comparing strategies used by communities will create an understanding and rank order of programs that are successful and what initiatives are successful to prepare and combat the Emerald Ash Borer Pandemic.

Key words, City/Urban Forestry, Emerald Ash Borer, Conservation

# Introduction to EAB and our Countermeasures

In 2002 the pest known as Emerald Ash Borer or EAB was found in the international metros of Detroit, Michigan and Windsor, Ontario, this would eventually lead to one of the most devastating and costly natural disasters in North American History. A year later there were confirmed cases as far as Maryland and Virginia, but these outbreaks were quickly quelled by felling sick trees and quarantining the states. The pest started to have strong consistent growth into neighboring states and provinces with the spreading being highly measured quarantine zones are implemented each year to stop the spread, Due to the taxonomy of the winged dual life cycle *Agrilus planipennis* (EAB) the infected areas expand faster yearly than originally estimated letting the pest spread like wildfire across North American forests and cities.

Thanks to large survey efforts during the initial outbreaks there is plenty of data on the spread of EAB down to a county level (quarantines are conducted at the same municipal level as surveys), but it is important to note that it takes years before EAB populations are detectable in most surveys. This enabled EAB to spread to 35 US states and 6 Canadian Provinces by 2021. In under 20 years EAB had spread with costly destruction to over half of North America. It is estimated by the USDA that over 38 million landscape ash trees were felled between 2009 and 2019 due to EAB. It is also estimated that another 17 million need treatment, or removal and replacement This is at an estimated cost of over \$10.7 billion. This raises the question of how this number was reached and who is to pick up the bill?

The short answer is the citizens of North America. American taxpayers may not see an increase in how much is taken out of their paycheck each month, but we will see other services and ideas hindered due to the need to fund replacement and treatment of beloved ash trees. The number the USDA invented is an estimated cost for the mass replacement of trees in the cities of the Midwest and remediation of Ash dominated forests. There is always the question of letting nature do, and letting the trees die on a natural course but the quality human environments in North America have tree lined streets, front yard trees, privacy trees, we even put trees where we shouldn't. The idea of the Radiant City lives through our trees, so to most communities not doing anything about EAB is not an option.

There are many approaches on how to prepare for EAB and react when it reaches communities. The first way governments tried to stop the spread was through quarantining counties adjacent to counties with confirmed outbreaks of the pest. Sadly, due to human intervention these are often ineffective due to EAB's ability to live up to two years in dead wood especially if dry, so the moving of firewood decreased the effectiveness of quarantining. This leads to the rapid spreading of EAB and campaigns to educate citizens on the dangers of moving firewood. By 2007 treatments for EAB became available and the option of saving or deferring the removal of trees was investigated to slow the economic burden of the EAB pandemic.

But treating trees is only cost effective up to 4-10 years unless the tree has extensive value. With the cost to treat and inspect trees around \$100 a year, and on average in the Midwest depending on species, trees cost \$300-\$900 with installation. With forestry departments increasing efforts to diversify their municipalities canopies as an effort to prepare for EAB and be better prepared for similar diseases, treating Ash trees has become common practice across states with EAB present until new canopy plans are in place and increased funding available. Large cities with large well-funded proactive forestry departments can now be studied by cities new to EAB to understand the effectiveness of treating and slow replacement of Ash trees versus mass felling and replacement of trees.

Studying these two methods will be the focus of the study with the goal of creating a list of recommended programs for communities new to battling EAB may emulate. Follow up studies may delve deeper into how these programs are successful monetarily and what specific on-the-ground practices can be recommended as well. It is important to identify successful programs because most have battled EAB for years and can share advice with at-risk communities, along with analyzing where new canopies are being implemented to be studied in time.

# RESEARCH OBJECTIVES

- Commonly Used Response Practices
- Determine Successful Forestry Programs

## METHODS

### 2.1 Analysis of Multiple City Program to Determine Common Response

Methods Through studying a variety of EAB response programs across the study area will create the criteria of how to value the programs to determine the usefulness of each municipal program.

### 2.2 Cross Reference with Other Programs Creating the Table Below

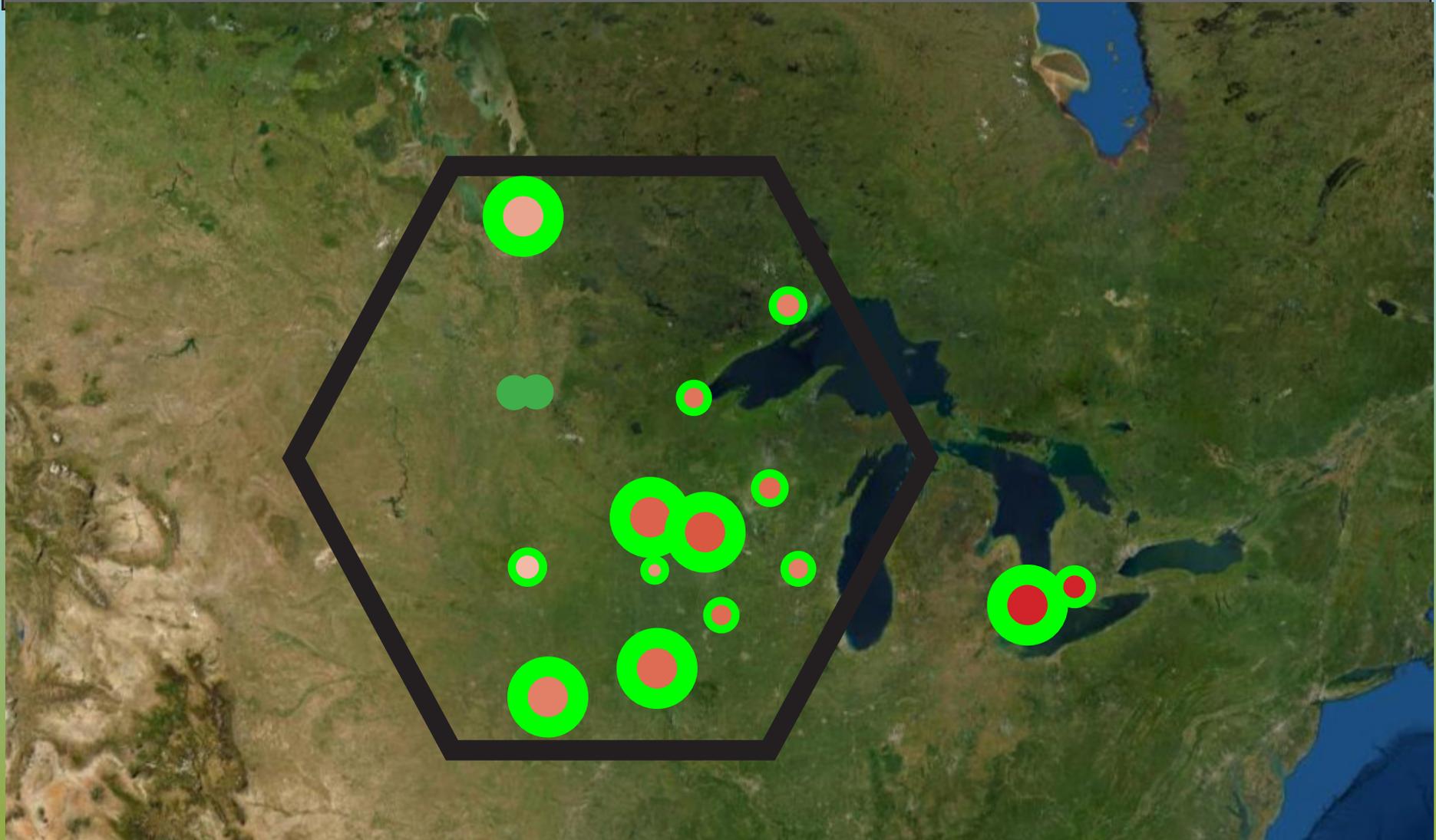
### 2.3 Listing Programs by Value of Cumulative Response Methods Implemented

Giving each response practice a numerical value will create a “Successful Value” for each program. This will then lead to a ranked order of what programs are most successful in curtailing EAB and preservation of value in the community of which they serve.

- Out of 10 Points
- 1 for Inspection of Trees
- 2 for Ash Treatment
- 1 for Mass Tree Removal
- 1.5 for Gradual Tree Removal
- 3 for Diverse Canopy Replacement
- 0.5 for Special EAB Budget
- 1 for Public Awareness Campaigns

### Great Plains EAB Response Survey

Municipality/Organization	EAB Present	Tree Inspections	High Value Ash Treatment	Mass Tree Removal	Gradual Tree Removal	Diverse Conopy Replacemnt	Special EAB Budget	Public Awareness Campaign
St. Paul Department of Forestry, MN	2009	X	X	X	X	X	X	X
Minneapolis Parks and Recreation Board, MN	2010	X	X		X	X		X
Davenport Public Works, IA	2011	X	X	X	X	X		
Eau Claire, WI	2011		X	X		X		
Des Moines Forestry, IA	2012		X		X	X	X	X
Madison, WI	2013		X	X	X	X		
Duluth Department of Natural Resources, MN	2015	X	X	X	X	X	X	X
Thunder Bay, ON	2016		X		X		X	X
Omaha Forestry, NB	2016	X	X	X		X	X	X
Winnipeg Urban Forestry, MB	2018		X	X			X	X
Eden Prairie, MN	2018		X		X		X	
Sioux Falls Forestry, SD	2019			X		X		
Moorhead Forestry, MN	NO		X		X	X		
West Fargo Parks and Recreation, ND	NO	X	X		X	X		



Municipality	EAB Responce Score	EAB Detected
Duluth Department of Natural Recources, MN	10	2015
St. Paul Department of Forestry, MN	10	2009
Davenport Public Works, IA	8.5	2011
Minneapolis Parks and Recreation Board, MN	8.5	2010
Omaha Forestry, NB	8.5	2016
Des Moines Forestry, IA	8	2012
Madison, WI	7.5	2013
West Fargo Parks and Recreation, ND	7.5	N/A
Moorhead Forestry, MN	6.5	N/A
Eau Claire, WI	6	2011
Eden Prairie, MN	5.5	2018
Thunder Bay, ON	5	2016
Winnipeg Urban Forestry, MB	4.5	2018
Sioux Falls Forestry, SD	4	2019

## CONCLUSION

From data collected and analyzed it shows 4 groups of success. A high level of success, good level of success, a moderate level of success, and a grouping of low level of success. Highly successful programs should be emulated by the less successful programs and cities looking to create a response program. The most successful programs use a combination of inspection, treatment, initial mass replacements, then switch to gradually replacing Ash trees, have established more diverse canopy goals, have specialized budgets for Emerald Ash Borer, and have public awareness campaigns.

St. Paul was the first city in Minnesota to have EAB present in the city and scored the highest in the analysis of Response Methods Implemented. The city also provided information unprecedented on the status of EAB and the budget to protect the city from its devastating effects. For these reasons it is recommended that other programs emulate this program. It should also be noted that the cities that scored the lowest also have had the least amount of time with EAB present and had more time to prepare for this disaster. This is not the outcome expected, but it is a lesson in the cliché of “learning from your elders”. By studying our cities that have battled EAB for over ten years, new cities should emulate these programs to have better success when EAB spreads further.

# Research 2

## Union of Transportation Methods – Seasonal Applications A Study of Ballerup Boulevard Combined Applied in American Winter Cities’ Streets and Bike Lane Standards

Colin Ceason | Anna Maria Visilla

NDSU LA 789 | SPRING 2022

Ballerup Boulevard, Skovlunde | Capital Region of Denmark

Landscape Architect | Marianne Levinsen

Features: Separated Drive Lanes, Bus Stop Sidings, Bike Lanes, Natural pedestrian refuge from fast traffic

### ABSTRACT

Ballerup Boulevard is a through street from Ballerup to central Copenhagen. Most of the street is four lanes with two in each direction measuring nearly 30 meters(98ft) wide. Currently most of its length has bike lanes for it is an important part of cosmopolitan Danish life and is a growing trend in cities worldwide especially in Europe. The section developed by Marianne Levinsen is a show of how pleasant streets can become for pedestrians when disconnected from the faster vehicle traffic. Being only a test segment of two blocks that are being redeveloped in conjunction this is an excellent case study for American cities that are looking to start patchwork neighborhood developments that bring streets into the modern century. With including more space for pedestrians and bicyclists this allows for a more natural connection and opens more opportunities for winter use.

# Hypothesis: By emulating this example we may be able to convert bike lanes into ski lanes seasonally in winter cities.

Have you ever been a car driver and questioned why there is a large berm of snow where a bike lane usually is? Couldn't this be used for parking or plantings? An idea explored in Marianne Levinsen's Ballerup Boulevard project in Skovlunde, Denmark. Remodeled in conjuncture with a medium density architectural development this boulevard shows how with space and design streets can become a naturally pleasant place for all the different way that we use streets, paths and plants. By separating drive, bike, and walking lanes by natural plantings it comforts all modes of transportation.

These plantings beds also choose a groundcover that allows for foot traffic to cross into other lanes to access the street directly for bus station, parking, and drop offs. Additional plantings form these natural paths through the rock ground-cover and create physical barriers from each individual mode of transportation. This shows when a street is constructed with enough space and physical barriers in the form of plantings comfort increases from the slow speed pedestrian to the medium bicyclist traffic, to the faster motor vehicles increases the confidence of which each mode of travel can move at its own speed. The plantings create a park feeling along the length of the boulevard cultivating a comfortable feeling.

In the Ballerup Boulevard case study the lane design follows as this. A center line to divide two-way motor vehicle traffic, (bus lane in certain areas) the curb then natural plantings. This is followed by the bike lane that has a measurement of 2.5 meters, then more plantings and a smaller walking lane with plantings on the other side. This separation of space is what creates the park feeling of the boulevard.

The hypothesis of being able to adapt the bike lane to a ski lane would be possible if the bike lane was widened to a minimum of 4 meters across adhering to U.S. Ski and Snowboard Association now known as U.S. Ski and Snowboard suggests for Interval start, free technique trails and notes that the end of the trail should be at least 6 meters and end. The state of New York has a minimum of 1.8288 meters (6ft) for one lane Ski Touring Trails and 2.4384 meters (8ft) for two lane trails. Calculated that an average of 3.5668 meters should be used for this adaptive concept. This comes out to be 11.7021 feet for bike lanes. By increasing the size of bike lanes and separating them from the street only one would need to be constructed on a side of the street and allows for two-way traffic. Currently the United States standard is 5 feet for bike lanes, but this is for one way one lane traffic. By adding an additional nine inches to the width of bike lanes this will increase the comfort of bicyclists and allow for the conversion to ski lanes in winter cities.

Popular in the city of Fargo, North Dakota is to have the 5ft bike lane adjacent to the drive lane separating it from parking. But this leads to the issue of drivers not being able to see small speedy bicyclists when backing out of the popular angled parking which is efficient for on street parking. So, by moving the bike lane on the other side of a walkable planted area this increases comfort and safety for all modes of transportation. The value of adding multiple plantings to streetscapes greatly adds a sense of place and comfort to people on foot and on bikes. This truly creates streetscape parks.

# CONCLUSION

By increasing the standard of 5 feet to 5 feet and 9 inches in American winter city bike lanes this opens the possibility to have them converted to ski lanes when snow is available. It should be combined with separating bike lanes from motor vehicle traffic with walkable plantings. This will add comfort to both forms and even when separated by walkable plantings from pedestrians as well. These comfort all modes of transportation and evolves streetscapes into boulevard parks.

# Research 3 Proposed

## Abstract: Evaluation of Policies Enacted to Counter Emerald Ash Borer

The effects of emerald ash borer have been widespread and there are different ways to prepare and counter its devastating effect on forestry, once EAB is threatening to reach cities with ash trees it costs minimum one hundred dollars a year to treat and inspect the tree {1,2,3 multiple sources}. This paper will investigate how communities have responded to this natural disaster to see what procedures and policies have been changed to curtail the spread and destruction caused by Emerald Ash Borer. Some initiatives include diversifying tree canopies, treatment and preservation of high rated ash trees, and inspecting trees annually for disease and risk of failure. {4,5, 6, multiple sources} After investigating the initiatives, measuring the amount of money spent on replacing at-risk trees and payouts from insurance claims and determining if initiatives are successful and should be replicated in other communities.

This study will focus on city and state forestry data, along with published budgets of these entities. Investigating the amount of tree failures with payouts, amount of tree failures without payouts, and successful inspection of at-risk trees requiring removal and replacement. From comparing the costs incurred by municipalities for these incidents we can identify the most cost effective and favorable risk-vs-reward method of approaching replacing ash trees in communities. This type of assessment has occurred in the Netherlands {7 Van Haaften, M.A." Urban Forestry & Urban Greening, vol. 15, 2016, pp. 15–21} and this can be a way to measure the effectiveness of municipality's counters to the emerald ash borer. Investigating the species of trees involved, not just ash trees will show how effective each species perform versus others to create suggestions of species are good replacements for ash trees. {8 Morgenroth, J., et al. Urban Forestry & Urban Greening, vol. 15, 2016, pp. 1–5.}

Key words, Street Trees, Emerald Ash Borer, Financial Risk, Conservation

# Research 4

Union of Transportation Methods – Seasonal Applications

A Study of Ballerup Boulevard Combined Applied in American Winter Cities' Streets and Bike Lane Standards

Colin Ceason | Anna Maria Visilla  
NDSU LA 789 | SPRING 2022

Ballerup Boulevard, Skovlunde | Capital Region of Denmark  
Landscape Architect | Marianne Levinsen

Features: Separated Drive Lanes, Bus Stop Sidings, Bike Lanes, Natural pedestrian refuge from fast traffic

# ABSTRACT

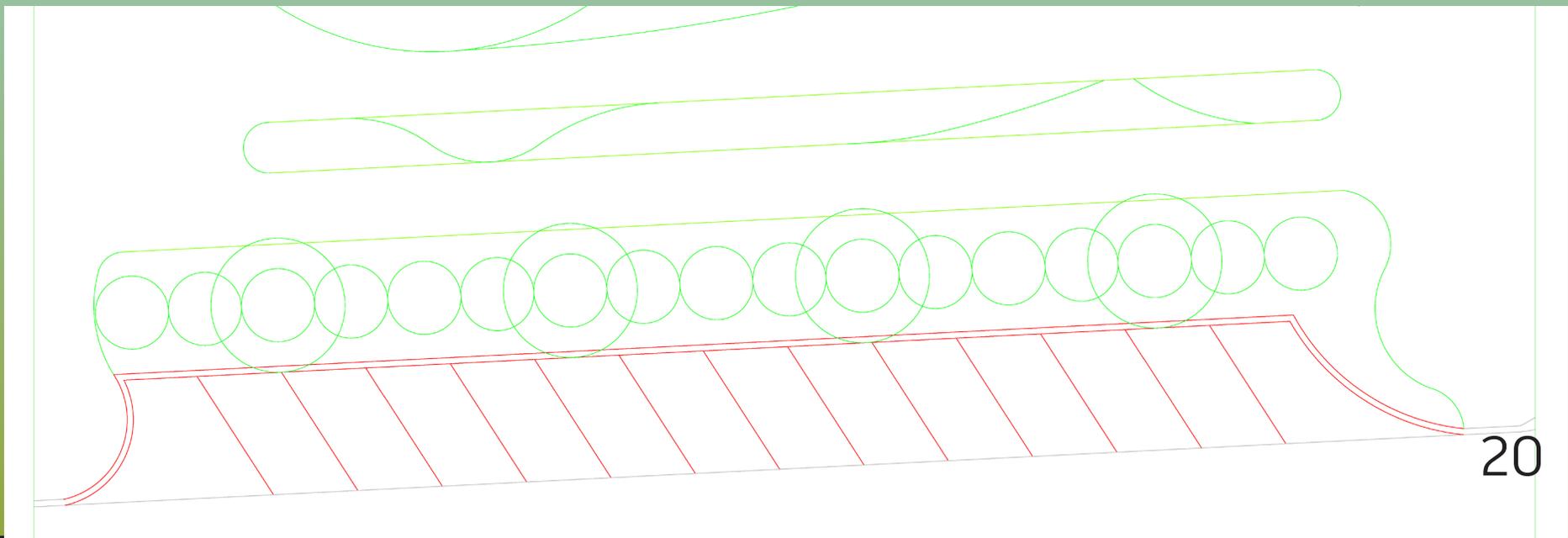
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The hypothesis of being able to adapt the bike lane to a ski lane would be possible if the bike lane was widened to a minimum of 4 meters across adhering to U.S. Ski and Snowboard Association suggestion for Interval start, free technique trails and notes that the end of the trail should be at least 6 meters and end. The state of New York has a minimum of 1.8288 meters (6ft) for one lane Ski Touring Trails and 2.4384 meters (8ft) for two lane trails. Calculating that an average between the trail sizes is 3.5668 meters should be used for this adaptive concept. This comes out to be suggested 11.7021 feet for two lane bike and ski travel. By increasing the size of bike lanes and separating them from the street only one would need to be constructed on a side of the street and allows for two-way traffic. Currently the United States standard is 5 feet for bike lanes, but this is for one way one lane traffic. By adding an additional nine inches to the width of bike lanes this will increase the comfort of bicyclists and allow for the conversion to ski lanes in winter cities.

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## CONCLUSION

By increasing the standard of 5 feet to 5 feet and 9 inches in American winter city bike lanes this opens the possibility to have them converted to ski lanes when snow is available. It should be combined with separating bike lanes from motor vehicle traffic with walkable plantings. This will add comfort to both forms and even when separated by walkable plantings from pedestrians as well. These comfort all modes of transportation and evolves streetscapes into boulevard parks.

# Major Project Elements

DIVERSE FORESTED AREA - DISEASE DETECTION

DIVERSE FARMING GROVE - MODEL STREET TREES

ARBORETUM PLAZA - DRY SPECIES BRIDGE

TREE PANDEMIC WATER FEATURE

OUTDOOR EDUCATION SPACE - TREE INSPIRED SCULPTURES

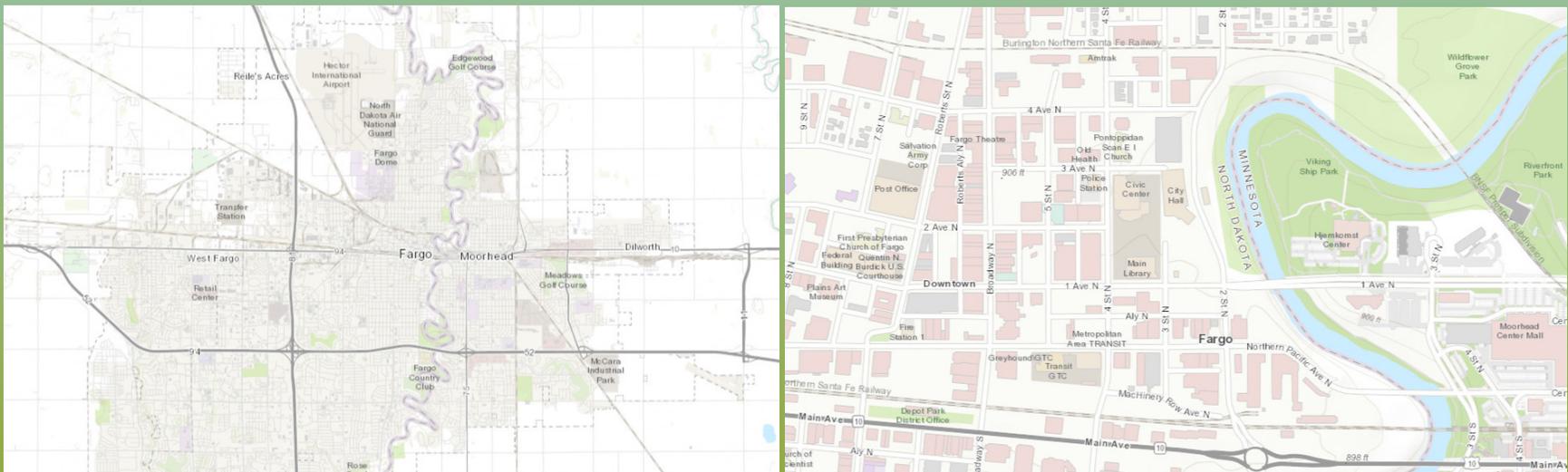
# Audience Description

The folks of the Red River Valley do not have many opportunities to see trees in curated urban landscape settings. The people envisioned to visit this site are looking to learn more about species that they may plant in their own property. In addition to prospective planters, people that want to have an oasis from the urban concrete that encompasses the city center. Finally, visitors to the nearby Fargo Civic Center, Central Library, and City Hall will have a wonderful view of the buildings as well as being immersed in a lively planted landscape.

# Area Context

- Upper Mid-West | Red River Valley

Cities along the Red River of the North have long struggled with its changing currents and seasonal flooding. But as the area was once a glacial lake bed this creates one of the most fertile land in the upper mid west. With an abundance of water and nutrients the areas along the river are full of diverse wildlife and fields of crops and cities inhabit the land past the river's natural corridor.



# Site Context

- Downtown Fargo, North Dakota | Red River Valley

The current Civic Center Park on the north side of 1st avenue in between the quieter 2nd and 4th streets currently is a chaotic combination of patchwork of landscapes that have been updated only when new building construction occurred. The 5-acre site is a short walk from the popular Broadway Square at the north east corner of 2nd avenue and Broadway. The terminus of 2nd avenue is the civic center and even from Broadway you can see the Fargo City Hall and the iconic Hjemkomst Center on the other side of the Red River of the North. Across from 2nd street and separated by a flood wall is the Red River Bike Trail which connects the community north and south along the river. Additionally, across the river is Viking Ship park and the Hjemkomst Center in Moorhead. The creation of a proper landscape that unifies these amenities nearby will add a crucial connection to the area's park system that creates a sense of place in the heart of the Fargo-Moorhead area.

# Proposed Site Inventory

## PLAZA ARBORETUM

TREE PANDEMIC WATER FEATURE  
BARK INSPIRED PAVEMENTS  
TREE SCULPTURE SEATING

## DIVERSE FOREST

FARMING GROVES  
TREE LEVEL WALKWAY  
AMPHITHEATER

## SYMBIOTIC DESIGNS

WALKABLE LANDSCAPES  
DISEASE DETECTION UTILITY  
AGRICULTURE STREETS

# Project Emphasis

- Diversity in urban tree canopies to prevent ecosystem disasters that come from mono-culture plantings
- Public engagement and education in relation to trees and diversity

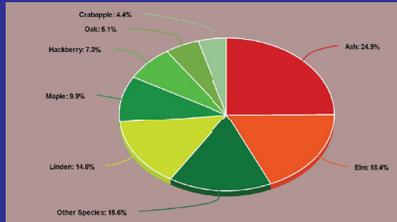
# Goals and Understanding of the Thesis Project

- Inspire through curated landscapes how we can add resilience through diverse sustainability
- Create test models for diverse urban canopy system using native trees new to the Red River Valley
- Consolidate utilities in a singular multipurpose building that Cultivates a sense of place for the site and welcomes folks to Fargo and North Dakota
- Expand on the existing idea of urban arboriculture to farm the new trees that are being exhibited in the arboretum plaza while showing the beauty in diversity

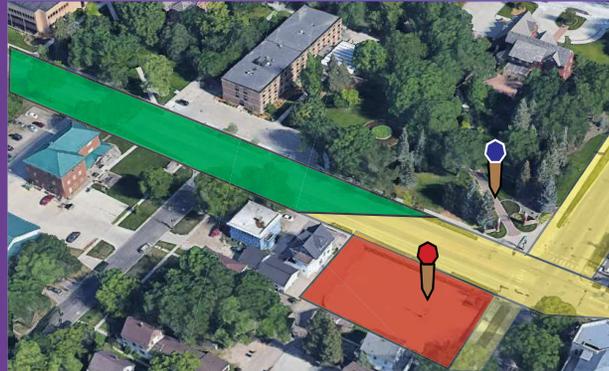
# *Design Solution*

# Area Analysis

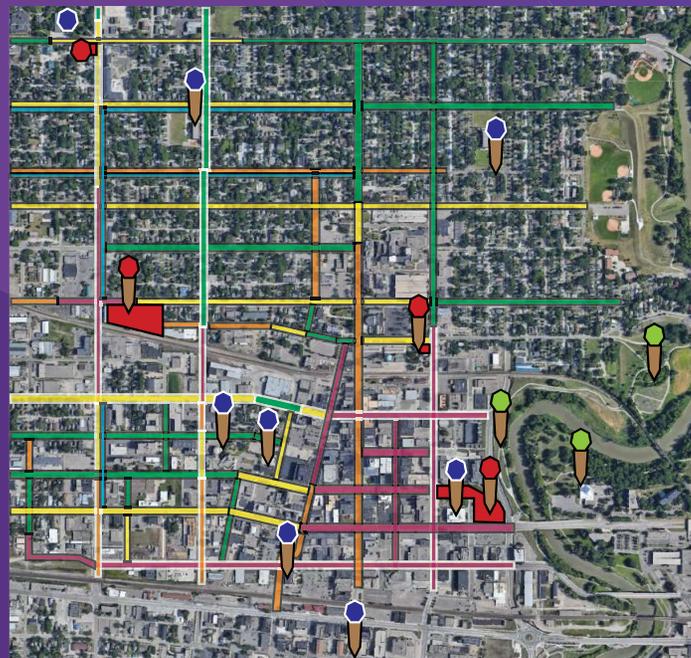
## Central Fargo, ND: Street Trees, Unmotorized Transit, and Natural Education



- At Risk Trees, Due to Utilities
- Streets Without Trees
- \*with bike lane
- Streets With Few Trees
- \*with bike lane
- Streets With Developing Trees or Canopy Gaps
- \*with bike lane
- Full Canopy Street Trees
- \*with bike lane
- Educational Institutions
- Natural Education Opportunities
- Planned Natural Educational Parks



Educational signs around Downtown informs visitors about local history. This can be expanded to include local natural information. Currently it is easy to sense the nature around but are given little incite to what or where it is.



# Site Analysis, Cultural

## Downtown Fargo, North Dakota | Red River Valley

The current Civic Center Park on the north side of 1st avenue in between the quieter 2nd and 4th streets currently is a chaotic combination of patchwork of landscapes that have been updated only when new building construction occurred. The 5-acre site is a short walk from the popular Broadway Square at the northeast corner of 2nd avenue and Broadway. The terminus of 2nd avenue is the civic center and even from Broadway you can see the Fargo City Hall and the iconic Hjemkomst Center on the other side of the Red River of the North. Across from 2nd street and separated by a flood wall is the Red River Bike Trail which connects the community north and south along the river. Additionally, across the river is Viking Ship Park and the Hjemkomst Center in Moorhead. The creation of a proper landscape that unifies these amenities nearby will add a crucial connection to the area's park system that creates a sense of place in the heart of the Fargo-Moorhead area.

# Site Analysis, Physical & Biological



# Application of Results from Theoretical Premise and Research

TREE PANDEMIC AWARENESS

DISEASE DETECTION

RESILIENT URBAN CANOPIES

10% Singular Tree Species

20% Any One Genus

30% Any One Family

# Performance Criteria for Thesis Project

TREE BASED INTERACTION AND EDUCATION

HUMAN TREE SYMBIOTIC PEDESTRIAN CONNECTIONS

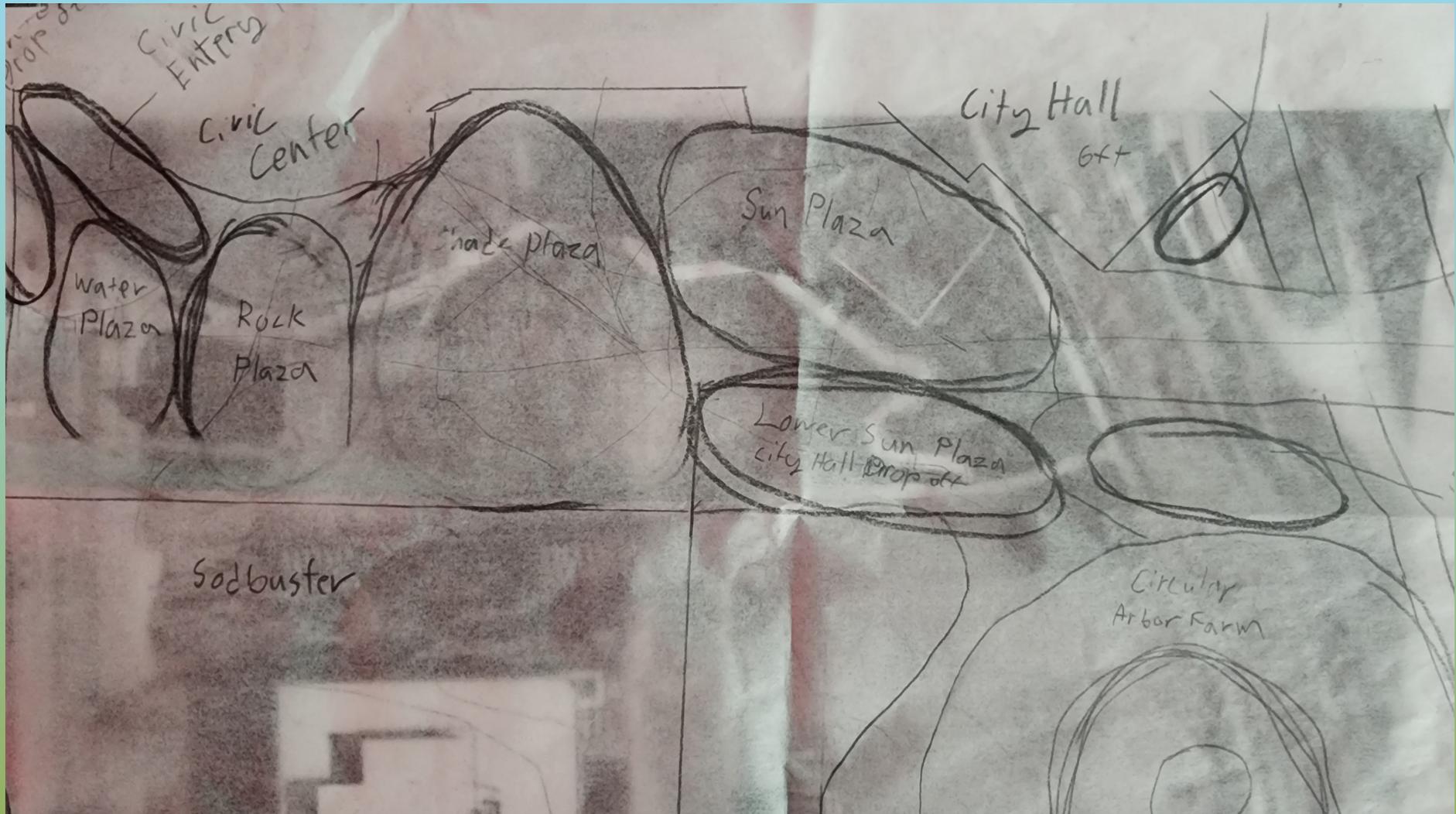
DIVERSE SPECIES FOR THE RED RIVER VALLEY

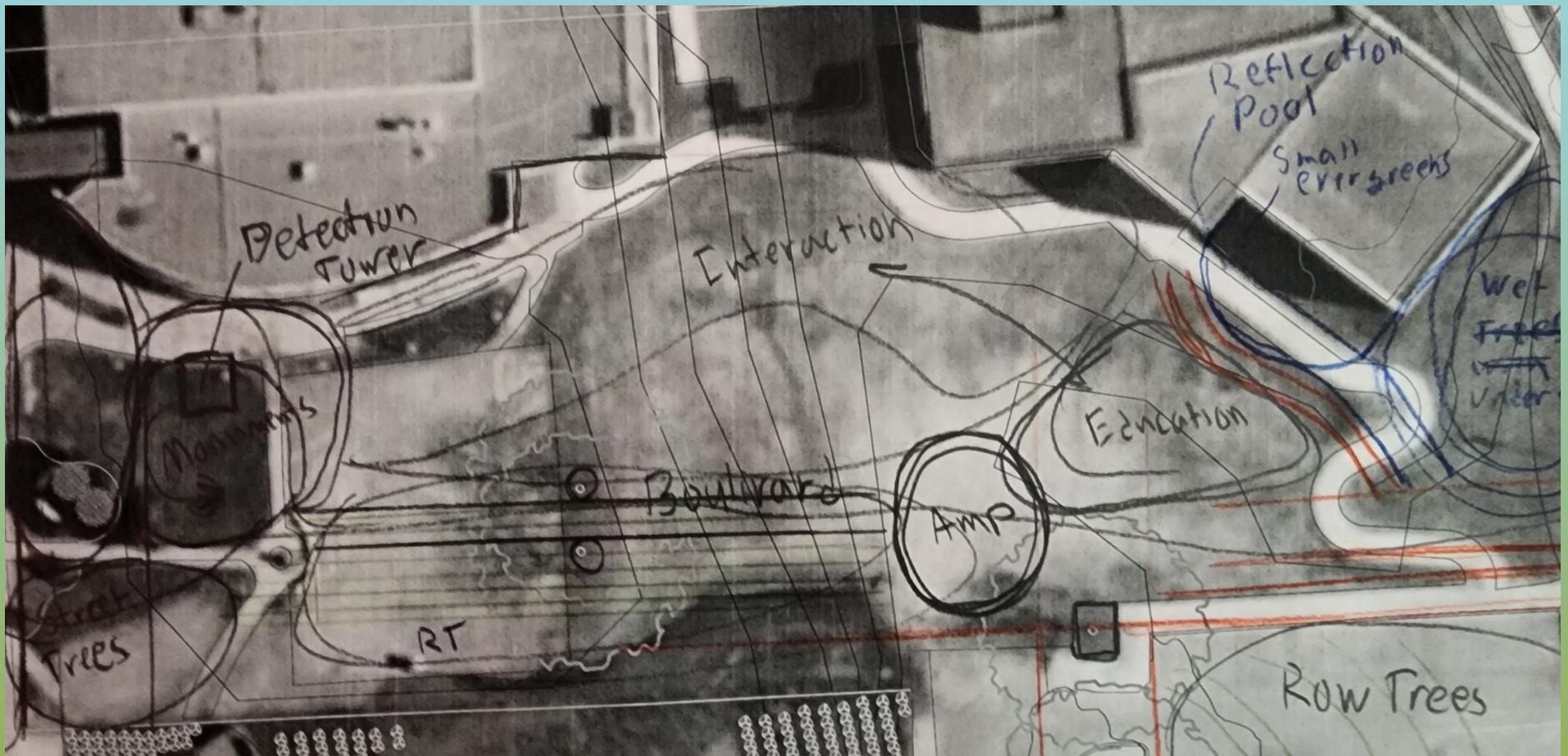
RESEARCH FOR URBAN SOIL CONDITIONS

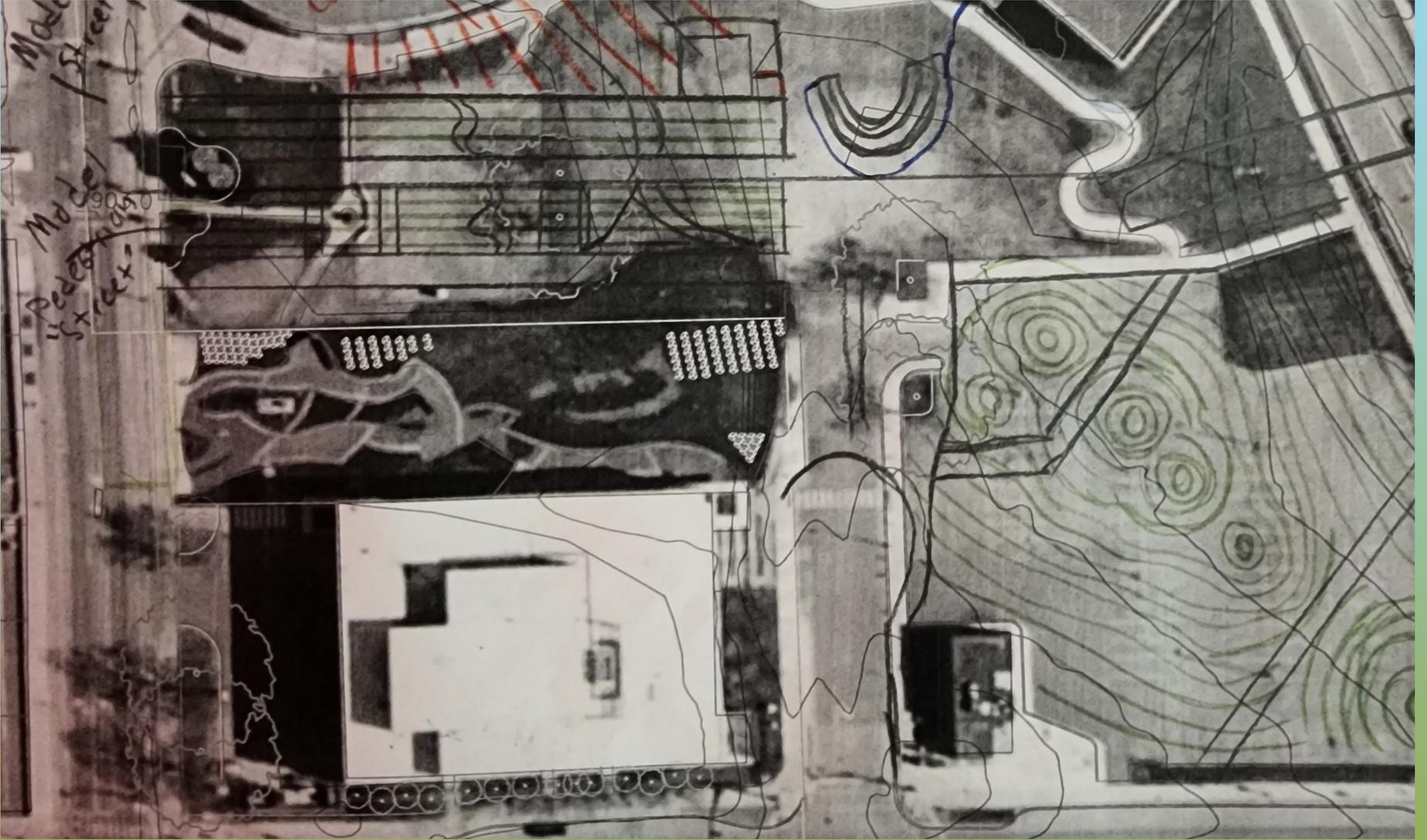
# Design Concept Statement

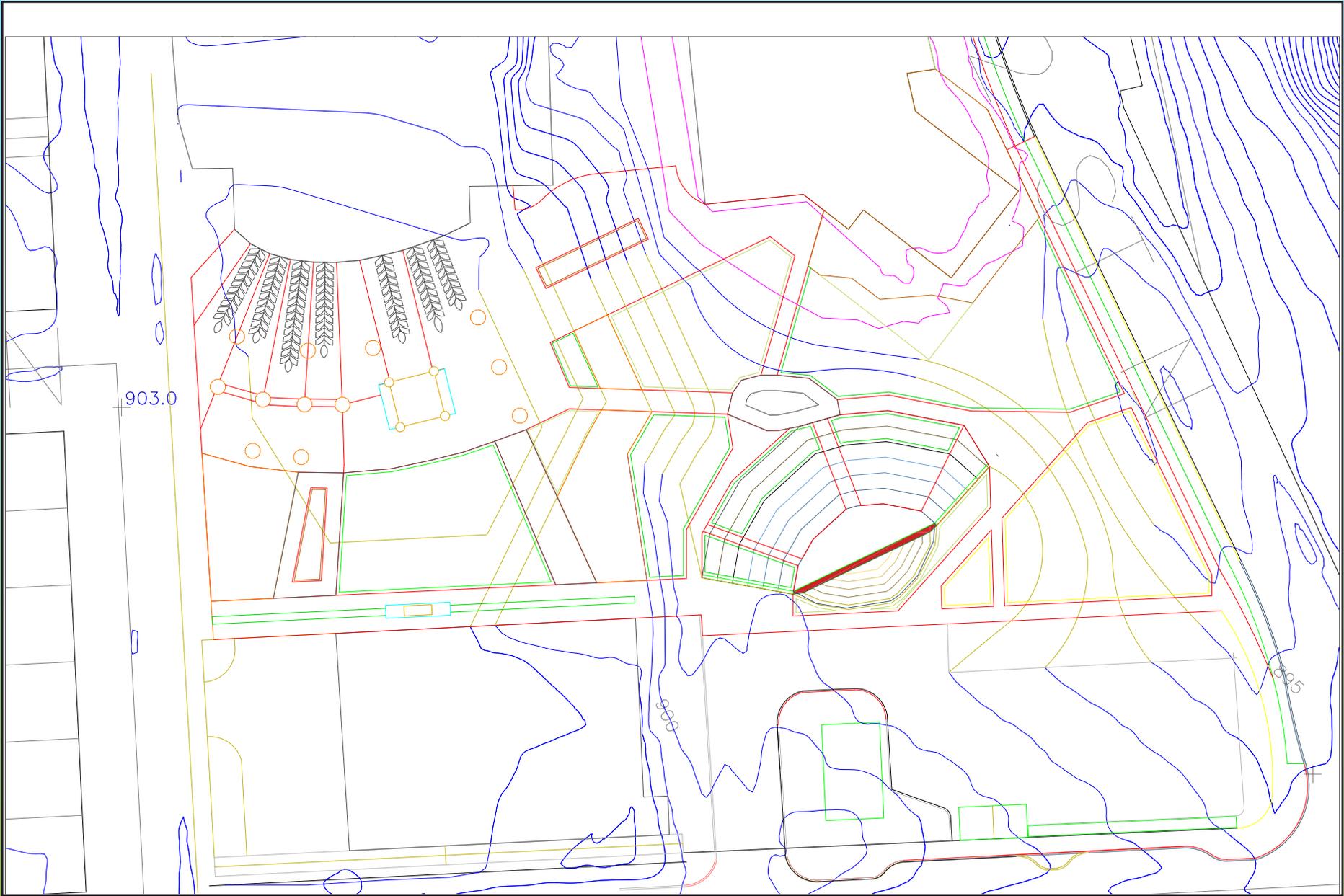
The Civic Center site was chosen for its centralized location in the Fargo-Moorhead metropolitan area and connectivity to the Red River Wildlife Corridor. At the center of this confluence of urban and wild nature the design should reflect both elements. The Southeast of the site is closest to the Red River and reflects the curvilinear forms then transitions to a linear form to represent cities and the sprawling fields of crops that extends far into the reaches of North Dakota.

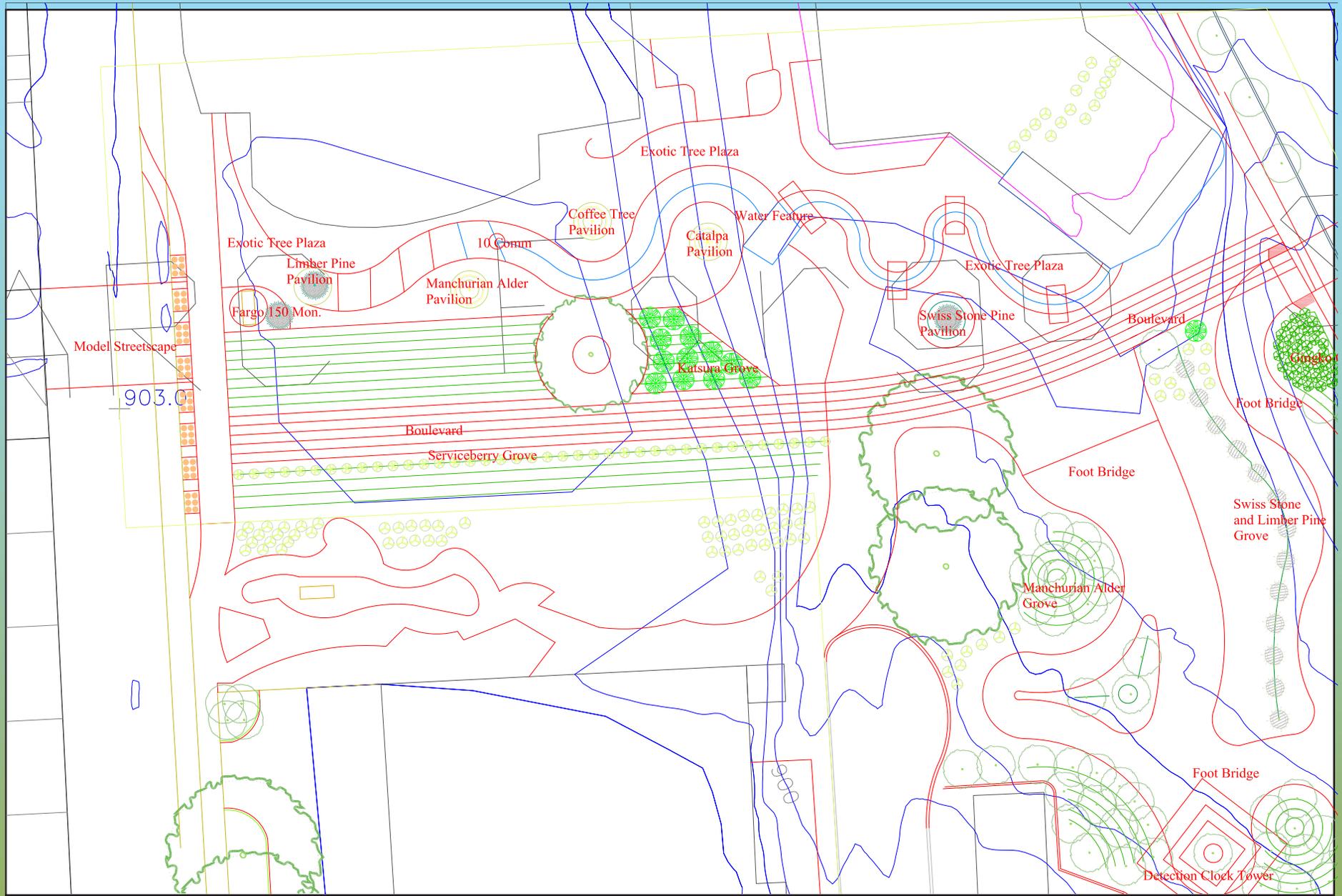
# Schematic Design Drawing and Diagrams

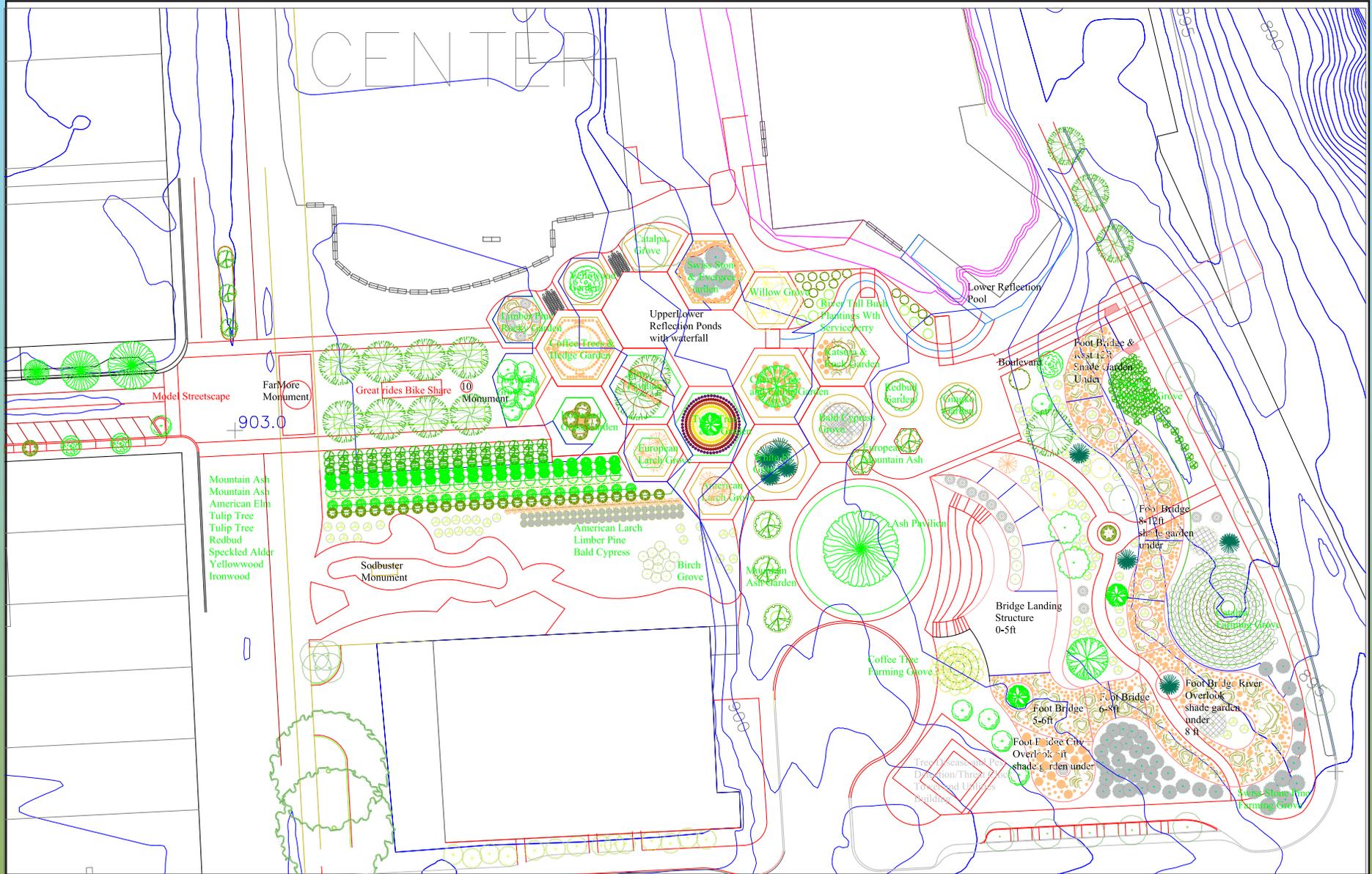


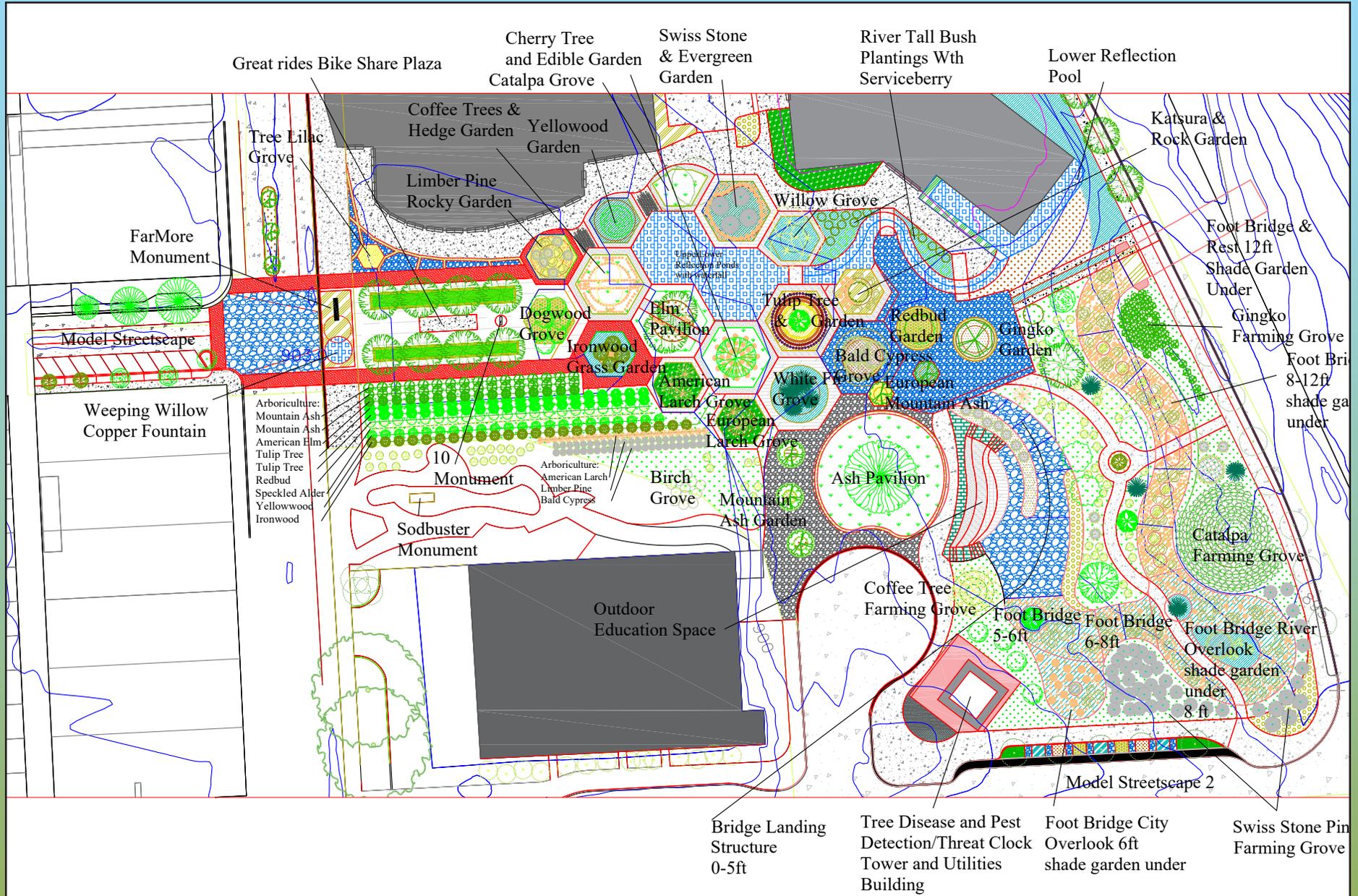












Great rides Bike Share Plaza

Cherry Tree and Edible Garden

Swiss Stone & Evergreen Garden

River Tall Bush Plantings With Serviceberry

Lower Reflection Pool

Catalpa Grove

Coffee Trees & Hedge Garden

Yellowwood Garden

Limber Pine Rocky Garden

Willow Grove

Katsura & Rock Garden

Tree Lilac Grove

FarMore Monument

Model Streetscape

Foot Bridge & Rest 12ft Shade Garden Under

Limber Pine Rocky Garden

Dogwood Grove

Elm Pavilion

Tulip Tree & Garden

Redbud Garden

Gingko Garden

Foot Bri 8-12ft shade ga under

Ironwood Grove

American Larch Grove

White Pine Grove

European Mountain Ash

Bald Cypress

10 Monument

Arboriculture: American Larch, Limber Pine, Bald Cypress

Birch Grove

Mountain Ash Garden

Ash Pavilion

Catalpa Farming Grove

Arboriculture: Mountain Ash, Mountain Ash, American Elm, Tulip Tree, Redbud, Speckled Alder, Yellowwood, Ironwood

Sodbuster Monument

Outdoor Education Space

Coffee Tree Farming Grove

Foot Bridge 5-6ft

Foot Bridge 6-8ft

Foot Bridge River Overlook shade garden under 8 ft

Model Streetscape 2

Bridge Landing Structure 0-5ft

Tree Disease and Pest Detection/Threat Clock Tower and Utilities Building

Foot Bridge City Overlook 6ft shade garden under

Swiss Stone Pin Farming Grove

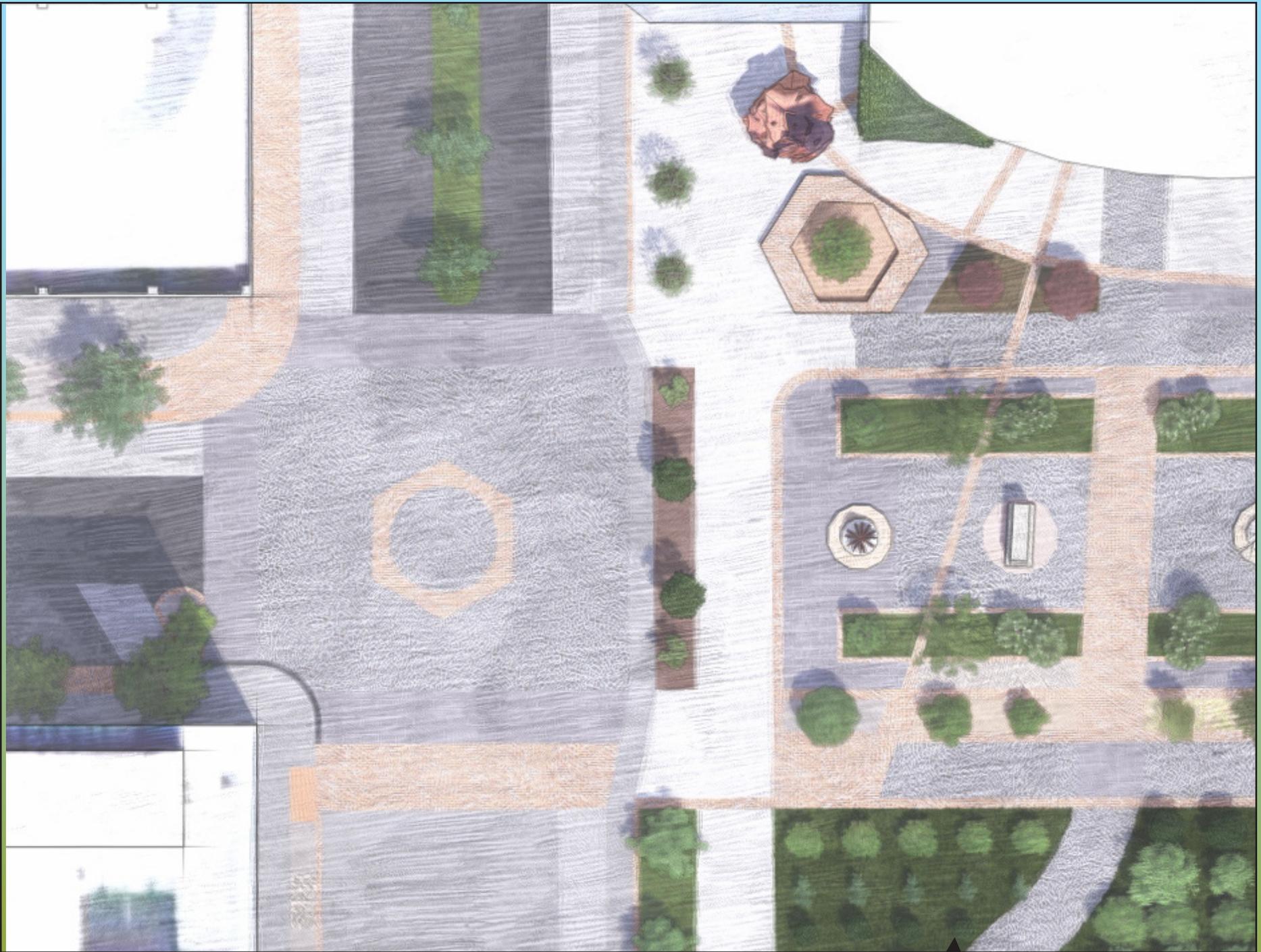
# Design Development Drawing and Models





Masterplan 1" = 100'





Model Street Tree Plantings 1" = 25'





Education Space and Diverse Forest 1" = 25'





Rendred Master Plan

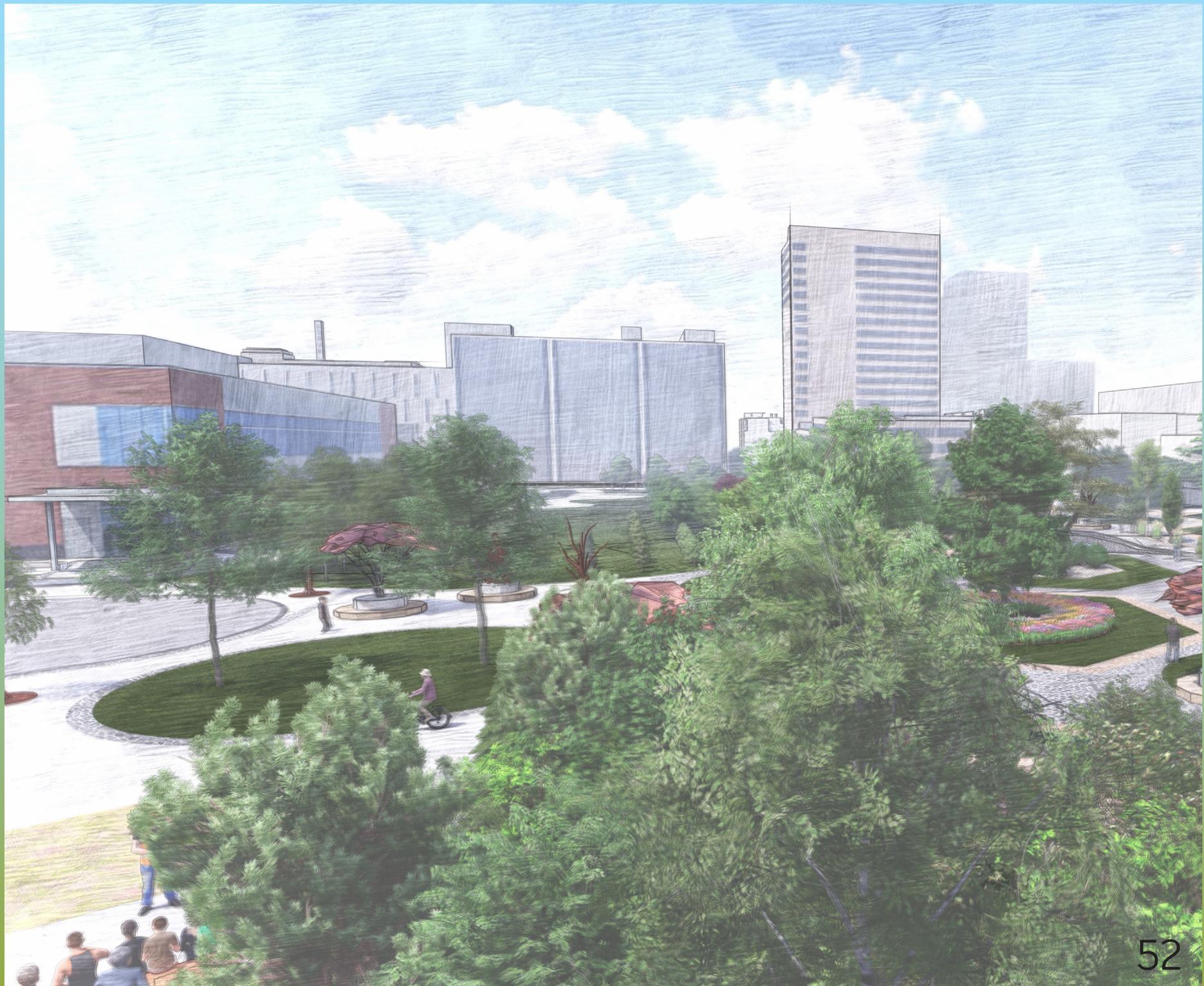




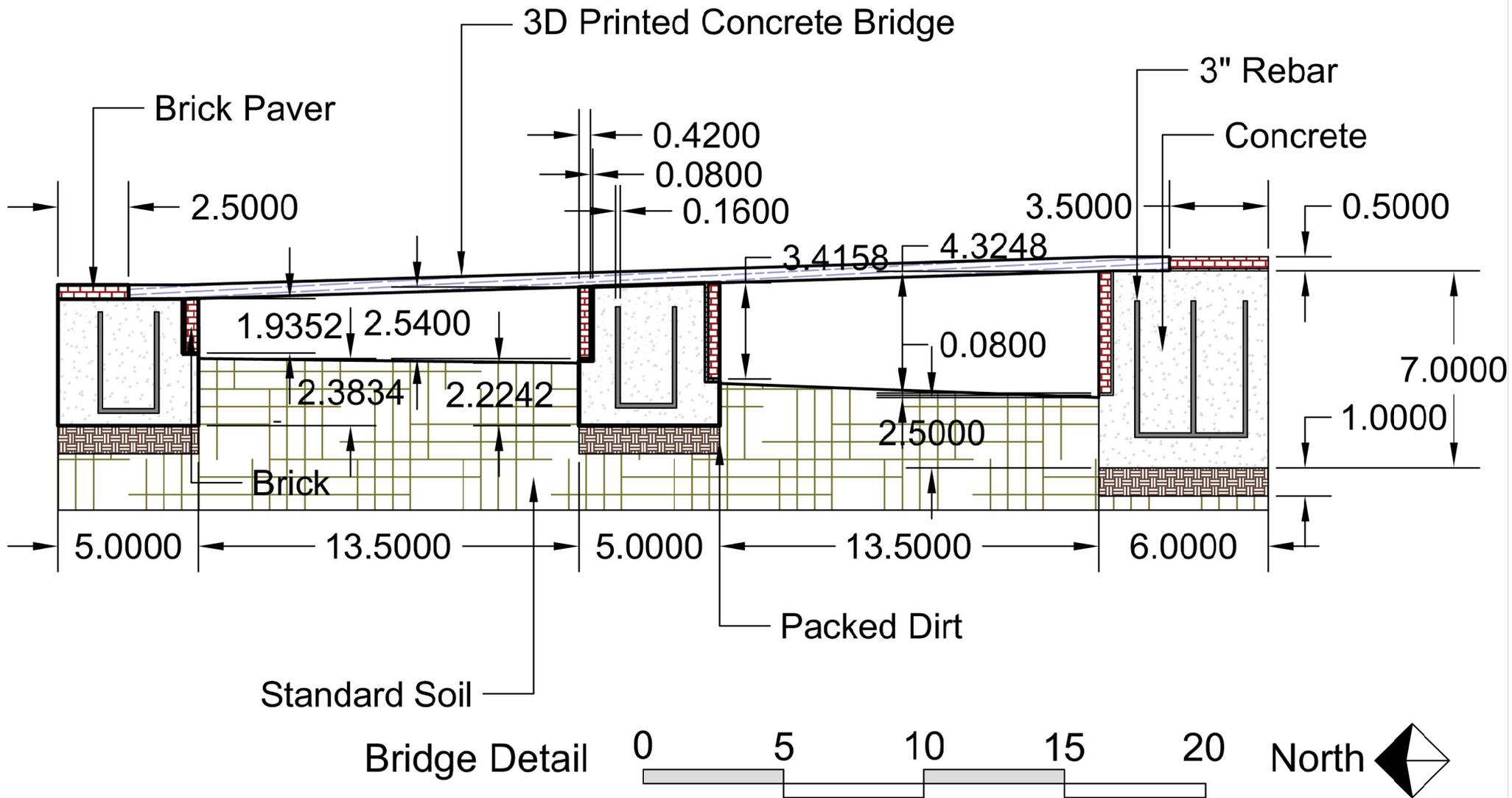


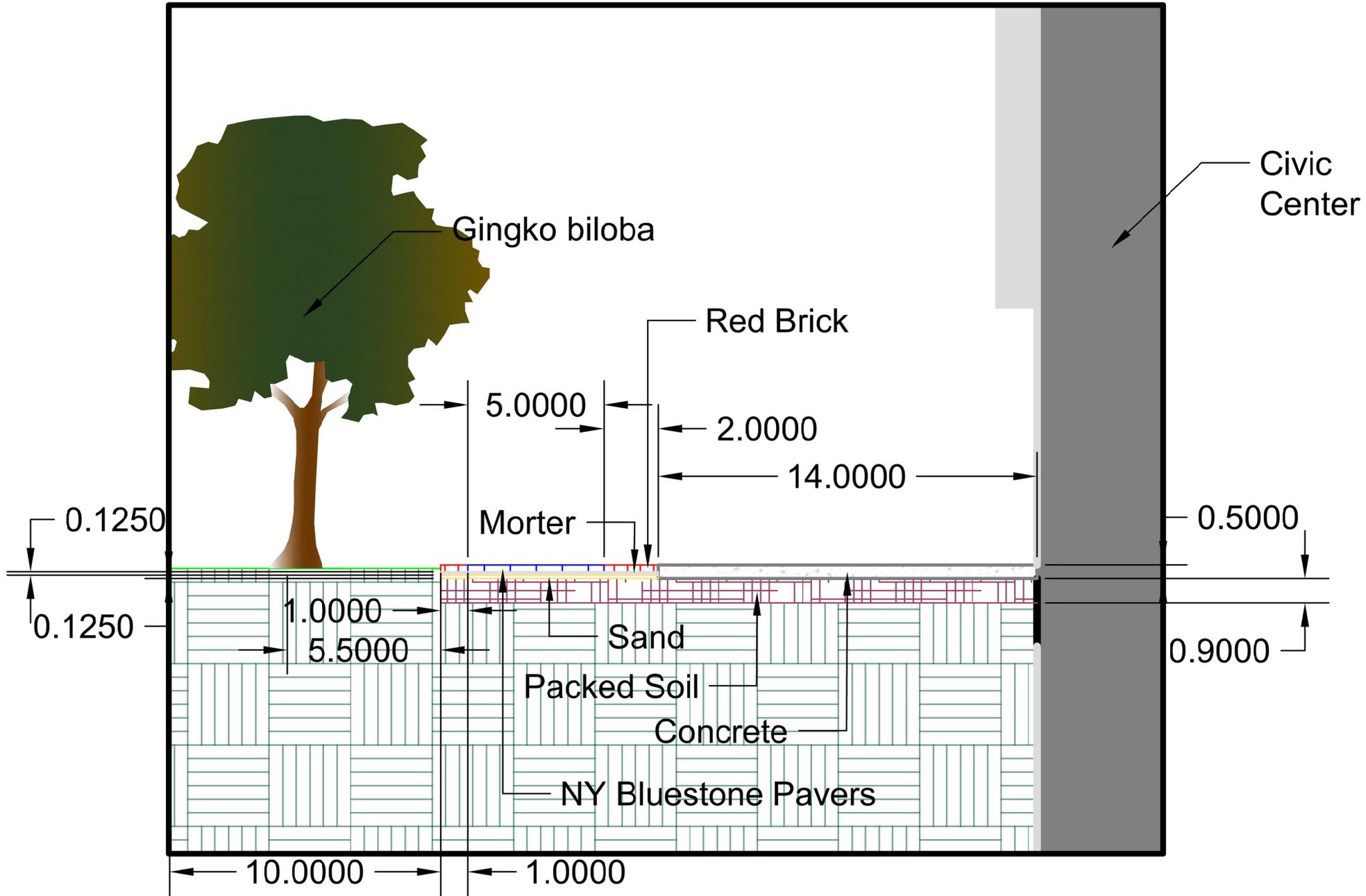




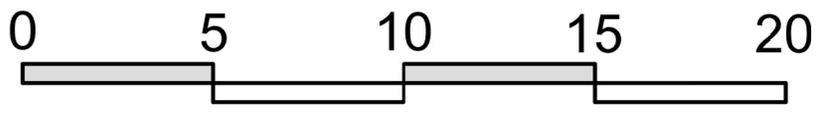


# Detail Drawings





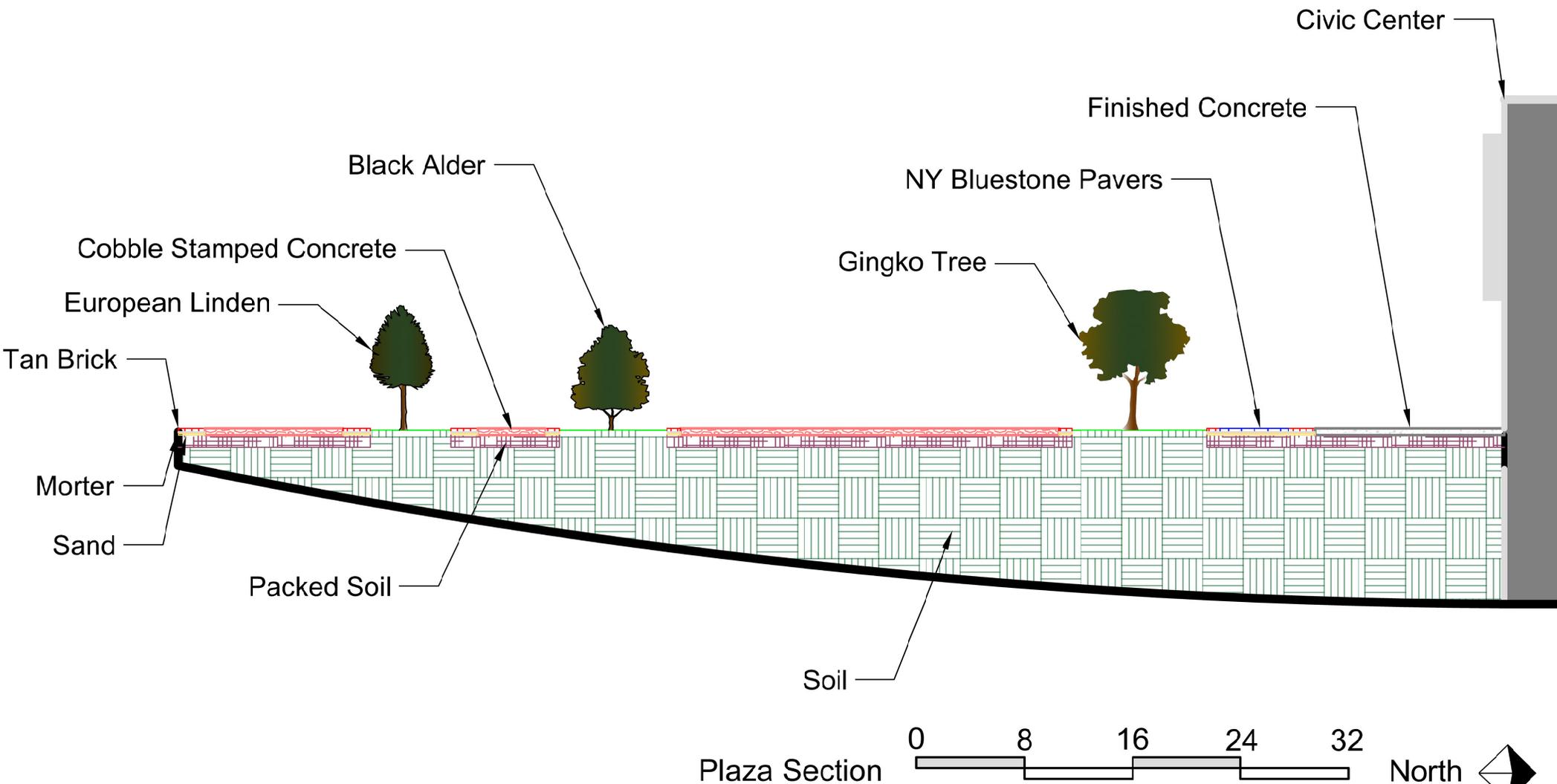
Civic Center Entry Detail



# Detail Drawings

Planter Seating, Brick Pavement, & Copper Tree Seating Rendred





# Discussion and Limitations

The genesis of the thesis was to help prepare for more fast sweeping tree pandemics such as the Emerald Ash Borer and Dutch Elm Disease which have devastated communities in North America and beyond. Diversity in street trees may be a complicated subject for some but biodiversity brings sustainability to ecosystems and has even more lasting benefits. One of the fun things about my chosen site was urban farming practices were already being experimented with but in a monoculture which is the cause of how tree pandemics are so devastating to communities.

My first research showed how awareness and work on the ground is the best way for us to prepare for another pandemic. This overarching theme was timely for we were in the 3rd to 5th wave of the COVID 19 pandemic that stunned society. I had been struggling much like the millions and even billions of people alike. As with nature, through research, action, and awareness we can overcome challenges and will be stronger for it. Nature is a cycle of life that we all participate in, and I hope with my projects that I help make it a virtuous cycle.

There are many things I would change in my 3D modeling and further design development as if this was to be built it would be fixed and even as I see it longer, I can make these changes myself. Limited by time and conditions we do what we can and emphasize the big ideas and story we are trying to tell with this academic exercise. If I had more time, I would have extended the area and created a plan to where to plant the new trees being farmed in stress, and community parks. This is the largest project site I have undertaken in my academic and professional career that mad to developed to such detail. I realize just how important teamwork is, and how much more we may create together. When we work on the same project for so long, we get arrogant and complacent and need others to guide, inspire, and bring fresh perspectives to our own eyes.

# *Appendix*

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# Final Boards



# Design Process

## Objectives

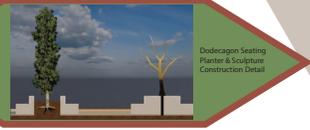
- Trees**  
 Research  
 Diverse Species in the Red River Valley  
 Trees in Urban Soil Conditions  
 Disease Detection  
 Revitalize Urban Canopies  
 MAX 10% singular tree species  
 MAX 20% any one genus  
 MAX 30% any one family
- Humans**  
 Tree Based Interaction and Education  
 Tree Pandemic Awareness  
 Symbolic Pedestrian Connections

## Elements

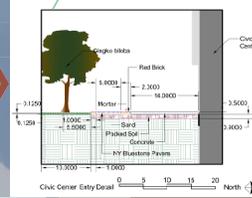
- Mass Exotic Tree Plantings Groves  
 Tree Pandemic Story Water Feature  
 Disease Detection Stations  
 Diverse Forested Areas  
 Model Street Tree Layout  
 Tree Arboretum  
 Outdoor Natural Education Space  
 Dry Species Planted Foot Bridge  
 Tree Inspired Sculptures

## Site Inventory

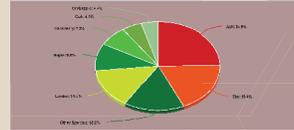
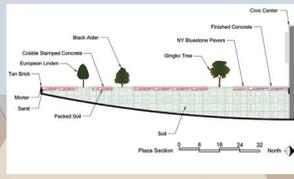
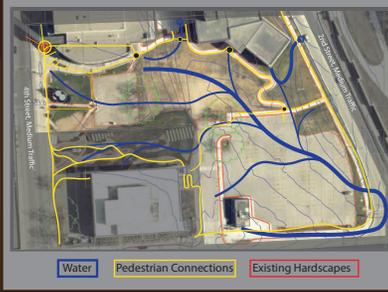
- Plaza Research Arboretum 1  
 Weeping Willow Water Feature 2  
 Bark Inspired Pavements 3  
 Copper Tree Sculptures Seating 4  
**Diverse Forest** 4  
 Farming Groves 5  
 Canopy Level Raised Walkway 6  
 Detection Tower Vista 7  
 Outdoor Amphitheater Landing 8  
**Symbiotic Design** 9  
 Permeable Pavements Throughout  
 Agriculture Streetscapes 10



## VIDEO & RENDERINGS



## Site Analysis



## Research

The Emerald Ash Borer is the currently fastest growing tree pandemic to date. Arriving in Detroit in the early Twenty-first century, nearly 10 years after it was established it had spread across large parts of North America causing a change in how we view planting trees in our urban canopies.

- Out of 10 Points
- 1 For Inspection of Trees
- 2 For Ash Treatment
- 1 For Mass Tree Removal
- 1.5 For Gradual Tree Removal
- 3 For Diverse Canopy Replacement
- 0.5 For Special EAB Budget
- 1 For Public Awareness Campaigns

Municipality	EAB Response Score	EAB Detected
Duluth Department of Natural Resources, MN	10	2015
St. Paul Department of Forestry, MN	10	2009
Overseer Public Works, IA	8.5	2012
Melroseville Parks and Recreation Board, ME	8.5	2017
Pinellas Forestry, FL	8.5	2016
San Mateo County, CA	8	2012
Madison, WI	7.5	2013
West Fargo Parks and Recreation, ND	7.5	N/A
Midland Forestry, MN	6.5	N/A
Essex County, WI	6	2011
Eden Prairie, MN	5.5	2018
Thurston Bay, OH	5	2018
Winnipeg Urban Forestry, MB	4.5	2018
Sioux Falls Forestry, SD	4	2018

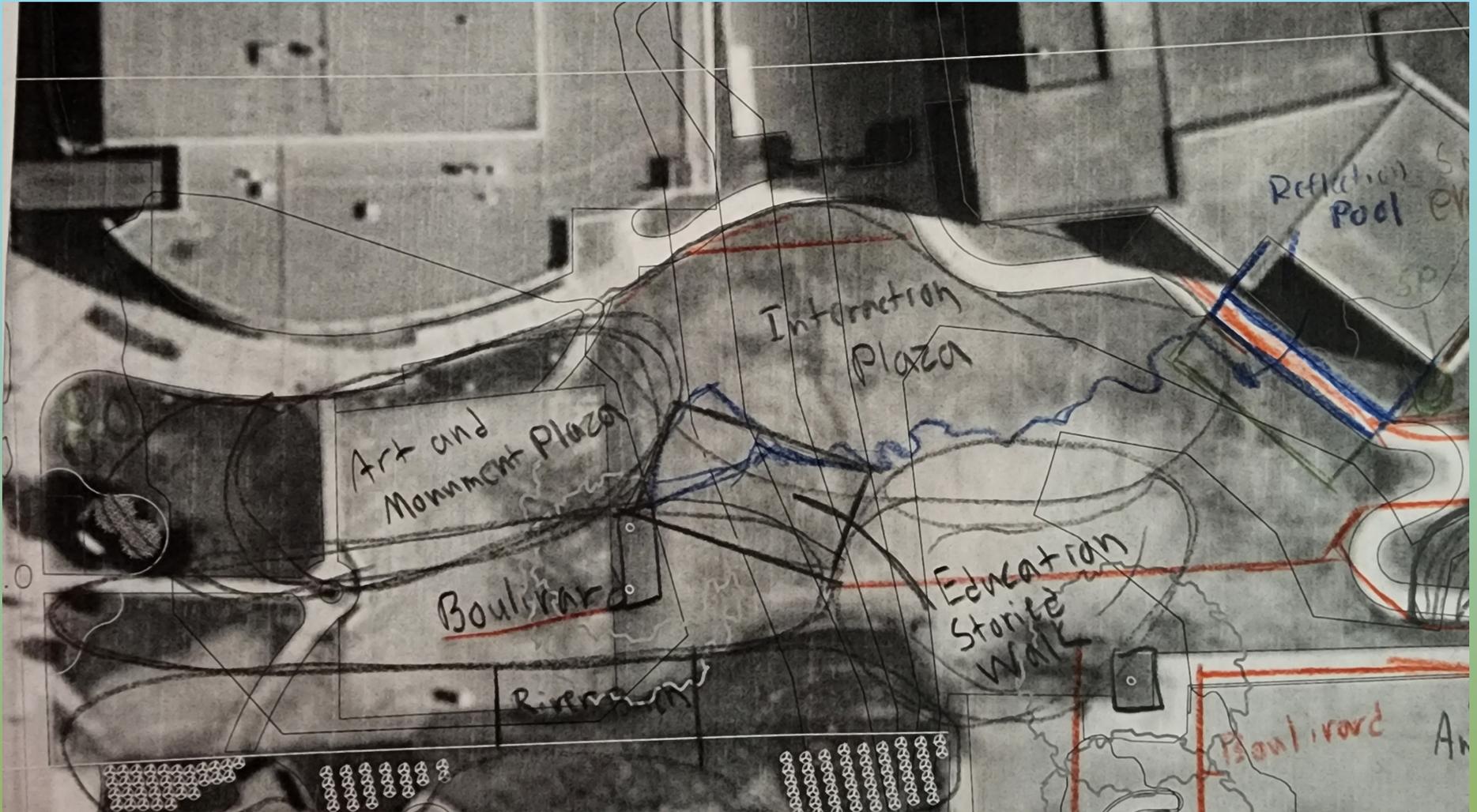
Research grid listing various tree species and their characteristics, including: American Elm, Silver Maple, Norway Spruce, etc.

Broadway Civic Center Site Hjemkomst Center

Elevation Change along 1st North Avenue, Fargo-Moorhead

Red River of the North

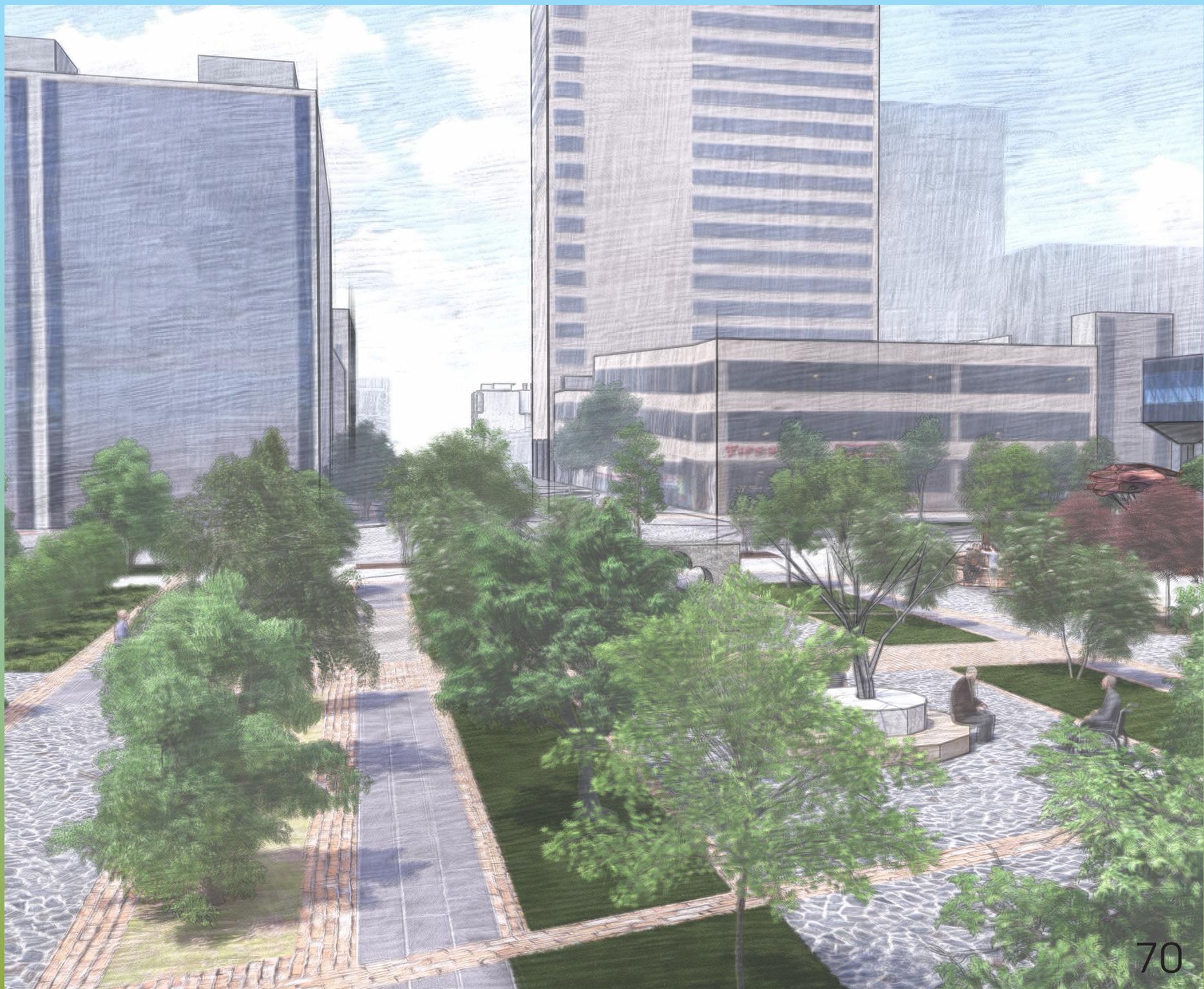
# *Extra Drawings and Renderings*













# *Diverse Growth*