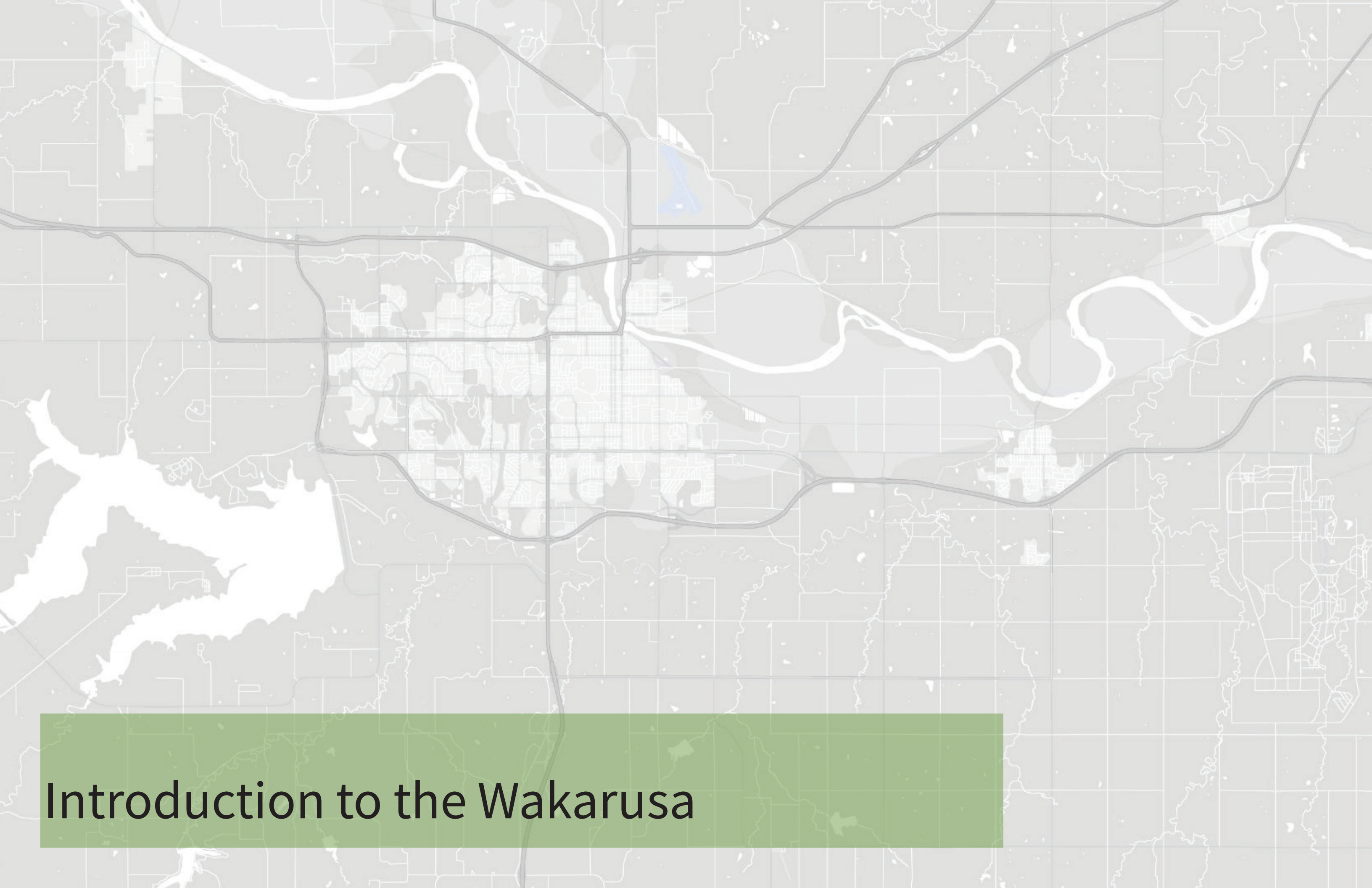




Wakarusa River Corridor Vision Plan

Jillian Routhieaux, Ariel Gish, Jenessa Broxterman
Spring 2025 | LAR420 | Dr. Hyung Jin Kim, PhD.
Landscape Architecture | Kansas State University
Douglas County, Kansas



Introduction to the Wakarusa

Introduction and Vision Statement

The intent of our vision proposal is to provide more ecological, hydrological, and social services to the Wakarusa River Corridor. This is accomplished through an overall vision of the Wakarusa corridor with specific redesigns throughout key locations along the river. These designs are based off the words: *educate*, *enrich*, and *empower*. The vision follows implementing ecological diversity, educating the surrounding communities, and providing opportunities and resources to enhance the riparian corridor of the Wakarusa River.

Acknowledgments

We would like to acknowledge the Kaw, Osage, Shawnee, and Delaware people that once inhabited this land and were forcibly removed from as we perform this analysis of the site. We also would like to acknowledge and thank our sponsors, Biohabitats and Douglas County.



Figure 2

History of the Wakarusa River

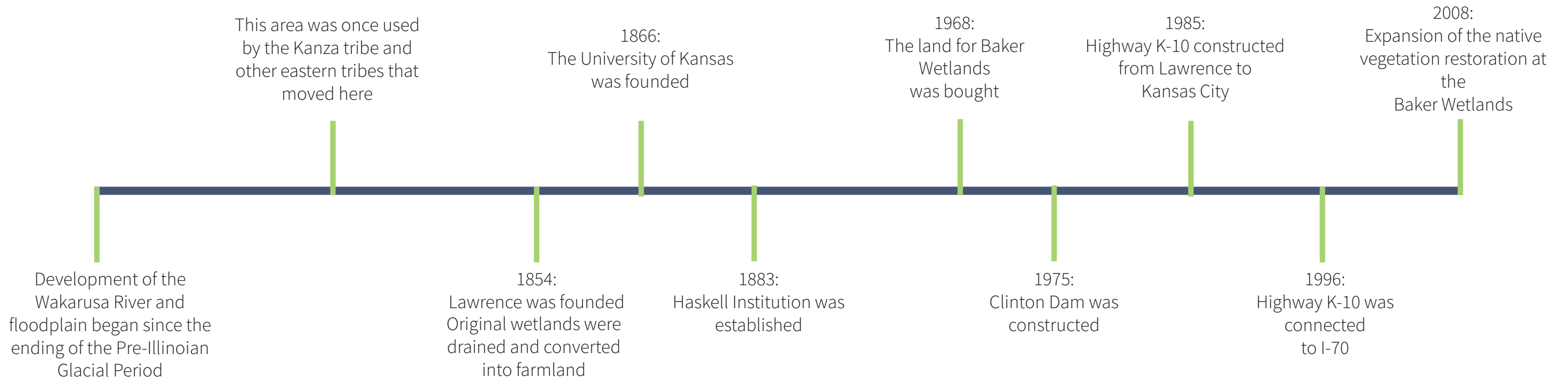


Figure 3: Kanza Tribe



Figure 4: University of Kansas ca. 1867



Figure 5: Haskell Institute ca. 1900



Figure 6: Converted Cropland



Figure 7: Clinton Dam



Figure 8: Baker Wetlands Today

Ecology

Riparian areas are vital elements of the watershed, primarily due to their protection of surface and groundwater quality from impacts related to human land use. These vegetated buffers are a part of complex ecosystems that provide food and habitat for unique plant and animal species and are essential to the mitigation and control of non-point source pollution. The removal of stream side vegetation, primarily for development purposes, has resulted in degraded water resources and diminished value for human consumption, recreation, and industrial use. Maintenance of riparian borders has been identified as one of the most effective means of protecting multiple outstanding resource values, including water quality, hydrology, unique species and natural communities, and watershed ecosystem function.

Increased sediment loads narrow channel widths and provide substrate for colonization of invasive aquatic plant species. Intact riparian buffers reduces these negative impacts by stabilizing stream banks. Vegetation in the buffers decrease erosional impacts during flood events and prevents undercutting of stream banks. Diverse borders that include trees, shrubs, and grasses compared to ones that purely contain trees or grass are more structurally effective at capturing a wide variety of pollutants.

Efficient border widths range from 10 feet for bank stabilization and stream shading, to over 300 feet for wildlife habitat.

Prevent most erosion: Vegetated buffers 30-98 ft

Pesticide Removal*: 49-328 ft

Protect aquatic wildlife: 33-164 ft



Eastern Meadowlark

Figure 9



Mosquitofish

Figure 11



Western Painted Turtle

Figure 10



Coyote

Figure 12



Muskrat

Figure 13

Figure 14

*Pesticides that are applied manually require less of a buffer area than aerielly sprayed pesticides

Current Land Use and Culture of the River Corridor

The land surrounding the Wakarusa River is largely agricultural, with crop fields encroaching on the river's riparian corridor and reducing habitat for native wildlife. Once rich in Oak-Hickory forests and tallgrass prairie, the landscape is now fragmented, with little remaining untouched prairie.

Key features along the river include Clinton Dam, Eagle Bend Golf Course, the Baker Wetlands, the Wakarusa River Wastewater Treatment Plant, and a public boat ramp in Eudora. These represent a mix of ecological, recreational, and infrastructure uses.

Culturally, the Wakarusa River holds deep significance for Indigenous communities, including the Kanza (Kaw), Osage, and Shawnee peoples. Historically, the river corridor served as a source of food, medicine, and spiritual meaning. Today, the Baker Wetlands continue to be an ecologically important site and a place of cultural memory, particularly tied to the histories of forced relocation in the 19th century. Collaboration with tribal nations remains essential for respectful stewardship and restoration.

In Lawrence, physical barriers like Highway K-10 and surrounding cropland limit public connection to the river. In contrast, areas like the Baker Wetlands and Eudora offer stronger links, with accessible recreation and conservation areas. Eudora's boat ramp provides one of the few direct public access points.

Reconnecting communities with the Wakarusa River will require restoring native ecosystems, expanding public access, and honoring the river's cultural heritage through inclusive planning and Indigenous engagement.

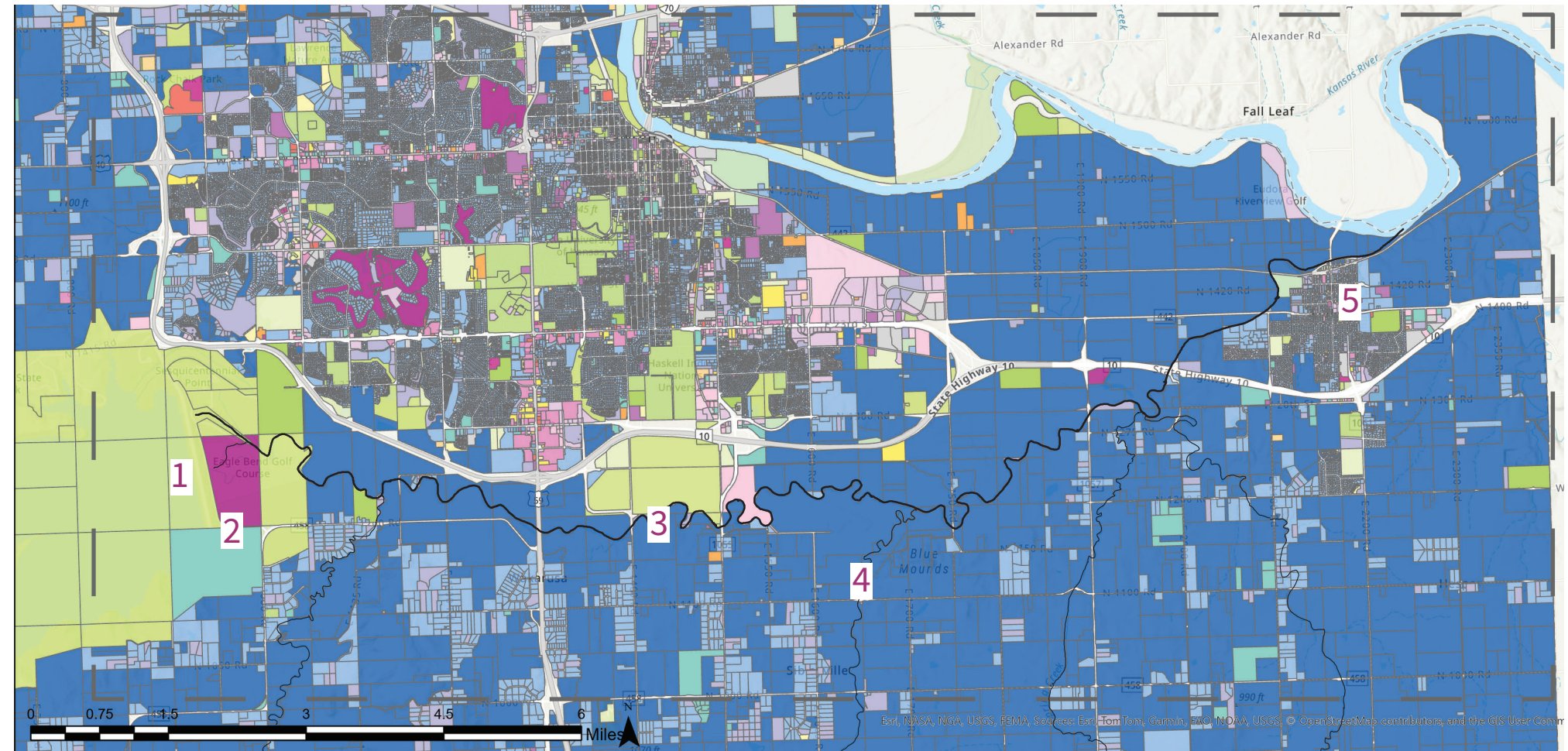


Figure 15



Figure 16



Figure 17



Figure 18



Figure 19



Figure 20

Precedent Studies

Battery Playscape & Kenilworth Tidal Marsh Restoration

Battery Playscape fosters public spaces into ecological spaces while still fostering ecological education. Kenilworth Tidal Marsh exemplifies waterfront restoration through grading and planting alterations.

Battery Playscape



Kenilworth Tidal Marsh



Precedent Ctd. Ecological Vision

Hudson's Riverfront Park



Figure 25

Hudson Riverfront Park showcases ecological restoration while providing community interaction and park experience.



Figure 26



Figure 27

Location and Key Findings From Site Analysis

There are 5 main focus areas, 4 of which are covered in this document (Eagle Bend Golf Course is not discussed). Much of the built structures are located on the southwest side of the site.

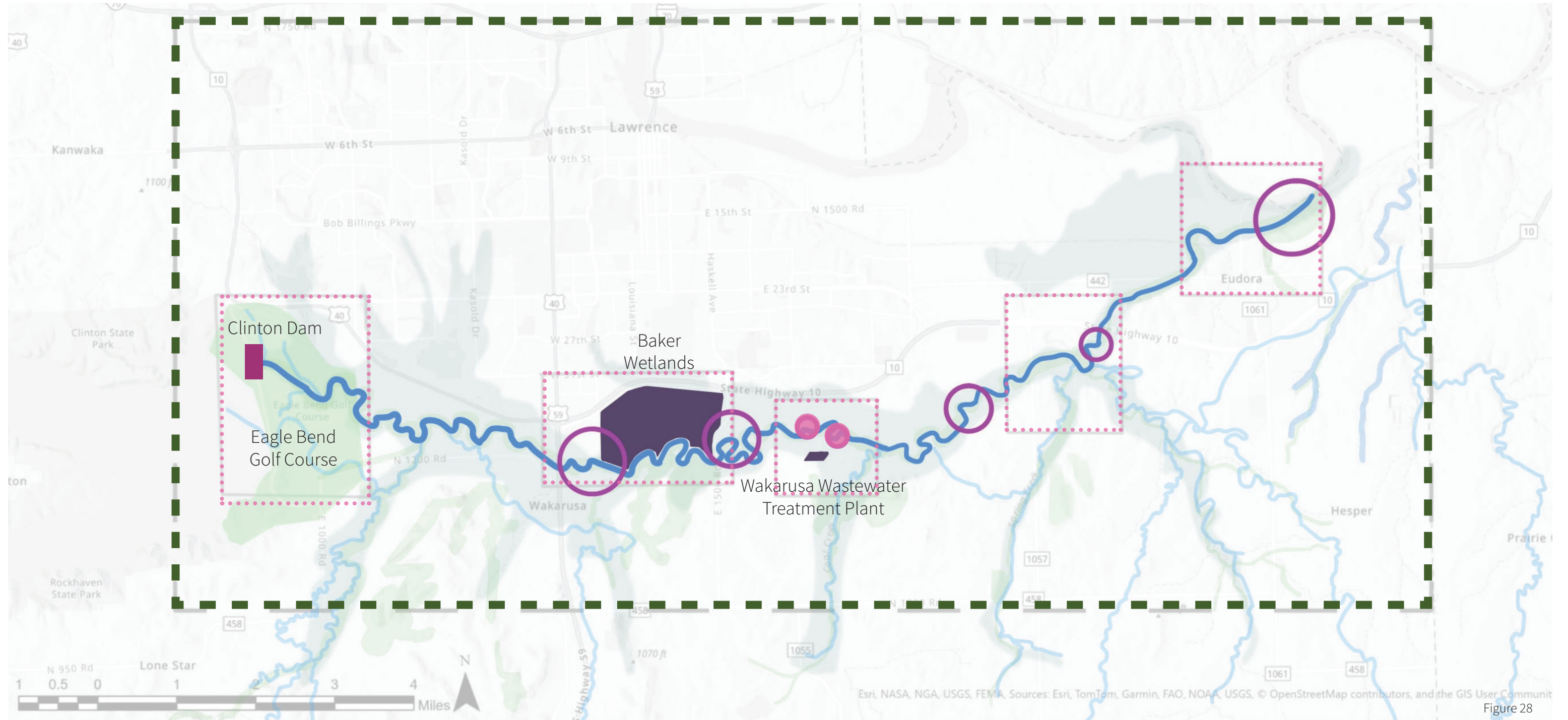


Figure 28

Key



Riparian edge needs repair



Wakarusa Wastewater Treatment Plant Drains

Goals and Objectives

Educate the Community

Objective 1:

Provide interactive zones along the river for people to appreciate the environment

Objective 2:

Inform the public about the importance of connected wildlife habitat through signage

Objective 3:

Raise awareness about the essential qualities of native vegetation and the benefits of its implementation around the Wakarusa River

Empower the Corridor

Objective 1:

Create accessible areas around the Wakarusa River for a variety of people to enjoy

Objective 2:

Highlight the ecosystems and groups that restore converted land

Objective 3:

Integrate the culture of Lawrence, Eudora, and the surrounding communities into the Wakarusa River

Enrich the Environment

Objective 1:

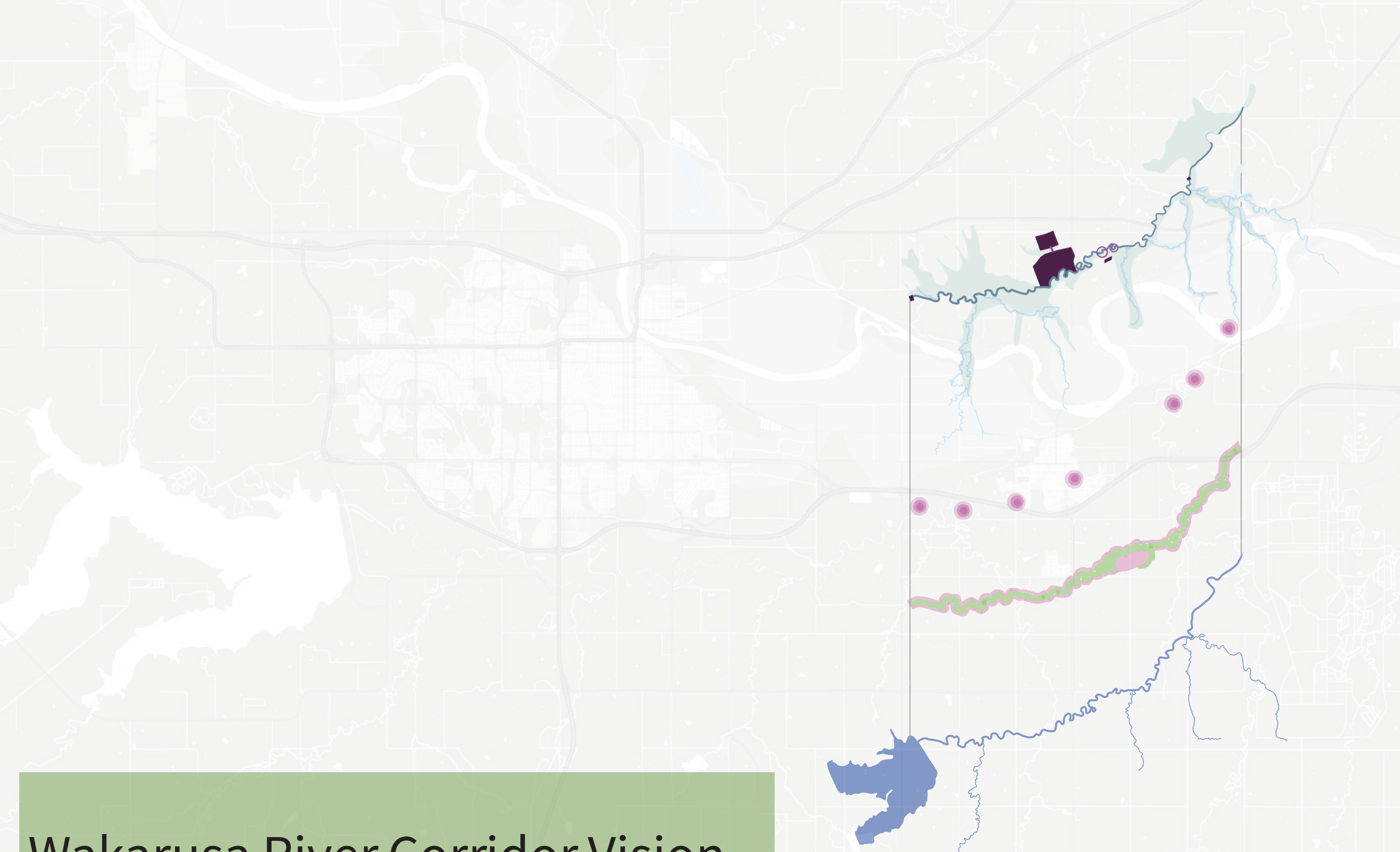
Restore the riparian corridors back to optimal wildlife habitat

Objective 2:

Reduce habitat fragmentation through strengthening ecological corridors

Objective 3:

Improve the quality of the water that flows through the Wakarusa River



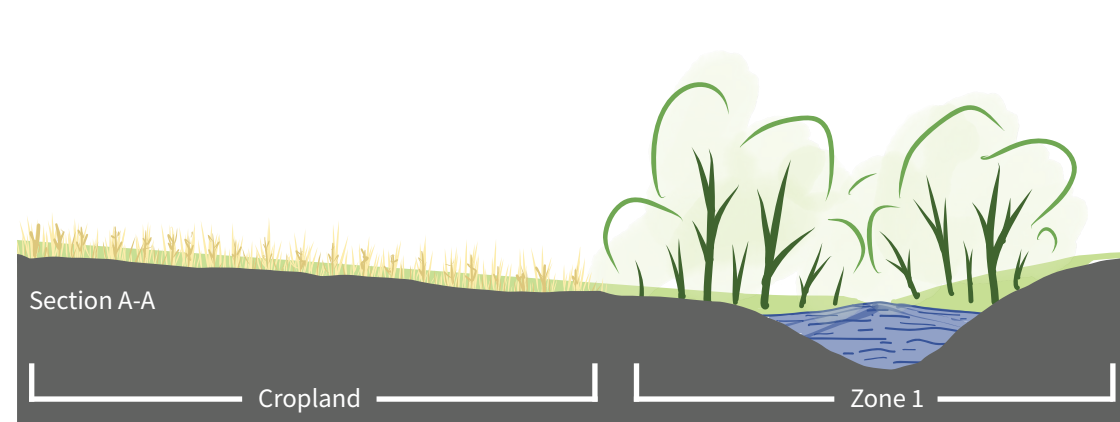
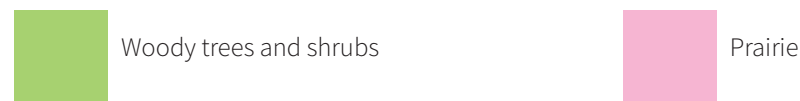
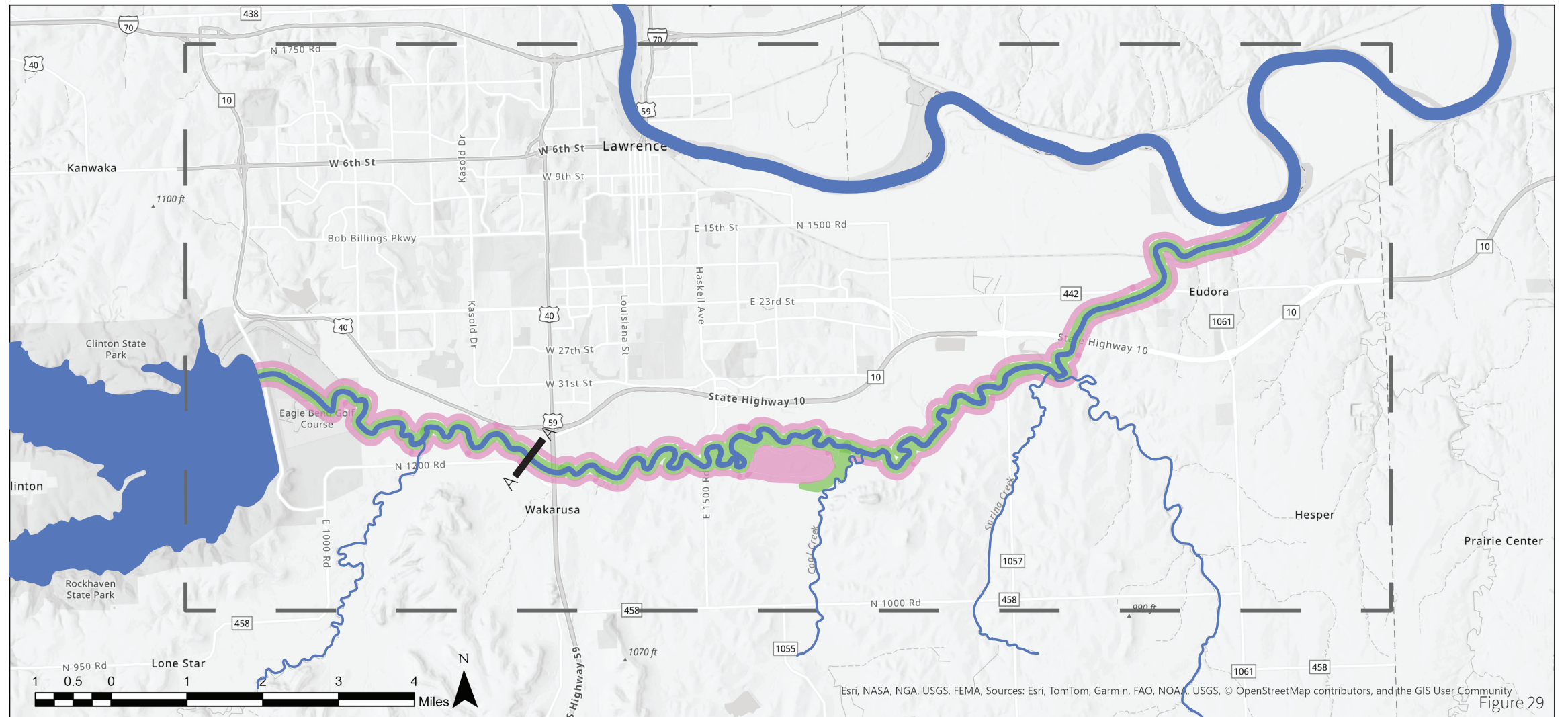
Wakarusa River Corridor Vision

River Corridor Vision: Ecology and Biodiversity

To improve the ecology and biodiversity of the Wakarusa River Corridor, attention needs to be drawn to restoring the riparian corridors and wet prairie habitats. The remaining oak-hickory forests and prairie have been severely fragmented, reducing the land animals can inhabit.

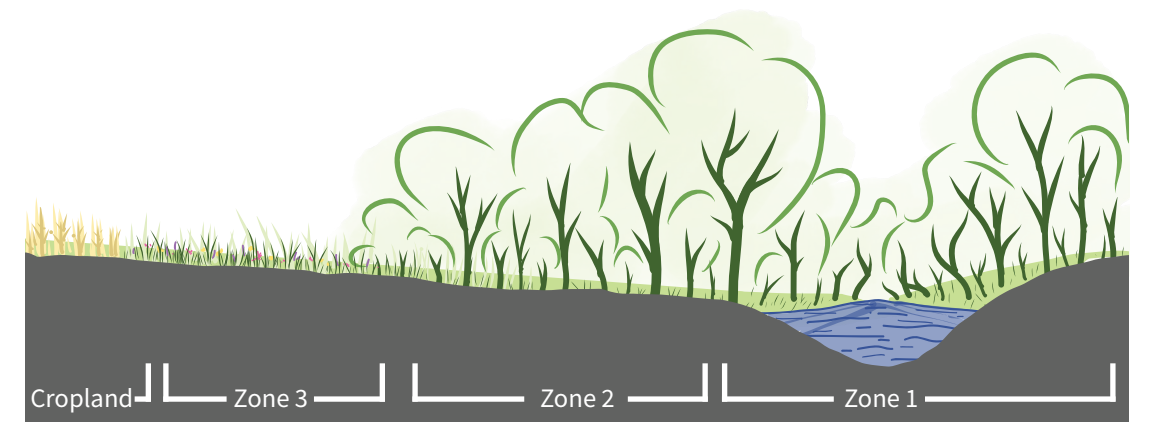
Increasing the width of the riparian buffer would provide a habitat for animals, reduce erosion, and clean pollutants from runoff before entering the river. The recommended width of the riparian buffer is a minimum of 100' and up to 600'+.

Riparian buffers consist of three zones. The first zone is next to the water and is composed of woody plants that hold the soil in place. Zone two contains trees, shrubs, and herbaceous vegetation. Zone three consists of grasses and other herbaceous plants.



Current Conditions

Figure 30



After Restoration

Figure 31

River Corridor Vision: The River and Water

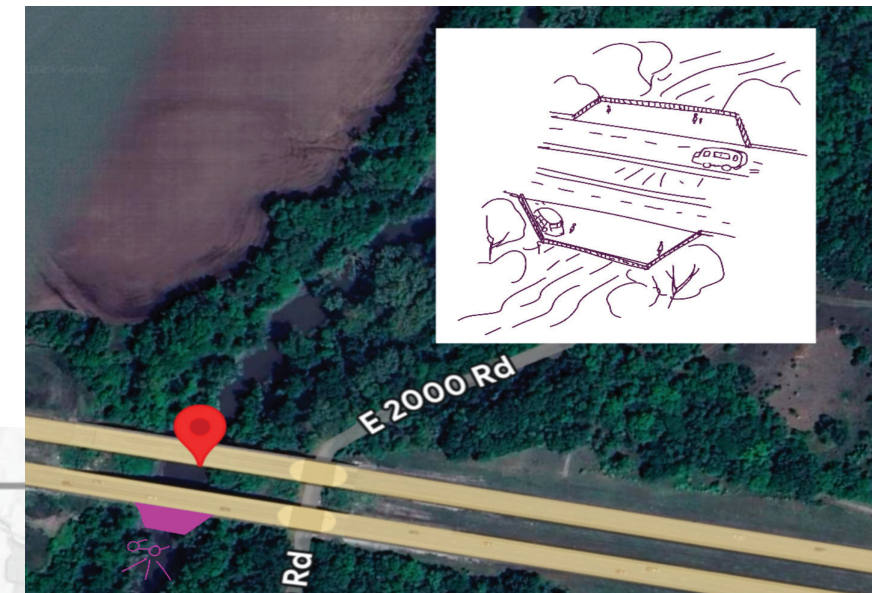
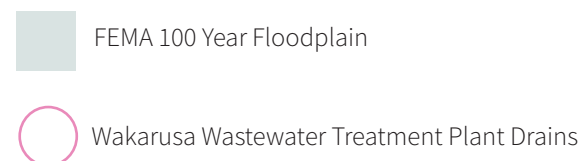
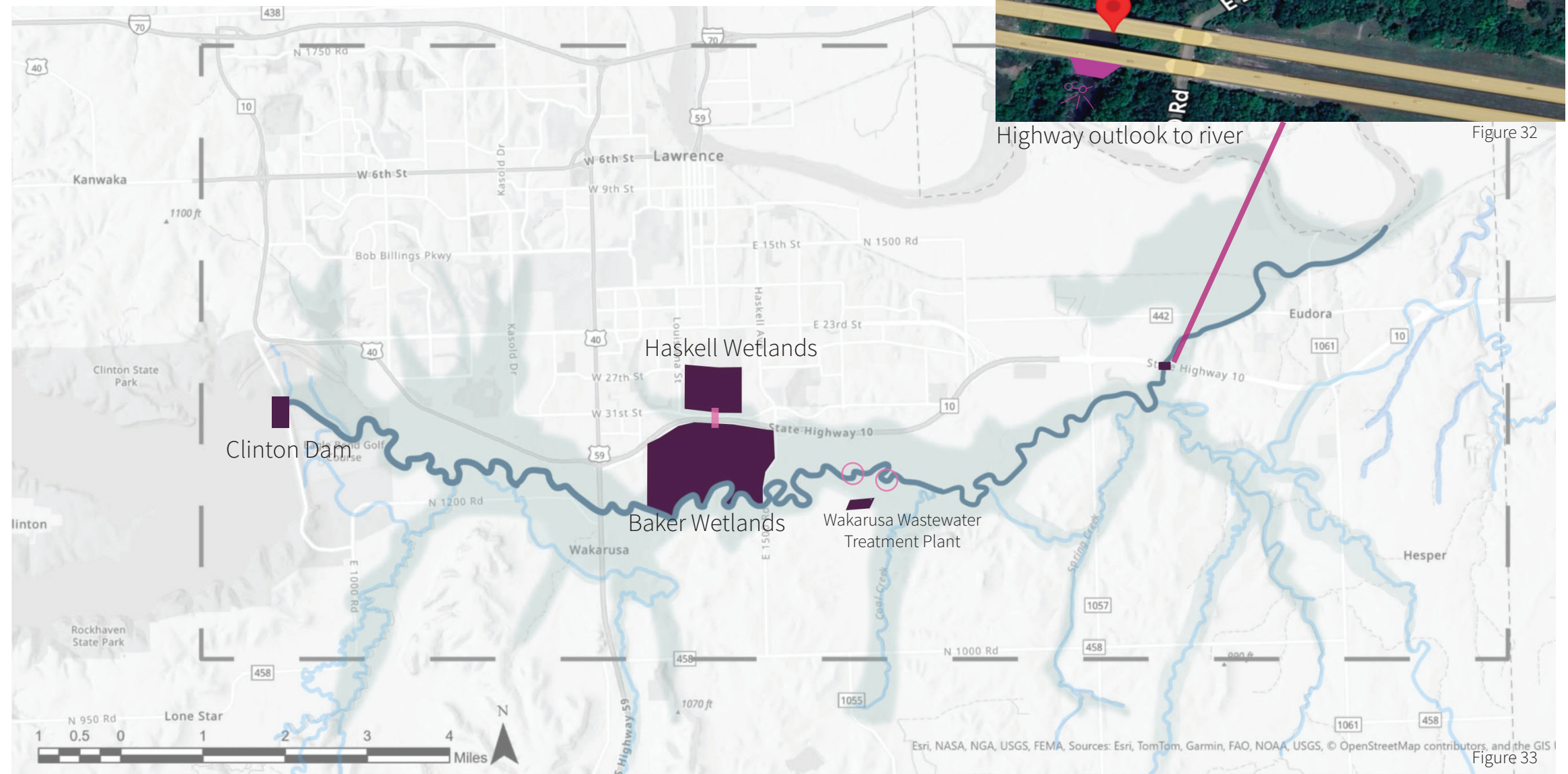
The Wakarusa River holds meaning for both people and wildlife, with people of many diverse backgrounds finding meaning and connection with the Wakarusa.

To address both human and ecological needs of the river, it is essential to avoid construction within the FEMA floodplain and instead implement effective flood mitigation strategies. Techniques such as planting native prairie borders can help absorb runoff, reduce flooding risk, and protect surrounding ecosystems.

As discussed previously, repairing and maintaining riparian buffers is critical for preserving habitat for fish, mammals, and birds. These vegetated zones also stabilize riverbanks and prevent erosion, playing a key role in maintaining the river's structure and health.

Improving public access through well-placed entry points can help connect communities with the river. However, development should be informed by collaboration with local Indigenous peoples to respect cultural values and guide ecologically sensitive restoration and access planning.

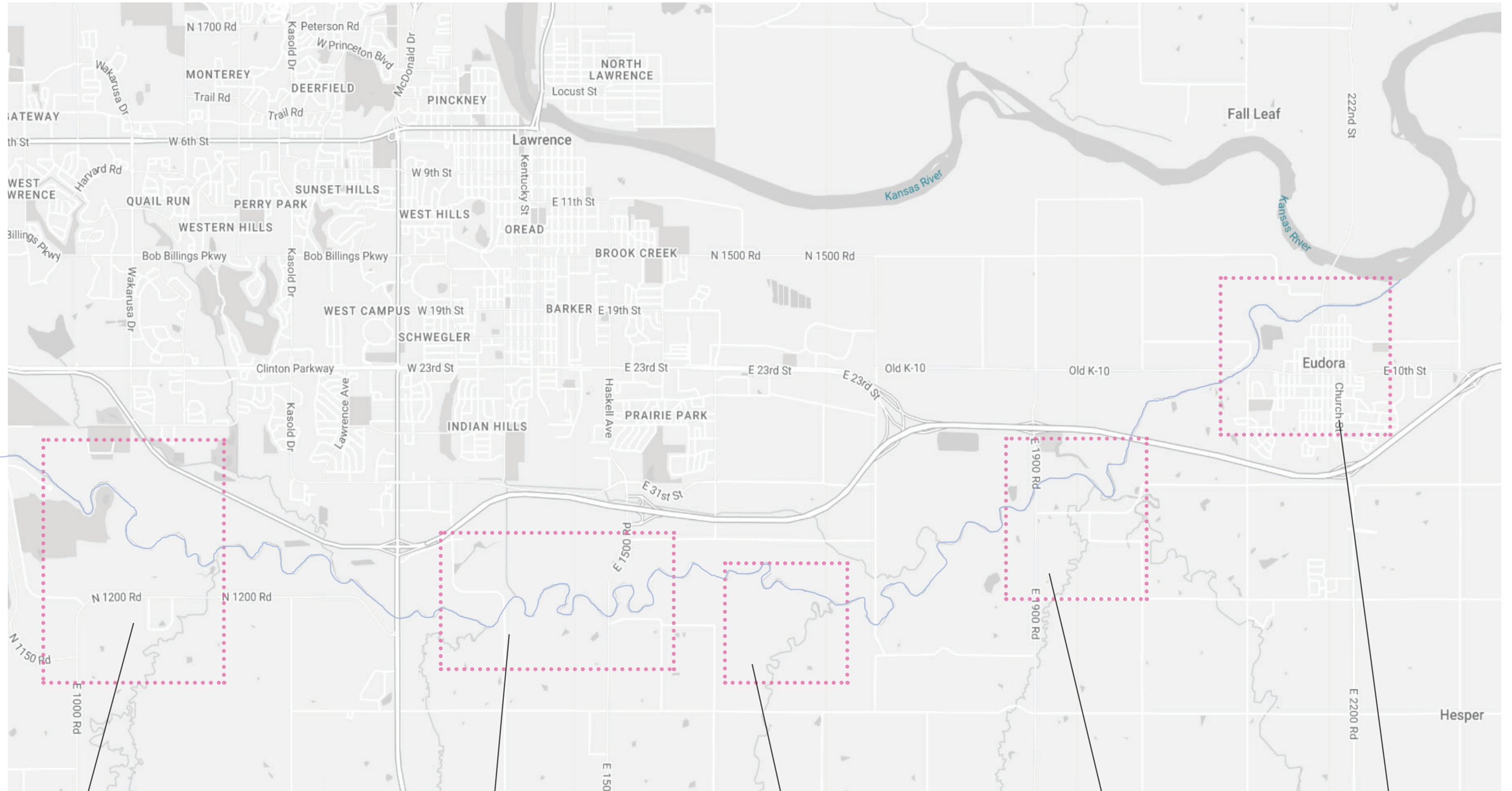
Finally, the Wakarusa Wastewater Treatment Facility offers an opportunity to support and showcase green, low-impact treatment methods. These innovations could serve as a model for sustainable infrastructure at other suitable sites in the region.



Highway outlook to river Figure 32

Figure 33

Focus Areas



Eagle Bend Golf Course

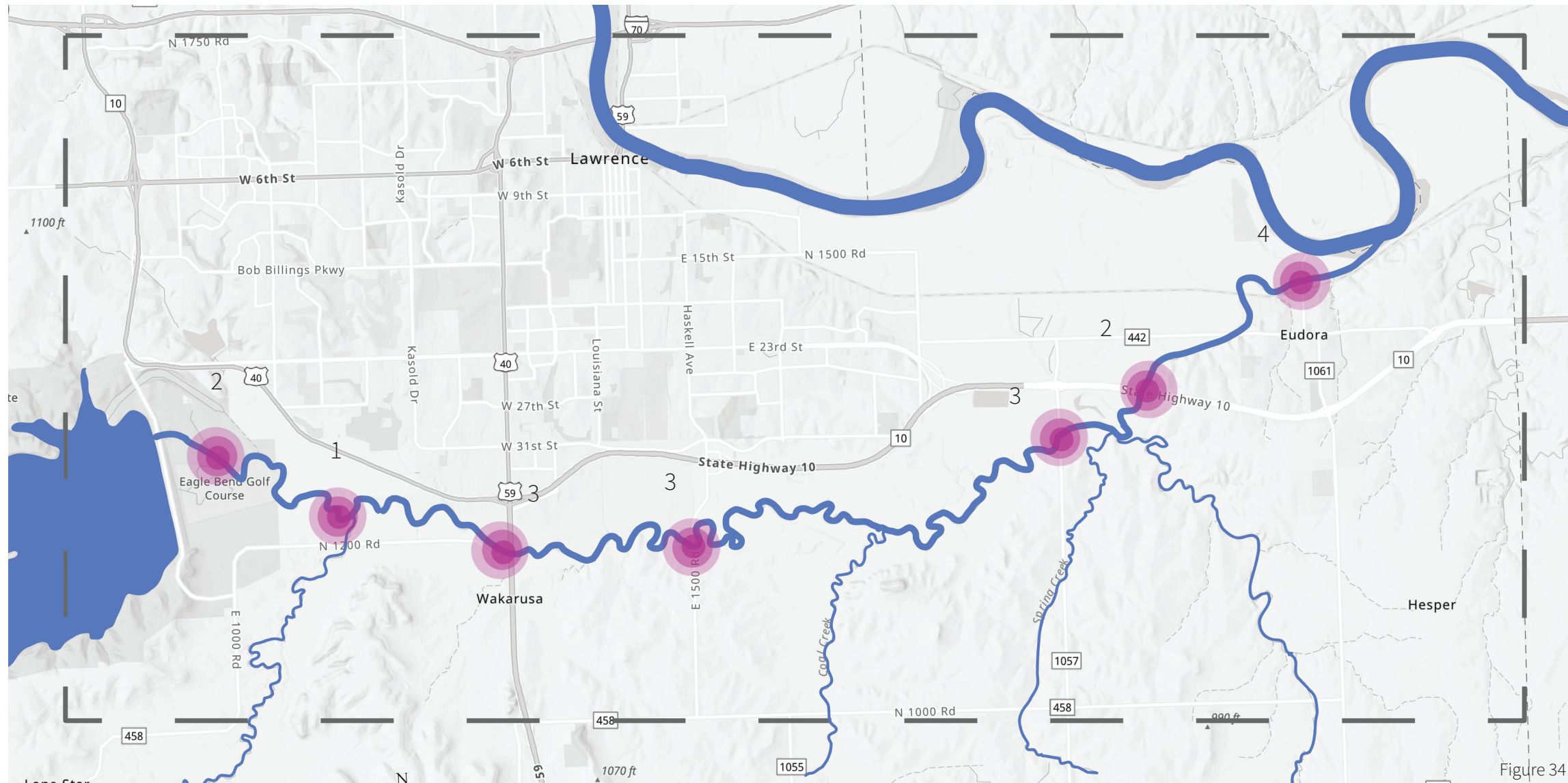
Baker Wetlands

Water Treatment Plant

Wakarusa/Spring Creek/Little
Wakarusa Intersection

Eudora Boat Ramp

River Corridor Vision: Social Connectivity



Lawrence and Eudora feel disconnected from the Wakarusa River due to the lack of resources they have to access the river. Installing lookout areas, river walks, and accessible waterfront keys allows the communities of Douglas County to reconnect to nature in a variety of opportunities. Marked on the map above are the areas that are considered to be improved by these additions due to their close proximity to 1) neighborhoods, 2) safe water edges, 3) high traffic, and 4) previous boat ramp points.



Figure 37

Focus Area Visions: Baker and Haskell Wetlands

Baker and Haskell Wetlands are restored wetlands north of the Wakarusa River. Both of these wetlands used to be used for agricultural use and were drained to dug canals. The majority of the land to what is now the Baker Wetlands and Haskell Wetlands was drained between 1917 and 1927 for education about agriculture for Haskell Institute.

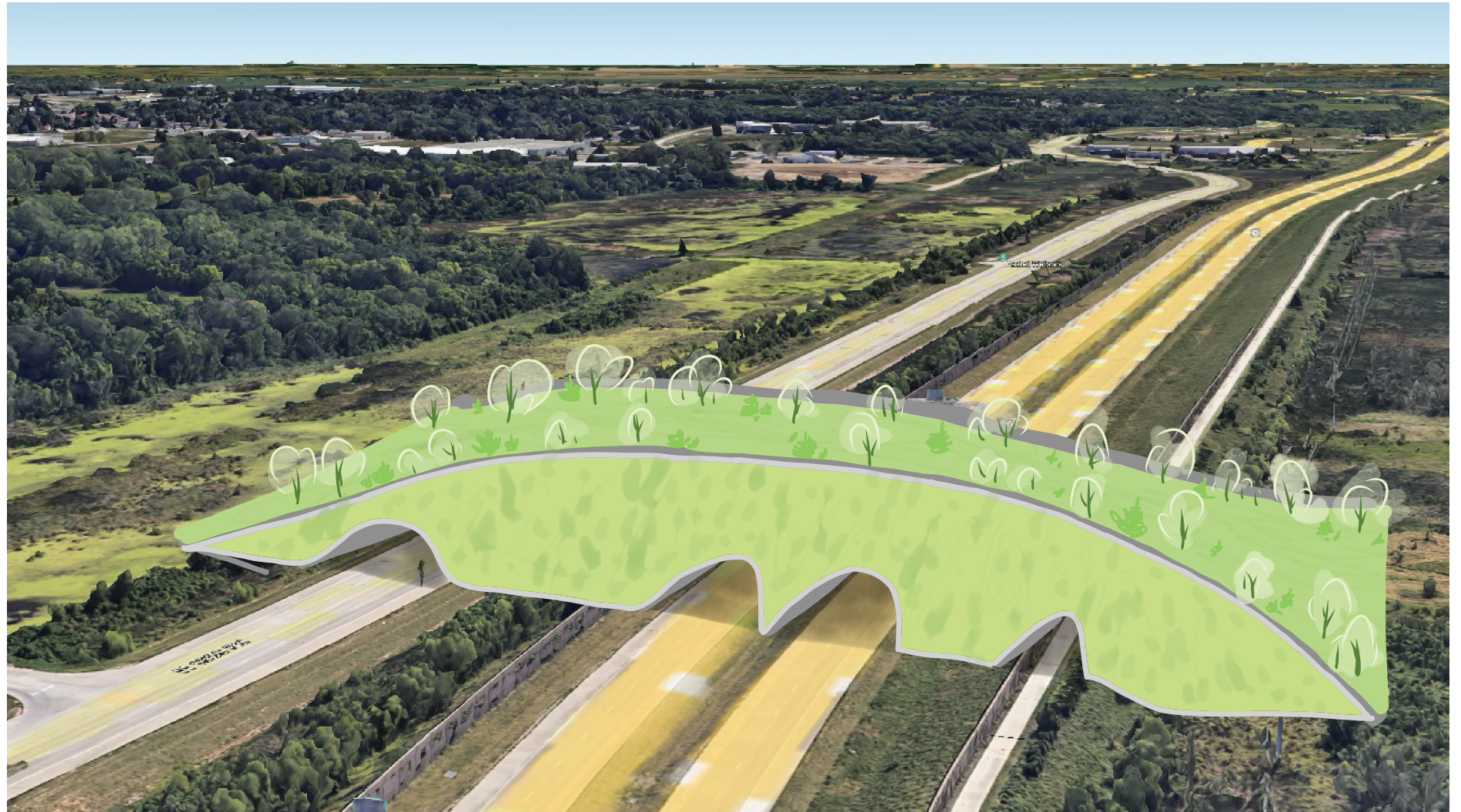
In 1934, Haskell changed their education mission that did not include agricultural training. These lands changed ownership many times before given to the government. In August of 1968, Baker University owned the lands for the education, research, and preservation of the remaining original wetlands.

Dr. Ivan Boyd, a biology professor at Baker University, had significant impacts in returning the land back into native wetlands. He and his students introduced prairie seeds, collected from nearby prairie, into these lands.

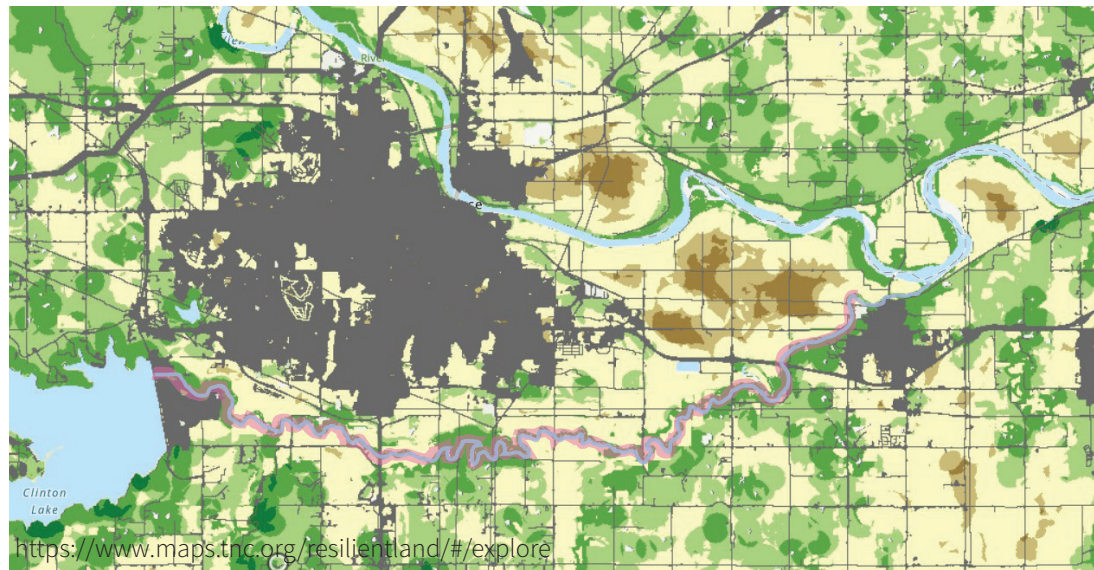
Now the Baker and Haskell Wetlands thrive with a diverse variety of plants, animals, and birds.

To continue this legacy, education about the importance of this habitat should continue to be spread.

This can be accomplished through community engagement and social media, or outreach through schools to educate the future generation.



The Haskell Wetlands and the Baker Wetlands are separated by highway K-10. To connect the two wetlands for animal migration and movement, a land bridge can be constructed over the roads for access to both the wetlands.



Ecological Resilience

The Wakarusa River section in Douglas County is heavily fragmented by roads, development, and agriculture, disrupting wildlife habitats and making it dangerous for animals. Barriers like highways isolate species, increase roadkill, and limit access to food and water, while pollution further harms aquatic life.



Focus Area Visions: Wakarusa Wastewater Treatment Plant

The Wakarusa Water Treatment Plant began operating in 2018 as a biological nutrient removal facility. This facility removes nitrogen and phosphorous from the wastewater using microorganisms, so these nutrients do not enter the Wakarusa, which would normally cause harmful algae blooms and death of freshwater animal life. After the water is cleaned, it is discharged into the Wakarusa River.

The focus is to enrich the Water Treatment Plant by transforming the surrounding land into prairie and restoring the riparian corridor. The discharged, cleaned water can create a wetland that connects to the Wakarusa River and drains to it.

Additionally, educating the public about the effects of nitrogen and phosphorous entering the river can raise awareness of the importance of treatment plants and wetlands that filter these nutrients.

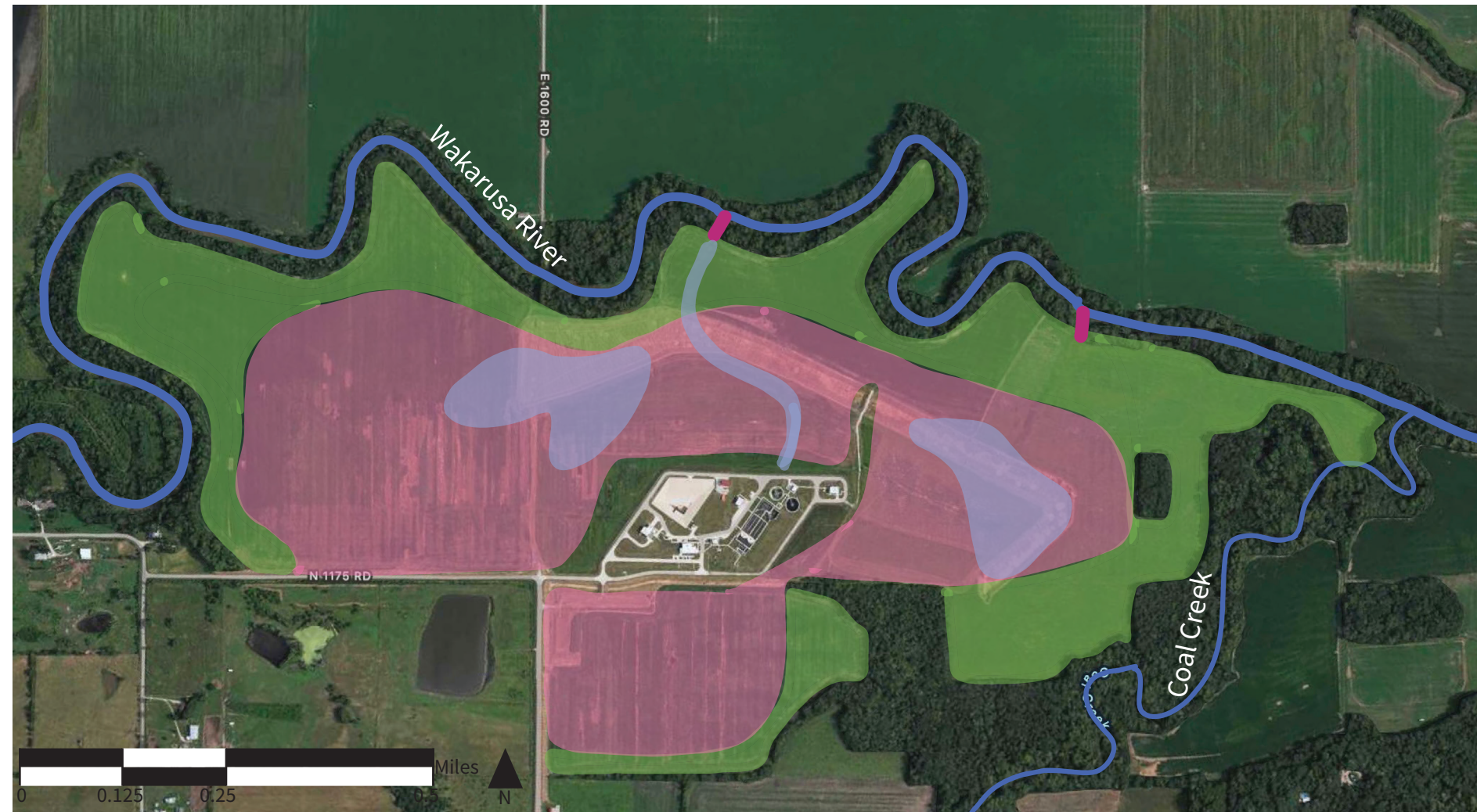
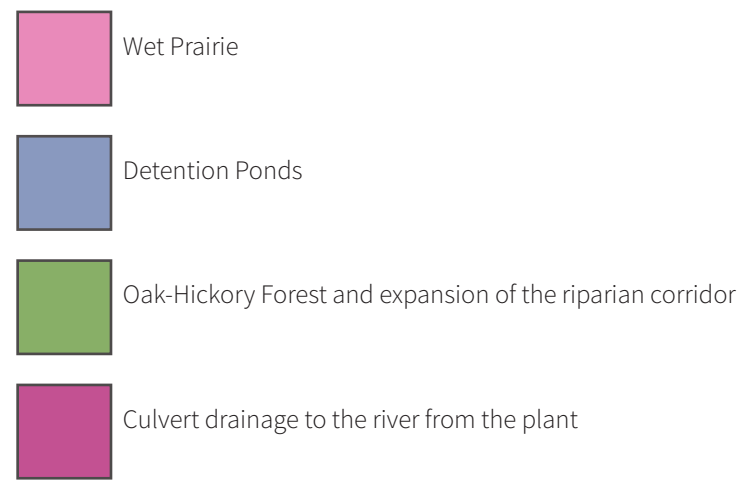


Figure 39



Focus Area Visions: Feeder Streams

This area is where Spring Creek and the Little Wakarusa Creek converge into the Wakarusa river. The current riparian borders in this area have a wide range, with some over 300' and some under 50'. The surrounding land is largely agricultural with the Bluejack Crossing Vineyard and Winery in the south part of this focus area. Most of area surrounding the Wakarusa on this area is woody and provides a patch of woodland habitat for mammals and shaded streams for fish.

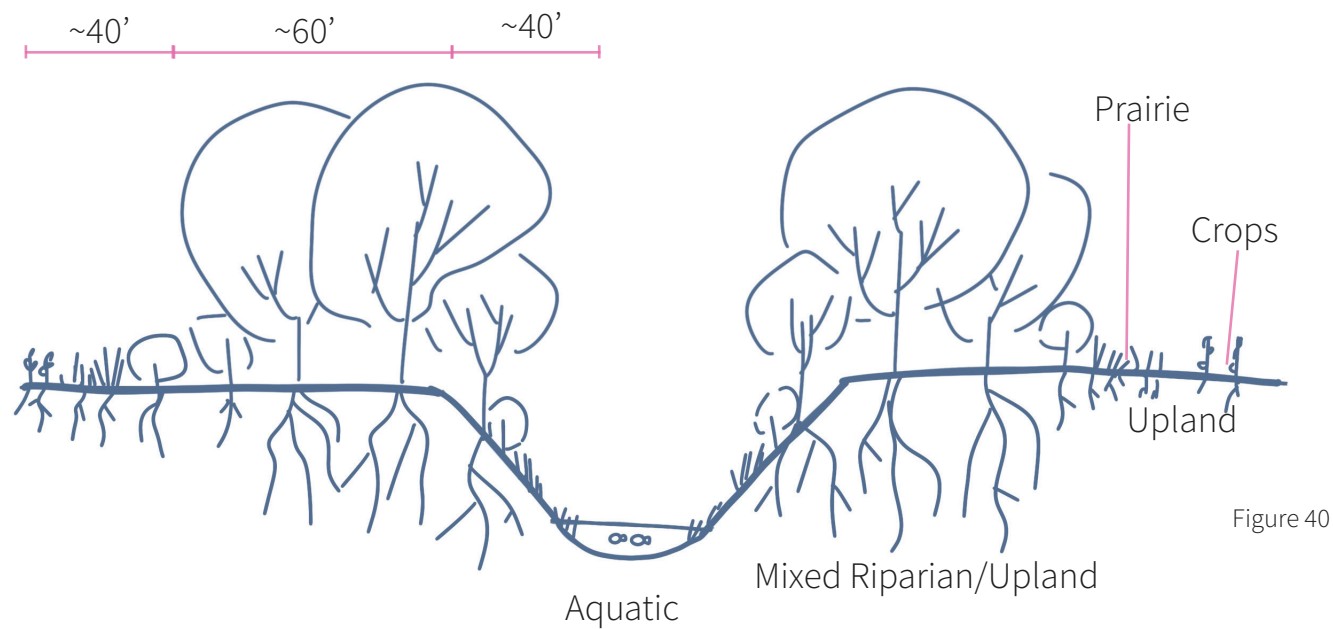
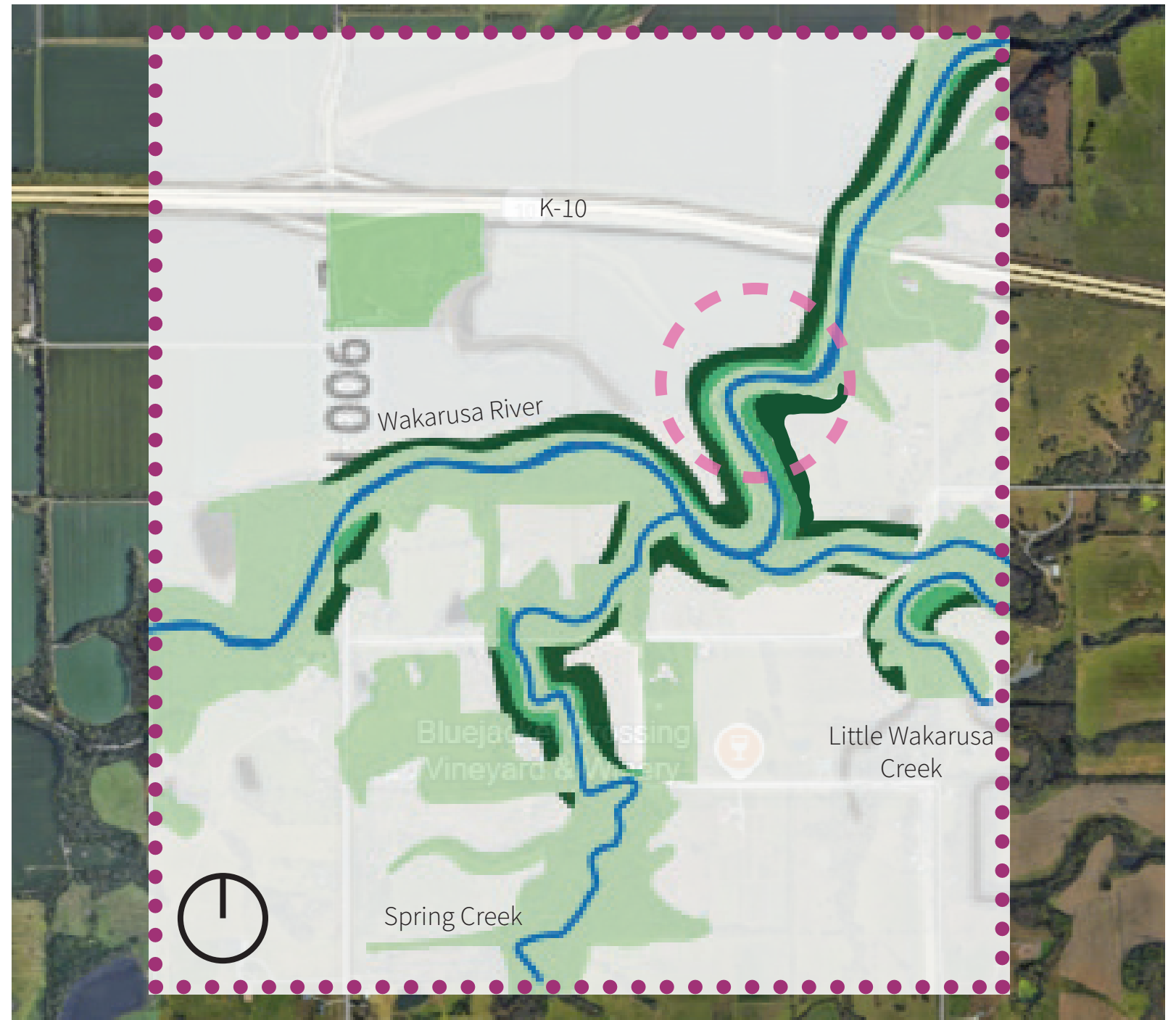


Figure 40

Riparian Edge Diagram

Riparian edge helps provide shade for fish in the water, habitat for animals in either side of the river, and the technique of edge feathering can be used to improve crop quality as crops transition into prairie grasses, not competing with wooded areas for resources.



Basemap by ArcGIS database and GoogleEarth, accessed March 11th, 2025

Figure 41



Focus Area Visions: Eudora

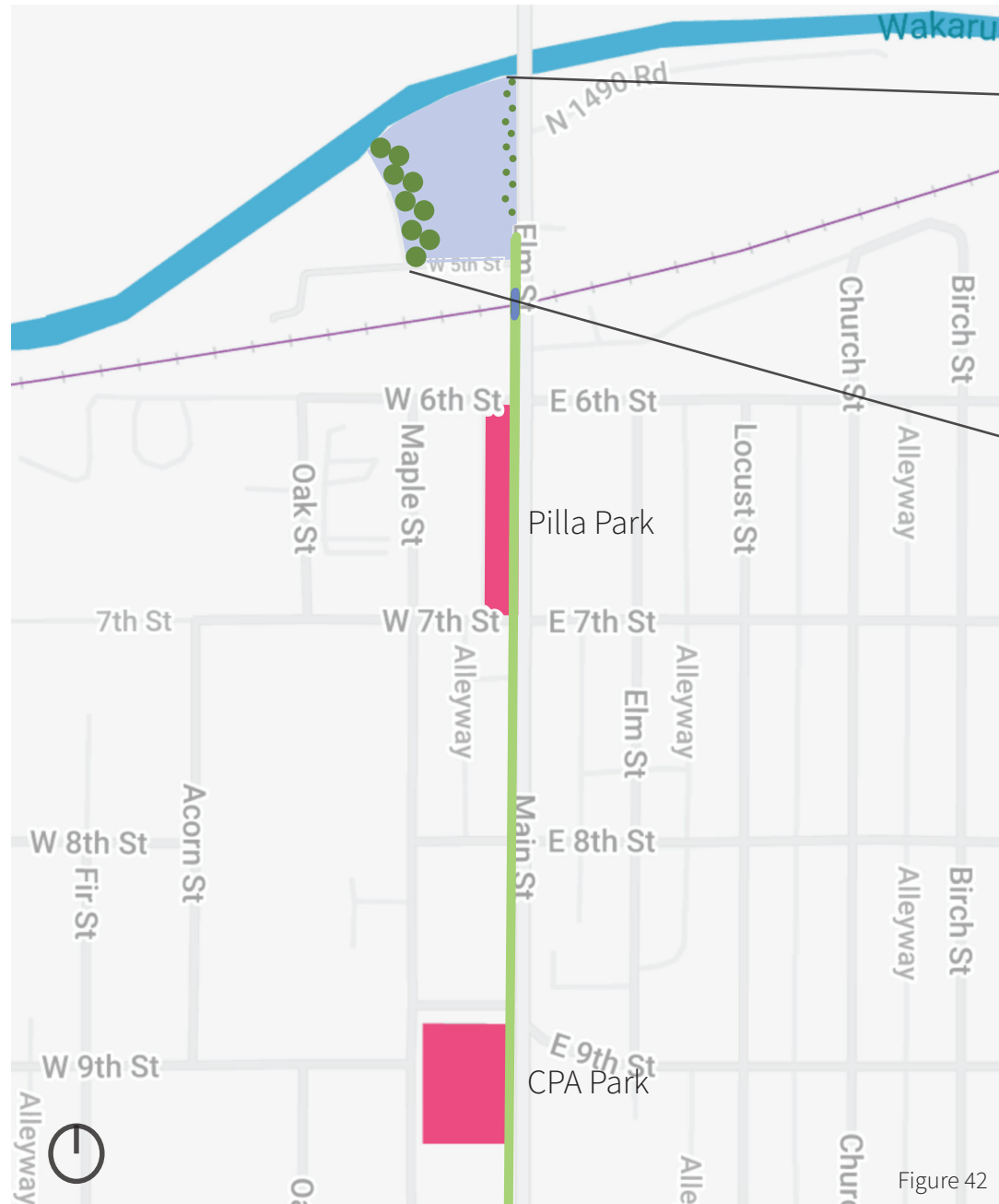


Figure 42

The parks are connected through proposed sidewalks that run down Main St. up to the boat ramp. This is to increase physical and visual connectivity of the boat ramp site to the greater urban form of Eudora, specifically for pedestrians. A row of trees on the west side of the site block views and disturbances by the Eudora Public Works Department. A row of shrubs on the east side helps mitigate sound and air pollution by automobiles crossing the bridge.

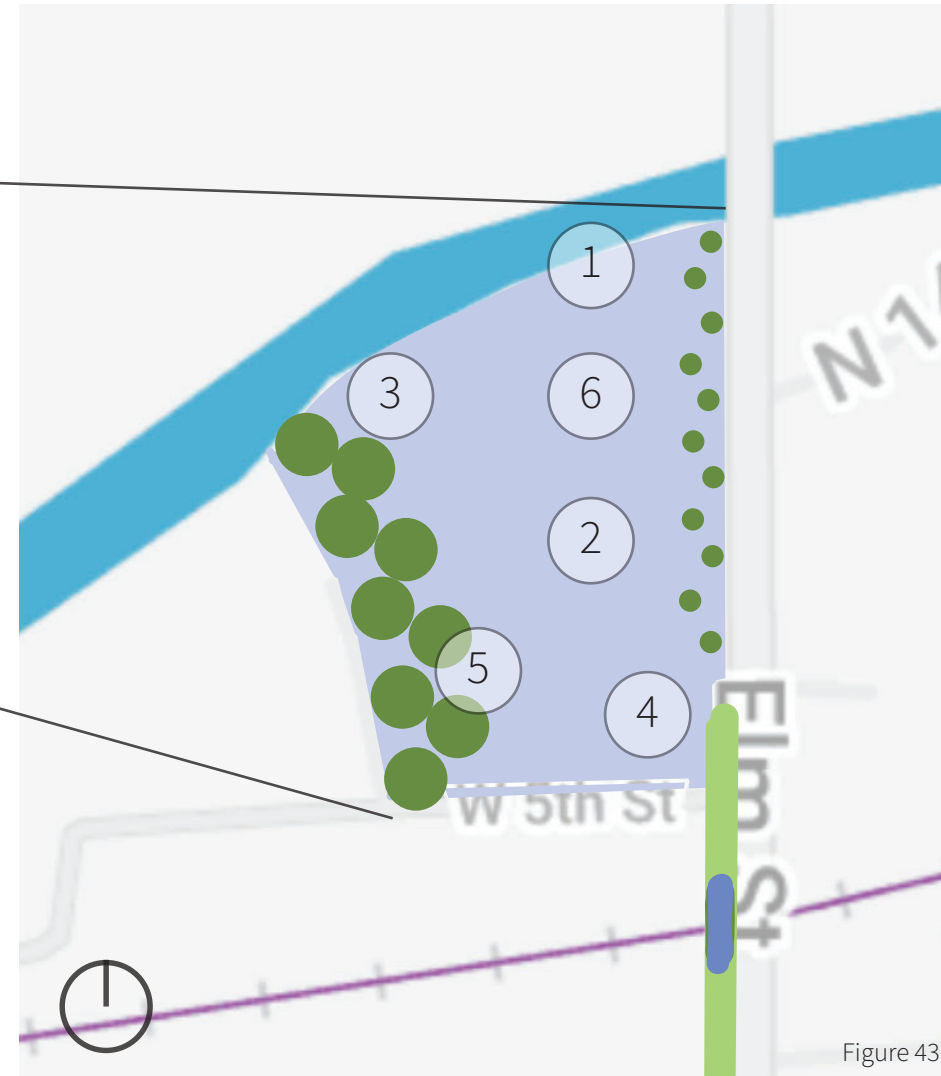


Figure 43



Figure 44

1. Fish Station



Figure 45

2. Resilient Structure/Permeable Paving



Figure 46

3. Signage



Figure 47

4. Lighting/Shade



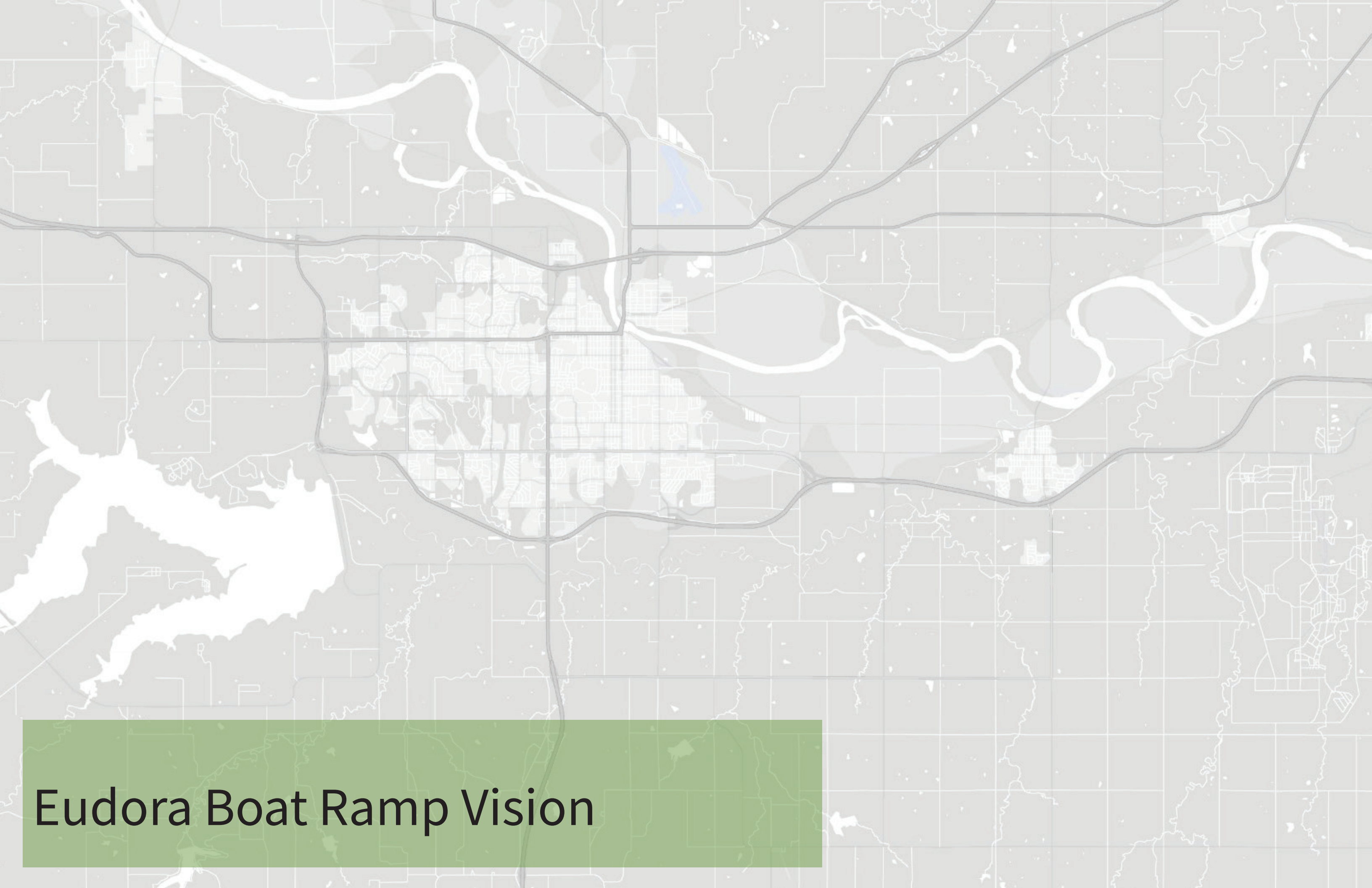
Figure 48

5. Bathroom



Figure 49

6. Accessibility (Physical/Visual)



Eudora Boat Ramp Vision

Phasing and Site Plan

Due to the presence of the existing wastewater treatment plant on-site, the development will unfold in two distinct phases: the first phase will focus on the boat ramp and existing parking areas, while the second phase will address the treatment plant and its integration into the larger site.

The vision for Wildflower Waterfront is to create an inclusive, flexible public space that reflects Eudora's community values, encouraging connection across all ages and interests. Designed with a range of activities in mind—walking, biking, fishing, gathering, and quiet reflection—the space offers both recreational opportunities and moments of peaceful respite, all while embracing environmental stewardship. By reusing existing infrastructure and incorporating sustainable elements such as bioswales, native plantings, and restored riparian corridors, the design minimizes the use of new materials and strengthens the site's resilience to flooding.




Additionally, the inclusion of rentable spaces provides an opportunity for revenue generation, which could support key community priorities, such as the potential relocation of the city's water treatment plant. This approach ensures long-term financial sustainability without compromising the public's access to the space. Accessibility is a central concern, with ADA-compliant pathways and inclusive viewpoints strategically placed to ensure the site is welcoming for all visitors, regardless of ability.

Through a phased, environmentally conscious approach, Wildflower Waterfront creates a harmonious balance between natural beauty, community engagement, and economic opportunity—positioning the site as a vibrant, connected space that supports Eudora's future growth and well-being.



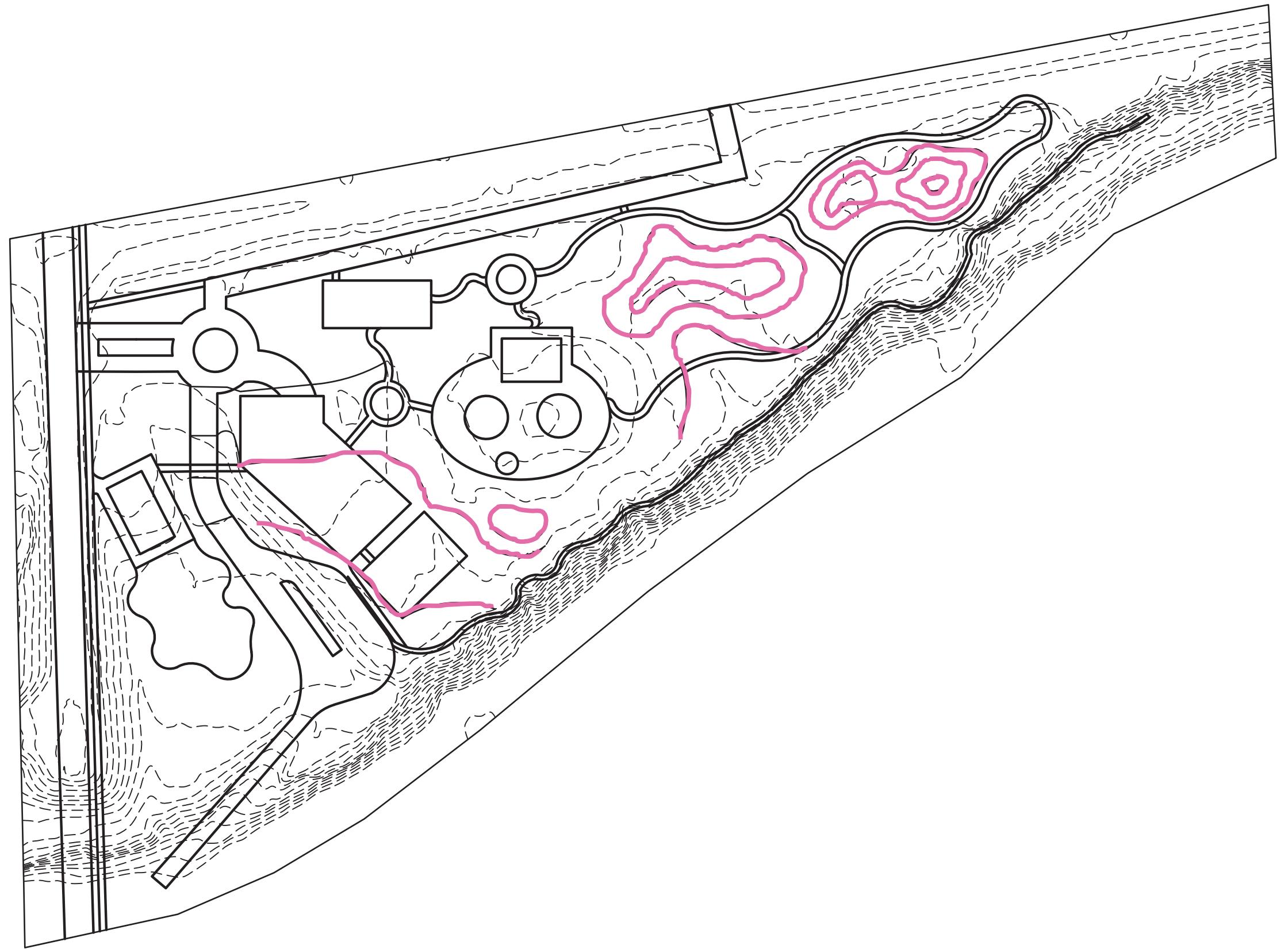
Phasing

With the existing waste water treatment plant still on site, the development will have to split into two different phases: one that covers the boat ramp and existing parking, and then the second phase which tackles the treatment plant.

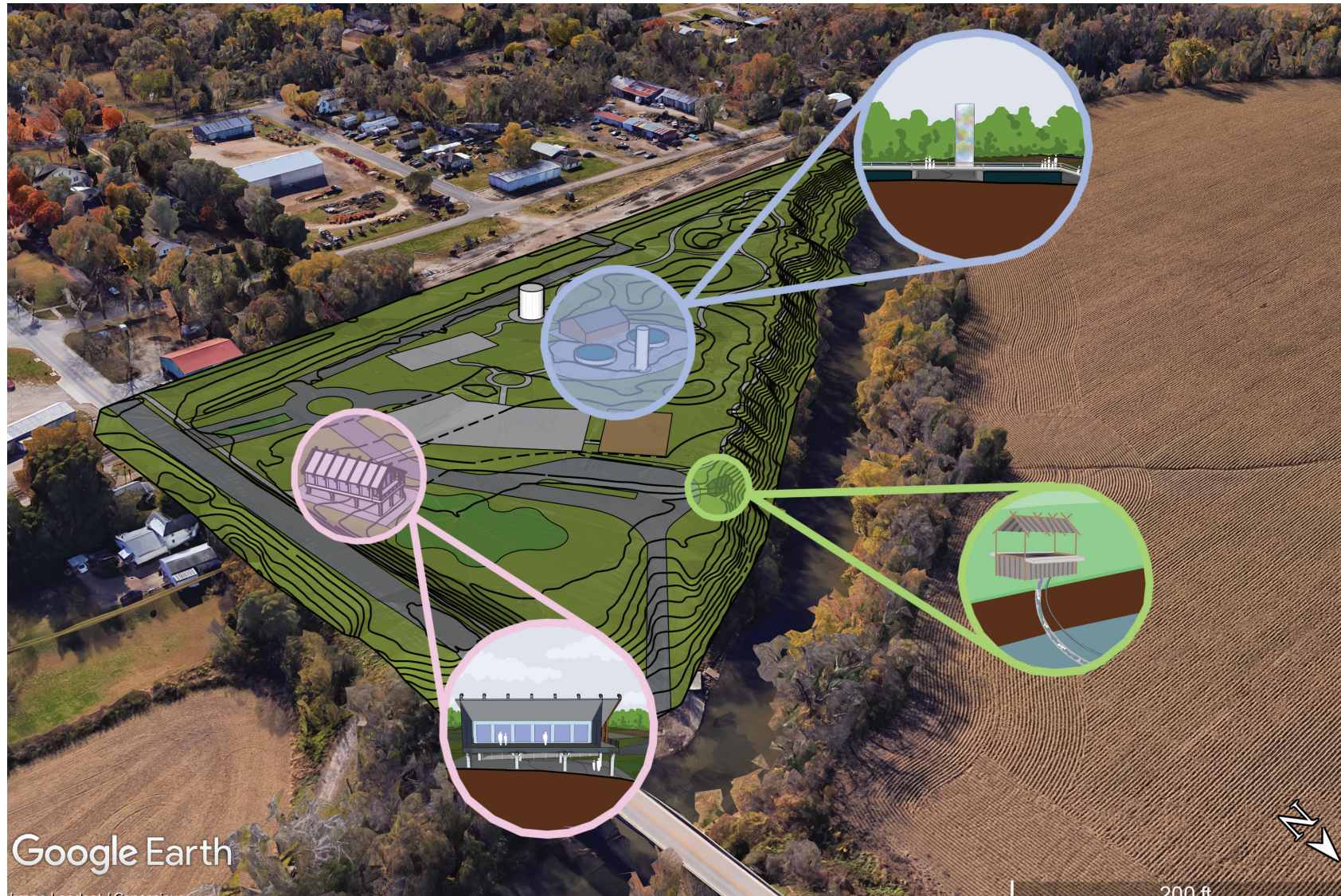
-  Phase 1
-  Phase 2
-  Reusable Structures

Flood Resistant Topography

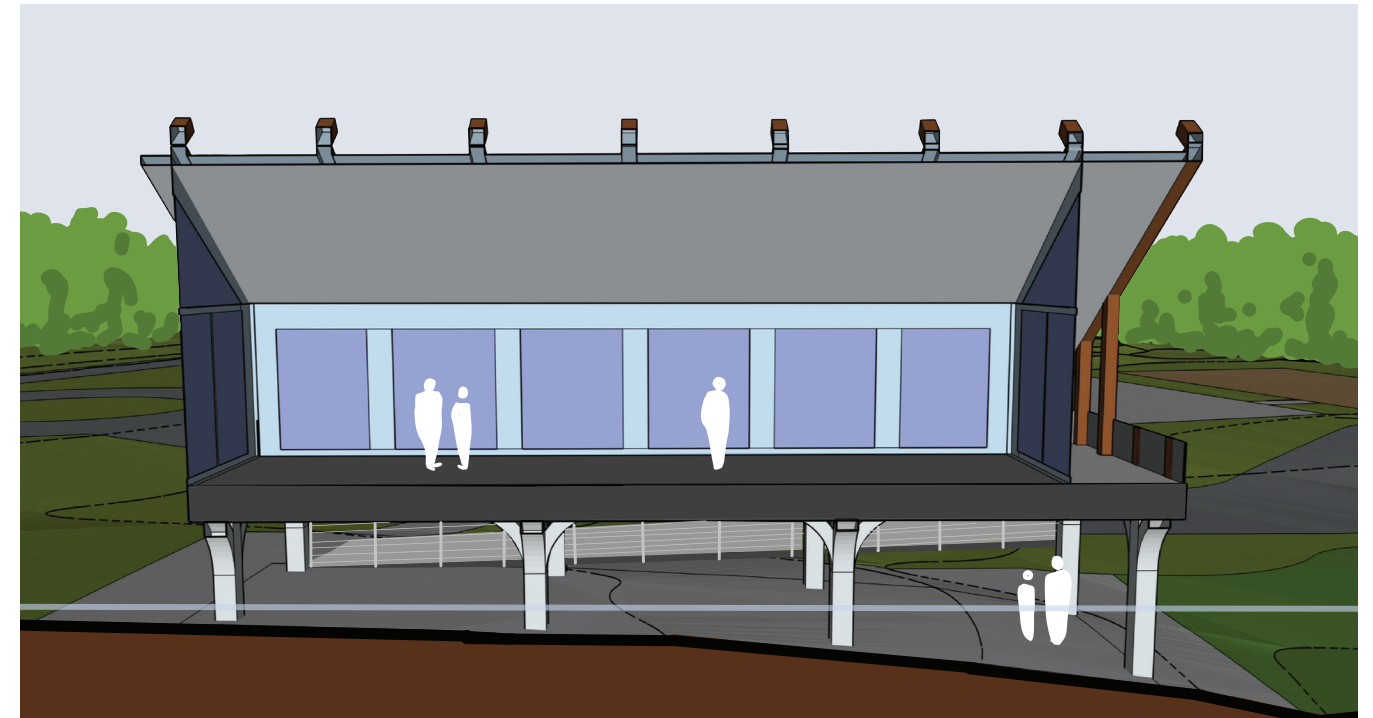
Wildflower Waterfront incorporates a wide range of recreational and ecological features thoughtfully integrated throughout the site. These include walking trails, natural play areas, native plantings, and wildlife habitats that enhance both the visitor experience and the local ecosystem. To support these additions, the design team made only minimal alterations to the site's existing topography. These subtle changes in elevation were strategically implemented to manage stormwater runoff—gently directing it across the landscape and channeling it back into the adjacent river. This approach not only minimizes environmental disruption but also supports sustainable water management and reinforces the site's natural hydrological cycle.



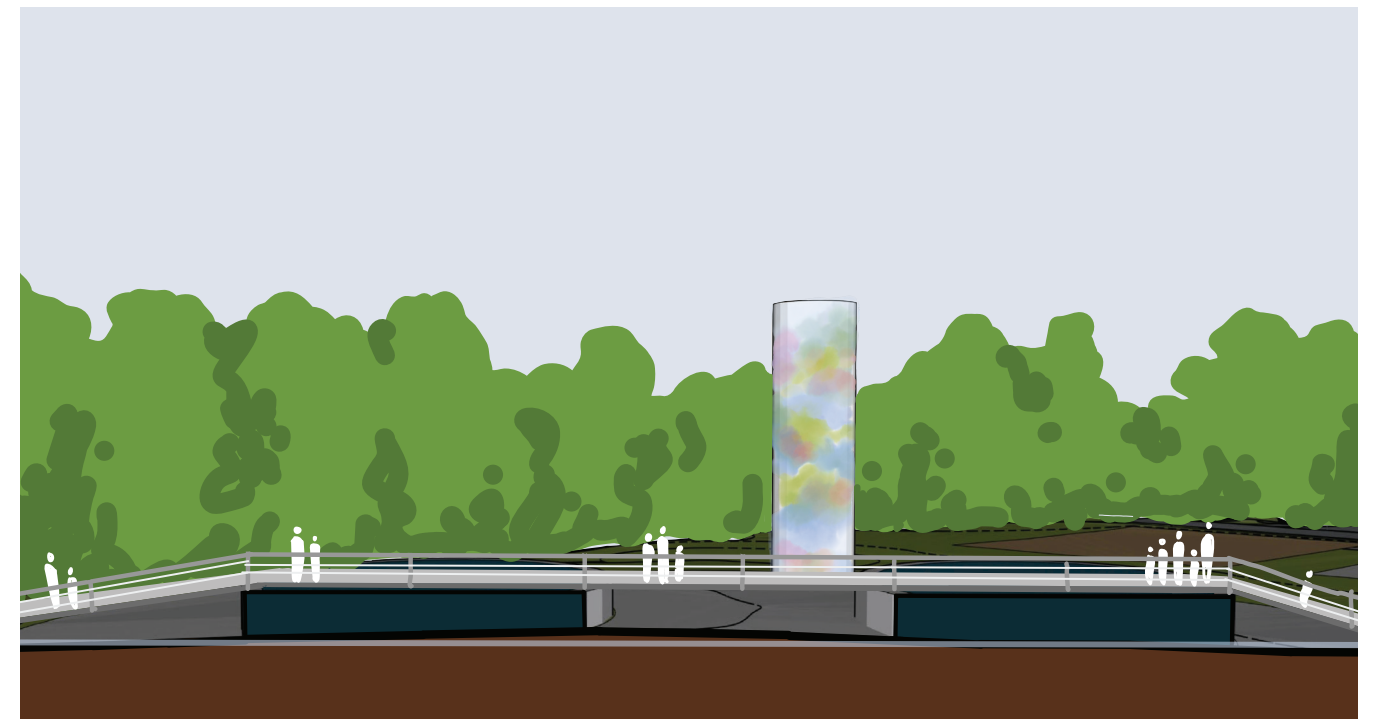
Key Design Features



Key design features include a rentable venue, a fish cleaning station, and elevated rain gardens, each thoughtfully integrated to serve both functional and community-oriented purposes. The rentable venue is strategically placed to serve as a flexible gathering space for the Eudora community—accommodating events ranging from birthdays and graduations to civic celebrations. Its inclusion not only activates the site socially but also generates passive income to support future phases of development, including the implementation of the rain gardens. The elevated rain gardens repurpose existing basins from the former water treatment plant, transforming utilitarian infrastructure into a sculptural and ecological landscape feature. These gardens offer seasonal visual interest while serving an educational function—demonstrating natural water filtration processes in an accessible, immersive way. Near the boat ramp, the fish cleaning station is perched above a series of fishing pavilions, carefully designed to support both recreation and environmental stewardship. The cleaning station allows anglers to process their catch on-site, with a discreet funnel system returning organic waste to the Wakarusa River—enhancing aquatic habitat health and reinforcing the project’s ecological values.



Venue provides space for community events and will eventually provide passive income for the City of Eudora.



Elevated paths included throughout the site allow for safe animal access as well as including accessible elevated spaces to look into the rain gardens created from the renovated water basins.

Connectivity

Ensuring inclusive and thoughtful access to the site—for both the human community of Eudora and the native wildlife—was a guiding principle throughout the design process. Whether visitors arrive on foot, by bicycle, or by car, or whether they are part of the existing ecosystem, the site was designed to support safe, intuitive movement for all. Extensions of the riparian corridor and the reintroduction of native prairie habitats create uninterrupted ecological passageways, allowing wildlife to navigate the site naturally with minimal human interference. These green corridors

not only support biodiversity but also reinforce the site's identity as a shared space between people and nature. For the community, renovated roadways and a network of multi-use trails offer seamless access across the site, encouraging exploration while reducing congestion and improving overall safety. This layered approach to circulation ensures that the site remains welcoming, navigable, and ecologically connected.



Ecological Connectivity

 Ecological Movement




Vehicular Connectivity

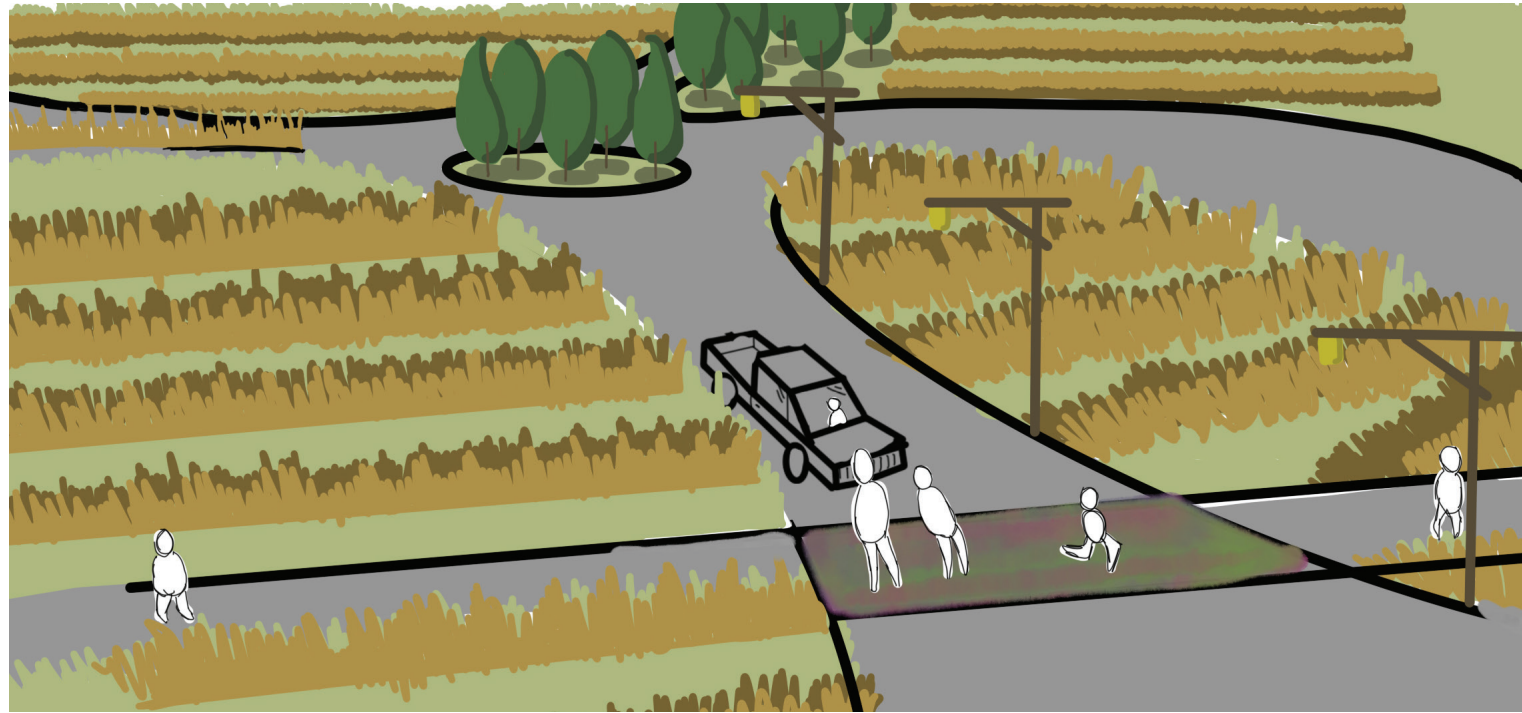
 Phase 1 Circulation  Phase 2 Circulation
 Phase 1 Parking  Phase 2 Parking



Pedestrian Connectivity

 Pedestrian Walkways
 Vehicular Movement

Key Design Aspects



Colorful Pedestrian Crosswalks

These vibrant crosswalks serve as clear visual indicators, signaling safe crossing points for pedestrians while simultaneously prompting drivers to reduce speed and heighten awareness.



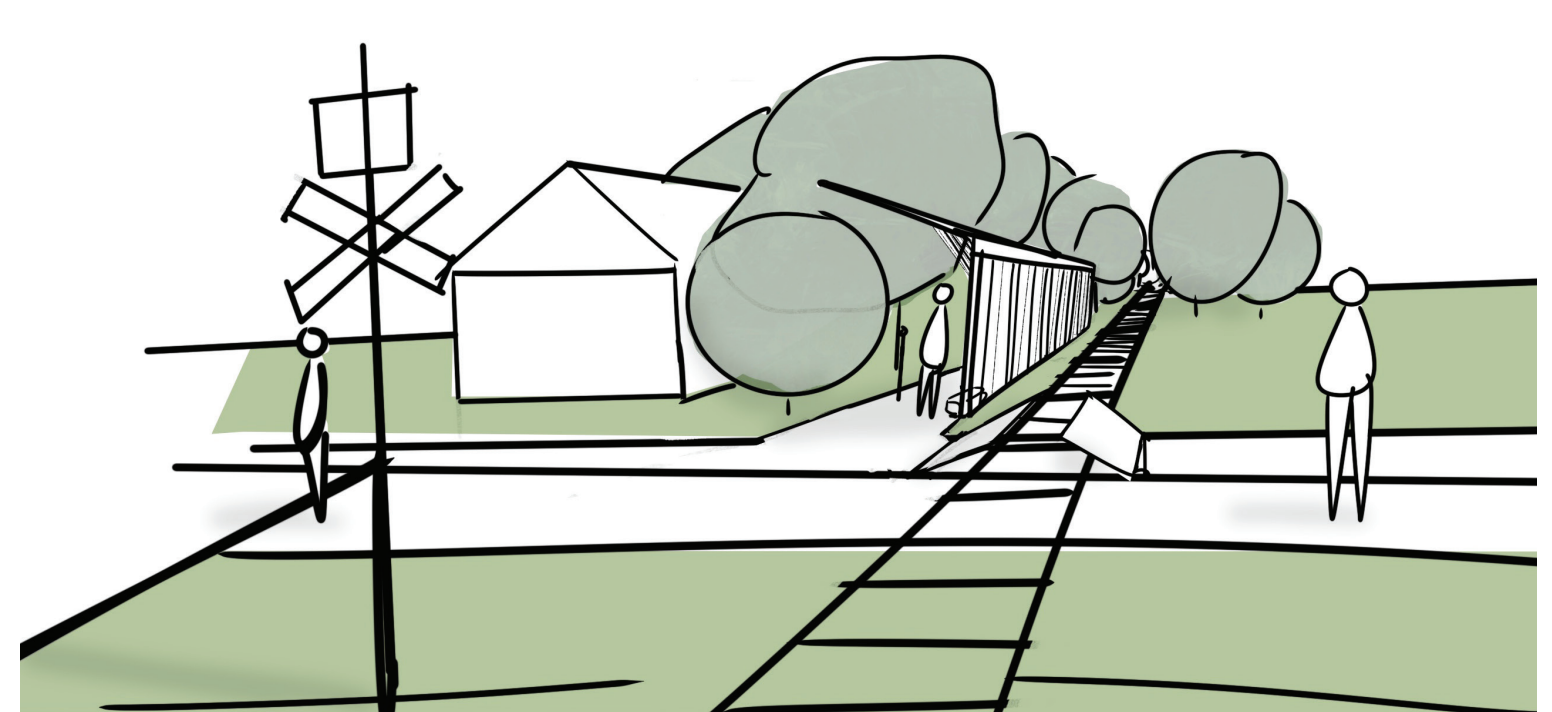
Entrance Way

The archway serves as a prominent visual marker, establishing a clear sense of entry and signaling the transition into a communal public space. It reinforces the park's identity as a place for gathering, connection, and shared experience.



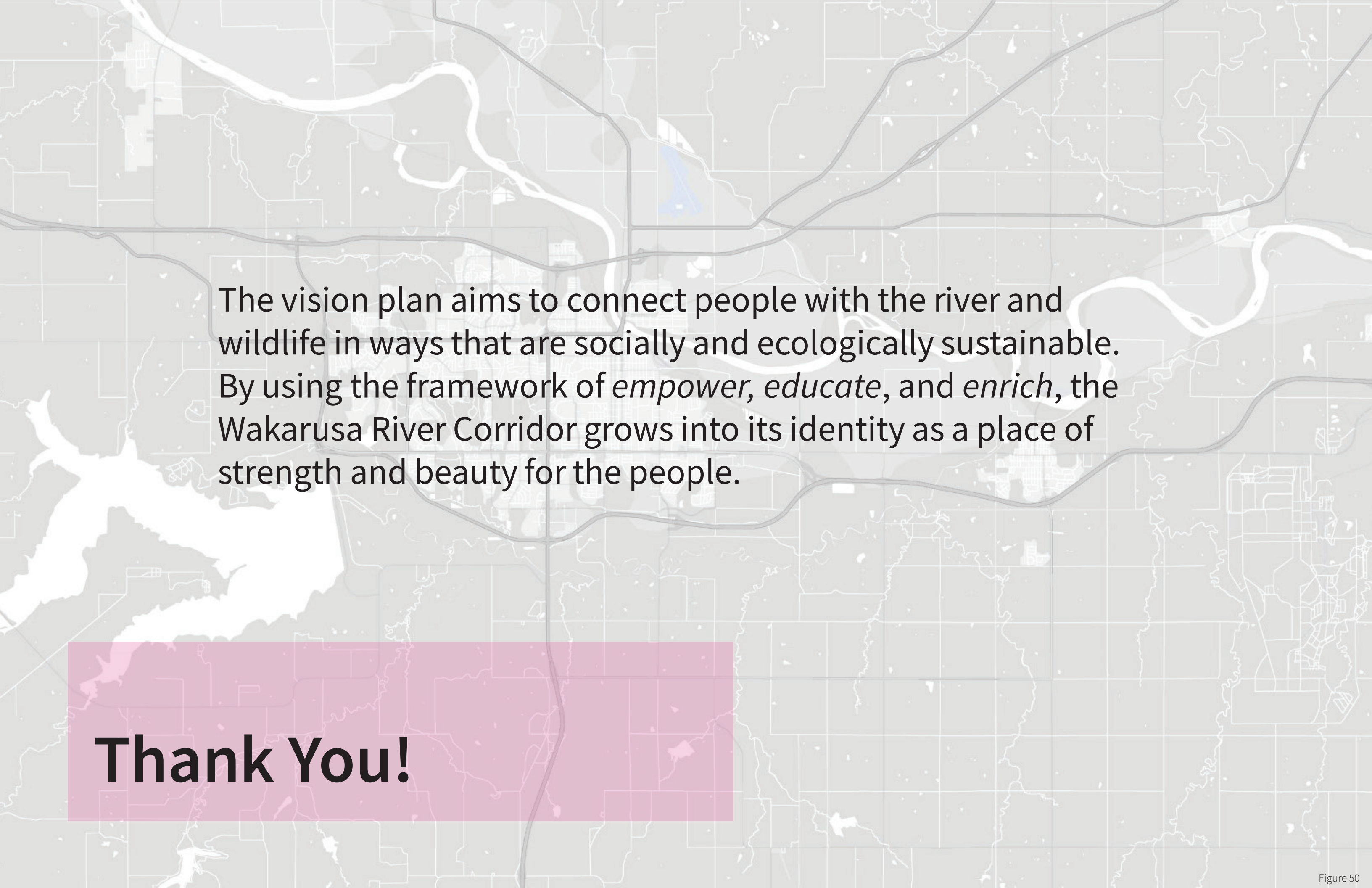
Community Venue

The community venue offers a dedicated space for the City of Eudora to gather, celebrate, and connect. Strategically elevated above the floodplain, the structure ensures year-round accessibility and resilience, allowing events to take place without concern for seasonal flooding.



Pedestrian Safe Railroad Crossings

Mechanical railroad crossings built into the sidewalk ensure safe, accessible passage for users of all abilities. As trains approach, a drawbridge-like feature rises to form a physical barrier between pedestrians and the tracks—enhancing safety through clear visual and functional design.



The vision plan aims to connect people with the river and wildlife in ways that are socially and ecologically sustainable. By using the framework of *empower*, *educate*, and *enrich*, the Wakarusa River Corridor grows into its identity as a place of strength and beauty for the people.

Thank You!

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Figure 1: Subtle Gray Scale. Map. 2014. Accessed March 12, 2025. <https://snazzymaps.com/style/55/subtle-greyscale-map>

Figure 2: Shannon, Mickey. Wakarusa River Falls. Photograph. 2018. Accessed March 11, 2025. <https://www.mickeyshannon.com/articles/northeast-kansas-waterfall-road-trip/>

Figure 3: Kanza Indians. n.d. Accessed March 10, 2025. <https://www.legendsofamerica.com/kanza-indians/>

Figure 4: Old North College. Photograph. ca. 1867. Accessed March 10, 2025. https://upload.wikimedia.org/wikipedia/commons/5/56/Overlooking_Lawerence_and_the_Kansas_River._%28Boston_Public_Library%29_%28cropped%29.jpg

Figure 5: Approaching Haskell Institute from the North. ca. 1900. Accessed March 10, 2025. <https://www.haskellhistory.com/history>

Figure 6: Google Earth. Accessed March 11, 2025.

Figure 7: Clinton Lake Kansas. n.d. Accessed March 7, 2025. <https://www.shutterstock.com/video/search/clinton-lake-kansas>

Figure 8: 70 on KS I-70. n.d. Accessed March 10, 2025. <https://kansasi70.com/point-of-interest/baker-wetlands/>

Figure 9: Campbell, Harold A. Eastern Meadowlark. 2018. Accessed March 11, 2025. <https://www.wildsouthflorida.com/eastern.meadowlark.html>

Figure 10: Thomas, Tracy. Painted Turtles. 2024. Accessed March 11, 2025. <https://spca.bc.ca/news/turtles-in-bc/>

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Figure 15: Gish, Ariel. ArcGIS. 2025.

Figure 16: Clinton Lake Kansas. n.d. Accessed March 7, 2025. <https://www.shutterstock.com/video/search/clinton-lake-kansas>

Figure 17: Eagle Bend Golf Course. Photograph. n.d. Accessed March 7, 2025. <https://www.explorelawrence.com/listing/eagle-bend-golf-course/293/>

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Figure 25-27: “At the Hudson’s Edge: Beacon’s Long Dock a Resilient Riverfront Park | 2015 ASLA Professional Awards.” 2015. Asla.org. 2015. <https://www.asla.org/2015awards/96213.html>.

Figure 28: Routhieaux, Jillian. ArcGIS. 2025.

Figure 29: Gish, Ariel. ArcGIS. 2025

Figure 30: Gish, Ariel. Current Conditions Section. 2025

Figure 31: Gish, Ariel. After Restoration Section. 2025

Figure 32: Google Earth, Jillian Routhieaux. 2025.

Figure 33: Routhieaux, Jillian. ArcGIS. 2025.

Figure 34: Broxterman, Jenessa. ArcGIS. 2025

Figure 35: Copper Falls State Park Photo, Wisconsin Trail Guide. 2015. Wisconsintrailguide.com. 2015. <https://wisconsintrailguide.com/hiking/gallery/photo-page/copper-falls-085.html>.

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Figure 38: Google Earth, Ariel Gish. Land Bridge. 2025.

Figure 39: Google Earth, Ariel Gish. Wakarusa Wastewater Treatment Plant. 2025

Figure 40: Routhieaux, Jillian. Riparian Edge. 2025.

Figure 41: Basemap by ArcGIS database and Google Earth. Accessed March 11th, 2025

Figure 42 - 43: Basemap by ArcGIS database. Accessed March 12, 2025.

Figure 44: Fish Cleaning Station. n.d. Accessed March 12, 2025. <https://www.moodie.com.au/?product=outside-products-flinders-fish-cleaning-station>

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