

An aerial photograph of a river winding through a dense forest. The trees display a mix of green, yellow, and orange foliage, suggesting an autumn setting. The river is dark and reflects the surrounding trees. In the top left corner, a dirt road or path is visible. The bottom half of the image is overlaid with a dark green semi-transparent banner containing white text.

# IMMERSION IN NATURE CHARLES F. LADD NATURE PRESERVE

## MASTER PLAN

MARCH 2025





## ACKNOWLEDGMENTS

CITY OF DUNCANVILLE CITY COUNCIL

CHARLES F. LADD NATURE PRESERVE STEERING COMMITTEE

BOB AND TRUDY LADD





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# 01 INTRODUCTION

LOOKING SOUTHEAST OVER BEAVER POND AND CREEK BEND

IMAGE: HALFF



## 1.1 PURPOSE OF THE MASTER PLAN

Duncanville is home to the Charles F. Ladd Nature Preserve, a unique open space defined by its picturesque creek beds and remnant prairie species. The purpose of this plan is to guide the City of Duncanville in developing an exceptional nature preserve that not only boasts outstanding educational opportunities and aesthetic appeal but is accessible to people of all ages and abilities. The siting of paths and structures will aid in the long-term restoration and preservation of its remnant species and will take advantage of shade, breezes, and passive heating to keep natural resource inputs to a

minimum. This iconic preserve will provide a unique sense of identity to the city by carefully preserving its fragile habitat and encouraging both residents and visitors to enjoy the diverse plants and wildlife. The plan emphasizes careful direction of foot traffic and encourages increased visitation from student groups. By involving the entire community in the preservation and restoration efforts, everyone can have the opportunity to become an amateur ecologist or biologist, contributing to the ongoing stewardship of this valuable natural resource.

## 1.2 THE VISION FOR THE CHARLES F. LADD NATURE PRESERVE

The design team of Blackland Collaborative, Halff, and Lake Flato developed the following statement for the Ladd Preserve's vision:



*As the City's ecological jewel, the Ladd Nature Preserve will be a lasting living resource that fosters environmental stewardship, education, and community connection for the enrichment of future generations.*

## 1.3 REPORT SUMMARY

This report presents an inventory and analysis of the Charles F. Ladd Nature Preserve as it exists today and combines those elements with input from the city-council-appointed Steering Committee and members of the public to synthesize a vision and conceptual plan for the Ladd Preserve. This plan aims to enhance the ecological and community value of the site to encourage its continued preservation through education and stewardship. The document provides three major sections with each addressing the building blocks of the design process.

The first section, **Inventory and Analysis**, examines the existing conditions, how the current conditions have been shaped through time, and an exploration of how those conditions inform possibilities in the built environment. For example, large mature trees work well to screen passing traffic along Danieldale Road, but existing overhead utilities may require smaller trees and shrubs along the southern edge.

In the **Client and Public Involvement** section, the design team summarizes insights from the steering committee visioning session and the public engagement meeting. This collective vision informs the guiding elements of the plan.

Finally, the **Master Plan Concept** section presents the approach the team chose in order to preserve and develop the unique ecological communities found at the site yet make more of those communities accessible to the public. For instance, stabilizing a pathway helps preserve habitat for ground-nesting birds, minimizes erosion, and prevents trampling of young seedlings.

At this unique site, preservation and restoration can be achieved through education and sensitive development. Past uses of the land have allowed non-prairie vegetation to literally take root, but future activity can help clear the way for prairie species to regain ground. This report is the beginning of the process of caretaking, or stewardship, for a precious community resource.



## 1.4 PROJECT LOCATION

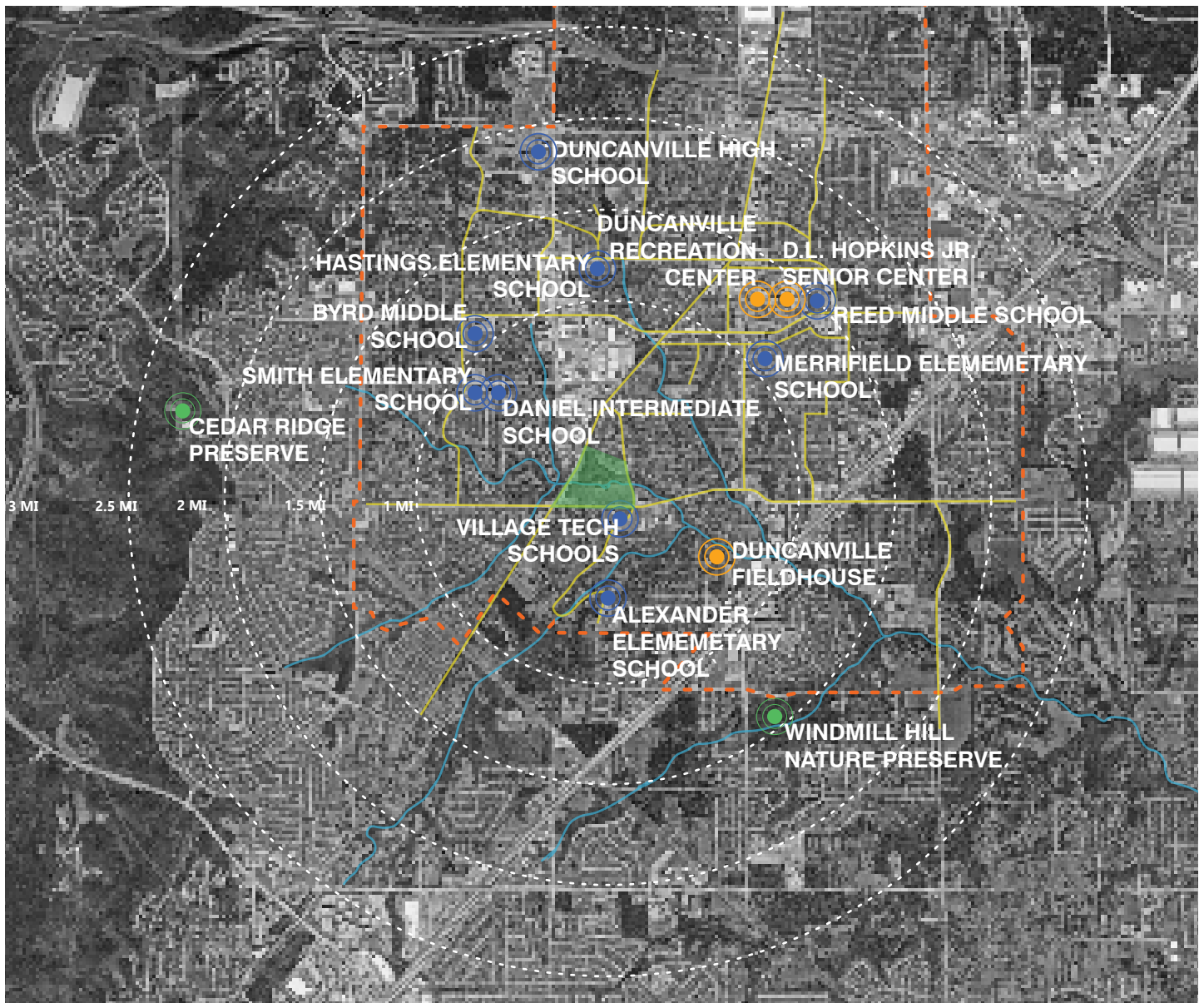
Charles F. Ladd Nature Preserve is located at 609 West Danieldale Road in Duncanville, Texas. Duncanville, in southwest Dallas county, has a population of over 40,500 residents.

The Ladd Preserve is located in the southwest area of the city. The Duncanville Fieldhouse, a premier multi-sport fitness and event venue, is also located in this area of the city, making this area home to two unique and outstanding Parks and Recreation Department properties.

Students and faculty at several schools are within a half mile, or walking distance, of the Ladd Preserve: Alexander

Elementary School, Smith Elementary School, Daniel Intermediate School, and Village Tech Schools, with students ranging from pre-K to 12th grade. Several more schools are located within a mile of the Preserve: Byrd Middle School, Hastings Elementary School, and Merrifield Elementary School.

The property is bounded by Danieldale Road on the south, Santa Fe Trail on the west, and Cedar Hill Road on the east. The northern edge of the preserve ends at residential properties along Alameda Avenue.







FOOTPRINTS FROM ANIMAL RESIDENTS AND VISITORS

IMAGE: K. GRAY-HARRISON





# 02

## INVENTORY AND ANALYSIS



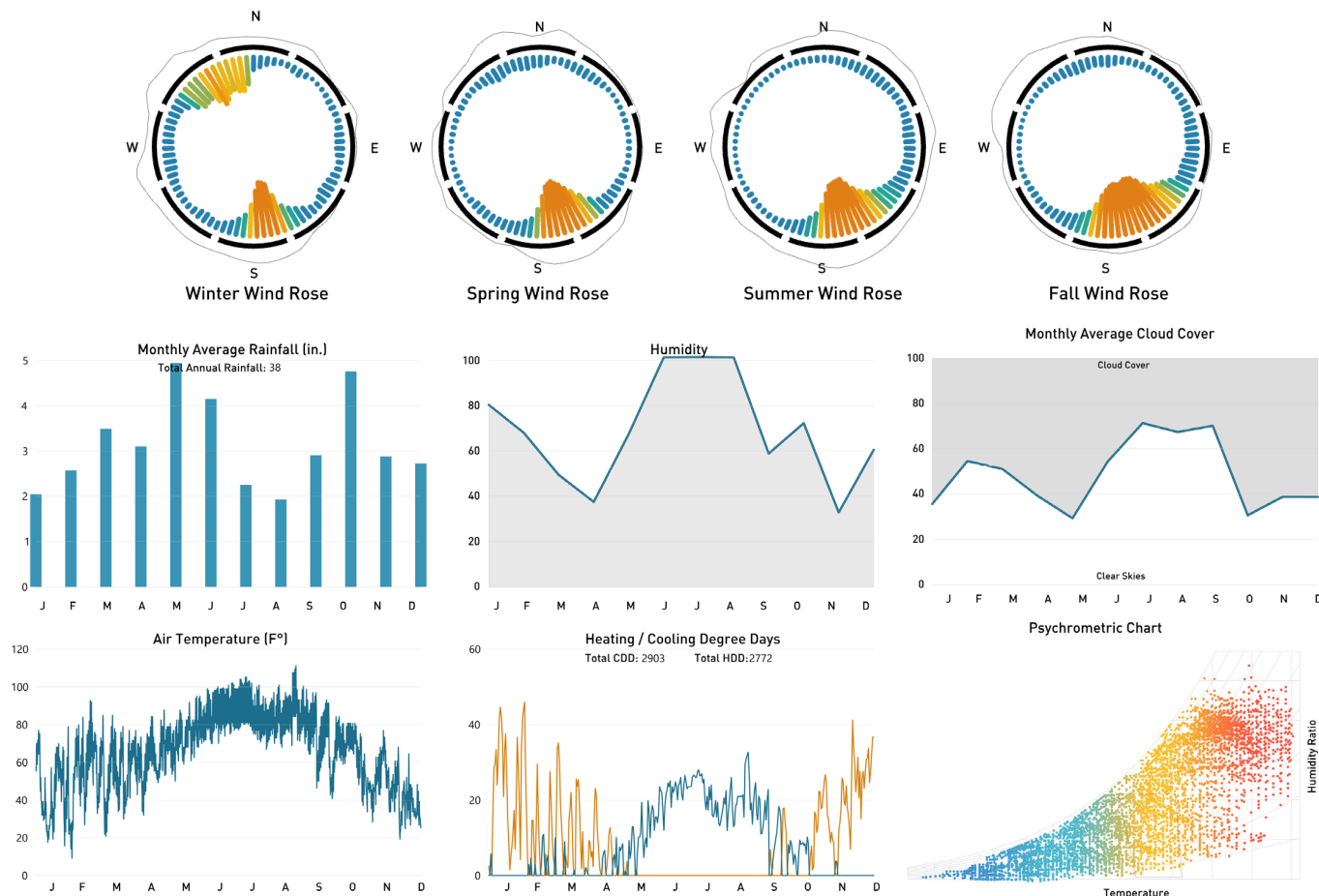
## 2.1 REGIONAL CLIMATE AND ECOLOGY

The climate of Duncanville and the surrounding region is classified as humid sub-tropical with annual rainfall varying from 20 to more than 50 inches. The bulk of precipitation in this region is associated with thunderstorms. Large hail, damaging winds, flooding, and tornadoes are possible.

Rainy weather generally occurs in spring and fall while winter and summer tend to be dry. Winter weather is mild, but below normal temperatures are possible when cold fronts move through the region. Winter is generally the

cloudiest season.

Summers are usually sunny with daily high temperatures reliably in the 90s and often reaching or exceeding 100 degrees Fahrenheit. Overnight lows in the urbanized areas of the region, including Duncanville, occasionally fail to fall below 80 degrees during the summer. Prevailing winds at this site are generally from the southeast, but fronts from the northwest are common in the winter.



The Preserve is located within the Blackland Prairie ecoregion and contains four distinct Ecological Sites: Northern Blackland, Southern Clay Loam, Northern Chalky Ridge, and Loamy Bottomland. Characteristics of these ecosites are discussed in detail in the Blackland Collaborative report, included as an appendix to this report.

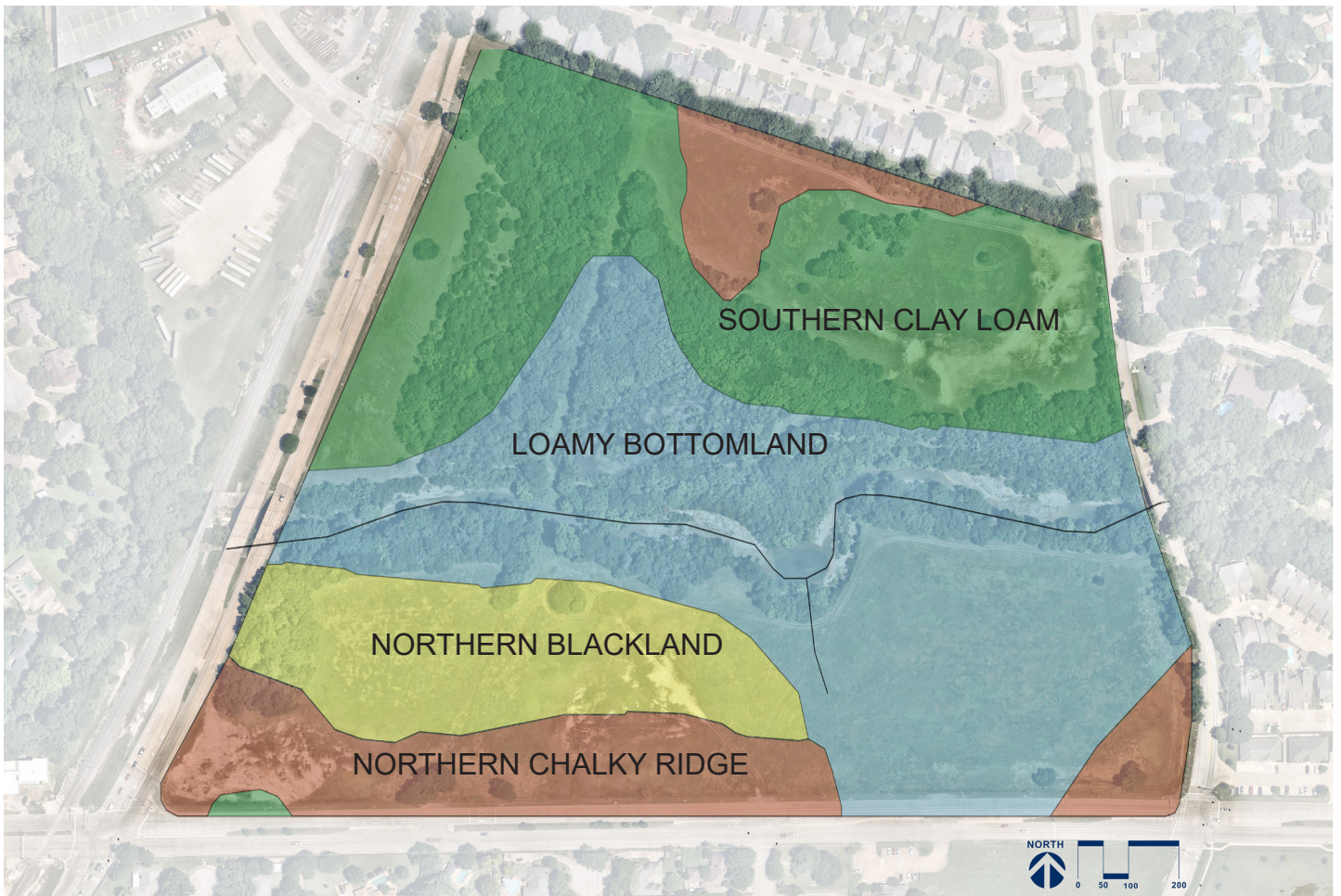
In general, the ecosites show damage when compared to reference communities due to heavy grazing or haying uses for the property in the past. Invasive grasses, including Johnson grass, bermuda grass, giant cane, and King Ranch Bluestem are common. Additionally, encroachment of woody species, related to the suppression of large-scale disturbance, such as fire, contributes to erosion of the soil.

In the Northern Blackland ecological site, vegetation would historically have been grazed by large herds of bison,

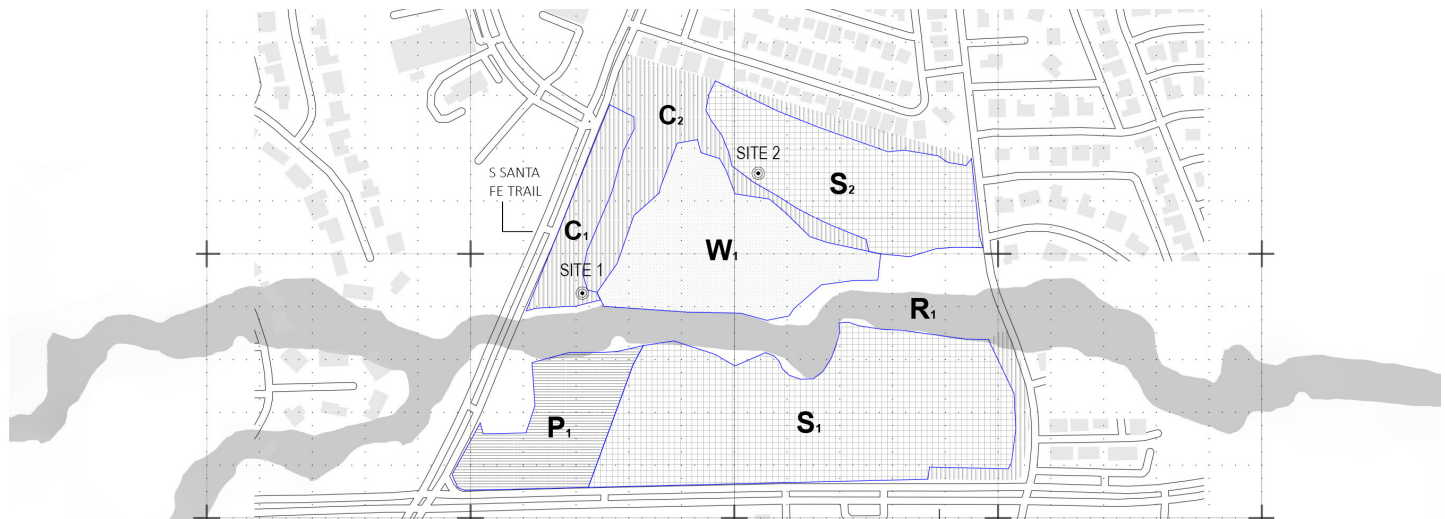
antelope, and deer. Other animals, including prairie chickens and wolves, would have been present. Today, the food web supports smaller animals, but the presence of coyotes, beaver, and even river otters has been documented.

In historic prairies, formations of small basins, called gilgai, help to retain water until it can infiltrate the clay soil. These gilgai would have been plowed when the Preserve was used for farming, but they may be able to reform naturally over a period of several decades.





ECOLOGICAL SITES



S <sub>1</sub>	S <sub>2</sub>	W <sub>1</sub>	P <sub>1</sub>	C <sub>1</sub>	C <sub>2</sub>
Savanna; Restored; Suitability for Development:	Savanna; Restored; Suitability for Development:	Ephemeral Wetland; Suitability for Development:	Prairie; Restored; Suitability for Development:	Converted Woodland; Suitability for Development:	Converted Woodland; Suitability for Development:
7	5	0	5	10	7

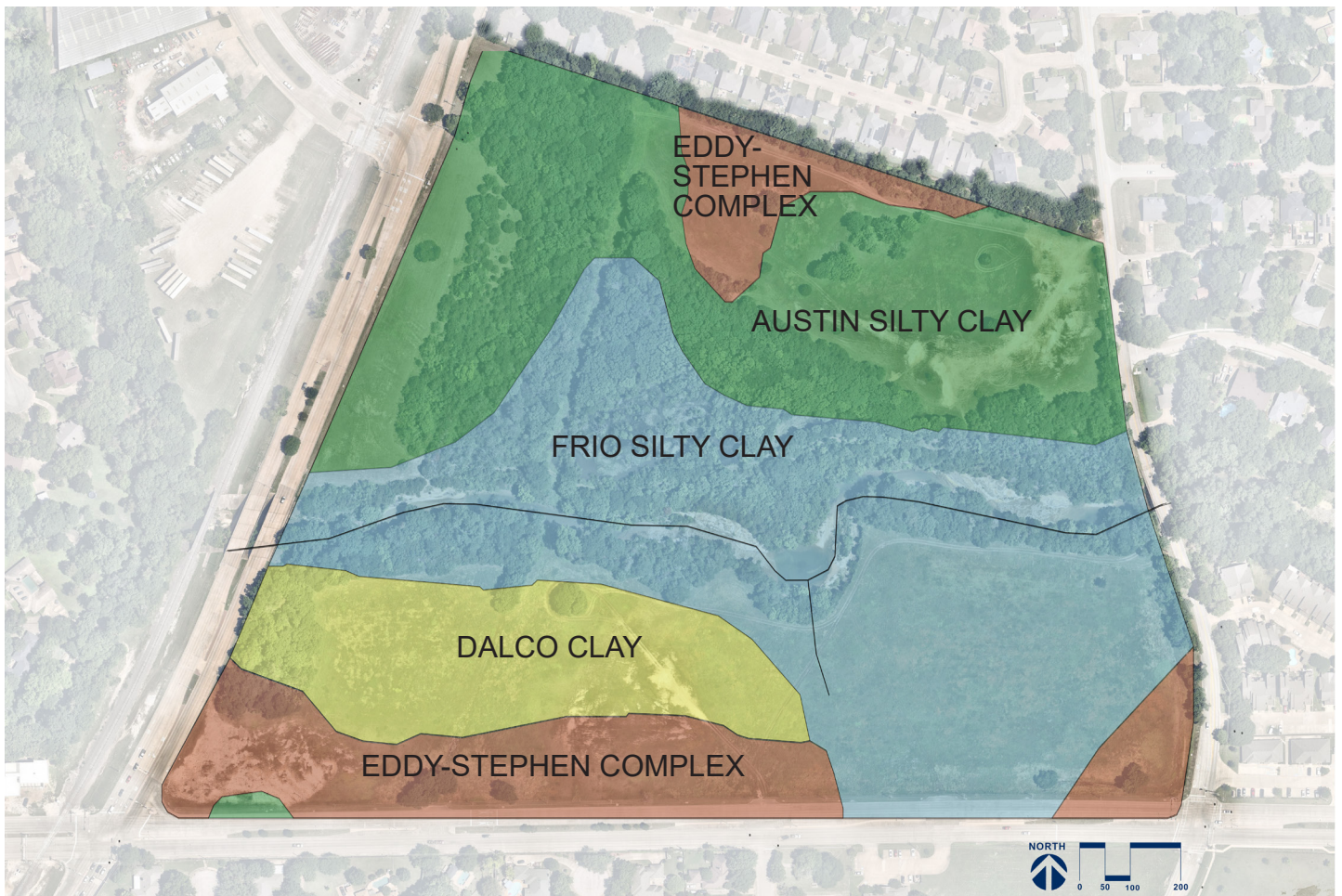
The development suitability rating system above refers exclusively to the ecological potential that each identified ecological region has for effective conservation or repair, based on soils reports and observation of existing flora and fauna. In addition to ecological potential, the design team has also incorporated other important design values (safety, visibility, traffic, noise, hydrology, solar orientation, inclusivity, access, etc.) for consideration with development recommendations.



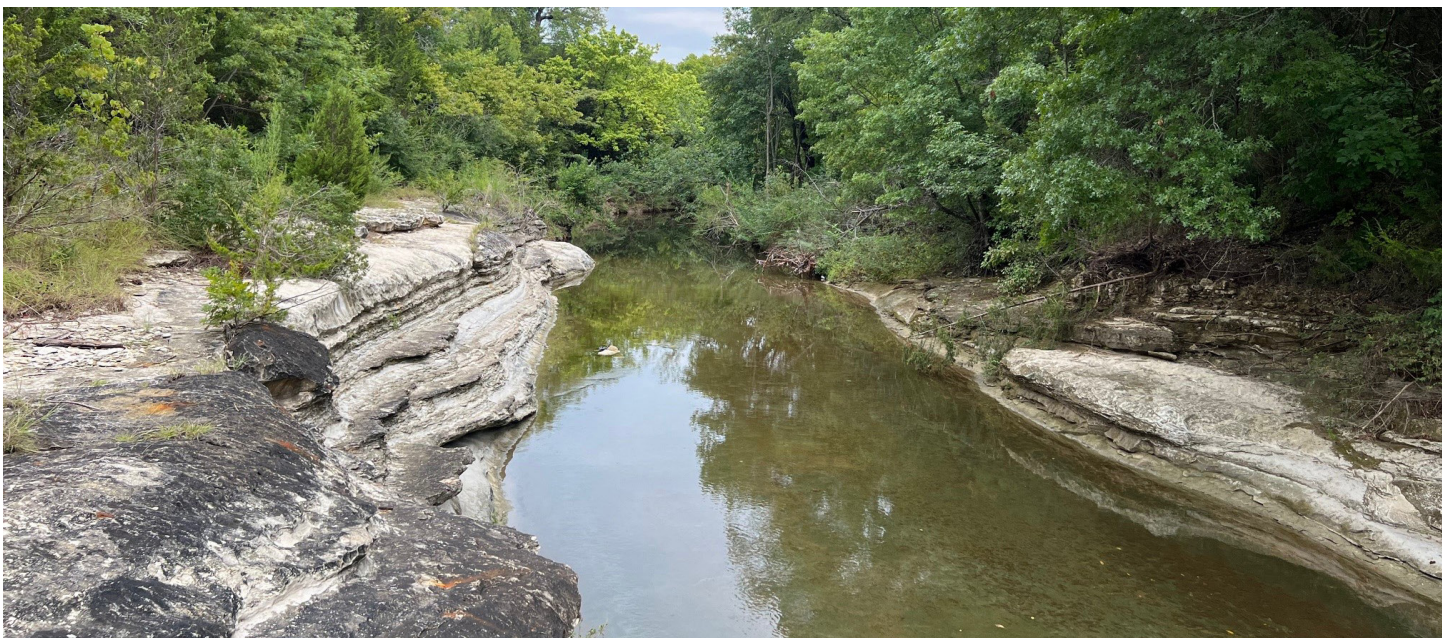
## 2.2 GEOLOGY AND SOILS

Duncanville sits on Austin Chalk bedrock. This underlying bedrock is visible on site as limestone ledges lining Tenmile Creek and give the creek bed its unique photogenic character. Iron-rich nodules, common in sedimentary rock,

are visible at the surface of these shelves. Eddy-Stephen complex, Austin silty clay, Frio silty clay, and Dalco clay comprise the soil types found at the preserve.



PRIMARY SOILS



LIMESTONE CREEK BEDS FORM NATURAL GATHERING PLACES.

IMAGE: LAKE FLATO





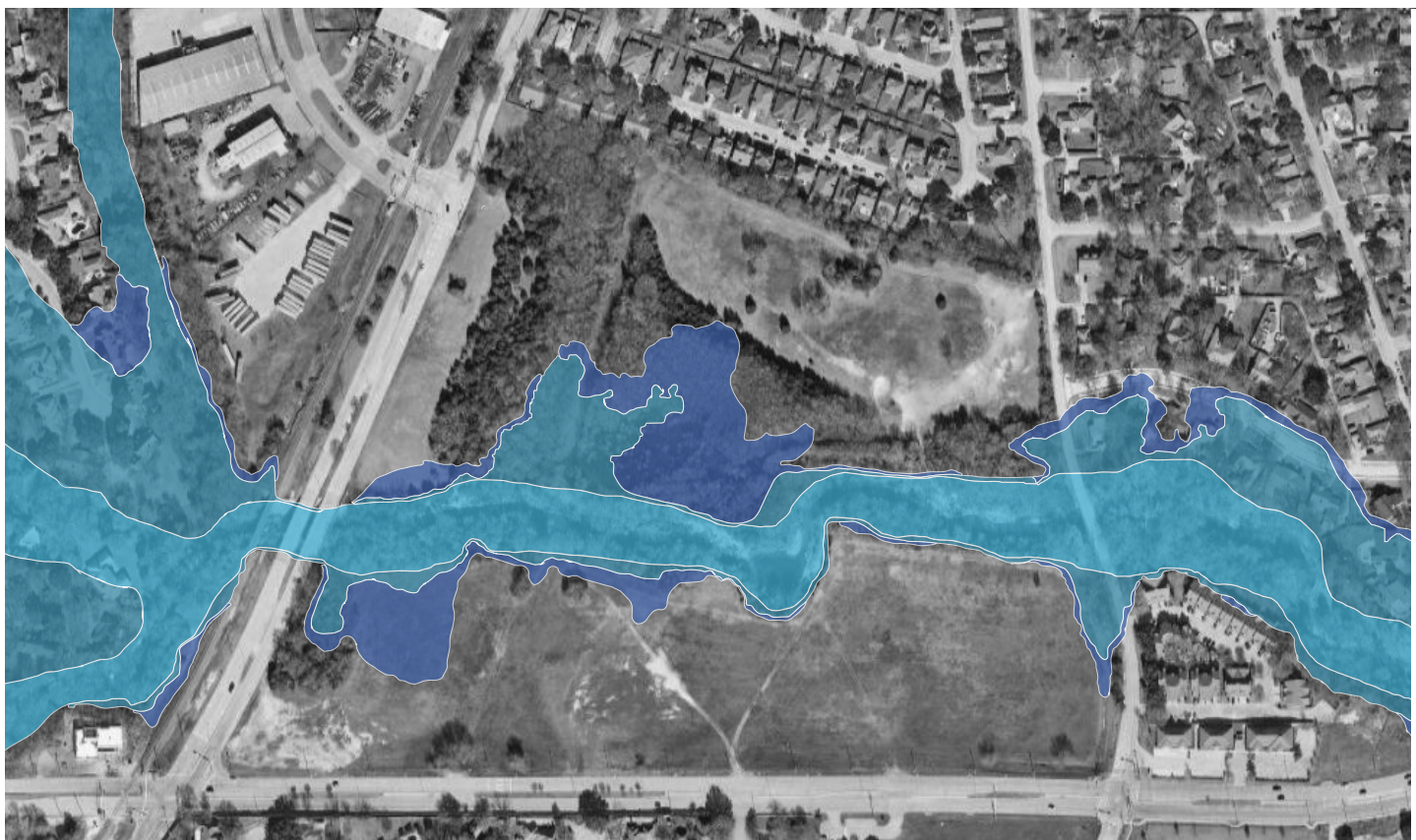
IRON NODULE REMNANTS IN LIMESTONE

IMAGE: HALFF

## 2.3 HYDROLOGY AND FLOODPLAIN

The Charles F. Ladd Nature Preserve is situated within the Tenmile Creek watershed, a tributary of the Trinity River system. Tenmile Creek bisects the preserve, defining the hydrological and ecological character of the area. This creek is a prominent feature within the watershed, and its associated floodplain plays a critical role in the site's natural processes and resource management.

Mapping of flood hazards for the City of Duncanville indicates that the 100-year floodplain of Tenmile Creek extends into portions of the preserve, primarily through the center of the property. This floodplain area provides important ecological functions, including natural floodwater storage, sediment transport, and nutrient cycling, which contribute to the health and stability of the creek system.



Floodway 100-YR Floodplain 500-YR Floodplain

Ladd Nature Preserve | Floodplains

1/2" = 100'

0 100' 200' 400'

FEMA DESIGNATED FLOOD ZONES IMAGE: LAKE FLATO



Natural drainage patterns and proximity to urbanized areas influence surface water movement within the preserve. The preserve's terrain directs stormwater runoff into Tenmile Creek through sheet flow and a network of ephemeral channels that become active during significant precipitation

events. Impervious surfaces in nearby residential and commercial developments contribute additional runoff, increasing the volume and velocity of flow entering the creek during storm events.



SEASONAL WETLANDS AND TENMILE CREEK.

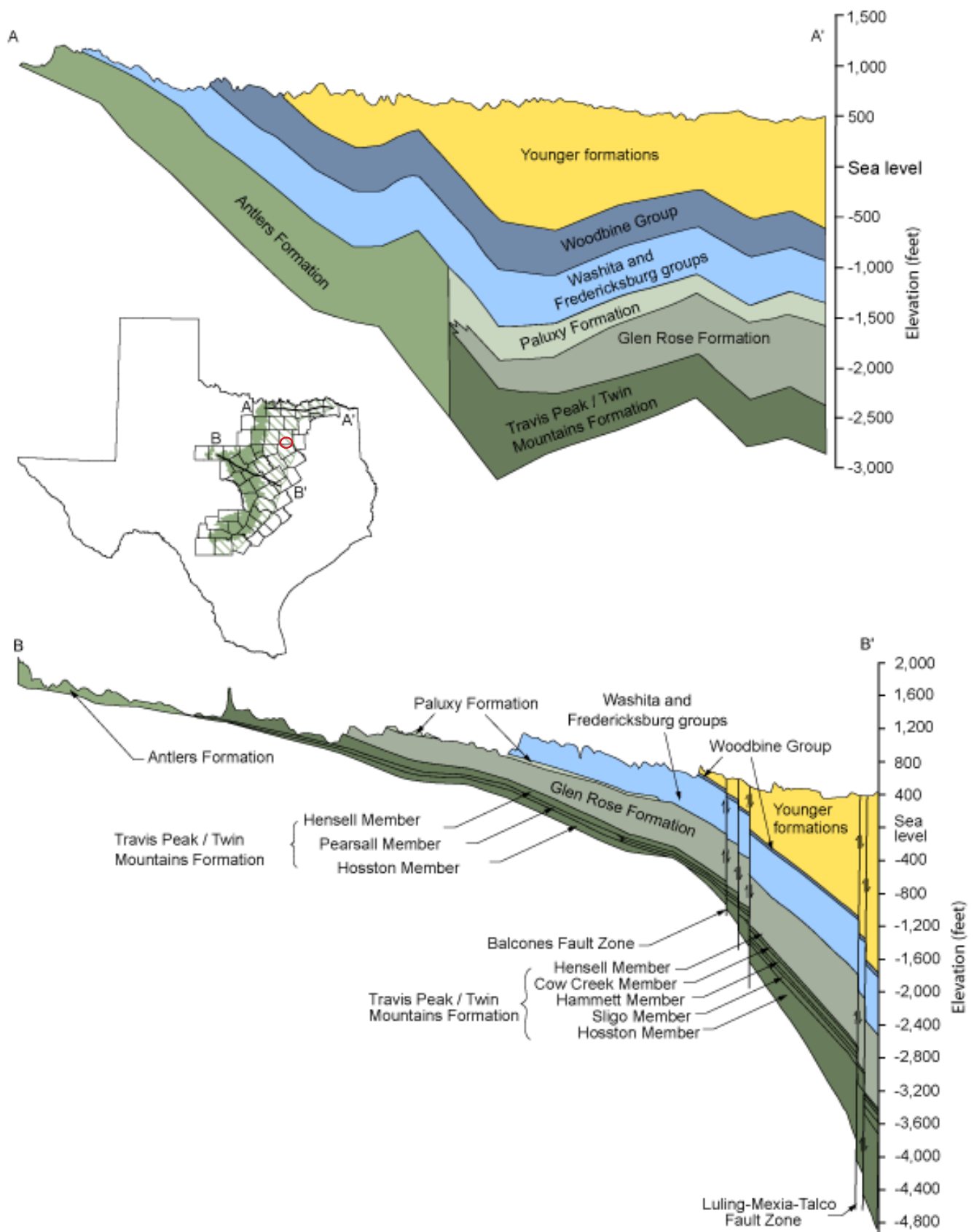
IMAGE: HALFF

The preserve has several low-lying areas adjacent to Tenmile Creek that could support wetland ecosystems. A review of the National Wetlands Inventory (NWI) map for the area indicates no officially designated wetlands within the preserve boundaries. However, field observations suggest that the creek's floodplain and adjacent riparian zones may exhibit characteristics of seasonally inundated wetlands during periods of heavy rainfall. Groundwater resources in the area are part of the Trinity Aquifer system, which underlies much of North Texas. This aquifer is a major water-bearing formation that supplies groundwater for municipal, agricultural, and ecological purposes. Recharge to the

Trinity Aquifer occurs primarily through infiltration in areas of exposed bedrock and permeable soils outside the immediate preserve boundary.

Future planning and management efforts for the Charles F. Ladd Nature Preserve should consider the hydrological dynamics of Tenmile Creek and its floodplain. Protecting these areas from encroachment and preserving natural floodplain functions will be critical to maintaining the ecological health and resilience of the preserve. Additionally, opportunities to restore or enhance riparian buffers and promote stormwater infiltration could further support water quality and habitat diversity along Tenmile Creek.





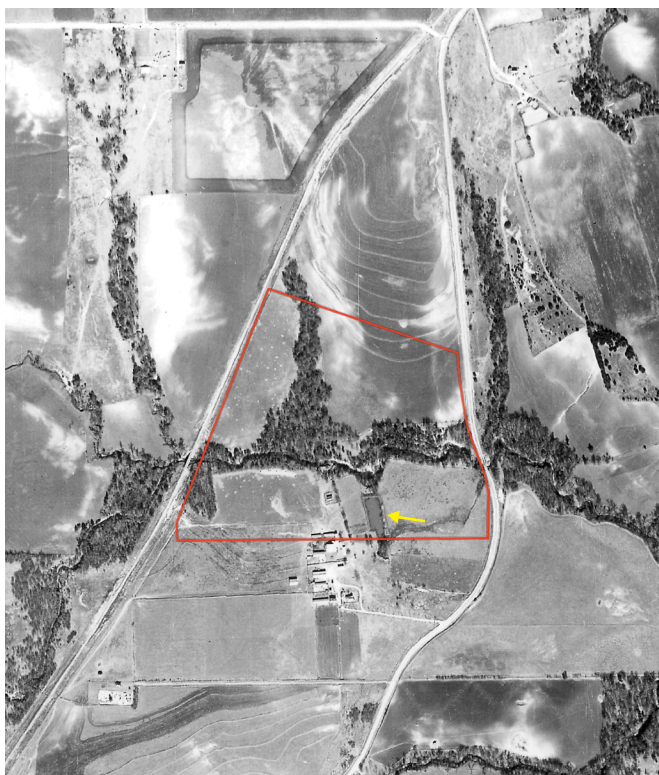
Modified from Klemt and others, 1975; Nordstrom, 1982

○ APPROXIMATE LOCATION OF PRESERVE  
TRINITY AQUIFER

IMAGE: TEXAS WATER DEVELOPMENT BOARD



## 2.4 SITE HISTORY AND PAST USES



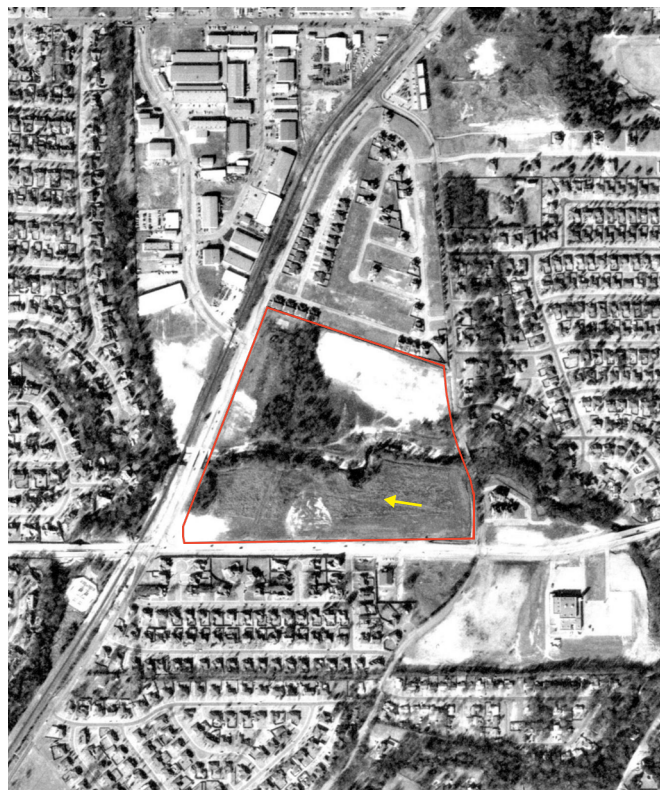
1942. IMAGE: ASCS



1972. IMAGE: ASCS



1981. IMAGE: USGS



1990. IMAGE: TXDOT

The deep soils of the Ladd property were well suited for farming. Aerial photos show farming activity in suitable areas and trees remaining in waterways. Standing water is visible in earlier images at the yellow arrows; a spring may have been flowing but was filled. Impermeable surface in

the surrounding neighborhoods expanded greatly between 1972 and 1990 as housing was constructed. This would have significantly increased storm water runoff into Tenmile Creek.



## 2.5 INVENTORY OF COMMUNITIES

These summaries are based on the complete site assessment in Appendix 1.

### 2.5.1 SOUTHERN SAVANNA AND PRAIRIE



#### MODERATE ECOLOGICAL HEALTH

This area has high vegetative cover and low erosion. Microtopographies, which allow the soil to capture and retain water, are present. The soil is healthy and has remnant climax forbs, or broad-leaf flowering plants. This area is challenged

by the dominant invasive Johnsongrass and moderate overall species diversity. Climax tallgrass species are missing and soil is compacted along pathways. The right of way over the pipeline shows significant soil and vegetative disturbance. See page 40 in assessment.

### 2.5.2 NORTHERN SAVANNA AND PRAIRIE



#### MODERATE ECOLOGICAL HEALTH

Like the southern savanna, this area has high vegetative cover with pockets of high diversity, but it shows vehicle damage and evidence of sheet erosion. The soil is thin and very susceptible to damage. Remnant prairie species such as White

Rosinweed and Milkweed still persist despite the use of the area by vehicles. This area should be kept as intact as possible as the thin soils make restoration very difficult. Importing soil to this area should be prevented. See page 46 in assessment.

### 2.5.3 MESIC COMMUNITIES



#### MODERATE TO HIGH ECOLOGICAL HEALTH

The beaver pond, riparian corridor, and ephemeral wetlands are the most sensitive and least suitable to development. The plant species found here are adapted to life in the wet soil. Although the creek bank shows steep sides and moderate

erosion in many areas, vegetative cover is high and the sequence of riffles and pools in the creek provide good habitat for aquatic species. The challenges in these areas are managing the young woodland to improve age and species diversity and addressing the unstable bank where the creek is disconnected from the floodplain. See page 49 in assessment.

### 2.5.4 MIXED UPLAND COMMUNITIES



#### LOW AND MODERATE ECOLOGICAL HEALTH

In contrast to the mesic communities, the converted land area is the least ecologically sensitive to development. The vegetation is dominated by invasive

species and the soil is heavily damaged. The encroached savanna is healthier from an ecological perspective and contains remnant prairie grasses. The encroachment of trees, however, are taking over the tallgrass community. See page 57 in the assessment.

### 2.5.5 HARDWOOD WOODLAND



#### MODERATE TO LOW ECOLOGICAL HEALTH

The woodland in the northwest area of the site contains healthy soil with limited erosion, but the tree community is too

dense to function as a healthy woodland. Without selective thinning, desirable hardwood seedlings and saplings are shaded out. See page 62 in the assessment.



## 2.6 NOTABLE PLANT AND WILDLIFE SPECIES

More than 1,000 species have been identified at this site on the community photo sharing site iNaturalist. While early successional plants such as Texas Grama and Silver Bluestem are commonly found where disturbance has occurred, White Rosinweed and Small Palafox are not commonly found in the wild. The Preserve also supports several species of Milkweed, which are critically important for the life cycle of Monarch Butterflies. *Asclepias viridis*, *asperula*, *oenotheroides*, and *tuberosa* have been documented at the Preserve.

Page 4 of this report shows footprints of numerous bird and mammal residents and visitors made in the mud of the beaver channels during the dry season of early autumn.

See **Appendix 1** for a complete list of plants identified during Blackland Collaborative's site visit. The Preserve is listed in iNaturalist as "Biodiversity of the Charles F. Ladd Preserve."



Texas Grama, *Bouteloua rigidiset*a K.Gray-Harrison



Small Palafox, *Palafoxia callosa* © Sam Kieschnick, some rights reserved (CC-BY 4.0)



Silver Bluestem, *Bothriochloa torreyana* K.Gray-Harrison



Green Milkweed, *Asclepias viridis* © Sam Kieschnick, some rights reserved (CC-BY)



Antelope Horns Milkweed, *Asclepias asperula* © Sam Kieschnick, some rights reserved (CC-BY)



White Rosinweed, *Silphium albiflorum* K.Gray-Harrison



2.7 DEED AND OWNERSHIP

The Charles F. Ladd Nature Preserve comprises two parcels. The larger 42.419 acre parcel, shaded green in the illustration below, is owned by the City of Duncanville. Bob and Trudy Ladd donated the property in 1998 with development restrictions:



*That the subject property, above described, shall be professionally master-planned prior to any development.*

*That the subject property, above described, shall be used primarily for purposes related to the promotion or advancement of cultural, artistic or educational objectives. Such uses may include libraries, museums, conference centers or similar educational facilities, interactive learning centers, theaters for live performing arts, indoor ice rink, botanical gardens, and nature trails.*

*That the subject property, above described, shall be named or identified through signage or other appropriate display using or incorporating the words “Charles Ladd” or “Charles F. Ladd.”*

Yellow shading in the illustration above indicates the 7.676 acre smaller parcel, located at 1011 Santa Fe Trail, which is owned by the Ladd family.

2.8 SITE ANALYSIS

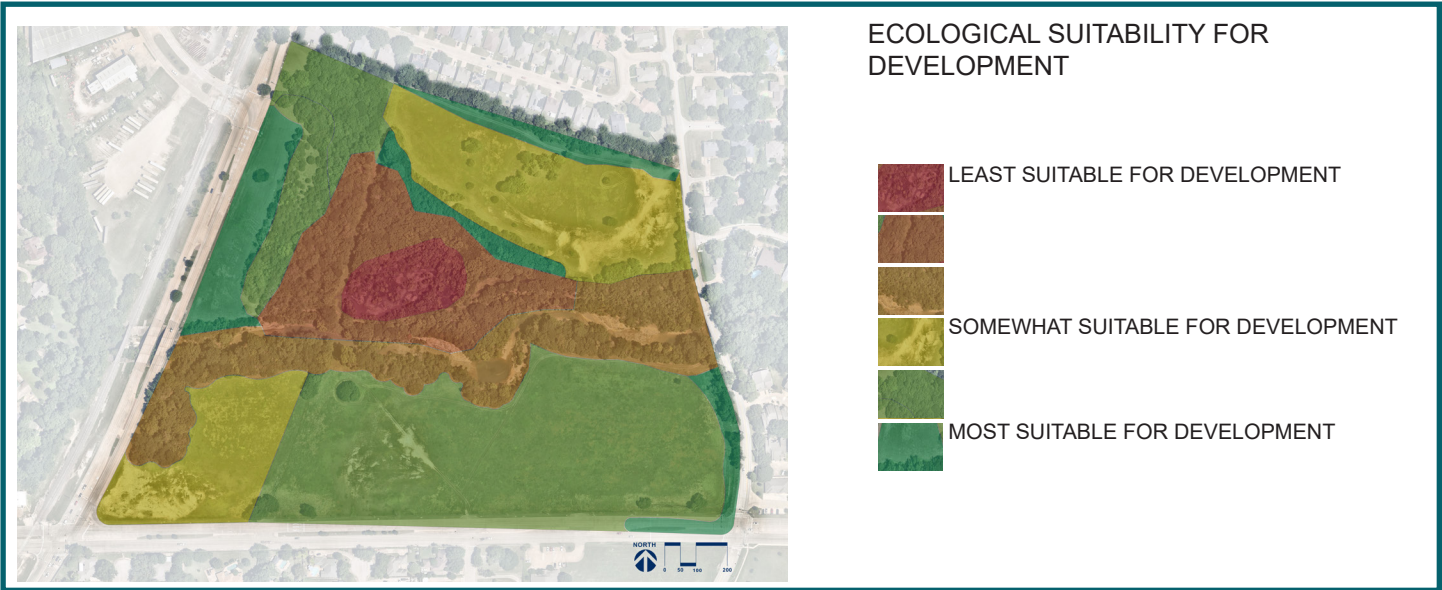
The Ladd Preserve is a special remnant of natural and cultural history. The very conditions that made farming difficult in certain areas of the Preserve, such as steep creek banks, low-lying areas, and rocky soils, allowed remnant prairie plant species to survive. Blackland Prairie is one of the rarest ecological zones in North America; preserving remnant plant species is critical for the survival of insects and other wildlife adapted to those species.

Hot summers and occasionally cold temperatures in winter require protection for human visitors of all ages. The gathering structure will provide protection from winter winds and capture prevailing summer breezes. Strong sunlight at this latitude makes shade a necessity for paths, structures, and gathering areas. Periodic flooding through the year and

100 and 500 year flood zones exclude some areas from structure and parking development.

Proximity to dozens of schools make the site important for educating students about the ecology of North Central Texas. The design of path layouts, parking lots, and gathering structures should take the size of visiting student groups into consideration.

Existing utilities, both overhead and underground, affect siting of the preserve entrance and buildings. Overhead electrical lines run the length of the southern edge along Danieldale Road and the northern sections of both Santa Fe Trail and Cedar Hill Road. A petroleum pipeline and corresponding right of way run north-south across the





western half of the site. Access to the right of way by the utility company is required. Sanitary sewer lines and access run east-west along the northern edge of Tenmile Creek.

Existing traffic signals and turn lanes on Santa Fe Trail at Cedar Ridge Drive provide safe entrance for vehicles. The northwest parcel shows a high level of vegetative disturbance, making it better suited for paving and parking than the ecologically sensitive northeastern area of the site. Additionally, the industrial areas across Santa Fe are less sensitive to arrivals of exuberant and noisy school children

than the quiet residential neighborhoods along Cedar Hill.

The beauty of the current plants, animals, and creek attract visitors, but some activities have led to damage. Adding designated parking lots, paths and boardwalks will help to condense the damage and allow restoration of areas.

The highly eroded creek bend, southeast of the beaver pond, requires mitigation efforts to contain the scouring effects of water during storm events.



ERODED CREEK BEND



RESIDENTIAL NEIGHBORHOOD ALONG CEDAR HILL ROAD



PROTECTED TURN LANES ALONG SANTA FE TRAIL



PIPELINE RIGHT OF WAY



SANITARY SEWER LINE LOCATED NORTH OF THE CREEK



# 03

## CLIENT AND PUBLIC INVOLVEMENT





### 3.1 SITE VISIT



July 30, 2024

Attendees included members of the Ladd Preserve Steering Committee and representatives of the design team. The group toured much of the site by foot and experienced the quiet of the creekbed, the tall grasses in deep soil, and the struggling

perennials in the thin, rocky soil in the edges of the property. The group discussed the advantages and disadvantages of the possible future vehicle entrances to the site and examined the layout of existing footpaths and mudslides built by beavers.

### 3.2 STEERING COMMITTEE VISIONING SESSION



September 4, 2024

Attendees included members of the Ladd Preserve Steering Committee, representatives of the design team, and Bob and Trudy Ladd. The design team presented preliminary findings from the site tour and other visits and administered a survey to gauge the range of the committee's opinions on the direction the plan should take. The general consensus was to balance increased visitation and improved accessibility with ecological preservation. Results from the survey are included as an appendix to this report.

### 3.3 PRELIMINARY DESIGN CONCEPTS PRESENTATION

November 6, 2024

The design team presented two preliminary concepts to the Ladd Preserve Steering Committee for review before the public input meeting. The first plan showed a larger building

and more extensive parking and trail layout, but the committee chose the second plan with a smaller building footprint and parking lot. The consensus of the members was for less programming in favor of a lighter development plan.



### 3.4 TOWN HALL PUBLIC MEETING

November 14, 2024

Approximately 25 members of the public attended the evening presentation to provide thoughts on the preliminary concept. K Strategies assisted with the collection of opinions by paper and online survey. The survey report is included as an appendix to this report.





# 04 MASTER PLAN

VIEW LOOKING EAST FROM SANTA FE TRAIL.

IMAGE: HALFF



## 4.0 MASTER PLAN CONCEPT

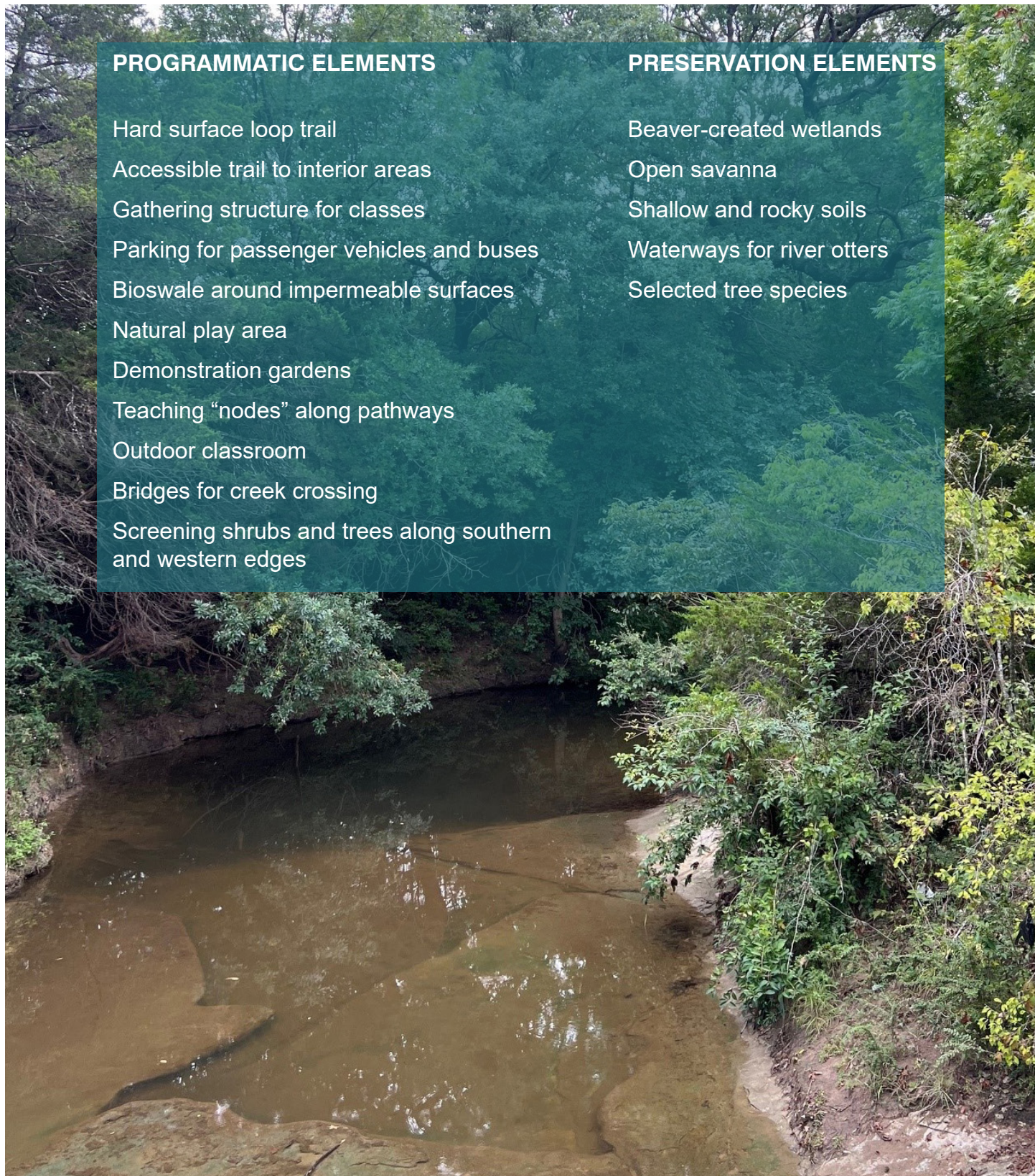
This conceptual site plan balances the Ladd Preserve’s need for stewardship with increased access for people. By providing designated trails, play areas, and gathering spaces in less sensitive ecological zones, careful development of the site can help to preserve the existing balance of plants, soil, and wildlife. Logical layouts can even set the stage for ease of land management and potential restoration of areas showing ecological damage from past uses. The following elements were specifically emphasized in this conceptual plan:

### PROGRAMMATIC ELEMENTS

- Hard surface loop trail
- Accessible trail to interior areas
- Gathering structure for classes
- Parking for passenger vehicles and buses
- Bioswale around impermeable surfaces
- Natural play area
- Demonstration gardens
- Teaching “nodes” along pathways
- Outdoor classroom
- Bridges for creek crossing
- Screening shrubs and trees along southern and western edges

### PRESERVATION ELEMENTS

- Beaver-created wetlands
- Open savanna
- Shallow and rocky soils
- Waterways for river otters
- Selected tree species



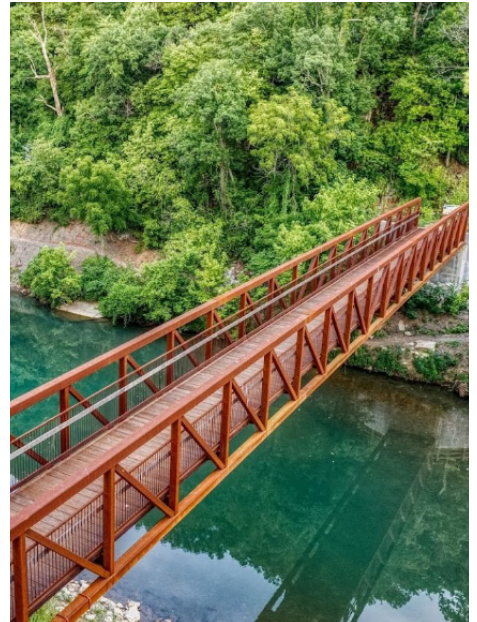
LIMESTONE SHELF AT CREEK

IMAGE: HALFF





NATURE PLAY AREA



BRIDGE EXAMPLE



BOARDWALK EXAMPLE



INTERPRETIVE SIGNAGE EXAMPLE



LIMESTONE BLOCKS AT PATH NODES



# Charles F. Ladd Nature Preserve

DUNCANVILLE, TEXAS



- 1 GATHERING STRUCTURE
- 2 DEMONSTRATION GARDEN
- 3 NATURE PLAY AREA
- 4 PERMEABLE PARKING (30)

- 5 BIOSWALE
- 6 GATHERING SPACE
- 7 SOFT SURFACE TRAILS
- 8 BOARDWALK

- 9 WETLANDS OVERLOOK
- 10 GATHERING SPACE
- 11 OUTDOOR CLASSROOM
- 12 TRAILHEAD

- 13 GATHERING SPACE
- 14 SHARED USE PATH
- 15 PEDESTRIAN BRIDGE
- 16 GATHERING SPACE

- 17 PEDESTRIAN BRIDGE
- 18 CREEK ACCESS
- 19 CREEK ACCESS

- 1 The gathering structure produces a very small footprint on the land. It is designed with very low impact construction, low utility usage and can potentially be net 0 with photo-voltaic panels on the south-facing roof.
- 2 Demonstration gardens provide a contained area for the cultivation of Blackland Prairie plants. These selections are well suited for residential and commercial landscapes and serve a dual purpose of visual appeal to people and benefits to wildlife. Trees along the edge provide visual screening and raised beds help block traffic noise.
- 3 Nature play area encourages participants to use their imagination and explore elements including logs, “tree cookie” stepping stones, twigs, and soil textures.
- 4 Parking for visitors, with around 30 spaces, accommodates daily visitors, small workshops, and classes. The drop off area provides a safe transfer of students from bus to preserve.
- 5 The bioswale, or rain garden, intercepts water runoff from pavement and parking to prevent vehicle brake dust, oils, and other chemicals from entering the creek.
- 6 Gathering spaces along the pathways allow for small-group instruction for tours and workshops. A small seating element and surfacing allow for a break away from the circulation along the pathway. These areas allow approximately 10 minutes of walking between stops.



- 7 Soft surface trails direct foot traffic through the woodlands with minimal impact to the existing vegetation. They follow existing trails wherever possible.
- 8 The boardwalk allows visitors into the wetlands to experience seasonal changes as water levels fluctuate, and allows constant monitoring of invasive vegetation. Visitors can observe how beavers shape the land.
- 9 At the wetlands overlook, small groups and classes can gather to observe flying and aquatic species. This overlook also allows for water quality monitoring.
- 10 An existing circular clearing in the woods makes the perfect shaded spot for small group gathering. Understory and overstory species are located in this area.
- 11 Cottonwood, juniper, and other tree species provide shelter for another outdoor classroom. This location provides views of grasslands.
- 12 The trailhead provides a trail guide, interpretive signage, and a key to the preserve.
- 13 Situated at woodlands and grasslands, this shaded area allows for gathering off the path.
- 14 The shared use path connects to the future Duncanville trail system across the southern edge of the preserve. Trees and shrubs help to buffer the preserve from invasive plant species, visually screen vehicle traffic, and provide a physical barrier to vehicles. Where soil is too shallow for vegetation, limestone boulders protect the preserve.
- 15 The western pedestrian bridge ties in to the structure's creek overlook and allows visitors to experience the quiet beauty of the creek regardless of mobility. The bridge width allows small groups to gather.
- 16 The gathering and resting space at the creek bend overlook allows for views of the photogenic view but directs foot traffic away from the eroding edge to slow down soil compaction.
- 17 The eastern pedestrian bridge brings visitors over the waterway without using Cedar Hill Road, which has no sidewalk. Like the western bridge, it allows visitors to experience the quiet beauty of the creek regardless of mobility. The bridge width allows small groups to gather and view the limestone shelves below.
- 18 Creek access near the riffles brings visitors into the creek bed where city sounds are lost and visitors may observe water birds and other wildlife.
- 19 Creek access at the eastern side of the preserve brings visitors onto the wide stone shelves.



VIEW FROM BRIDGE OVERLOOKING CREEK



VIEW OF PROPOSED NATURE PLAY AREA



VIEW OF PROPOSED BOARDWALK



# Charles F. Ladd Nature Preserve

DUNCANVILLE, TEXAS









## 4.1 DESIGN STRATEGY

### 4.1.1 ARRIVAL AT THE SITE

Visitors arriving by vehicles will be greeted by a monument sign and a welcome plaza, with an opportunity for an art installation. Vehicles are directed to park in spots with permeable paving or drop off passengers at the turn-around extending towards the Nature Center, with its gathering

overlooks, shaded walkthroughs, and restrooms. Parking is situated on the preserve side of the roadway to keep young children from crossing over the path of vehicles. Demonstration gardens and bioswales, or rain gardens, line the linear parking zone.

### 4.1.2 NATURE PLAY

For many young visitors and caregivers, a nature play area will provide a defined site for physical, social, and inquisitive mental activity. This area can be kept free of poison ivy but allow for rotting logs, which make excellent habitat for beetles and other ground-dwelling insects. This area will also

provide other inquiry-provoking habitats. Twigs, stumps, and reptile habitat will also allow for exploration within a defined area. Plantings will include species with high sensory and play value, such as arching grasses and soft leaves.

### 4.1.3 GATHERING STRUCTURE OR NATURE CENTER

The proposed Nature Center responds to its local adjacent landscape, is informed by the site's climate and weather patterns, and demonstrates variable programmatic opportunities.

- Architecture is consolidated to minimize extensive site disruption with ready access to roads for construction material lay-down and equipment.
- Serves as a threshold that occupies the edges of two ecological communities for enhanced educational experience.
- Positions land management as a front of house program type that is integral with architecture and is ultimately educational.
- Has a spine of external circulation that welcomes as well as serves as a trailhead to the rest of the site.
- Uses the opaque nature of the architecture as well as well-positioned site walls to provide visual and auditory protection of the outdoor space and classroom from

Santa Fe.

- The foundations are lifted via helical pier systems that allow for reduced disturbance of surface stormwater flow.
- Is fully unconditioned. Classroom, restrooms, and support rooms will rely entirely on passive strategies (prevailing wind capture from the southeast in the summer, sliding wind screens for the prevailing northern winds in the winter, as well as ceiling fans).
- Is oriented to take advantage of solar capture, with electrical loads anticipated to be low. See attached solar analysis report in **Appendix 4**. The design team recommends photo-voltaic (PV) panel ready roof assemblies with pre-wired systems and minimal upfront solar PV arrays (1-2 panels) which can be expanded in the future as operational data is available. The design team also recommends PV installation on the roof volume that is least impacted by adjacent tree shading. Further analysis of tree canopy is needed to determine ideal placement.



ELEVATION LOOKING SOUTH

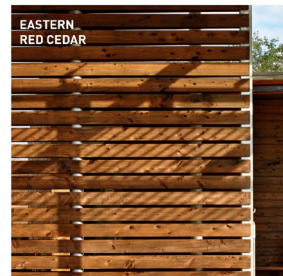
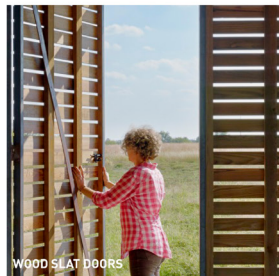
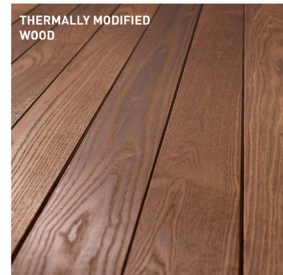
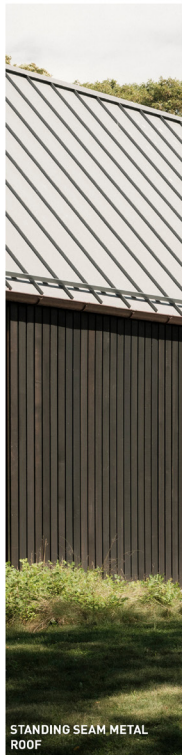




FLOOR PLAN

## MATERIALS:

- Low embodied carbon steel and concrete elements with embodied carbon targets specified for contractors.
- Thermally modified wood for durability. FSC certified for sustainably sourced timbers.
- Helical pier foundations can be drilled directly into the ground to support the structure with minimal ground disturbance. Compared to other systems, less concrete is needed. Helical pier systems also allow the building structure to lift above the native ground plane to limit disturbance to natural surface water flow toward the creek around the structure.





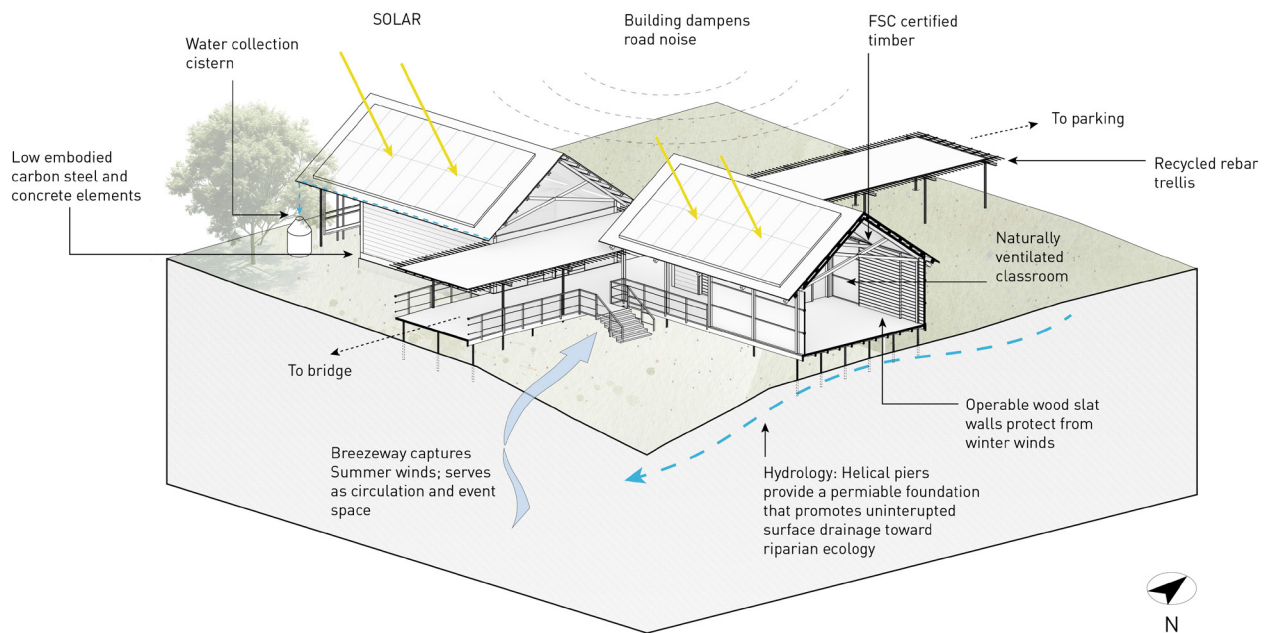


SMALL CLASSROOM VIEW LOOKING WEST



CLASSROOM ELEVATION





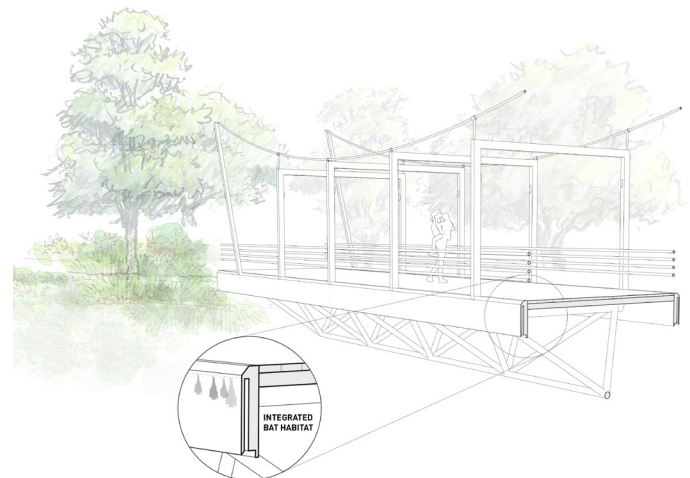
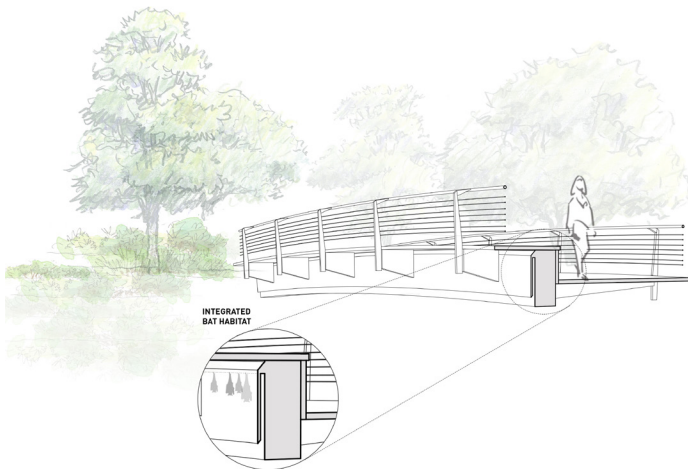
## INTEGRATION OF BUILDING WITH LOCAL CLIMATE

### 4.1.4 MAJOR PATHS

The Steering Committee and public town hall meetings both listed a loop path around the Preserve as an important program element. The loop path design strategically incorporates two bridges across Tenmile Creek.

The creek is one of the most appealing features of the preserve, but traversing the steep incline can cause damage in a sensitive area and is not possible for some

visitors to traverse. These bridges, although representing a substantial budget figure, allow all visitors to observe the beauty of the riparian areas yet protect it. Bridges are intended to serve as educational stops along the paths to facilitate observation and instruction for small groups of 10 to 12, and to be wide enough to allow passage of land management vehicles. They also provide an opportunity for wildlife habitat within the bridge itself such as bat roosting.



## BRIDGE CONCEPTS WITH WILDLIFE HABITAT

Educational stops are deliberately located approximately ten minutes' walk all along the major path and include both small areas to stop off of the path and larger outdoor classrooms. The outdoor classrooms provide circular gathering spaces with informal seating to allow group instruction and interaction for around 25 to 30 people. These spaces are

planned for a teacher and school class or a starting point for guided tours to meet before separating into smaller groups.

The wide paths also assist with land management by serving as fire breaks between ecological communities. This allows fire to be more easily used as a land management tool.



#### 4.1.5 INTERIOR PATHS

Proposed soft-surface paths meander along existing footpaths in many locations. They lead through the woodlands to the creek bed, with its limestone ledges, and the beaver pond and boardwalk. Because the woodlands

contain many woody invasive species, the paths will serve as starting lines for selective thinning and encouragement of healthy species and age diversity.



#### 4.2. OPINION OF PROBABLE CONSTRUCTION COSTS

Opinion of Probable Construction Cost (OPCC) 100%	
Base Bid	
Description	Total
Mobilization and Site Preparation	\$880,000.00
Hardscape and Circulation	\$3,197,500.00
Nature Center	\$2,000,000.00
Landscaping	\$473,000.00
Site Ameneties and Signage	\$948,750.00
<b>Overall Subtotal</b>	<b>\$7,499,250.00</b>
20% Contingency	\$ 1,499,850.00
<b>Base Bid Total</b>	<b>\$ 8,999,100.00</b>
<i>Estimated Annual Land Management &amp; Maintenance (1%)</i>	\$ 89,991.00
<i>Estimated Annual Inflation (2026)</i>	\$ 9,269,073.00
<i>Estimated Annual Inflation (2027)</i>	\$ 9,547,145.19
<i>Estimated Annual Inflation (2028)</i>	\$ 9,833,559.55
<i>Estimated Annual Inflation (2029)</i>	\$ 10,128,566.33

The complete Opinion of Probable Construction Costs is included as an appendix to this report.

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professional familiar with the

construction industry. However, the design professional can not and does not guarantee that proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater assurance as to the construction cost, he shall employ an independent cost estimator.



## 4.3. IMPLEMENTATION PLAN

### 4.3.1 PHASE 1: INITIAL DEVELOPMENT (YEARS 1-2)

Objective: Establish foundational elements to enable public access and ensure environmental stability.

#### 1. Site Preparation and Ecological Restoration:

- Remove invasive species and restore native prairie vegetation.
- Stabilize Tenmile Creek banks and mitigate erosion through riparian planting.
- Conduct soil preparation for future plantings, especially in demonstration gardens.
- Conduct geotechnical investigation for site soil suitability, spring hydrology, and scour analysis.
- Evaluate concrete and other debris within stream crossing woodland trail. Evaluate removal or adaptation of existing concrete slab.

#### 2. Trail and Parking Infrastructure:

- Construct the main hard-surface loop trail and

accessible interior paths.

- Install permeable parking for daily visitors, ensuring adequate space for buses and passenger vehicles.
- Add bioswales to manage stormwater runoff effectively.

#### 3. Educational and Interpretive Features:

- Develop and install interpretive signage at key points, including trailheads and gathering spaces.
- Identify and map locations for teaching “nodes” along pathways.

#### Key Milestones:

- Completion of the primary loop trail.
- Opening of parking facilities with signage and landscaping.

### 4.3.2 PHASE 2: ENHANCING VISITOR AMENITIES (YEARS 3-4)

Objective: Expand visitor facilities to improve accessibility, educational opportunities, and community engagement.

#### 1. Construction of Nature Center and Gathering Structure:

- Build a compact, low-impact Nature Center equipped with photovoltaic panels and passive design features.
- Include restrooms, an outdoor classroom, and a shaded walkthrough.

#### 2. Nature Play Area and Demonstration Gardens:

- Construct the nature play area with interactive elements like logs, mounds, tunnels, tree “lily pads”, and sensory plantings.

- Establish demonstration gardens showcasing Blackland Prairie species suitable for residential use.

#### 3. Boardwalk and Wetlands Overlook:

- Build boardwalks for wetland observation and environmental monitoring.
- Include a wetlands overlook designed for small group activities and water quality testing.

#### Key Milestones:

- Completion of the Nature Center and associated gathering spaces.
- Launch of the nature play area and demonstration gardens.

### 4.3.3 PHASE 3: LONG TERM CONNECTIVITY AND PROGRAMMING (YEARS 5+)

Objective: Ensure the Preserve’s integration into the regional landscape and enhance its programming and sustainability.

#### 1. Trail Connections and Wayfinding:

- Connect the shared-use path to the future Duncanville Trail System.
- Install clear and accessible wayfinding signage along trails to guide visitors through the Preserve. Include distance markers, difficulty ratings, and interpretive signs highlighting the surrounding ecological features and historical significance of the area.

#### 2. Ongoing Ecological Monitoring and Maintenance:

- Develop a citizen science program to involve the community in monitoring biodiversity, water quality, and invasive species.
- Establish a dedicated maintenance schedule for trails, signage, and ecological restoration areas.

#### 3. Community Engagement and Education:

- Introduce seasonal programs, such as guided tours, school workshops, and habitat restoration events.



- Host an annual Nature Preserve Day to celebrate progress and engage with the community.

#### Key Milestones:

- Connection of Preserve trails to regional networks.
- Establishment of a robust volunteer and

educational programming calendar.

To support these phases, the following funding sources and partnerships should be explored.

### 4.3.4 FUNDING OPPORTUNITIES

#### 1. Grant Opportunities:

- Apply for grants from organizations like the National Fish and Wildlife Foundation, Texas Parks and Wildlife Department, and the U.S. Environmental Protection Agency.

#### 2. Public-Private Partnerships:

- Partner with local businesses, schools, and civic organizations for funding and sponsorship opportunities.
- Encourage corporate contributions for educational infrastructure, such as the Nature Center or play area.

#### 3. Community Fundraising:

- Launch a fundraising campaign targeting individuals and groups passionate about conservation.
- Recognize donors by name in a key gathering space with an art installation which allows for

names to be added over a long span of time.

- Offer naming rights for major features, such as the Nature Center or teaching nodes.

#### Monitoring and Evaluation:

To ensure the Preserve meets its goals, the following performance indicators will be tracked:

- Ecological Health: Regular assessments of native vegetation coverage, invasive species control, and water quality.
- Visitor Metrics: Data on the number and demographics of visitors, participation in programs, and community feedback.
- Financial Sustainability: Annual reviews of operational costs, fundraising success, and grant utilization.





## 4.4. EDUCATION

The Charles F. Ladd Nature Preserve is uniquely positioned to serve as a regional hub for environmental education and interpretation, fostering a deeper connection between the community and the natural world. Through thoughtfully designed interactive learning spaces, interpretive features, and educational programs, the Preserve will engage visitors of all ages and backgrounds while promoting stewardship of its unique ecological and cultural heritage.

Interactive learning spaces will be strategically located throughout the Preserve to encourage exploration and foster hands on learning. Teaching nodes along key pathways will serve as small, defined areas where visitors can pause to learn about specific ecological features, such as native plant species, local wildlife, and the interconnectedness of prairie and riparian systems. These nodes will include interpretive panels with engaging visuals and explanations, as well as QR codes linking to supplemental digital content, such as audio tours and videos. Simple seating arrangements will accommodate small group discussions, workshops, and school programs, creating opportunities for interactive engagement with the environment.

Outdoor classrooms will provide additional spaces for larger educational gatherings. Located near high interest areas such as wetlands, savannas, and riparian woodlands, these shaded spaces will be designed to host field trips, habitat restoration workshops, and community events. Their informal layout and natural surroundings will create an immersive learning experience, allowing groups of 25 to 30 participants to engage with the Preserve's ecological and cultural narratives.

The nature play area will be a focal point for young visitors, offering an environment that stimulates curiosity and creativity. Designed to encourage unstructured exploration, this area will feature natural elements such as logs, tree lily pads and soil textures, as well as plantings selected for their sensory appeal and play value. Interpretive signage will provide guidance for caregivers, helping them facilitate educational and imaginative play. This space will serve as an introduction to nature for children and families, fostering a sense of wonder and connection to the environment.

Interpretive features throughout the Preserve will enhance visitors' understanding of its ecological and historical significance. Thematic trails, such as a Prairie Pathway, Wildlife Wander, and Waterways Walk, will provide guided explorations of the Preserve's diverse habitats. Along these trails, interpretive signage will explain key features such as the Blackland Prairie ecosystem, the geological history of Tenmile Creek, and the role of native species in supporting biodiversity. Demonstration gardens near the Nature Center will showcase native plants suitable for residential and commercial landscapes, offering practical examples of sustainable gardening practices.

Digital and augmented reality experiences will further enhance interpretation and accessibility. Visitors using mobile devices will be able to access overlays of historical maps, animated depictions of ecosystem changes, or audio recordings of local bird calls. These tools will cater to tech-savvy audiences and offer alternative ways to engage with the Preserve, broadening its appeal to a diverse range of visitors.

Educational programming will play a central role in the Preserve's mission. Partnerships with local schools will allow students to experience hands-on learning tailored to their curriculum. For younger children, scavenger hunts and storytelling sessions will introduce foundational ecological concepts, while middle and high school students will have opportunities to participate in water quality testing, habitat studies, and citizen science initiatives. Seasonal events, such as guided nature walks, pollinator festivals, and astronomy nights, will provide additional avenues for community engagement and learning.

By integrating educational and interpretive opportunities into the Charles F. Ladd Nature Preserve, the Master Plan ensures that the site will serve as a living classroom for generations. These features will inspire curiosity, deepen ecological understanding, and foster a strong sense of stewardship, reinforcing the Preserve's role as a vital community asset and a model for sustainable development.





## 4.5. METRICS FOR SUCCESS

The Charles F. Ladd Nature Preserve's success will be measured through clearly defined metrics that align with its goals of ecological preservation, community engagement, and educational enrichment. These metrics will guide the ongoing evaluation of the Preserve's impact, inform resource allocation, and provide measurable evidence of progress over time. Given the absence of baseline data and monitoring tools at present, an initial priority will be to establish foundational metrics and frameworks to support long term assessment.

A critical measure of success will be the ecological health of the Preserve. Efforts to restore native Blackland Prairie vegetation will be monitored through site surveys, with an emphasis on increasing the extent of native species coverage and reducing invasive plant populations. Biodiversity will also serve as a key indicator of ecological health, with a focus on tracking the presence of monarch butterflies, native birds, and other wildlife. Observations and community-based monitoring tools, such as citizen science apps, will document species diversity and provide ongoing data for analysis. The health of Tenmile Creek will be evaluated through regular water quality testing, focusing on sediment levels, pollutant concentrations, and seasonal wetland stability. These efforts will ensure that the Preserve's ecological restoration remains aligned with its conservation goals.

Visitor engagement will also be central to evaluating the success of the Preserve. Tracking visitor numbers through entry counters or manual logging will provide insight into overall use and highlight trends in community participation. Surveys will be conducted annually to gather demographic information and measure visitor satisfaction, providing valuable feedback for improving facilities and programming. Participation in educational programs and seasonal events will be monitored to assess the success of these initiatives and their impact on the community.

Education will play a pivotal role in the Preserve's mission, with measurable outcomes linked to both volunteer and public learning. Volunteer training programs will equip participants with the skills needed for ecological monitoring and habitat restoration, while parks maintenance staff will receive supplementary training to support these efforts during critical periods. The success of educational outreach will be evaluated through the number of school groups visiting the Preserve and participating in field trips, as well as through feedback from educators and students. Public learning will be assessed through post-event surveys, with an emphasis on tracking increases in ecological awareness and knowledge of the Blackland Prairie ecosystem.

The financial sustainability of the Preserve will be another critical area of focus. Annual tracking of revenue generated through grants, sponsorships, and donations will provide insight into the Preserve's funding health. Cost savings achieved through sustainable features, such as reduced water and energy use, will also be monitored to highlight the economic benefits of environmentally friendly practices. Volunteer contributions will be recorded in terms of hours

worked and their estimated value relative to operational costs, offering a clear picture of the community's role in sustaining the Preserve.

Looking toward the future, the Preserve's integration into broader regional and ecological contexts will be assessed. Progress in linking the Preserve's trails to regional networks will be documented, with user surveys and trail counters providing data on public use. Community stewardship initiatives, such as habitat restoration days and citizen science programs, will be evaluated based on participation levels and their contributions to the Preserve's ecological data. Additionally, the performance of climate resilience features, including bioswales and riparian buffers, will be assessed to determine their effectiveness in mitigating stormwater impacts and enhancing the site's overall sustainability.

To support continuous improvement, annual reports will summarize progress in all key areas, providing transparency and accountability to stakeholders. These reports will include visual representations of data, such as graphs and tables, to ensure accessibility and clarity. Adaptive management practices will be employed to refine strategies based on monitoring results, with periodic stakeholder reviews every three to five years to ensure the Preserve's goals remain relevant and impactful. Early efforts will focus on establishing baseline data, particularly in areas such as vegetation coverage, wildlife presence, and visitor engagement, to build a foundation for long-term monitoring.

The development and application of these metrics will ensure that the Charles F. Ladd Nature Preserve remains a thriving ecological, educational, and community resource. By systematically tracking progress and adapting strategies as needed, the Preserve will continue to fulfill its mission of conservation and engagement.







# 05 CONCLUSION



## 5.0 CONCLUSION

The Charles F. Ladd Nature Preserve represents a rare and invaluable ecological treasure in Duncanville. It is a living testament to the regions Blackland Prairie heritage and a vibrant commitment to preserving its natural and cultural legacy. This Master Plan established a thoughtful, forward thinking vision that balances ecological stewardship, community engagement, and sustainable development, ensuring the Preserve's significance for future generations.

### STEWARDSHIP AND CONSERVATION

At its core, this Master Plan prioritizes preserving the Preserve's unique ecological communities. From the protection of the Tenmile Creek floodplain to the restoration of prairie species and mitigation of invasive vegetation, every aspect of this plan underscores the importance of ecological integrity. By incorporating sustainable design elements such as bioswales, permeable parking, and strategic pathways, the plan minimizes human impact while enhancing habitat resilience. These measures not only protect the land's biodiversity but also position the Preserve as a model of environmental stewardship.

### COMMUNITY CONNECTION AND EDUCATION

The Charles F. Ladd Nature Preserve is more than a natural space; it is a communal asset designed to foster environmental education and public appreciation for nature. With its accessible trails, outdoor classrooms, and interpretive features, the Preserve offers unparalleled opportunities for hands on learning and personal exploration. The thoughtful integration of gathering spaces, demonstration gardens, and nature play areas ensures that visitors of all ages and abilities can connect with the land in meaningful ways. Through partnerships with local schools and community organizations, the Preserve has the potential to become a hub for education programming and citizen science initiatives. These efforts will empower residents to take an

active role in conservation and deepen their understanding of Duncanville's unique ecological landscape.

### SUSTAINABLE DEVELOPMENT AND FUTURE RESILIENCE

The design strategies outlined in this plan embody a commitment to sustainability and adaptability. The use of passive design principles in structures like the Nature Center, coupled with low impact construction techniques, demonstrates a forward-looking approach to development. These measures ensure that the Preserve can withstand the challenges of a changing climate and increase urbanization while maintaining its ecological and cultural value.

Moreover, the plan's emphasis on inclusive and equitable access reinforces Duncanville's identity as a city that values the wellbeing of its residents and visitors. By creating a space where nature and people coexist harmoniously, the Preserve serves as a beacon of sustainable urban planning.

### A VISION FOR THE FUTURE

The Charles F. Ladd Nature Preserve is not only a reflection of Duncanville's past but also a promise for its future. The collaboration between the City of Duncanville, the Ladd family, Steering Committee, and countless stakeholders has laid the foundation for a Preserve that embodies environmental excellence and community pride. This Master Plan is a call to action, inviting all who cherish this land to join in its stewardship and to envision a future where natural beauty and urban life thrive side by side.

By implementing this plan, the City of Duncanville takes a bold step toward ensuring that the Charles F. Ladd Nature Preserve remains a cherished sanctuary and a source of inspiration for generations to come. Together, through collective effort and enduring commitment, we can honor the legacy of this remarkable land and secure its place as a cornerstone of Duncanville's identity.









