BELLE PRAIRIE PARK SCHEMATIC DESIGN

2017 MASTER PLAN ENHANCEMENTS

July 21, 2020

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BELLE PRAIRIE PARK

MASTER PLAN ENHANCEMENTS

Prepared For:

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CONTENTS

SCHEMATIC DESIGN PHASE

The work completed in the 2017 Master Plan and improvements identified by the Belle Prairie County Park Master Plan Task Force served as the foundation to providing Schematic Design development for the identified site improvements. These much anticipated enhancements were further discussed with Morrison County staff throughout the design process to ensure that they reflect the values and interest of the community and the next generation of park users in the area. Three overarching principles guided the Schematic Design effort in concert with the themes set forth by the Greater Minnesota Regional Parks and Trails Commission. These principles helped guide the design of the future improvements, the proposed phasing, and the realization of the master plan effort to connect users to nature based outdoor recreation.

CELEBRATE THIS SITE

Belle Prairie Park is a unique site situated along the Mississippi River, located at a confluence of not only rich, natural ecosystems and biodiversity, but also of significant cultural history Shaped by layers of glacial sediment deposits from the last Ice Age over 2 million years ago, the landscape contains multiple biomes that represent vastly different landscapes across the state of Minnesota. The 145 acres that comprise Belle Prairie Park are rich in prairie remnants, oak savanna, hardwood forests species, a floodplain terrace and native stand of white pine that all serve as the canvas for the park uses.

OUTDOOR CONNECT VISION

With so few county parks in the region and being conveniently located near Morrison County's largest city of Little Falls, the Park draws visitors from around the region to an accessible natural area with the unique opportunity to immerse oneself in the native landscapes that historically dominated central Minnesota. Accessing the site by boat, bike, or car, these remnant landscapes provide visitors a critical connection to our valuable natural systems and offer the ability to foster environmental and historical awareness through creative engagement opportunities within the Park.

EXPAND RECREATION OPPORTUNITIES

The improvements identified are carefully placed to protect and reveal the story of this landscape while protecting valuable natural and cultural features. Through trails, signage, and engaging spaces, opportunities crafted to discover, learn, and form emotional connections to the site dating back to the Archaic period Native American tool shop, the Hamilton-Farrand Cemetery, Belle Prairie Village Site, and the Red River Ox Cart Trail used during the 1800's. These historical artifacts and the significance of the biodiversity on one site make this a unique opportunity to connect people to the outdoors.

IMPROVEMENT GOALS

The Greater Minnesota Regional Parks and Trails Commission has identified Belle Prairie Park as a park of Regional Significance, a Natural Resource Based Park eligible for funding through the Legacy Parks and Trails Grant. To achieve this designation, Belle Prairie Park meets the following criteria:

- Provides a High-Quality Outdoor Recreation Experience
- Preserves a Regionally Significant and Diverse Natural or Historic Landscape
- Well-Located and Connected to Serve a Regional Population and Tourist Destination
- Fills a Gap in Recreational Opportunity within a Region

To rise to the established guiding principles and fulfill the themes of the GMRPTC, the following 5 goals were set forth as an evaluation tool for the development of proposed park features:

BALANCE PASSIVE AND ACTIVE RECREATION

- The site should be a space for both respite and activities that create a unique sense of place and are unlike others in the region, submersing users into a unique outdoor recreation experience.

SUPPORT YEAR-ROUND USE AND ACCESSIBILITY

- For current and future users while also supporting connectivity to amenities both within the park and in the larger regional context.

APPRECIATE AND INTERPRET NATURAL FEATURES AND CULTURAL HISTORY

- Offer opportunities throughout the site to inform both regular and destination type users.

BE APPROPRIATE AND SUSTAINABLE

- In the environment, economics, and in operations and management in an effort to create programming & preservation of natural resources into the future.

EXPLORE INTERVENTIONS THAT EXPAND AND ENHANCE THE OUTDOOR EXPERIENCE THIS SITE OFFERS

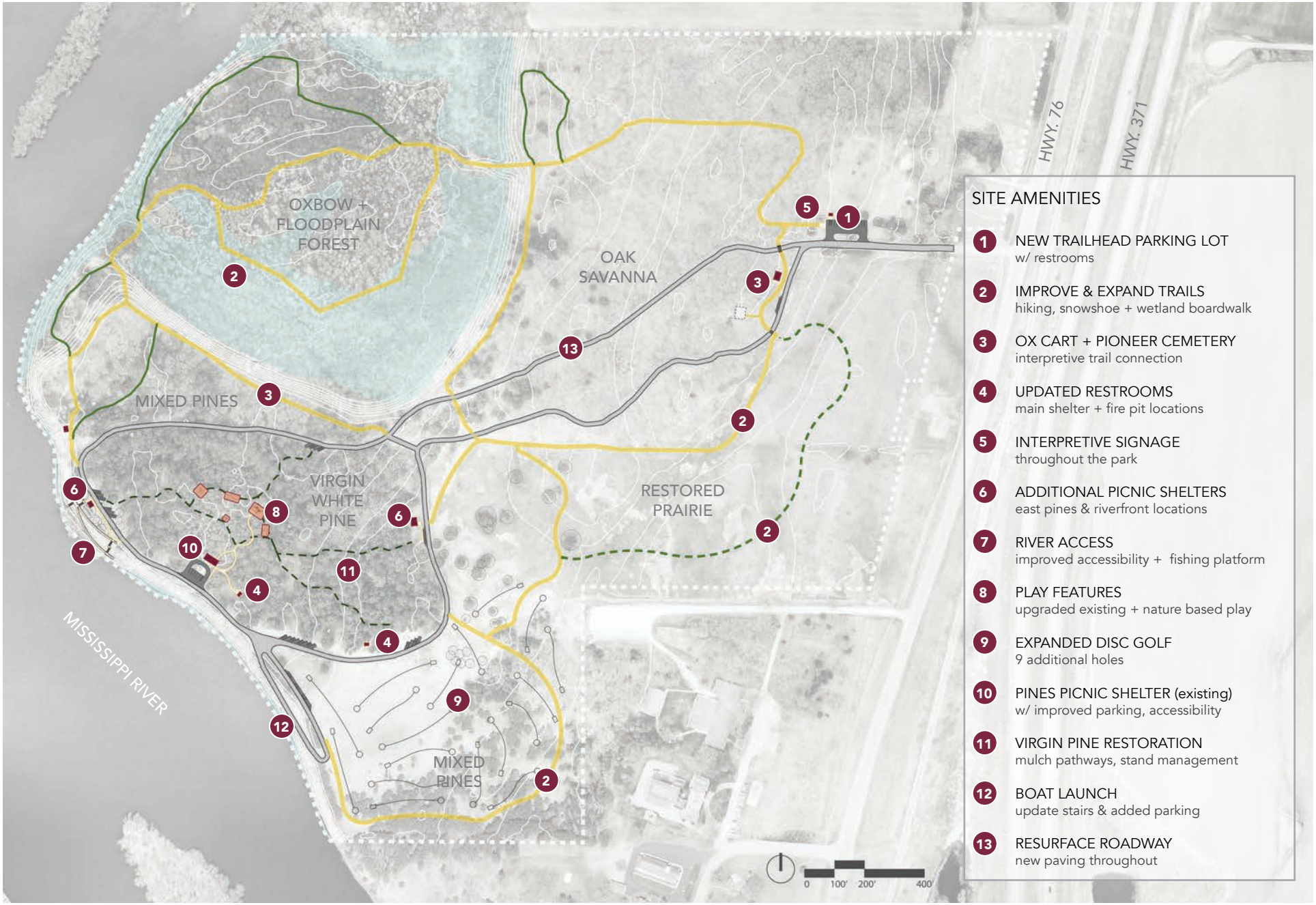
- To support value improvements and build upon master plan improvements to continue to keep this park a regional draw for users to experience a natural resource based recreational opportunity.

SD PROCESS

00

SITE PLAN

SITE PLAN: IMPROVED + ADDED AMENITIES

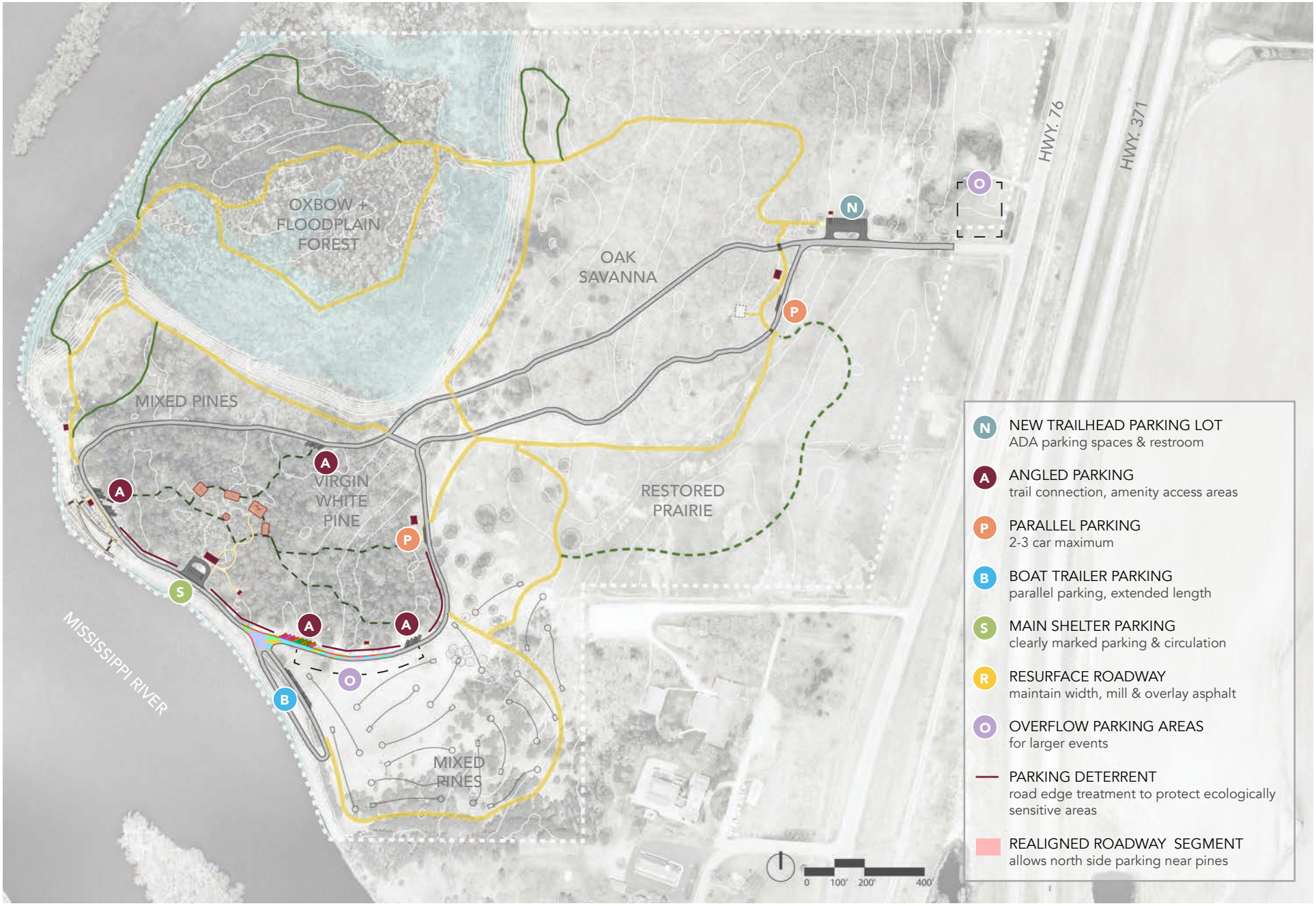


01

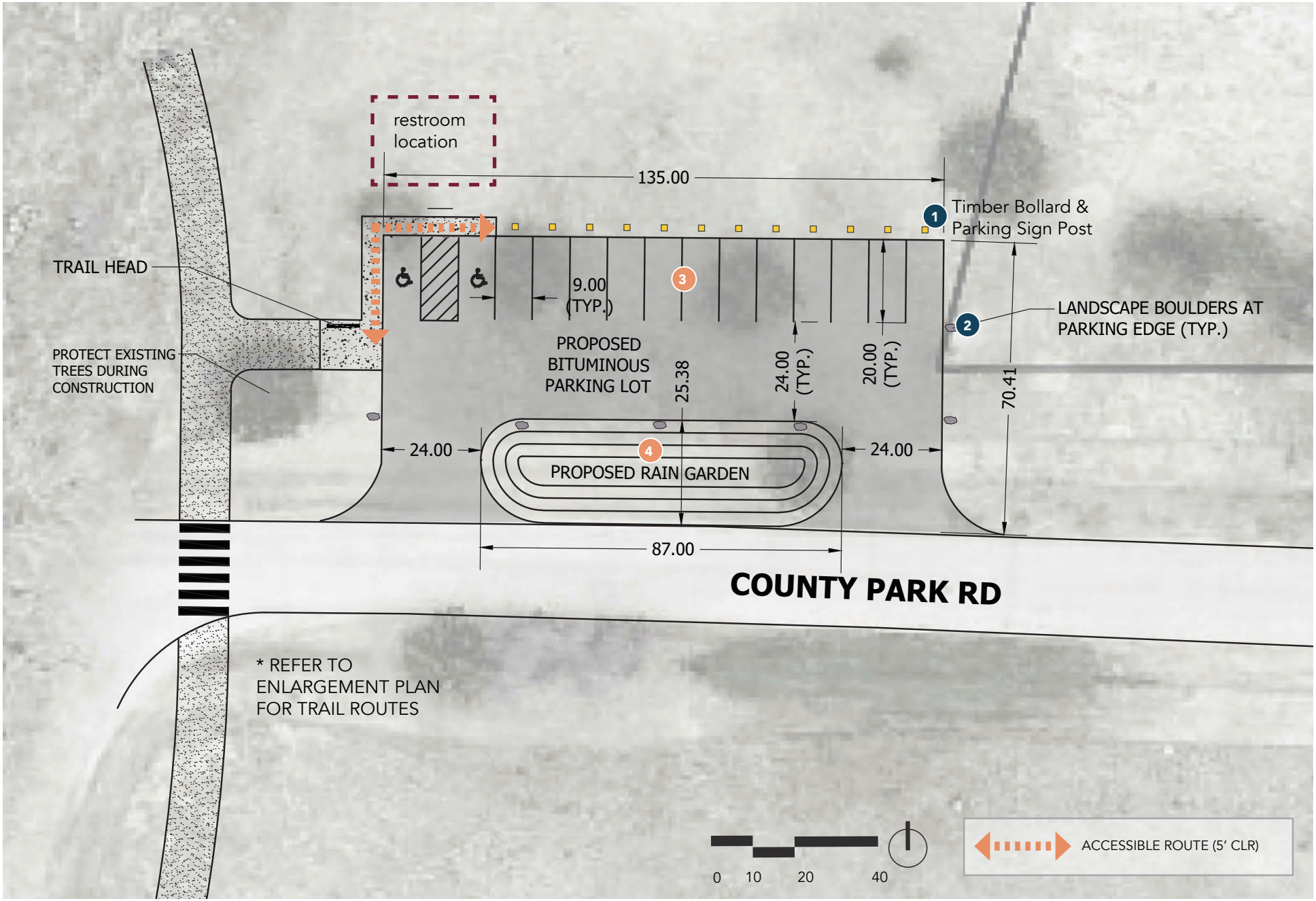
PARKING + ROADWAY

A SERIES OF PROPOSED PARKING STRATEGIES WILL PROVIDE ACCESSIBLE AND CONSOLIDATED PARKING NEAR HIGH-USE SITE AMENITIES. THIS INTERVENTION WILL ALLEVIATE THE NEGATIVE IMPACTS CURRENTLY PLACED ON THE VIRGIN PINE AREA AS USERS PARK UNDER THE MATURE CANOPY. ADDITIONAL INTERVENTIONS INCLUDE ROADWAY RECONSTRUCTION, DESIGNATED PEDESTRIAN CROSSING AREAS, AND A SERIES OF PARKING DETERRENTS TO FURTHER PRESERVE SENSITIVE AREAS OF THE SITE.

PARKING: STRATEGIES



PARKING: ADDED TRAILHEAD PARKING LOT



TRAFFIC CONTROL & PARKING IMPROVEMENT OPPORTUNITIES

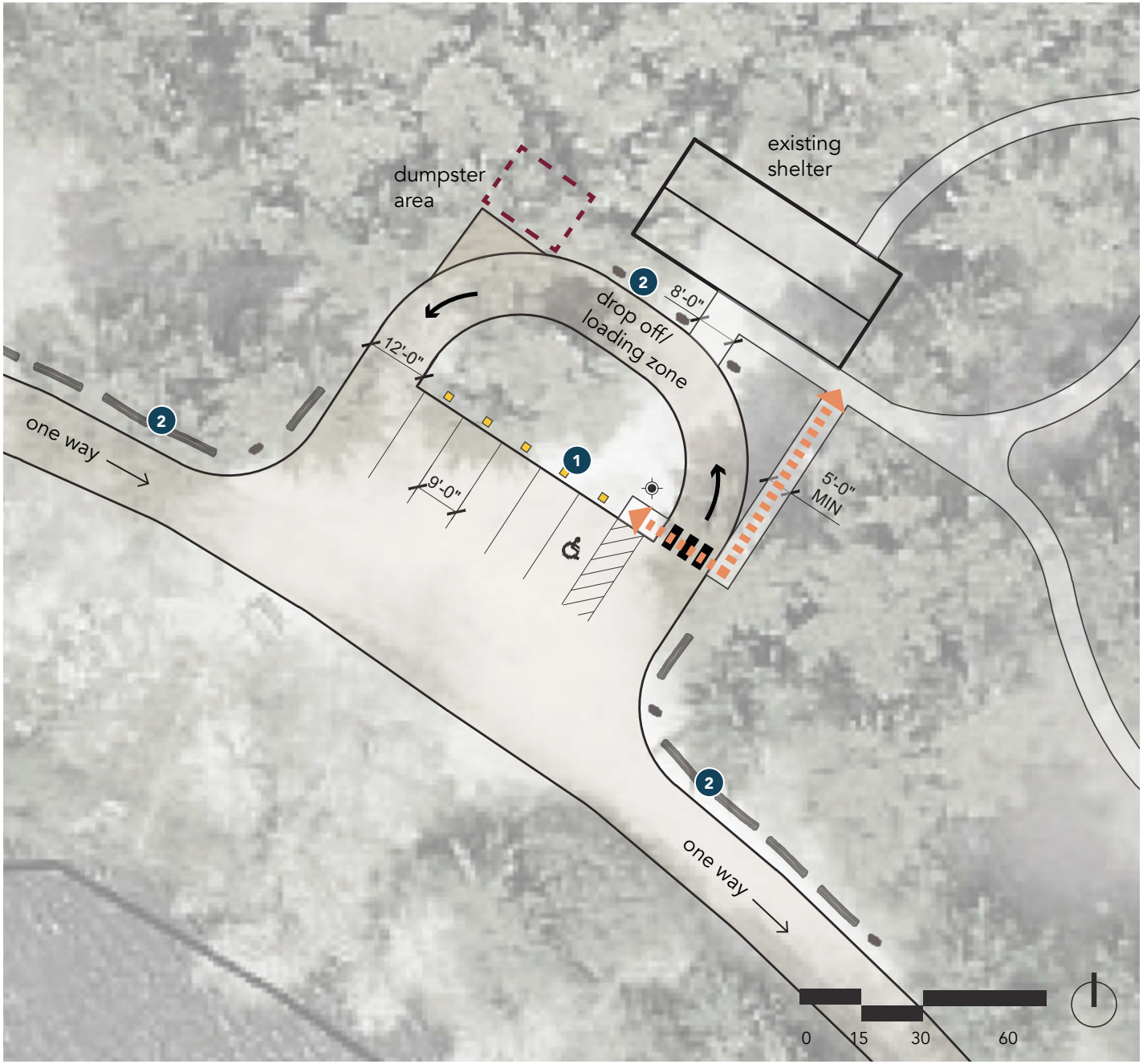
1 Timber Bollard & Parking Sign Post

2 Boulder edge restraints (parking deterrents)

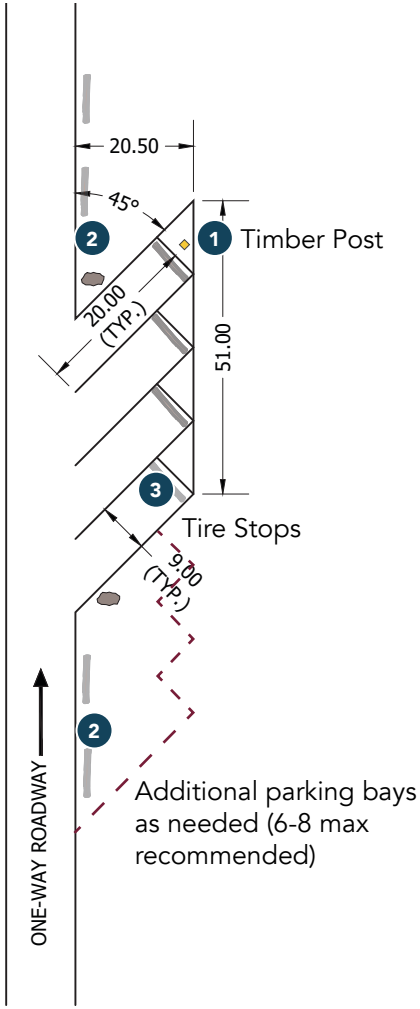
3 Permeable Paving Opportunity

4 Demonstration Rain Garden

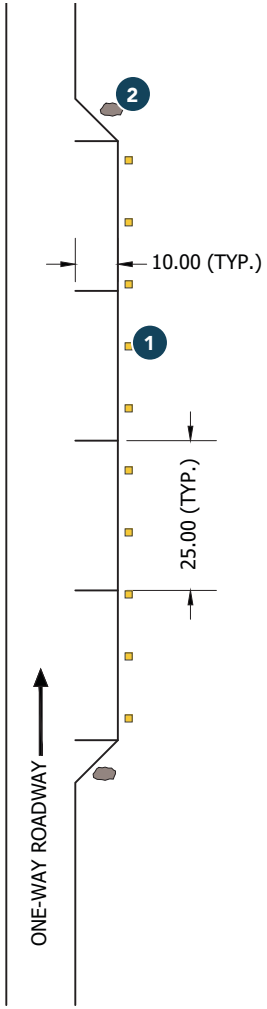
PARKING: EXISTING SHELTER LOT



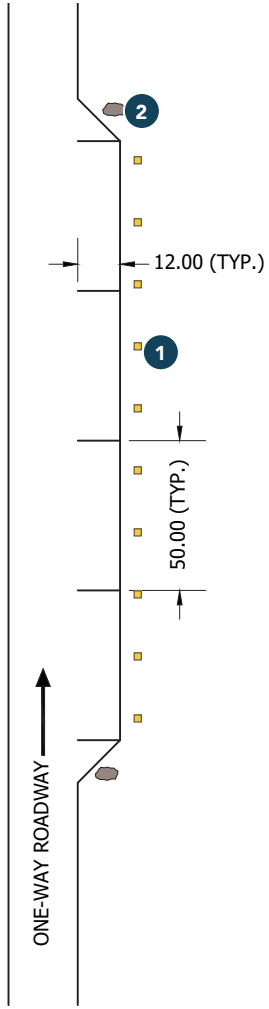
PARKING: SECONDARY PARKING



ANGLED TURN-OUT PARKING



PARALLEL TURN-OUT PARKING



BOAT & TRAILER PARALLEL
TURN-OUT PARKING

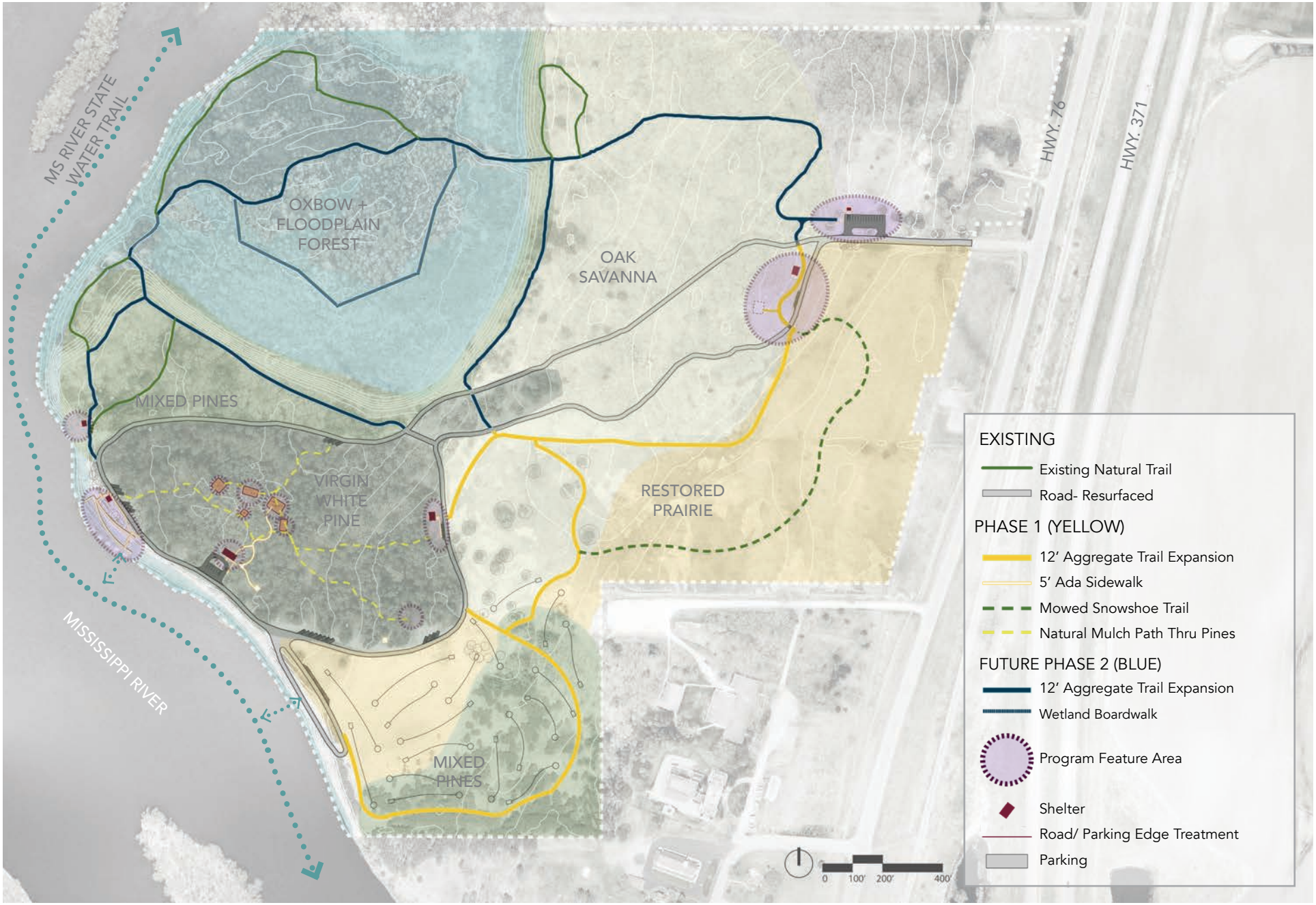
PARKING NOTES: PROVIDE ACCESSIBLE PARKING SIGNAGE
& STRIPING AS REQ'D BY JURISDICTIONAL AUTHORITY

02

EXPAND TRAIL SYSTEM

EXISTING TRAILS WILL BE EXPANDED AND ENHANCED WITH CONSISTENT, ADA ACCESSIBLE AGGREGATE PAVING AND WIDENED TO SUPPORT WINTER SKIING AND SNOWSHOEING. THE IMPROVED TRAIL NETWORK INVITES USERS TO EXPLORE NEW AREAS OF THE SITE, INCLUDING A MOWED PRAIRIE TRAIL SUITABLE FOR WINTER SNOWSHOEING AND A WETLAND BOARDWALK IN THE REMNANT OXBOW FLOODPLAIN. SITE AMENITIES ARE CONNECTED THROUGHOUT THE PARK WITH PAVED ACCESSIBLE ROUTES AND A SECONDARY NETWORK OF INTERTWINED MULCH PATHWAYS PROTECT THE SENSITIVE ROOT SYSTEM OF THE VIRGIN PINE FOREST.

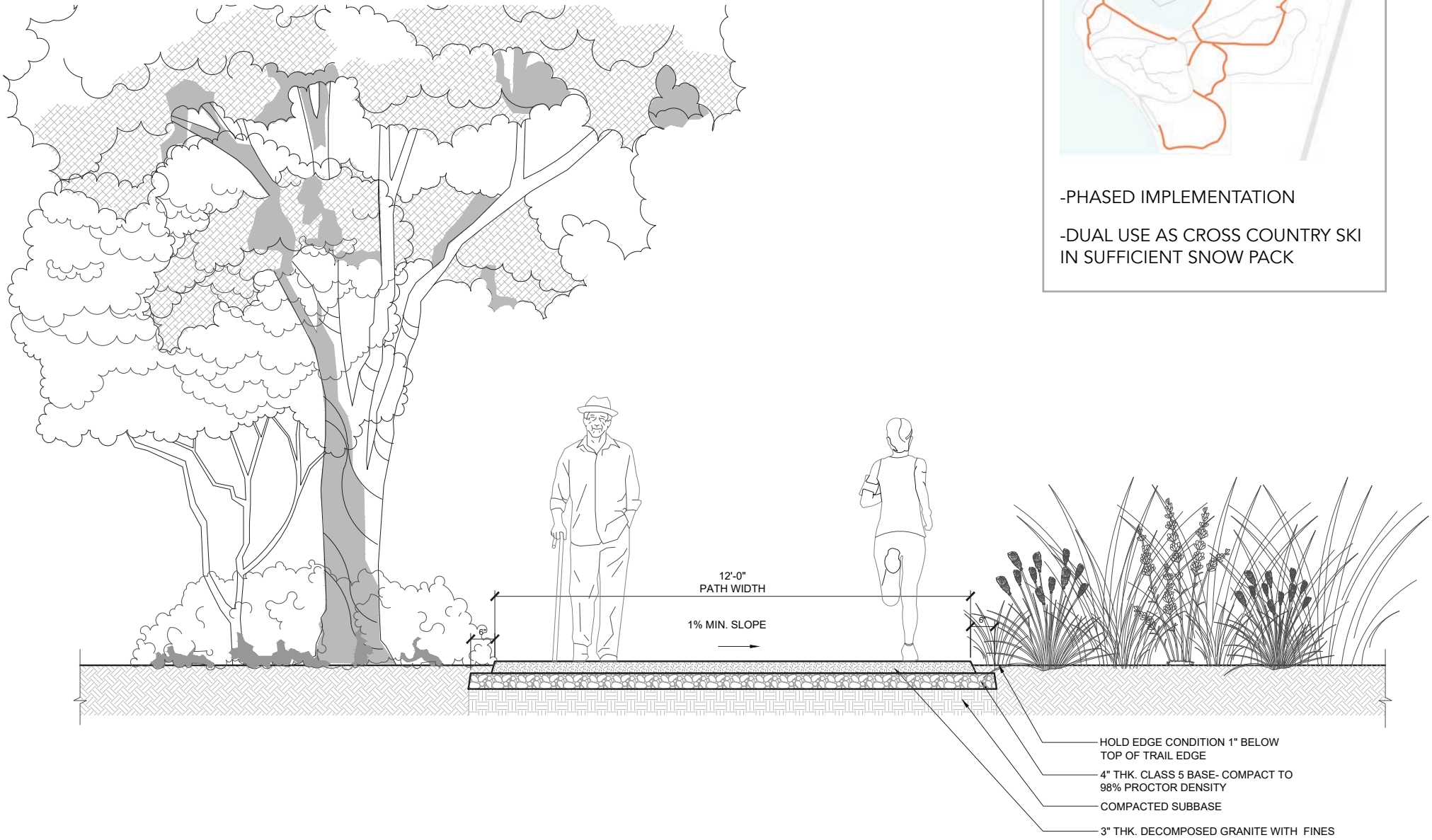
TRAILS: IMPROVED ACCESS & NETWORK



TRAILS: 12’ ACCESSIBLE TRAIL

-PHASED IMPLEMENTATION

-DUAL USE AS CROSS COUNTRY SKI IN SUFFICIENT SNOW PACK

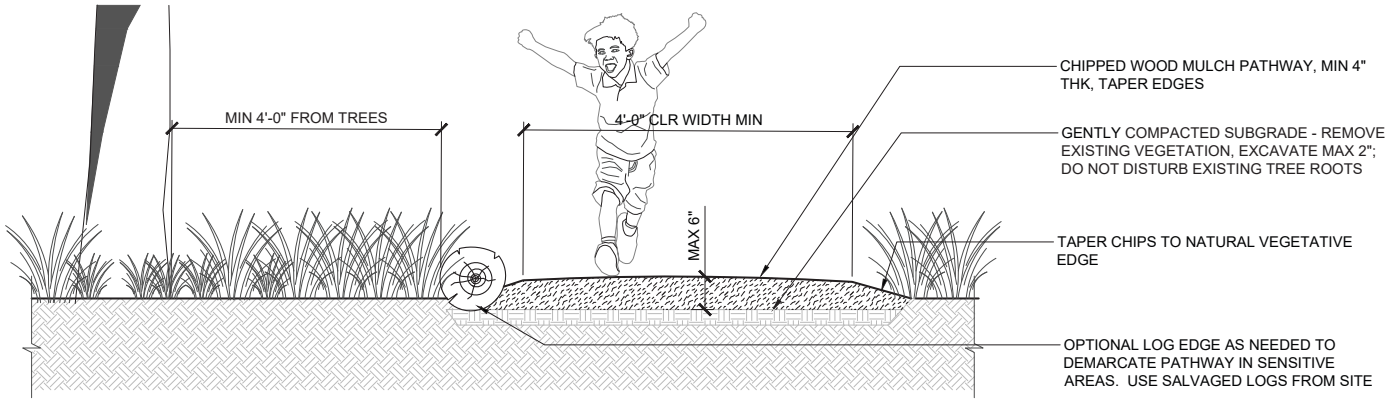


TRAILS: WOODLAND TRAIL

-PROTECTS VIRGIN PINE ROOT SYSTEMS FROM COMPACTION

-RENEWABLE, ON SITE RESOURCE

-EASILY MAINTAINABLE, FLEXIBLE PATHWAY OPTION



TRAILS: BOARDWALK

PREMANUFACTURED BOARDWALK

Cost: $$$
Maint.: Med- Low
ADA.: Yes
Impact: Med (on pedestals)

STICK-BUILT BOARDWALK

$$$ ($450+/LF)
High
Yes
High (piers/footings)

PRIMITIVE BOARDWALK

$ (40-60/LF)
Med-Low
No
Low (ledger board)

-1500 SF ADDED TRAIL

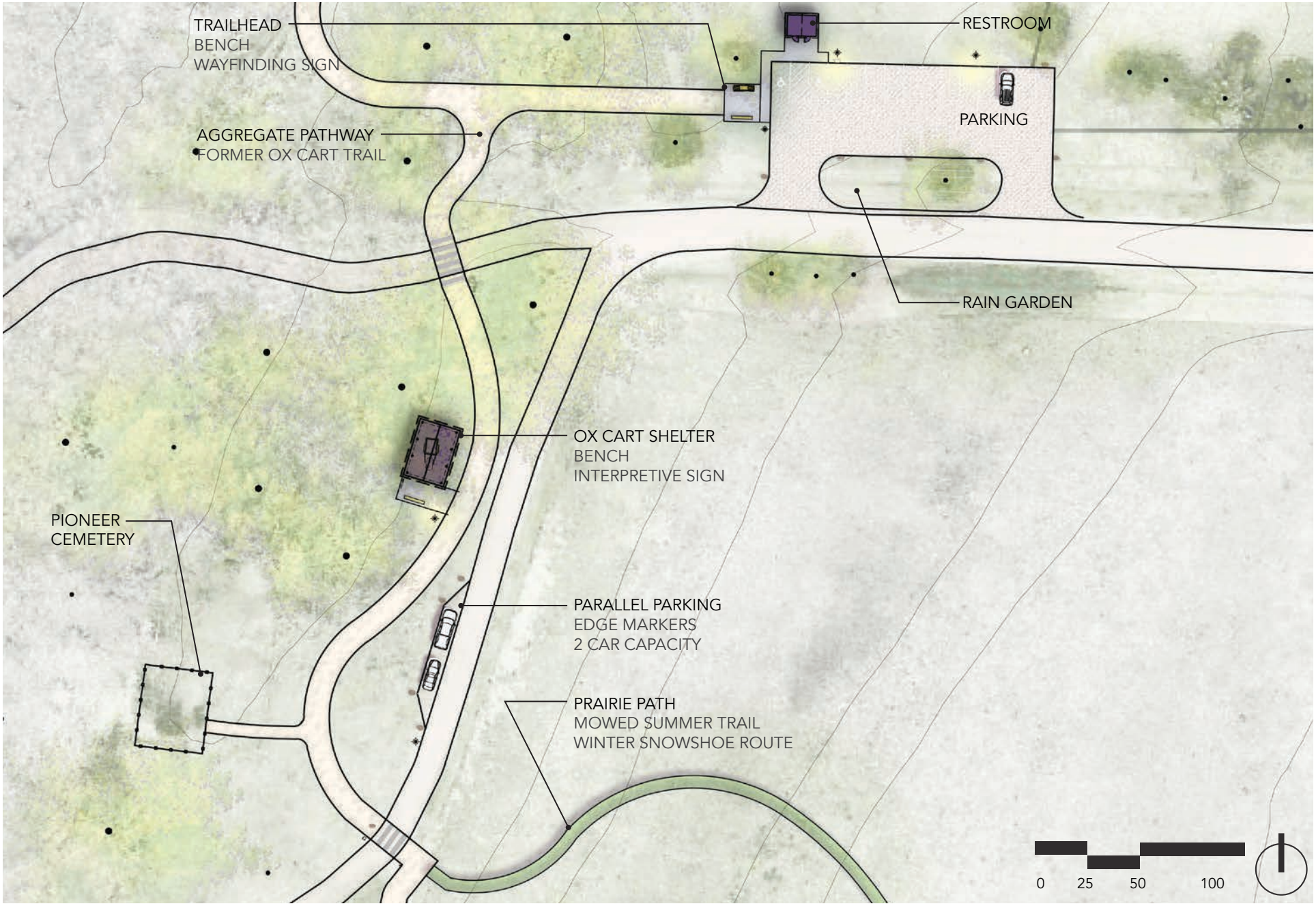
TRAILS: BOARDWALK

03

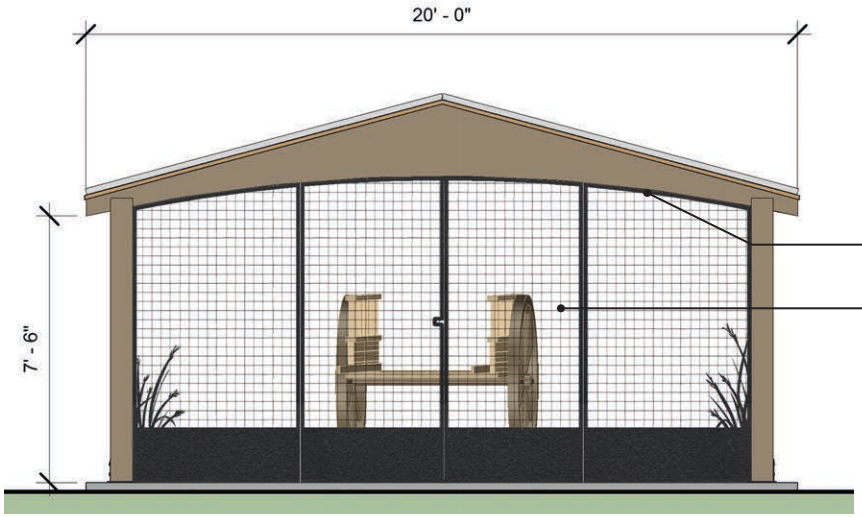
OX CART AREA

AT THE CONVERGENCE OF THE OAK SAVANNA AND RESTORED PRAIRIE, THE OX-CART AREA WILL BECOME A NEW HUB OF ACTIVITY AS YOU ENTER THE PARK. THIS AREA INCLUDES A RESTROOM FACILITY, INTERPRETIVE & WAYFINDING MAPS, AND TRAIL CONNECTIONS FROM THE TRAILHEAD PARKING LOT TO THE PROPOSED OX-CART SHELTER, PIONEER CEMETERY, AND PRAIRIE TRAIL FOR AN IMMERSIVE INTERPRETIVE EXPERIENCE OF THE SITE'S EARLY SETTLEMENT HISTORY.

OX CART AREA: ENLARGEMENT PLAN

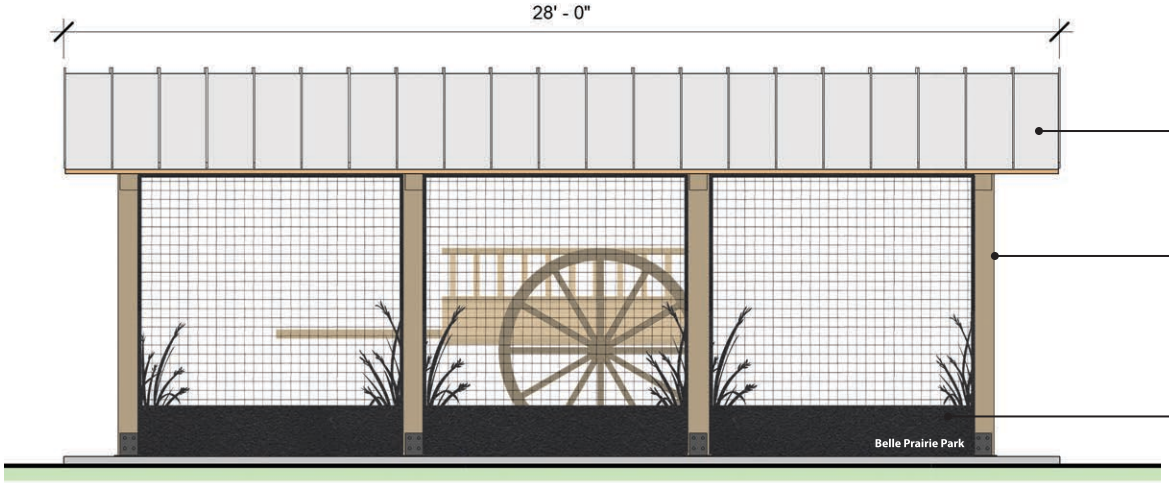


OX CART AREA: SHELTER



LAMINATED BEAM- ARCH

DECORATIVE WELDED WIRE MESH & STEEL ENCLOSURE PANEL W/ CENTER 8' GATE (OPT. 1)

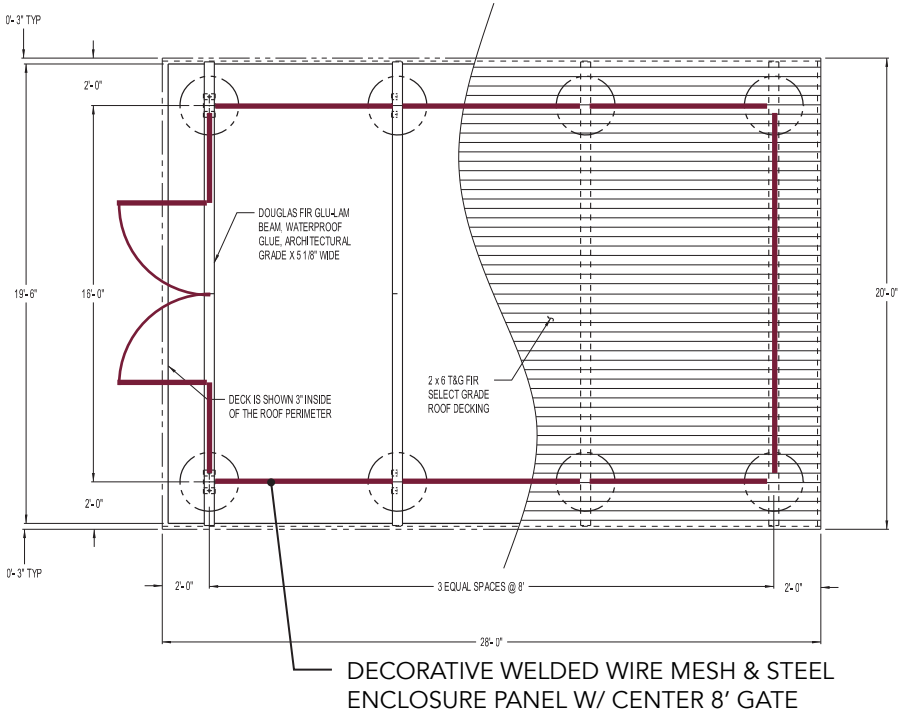


STANDING SEAM MTL ROOF
4:12 PITCH

TIMBER POSTS W/ POWDER COATED STL CONNECTIONS

DECORATIVE WELDED WIRE MESH & STEEL ENCLOSURE PANEL (OPT. 1)

OX CART AREA: SHELTER ENCLOSURE STUDIES



SHELTER PRODUCT: 20X28 SISKIYOU SHELTER BY NATURAL SHELTERS, INC. REFER TO 'SHELTERS' SECTION FOR PRODUCT INFO

ENCLOSURE OPT 2: BASIC WELDED WIRE

ENCLOSURE OPT 3: PRAIRIE PATTERN DECORATIVE WELDED WIRE

OX CART AREA: RENDERED VIEW

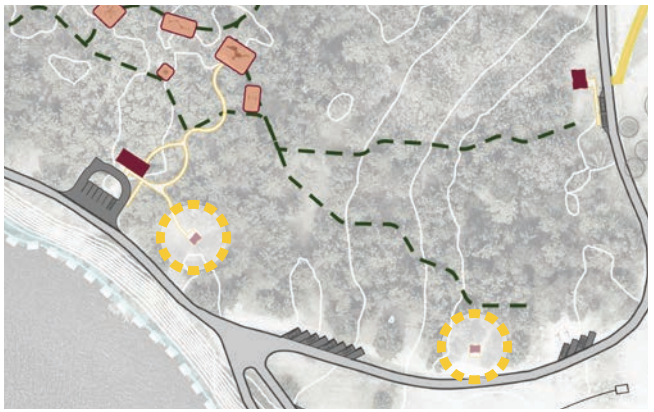
OX CART AREA: RENDERED VIEW

04

UPDATED RESTROOMS

PRECAST CONCRETE RESTROOMS CONSISTENT WITH OTHER MORRISON COUNTY PARK FACILITIES WILL REPLACE THE OUTDATED, PIT RESTROOMS ON SITE AND OFFER ADA ACCESSIBILITY, LOW MAINTENANCE, AND IMPROVED LOCATIONS THROUGHOUT THE SITE.

RESTROOMS: UPDATED RESTROOMS



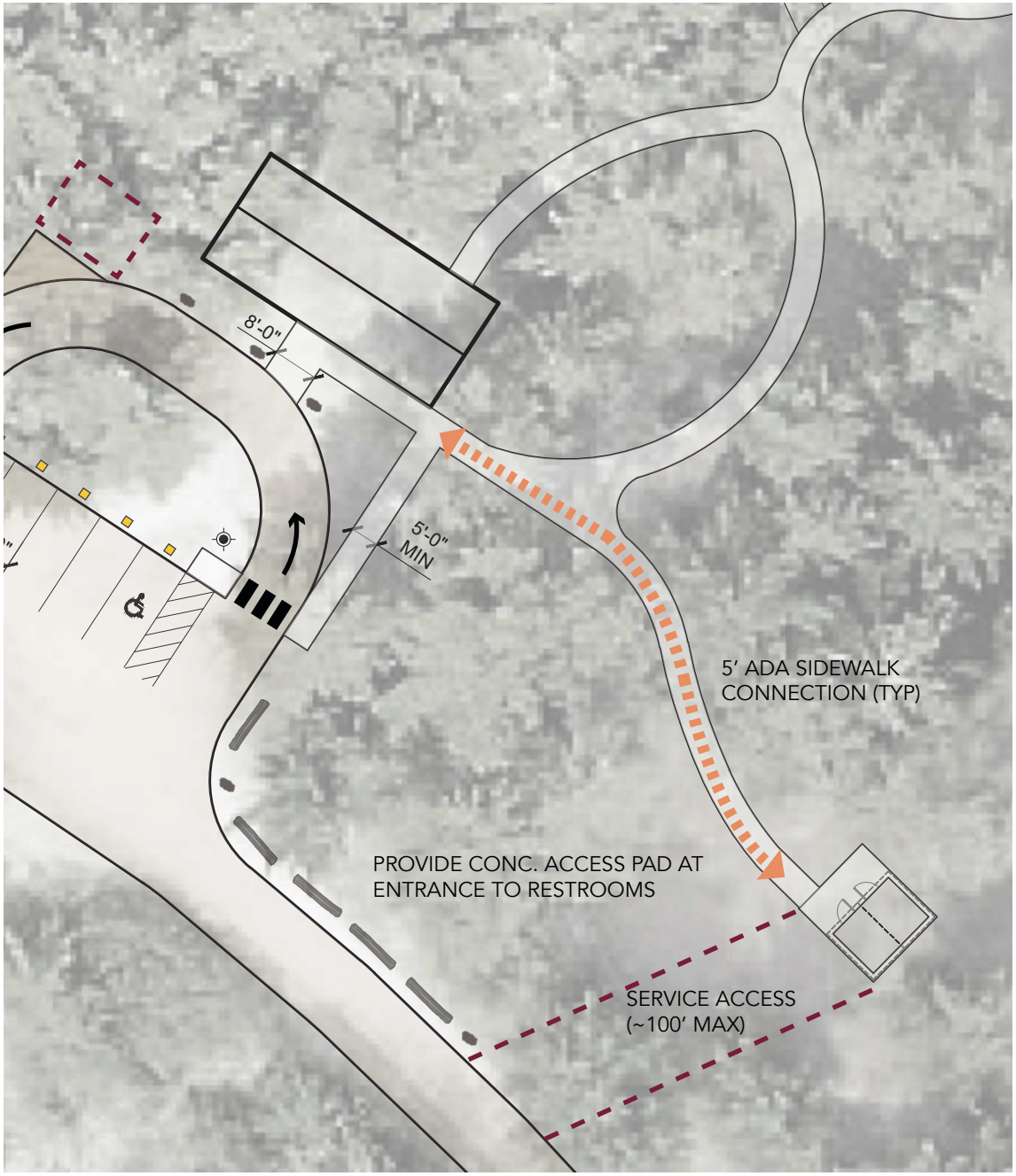
*TRAILHEAD RESTROOM LOCATION NOT PICTURED

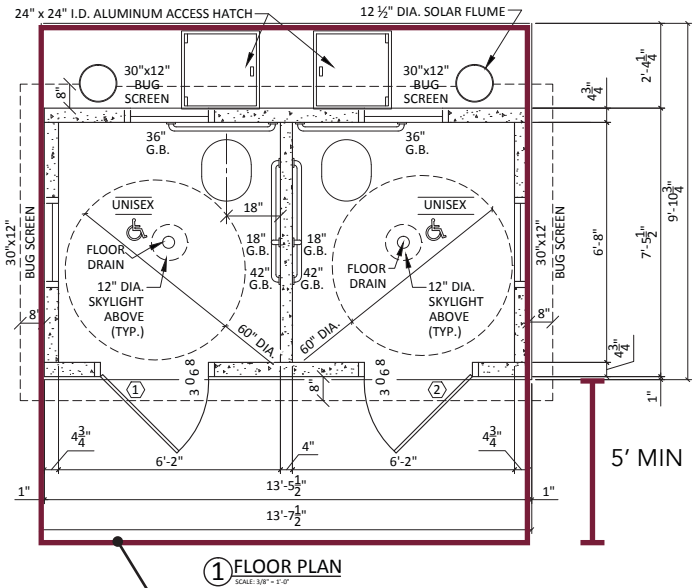
HISTORICAL CONTEXT

PRECAST
BOARD & BATTEN

EXISTING PRECEDENT AT
SOO LINE TRAILHEAD

RESTROOMS: EXISTING SHELTER LOCATION



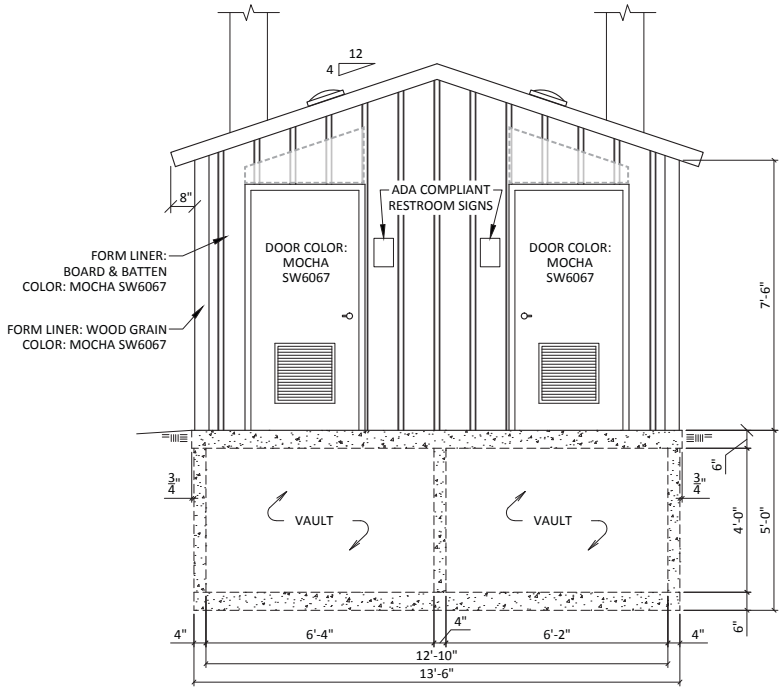


PROVIDE CONC. ACCESS PAD AT ENTRANCE TO RESTROOMS

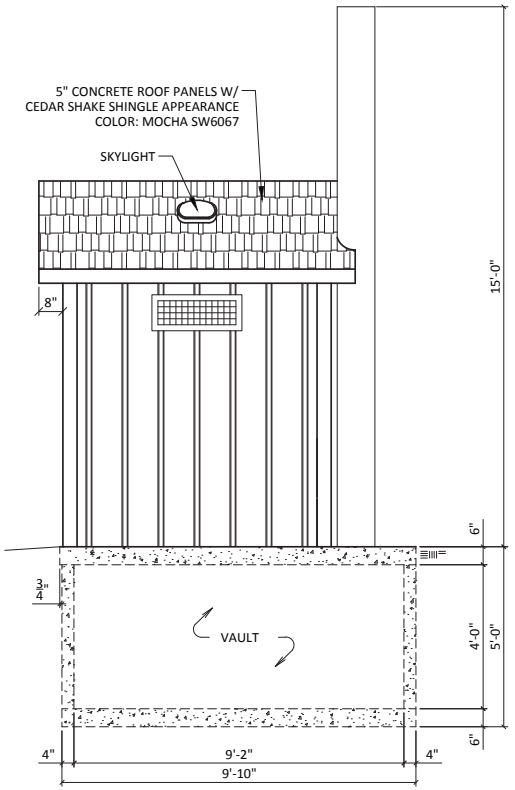
ADDITIONAL ACCESSIBLE RESTROOM LOCATIONS:
-FIRE PIT ADJACENT
-TRAILHEAD PARKING LOT

RESTROOMS: MANUFACTURER DATA

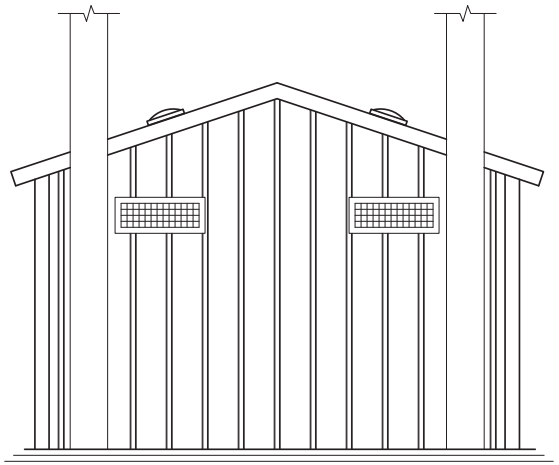
PRODUCT: UNISEX WOOD DUCK BY HUFFCUT CONCRETE



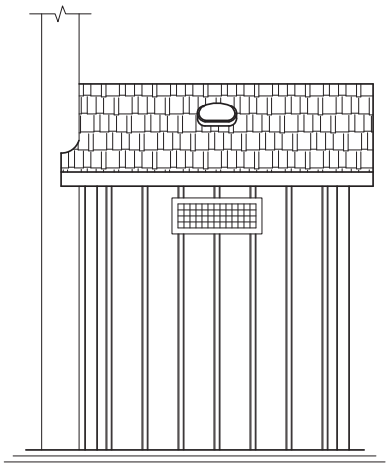
1 FRONT ELEVATION
SCALE: 3/8" = 1'-0"



1 RIGHT ELEVATION
SCALE: 1/4" = 1'-0"



2 REAR ELEVATION
SCALE: 1/4" = 1'-0"



3 LEFT ELEVATION
SCALE: 1/4" = 1'-0"

05

WAYFINDING & INTERPRETIVE SIGNAGE

GREETING USERS OF THE PARK WILL BE NEW MONUMENT, WAYFINDING, AND INTERPRETIVE SIGNAGE. TOGETHER, THESE AESTHETICALLY CONSISTENT PROPOSED SIGNS ARE DESIGNED TO HELP GUIDE, INSPIRE AND EDUCATE USERS ABOUT THE NATURAL AND CULTURAL HISTORY OF THE PARK, WHILE ALSO HIGHLIGHTING THE PARK'S DEFINING WESTERN BOUNDARY, THE MISSISSIPPI RIVER.

SIGNAGE: WAYFINDING & INTERPRETIVE SIGNAGE

SIGNAGE: WAYFINDING & INTERPRETIVE SIGNAGE

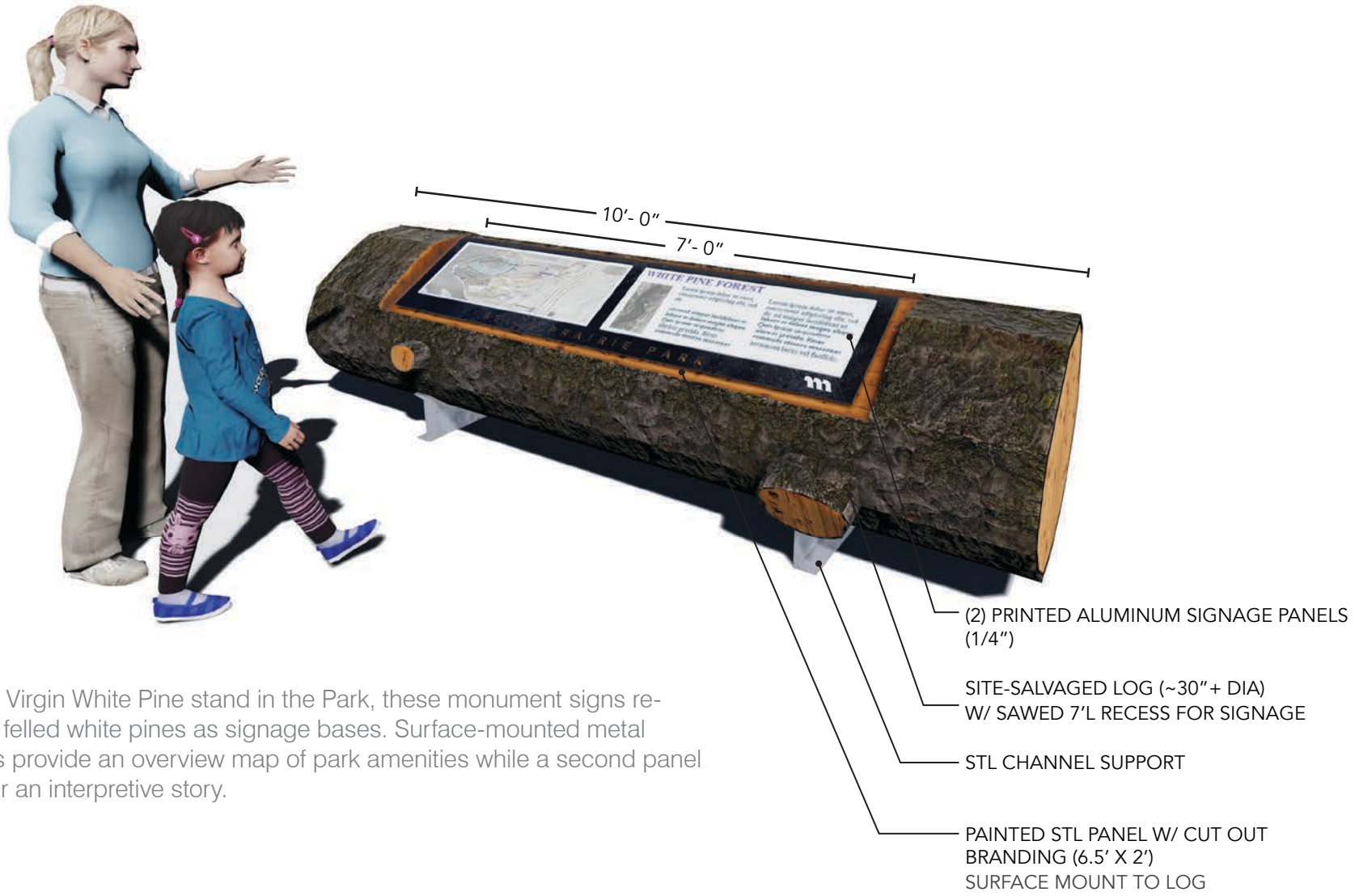
INTERPRETIVE SIGN W/
VIEWSHED PANEL

INTERPRETIVE
PILLAR

WAYFINDING
TRAIL MARKER

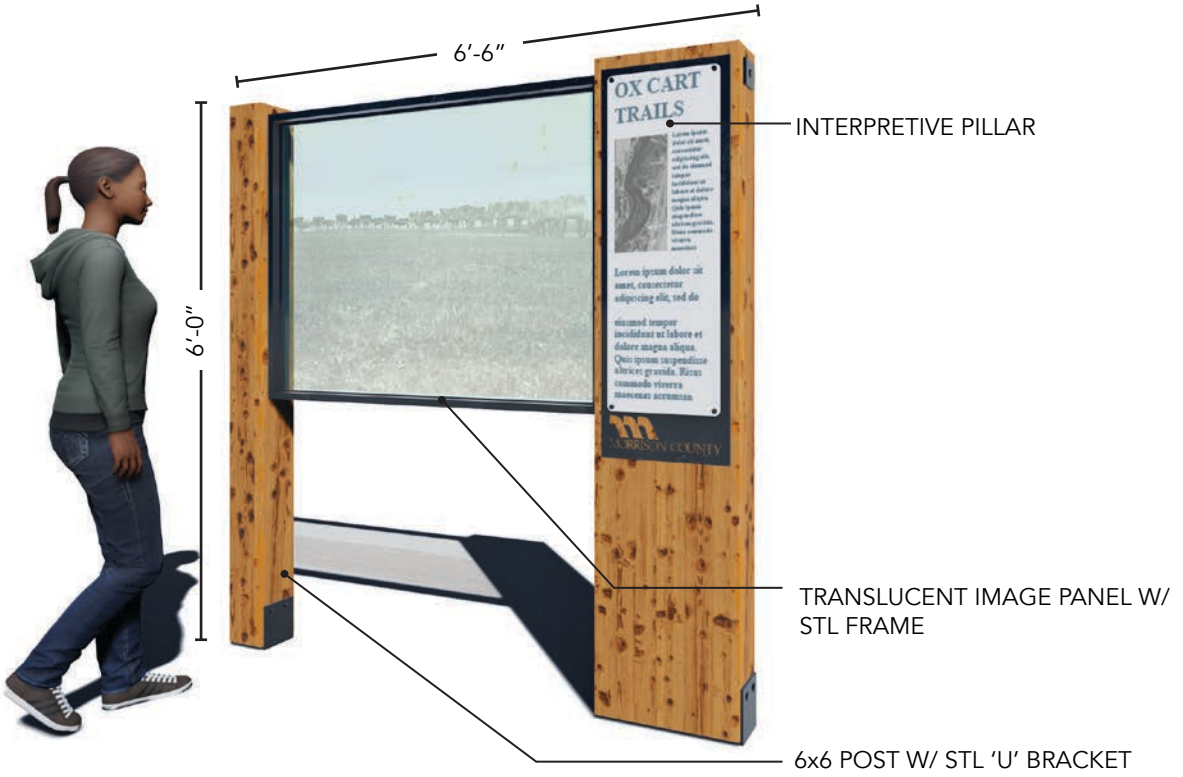
MONUMENT
TRAILHEAD SIGN

SIGNAGE: MONUMENT SIGN



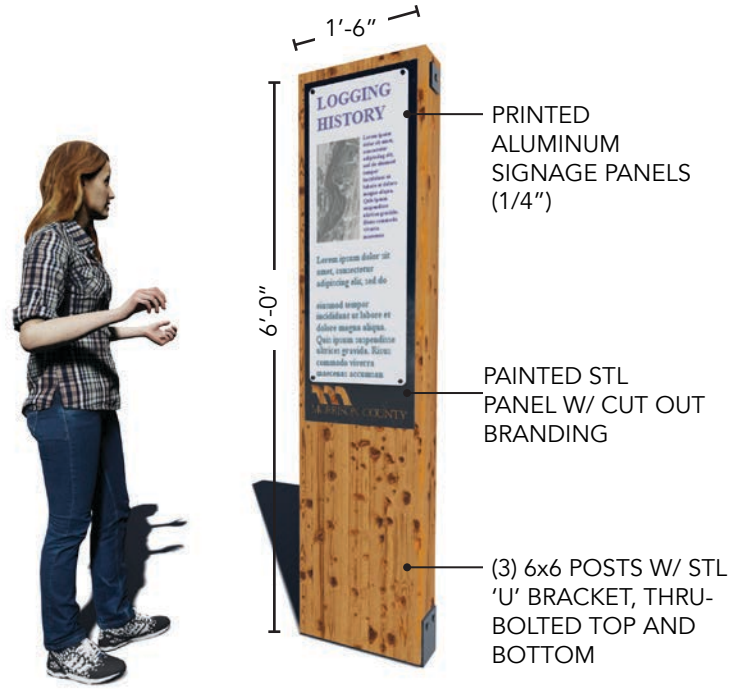
Inspired by the Virgin White Pine stand in the Park, these monument signs re-purpose large, felled white pines as signage bases. Surface-mounted metal signage panels provide an overview map of park amenities while a second panel offers space for an interpretive story.

SIGNAGE: PILLAR WITH VIEWSHED



Glimpse Belle Prairie Park's rich history through translucent panels etched with historic imagery. Positioned in their respective context, the viewshed panels look into the past and offer interpretive opportunities for elements such as the Ox Cart Trails, historic logging industry, and early Native American Settlements. The adjacent interpretive pillar provides space for added narrative, graphic information, and park branding.

SIGNAGE: PILLAR



Timber pillars festoon surface mounted interpretive metal sign panels. Base panels are branded with cut-outs of the County logo and park name and support a surface signage featuring interpretive data. This durable, removable aluminum panel is easily accessible for maintenance and information updating.

SIGNAGE: WAYFINDING SIGN

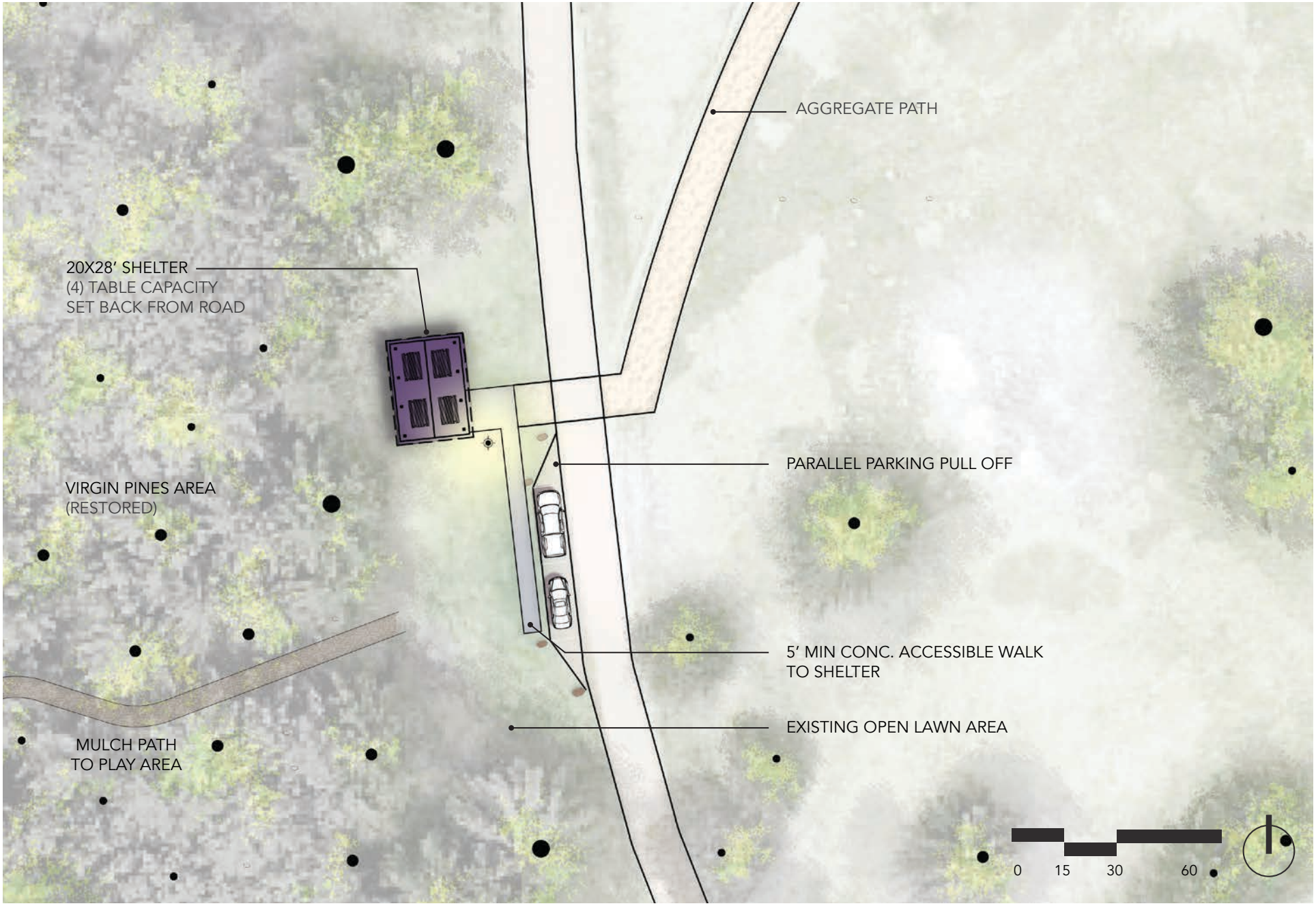
Timber wayfinding posts guide visitors throughout the park and are positioned at main trail entrances and intersections to create easily navigable experiences. Metal panels surface mount to the timbers with a removable signage insert to accommodate future trail upgrades and expansions over time.

06

PICNIC SHELTER

THE EAST PINES PICNIC SHELTER WILL OFFER A UNIQUE OPPORTUNITY TO GATHER AND ENJOY THE EXPERIENCE OF THE TOWERING VIRGIN WHITE PINE CANOPY WHILE LOOKING EAST ACROSS THE EXPANSIVE RESTORED PRAIRIE. THE PROPOSED SHELTER WILL HAVE A MULCHED TRAIL CONNECTION BACK TO THE PLAYGROUND AND EXISTING SHELTER, A NEW AGGREGATE TRAIL CONNECTION TO THE GREATER PARK TRAILS, AND AN ACCESSIBLE WALK CONNECTING TO NEARBY VEHICLE PARKING.

PICNIC SHELTER: EAST PINES ENLARGEMENT PLAN



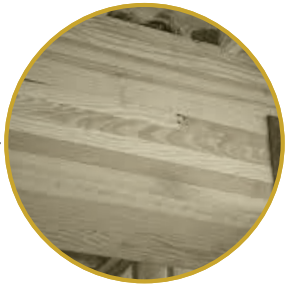
PICNIC SHELTER: EXISTING PRECEDENT

STRUCTURE BLENDS IN TO CONTEXT
NEUTRAL COLOR PALETTE
DURABLE MATERIALS: WOOD, CONC, STEEL
FLEXIBILITY (OPENNESS)
SIMPLE GEOMETRY

LOW LIGHTING- DARK
FINISH MAINTENANCE
ROOF MAINTENANCE
SHALLOW OVERHANGS

TONGUE & GROOVE

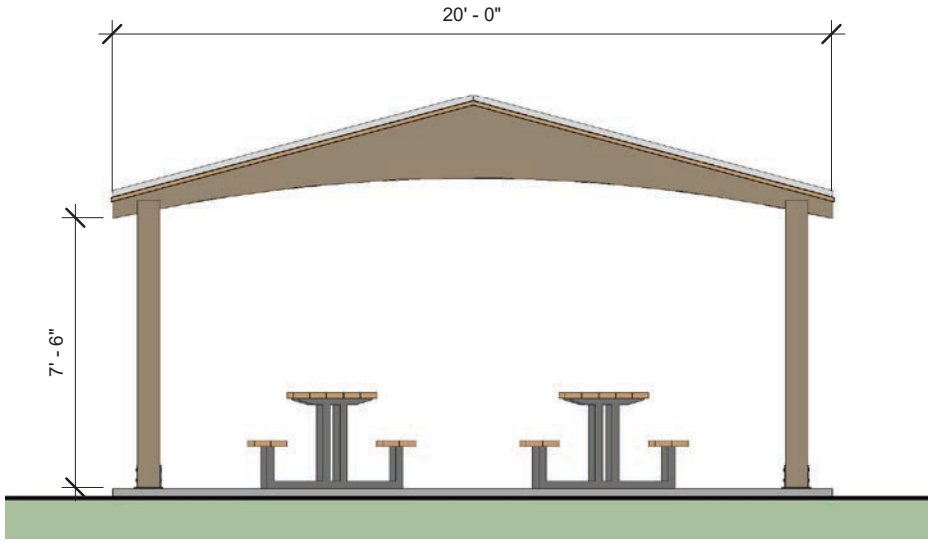
SIMPLE CONNECTION

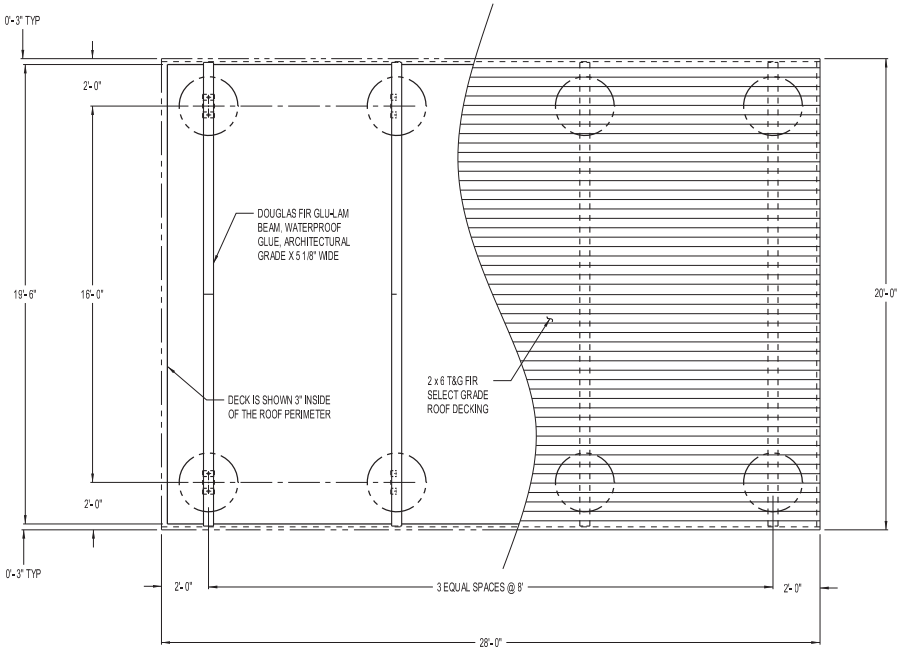


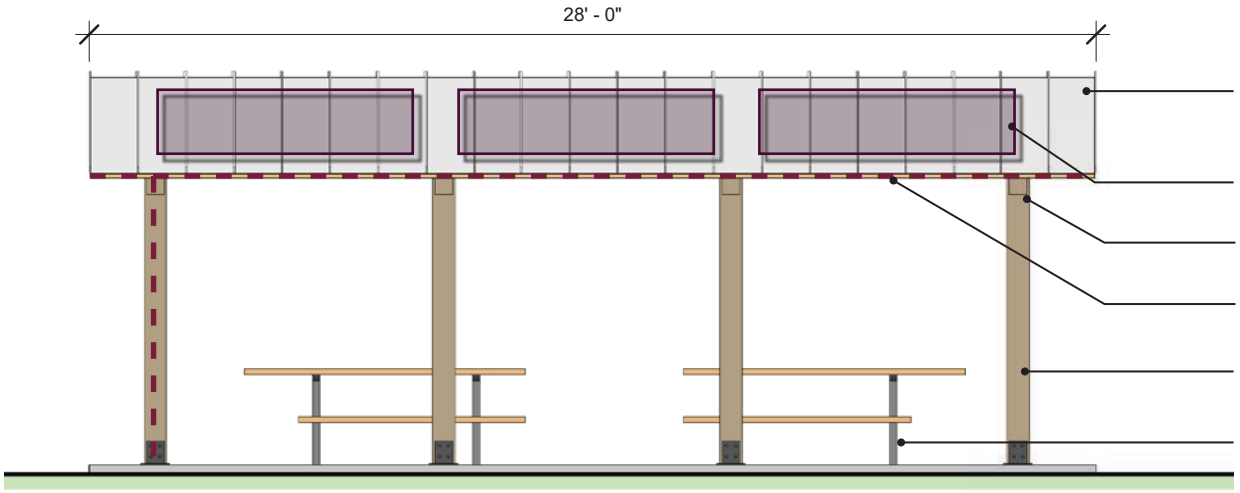
LAMINATED BEAM

PICNIC SHELTER: PROPOSED STRUCTURE

PICNIC SHELTER: PROPOSED PRODUCT







PICNIC SHELTER: PROPOSED PRODUCT

Siskiyou Mountain Shelter Model 98-S20028-4T SPWB SS

Specifications

Description: Rectangular
Size: 20′ x 28′
Roof Pitch: 4/12

Roof Style: Gable
Options Shown: Standing Seam Steel Roof, 2x6 Tongue & Groove Roof Decking, 8″ x 4″ Steel Posts

Features

- 4/12 roof pitch
- Wood or steel posts
- 8′ to 9′ post spacing
- 20′ to 40′ widths
- Up to 124′+ lengths
- Peak & camber glu-laminated beams
- Clear spans
- 2x6 or 3x6 tongue & groove roof decking
- Non-bird nesting or perch design
- Polyester powder coated
- Wind load: 90 mph class C
- Snow Load: 30 lbs
- USA Made

Options

- Hot dipped galvanized
- Stain or clear sealer for wood members
- Increased wind & snow load available
- Variety of roof pitches available
- Wood post options: square, rectangular, or round
- Steel post options: square, rectangular, or round
- Roof options: hi rib, standing seam, cedar, asphalt, tile, etc.
- Gutters & downspouts
- Chemical resistant Natur-Kote primer for harsh environments
- On-site technical assistance available.
- Custom designs available

PO Box 270, Baker City, OR 97814 (541) 523-0224 (800) 252-8475 www.naturalstructures.com - info@naturalstructures.com

November 2019

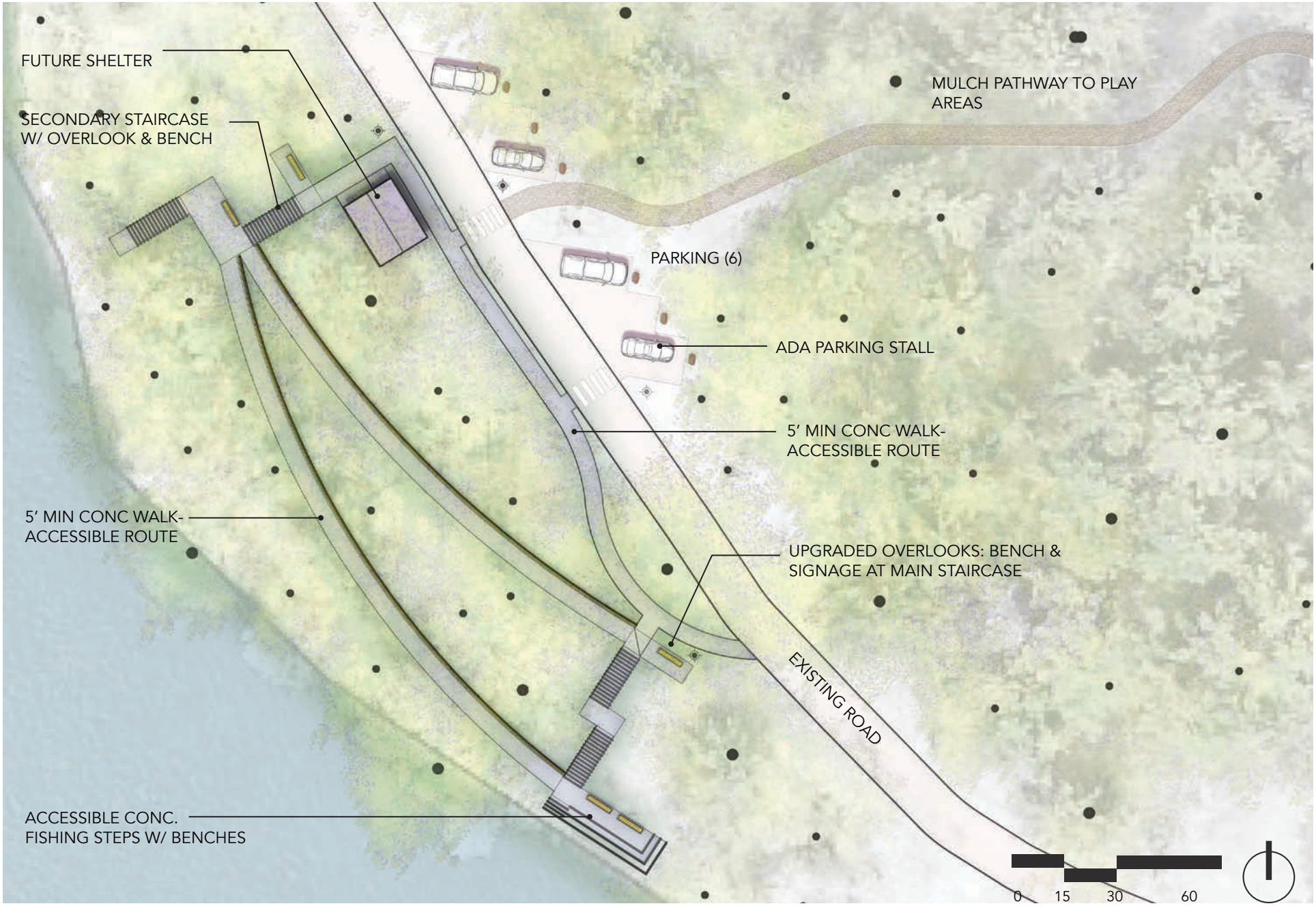
SHELTER PRODUCT: 20X28 SISKIYOU SHELTER
BY NATURAL SHELTERS, INC.

07

RIVER ACCESS

THE PROPOSED RIVER ACCESS AREA OFFERS A WATERFRONT EXPERIENCE ACCESSIBLE TO ALL PARK USERS. SITUATED BETWEEN THE TWO NEW STAIRCASES, A SLOPED SIDEWALK PROVIDES A SAFE, ACCESSIBLE ROUTE DOWN THE RIVERBANK TO A LARGE FISHING PLATFORM WITH SEATING. OVERLOOKS, INTERPRETIVE SIGNAGE, AND THE OPPORTUNITY FOR A THIRD PICNIC SHELTER PROVIDE MULTIPLE GATHERING SPACES WITH VIEWS OF THE MISSISSIPPI. THESE FEATURES ARE CONNECTED BY ACCESSIBLE PARKING AND TRAIL CONNECTIONS TO THE NEARBY PLAYGROUND, RESTROOM AND MAIN SHELTER IN THE HEART OF THE WHITE PINES.

RIVER ACCESS: ENLARGEMENT PLAN



RIVER ACCESS: CASTING PLATFORM

RIVER ACCESS: UPGRADED OVERLOOK

RIVER ACCESS: RAMP + RIVER STAIRS

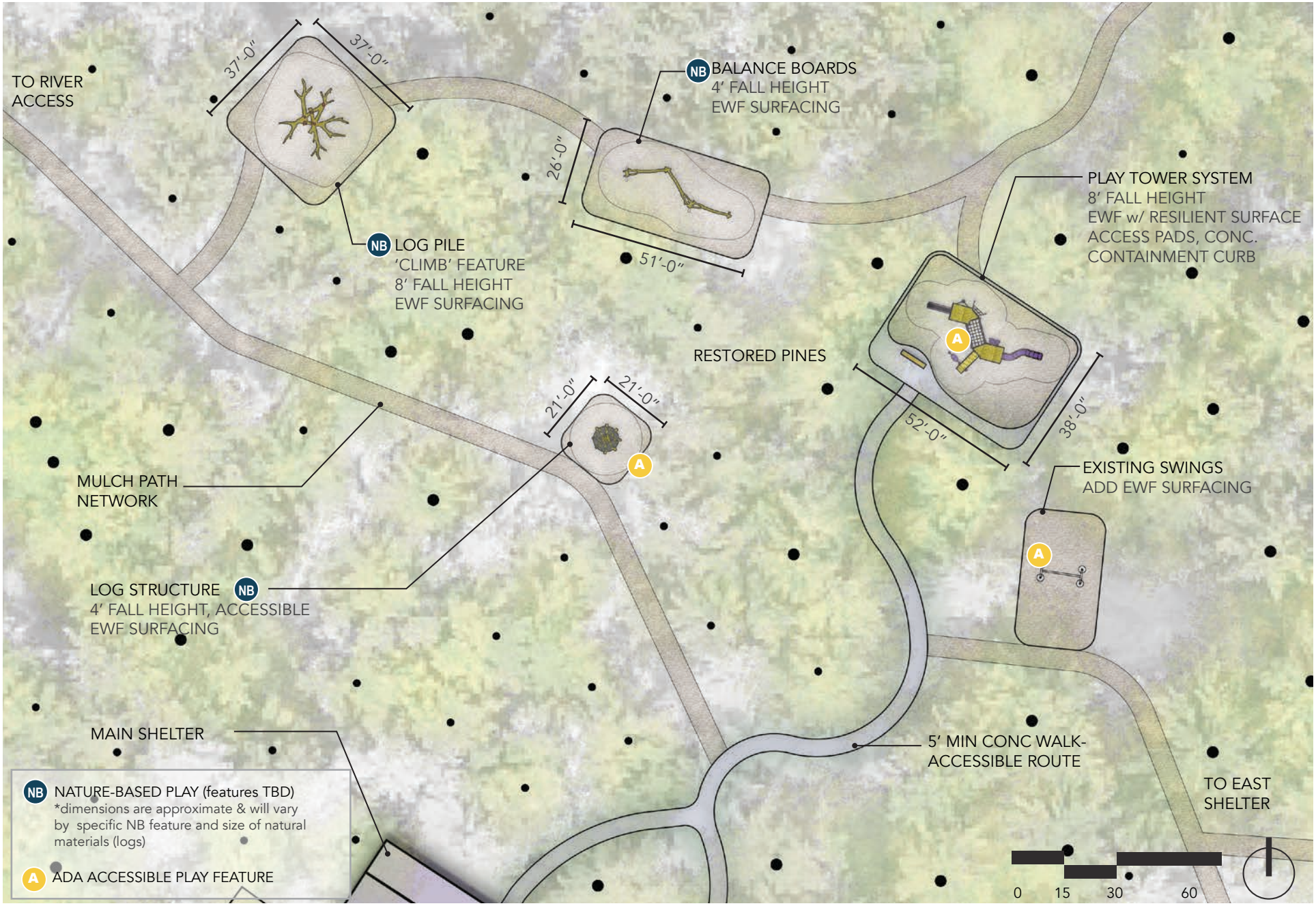
RIVER ACCESS: PICNIC SHELTER OVERLOOK

08

PLAY FEATURES

AGING PLAY EQUIPMENT WILL BE REPLACED WITH ADA COMPLIANT, NATURE INSPIRED STRUCTURES AND INDIVIDUAL NATURE BASED PLAY FEATURES THAT UTILIZE NATURAL MATERIALS FOR A UNIQUE PLAY EXPERIENCE. ARRANGED UNDER THE CANOPY OF NATIVE WHITE PINES, THE ENTIRE PLAY AREA WILL BE BETTER CONNECTED WITH MULCH PATHWAYS AND A CONCRETE, ADA ACCESSIBLE ROUTE.

PLAY EQUIPMENT: ENLARGEMENT PLAN



PLAY EQUIPMENT: REPLACE EXISTING EQUIPMENT

THE WIZARD's DOUBLE TOWER FORTRESS

KOMPAN Let's play

NRO2010

PHYSICAL
Joy of movement:
motor skills, muscle, cardio and bone density

SOCIAL-EMOTIONAL
Joy of being together:
teamwork, tolerance and sense of belonging

COGNITIVE
Joy of learning:
curiosity, understanding of causal relationships and knowledge of the world

CREATIVE
Joy of creating:
co-creation and experimenting with materials

Curly climber
Physical: coordination and proprioception is supported when placing arms, legs and backside correctly for going down. Sense of balance when rotating. Arm muscles for holding tight. Bone density when jumping down.
Social-Emotional: empathy stimulated by turn-taking.
Cognitive: logical thinking when placing arms and legs right for rotating downwards.

Net Bridge
Physical: children develop their balance, cross-coordination and spatial awareness in the open net.
Social-Emotional: interaction with children outside, socializing.

Curved slide
Physical: sliding on high slides tickles the stomach and develops spatial awareness and a sense of balance. Furthermore, the core muscles are trained when sitting upright going down.
Social-Emotional: empathy stimulated by turn-taking.
Cognitive: young children train their understanding of space, speed and distances when sliding down quickly.

Accessible stairway
Physical: climbing the accessible stairway is for all and supports cross-coordination as well as arm and leg muscles. For young children, walking stairs and alternating feet is developed.
Social-Emotional: room for active breaks and adult helpers. An inclusive space.

Slide
Physical: sliding develops spatial awareness and sense of balance. Furthermore, the core muscles are trained when sitting upright going down.
Social-Emotional: empathy stimulated by turn-taking.
Cognitive: young children develop their understanding of space, speed and distances when sliding down fast.

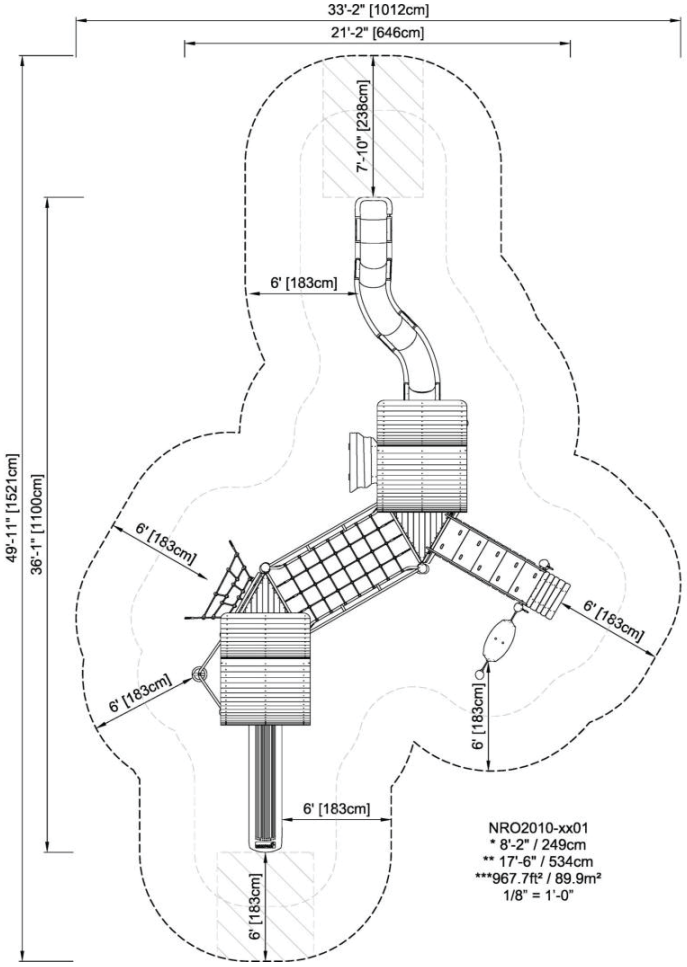
Hammock
Physical: coordination and sense of balance when swaying.
Social-Emotional: pushing friends gently back and forth, turn-taking.
Cognitive: for toddlers cause and effect understanding.

Desk
Social-Emotional: great meeting place and space creator for storing or sitting.

Rock climber
Physical: supports cross-coordination and leg, arm and hand strength.
Social-Emotional: the inclination makes climbing feel secure, especially for younger children.

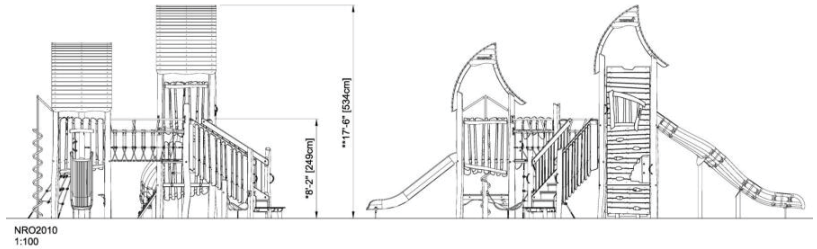
PLAY EQUIPMENT: PRODUCT INFORMATION

*Max fall height | **Total height | ***Safety surfacing area



Click to see 1:100 ratio TOP VIEW

*Max fall height | **Total height



Click to see 1:100 ratio SIDE VIEW

PLAY EQUIPMENT: REPLACE & ADD NATURE PLAY

NATURE BASED PLAY

POLE CLIMBER

PILES

STEPPERS

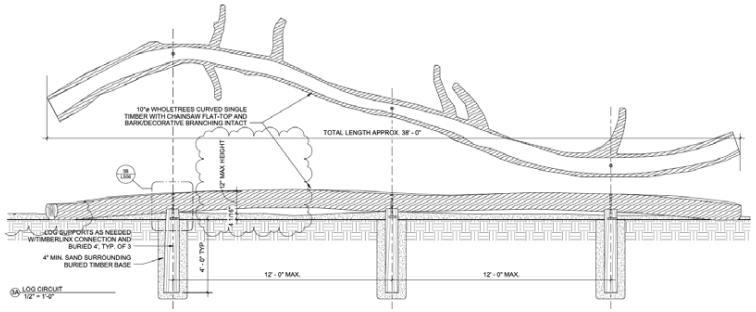
FORTS & STRUCTURES

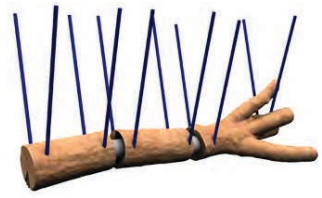
BALANCE BEAMS

PLAY EQUIPMENT: REPLACE & ADD NATURE PLAY

Pole Climbers

- **Overview:** Hug a tree or climb a tree. Jump from branch to branch. The natural nobs, twists, and feel of wood under the hand provide varied tactile stimuli. Blocks or carved hand or foot holds create different heights and climbing experiences.
- **Dimensions:** Each climber typically 9" diameter and 8' above grade.
- **Age Range:** 5+





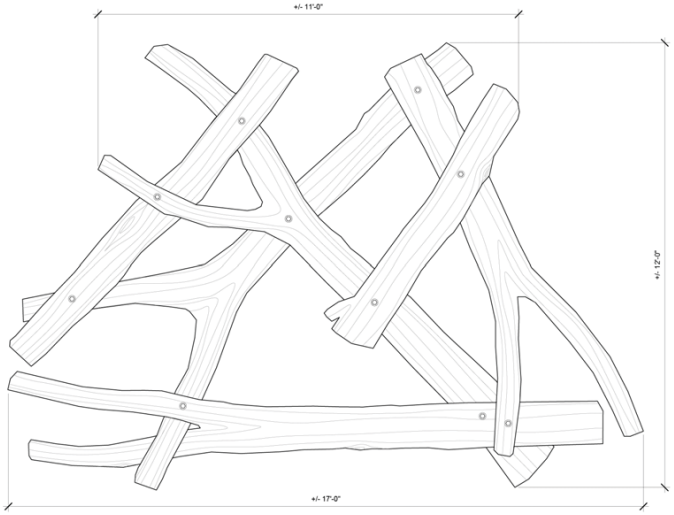
Fixed & Articulated Balance Beams

- **Overview:** These fixed or moving balance beams provide dynamic challenges that will stimulate a wide-range of climbers. Straight and curved pieces evoke forest dynamics and encourage exploration along their undulating surfaces.
- **Dimensions:** Typical logs range 8-12" in diameter and up to 20' long. Custom sizing available.
- **Age Range:** 2-5

PLAY EQUIPMENT: REPLACE & ADD NATURE PLAY

Log Steppers

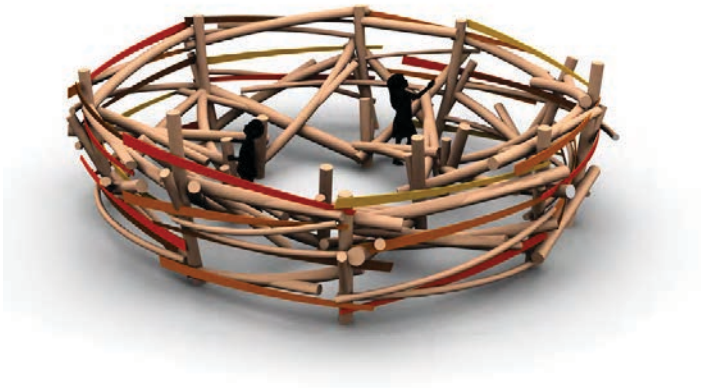
- **Overview:** Round timber log steppers and pavers can create patterns and spaces accessible for all. These simple log rounds provide a direct physical connection to nature and the foundation that nature provides. The horizontal cuts allow people to count growth lines and consider the history of the trees.
- **Dimensions:** Varying sizes typically ranging from 0-18" high and 6-18" in diameter.
- **Age Range:** 2+



Log Pile

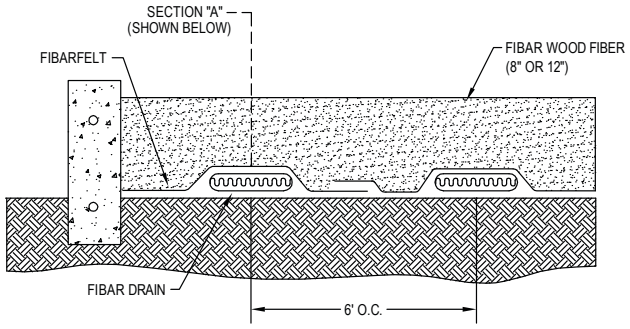
- **Overview:** Branching logs provide a simple yet engaging play feature, providing refuge and mystery in their interlaced branches. Maybe this is a nest, a fortress, or whatever else the imagination can make it. Logs are interlaced and stacked to appear random, secured with concealed connections.
- **Dimensions:** Typical logs range 8-12" in diameter and up to 15' long. Custom sizing available.
- **Age Range:** 5+

PLAY EQUIPMENT: NATURE PLAY & SURFACING

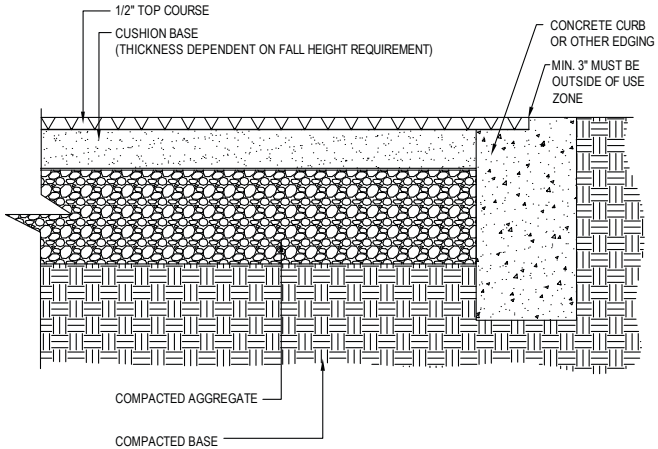


Nest Structures

- **Overview:** Exploration, refuge, and imagination come together in nest structures. These custom-designed structures can be a range of sizes and can include or connect to other play features. Gates and ramps can make nests wheelchair accessible.
- **Dimensions:** Vary by design from 12-30' in diameter.
- **Age Range:** 5+



ENGINEERED WOOD FIBER SECTION DETAIL
*DETAILS WILL VARY BY MFR, INCLUSION OF RUBBER MATS MAY BE REQUIRED BELOW SWINGS, SLIDES, AND OTHER PLAY ELEMENTS FOR ACCCESIBILTY COMPLIANCE



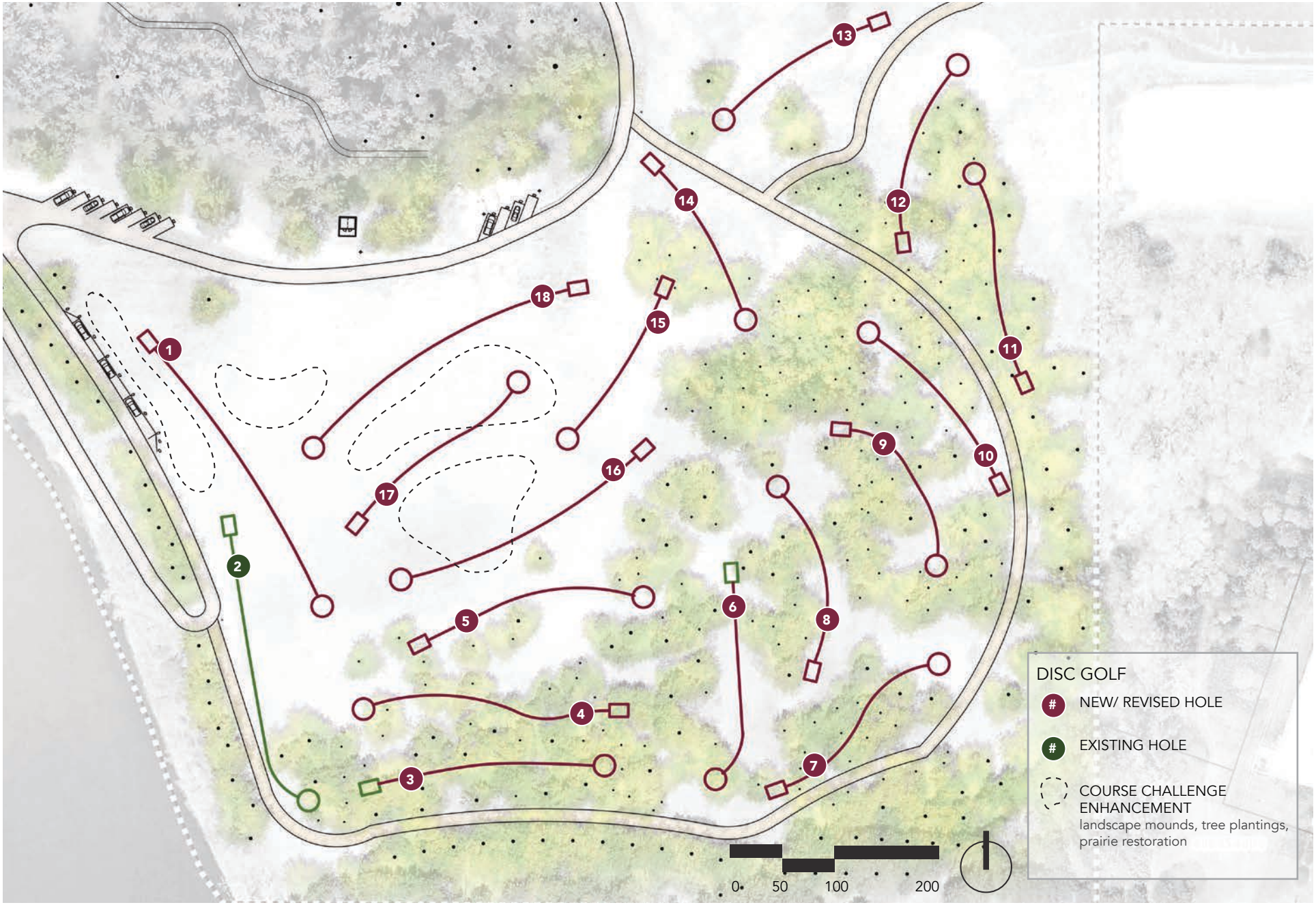
RESILIENT SURFACING SECTION DETAIL
*DETAILS WILL VARY BY MFR

09

EXPANDED DISC GOLF

THE EXISTING 9-HOLE DISC GOLF COURSE WILL BE EXPANDED TO 18 HOLES AND INCREASE COURSE DIFFICULTY FOR MORE ENTERTAINING AND CHALLENGING PLAY. PAIRED WITH RECOMMENDED RESTORATION ACTIVITIES, THE IMPROVED COURSE EFFICIENTLY REORGANIZES HOLES WITHOUT DISTURBING THE CRITICAL RESTORED PRAIRIE LANDSCAPE OR VIRGIN WHITE PINE STAND TO THE NORTH.

EXPANDED DISC GOLF: ENLARGEMENT PLAN

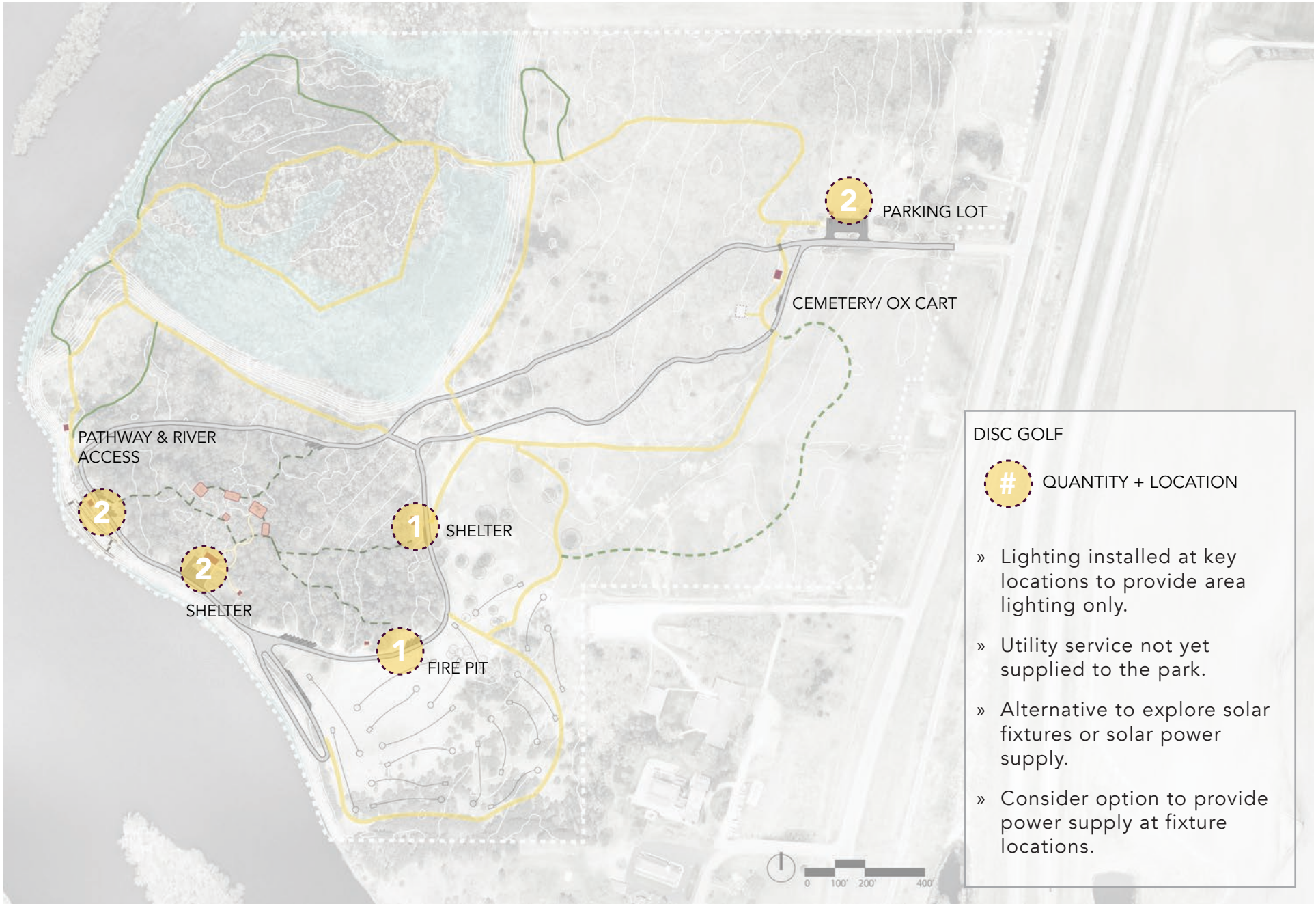


10

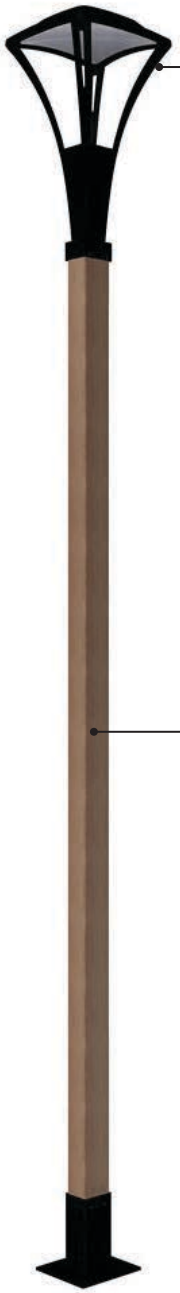
SITE LIGHTING

FUTURE SITE LIGHTING IS SELECTIVELY LOCATED TO PROVIDE SECURITY LIGHTING TO SITE AMENITIES WHILE PRESERVING THE NATURAL CHARACTER OF THE PARK. DARK SKY COMPLIANT FIXTURES FEATURE LOW ENERGY LEVEL LED LUMINARIES, AND WOOD POSTS INSPIRED BY THE NATURAL ELEMENTS OF THE PARK. OPPORTUNITIES FOR SECURITY CAMERAS, AND CONSIDERATION OF ALTERNATIVE SOLAR ENERGY SOURCES ARE RECOMMENDED.

SITE LIGHTING: LOCATIONS



SITE LIGHTING: FIXTURE RECOMMENDATIONS



STERNBERG MILLENIA LG POST TOP- ML760

- U0 BUG Night Sky Friendly
- Cast aluminum body
- Wide range of lumen outputs & CCT's
- Dimmable capable with 0-10 volt driver
- Durable powder coat finish with a wide range of colors
- 7 year warranty
- UL listed in US and Canada
- https://www.sternberglighting.com/millenia-ml760/

TIMBERWOOD STRAIGHT POLE

- Cedar or Treated Douglas Fir
- Anchor Bolt & Steel Base Mount Recommended
- 5 year Warranty
- http://www.woodlightpoles.com/square-wood-light-poles.html

SITE LIGHTING: OPPORTUNITIES

ALTERNATIVE ENERGY SOURCES FOR SITE LIGHTING:

INDIVIDUAL POLE-MOUNTED SOLAR UNIT

SOLAR COMPATIBLE ARM-MOUNTED LIGHT FIXTURE

TIMBERWOOD STRAIGHT POLE

FREE-STANDING SOLAR ARRAY W/ POLLINATOR HABITAT
(FRESH-ENERGY)

INTEGRATED ROOFTOP SOLAR
(MN DNR: LAKE SHETEK STATE PARK)

OPTION TO INCLUDE SECURITY CAMERA AT DESIRED LOCATION

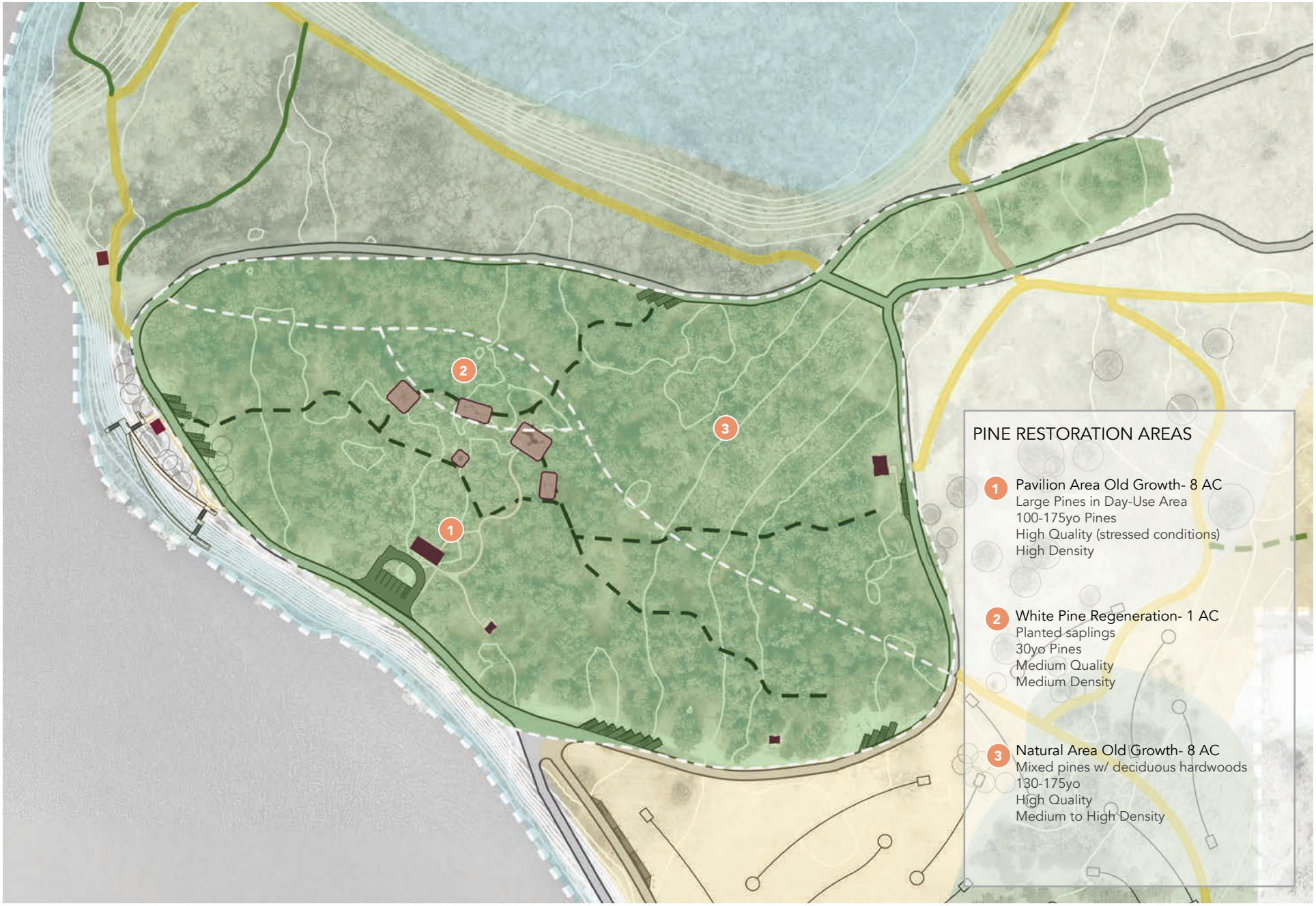
» Solar & cellular-data operable model included in Appendix

11

PINE RESTORATION

THIS FOREST MANAGEMENT PLAN FOCUSES ON 17 ACRES OF BELLE PRAIRIE PARK LOCATED INSIDE THE “LOOP” AND AROUND THE PAVILION. THIS AREA CONTAINS OLD GROWTH PINE FOREST. THIS PLAN DESCRIBES THE CURRENT CONDITIONS OF THE FOREST AND IDENTIFIES AND DESCRIBES ACTIONS TO PROTECT, MANAGE, MAINTAIN, AND ENHANCE THE FOREST RESOURCES IN A MANNER COMPATIBLE WITH THE OVERALL OBJECTIVES AND GOALS FOR THE PARK.

PINE RESTORATION: MANAGEMENT AREAS



PINE RESTORATION: MANAGEMENT PLAN

OLD GROWTH PINE FOREST LONG-TERM MANAGEMENT PLAN

Prepared by: Robert Perleberg, Forestry First LLC - 18 May 2020

CONTENTS

PINE RESTORATION: MANAGEMENT PLAN

PARK OBJECTIVES AND GOALS

1. Sustain and increase the use of the pavilion Old Growth area
2. Maintain the health and vigor of the Old Growth Pines
3. Begin the process of regenerating the Pines to create age diversity and a future “old growth” park setting
4. Increase stand diversity to maintain a dynamic ecosystem
5. Provide a safe and hazard free setting for visitors
6. Enhance recreational opportunities
7. Provide a unique, natural experience to park visitors
8. Establish a feeling of ownership with the park visitors

PROPERTY DESCRIPTION

Belle Prairie Regional Park is legally described as being located in the NE ¼ of Section 14, Belle Prairie Township (T41, R32) of Morrison County. The associated property Identification number (PIN) is 020395000.

The Park is located three miles north of Little Falls, Minnesota on the east bank of the Mississippi River. The property is primarily forested and includes mixed stands of Red Pine (*Pinus resinosa*) and White Pine (*Pinus strobus*) that can be described as “old growth” because they are beyond the traditional rotation (harvest) age. Remnant patches of native prairie and Oak Savanna are also present.

A portion of the Park has been placed on the National Register for Historic Places and the property is near known sites of significant archaeological finds (see pg. 16 for additional information on cultural and historical resources and implications for management).

SOILS

This site is the northwest edge of the Anoka Sand Plain Ecological Subsection. The Park occurs on a sandy terrace associated with historic levels of the Mississippi River. As the name of the Ecological Subsection implies, soils in this area are light, infertile and sandy. Along the river, the Pavilion Area soils are classified as Menagha Loamy Sand. This soil type is sand down to a depth of six feet. Due to the drought conditions these soils are poorly suited to crops but the pine species here are well adapted to these conditions. This portion of the property contains the old growth pine and day use area. It is heavily utilized as a recreational site by many Morrison County residents and visitors.

PINE RESTORATION: MANAGEMENT PLAN

The area to the north, which includes the ox-bow area of the Park, is much lower and wetter than the remainder of the Park. Black Ash and Silver Maple are common on these sites. Described as Bowstring Muck and Fordum-Winterfield Complex, these soils commonly experience seasonal flooding and ponding, leaving soils permanently saturated. Soil wetness limits the recreational use without installing a boardwalk.

PRE-SETTLEMENT VEGETATION

Prior to European settlement, Oak barrens and openings dominated this area. These sites included poorly formed Bur Oak and Northern Pin Oak. Jack Pine was present locally along the northern edge of the subsection. Brush land characterized large areas of the sand plain. Upland prairie and floodplain forest occurred in a narrow band along the Mississippi River. Tallgrass prairie grew on more level terrain within the subsection.

NATURAL DISTURBANCE:

Fire and drought were important factors impacting the vegetation of the sand plain. Bur Oak and Northern Pin Oak have been impacted by drought conditions. During severe periods of drought, vegetation cover was greatly reduced on portions of the sand plain, resulting in erosion and sand dune movement.

ENVIRONMENTAL FACTORS INFLUENCING THE FUTURE OF THE PARK

The most recent studies of climate change in Minnesota yield an amazing variety of scenarios. The most respected and referenced studies indicate a long term scenario of longer summers, increased precipitation, higher levels of carbon dioxide in the atmosphere, and more dramatic weather events. This change in weather will certainly affect the health and vigor of central Minnesota forests, both positively and negatively.

In Belle Prairie Park, and specifically in the White Pine stand, the soil type will still be the controlling factor in the stand's long term species composition. These infertile, drought soils are well suited to Pine species and this won't change. Increased moisture levels may permit tree species that are associated with more fertile soils, including Red Maple and Red Oak, to become more prevalent, but they will still not be suited to the soil conditions found here.

The factors of climate change outlined above could have a very positive effect on the pines. Increased levels of carbon dioxide will aid in plant photosynthesis, which increases trees growth rates and vigor. Increased precipitation will also benefit growth and health on this dry site. The longer summers will lead to increased diameter growth and potentially less winter damage and stress giving the trees a "jump start" in the spring.

Negative effects would include the potential for more dramatic wind events which could result in blowdown and top damage. As these trees age, they become much more susceptible to wind damage due to increased height and a weakening of the root systems. The positioning of this stand high on the banks of the Mississippi make it vulnerable to such events and blowdown has occurred in the past. The longer summers could allow detrimental insects and pathogens more time to propagate and spread (Blister Rust, Adelgids, Aphids, Oak Wilt) which could lessen stand health. The longer summers could also result in more day use in the park which would result in higher levels of soil compaction under the pines.

Invasive plant species on the site will also benefit from this model of climate change for the same reasons that the pine will. In the case of Buckthorn this could lead to heavier berry crops resulting in a faster spread of the shrub.

PINE RESTORATION: MANAGEMENT PLAN

COVER TYPES

For the purposes of this plan, the Old growth Area is divided into three vegetative cover types. Areas of vegetation that are similar in condition are combined into one cover type. A cover type is described with its current conditions and any past activities, which have occurred there. Management recommendations are provided for your consideration.

BELLE PRAIRIE PARK COVER TYPE MAP 1
1 = PAVILION AREA OLD GROWTH,
2 = WHITE PINE REGENERATION,
3 = NATURAL AREA OLD GROWTH

COVER TYPE 1: PAVILION OLD GROWTH PINE
ACRES: 8

- Age: 100-175 years
- Site Quality: High (SI-65)
- Tree Density: High (120-130 BA

PAVILION AREA WHITE PINES

COVER TYPE DESCRIPTION:

This area contains the Day Use portion of the Park which includes the pavilion, picnic tables, playground and restrooms. White Pine are the dominant species here and this site provides a magnificent example of Minnesota's State Tree Species. These towering pines, along the banks of the Mississippi River, give us a glimpse back to an era in Morrison County when White Pine was king! The town of Little Falls developed because of the pineries of Morrison County and the surrounding areas. The Pine Tree Lumber Company and Hennepin Paper Company, both of which were started in Little Falls in the late 1850's, provided local employment through the use of this vast natural resource. This remnant stand allows us to appreciate the beauty that the original settlers discovered in the mid 1800's as they explored the Mississippi River. The oldest trees in today's Belle Prairie Park were present way back then.

Overstory composition is 95% White Pine and 5% Red Pine. Larger diameter trees are up to 35 inches in diameter and are 125 to 175 years old. This stand is characterized as "old growth" because trees are beyond the traditional rotation (harvest) age. Overstory health is generally good although tree core samples show very limited diameter growth in the last 20 years, indicating potential environmental stress. Approximately 15% of the stand is undersized and stressed due to limited light availability, crowding, and soil compaction. Issues in these trees include insect/woodpecker damage, crown damage, small diameters, lightning strikes and suppressed crown development. Much of this crown damage occurred in the mid 1990's when a major wind event occurred. Stressed trees are generally the entry points for insect and disease outbreaks in old growth stands. During wind events, they are also a hazard for Park users.

Red Pine adds diversity and resiliency to the stand but in the northwest corner, a small area is impacted by Red Pine Pocket Decline. This is caused by a fungus, *Leptographium*, that is carried to

trees by insects that feed on roots and lower branches. This fungus spreads between healthy trees through root connections. Infected trees become stressed and cannot take up and move water nor make defensive compounds. Insects continue to feed on the stressed trees and eventually kill them. Infected trees should be cut and removed to protect the remaining Red Pine. This will capture the timber value before trees die and it will also help limit the potential damage by bark beetles. Bark beetles (*Ips* species) breed in stressed trees, recently cut trees, or killed trees and build populations in trees without adequate resistance. Large populations of the insect then infect surrounding healthy trees which cannot defend against the large population buildup.

The ground cover is exposed soil, grass and pine needles. Heavy visitor use and Park maintenance limit the development of understory regeneration and a shrub layer. The lack of an understory allows wind and direct sun exposure to rapidly dry the soil around the stand margins, causing stress to the overstory. Trees are further stressed by extremely high levels of soil compaction from foot traffic. This stress is most evident in high traffic areas including the playground, rest rooms, water pumps, pavilion and edges of the stand where vehicles park off the pavement. Soil tensiometer readings in stand #1 show compaction readings of 300lbs/sq. inch at 6 - 12 inches of depth. 300lbs/sq. in readings were not obtained in stand #3 until depths of 2.5 - 3 ft were obtained. At two test sites 300lbs/sq. inch readings could not be reached at full extension of the tester. A Dickey – John soil compaction tester was utilized for these findings. This level of compaction is very detrimental to the old growth pine health and should be addressed.

Stress in the form of soil compaction and reduced soil health presently and will in the future negatively impact the stand. This stress will result in slower diameter growth, shortened life span, increased susceptibility to insect outbreaks, disease damage, and weakened root systems. The stand will become more prone to wind and drought damage.

The pavilion, picnic tables and playground provide a “free to use” model where users can return to the woods without incurring direct costs. This no cost recreation is rare in today’s society. Increased daily Park use is encouraging, but it brings with it added stress on the majestic canopy of pines that invites more and more visitors. The responsibility of caring for these beautiful remnants of our past is not one to be taken lightly. Balancing public use and forest stewardship will be time consuming and require additional expense. The end goal is to pass along a well maintained, healthy, sustainable old growth pine stand to the next generation’s children.

PINE RESTORATION: MANAGEMENT PLAN

MANAGEMENT RECOMMENDATIONS

» Conduct a sanitation thinning to remove hazard trees. This would include highly suppressed, damaged, infected and poorly formed trees. These trees could be sawed and utilized in the park for future construction projects. This harvesting work should be done with frozen ground conditions to eliminate mechanical damage to the soil. Approximately 14 hazard trees are located in the Pavilion Area. These mostly suffer from top damage, woodpecker damage, and pocket decline in the Red Pine. The removal of suppressed and stressed trees will include another 50 White Pine less than 10 inches in diameter. The removal of the stressed trees is secondary to the removal of the hazard trees.

» Combine the sanitation thinning with a pruning operation. This will help minimize the potential for falling branches and improve the aesthetic quality of the trees. This should also be done with frozen ground conditions to protect the fragile soils and root systems. Very few trees require pruning, but the job will be difficult due to the height of the branches.

» Establish White and Red Pine regeneration in the understory to replace the mature trees in the future. Plant in areas where sunlight is available after the sanitation/hazard thinning is complete. Protection will be required for the planted trees. Individual cages will be the most likely protection scenario. The caging will protect trees from deer browsing, deer rubbing and human interference. The cages need to be 4-5 ft tall with a diameter of 4-5 ft. Consider using balled and burlapped stock, 4-5 ft. tall. Start with 20-30 trees with caging and annually reassess the transplants vigor and health. Expand on the project if necessary.

» Implement an “Adopt a Tree Program” and/or a “Planted in Memory of Program” with the planted trees. Such programs bring a feeling of community ownership to the park and can be funded by individual, group or business donations.

» Establish a designated parking site near the picnic shelter to keep vehicular traffic out of the woods and off the grass perimeter. This will reduce soil compaction and rutting in wet conditions.

» Designate parking areas and install barriers around the stand edge between the road and the old growth stand to eliminate vehicular travel off the roadway. This would also protect saplings planted for future regeneration of the stand. Consider a split rail design, rocks, or utilizing the logs harvested during the sanitation thinning. Create openings in the barrier to direct foot traffic onto mulched paths and to help minimize soil compaction.

» Install mulched walkways between the pavilion and the restrooms, around the playground area, water pumps, and other high traffic areas to reduce soil compaction and concentrate foot traffic. Paving stones could also be used but would be more difficult to relocate if facilities are rotated to reduce compaction issues.

» Consider applying fertilizer to the pines in the fall to promote stand health and longevity. This could be applied with a surface or subsoil application. A soil test should be done to address specific shortcomings in the soils. A typical application rate would be 125 lbs/acre of nitrogen and 25 lbs/acre of phosphorous. Boron and potassium deficiencies may also exist. A surface (top spreading) fall application may be the best choice for the health of the trees but this may limit park use. A subsurface application should not affect park use as the fertilizer is placed in holes dug around the drip line of the trees, 6 inches deep and covered with soil.

» Consider mechanical soil aeration (short spike system) to help alleviate soil compaction. This could be done in conjunction with the top spreading of fertilizer to help incorporate it into the soil

PINE RESTORATION: MANAGEMENT PLAN

MANAGEMENT ALTERNATIVES

» Restrict use of the north half of the site by erecting a barrier, such as a split rail fence. This would be done after Type #3 has been converted to a Day Use Area so the amount of public use space would not be diminished. Once this area is established, eliminate mowing and vehicular travel. This would allow the soil to naturally aerate and eliminate compaction. Balled and burlapped stock planted in this area would be much more vigorous, providing a healthy new stand in the future. The area should be left in this minimal use state for at least 10 years.

» Consider implementing a very light salvage harvest (3-4 trees) in the early fall of hazard trees holding ripe cones. Choose large diameter, dominant trees with hazard tree status. Harvest these cones from the felled trees and have the Minnesota State Nursery extract and germinate the seeds. The nursery will grow these trees to transplant size and return them to you. These transplants could be used to regenerate the Park and would preserve this excellent genetic line specific to this area of Minnesota. These transplants could also be used in public gathering / media events to celebrate the Park revitalization. These site specific transplants could be distributed to Park visitors in an Arbor Day type gathering. The planting of these transplants by County residents would tie them and their families to the Park, creating lasting memories and emotional connections. Distribution could also occur through the local Soil and Water Conservation District's (SWCD) tree distribution program.

» Consider rotating the picnic tables, fire grills and playground equipment to areas of lower use in an effort to mitigate soil compaction issues and root damage. This could be done on a rotating 5 year schedule.

COVER TYPE 2: WHITE PINE SAPLINGS
ACRES: 1

» Age: 30 years

» Site Quality: medium (SI 65)

» Tree Density: medium (100 BA)

WHITE PINE SAPLINGS

COVER TYPE DESCRIPTION:

These White Pine were planted after a wind event in the mid 1990's that extensively damaged the large White Pine. The downed old growth trees were salvaged and approximately 50,000 bd ft of lumber was sold. The County had the site chipped, stumps removed and replanted with White Pine. Seedling protection was put in place to stop browsing and today we have a vigorous stand of 40 ft tall White Pine. The stand density is good, with diameters of 5-10". Site quality is medium. The understory is light in density due to the shaded environment caused by the White Pine saplings. Shrub species present in the understory are Buckthorn, Raspberry, Ironwood, and Prickly Ash. Poison Ivy is also present.

Stand health is generally good. Health problems associated with this stand include pine bark adelgids, aphids and a very light presence of blister rust. The adelgid damage is easily identified by the white residue left on the main stem of the tree at eye level. The adelgid damage is unsightly but generally does not damage healthy trees.

Blister rust is a fungus that is not native to North America. Unlike adelgid damage, blister rust damage is generally higher on the main stem and causes deformity in the main stem or branches with sap discharge. The fungus enters the tree at the branch tips, killing the branch as it moves toward the main stem. The tree will die from the point of infection on the main stem up. The fungus can take up to 3 years to travel down the branch and the "flagging" of the dead branch is easily identifiable. The removal of the infected branch before it reaches the main stem will eliminate the fungus from the tree and save the tree. As with all fungi, spore survival is better in areas with high humidity, low wind, and low light. Pruning and thinning will reduce the stands susceptibility to the fungus. White Pine Blister Rust does not spread from tree to tree. It requires the Gooseberry (*Ribes* spp.) plant as an alternate host.

PINE RESTORATION: MANAGEMENT PLAN

ADELGID DAMAGE

BLISTER RUST DAMAGE

MANAGEMENT RECOMMENDATIONS

» Thin the stand by removing 30% of the saplings. Remove the suppressed, small diameter and diseased trees based on spacing. This will give additional light and nutrients to the remaining trees and improve their vigor. Harvested material over 3 inches should be removed from the stand and burned or chipped to eliminate the potential for harmful insect population build-up. Since this work will be done manually it could be done in the summer months.

» To help reduce the incidence of Blister Rust, prune half of the remaining trees to 13' in height. Choose large diameter, healthy trees. Prune trees in winter months, starting in mid-November and finishing before February 15, to allow the wounds to "harden" off before growth starts in the spring. Pruned branches may be left on the ground. The small diameter of the material will not become an insect problem and will be "recycled" by the overstory.

» Remove the invasive species in the understory, targeting the European Buckthorn. The thinning of the overstory will allow additional sunlight into the understory which will encourage the Buckthorn. Management of understory invasive species should be done before or shortly after the overstory work.

» Conduct biannual inspections for Blister Rust and prune off infected branches to limit mortality.

MANAGEMENT ALTERNATIVES

» Consider planting Jack Pine or Red Pine in the openings around the edges of this sapling stand. This will promote species diversity and create improved stand diversity in the future ecosystem.

» Allow the stand to remain in its present state. When Stand 3 is utilized as a day use area, this dense area of cover will create a heavy visual barrier between Stands 1 and 3. This alternative will negatively affect the health of the stand in the future.

COVER TYPE 3: NATURAL AREA OLD GROWTH
ACRES: 8

- Age: 130-175 years
- Site Quality: High
- Tree Density: Medium to high

OLD GROWTH WHITE PINE IN BELLE PRAIRIE PARK, APRIL 2020

COVER TYPE DESCRIPTION:

White Pine is the most common species in the overstory with 80% of the volume. This stand is Old Growth with trees ranging from 130-175 years. Bur Oak, Red Pine, Aspen, Elm, and Maple are also present. Stand Health is good. Problems such as White Pine blister rust, lightning strikes and small areas of overcrowding exist but these issues are common in these stands. Hazard trees are present in the form of dead standing, Blister rust affected, center rot and base rot affected trees. Diameters in the White Pine are up to 35".

The Bur Oak component of this stand provides good diversity. Bur Oak is an excellent tree to partner with the White and Red Pine. It is drought tolerant, and able to survive on sandy, infertile soils. While not immune to Oak Wilt it does seem to live longer before it dies than Red Oak. The maturity ages of the pine and oak are similar and the stand becomes healthier due to the species diversity. The Bur Oak also provides mast in the form of acorns for wildlife consumption. The Bur Oak is mature, averaging 15-20" with good health and wide spreading crowns. Presently the Bur Oak is occupying space in the "middle story" of the stand. Competition from the remaining trees and shrubs is limiting the sunlight and nutrients available to the Bur Oak.

Natural regeneration consists of a diverse mix of Ash, Black Cherry, Red Oak, Elm, Hackberry, Aspen and White Pine. Densities are 500/ acre of 1-3" saplings. These saplings have been suppressed by the heavy overstory and competition from the dense shrub layer. This competition has caused the regeneration to be in poor health with small, thin tops and low vigor. Heavy browsing by deer has caused high levels of damage to the Oaks and Pines in this understory. This extensive damage and many years of overstory suppression may make them unsuitable as replacements for the overstory.

The shrub layer is comprised mainly of non-native, invasive and undesirable shrub species. European Buckthorn, Honeysuckle, Prickly

PINE RESTORATION: MANAGEMENT PLAN

Ash, Ironwood, Red Berried Elder, Sumac, Hazel and Poison Ivy are all present in heavy densities up to 8000 st/acre. Buckthorn in the 1-3" range is present.

The soil health here is much better than in Stand #1, The presence of an understory has allowed natural decay and aeration processes to continue. These processes include a vast array of soil dwelling insects, beneficial fungi, cellulose feeders and mycorrhizae not present in Stand #1. This process has allowed the overstory to maintain its health and diversity.

MANAGEMENT RECOMMENDATIONS

» Convert this area to an extension of Type #1. This would be done by eliminating the understory layer. This would include the all woody vegetation under 8" in diameter and hazard trees. This would be done in conjunction with the expansion of the existing day use area into this stand. A minimum of 18 large diameter hazard trees were identified in this area. The removal of stressed and suppressed trees as was done in stand 1 will also have to be done here. This could occur after the understory is controlled and the hazard trees are removed giving a clearer picture of the steps necessary.

» This would greatly expand the day use capability and at the same time take some of the human pressure off the old growth in stand #1. This would allow the restricting of traffic into "rehab" areas in stand #1 without causing overuse in the remainder of the stand.

» The elimination of all invasive and non-native shrubs in the understory here and park wide is necessary to show the park visitors the counties commitment to proper land stewardship. This project could be a learning experience for visitors who struggle with the same invasive species on their ownerships. The European and Glossy Buckthorn issue is widespread in Morrison and all surrounding counties it is degrading many private ownerships. This example of control could give landowners hope that they can also win the Buckthorn battle. Elimination of the understory would best be accomplished using skid steer type equipment with a planer style mulching head. If a mulching system is used, follow up treatment would include yearly mowing until the sprouts are killed. If a simple brush mower operation is used a follow up treatment of herbicide or additional brushing work would be needed to kill the root systems of the shrubs. This work could also be done manually much like the Oak Savanna project.

» Since soil disruption will occur if a mulching system is used, The MN field Archaeology act (MN statute 138.4 subd 3) may require project review from the Office of the state Archaeologist.

» Once the understory is controlled the hazard and suppressed tree removal work could be done

» The Bur Oak present in this stand should be encouraged and promoted due to the diversity and beauty they provide. This would be done in a release thinning which would remove less desirable overstory trees directly competing with the Bur Oak. In certain cases, the removed trees will be undersized and suppressed White Pine but generally they would be less desirable species of hardwoods. Releasing these Bur Oak would promote crown health and development which in turn yields longer lives for the Oak and heavier acorn crops.

» Monitor the Bur Oak for the presence of Oak Wilt. Oak Wilt is new to Morrison county but has already established a firm foothold in these types of low quality soils adjacent to the Mississippi river. Follow all Oak Wilt management guidelines when implementing practices in the Bur and Red Oak.

» The control and elimination of the understory would also lessen the chances for Park visitors and pets to be exposed to Lyme's disease. The deer ticks that carry the virus require the brushy understory and grass present in Stand #3.

PINE RESTORATION: MANAGEMENT PLAN

» After the understory is controlled, begin efforts to regenerate this stand utilizing the same techniques outlined for Stand #1. The White Pine regeneration present in Stand #3 has been suppressed and browsed for many years. The majority of it will not make adequate replacement stock for the overstory. The few remaining high quality, well- formed White Pine saplings with healthy crowns should be protected.

MANAGEMENT ALTERNATIVE

» Attain a more private setting at the future shelters in stand #3 by reserving small diameter trees and limiting understory vegetation control to only invasive species. This would reserve 40% of the understory after the hazard trees are disposed of creating a partial screen between Day Use facilities. Trails could connect the Day Use areas. These facilities would have small, one acre openings around them cleared of any understory material less than 10" in diameter. This would potentially limit the use of the site but would help protect it from soil compaction. Negative aspects to this alternative are increased exposure to insects due to decreased circulation in the understory, increased exposure to Lyme's disease and less area for public use.

» Remove the invasive species and hazard trees, then thin the overstory to encourage Bur Oak health leaving the understory regeneration in place. The expansion of the Day Use area would not occur. These steps would improve the health of the stand and protect it from future disturbance but not allow expanded Park use.

PINE RESTORATION: MANAGEMENT PLAN

SUMMARY OF PROPOSED ACTIVITIES FOR BELLE PRAIRIE PARK OLD GROWTH PINE

These recommendations are for the 17 acres located inside the Pavilion parkway. There are 3 cover types located in this area. The following summarizes unique management recommendations for each cover type.

TYPE 1 - PAVILION OLD GROWTH

- Conduct a sanitation thinning to remove hazard and stressed trees
- Coordinate a pruning project with the sanitation thinning
- Establish regeneration
- Create designated parking
- Develop surfaced walking trails to help reduce soil compaction
- Apply fertilizer to improve stand vigor
- Create temporary restricted areas to eliminate visitor use allowing the soil to recover from compaction

TYPE 2 - WHITE PINE SAPLINGS

- Thin the stand to remove 30% of the saplings
- Prune half of the remaining saplings to 15’ in height
- Remove invasive and non-native shrubs from the understory

TYPE 3 – NATURAL AREA OLD GROWTH

- Remove/control the understory
- Remove hazard trees and prune branches
- Thin the overstory to benefit the existing Bur Oak
- Create additional day use facilities in type 3 to increase public use and spread the impact of the use over more area

PINE RESTORATION: MANAGEMENT PLAN

ESTIMATED COSTS FOR PROPOSED ACTIVITIES USING CONTRACTORS

TYPE 1 PAVILION AREA

Activity	Number	Item Cost	Subtotal
Remove hazard trees (short term project)	14 trees	$2,000/tree	$28,000
Remove suppressed trees (long term project)	50 trees	$200/tree	$10,000
Plant balled and burlapped stock	30 trees	$100/tree	$3,000
Protect transplants	30 trees	$30/tree	$900
Fertilize, top dress method	8 acres		$1,500
Total			**$43,400**

TYPE 2 WHITE PINE REGENERATION

Activity	Number	Item Cost	Subtotal
Hand thin stand and dispose of material	100 saplings	$20/tree	$2,000
Prune saplings to 9 feet	150 saplings	$5/ tree	$750
Remove invasive species (brush saw followed by chemical application)	1 acre	$1,000/ acre	$1,000
Total			**$3,750**

TYPE 3 NATURAL AREA

Activity	Number	Item Cost	Subtotal
Remove understory. Recommended method: mechanical, mulching style.	8 acres	$1,400/acre	$11,200
Remove large diameter hazard trees	18 trees	$400/ tree	$7,200
Remove suppressed trees, Bur Oak release project	8 acres	$1,200/acre	$9,600
		Total	**$28,000**

The hazard tree removal and thinning work in Types 1 and 2 can potentially be accomplished commercially by a local logger. To have sufficient Removal Volumes for a commercial logger, this work could be combined with the sanitation thinnings in the Red Pine plantings on the south and north borders. In a commercial operation, the main stems would be removed leaving branch and top cleanup but the costs would be reduced by up to 75%. This work would need to be done in the winter and the Park would need to be closed to visitors until the work is completed.

PINE RESTORATION: MANAGEMENT PLAN

EXPANDED RECOMMENDATIONS FOR AREAS OUTSIDE OF THE PAVILION PROJECT

- The naturally seeded White Pine in the Disk Golf Area should be protected from White Pine Blister Rust by pruning half of the trees up to 5' in height. This will remove the branches from the understory grass which is the most susceptible location for the transmission of Blister Rust This limited pruning would still maintain a partial screen.
- The Red Pine planted along the parks south border is extremely dense. Due to this density, stand health is compromised and Bark Beetles have caused mortality. The old growth Red Pine in the pavilion area are also subject to mortality from this insect. These younger Red Pine on the south border should have 30-40% of the stand harvested in a sanitation thinning to remove Bark Beetle damaged and susceptible trees.
- Buckthorn is prevalent in the Red Pine plantation along the southern edge of the south park boundary along with areas to the north of the pavilion. Implement invasive control practices to eliminate these populations. This will help control the future spread of Buckthorn back into the pavilion area.
- Monitor the Black Ash in the oxbow lowland area for Emerald Ash Borer
- Eliminating work or development in the Bur Oak savanna area that could potentially wound the Bur Oak during the growing season. This would include damage to the root system or stem. Due to the location of surrounding Oak Wilt infestations and site conditions, this stand is extremely susceptible to Oak Wilt.
- Monitor the Bur and Red Oak on the site for Oak Wilt. It is a new hazard for Morrison County's oak species. It was identified in the county in 2018 and has rapidly expanded causing stand mortality on low quality, sand plain oak very similar to Belle Prairie Park.

CULTURAL AND HISTORICAL RESOURCES

Good stewardship values the evidence of past human occupation on the land. A cultural resource is evidence of human activity that is 50 years or older. Many artifacts are found within the top several inches of the ground and may include pieces of pottery, arrowheads, logging tools, and remnants of farm machinery. Examples of sites where artifacts might be found include old logging camps, sawmill sites, railroad grades, Civilian Conservation Corp (CCC) camps, Native American campsites and burial grounds. Cultural and historical resources help to tell of our heritage and should be protected during management activities, such as logging or other forest development work.

Federal and State laws protect cultural resources from disturbances, destruction, and removal. The Minnesota Office of the State Archaeologist maintains a database of cultural heritage sites in Minnesota. The legal description of this property has been compared with this database and indicates that Native American artifacts have been found at two locations near the Mississippi River. The Woods Trail / Ox Cart Trail ran through the eastern portion of the property.
The Minnesota Field Archaeology Act (MN Statute 138.40 subd. 3) requires that when significant archaeological or historic sites are known to exist on public lands, development plans should be submitted to the State Archaeologist for review. This includes activities with the potential for soil disturbance including timber harvesting.

- The State Archaeologist should be provided a copy of the proposed Park development plan for review and comment.
- Because a portion of the Park has been placed on the National Register for Historic Places, it may also be necessary to contact the State Historic Preservation Office.

SITE OF HIGH BIODIVERSITY

Minnesota DNR's Biological Survey Program surveys the state's remaining natural plant communities, documents rare and unique plant and animal species, and identifies and ranks sites of biological significance. More information about these rankings can be found on the DNR website: **MBS Site Biodiversity Ranking.** Belle Prairie Park is identified as High Biological Significance based on three factors:

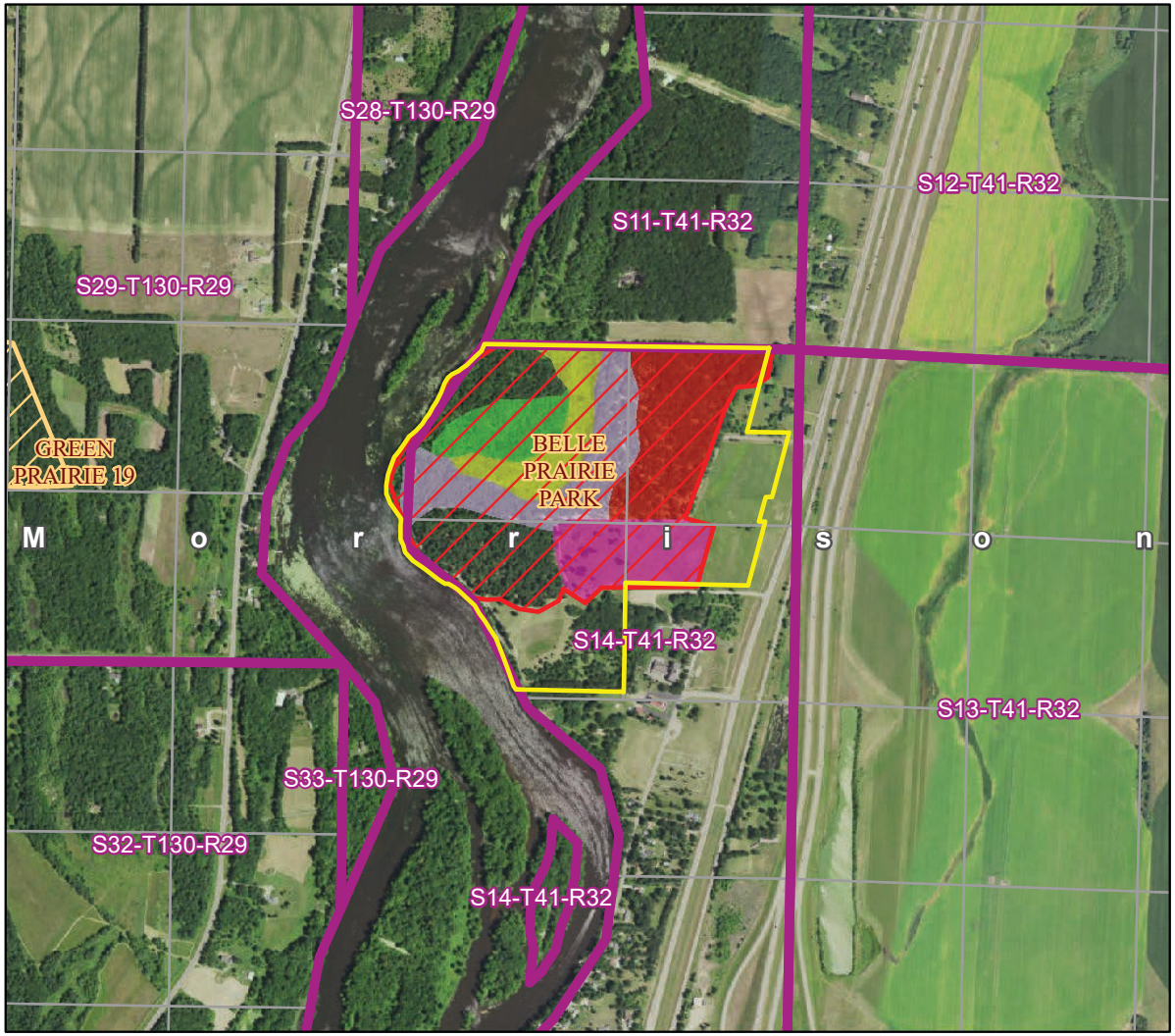
1. Landscape context:
In central Minnesota, Belle Prairie Park is one of the larger tracts of land on the banks of the Mississippi River that has not been developed by residential homes or agricultural land. It provides an important buffer and habitat corridor area.

2. Size and condition of native plant communities:
In addition to the magnificent Pine stands, other native plant communities in the Park include Pin Oak-Bur Oak Woodland, Black Ash-Silver Maple Forest, Willow-Dogwood Shrub Swamp, Dry Sand-Gravel Oak Savanna, and Dry Sand-Gravel Prairie.

3. Rare species populations:
A search of the DNR's Rare Features Database found five state-listed rare species within one mile of Belle Prairie Park.

Biodiversity Significance and Native Plant Community Map for:
Forest Stewardship Plan by Robert Perleberg
for Morrison County - Steve Backowski
N1/2 NW, pt S1/2 NE S14-T41-R32
Morrison County

GIS shapefiles of Sites of Biodiversity Significance and Native Plant Communities can be downloaded from the MN Geospatial Commons at gisdata.mn.gov.



Legend

- Property Line
- Counties
- PLS Sections
- PLS 40s

Sites of Biodiversity Significance

- Outstanding
- High
- Moderate
- Below

Mapped Native Plant Communities near or on property

- FDs37b - Pin Oak - Bur Oak Woodland
- FFn57a - Black Ash - Silver Maple Terrace Forest
- UPs13b - Dry Sand - Gravel Prairie (Southern)
- UPs14b - Dry Sand - Gravel Oak Savanna (Southern)
- WMn82a - Willow - Dogwood Shrub Swamp

RARE SPECIES THAT MAY OCCUR AT BELLE PRAIRIE PARK:

Minnesota's Endangered Species Statute (Section 84.0895) requires the Minnesota DNR to adopt rules designating Rare species. **Endangered** means the species is threatened with extinction. **Threatened** means the species is likely to become endangered within the foreseeable future. A **Species of Special Concer**n is not endangered or threatened, but it is extremely uncommon in Minnesota. These species populations are dangerously low for reasons, such as habitat loss and human disturbance. More information about Minnesota's rare species can be found at this DNR web site: **Minnesota Rare Species Guide**. Development and forest management activities should consider the presence of these species. to prevent further habitat loss and to avoid further species decline.

KITTEN TAILS. PHOTO: MN WILDFLOWERS

BLUNT SEDGE PHOTO: MN WILDFLOWERS

HILL'S THISTLE PHOTO: MN DNR

RARE PLANTS

Kitten Tails *(Bessya bullii)* – **Threatened**

This perennial plant has large leaves at the base and smaller leaves that alternate up the stem. A dense spike of small yellow flowers form in the second or third year. Flowering usually occurs in May. Kitten Tails are associated with oak savannas, dry oak woodlands and dry prairies.

Blunt Sedge *(Carex obtusata)* **– Special Concern**

This is a short, perennial sedge that grows 4-8 inches high. The stems have red-brown or red-purple bases and arise singly along a long, horizontal rhizome rather than from a dense clump. It is uncommon in native grasslands that have developed on dry, sandy or gravelly soil and it appears well adapted to fires and drought conditions.

Hill's Thistle *(Cirsium pumilum var. hillii)* **– Special Concern**

Thistles have a negative reputation because of the unintentional introduction of two non-native thistles (Canada Thistle and Bull Thistle) that have damaged agricultural and natural ecosystems across North America. But Hill's Thistle is one of five native, non-aggressive Minnesota thistles and is listed as Special Concern due to loss of its prairie and sandy woodland habitat. Hill's Thistle grows 10 to 24 inches tall and has a single deep purple flower head (1 to 3 inches wide) at the top of the stem.

RARE MUSSELS

Two species of rare, freshwater mussels have been documented near Belle Prairie Park. Mussels are long-lived, often surviving for decades. They spend most of their lives buried in the bottom sediments of lakes, rivers and streams. They are primarily sedentary, but they can move around with the use of their foot, which is a hatchet shaped muscle that can be extended out between the shells.

Creek Heelsplitter (*Lasmigona compressa)* **– Special Concern**
The Creek Heelsplitter has a greenish or brown oblong shell up to 5 inches in length. It typically occurs in sand, fine gravel, and mud of creeks, small rivers, and the upstream portions of large rivers. It most often colonizes areas downstream of riffles in small pools in 1 to 3 feet of water. Habitat degradation throughout it's known range is a continuing threat to this species.

Black Sandshell *(Ligumia recta)* **– Special Concern**
This mussel has an elongate shell up to 8 inches long. It has been most often found sand or gravel in the riffle and run areas of medium to large rivers. Habitat degradation has led to the decline of this species.

In Minnesota it is illegal to possess live mussels. If you are fishing or swimming in a lake or river and find mussels, try not to disturb them. If you move one, replace it on the riverbed or lake bottom in the same place and position as you found it. That will give the animal a fighting chance for continued survival.

CREEK HEELSPLITTER
PHOTO: MN DNR

BLACK SANDSHELL
PHOTO: MN DNR

12

COST ESTIMATE

COST ESTIMATE: SHORT-TERM IMPROVEMENTS

Belle Prairie Park Cost Estimate

Little Falls, Minnesota

SCHEMATIC DESIGN COST ESTIMATE

	DESCRIPTION	UNIT	QTY	UNIT COST	UNIT TOTAL	CONSTRUCTION SUBTOTAL	SD Contingency (20%)	DESIGN/ENG FEE (15%)	FEATURE TOTAL (w/ Cont. & Design)
	SHORT-TERM								
1	Add Parking Lot					**$ 77,460.00**	$ 15,492.00	$ 13,942.80	**$ 106,894.80**
	Parking Lot: Surfacing,	LS	1	$ 52,460.00	$ 52,460.00				
	Site Restoration: Erosion Control, Rain Garden, Turf Establishment	LS	1	$25,000.00	$ 25,000.00				
2	Clearly Define Hiking Trails and Maintain 12' Width Minimum					**$ 309,480.00**	$ 61,896.00	$ 55,706.40	**$ 427,082.40**
	Aggregate path & base (12' width, agg over class 5 base)	LF	5,158	$ 60.00	$ 309,480.00				
	Natural surface trail	LF	2,977	$ -	$ -				
3	Expand Trail System					**$ 1,034,280.00**	$ 206,856.00	$ 186,170.40	**$ 1,427,306.40**
	Aggregate path & base (12' width, agg over class 5 base)	LF	5,383	$ 60.00	$ 322,980.00				
	ADA boardwalk (no railing)	LF	154	$ 450.00	$ 69,300.00				
	New Trail- Boardwalk	LF	1,400	$ 450.00	$ 630,000.00				
	Seating elements along path	EA	8	$ 1,500.00	$ 12,000.00				
4	Update Primitive Restrooms					**$ 43,500.00**	$ 8,700.00	$ 7,830.00	**$ 60,030.00**
	Prefab Unit, Installed	EA	1	$ 35,000.00	$ 35,000.00				
	Site Prep, Base	LS	1	$ 8,500.00	$ 8,500.00				
	ADA sidewalk connection	SF	500	$ 8.00	$ 4,000.00				
5	Replace Asphalt pavement through park					**$ 869,200.00**	$ 173,840.00	$ 156,456.00	**$ 1,199,496.00**
	Parking barriers - boulders (1 per 8')	LF	1,400	$ 8.00	$ 11,200.00				
	Parallel Boat Parking stalls	EA	4	$ 7,000.00	$ 28,000.00				
	Parallel Parking Stalls w/ Boulders & Timber Post	EA	4	$ 5,000.00	$ 20,000.00				
	Angled Parking w/ Timber post & log tire stop	EA	22	$ 5,000.00	$ 110,000.00				
	Parking Lot at Existing Shelter	ALLOW	1	$ 50,000.00	$ 50,000.00				
	Grind and resurface asphalt	ALLOW	1	$ 650,000.00	$ 650,000.00				
6	Virgin Pine Restoration					**$ 83,550.00**	$ 16,710.00	$ 15,039.00	**$ 115,299.00**
	Type 1: Pavillion Area Improvements	LS	1	$ 43,400.00	$ 43,400.00				
	Type 2: White Pine Regeneration	LS	1	$ 3,750.00	$ 3,750.00				
	Type 3: Natural Area	LS	1	$ 28,000.00	$ 28,000.00				
	Mulched paths	LF	2,100	$ 4.00	$ 8,400.00				
7	Incorporate Interpretive Signage					**$ 27,400.00**	$ 5,480.00	$ 4,932.00	**$ 37,812.00**
	Custom Interpretive Signage- Pillar w/ 'viewshed' panel	EA	3	$ 5,000.00	$ 15,000.00				
	Kiosk/ Monument Sign- Salvage Log & large Panel	EA	2	$ 1,700.00	$ 3,400.00				
	Standard upright Timber panel w/ 2x4' Imageloc Panel	EA	6	$ 1,000.00	$ 6,000.00				
	Wayfinding Signage (4x4 w/ Imagelock panel)	EA	10	$ 300.00	$ 3,000.00				
					$ -				
	Short Term Subtotal					**$ 2,444,870.00**	**$ 488,974.00**	**$ 440,076.60**	**$ 3,373,920.60**

COST ESTIMATE: MID-TERM IMPROVEMENTS

Belle Prairie Park Cost Estimate

Little Falls, Minnesota

SCHEMATIC DESIGN COST ESTIMATE

	DESCRIPTION	UNIT	QTY	UNIT COST	UNIT TOTAL	CONSTRUCTION SUBTOTAL	SD Contingency (20%)	DESIGN/ENG FEE (15%)	FEATURE TOTAL (w/ Cont. & Design)
	MID-TERM								
8	Ox Cart Shelter					$ 87,295.50	$ 17,459.10	$ 15,713.19	$ 120,467.79
	Prefab Unit, 20x28	LS	1	$ 30,861.00	$ 30,861.00				
	Delivery off loading & Installation	LS	1	$ 15,430.50	$ 15,430.50				
	Footings	EA	8	$ 500.00	$ 4,000.00				
	Conc Slab	SF	560	$ 8.00	$ 4,480.00				
	Grading & Site Prep	LS	1	$ 15,000.00	$ 15,000.00				
	Custom Enclosure Panels	SF	768	$ 18.00	$ 13,824.00				
	8' access gate	LS	1	$ 2,200.00	$ 2,200.00				
	Bench Site Furnishings	EA	1	$ 1,500.00	$ 1,500.00				
9	Construct Second Picnic Shelter					$ 81,451.50	$ 16,290.30	$ 14,661.27	$ 112,403.07
	Prefab Unit, 20x28	LS	1	$ 30,861.00	$ 30,861.00				
	Delivery off loading & Installation	LS	1	$ 15,430.50	$ 15,430.50				
	Footings	EA	8	$ 500.00	$ 4,000.00				
	Conc Slab & ADA Walk	SF	1,020	$ 8.00	$ 8,160.00				
	Grading & Site Prep	LS	1	$ 15,000.00	$ 15,000.00				
	Furnishings (Picnic tables)	EA	4	$ 2,000.00	$ 8,000.00				
10	Upgrade River Access Points					$ 296,550.00	$ 59,310.00	$ 53,379.00	$ 409,239.00
	CIP Conc Ramp (w/ thickened edge)	SF	1,690	$ 16.00	$ 27,040.00				
	CIP Conc Stairs	LF	300	$ 55.00	$ 16,500.00				
	Conc Slab (walk & landings)	LS	600	$ 8.00	$ 4,800.00				
	Stone (boulder) Retaining Wall (along ramp)	SF	1,140	$ 80.00	$ 91,200.00				
	Handrails	LF	139	$ 90.00	$ 12,510.00				
	Seating Elements	EA	3	$ 1,500.00	$ 4,500.00				
	Earthwork, Erosion Control & Site stabilization	LS	1	$ 140,000.00	$ 140,000.00				
	Casting Pier *(See Long Term Improvements)*								
11	Add "Natural Play" Features					$ 41,100.00	$ 8,220.00	$ 7,398.00	$ 56,718.00
	3 Custom Features	EA	3	$ 10,000.00	$ 30,000.00				
	EWF Surfacing & container prep	SF	3,000	$ 3.70	$ 11,100.00				
	Mid Term Subtotal					$ 419,101.50	$ 83,820.30	$ 75,438.27	$ 578,360.07

COST ESTIMATE: LONG-TERM IMPROVEMENTS

Belle Prairie Park Cost Estimate
Little Falls, Minnesota
SCHEMATIC DESIGN COST ESTIMATE

	DESCRIPTION	UNIT	QTY	UNIT COST	UNIT TOTAL	CONSTRUCTION SUBTOTAL	SD Contingency (20%)	DESIGN/ENG FEE (15%)	FEATURE TOTAL (w/ Cont. & Design)
	LONG-TERM								
12	Create Snowshoe Trail System					$ -	$ -	$ -	$ -
	Mow paths	LF	1,682		$ -				
13	Build Accessible Fishing Pier					**$ 101,525.00**	$ 20,305.00	$ 18,274.50	**$ 140,104.50**
	River Steps	LF	195	$ 55.00	$ 10,725.00				
	River Steps Strip Footing	LF	40	$ 80.00	$ 3,200.00				
	Conc Slab Casting Platform	SF	200	$ 8.00	$ 1,600.00				
	Seating Elements	EA	2	$ 1,500.00	$ 3,000.00				
	Concrete Pumping	ALLOW	1	$ 8,000.00	$ 8,000.00				
	Site Excavation & Restoration	LS	1	$ 75,000.00	$ 75,000.00				
14	Update Play Equipment					**$ 101,750.00**	$ 20,350.00	$ 18,315.00	**$ 140,415.00**
	Main Structure Replacement	LS	1	$ 65,000.00	$ 65,000.00				
	Installation	LS	1	$ 19,500.00	$ 19,500.00				
	Surfacing: EWF, Cont. Prep, Resilient access pads	SF	3,000	$ 5.75	$ 17,250.00				
15	Expand Disc Golf Course					**$ 18,250.00**	$ 3,650.00	$ 3,285.00	**$ 25,185.00**
	Add & relocate holes	EA	17	$ 500.00	$ 8,500.00				
	Tee Box	EA	15	$ 150.00	$ 2,250.00				
	Planting	LS	1	$ 7,500.00	$ 7,500.00				
16	Park Lighting					**$ 87,000.00**	$ 17,400.00	$ 15,660.00	**$ 120,060.00**
	Timber post w/ Luminair	EA	15.0	$ 4,000.00	$ 60,000.00				
	Lighting Install	EA	15.0	$ 1,800.00	$ 27,000.00				
	Long Term Subtotal					**$ 308,525.00**	**$ 61,705.00**	**$ 55,534.50**	**$ 425,764.50**
	Total Construction Budget					$ 3,172,496.50	$ 634,499.30	$ 571,049.37	$ 4,378,045.17
	County Match (10%) (applied to construction, eligible funds)								
	Design and Engineering Fees Grant Eligible (10%)							$ 380,699.58	
	Non-Grant Eligible Costs								
	Archeology- if needed								
	Site Survey or Project Area Survey's								
	Tree Inventory & Survey								

Does Not include:

- Site Electrical Installation, Solar
- 3rd Picnic Shelter (River Access Area)
- Additional restrooms (at trailhead, at fire pit)
- Security Cameras ($12k-$17k, dependent on data service)