DRAFT 06/27/2014

Hartley Park
Master Plan

CITY OF DULUTH, MINNESOTA

June 2014

SRF | Engineers Planners Designers

Two By Forestry

Hartley Park
Master Plan

Client

Duluth Parks and Recreation

Consultant Team

SRF Consulting Group, Inc.

Schoenbauer Consulting Inc.

Janet KS Bernu-Two By Forestry

Introduction 4

Project Purpose 5

Funding Criteria 6

Master Plan Process 6

Public Dialogue and Feedback 8

Public Process 8

Comment Summary 9

Public Engagement Schedule 9

Historical Context 10

Regional Context 12

Existing Natural Resources 14

Existing Conditions Overview 14

Cultural and Natural Resources 14

Water Resources 15

Existing Trail Systems 16

General Overview 16

Ski Trails 16

Superior Hiking Trail 17

Natural Surface Multi-Use Trails 17

Traverse Trail 17

Existing Park and Trail System Map 18

DRAFT 06/27/2014

Natural Resource Recommendations 20

Introduction 20
Management Recommendations 21
Managing Invasives 31
Water Resources Recommendations 33
Education and Programming 36

Trail Recommendations 38

Introduction 38
Accessibility 38
Ski Trails 39
Superior Hiking Trail 39
Natural Surface Multi-use Trail 39
Core Accessible Trail 40
Crushed Stone Accessible Trail 41
Wayfinding 42
Proposed Trail Recommendations Maps 43
Trail Sections 47

Parking Recommendations 50

Proposed Parking Maps 51

Sustainable Trail Design Principles 56

Introduction 56
Core Principles of Sustainable Trail Design 56

Park Amenities 58

Introduction 58
Hartley Nature Center 58
Nature-Based Preschool 58
Nature Center Site Recommendations 59
Preschool Site Recommendations 60
Woodland Recreation Area 61

Partnerships 62

Phasing 63

Phasing Plan Map 64

Appendix 66

DRAFT 06/27/2014

Introduction

1. Project Purpose
2. Funding Criteria
3. Master Plan Process

Views of Lake Superior from Gazebo Point Overlook

Hiking

View from Rock Knob Overlook

Existing Trail

Existing views from within Hartley Park.

Hartley Park

Hartley Park is a premier nature-based park with recreation and environmental education areas located in the heart of Duluth, Minnesota – the region's largest city and top tourist destination. The Park provides a unique, immersive nature experience only four miles from Duluth's central business district. Within its boundaries are 640-acres of woodlands, creeks, ponds, meadows, and rocky overlooks, as well as remnants of a culturally significant farm begun in 1890.

Hartley Park is a highly valued amenity both locally and regionally. Operated in partnership by the Duluth Parks and Recreation Division and the nonprofit, Hartley Nature Center, the Park includes:

» An extensive 11-mile trail system used by avid hikers, mountain bikers and skiers, and largely maintained by nonprofit partners representing each group

» Expansive primitive areas used by bow-hunters, birders, K-to-college students and all those drawn to the peace of natural places

» A pond and designated trout stream used by paddlers, fishermen, sunset watchers and rock skippers

» Hartley Nature Center facilities that serve more than 15,000 children per year using the nonprofit's classrooms, interpretive exhibits, equipment rental service, nature-based pre-school and natural play area

The Park is also a laboratory, classroom, and regional showcase for ecological restoration that engages volunteer service groups, citizen scientists, UMD and St. Scholastica students, recreational users and Hartley Nature Center participants in learning about, creating and advocating for visionary restoration of Hartley's diverse landscapes and similar landscapes in northern Minnesota.

The Park serves individuals and groups who are drawn to the diverse terrain, sweeping vistas of Lake Superior and the regionally significant Superior Hiking Trail and Duluth Traverse mountain biking trail. Like the

DRAFT 06/27/2014

Project process diagram

entire Duluth parks and trails system, improvement and stewardship of Hartley Park depends upon vital partnerships between the City of Duluth and a variety of community-based organizations. Hartley Nature Center is the City's primary partner in the planning, improvement, use and stewardship of Hartley Park. While the City of Duluth retains ultimate responsibility and authority for the Park, the City works in partnership with Hartley Nature Center (HNC) on all significant decisions about the Park and strives, to achieve genuine consensus with HNC leadership. In addition to Hartley Nature Center, key partners in Hartley Park include Cyclists of Gitchee Gumee Shores (COGGS), the Duluth Cross Country Ski Club (DXC), the Superior Hiking Trail Association (SHTA), and the W.J. McCabe Chapter of the Izaak Walton League.

Project Purpose

This master plan will establish a framework for implementing improvements and managing resources within Hartley Park over the next 5-10 years. The goals of the plan are to:

» Preserve and enhance the distinctive character of Hartley Park as a unique place both locally within Duluth and the greater region

» Ensure that any proposed recreational activities and amenities are compatible with the Park's primary role as a nature-based park

» Restore natural ecological processes within the Park's diverse landscapes

» Improve access to and enjoyment of the Park for all Park users

» Determine funding needs and identify potential grant sources to implement improvements

DRAFT 06/27/2014

Fairmont Street entrance to Hartley Park

Funding Criteria

The Duluth Parks and Recreation Division will seek funding with these goals in mind. There are several funding sources available, including the Legacy Amendment and the Environment and Natural Resources Trust Fund (Legacy funding), the Department of Natural Resources, the City of Duluth, and other grants. In order to be eligible for Legacy funding the master plan must demonstrate that Hartley Park meets the following requirements:

- Provides a high quality outdoor recreation experience
- Preserves a regionally-significant and diverse natural or historic landscape
- Is well located and connected to serve a regional population and/or tourist destination
- Fills a gap in recreational opportunities within the region

Each of these requirements has a set of criteria for which Hartley Park will be ranked, and which will ultimately determine its eligibility for Legacy funding.

Master Plan Process

The master planning process includes the completion of site inventory and analysis, the development of programming, the completion of a natural resource management plan, schematic trail design and preparation of a cost estimate and phasing plan. Through involvement with the local community, this master plan integrates public feedback into its recommendations and works to propose enhancements that are compatible with the Park's unique history and identity.

Over the course of several months, six meetings and three open houses were held to facilitate a dialogue with the public and collect feedback. In addition to these gatherings, the public had the opportunity to comment online. Throughout this process people were asked a series of questions, including:

What do you do when you visit the Park?

What do you like about the Park?

How can Hartley Park be improved?

Public input is an essential component of the master planning process, as it works to assure that recommendations will serve both local and regional user groups.

Based on public response, adjustments have been made to better address Hartley's identity as a nature-based park.

DRAFT 06/27/2014

This page left blank intentionally

DRAFT 06/27/2014

Public Dialogue and Feedback

1. Public Process
2. Comment Summary
3. Public Engagement Schedule

Planning team on park site tour

Public Process

Over the course of several months, six meetings and three open houses were held to facilitate a dialogue with the public and collect feedback. In addition to these gatherings, the public had the opportunity to comment online. Throughout this process people were asked a series of questions, including:

- What do you do when you visit the Park?
- What do you like about the Park?
- How can Hartley Park be improved?

Public dialogue is an essential component of the master planning process, as it works to assure that recommendations will serve both local and regional user groups.

It is clear that people are passionate about Hartley Park– their valuable input has helped shape the recommendations put forth by this master plan. Since receiving feedback on the initial draft of the document, adjustments have been made to better address Hartley's identity as a nature-based park.

Based on public feedback, it is clear that people are passionate about Hartley Park- their valuable input has helped shape the recommendations put forth by this master plan.

DRAFT 06/27/2014

Comment Summary from August 13th, 2013 Public Open House

What do you do when you visit the Park?

- Hike, run, mountain bike, and ski the trails – use the trails year round
- Use the building for occasional meetings
- Enjoy nature
- Bird watching
- Fish at dam and pond
- Snowshoe in the woods
- Take in views at overlooks
- Walk my dog
- Hike the trails with kids, family, and friends

What do you like about the Park?

- The pine plantation
- Being away from it all in a natural setting
- The seclusion and sense of privacy while hiking the trails – never crowded
- Close proximity to city neighborhoods and easy access
- Hartley Pond and the wetland areas
- Great views from overlooks
- Having a building facility and restrooms to use during the day
- Serves a wide range of user groups from children to adults
- The wildlife
- Nature Center program offerings

How can Hartley Park be improved?

- Acquire School District property
- Add wayfinding signage with trail distances identified
- Consider a paved path for people in wheel chairs, the elderly and families with strollers
- Repair eroded trails and embankments
- Add a beginner ski trail loop
- Take out steep curves on ski trail
- Reduce fees for classes
- Provide longer hours at Nature Center
- Redesign Fairmont Street Entrance
- Remove invasives and improve forest quality
- Eliminate proposed disc golf at Woodland Recreation Area
- Dedicated biking and hiking trails (in addition to the Superior Hiking Trail)
- Establish better pedestrian connection from Nature Center to Woodland Recreation Area
- Better manage off leash dogs and picking up dog feces
- Maintain trails better but avoid paving

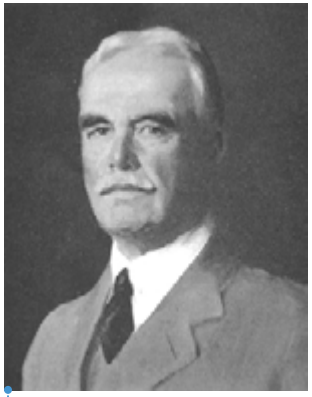
Public comments from the August 13th Public Open House

Public Engagement Schedule

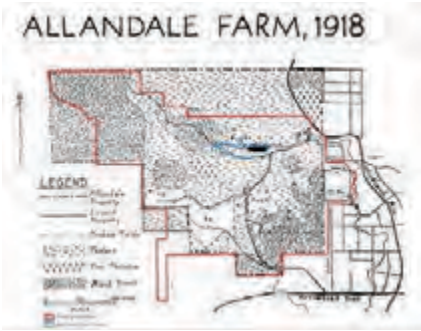
Public engagement schedule

DRAFT 06/27/2014

Historical Context



Guilford Graham Hartley born in New Brunswick



A farm house and root cellar are built at the base of Rock Knob, the remnants of which are some of the only traces of the farm left today.

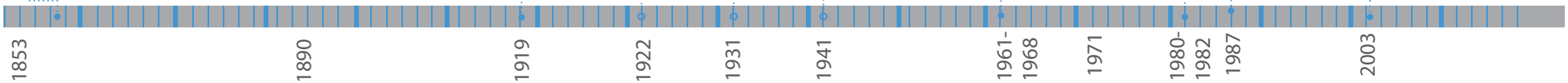
Workers in field at Allandale Farm.

An asphalt Soap Box Derby track is constructed and used until interest declines

Guilford Graham Hartley passes away.

Hartley Estate fails to pay taxes and fields are abandoned

Hartley land is cleared of buildings.



Historical timeline

Hartley Park's history dates back to the late 1800's, when Guilford Hartley purchased the land along Woodland Avenue that would eventually become Hartley Park as it is known today. It has gone through several transformations as a working farm, a Victory Gardens site, a Soap Box Derby track and now home to Hartley Nature Center and a designated Duluth Park. Notable points in Hartley Park's history include:

1890 Guilford Hartley purchases and clears 80 acres for commercial produce and dairy, creating the Smaller Allandale Farm.

1900-1911 Hartley purchases another 700 acres, expanding produce and dairy capacity becoming Greater Allandale Farm, the largest farm in Duluth.

1913 Hartley Road and Hartley Pond are constructed, the latter by an earthen dam on Tischer Creek.

1919 A farm house and root cellar are built at the base of Rock Knob, the remnants of which are visible today.

1920s-1930s Fires burn across Hartley Park.

1922 Guilford Graham Hartley passes away.

1931 Hartley Estate fails to pay taxes and the fields are abandoned.

1940's Fields are used by the community for "Victory Gardens" and pasturing of cattle. Schools and youth groups plant pines in several locations.

1961-1968 An asphalt Soap Box Derby track is constructed and used until interest declines.

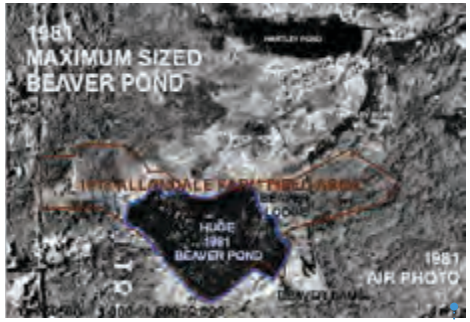
1971 Hartley Dam washes out and is replaced with the current dam.

1970's Ski trails are constructed.

1980-1982 Beavers build a dam and flood the wet meadow where former farm fields were located, creating a larger, temporary pond.

1986-2001 Hartley Nature Center Inc. forms in 1987 and begins educational programs soon after. HNC further develops its field trip program serving area schools. Teaching sites are identified and developed, ecological monitoring commences. Fundraising begins for a new nature center facility.

DRAFT 06/27/2014



Beavers build a dam and flood the wet meadow where former farm fields were located and the new pond is the largest ever.

Hartley Nature Center Inc. forms in 1987 and begins educational programs soon after.

The New Hartley Nature Center Building officially opens, marking a new era for stewardship and sustainability for the Park and for Duluth.

1997 HNC receives a donation of 22 acres of land contiguous to the Park, which provides key access from Duluth's Kenwood neighborhood.

2003 The new Hartley Nature Center Building officially opens, marking a new era of stewardship and sustainability for the Park and for Duluth.

2006 The Superior Hiking Trail is constructed and work to improve trails west of Hartley Road begins.

2010 City of Duluth completes a Parks Master Plan.

2011 City of Duluth completes a Trail and Bikeway Master Plan.

2013-14 To meet growing program demand, Hartley Nature Center constructs a 700 square foot yurt classroom, outdoor amphitheater and nature play area. The Nature Center also opens Hartley Nature Preschool, one of only 30 nature based preschools in the country operating from a nature center.

The opening of Hartley Nature Center green building ushered in a new era of stewardship and sustainability for Hartley Park and for the City of Duluth.

DRAFT 06/27/2014

Regional Context

Hartley Pond

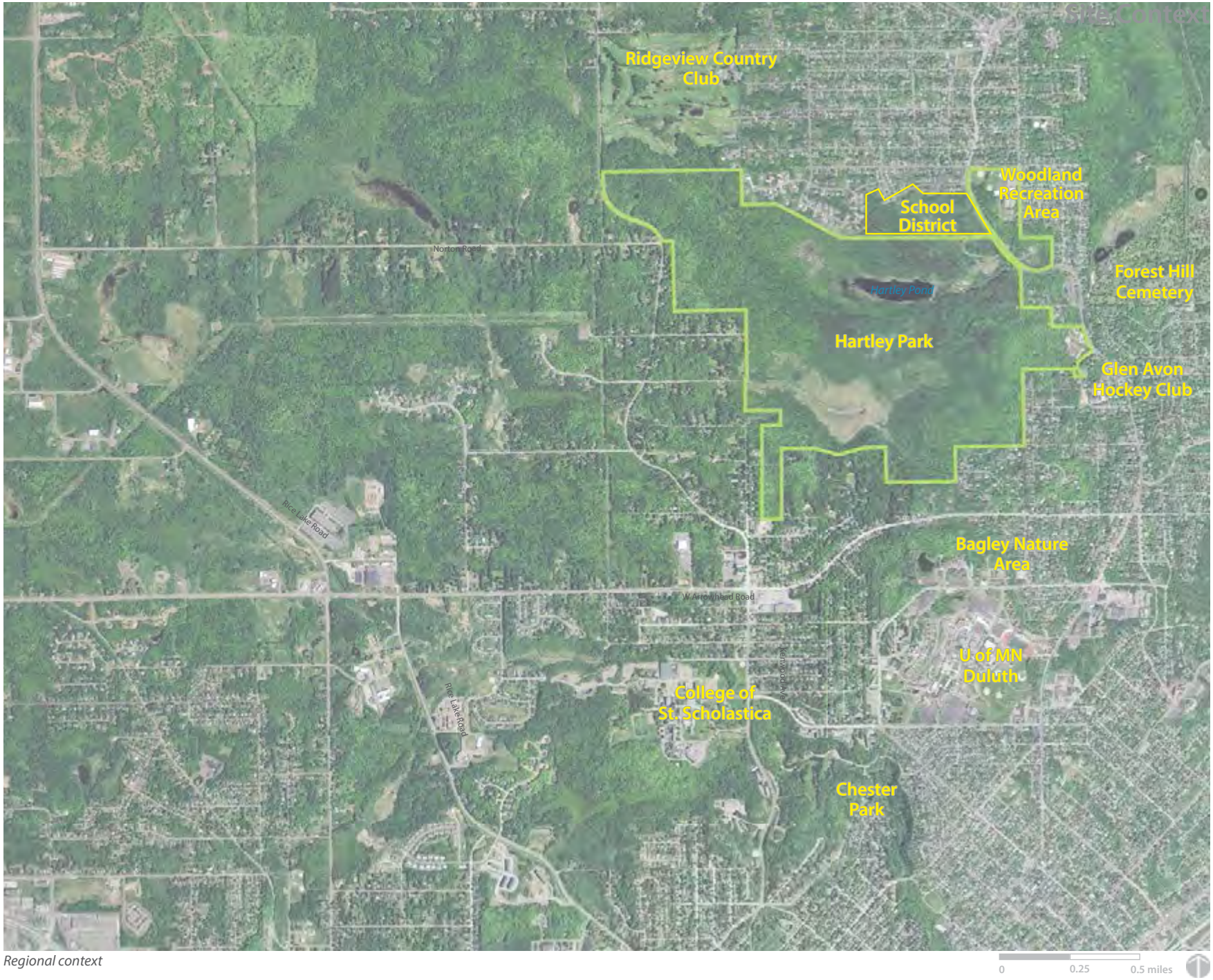
Hartley Park is located in the heart of eastern Duluth, four miles from the central business district and within close proximity to many surrounding residential areas. The University of Minnesota Duluth and College of St. Scholastica campuses are also nearby. The adjacent Woodland Recreation Area property located northeast of the Park across Woodland Avenue contains a large contiguous natural resource area as well as athletic fields, an ice arena and outdoor rinks on the north end of the Park. This area serves several thousand children every year who participate in youth athletics including hockey, figure skating, soccer, baseball and gymnastics.

Independent School District #709 currently owns a parcel of land on the north boundary of the Park which is slated for residential development, but currently remains undeveloped. At a minimum, the City seeks rm npcqcptc rfc qmsrf ucqr nmprgm l _jm l e rfc L_rspc Ac l rcp c l rpw pm_b _l b rfc ucrj_l bq rf_r ps l l mprf+qmsrf g l rfc ac l rcp md rf_r npmncprw,

In addition to many trail connections established with residential neighborhoods around the perimeter of the Park, the Superior Hiking Trail is routed through the east side of the Park. Future plans include routing of the new mountain bike Traverse Trail through the Park along the current Old Hartley Road trail corridor. Potential opportunities also exist for the Snowflake Nordic Ski Center trail system to be linked with the trail system at Hartley Park if additional trail right-of-way connections can be secured between the two properties.

Hartley Park provides a unique, immersive nature experience within the greater northern Minnesota region. It offers outdoor education opportunities, multi-use trails for biking, hiking, and skiing, sweeping vistas of Lake Superior, and aquatic recreation on Hartley Pond all within close proximity of an urban center.

DRAFT 06/27/2014



Regional context

DRAFT 06/27/2014

Existing Natural Resources

1. Existing Conditions Overview
2. Cultural and Natural Resources
3. Water Resources

A thinned and well-managed Red/Norway Pine stand at the Cloquet Forestry Center, Cloquet, MN (CFC)

Existing Conditions Overview

Hartley Park consists of approximately 640 acres of woodlands, creeks, ponds, multi-use recreational trails, recreational fields and rinks, and scattered buildings. Approximately 30 acres of the property are located on the east side of Woodland Avenue, which divides the property. This 30 acre area consists of recreational fields, hockey rinks and arena, and access roads, interspersed with woodlands and recreational trails. In 2012, the Hartley Nature Center (HNC) received approximately eight additional acres of land located on the east side of Woodland Avenue. This was a former residential property, and currently consists of woodlands with a wildlife pond surrounded by a grassy region. The buildings on this property have been demolished. Finally, Independent School District #709 (ISD) is selling approximately 35 acres, which adjoins the Park to the north. This is a wooded and brushy piece of property with scattered recreational trails. The City of Duluth is considering potential options for the acquisition of this property which would further compliment the Park.

Cultural and Natural Resources

It is important to be aware of any natural and cultural resources that are present on the property prior to conducting enhancement projects. It is highly recommended that an evaluation of potentially historic features be completed in 2014. According to the Minnesota Department of Natural Resources (DNR) Natural & Cultural Heritage Information Systems (NCHIS), the following are found in the Park:

- Remnants of the farm's root cellar, stairs and well, as well as bluestone curbs, gutters, culverts and road surface on Old Hartley Road.
- Portions of this property are located within a site of biodiversity with a ranking of moderate significance. The site, number 15, is named "Hartley Park". It is a small site which is located within the Duluth city limits and is centered in and around Hartley Park.

DRAFT 06/27/2014

Dense hardwood stand in a unknown Minnesota location

Small wildlife pond in Hartley Park

The Hartley Park Forest

The Native Plant Communities of Hartley Park (Native Plants) prepared for Hartley Nature Center in 2004 by Ethan Perry, Ecological Consultant, states that the Park "lies within with a Land Type Association (LTA) called the Tettegouche Till Plain." The predominant natural vegetation of this Plain "is northern hardwood forest of sugar maple and red oak like that found at Hartley". It is the "second largest" remnant of northern hardwoods in Duluth. Adding to the Park's "significance is the large wet meadow and willow swamp complex. It is the largest wet meadow in Duluth in the Plain." In the report he further states that although the plant communities in the Duluth area have been heavily affected by humans, the Park's plant communities "stand among the best remnants of natural vegetation. In fact, the diversity of community types (two types of northern hardwood forest, three types of lowland forest, pine forest, wet meadow, willow swamp, etc.) is in itself significant".

There are two major threats to these significant plant communities. One is the existence of invasive plant species, which are present in varying degrees throughout most of the Park. The other is the lack of enhancement and sustainability projects, such as woodland thinning, to promote forest health and biodiversity, especially within the pine stands.

Water Resources

Hartley Pond, Tischer Creek and the Beaver Pond are the main surface water resources within Hartley Park. There is currently a dam at the eastern edge of Hartley Pond. Tischer Creek is a DNR designated trout stream that flows through the Park, but nearly one mile of fish habitat is compromised by warm water flowing over the dam. Beaver dams have occasionally presented an issue with flooding on multi-use trails around the perimeter of the wet meadow.

DRAFT 06/27/2014

Existing Trail Systems

1. General Overview
2. Ski Trails
3. Superior Hiking Trail
4. Natural Surface Multi-Use Trails
5. Traverse Trail

Trails within Hartley Park

General Overview

The existing trail system at Hartley Park includes five kilometers of cross country ski trails, multi-use trails open to all human-powered users, and a section of the Superior Hiking Trail that is also part of the North Country National Scenic Trail. These trails are frequented by hikers, bicyclists, trail runners, dog walkers, cross country skiers, snowshoers, photographers, neighborhood residents, birders, anglers, bow-hunters, Hartley Nature Center program participants and visitors to Duluth. Though well-used and loved by all of the user groups, the trail system faces challenges including insufficient accessibility, connectivity and wayfinding, low spots that remain wet and erode due to unsustainable slopes or poor to little design and perceived conflicts among user groups. Public input from trail users and field investigation has helped identify the opportunities for improvement associated with each trail type.

Ski Trails

- Too many intersections
- Sections that are unsustainable
- Tight spaces and visual overlap
- Sections that are inappropriate for summer use
- Limited length
- Absence of beginner terrain or beginner teaching sites

Superior Hiking Trail

- Needs minor enhancements
- Limited accessibility
- Lack of sustainable accesses to the trail and to overlooks results in user defined trails

DRAFT 06/27/2014

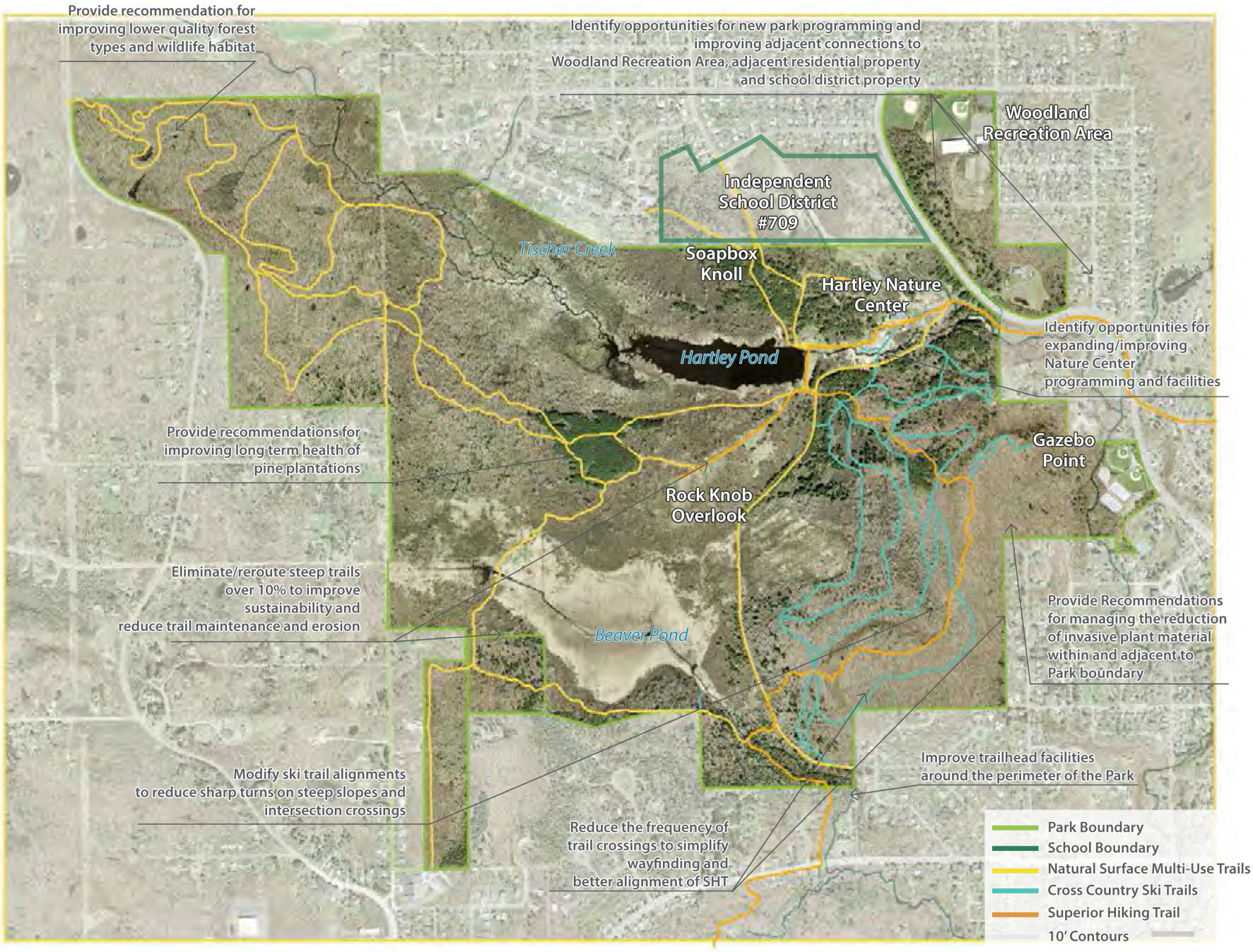
Natural Surface Multi-Use Trails

- Primary user groups include mountain bikers, trail runners, walkers, hikers and Nature Center program participants.
- Perceived conflict between vulnerable users and fast moving cyclists on heavily traveled trails on Old Hartley Road, the Tunnel Trail and Rock Knob Trail
- Challenges in educating trail user groups to reduce conflict by following trail etiquette
- Limited multi-use and hiking access from eastern neighborhoods to general trail system
- Some unsustainable trail sections need to be rerouted and built new
- Trail sections that have not been fully restored should be closed
- Insufficient wayfinding make trails difficult to follow

Duluth Traverse Trail

The Duluth Traverse trail is a single-track, natural surface, "green" (easy) multi-use trail purpose built for mountain biking that will soon connect about 100 miles of trail from one end of Duluth to the other linking together many of the City's neighborhoods, parks, and trails. The Traverse will preserve and connect green space throughout the city, and provide recreational opportunities for mountain biking, hiking, running and snowshoeing. The trail will enter Hartley Park from the south at Arrowhead Road across from UMD's Bagley Nature Center and exit the Park to the east at the Hartley Nature Center entrance drive, connecting the mountain bike trails at Hartley to the greater system.

DRAFT 06/27/2014



Existing Park & Trail Systems and Analysis of Conditions

DRAFT 06/27/2014

This page left blank intentionally

DRAFT 06/27/2014

Natural Resource Recommendations

1. Introduction
2. Management Recommendations
3. Managing Invasives
4. Water Resources Recommendations
5. Education and Programming

Natural resource types within Hartley Park

Introduction

Hartley Park is a regionally significant natural area recognized for its unusual expanse, landscape diversity and water resources. The Park's northern hardwood forests and wet meadows are among the largest of their type in the Duluth area. The Park's ecological importance and recreational value are diminished by three major threats:

» The dam on Tischer Creek which impairs riparian and fish habitat on nearly one mile of Tischer Creek, a DNR designated trout stream.

» Invasive plant species which are present in nearly all areas of the Park and spreading.

» Failure to proactively thin and replant forests planted in the 1940's that are now unnaturally uniform in age and species composition.

Preservation and restoration of natural resources is unusually important to the use of Hartley Park in light of the Park's City Council-declared purpose to:

> "Foster and enhance educational and recreational activities aimed at promoting the preservation of, learning about, and understanding of the natural environment of the Duluth area."

Because of this unique purpose, and the long tradition of nature-focused education, recreation and ecological data collection in the Park, ecological restoration is not only essential to the extensive environmental education programming occurring in the Park, but it is integral to place-appropriate recreational use. Development and use of all Park improvements are tailored to the unique purpose of Hartley as Duluth's premier nature-based park.

Recognizing that the Park's use is as a regional laboratory, classroom and showcase for ecological restoration, the primary purpose of natural resource recommendations is to restore the natural conditions that prevailed before the land was cleared and developed. Other important resource management goals are to preserve landscapes valued for their appearance and/or history and protect property and people from harm. The recommendations

DRAFT 06/27/2014

below address each of the unique plant communities and water resources within Hartley Park, as well as suggest opportunities for invasive plant management, education and environmental programming. As indicated in the Native Plants report, it is important to avoid disturbance in areas of high plant community rankings. Invasives should be managed, especially buckthorn, to allow for native plant areas to become established.

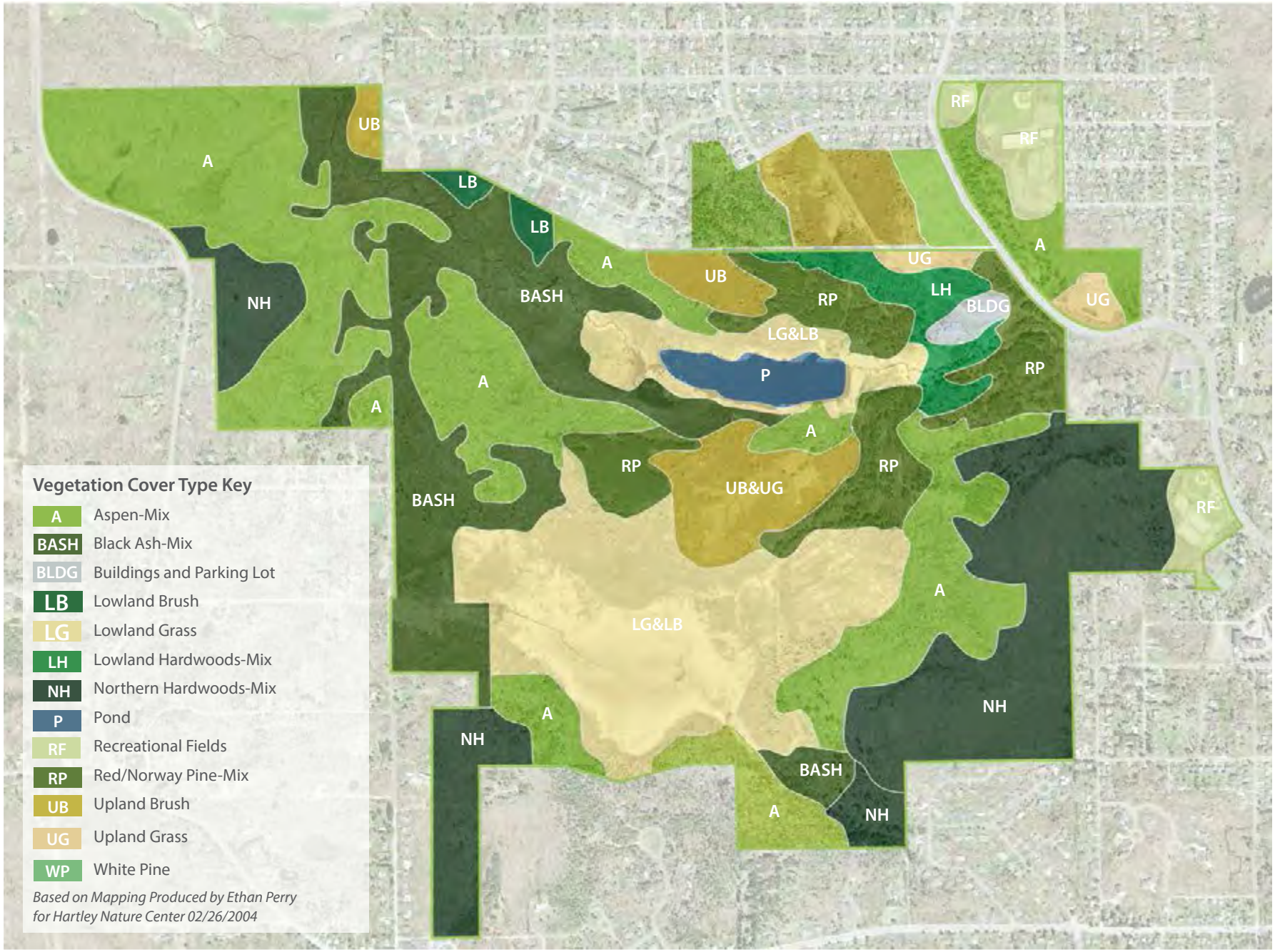
Management Recommendations

Existing plant communities were mapped into vegetation cover types as seen in Figure 1.14. Cover types were then consolidated into the following vegetation groups based on their specific needs and management recommendations.

- Red/Norway Pine
- Aspen Mix
- Northern Hardwoods
- Lowland Hardwoods
- Lowland Brush and Grasses
- Upland Brush and Grasses

Management recommendations also include methods to avoid potential risks to vegetation and describe the benefits of selective thinning.

DRAFT 06/27/2014



Existing vegetation communities

DRAFT 06/27/2014

Red Pine stands at the Cloquet Forestry Center (managed stand)

Red Pine stands at the Cloquet Forestry Center (ice storm damage)

Red Pine stand in Hartley Park invaded by Glossy Buckthorn

Red Pine Stand in Hartley Park

Red/Norway Pine

The purpose of red pine management in the Park shall be to increase the species and age diversity of the red pine plantation in a manner that also preserves the survival of mature red pines and the stand's cathedral-like feeling.

- Thin the pine stands that have not been thinned to date by removing approximately 1/4 to no more than 1/3 of the stand. If possible, "snake" rows to create a more natural appearance and also randomly select trees from each side of these rows to create gaps for planting.
- After thinning, plant a variety of seedlings in openings in order to increase forest diversity and sustainability and to protect forest health. Suggested species for planting include white pine, white spruce, paper birch, balsam fir, northern white cedar (in moister areas) and native berry or nut-producing shrubs. Due to browse pressure, all trees will need to be protected.
- To illustrate the ecological consequences of various forest management practices, the City and Hartley Park partners may consider designating some adjacent areas to "leave alone."
- Selectively thin these stands two more times and approximately 5-7 years apart, again removing approximately 1/3 of each stand in each of the thinning sequences.

DRAFT 06/27/2014

Aspen Mix

This type is an early successional forest type, which relies on disturbances such as pasturing, land clearing, thinning or fire. The species growing within this type require full sunlight to reproduce and grow well.

- » Conduct selected group removal in order to enhance tree growth and health as well as to create tree age-class and species diversity. Thin these areas in conjunction with other types or stands in the Park.
- » Allow openings to naturally regenerate or plant these areas with suitable and desirable species.

Aspen Stand in Hartley Park

An Aspen Stand at age 45, Brule River State Forest, WI DNR

Thinned Aspen Stand; Grand Rapids, MN

An Aspen "left to grow" to age 56 years, Brule River State Forest, WI DNR

DRAFT 06/27/2014

Northern hardwoods stand in northern Minnesota unknown location

Thinned hardwood stand in northern Minnesota unknown location

Northern Hardwoods

A Northern Hardwoods type is a late successional forest type, which means that there has been a lack of recent or very minimal disturbances in these areas. The plant species growing in this type are generally shade-tolerant species, which will naturally reproduce and grow well in shadier conditions.

- Conduct thinning or selected group removal in order to enhance tree growth and health as well as to create tree age-class and species diversity. Thin these areas in conjunction with other types or stands in the Park.
- Allow openings to naturally regenerate or plant and protect these areas with suitable and desirable species.

DRAFT 06/27/2014

Lowland Hardwoods

Located near the drainages in the wetter areas within the Park.

» Conduct thinning or selected group removal in order to enhance tree growth and health as well as to create tree age-class and species diversity. Thin these areas in conjunction with other types or stands in the Park.

Lowland hardwoods in Hartley Park

DRAFT 06/27/2014

Lowland Brush and Grasses

- Reintroduce native shrubs and grasses in these areas.
- Manage invasives, especially buckthorn, to allow for native plant areas to become established.

Brush and grasses in areas throughout Hartley Park

Upland Brush and Grasses

- Reintroduce native shrubs and grasses in these areas.
- Manage invasives, especially buckthorn, to allow for native plant areas to become established.

DRAFT 06/27/2014

Tree Risk Management for Building, Parking Lot, and Trail System Corridors

- Assess all trees for hazardous risk removal.
- Mitigate risks by pruning or removing trees.
- Conduct assessments within high risk zones after large storm events.
- Allow for fallen trees that do not pose a risk to the general public to remain for wildlife habitat.

Ensure that high risk trees along trails or facilities are assessed regularly to ensure public safety.

DRAFT 06/27/2014

Large Red Pine stand with Glossy Buckthorn understory in Hartley Park

Northern hardwood stand near Woodland Recreation Area

"Leave it Alone" Vegetation Management Option

This option may be suitable for areas of high quality plant communities; however, doing nothing in other areas may have the following ramifications:

- Risk the long term health of the entire forest, especially the pine stands
- Will not necessarily improve and may hinder the biodiversity of plant and wildlife species within the Park

DRAFT 06/27/2014

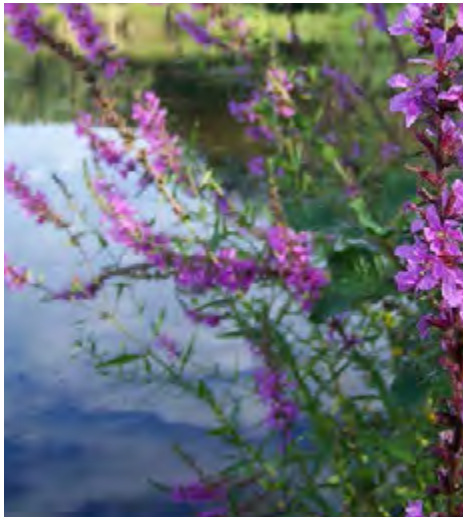
Benefits of selective thinning and small selected group removal

- Create openings, which will enhance wildlife habitat and woodland diversity
- Create better tree spacing and reduce competition, which will enhance tree and overall forest health;
- Encourage diverse natural plant regeneration, optimum tree growth and health, and canopy layering, which enhances both woodland and wildlife habitat diversity;
- Reduce tree stress due to competition and, in the red pine stands, reduce the potential infestations of and mortality due to pine bark beetles;
- Reach the desired future forest conditions faster and the forest will be healthier overall.

Thinned Aspen stand at age 44 near Grand Rapids, Minnesota

Thinned Hardwood stand in northern Minnesota

DRAFT 06/27/2014



P urple loosestrife

Common tansy

Possible means for controlling buckthorn

Managing Invasives

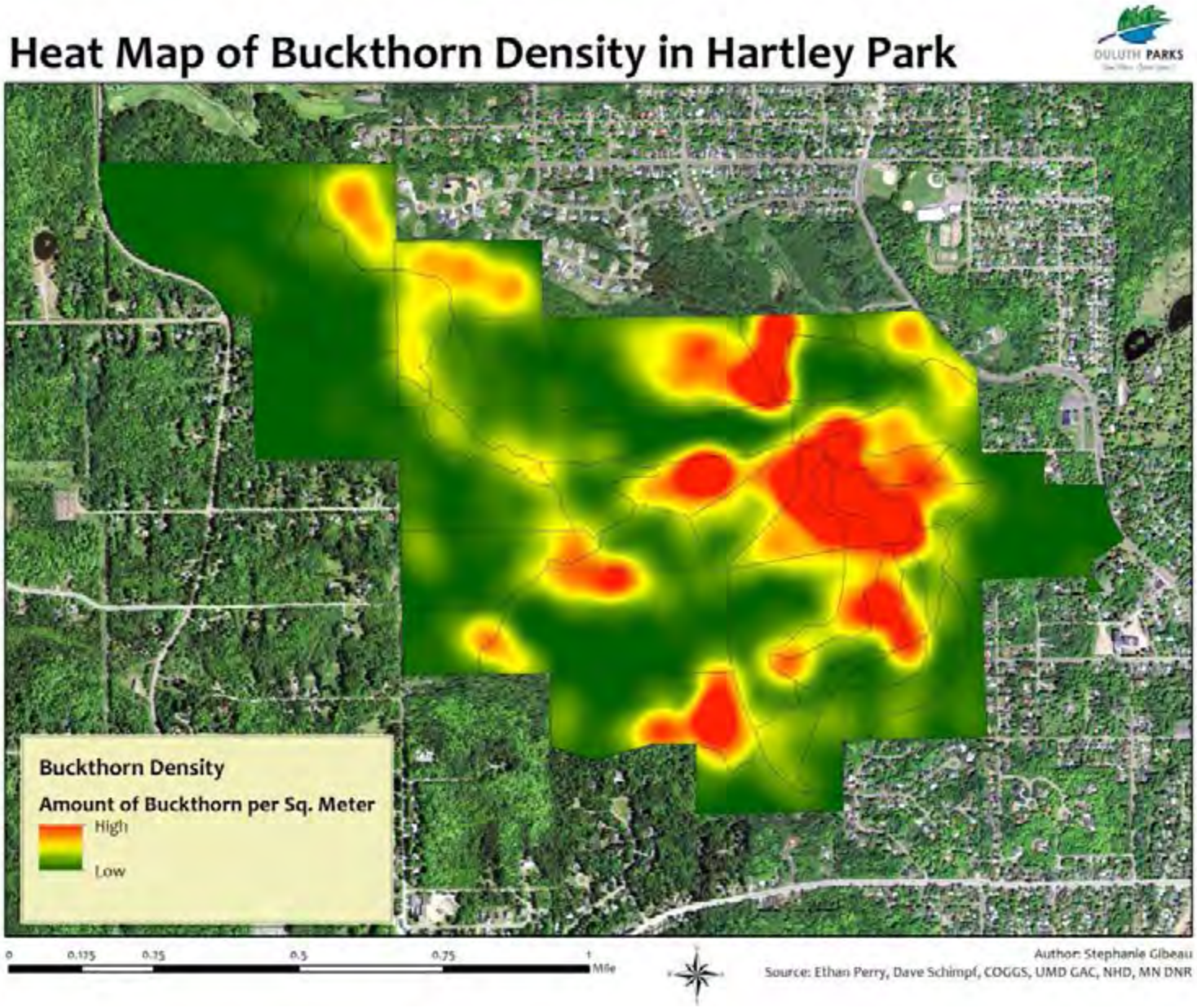
Invasive Management Controls

- Mechanical Control
- Chemical Control
- Biological Control

Invasive Management Methods

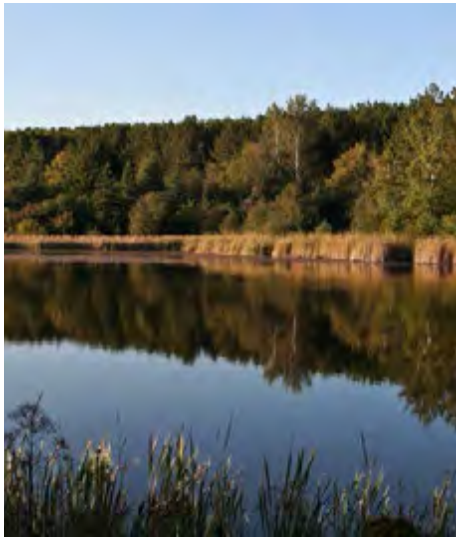
- Begin in areas with light invasive infestation and continue toward heavily infested areas
- Prioritize removing plants that are producing the seed source
- Develop and maintain mapping data identifying existing invasive locations and areas completed to monitor progress over time
- Utilize volunteers where possible to assist with the removal effort.
- Create wildlife enhancement areas, such as brush piles, for observing wildlife habitat

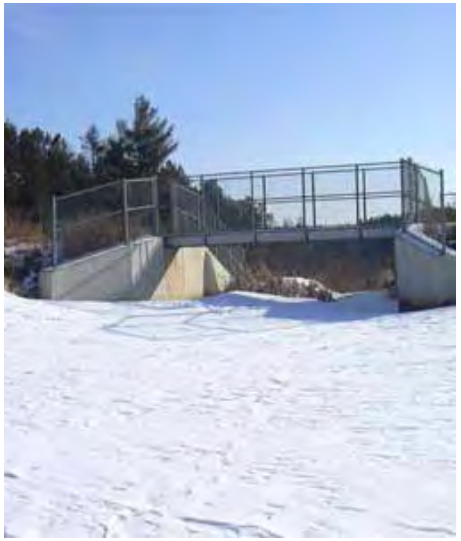
DRAFT 06/27/2014



Buckthorn density analysis

DRAFT 06/27/2014





Tischer Creek , Hartley Pond and structure dam

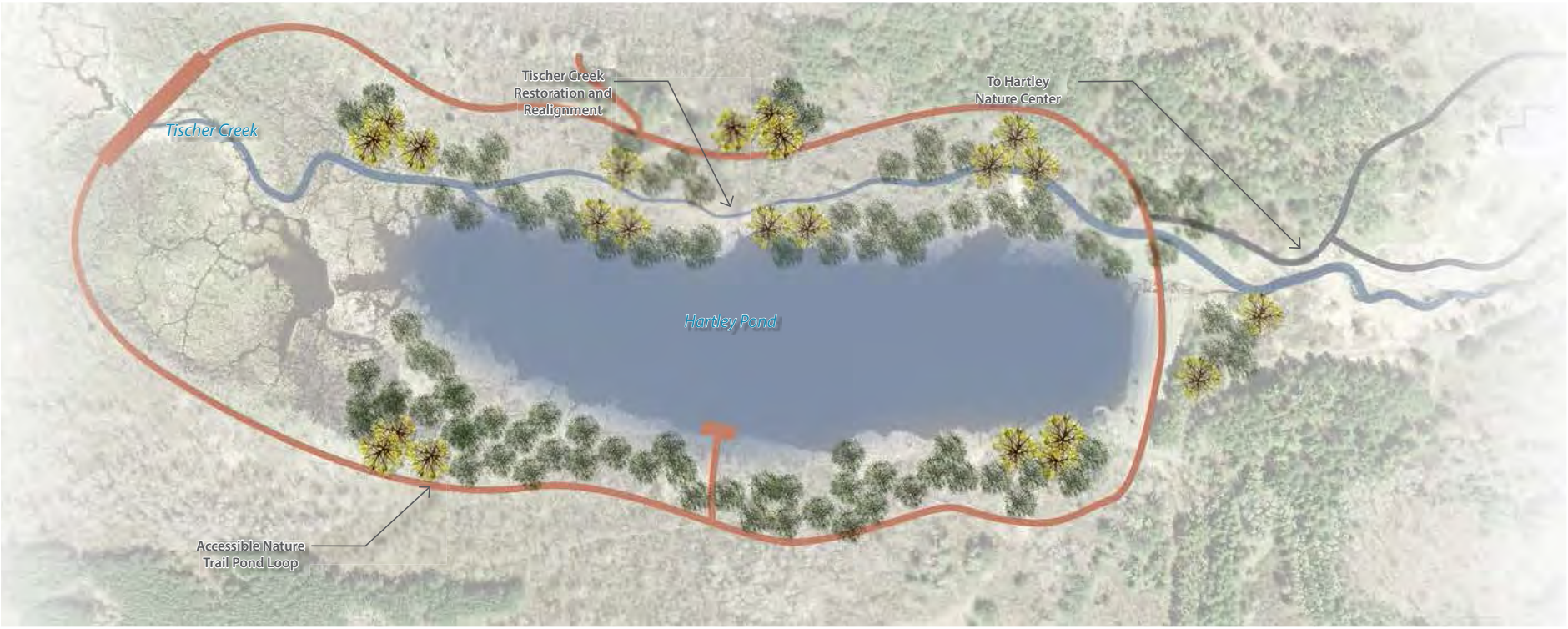
Water Resource Recommendations

The primary goal of the water resource recommendations is to restore nearly a mile of Tischer Creek coldwater trout habitat above and below the current dam in a manner that preserves and increases the historical, recreational, ecological, educational and aesthetic value of the current Hartley Pond.

Tischer Creek/Hartley Pond Restoration

- Commission study to assess feasibility of restoring Tischer Creek.
- Examine feasibility of restoring natural creek condition above and below dam by separating and realigning stream bed around Hartley Pond.
- Examine the feasibility of preserving and improving Hartley Pond by digging a new, smaller and deeper pond and ensuring satisfactory water volume and quality by allowing for creek overflow into the Pond during peak flow events and introducing measures to ensure sufficient aeration.
- Improve aesthetics of dam water crossing by replacing chain link fence with a reduced height, decorative railing.
- Improve shoreline access and increase native landscaping and habitat restoration around perimeter of pond and along creek edge.

DRAFT 06/27/2014



Potential separation and restoration of Tischer Creek from Hartley Pond with proposed Crushed Stone Accessible Trail Pond Loop

0 100 200 feet

DRAFT 06/27/2014

Beaver pond

Wet Meadow and Beaver Ponds

- Monitor existing beaver dams to ensure trail circulation can be maintained around perimeter of wet meadow.
- Consider installing elevated structured boardwalk across wet meadow to eliminate trail flooding by snow melt, rains and beaver activity.
- Allow for beaver population as an integral part of Nature Center experience.

DRAFT 06/27/2014

Natural Resource Education and Programming Opportunities

In addition to existing Nature Center programming, the following natural resource based activities could be developed to support additional education for children and adults:

- Maple syrup harvesting.
- Create wildlife enhancement areas, such as brush piles, for observing wildlife habitat.
- Demonstrate old growth and new growth forest types.
- Establish bird/wildlife blinds for viewing wildlife.
- Install interpretive signs to educate the general public and to identify features or projects such as invasive species removal or restoration aims.
- Identify materials in the forest for making "goods from the woods" products.
- Identify edible plants and their uses.
- Develop programs to educate the general public about the Park's restoration aims and activities.
- Identify medicinal plants and their uses.
- Create a soil pit to observe plant root growth and soil layers.

Natural resource education and programming examples

DRAFT 06/27/2014

This page left blank intentionally

DRAFT 06/27/2014

Trail Recommendations

1. Introduction
2. Accessibility
3. Ski Trails
4. Superior Hiking Trail
5. Natural Surface Multi-Use Trails
6. Core Accessible Trail
7. Crushed Stone Accessible Trail
8. Wayfinding
9. Trail Sections

Examples of trail types and trail users

Introduction

After taking into consideration the needs of trail user groups, the overall ecological restoration goals of the Park, and public input, several themes emerged to guide trail recommendations. These include:

» Provide a high quality experience for multiple user groups

» Create better connections to the surrounding neighborhoods

» Improve trail sustainability through the use of advanced trail building techniques

» Provide accessible trails

» Create a comprehensive wayfinding system throughout the Park

» Develop a comprehensive trail plan for the Park, collaborating with all trail user groups

» Conduct all future trail design in close partnership with Hartley Nature Center and the City of Duluth

» Maintain the natural character of the Park

Accessibility

While Hartley Park has a robust existing trail system, most trails are difficult or impossible to access for those in wheelchairs, with strollers, or otherwise needing wide, hard surface trails. While there is desire to keep the Park's wild, natural aesthetics in place, it is important to create an accessible experience for all Park users. With sensitivity to material selection and trail design, effects to the Park's natural quality can be mitigated, while still providing an improved experience for all users. Recommendations to increase accessibility include:

» Improving trail access and surfacing to encourage a broader spectrum of Park users

DRAFT 06/27/2014

Examples of trail types and trail users

- Use materials that balance place-appropriate aesthetics, environmental sustainability, accessibility, durability, capital costs, fundability and maintenance
- Provide accessible trails to serve the needs of seniors, wheelchair or walker users, bikers, joggers and families with strollers

Recommendations have been made for each trail system as follows.

Ski Trails

There are approximately five kilometers of existing ski trails on the eastern side of Hartley Park. They are typically 10-14 feet wide and are groomed for classic skiing. Recommendations are for the City of Duluth and Hartley Nature Center to work in partnership with the Duluth Cross-Country Ski Club to implement:

- Modest alignment changes to improve flow and sustainability
- The addition of a 1.5 km beginner ski trail loop and practice area extending from Hartley Nature Center north into the adjacent School District property.
- Reduction of visual overlap

Superior Hiking Trail

Two miles of the 296-mile Superior Hiking Trail pass through the Park as it winds its way to the Canadian border. Recommendations are for the City of Duluth and the Superior Hiking Trail Association, in partnership with Hartley Nature Center, to work to:

- Examine potential for modest improvements to flow, access, and sustainability
- Improve access to overlooks
- Study the trail's potential realignment through the Woodland Recreation Area

Natural Surface Multi-Use Trails

There are approximately 4.4 miles of existing natural surface multi-use trails in Hartley Park concentrated in the western portion of the Park and around Hartley Nature Center. Primary user groups include mountain bikers, trail runners, hikers, walkers and Nature Center program participants. The trails were originally user-defined trails that developed over the course of decades. More recently, Hartley Nature Center and the

DRAFT 06/27/2014

Cyclists of Gitchee Gumee Shores (COGGS), a local cycling club, have been making trail upgrades for sustainability and user enjoyment. Recommendations are for the City of Duluth to work in partnership with COGGS and Hartley Nature Center to:

» Investigate potential for reducing conflicts and collisions by improving sightlines and/or creating one-way trail segments

» Improve multi-use access from eastern neighborhoods to the multi-use system by improving routing and/or surfacing of existing Fairmont Road connector to the Old Hartley Road and improving signage and surfacing of connector trail from the end of West Lewis Street to Hartley Place

» Ensure that future trail changes and improvements be designed to best accommodate the broad spectrum of trail users.

» Correct trail out-slopes that are excessively steep

» Complete restoration of closed trail sections

» Install wayfinding on all trails

» Implement two-option route for the Duluth Traverse with the Old Hartley Road providing a beginner level trail from Arrowhead Road to Woodland Avenue and a western option utilizing existing trail from Arrowhead Road through the Root Canal to the Pines and a short segment of new purpose-built trail running from the Pines east along the northern slope of Rock Knob across Old Hartley Road to the Hartley Nature Center parking lot. This route will be confirmed on the ground by the City of Duluth, COGGS, and Hartley Nature Center.

» Study the Duluth Traverse's potential entry through the Woodland Recreation Area

Core Accessible Trail

The Core Accessible Trail will be a ten-foot wide path winding its way along the Old Hartley Road corridor connecting Hartley Nature Center to the Hartley Road trailhead. Primary trail users will include seniors, people with mobility challenges, Nature Center program

DRAFT 06/27/2014

participants, youth bikers, walkers, hikers, joggers and families with young children and strollers. The Core Trail will encourage a broader spectrum of use in the Park by improving trail access and surfacing. Alignment will be adjusted from that of a straight road to a meandering trail with spur connections to overlooks and educational waypoints. For the purposes of determining trail surface, the Core Accessible Trail may be broken into three segments:

- First, the Hartley Nature Center/Hartley Pond loop, including the northern quarter of the Old Hartley Road, will be surfaced with durable, permeable pavers that will prevent storm run-off to Tischer Creek, provide a fully accessible (smooth, hard, stable, and firm) surface, and fit unobtrusively into the natural environment of the Park.
- Second, the quarter of the Old Hartley Road that traverses intermittently flooded wetland will consist of boardwalk on pilings to allow free flow of water and wildlife.
- Third, the remainder of the Old Hartley Road will be surfaced with permeable pavers if an affordable paver product can be found that meets high standards of environmental sustainability, durability and accessibility and fits unobtrusively in the Park. If an affordable product that meets those standards cannot be found, the remaining half of the Old Hartley Road will be surfaced with a crushed aggregate selected to fit unobtrusively in the natural environment of Hartley. The Old Hartley Road will be ten feet wide with no margin after grow-in. The section of the Hartley Pond/Hartley Nature Center loop not on the Old Hartley Road will be six feet wide.

Crushed Stone Accessible Trail

The Crushed Stone Accessible Trail is comprised of several loops that can primarily be accessed from the Core Trail. It will be six feet wide and surfaced with a crushed aggregate. Primary user groups will include hikers, school groups, seniors, people with mobility challenges, youth bikers, joggers, Nature Center program participants and families with strollers. Loops will eventually link Hartley Nature Center, Hartley Pond, Rock Knob and the Woodland Recreation Area with the Core Trail and with adjoining neighborhoods. The trail through the Woodland Recreation Area will be routed in a manner that precludes any removal of, or damage to, the area's white pines which have been shown to be unusually resistant to blister rust and thus represent an important tool in the regional effort to conserve white pines.

DRAFT 06/27/2014

Wayfinding signage examples

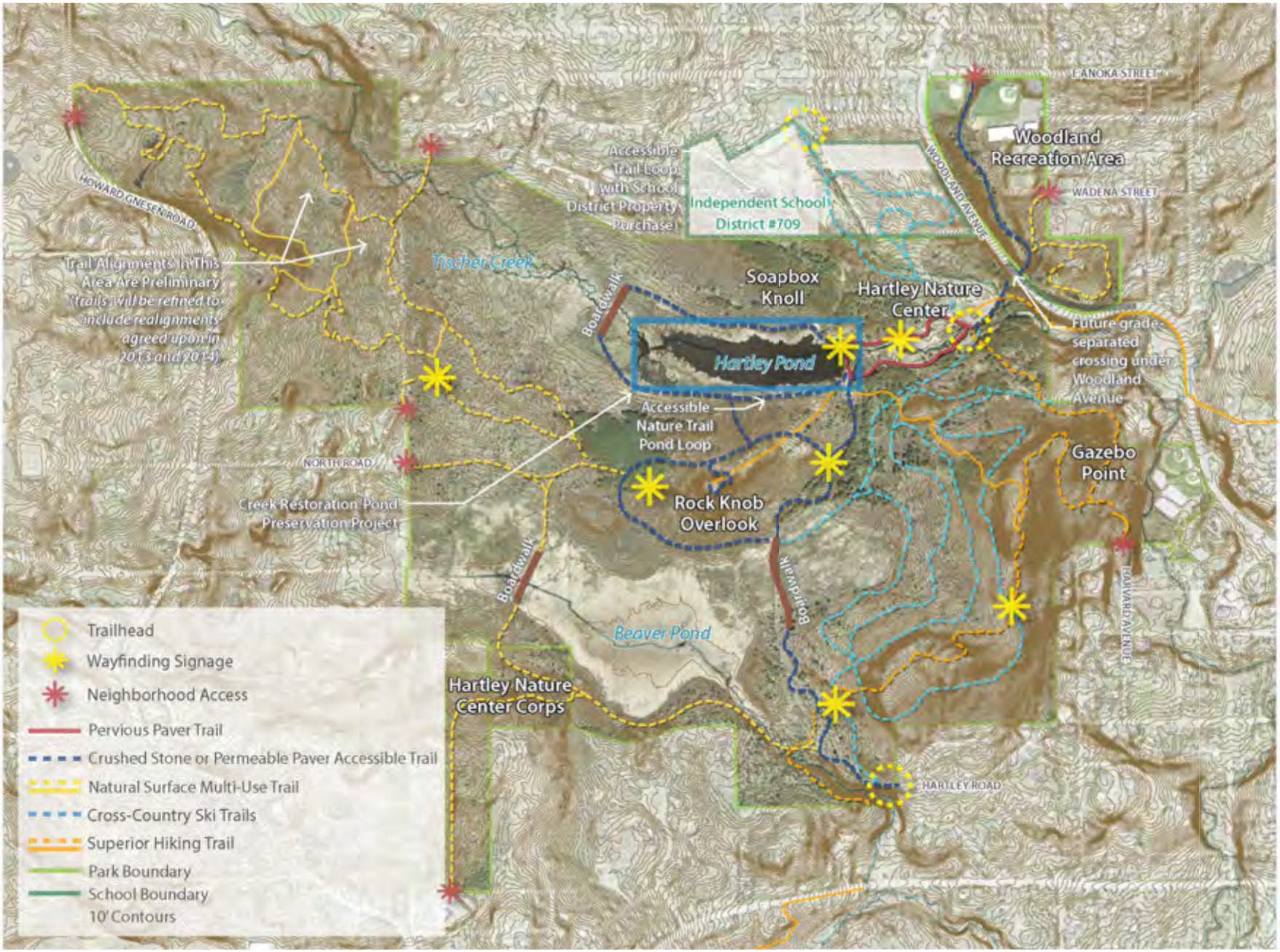
Wayfinding

Due to the size of Hartley Park and the complexity of its trail system, trail users often get lost in the Park. Too many trail intersections makes the trail system confusing and there is a need for wayfinding.

Wayfinding recommendations include:

- Implement wayfinding signage and 'you are here' map locations at all trail intersections
- Identify trail distances on wayfinding signage for the Duluth Traverse and Ski maps
- Designate names for loop trail segments to easily identify trail layout
- Include degree of difficulty of each trail segment
- Clearly identify each trail segment's intended user group
- Provide accurate kiosk maps at all entrances to the trail system
- Identify key 'Points of Interest'

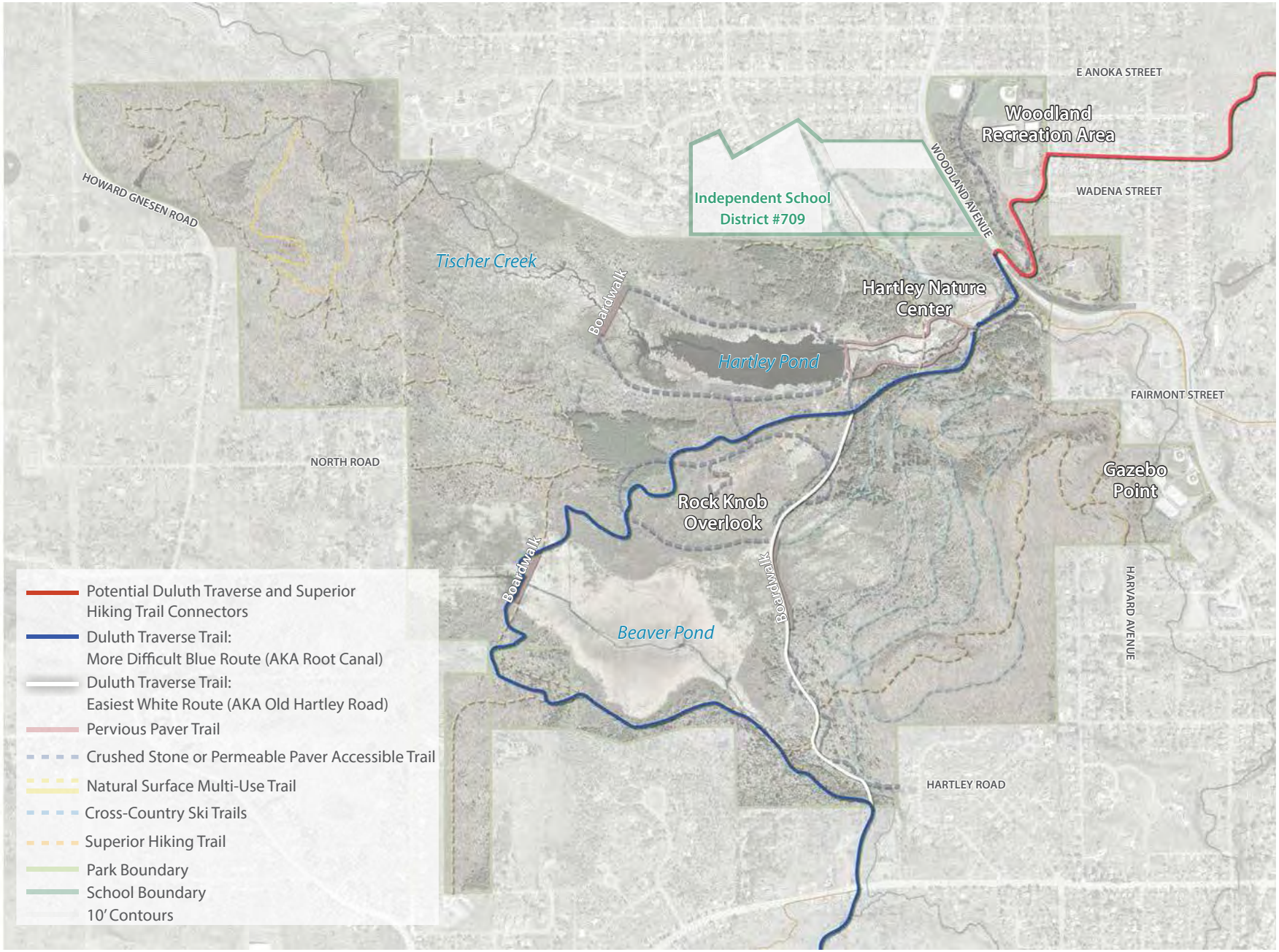
DRAFT 06/27/2014



Proposed trail recommendations

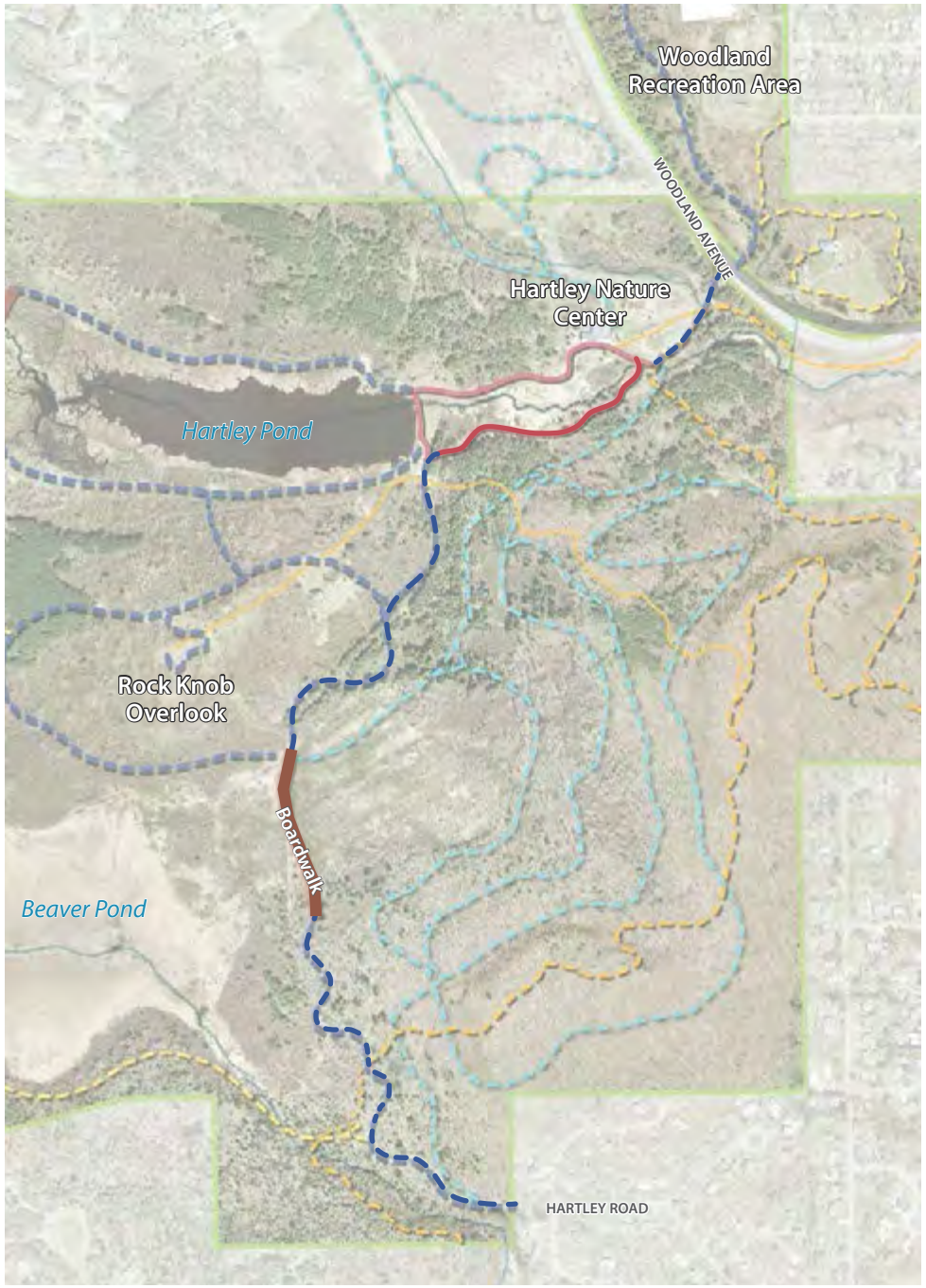
For Duluth Traverse Trail alignments see page 44.

DRAFT 06/27/2014



Proposed Traverse Trail

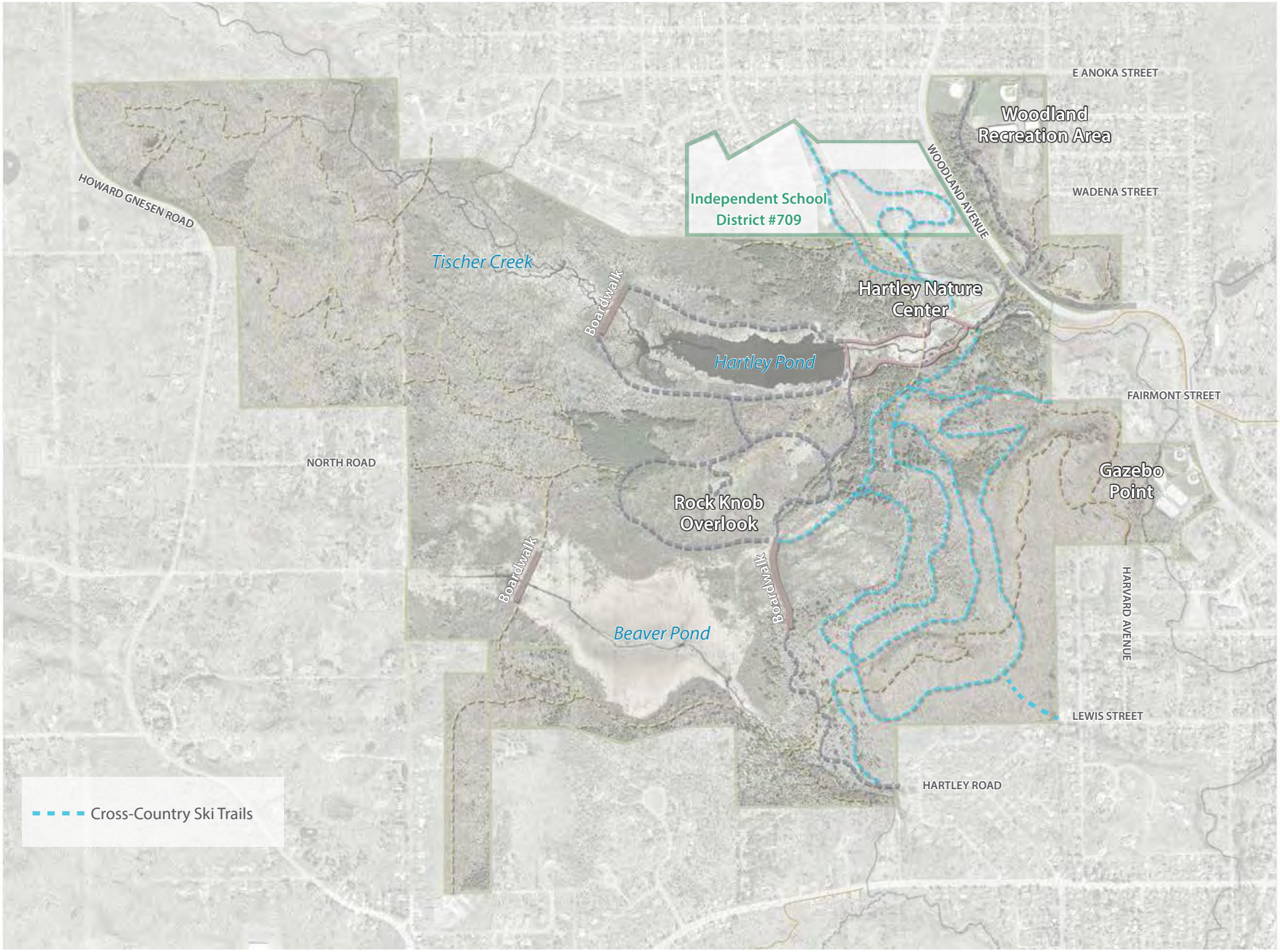
DRAFT 06/27/2014



Pervious Paver Trail (Old Hartley Road)
Crushed Stone or Permeable Paver Accessible Trail
Pervious Paver Trail
Natural Surface Multi-Use Trail
Cross-Country Ski Trails
Superior Hiking Trail
Park Boundary
School Boundary
10' Contours

Old Hartley Road Surface Considerations

DRAFT 06/27/2014



Proposed Ski Trails

DRAFT 06/27/2014

Natural Surface Multi-Use Trails

- 18" wide, 4.4 miles long
- Develop a comprehensive trail plan for the entire Park collaborating with all trail user groups
- Create a one way trail system to minimize conflicts
- Primary user groups include mountain bikers and trail runners

Proposed Natural Surface Multi-Use Trail

DRAFT 06/27/2014

Proposed Core Accessible Trail

Core Accessible Trail

- 10 feet wide, 1.5 miles long
- Surface materials will be chosen that balance place-appropriate aesthetics, environmental sustainability, accessibility, durability, capital costs, fundability and maintenance
- Surface materials could include a specialized crushed stone aggregate, permeable pavers and elevated boardwalks
- Trail will encourage a broader system of use in the Park by improving trail access and surfacing
- Alignment will be adjusted from that of a straight road to a meandering trail with spur connections to overlooks
- Primary trail users include seniors, people with mobility challenges, youth bikers, joggers and families with strollers

DRAFT 06/27/2014

Crushed Stone Accessible Trail

- 6 feet wide, 1.9 miles long
- Surface materials will be a crushed stone aggregate
- Several loops will link Hartley Nature Center, Hartley Pond, Woodland Recreation Area and potential future development of the School District property with the core trail and with adjoining neighborhoods
- Primary user groups include hikers, school groups, seniors, people with mobility challenges, youth bikers, joggers and families with strollers

Proposed Crushed Stone Accessible Trail

DRAFT 06/27/2014

Parking Recommendations

1. Hartley Road/North Road
2. Fairmont Street

Fairmont Street entrance to Hartley Park has several issues that need to be addressed

Trailhead parking is provided by one, often overfull, parking lot at Hartley Nature Center and on-street parking at neighborhood trailheads. Three neighborhood trailheads – at Hartley Road, Fairmont Street, and North Road – require improvement. All three require improved wayfinding and interpretive signage.

Hartley Road/North Road Recommendations

» At Hartley Road and North Road trailheads, the street is narrow, there is no curb and gutter, and there is no turn-around. As a result, on-street parkers face hazards from passing cars as they get in and out of vehicles, have difficulty turning around and sometimes go off the road bed. At Hartley Road and North Road, recommendations for improved parking include:

» Widen the road within the existing public right-of-way to enable more space for safe on-street parking.

» Add curb and gutter to prevent driving and parking off the road bed.

» Add a no-parking turnaround.

Fairmont Street

Fairmont Street is presently underutilized because of severe erosion, severe deterioration of the road bed, and illegal dumping. Recommendations to improve Fairmont Street parking include:

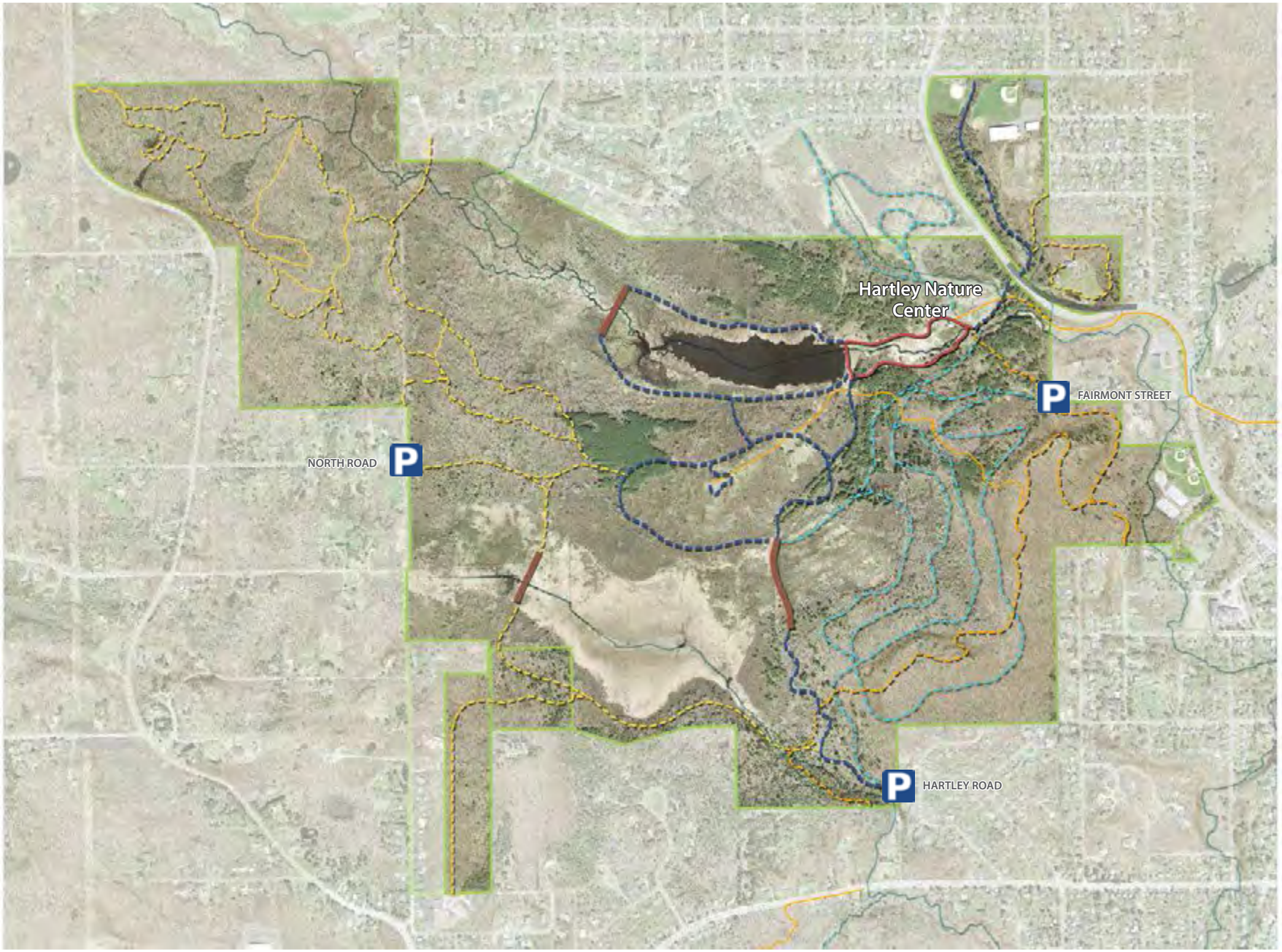
» Widen the road within the existing public right-of-way to enable more space for safe on-street parking.

» Add curb and gutter.

» Add a no-parking turnaround.

» Add rain gardens to direct run-off into the ground rather than into eroded channels and the sewer.

DRAFT 06/27/2014



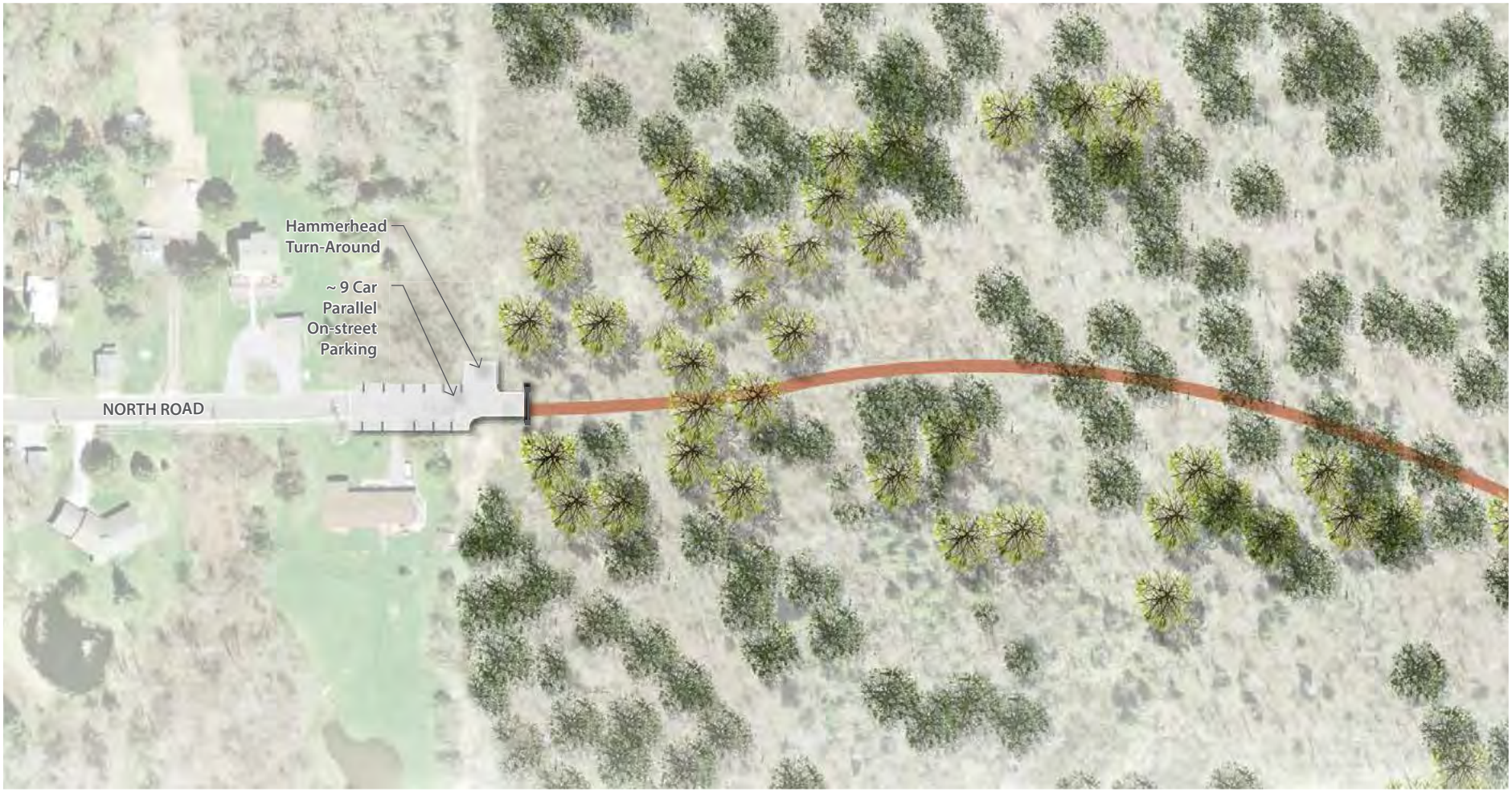
Proposed parking areas

DRAFT 06/27/2014

Old Hartley Road Parking

Proposed Old Hartley Road Parking

DRAFT 06/27/2014



Proposed North Road Parking

DRAFT 06/27/2014

Fairmont Street Parking

Proposed Fairmont Street Parking

0 50 100 feet

DRAFT 06/27/2014

Cyclists of Gitchee Gumee Shores (COGGS), a local cycling club, have been making trail upgrades for sustainability and user enjoyment. Recommendations are for the City of Duluth to work in partnership with COGGS and Hartley Nature Center to:

» Investigate potential for reducing conflicts and collisions by improving sightlines and/or creating one-way trail segments

» Improve multi-use access from eastern neighborhoods to the multi-use system by improving routing and/or surfacing of existing Fairmont Road connector to the Old Hartley Road and improving signage and surfacing of connector trail from the end of West Lewis Street to Hartley Place

» Ensure that future trail changes and improvements be designed to best accommodate the broad spectrum of trail users.

» Correct trail out-slopes that are excessively steep

» Complete restoration of closed trail sections

» Install wayfinding on all trails

» Implement two-option route for the Duluth Traverse with the Old Hartley Road providing a beginner level trail from Arrowhead Road to Woodland Avenue and a western option utilizing existing trail from Arrowhead Road through the Root Canal to the Pines and a short segment of new purpose-built trail running from the Pines east along the northern slope of Rock Knob across Old Hartley Road to the Hartley Nature Center parking lot. This route will be confirmed on the ground by the City of Duluth, COGGS, and Hartley Nature Center.

» Study the Duluth Traverse's potential entry through the Woodland Recreation Area

Core Accessible Trail

The Core Accessible Trail will be a ten-foot wide path winding its way along the Old Hartley Road corridor connecting Hartley Nature Center to the Hartley Road trailhead. Primary trail users will include seniors, people with mobility challenges, Nature Center program

DRAFT 06/27/2014

Sustainable Trail Design Principles

1. Introduction
2. Core Principles of Sustainable Trail Design

Existing Gravel Trail

Exposed Tree Roots

Eroded Bedrock

Eroded Trail

Steep Trail Embankment

Wet Low Line Area

Flooded Trail

Eroded Trail

Existing trail conditions

Introduction

Trail conditions within Hartley Park vary in surface quality and their ability to withstand the effects of large storm water events, which cause flooding and erosion issues on many segments of the trail system. Some other trail quality and accessibility issues include exposed tree roots, unmanageable steep slopes, trails aligned through perpetually wet areas and degraded wood plank trail surfacing. Sustainable trail design aims to correct these problems to improve the longevity and accessibility of trails.

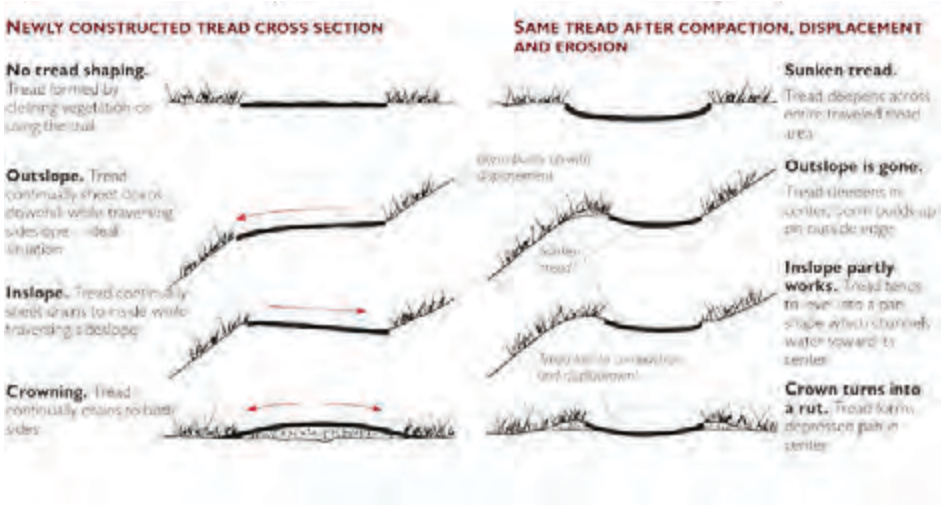
Core Principles of Sustainable Trail Design

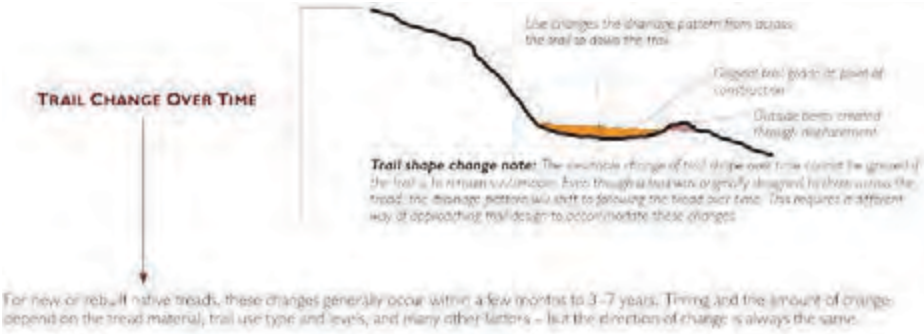
There are several core principles that drive sustainable trail design. These include:

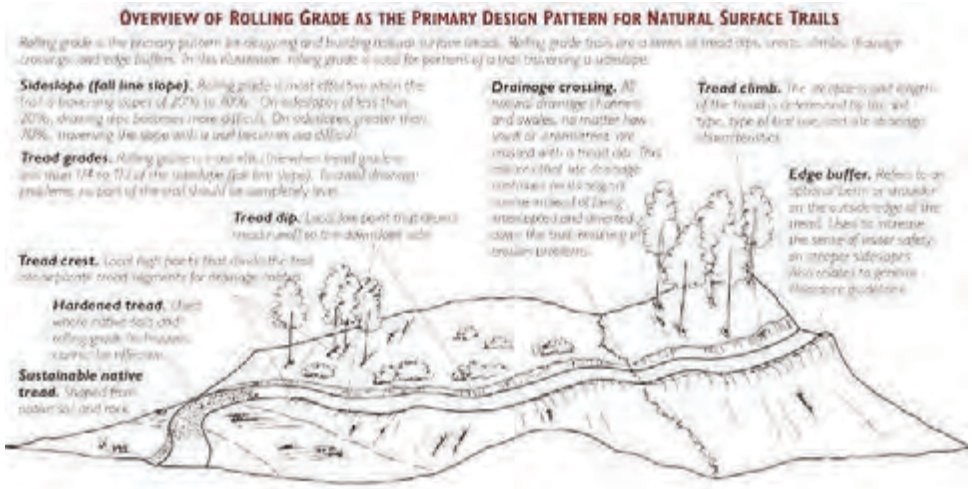
- Respect the setting and minimize ecological effects of trails.
- Respect the "Half Rule:" the grade of a trail should not exceed half the grade of the side slope it is traversing.
- Use the "Ten Percent Rule:" the overall average grade for a trail should be a 10% grade or less.
- Adhere to the maximum grade standards that state no trail grade should be greater than 15-20%.
- Utilize grade reversals to allow for water to leave the trail at low points of reversal.
- Focus on trail flow and create a sequence of events
- Maintain outslopes of trails, especially in loose soils.
- Utilize trail anchors and gateways to corral users to control speed and reduce user conflicts.

The graphics on the following page illustrate these principles.

DRAFT 06/27/2014







Trail design diagrams

DRAFT 06/27/2014

Park Amenities

1. Introduction
2. Hartley Nature Center
3. Nature-Based Preschool
4. Nature Center Site Recommendations
5. Preschool Site Recommendations
6. Woodland Recreation Area

Nature Center Building

Yurts

Amphitheater

Native Plants and Rain Gardens

Park amenities

Introduction

Hartley Park is rich with natural resources, and its trail system provides unique ways to experience nature within an urban area. In addition, there are several distinct areas within the Park that provide specific recreational, educational and access opportunities for users. These include the Hartley Nature Center, the Nature-Based Preschool and the Woodland Recreation Area.

Hartley Nature Center

The Hartley Nature Center is a non-profit organization dedicated to environmental education with a focus on school-aged children. It is housed within a state-of-the-art 'green' building that provides public restrooms, a library, classroom space and an exhibit hall. Additionally, the Nature Center has a 30' diameter yurt and an amphitheater within its deer exclosure fence. Hartley, in partnership with the City, is also implementing a nature play area within the exclosure fence. The play area will serve as the playground for the preschool, and will also be available most times to the general public. The Nature Center also disperses general Park information to the public and runs programs for adults and families.

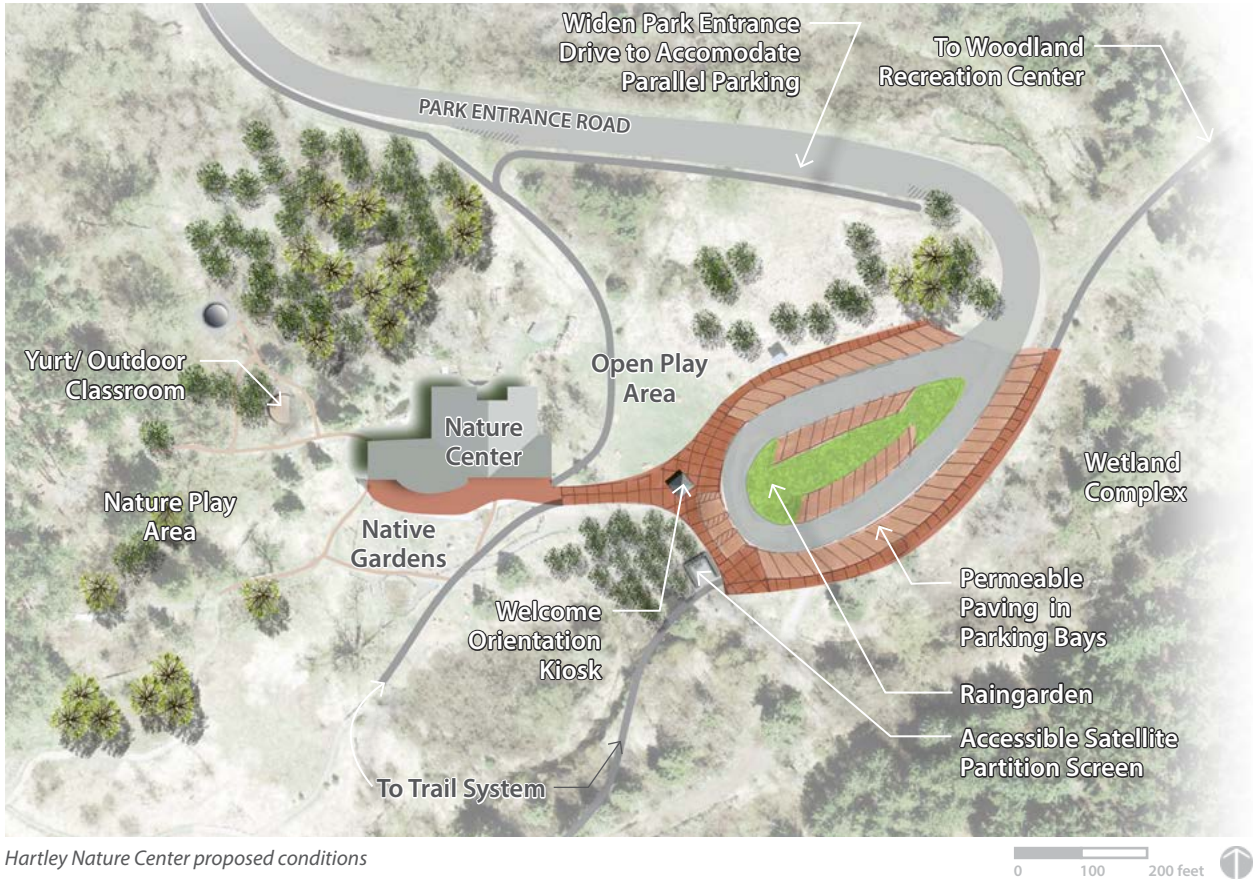
Recommendations include permeable pavers in the expanded main parking lot and rain gardens to slow the flow of surface runoff and increase infiltration. Wayfinding and trail connections, including connections to the preschool, are important to increase ease and clarity of access.

In addition to serving as the main trailhead to the Park, the Nature Center parking lot also accommodates HNC's many program participants. The existing parking lot cannot accommodate current Park and HNC program users. Projected program growth at HNC, as well as increased Park use require expansion and improvement of the Nature Center parking lot.

Nature-Based Preschool

The Nature-Based Preschool is in its fledging year, and will be run by the Hartley Nature Center. Its mission is to inspire lifelong connections with nature through education, play and exploration, and serves young children ages 3-5. The preschool will be housed within the Nature Center building temporarily until a permanent location can be determined.

DRAFT 06/27/2014



Hartley Nature Center proposed conditions

Nature Center Site Recommendations

- Yurt for outdoor classroom space
- Nature play area
- Permeable pavers in parking lot to infiltrate stormwater runoff
- Rain gardens to collect stormwater runoff and reuse to irrigate plant material
- Wayfinding kiosk
- Accessible satellite toilet
- Paved walk connections to accessible picnic tables

DRAFT 06/27/2014

Preschool Site Recommendations

Three locations are under consideration for a potential dedicated Nature-Based Preschool building: the School District property, a site east of Woodland Avenue, or a site adjacent to the Nature Center that could take advantage of the proximity of existing programmatic elements. Other site recommendations include:

- Indoor community meeting space
- Outdoor gathering/play area with native plantings
- Strong physical connection to Nature Center
- Ability to easily access Park trails
- Parking (10-20 spaces)

Nature Hikes

Native Plant Education

Yurt Classroom

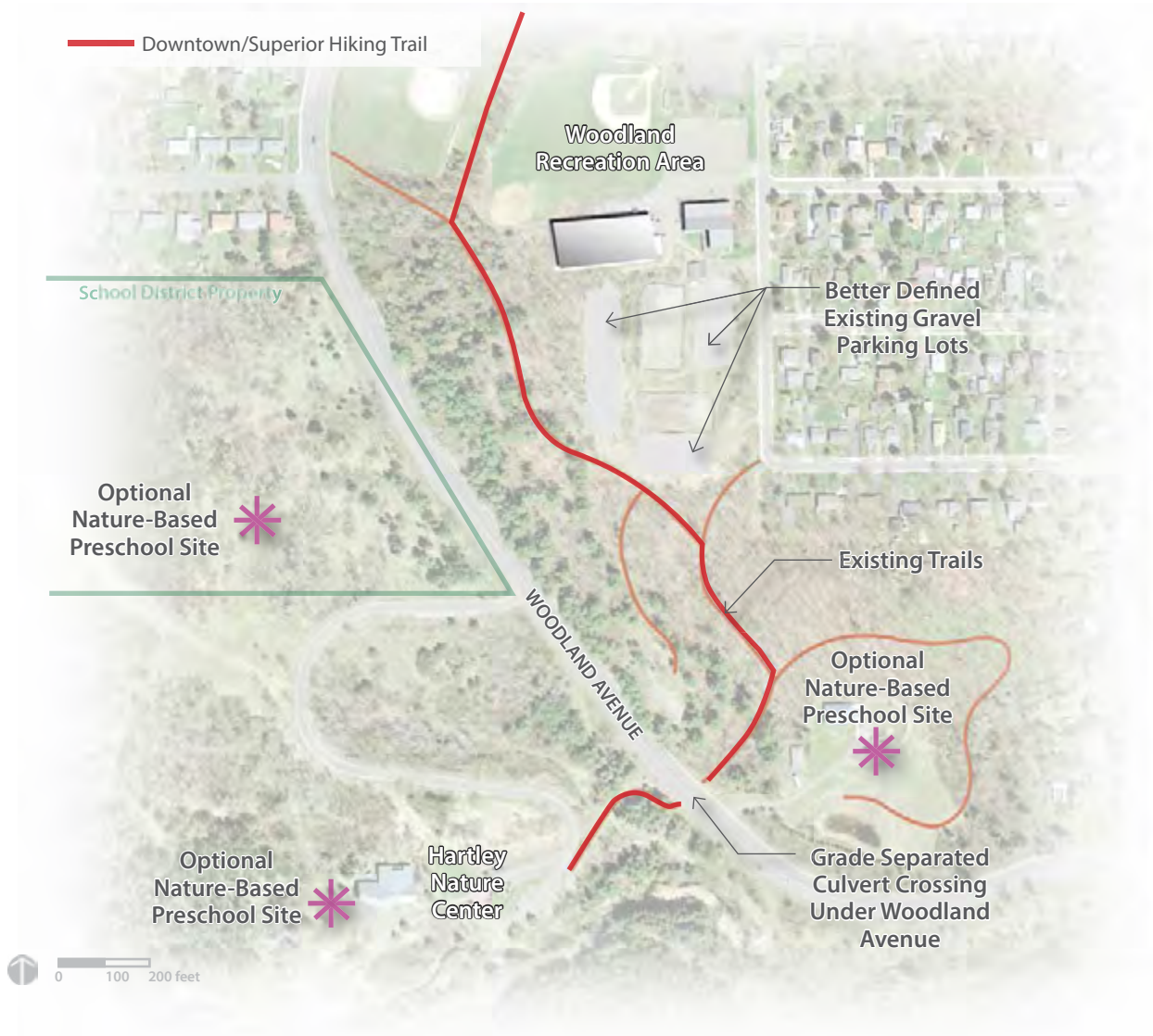
Natural Science Education

Nature Play

Natural Science Education

Potential Nature-Based Preschool and Nature Center programmatic elements

DRAFT 06/27/2014



Hartley Nature-Based Preschool optional sites and the Woodland Recreation Center below-grade connection

Woodland Recreation Area

The Woodland Recreation Area occupies the northeast portion of Hartley Park and is separated from the larger Park by Woodland Avenue. It is referred to interchangeably as Woodland Recreation Area and Hartley Field, and includes recreational fields and skating rinks. Recommendations for the Woodland Recreation Area include:

- Create better connections to Hartley Park south of Woodland Avenue
- Consider installing a grade separated trail crossing connection beneath Woodland Avenue
- Better define existing gravel parking areas to maximize parking efficiencies around outdoor rink areas

DRAFT 06/27/2014

Partnerships

Mountain biker in Hartley Park

The Hartley Nature Center, Cyclists of Gitchee Gumee Shores (COGGS), the Superior Hiking Trail Association (SHTA), the Duluth Cross Country Ski Club (DXC), the W.J. McCabe Chapter of the Izaak Walton League, and the general public are the major stakeholders involved in the improvement and stewardship of Hartley Park. As funding sources are secured and efforts move forward for implementation of these master plan recommendations, additional outreach with all stakeholders will be undertaken to determine implementation of the final details.

DRAFT 06/27/2014

Phasing

Hartley Nature Center

A phasing plan prioritizes park and trail development to allow for appropriate fund allocation and park planning.

Phase One improvements propose the following:

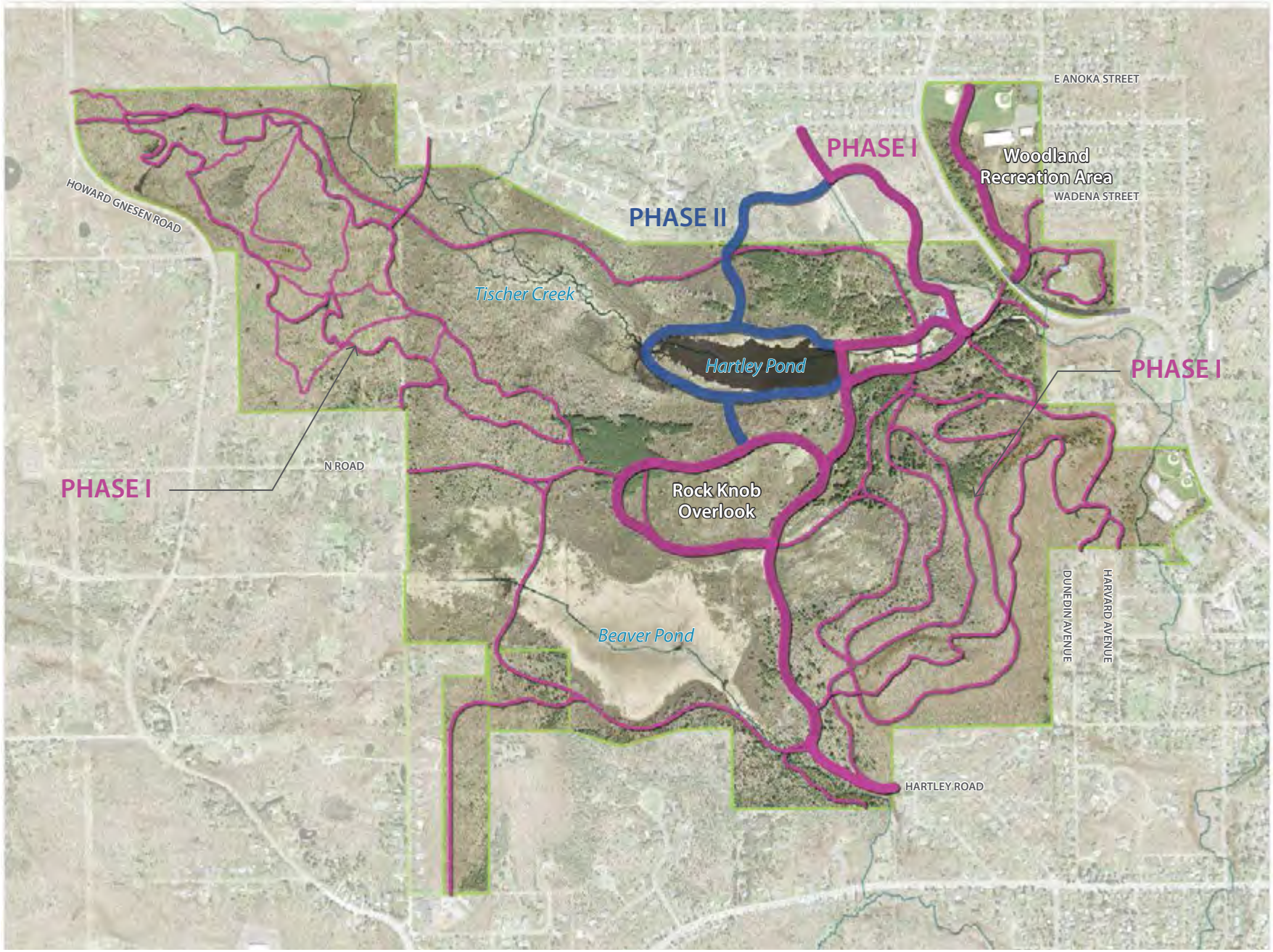
- Evaluation of Old Hartley Road, the root cellar, well and other structures for historical significance.
- Improvements to Old Hartley Road Trail and development of the Core Accessible Trail
- Creation of Crushed Stone Accessible Trail around Rock Knob
- Improvements to existing Natural Surface Multi-Use Trail, Ski Trails and Superior Hiking Trail
- Implementation of a wayfinding signage system
- Installation of a boardwalk across the wet meadow to avoid trail flooding
- Management of Red/Norway Pine Stand
- Removal of Buckthorn and other invasive plants
- Completion of feasibility study for restoration of Tischer Creek and preservation of Hartley Pond

Phase Two improvements propose the following:

- If indicated by feasibility study, restoration of Tischer Creek and preservation of Hartley Pond
- Creation of Crushed Stone Accessible Trail around Hartley Pond
- Installation of improved trailhead parking and wayfinding at Hartley Road, Fairmont Street, and North Road.
- Expansion and upgrade of the Nature Center parking area
- Management of the Aspen mix, Northern and Lowland hardwood forests

Other improvements such as construction of the Nature-Based Preschool facility and a grade separated crossing under Woodland Avenue will be taken into consideration as plans move forward for Hartley Park.

DRAFT 06/27/2014



Phasing plan for trail improvements

DRAFT 06/27/2014

	PHASE I Improvements	PHASE II Improvements
Trail Improvements	» Grading, alignment and surface improvements to Old Hartley Road Trail and development of the core accessible trail » Grading and alignment improvements to existing natural surface multi-use trail, ski trails and Superior Hiking Trail » Wayfinding signage system » Install boardwalk across beaver pond to avoid trail flooding	» Creation of Crushed Stone Accessible Trail » Install trailhead at south end of Hartley Road » Install observatory » Expand and upgrade Nature Center parking area
Natural Resource Improvements	» Red/Norway Pine Stand thinning » Buckthorn and invasive plant removal	» Thinning of Aspen mix, Northern and Lowland hardwoods » Tischer Creek channel separation from Hartley Pond (coordinated effort with DNR)

Matrix for trail and natural resource improvement phasing

DRAFT 06/27/2014

Appendix

PUBLIC COMMENTS TO BE PROVIDED AS SEPARATE APPENDIX

DRAFT 06/27/2014

DRAFT 06/27/2014