Restoration and Management Plan

Introduction

This restoration and management plan will guide future restoration and management work at Bend in the River Regional Park, and includes management unit maps, description of work tasks that will occur in each unit, and a phased schedule of tasks for each unit. The management unit boundaries proposed in this plan are aligned with future roads, trails, and cropland, as illustrated in the Bend in the River Regional Park Master Plan. The management unit restoration cover types were designed based on existing vegetation conditions and habitats, as well as anticipated future conditions and habitats. The units are numbered in the order of priority for carrying out the restoration and management work.

An important goal of this project is to utilize the pine and spruce in the park by engaging a contractor to selectively remove the trees valuable for timber from the plantations and windbreaks. In return it is envisaged that the contractor will also clear the undesirable native and non-native woody species from the park. A complete clearing is not envisioned. Rather, oaks and other native trees and shrubs that have colonized the windbreaks will be left, as well as Jack pine. Other trees may be left as needed for screening, especially along the north and east edge of the park.

Management Units and Task Schedules

Ecological restoration and management is generally comprised of two stages:

> ***Remedial Restoration Stage***: The remedial stage is the period when major efforts are undertaken to restore vegetation and biological diversity and begin the process of restoring ecological functions. The period of time required to conduct the remedial stage depends on the condition of the ecological system, the level of effort needed, and the opportunities and constraints present. Typically a remedial stage of three years for a given area is required, followed by the perpetual management stage for that area.
>
> ***Perpetual Management Stage***: After achieving initial restoration goals, the restoration process shifts to a reduced-intervention, long-term management stage. The perpetual management stage is critical for maintaining the value of the investment, perpetuating healthy plant communities, and maximizing the ecological and aesthetic benefits of the native plant communities.

To carry out the remedial restoration and perpetual management stages at Bend in the River Regional Park, work tasks are listed and scheduled over a multi-year period for each of the five management units that have been developed for the Park. Restoration and management at the Park is scheduled to occur in three phases. The work in each management unit may span one or more phases. Once work begins in a management unit, it is critical that all tasks be completed in sequence or the restoration targets for that unit may not be achieved.

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Management Unit 1

General Description:

This unit contains significant natural resources and is the highest priority for restoration. The main target community for this unit is river slope and bottomland forest. Existing land cover types for Management Unit 1 are:

- Bur oak woodland/savanna
- Silver maple floodplain forest
- Roadside prairie
- Developed roadway and lawn (to be removed)

Task Prioritization

1. Removal of Woody Species: Brushing & Thinning

- Remove invasive non-native woody vegetation from the unit including European buckthorn, Siberian elm, black locust and Tartarian honeysuckle.
- Selectively thin aggressive native woody species which have colonized from the bottomland forest including box-elder, green ash, hackberry, American elm and prickly ash.
- Selectively thin any valuable timber species present (Scotch pine, white pine, white spruce, etc.).
- Eventually remove all Scotch pine and white spruce.

2. Manage Undesirable Species: Weed Control

- Control invasive non-native herbaceous vegetation with appropriate herbicides, prescribed burning and/or mowing. It should be noted that areas dominated by reed canary grass in the floodplain forest will require multiple treatments.

Table 1. Remedial (Short-Term) Management Activities

Task Prioritization			Phase 1			Phase 2	
			Year 1	*Year 2*	*Year 3*	*Year 1*	*Year 2*
1	**Brushing & Thinning**	Cut and stump treat all non-native woody vegetation (buckthorn, Siberian elm, black locust & Tartarian honeysuckle, etc.); Selectively thin aggressive native woody species (box-elder, prickly ash, elm, hackberry, etc.) and timber species	1 2 3 **[4]**				
		Herbicide resprouts and new germination of undesirable woody vegetation from above task.		1 2 **[3]**[**4]**			
2	**Weed Control**	Assess conditions to determine need for control of undesirable groundlayer species; herbicide undesirable vegetation if needed		1**[2] [3]** 4			
		Assess conditions to determine feasibility of conducting fall burn (recommended for oak communities).			1**[2] [3]** 4		
		If feasible from above task, apply for permits, contact local authorities, prepare burn plan, and conduct fall burn			1**[2] [3]** 4		
3	**Annual Inspection & Report**	Assess unit and prepare report of specifics recommendations for restoration & management.	1 2 3 **[4]**	1 2 3 **[4]**	1 2 3 **[4]**		
4	**Site Maintenance**	Complete follow-up weed control, seeding, planting, and erosion control as determined in 3.			*		
5	**Perpetual Management**	Conduct perpetual management tasks (see table 2 below)				*	*

[Bracket] indicates recommended quarter for work to be conducted.

Table 2. Perpetual (Long-Term) Management Activities, Unit 1 – *Begin Phase 2, Year 1*

Plant Community	Task Frequency in Years			
	Prescribed Burning	**Spot Herbicide Treatment**	**Remedial Seeding & Planting**	**Annual Monitoring**
River Slope and Bottomland Forest	2-3	2-3	3-5	1

Notes: Schedules assume that prescribed burning will be employed as a restoration and management technique. If prescribed burning is not employed as a restoration and management technique, mowing would likely be required.

Management Unit 2

General Description

The target community for Unit 2 is oak savanna. Sub-unit 2a contains significant natural resources in the old field prairie area including many native plants. Existing land cover types for Management Unit 2 are:

- Roadside prairie
- Old field prairie
- Cropland
- Planted windbreaks

Task Prioritization

1. Removal of Woody Species: Brushing & Thinning

- Remove invasive non-native woody vegetation from the unit including European buckthorn, black locust, Siberian elm and Tartarian honeysuckle.
- Selectively thin aggressive native woody species in the windbreaks such as box-elder, hackberry, prickly ash and American elm in order to favor the oaks.
- Selectively thin any valuable timber species from the windbreaks.
- Eventually remove all Scotch pine and white spruce.

2. Manage Undesirable Species: Weed Control

- Control invasive non-native herbaceous vegetation with appropriate herbicides, prescribed burning and/or mowing.

3. Establish Native Vegetation: Seeding & Planting

- Enhance savanna communities using appropriate local ecotype species.
- Seed and/or plant areas with poor native seedbank response using appropriate local ecotype species. It should be noted that response of native vegetation is anticipated to be good in Management Unit 2a; however, the former cropland may not contain sufficient native seedbank to allow for a good response and therefore is more likely to need augmentation with seed or plants. It should also be noted that Management Unit 2 contains valuable opportunities for native seed collection within the old field prairie and roadside prairie areas.

Table 1. Remedial (Short-Term) Management Activities

			Phase 1		Phase 2		
Task prioritization			*Year 2*	*Year 3*	*Year 1*	*Year 2*	*Year 3*
1	**Brushing & Thinning**	Cut and stump treat all non-native woody vegetation (buckthorn, Siberian elm, black locust & Tartarian honeysuckle, etc.); Selectively thin aggressive native woody species (box-elder, prickly ash, elm, hackberry, etc.) and timber species	1 2 3 **[4]**				
		Herbicide resprouts and new germination of undesirable woody vegetation from above.		1 2 **[3]**[4]			
2	**Weed Control**	Herbicide all non-native herbaceous vegetation including smooth brome grass		1**[2] [3]** 4			
3	**Seeding & Planting**	Assess native vegetation response and determine level of effort needed for seeding/planting			1 **[2]** 3 4		
		Seed savanna groundlayer and plant trees and shrubs			1 **[2]** 3 4		
		Follow-up management for seeding: assess need for remedial seeding & complete as necessary				1 **[2]** 3 4	1 **[2]** 3 4
4	**Annual Inspection & Report**	Assess site and prepare report to provide specifics on activities and recommendations.	1 2 3 **[4]**	1 2 3 **[4]**	1 2 3 **[4]**	1 2 3 **[4]**	
5	**Site Maintenance**	Complete follow-up weed control, seeding, planting, and erosion control as determined in 3.			*	*	
6	**Perpetual Management**	Conduct perpetual management tasks (see table 2)					*

[Bracket] indicates recommended quarter for work to be conducted.

Table 2. Perpetual (Long-Term) Management Activities, Unit 1 – *Begin Phase 2, Year 3*

	Task Frequency in Years			
Plant Community	**Prescribed Burning**	**Spot Herbicide Treatment**	**Remedial Seeding & Planting**	**Annual Monitoring**
Oak Savanna	3-4	1-2	3-5	1

Notes: Schedules assume that prescribed burning will be employed as a restoration and management technique. If prescribed burning is not employed as a restoration and management technique, mowing would likely be required.

Management Unit 3

General Description

The target for this unit is restoration to oak savanna. Unit 3c contains significant natural resources in the old field and roadside prairie areas. Existing land cover types for Management Unit 3 are:

- Roadside prairie
- Old field prairie
- Old field
- Cropland
- Planted windbreak
- Red pine-spruce plantation
- Developed (new road)

Task Prioritization

1. Removal of Woody Species: Brushing & Thinning

- Remove invasive non-native woody vegetation from the unit including European buckthorn, black locust, Siberian elm, and Tartarian honeysuckle.
- Selectively thin aggressive native woody species in the windbreak and plantation areas such as box-elder, hackberry, prickly ash and American elm in order to favor the oaks.
- Selectively thin any valuable timber species from the windbreak and plantation areas.
- Eventually remove all Scotch pine and white spruce.

2. Manage Undesirable Species: Weed Control

- Control invasive non-native herbaceous vegetation with appropriate herbicides, prescribed burning and/or mowing.

3. Establish Native Vegetation: Seeding & Planting

- Enhance savanna communities using appropriate local ecotype species.
- Seed and/or plant areas with poor native seedbank response using appropriate local ecotype species. It should be noted that response of native vegetation is anticipated to be good in Management Unit 3b and 3c; however, the former cropland may not contain sufficient native seedbank to allow for a good response and therefore is more likely to need augmentation with seed or plants. It should also be noted that Management Unit 3 contains valuable opportunities for native seed collection within the old field prairie and roadside prairie areas.

Table 1. Remedial (Short-Term) Management Activities

			Phase 1	Phase 2			Phase 3
Task prioritization			*Year 3*	*Year 1*	*Year 2*	*Year 3*	*Year 1*
1	**Brushing & Thinning**	Cut and stump treat all non-native woody vegetation (buckthorn, Siberian elm, black locust & Tartarian honeysuckle, etc.); Selectively thin aggressive native woody species (box-elder, prickly ash, elm, hackberry, etc.) and timber species	1 2 3 **[4]**				
		Herbicide resprouts and new germination of undesirable woody vegetation from above.		1 2 **[3]** 4			
2	**Weed Control**	Herbicide all non-native herbaceous vegetation including smooth brome grass		1**[2]** **[3]** 4			
3	**Seeding & Planting**	Assess native vegetation response and determine level of effort needed for seeding/ planting			1 **[2]** 3 4		
		Seed savanna groundlayer and plant trees and shrubs			1 **[2]** 3 4		
		Follow-up management for seeding: assess need for remedial seeding & complete as necessary				1 **[2]** 3 4	1 **[2]** 3 4
4	**Annual Inspection & Report**	Assess site and prepare report to provide specifics on activities and recommendations.	1 2 3 **[4]**	1 2 3 **[4]**	1 2 3 **[4]**	1 2 3 **[4]**	
5	**Site Maintenance**	Complete follow-up weed control, seeding, planting, and erosion control as determined in 3.			*	*	
6	**Perpetual Management**	Conduct perpetual management tasks (see table 2)					*

[Bracket] indicates recommended quarter for work to be conducted.

Table 2. Perpetual (Long-Term) Management Activities, Unit 1 – *Begin Phase 3, Year 1*

	Task Frequency in Years			
Plant Community	**Prescribed Burning**	**Spot Herbicide Treatment**	**Remedial Seeding & Planting**	**Annual Monitoring**
Oak Savanna	3-4	1-2	3-5	1

Notes: Schedules assume that prescribed burning will be employed as a restoration and management technique. If prescribed burning is not employed as a restoration and management technique, mowing would likely be required.

Management Unit 4

General Description

The target for this unit is restoration to oak savanna. Existing land cover types for Management Unit 4 are:

- Restored prairie
- Roadside prairie
- Planted windbreak
- Cropland
- Developed roadway and lawn (to be removed)

Task Prioritization

1. Removal of Woody Species: Brushing & Thinning

- Remove invasive non-native woody vegetation from the unit including European buckthorn, black locust, Siberian elm, and Tartarian honeysuckle.
- Selectively thin aggressive native woody species in the windbreaks such as box-elder, hackberry, prickly ash and American elm in order to favor the oaks.
- Selectively thin any valuable timber species from the windbreak.

2. Manage Undesirable Species: Weed Control

- Control invasive non-native herbaceous vegetation with appropriate herbicides, prescribed burning and/or mowing.

3. Establish Native Vegetation: Seeding & Planting

- Enhance savanna communities using appropriate local ecotype species.
- Seed and/or plant areas with poor native seedbank response using appropriate local ecotype species. It should be noted that response of native vegetation is anticipated to be good in the formally restored prairie area; however, the former cropland may not contain sufficient native seedbank to allow for a good response and therefore is more likely to need augmentation with seed or plants. It should also be noted that Management Unit 4 contains valuable opportunities for native seed collection within the formally restored prairie area.

Table 1. Remedial (Short-Term) Management Activities

			Phase 2			Phase 3	
Task prioritization			*Year 1*	*Year 2*	*Year 3*	*Year 1*	*Year 2*
1	**Brushing & Thinning**	Cut and stump treat all non-native woody vegetation (buckthorn, Siberian elm, black locust & Tartarian honeysuckle, etc.); Selectively thin aggressive native woody species (box-elder, prickly ash, elm, hackberry, etc.) and timber species	1 2 3 **[4]**				
		Herbicide resprouts and new germination of undesirable woody vegetation from above.		1 2 **[3]** 4			
2	**Weed Control**	Herbicide all non-native herbaceous vegetation including smooth brome grass		1**[2] [3]** 4			
3	**Establish native vegetation**	Assess native vegetation response and determine level of effort needed for seeding/planting			1 **[2]** 3 4		
		Seed savanna groundlayer and plant trees and shrubs			1 **[2]** 3 4		
		Follow-up management for seeding: assess need for remedial seeding & complete as necessary				1 **[2]** 3 4	1 **[2]** 3 4
4	**Annual Inspection & Report**	Assess site and prepare report to provide specifics on activities and recommendations.	1 2 3 **[4]**	1 2 3 **[4]**	1 2 3 **[4]**	1 2 3 **[4]**	
5	**Site Maintenance**	Complete follow-up weed control, seeding, planting, and erosion control as determined in 3.			*	*	
6	**Perpetual Management**	Conduct perpetual management tasks (see table 2)					*

[Bracket] indicates recommended quarter for work to be conducted.

Table 2. Perpetual (Long-Term) Management Activities, Unit 1 – *Begin Phase 3, Year 2*

	Task Frequency in Years			
Plant Community	**Prescribed Burning**	**Spot Herbicide Treatment**	**Remedial Seeding & Planting**	**Annual Monitoring**
Oak Savanna	3-4	1-2	3-5	1

Notes: Schedules assume that prescribed burning will be employed as a restoration and management technique. If prescribed burning is not employed as a restoration and management technique, mowing would likely be required.

Management Unit 5

General Description

Unit 5a contains significant natural resources in the groundlayer of the pine/spruce plantation area. The plantations represent a valuable source of timber that it is envisaged will be removed by a contractor in return for brushing services. The target for this unit is restoration to oak savanna. Existing land cover types for Management Unit 5 are:

- Roadside prairie
- Old field
- Red pine-white spruce plantation
- Red pine-white spruce plantation/savanna
- Red pine plantation
- Cropland
- Planted windbreak
- Developed (new road & former roadway)

Task Prioritization

1. Removal of Woody Species: Brushing & Thinning

- Remove invasive non-native woody vegetation from the unit including European buckthorn, black locust, Siberian elm, and Tartarian honeysuckle.
- Selectively thin aggressive native woody species in the windbreak and plantation areas such as box-elder, hackberry, prickly ash and American elm in order to favor the oaks.
- Selectively thin any valuable timber species from the windbreak and plantation areas
- Eventually remove all Scotch pine and white spruce.

2. Manage Undesirable Species: Weed Control

- Control invasive non-native herbaceous vegetation with appropriate herbicides, prescribed burning and/or mowing.

3. Establish Native Vegetation: Seeding & Planting

- Enhance savanna communities using appropriate local ecotype species.
- Seed and/or plant areas with poor native seedbank response using appropriate local ecotype species. It should be noted that response of native vegetation is anticipated to be good in the pine/spruce plantation/savanna (part of 5a); however, the closely planted pine/spruce plantation and pine plantation areas may not contain sufficient native seedbank to allow for a good response and therefore are more likely to need augmentation with seed or plants. It should also be noted that Management Unit 5 contains valuable opportunities for native seed collection within the pine/spruce plantation/savanna area.

Table 1. Remedial (Short-Term) Management Activities

			Phase 2		Phase 3		
	Task prioritization		*Year 2*	*Year 3*	*Year 1*	*Year 2*	*Year 3*
1	**Brushing & Thinning**	Cut and stump treat all non-native woody vegetation (buckthorn, Siberian elm, black locust & Tartarian honeysuckle, etc.); Selectively thin aggressive native woody species (box-elder, prickly ash, elm, hackberry, etc.) and timber species	1 2 3 **[4]**				
		Herbicide resprouts and new germination of undesirable woody vegetation from above.		1 2 **[3]** 4			
2	**Weed Control**	Herbicide all non-native herbaceous vegetation including smooth brome grass		1**[2] [3]** 4			
3	**Seeding & Planting**	Assess native vegetation response and determine level of effort needed for seeding/planting			1 **[2]** 3 4		
		Seed savanna groundlayer and plant trees and shrubs			1 **[2]** 3 4		
		Follow-up management for seeding: assess need for remedial seeding & complete as necessary				1 **[2]** 3 4	1 **[2]** 3 4
4	**Annual Inspection & Report**	Assess site and prepare report to provide specifics on activities and recommendations.	1 2 3 **[4]**	1 2 3 **[4]**	1 2 3 **[4]**	1 2 3 **[4]**	
5	**Site Maintenance**	Complete follow-up weed control, seeding, planting, and erosion control as determined in 3.			*	*	
6	**Perpetual Management**	Conduct perpetual management tasks (see table 2)					*

[Bracket] indicates recommended quarter for work to be conducted.

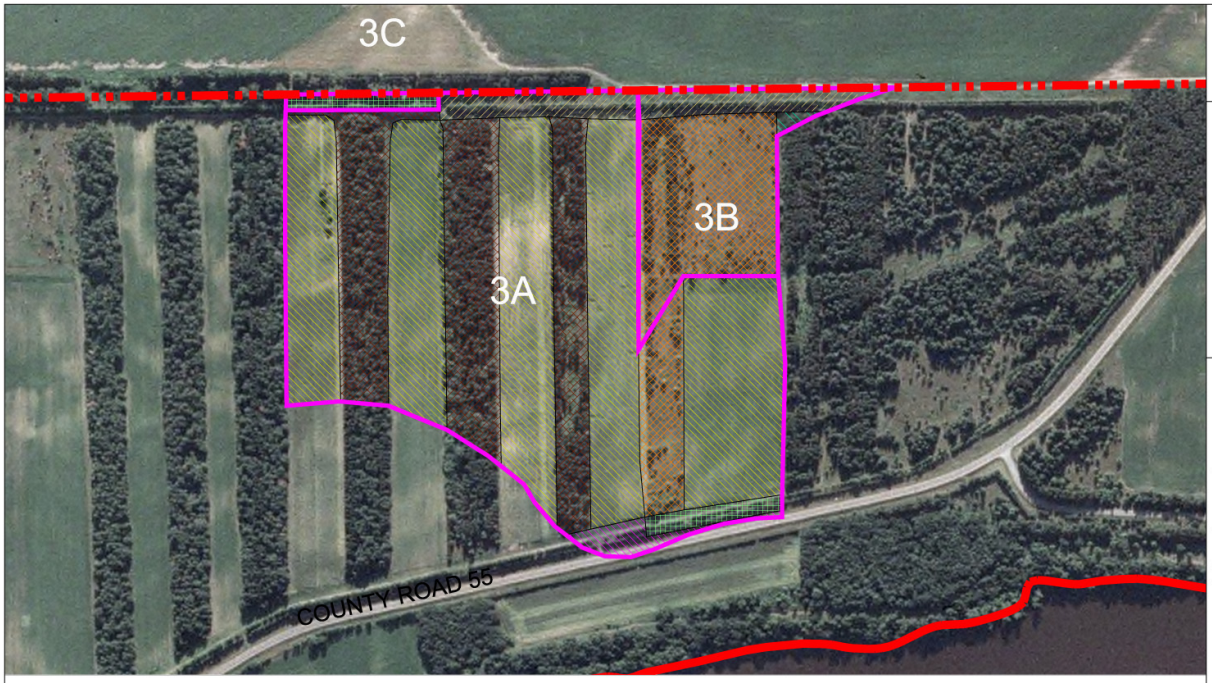
Table 2. Perpetual (Long-Term) Management Activities, Unit 1 – *Begin Phase 3, Year 3*

	Task Frequency in Years			
Plant Community	**Prescribed Burning**	**Spot Herbicide Treatment**	**Remedial Seeding & Planting**	**Annual Monitoring**
Oak Savanna	3-4	1-2	3-5	1

Notes: Schedules assume that prescribed burning will be employed as a restoration and management technique. If prescribed burning is not employed as a restoration and management technique, mowing would likely be required.


COUNTY ROAD 55
1
Legend
Property Boundary
Developed/Residential
0.65 Ac.
Roadside Prairie
2.44 Ac.
Bur Oak Woodland/Savanna
20.10 Ac.
Silver Maple Floodplain Forest
5.86 Ac.
0 150' 300' 600'
SCALE: 1"= 300'
NORTH
Ecological Land Cover-
Management Unit 1
Bend in the River
Watab Township, Minnesota
Brauer & Associates, Ltd.
10417 Excelsior Boulevard, Suite #1
Hopkins, Minnesota 55343
Sheet Number
1 of 1


2A
2B
COUNTY ROAD 55
Legend
Property Boundary
Old Field Prairie
7.70 Ac.
Cropland
17.67 Ac.
Roadside Prairie
2.11 Ac.
Planted Windbreak (Scotch Pine, etc.)
32.88 Ac.
0 150' 300' 600'
SCALE: 1"= 300'
NORTH
Ecological Land Cover-
Management Unit 2
Bend in the River
Watab Township, Minnesota
Brauer & Associates, Ltd.
10417 Excelsior Boulevard, Suite #1
Hopkins, Minnesota 55343
Sheet Number
1 of 1



Legend

- Property Boundary
- Developed/Residential 0.90 Ac.
- Cropland 29.21 Ac.
- Old Field 3.30 Ac.
- Old Field Prairie 10.14 Ac.
- Roadside Prairie 1.52 Ac.
- Planted Windbreak (Scotch Pine, etc.) 14.59 Ac.
- Red Pine-White Spruce Plantation 0.17 Ac.

0 150' 300' 600'

SCALE: 1"= 300'

NORTH

Applied Ecological Services, Inc.
21938 Mushtown Road
Prior Lake, Minnesota 55372
Phone: 952-447-1919 Fax: 952-447-1923
Email: info@appliedeco.com

Ecological Land Cover-Management Unit 3

Drawn By: k.s.p. | AES Project No.: 05-0390
Checked: | File Name: mr082605.dwg
Approved: | Date: 11-21-05

Bend in the River
Watab Township, Minnesota
Brauer & Associates, Ltd.
10417 Excelsior Boulevard, Suite #1
Hopkins, Minnesota 55343

Revisions:

No.	By	Date	Description
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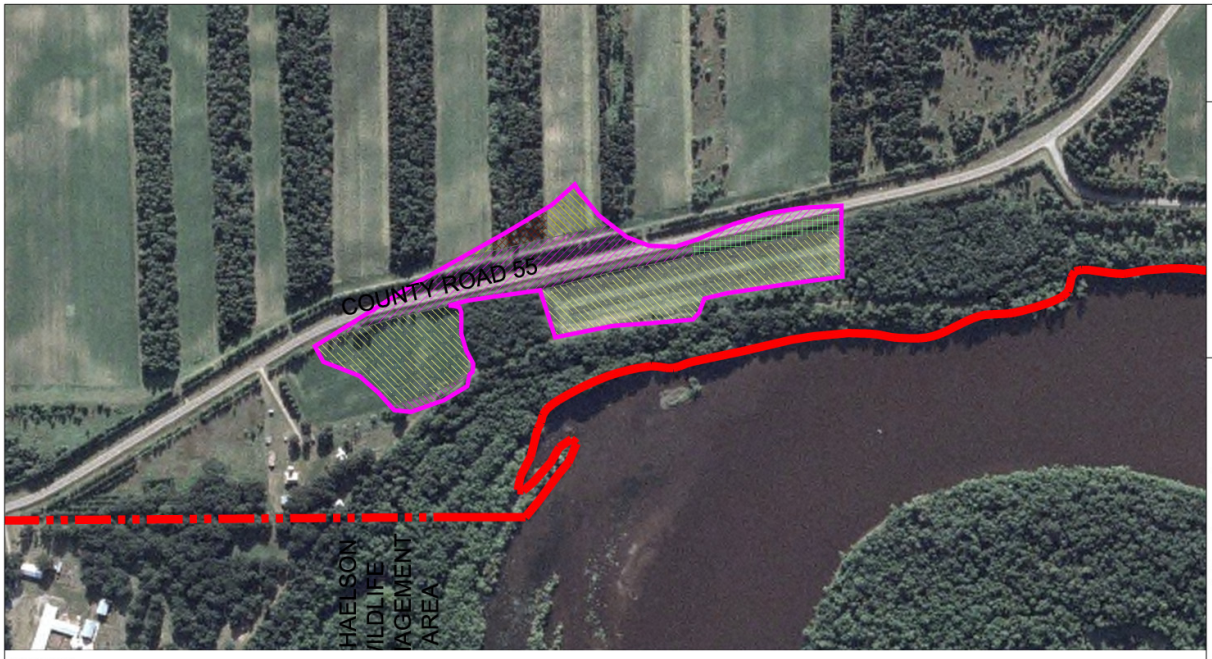
2			
3			
4			
5			

Coordinate System:
Zone:
Datum:
Units:

Sheet Number
1 of 1



Legend

- Property Boundary
- Developed/Residential 4.36 Ac.
- Cropland 0.60 Ac.
- Planted Windbreak (Scotch Pine, etc.) 0.35 Ac.
- Restored Prairie 7.51 Ac.
- Roadside Prairie 0.66 Ac.

0 150' 300' 600'

SCALE: 1"= 300'

NORTH

Applied Ecological Services, Inc.
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Email: info@appliedeco.com

Ecological Land Cover-Management Unit 4

Drawn By: k.s.p. | AES Project No.: 05-0390
Checked: | File Name: mr082605.dwg
Approved: | Date: 11-29-05

Bend in the River
Watab Township, Minnesota
Brauer & Associates, Ltd.
10417 Excelsior Boulevard, Suite #1
Hopkins, Minnesota 55343

Revisions:

No.	By	Date	Description
1		-- -- --	Unreleased
2			
3			
4			
5			

Coordinate System:
Zone:
Datum:
Units:

Sheet Number
1 of 1


105TH
5A
5B
5C
5D
AD 55
FERRY POINT PLACE
Legend
Property Boundary
Developed/Residential 5.24 Ac.
Cropland 15.30 Ac.
Old Field 10.68 Ac.
Roadside Prairie 1.77 Ac.
Planted Windbreak (Scotch Pine, etc.) 4.24 Ac.
Red Pine-White Spruce Plantation 18.25 Ac.
Red Pine-White Spruce Plantation/Savanna 6.61 Ac.
Red Pine Plantation 5.95 Ac.
0 150' 300' 600'
SCALE: 1"= 300'
NORTH
Applied Ecological Services, Inc.
21938 Markhown Road
Prior Lake, Minnesota 55372
Phone: 952-447-1919 Fax: 952-447-1923
Email: info@appliedeco.com
Ecological Land Cover-Management Unit 5
Drawn By: k.s.p.
Checked:
Approved:
AES Project No.: 05-0390
File Name: nr082605.dwg
Date: 11-18-05
Bend in the River
Watab Township, Minnesota
Brauer & Associates, Ltd.
10417 Excelsior Boulevard, Suite #1
Hopkins, Minnesota 55343
Revisions:
No. By Date Description
1 Unreleased
2
3
4
5
Coordinate System
System:
Zone:
Datum:
Units:
Sheet Number
1 of 1

Preliminary Master Plan Estimate of the Cost to Implement

Bend in the River Regional Park

Benton County, Minnesota

Item	Description	Phase One*	Phase Two*	Phase Three*	Total
1	**Regional Park Boundary Markers**	$2,800.00			**$2,800.00**
2	**Roadway and Pedestrian Underpass**				**$1,498,400.00**
	County Road 55			$946,000.00	$946,000.00
	Pedestrian Underpass			$350,000.00	$350,000.00
	105th Street NW		$182,400.00		$182,400.00
	Entrance Monuments	$20,000.00			$20,000.00
3	**Group Picnicking**				**$387,800.00**
	Shelters		$108,000.00	$150,000.00	$258,000.00
	Parking and Drives		$47,650.00		$47,650.00
	Trails		$4,000.00	$2,000.00	$6,000.00
	Miscellaneous Site Amenities		$16,450.00	$16,450.00	$32,900.00
	Portable Restroom Enclosures		$5,000.00	$5,000.00	$10,000.00
	Utilities		$20,000.00	$4,750.00	$24,750.00
	General Grading		$4,500.00		$4,500.00
	General Removals		$3,500.00		$3,500.00
	Secondary Entrance Signage		$500.00		$500.00
4	**Farmstead Improvements**				**$201,000.00**
	Parking and Pedestrian Access		$65,800.00		$65,800.00
	Building Stabilization and Security Improvements	$50,000.00			$50,000.00
	Interpretive and Directional Signs		$10,000.00		$10,000.00
	Accessible Interpretive Trail Loop		$6,500.00		$6,500.00
	Wildlife Blind		$12,000.00		$12,000.00
	River Overlook			$24,000.00	$24,000.00
	General Grading		$4,500.00		$4,500.00
	General Removals		$3,250.00		$3,250.00
	Utilities		$3,000.00		$3,000.00
	Portable Restroom Enclosure		$5,000.00		$5,000.00
	Secondary Entrance Signage		$500.00		$500.00
	Miscellaneous Site Amenities		$16,450.00		$16,450.00
5	**Trail Construction**				**$1,137,500.00**
	Hiking Trails - (6')		$22,900.00		$22,900.00
	Hike/Ski Trail - (8' and 14')	$114,300.00	$114,300.00		$228,600.00
	Hard Surface Trails			$157,900.00	$157,900.00
	Portable Restroom Enclosure	$5,000.00	$10,000.00		$15,000.00
	Secondary Entrance Signage	$500.00			$500.00
	Parking Lot	$27,000.00			$27,000.00
	General Grading	$14,875.00	$14,875.00		$29,750.00
	General Removals	$14,875.00	$14,875.00		$29,750.00
	Miscellaneous Site Amenities		$8,225.00	$8,225.00	$16,450.00
	Interpretive Signage		$5,000.00	$5,000.00	$10,000.00
	Utilities	$21,375.00	$21,375.00		$42,750.00
	Staircases		$92,700.00	$92,700.00	$185,400.00
	Ski Trail Lighting		$130,000.00	$162,000.00	$292,000.00
	Wildlife Blinds	$36,000.00	$36,000.00		$72,000.00
	Canoe Landing		$7,500.00		$7,500.00

Item	Description	Phase One*	Phase Two*	Phase Three*	Total
6	**Ecological Restoration**				**$1,412,900.00**
	Brushing Weed Control Windbreak Thinning Burning	$431,000.00			$431,000.00
	Savanna Ground Layer Seeding Savanna Tree and Shrub Planting Windbreak Re-treatment Windbreak Weed Control Windbreak Thinning		$647,000.00		$647,000.00
	Savanna Ground Layer Seeding Savanna Tree and Shrub Planting Follow-up Management for Seeding			$334,900.00	$334,900.00
	Construction Subtotal	**$737,725.00**	**$1,643,750.00**	**$2,258,925.00**	**$4,640,400.00**
	Construction Contingency = 10%	$73,772.50	$164,375.00	$225,892.50	$464,040.00
	Subtotal	$811,497.50	$1,808,125.00	$2,484,817.50	$5,104,440.00
	Design, Survey Testing	$121,724.63	$271,218.75	$372,722.63	$765,666.00
	Grand Total	**$933,222.13**	**$2,079,343.75**	**$2,857,540.13**	**$5,870,106.00**

* Each phase of the project is expected to span three years.

Notes:
Costs shown in this master plan estimate are based upon 2005 dollars.
The costs for this work are based upon competative bidding of the work to private contracting companies.
As the County budgets for this work inflation should be added to these estimates.