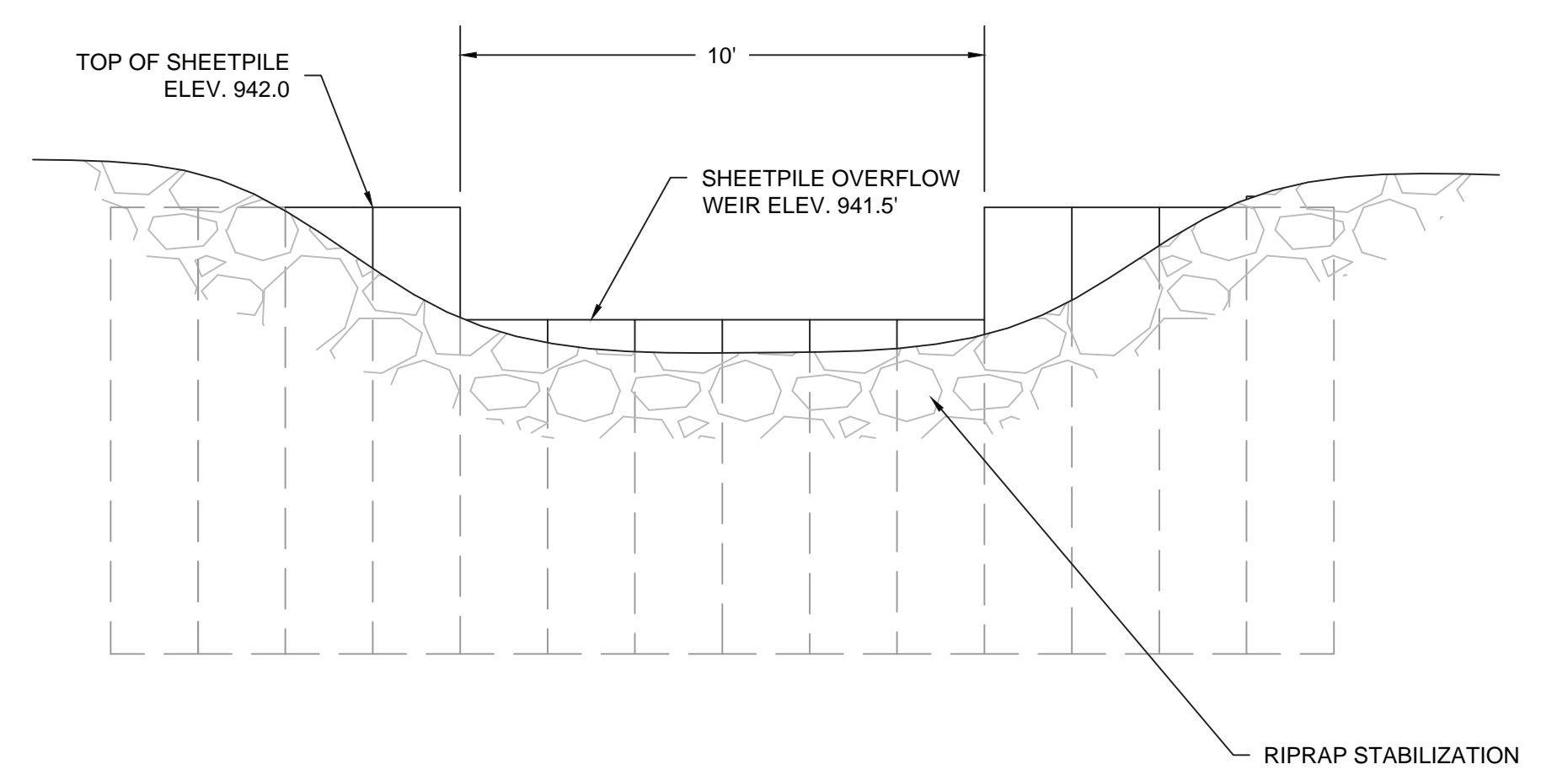


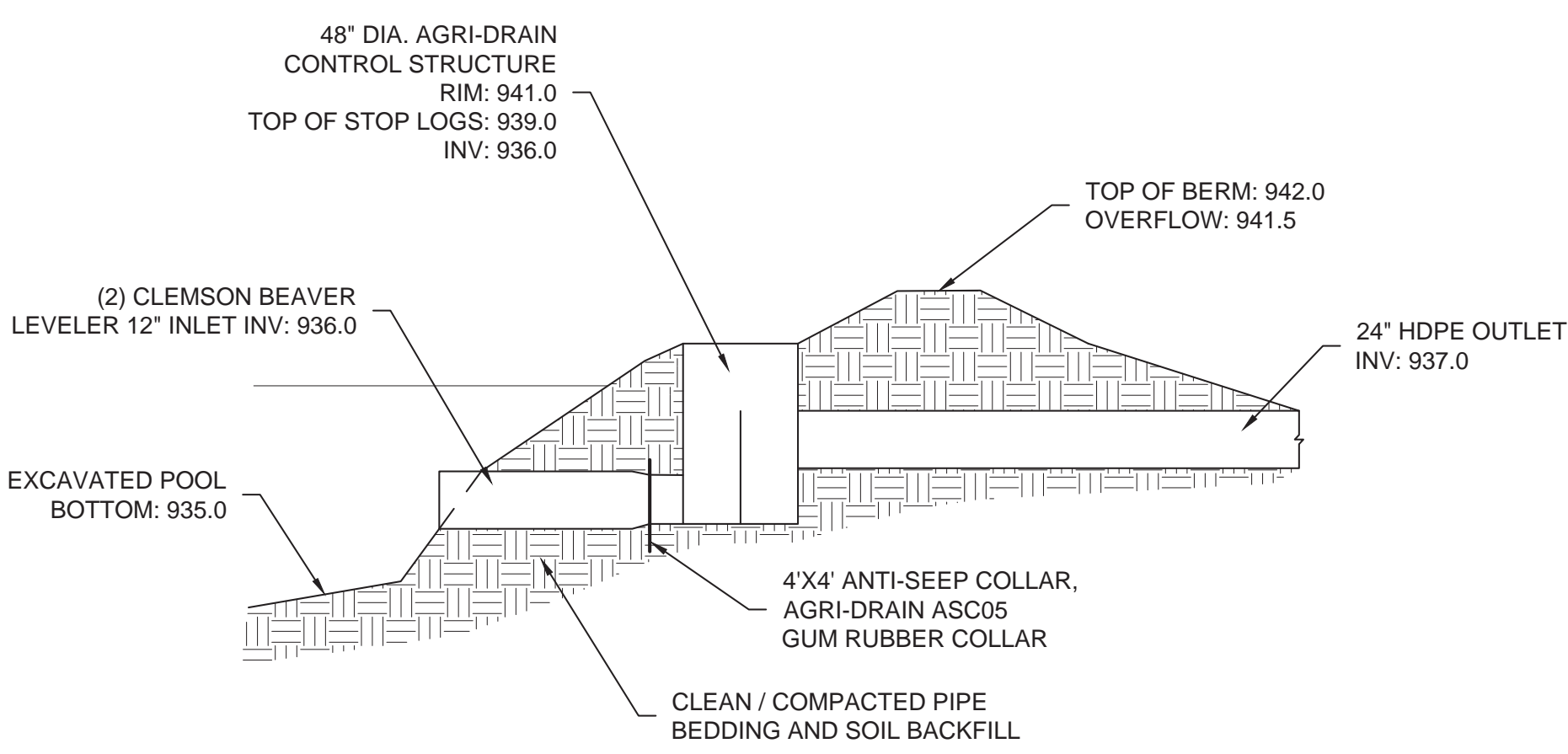
# Sutton Lake Outlet Structure Design & Management Planning



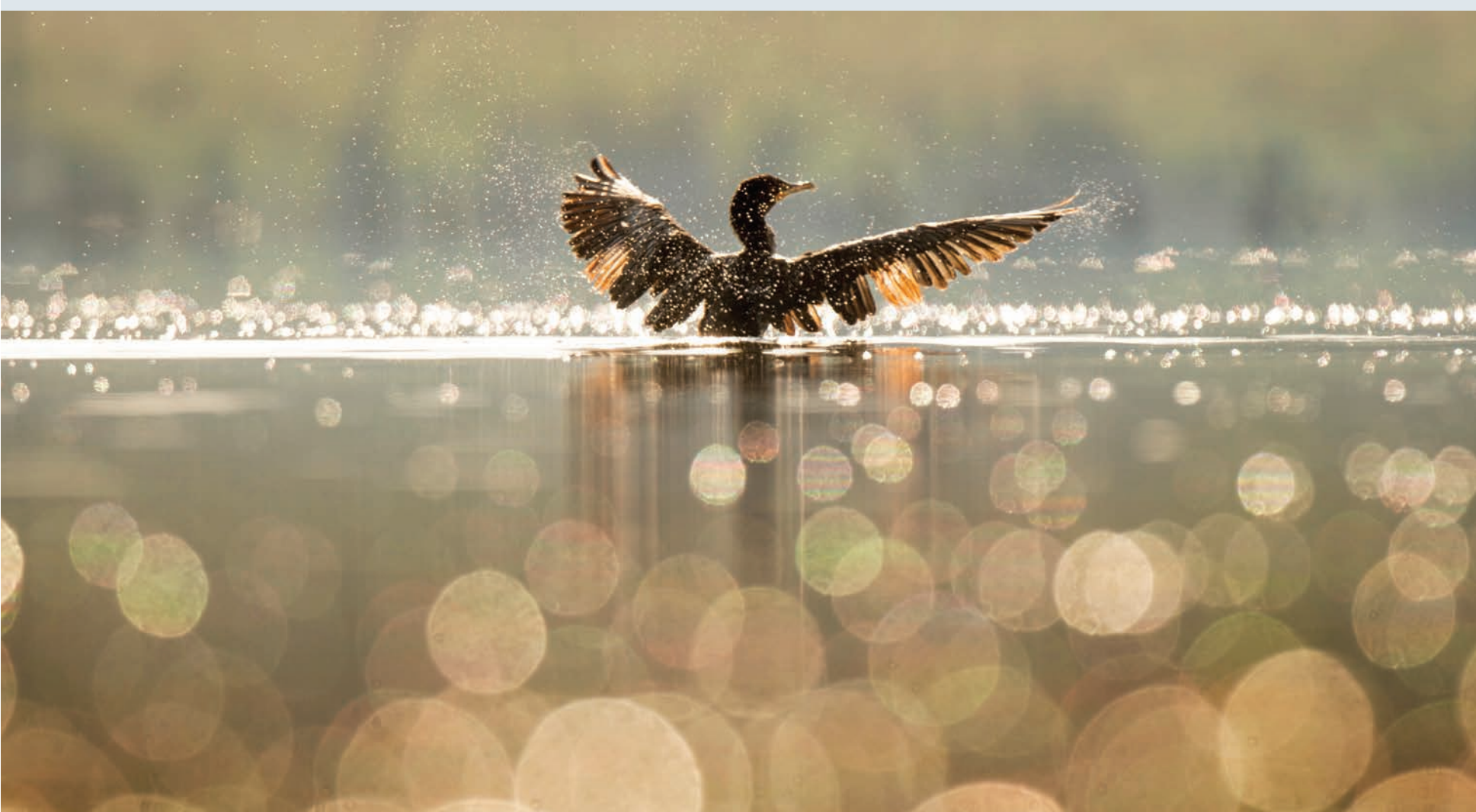
## 60% Concept Plan



01 SHEETPILE WEIR  
NOT TO SCALE



02 CLEMSON LEVELER AGRI-DRAIN OUTLET  
NOT TO SCALE



## Primary Design Elements

1. Lake Drawdown Structure – 937.0’
2. Baseflow Beaver Bafflers – 939.0’
3. High Capacity Overflow Grate – 940.5’
4. Emergency Overflow Weir – 941.5’

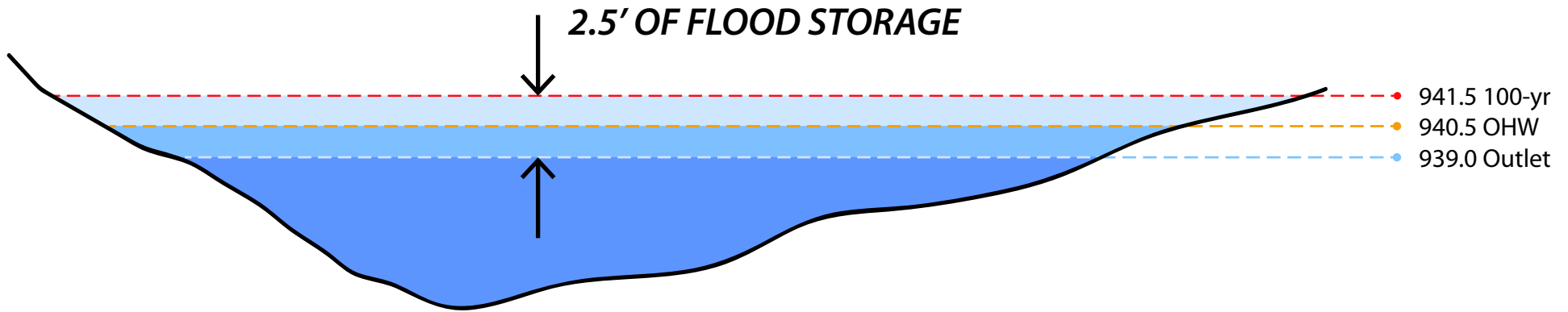
## Management Plan Elements

1. MnDNR-Approved Plan That Affords Winter Drawdown
2. Maximize Wildlife Habitat Benefits on Sutton Lake
3. Maximize Flood Reduction Potential on Prior Lake
4. Fall (November) Drawdown to 937.0’;  
Keep Outlet Open Through Winter
5. Spring (March) Adjustment Back to 939.0’

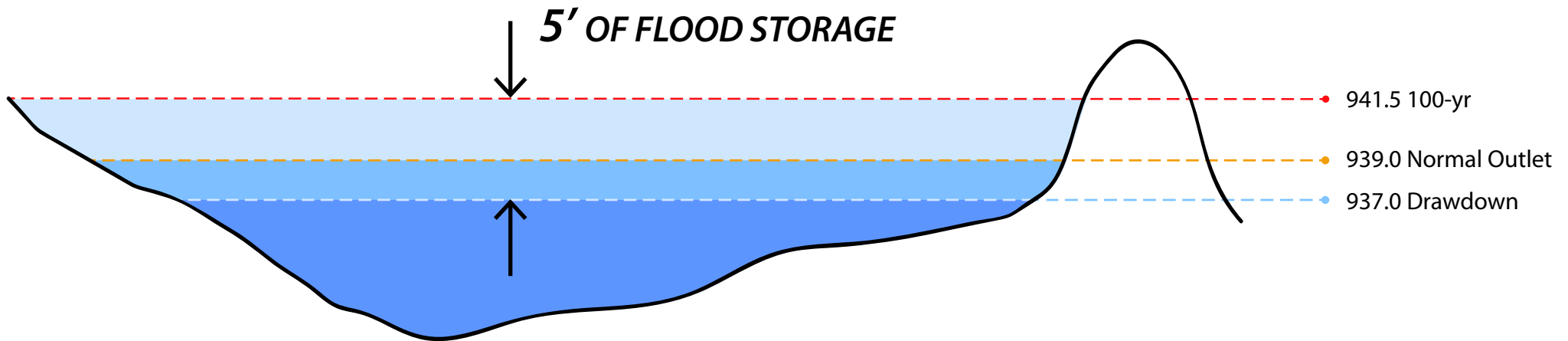
## Project Benefits

1. Diversification of Aquatic Community (Plant and Animal)
2. Increased Habitat for Migrating Waterfowl and Shorebirds
3. Increased Winter Cover for Pheasant
4. 0.12 Foot Decrease in Prior Lake Flood Level





EXISTING



PROPOSED

## Sutton Lake Outlet Operation Plan – March 2019 Draft

Primary Drawdown Goal	Drawdown Date	Storage Benefit	Habitat Benefit
Maximize Storage Capacity	November 15 – March 15 (or after snow melt)	<ul style="list-style-type: none"> <li>- Captures spring runoff</li> <li>- Maximizes storage capacity during early growing season</li> </ul>	<ul style="list-style-type: none"> <li>- Promotes aquatic plant abundance and diversity via consolidation of sediments and stimulation of native seed bank</li> </ul>
Habitat Management*	May 15 – July 15	<ul style="list-style-type: none"> <li>- Maximizes flood storage capacity after July 15</li> </ul>	<ul style="list-style-type: none"> <li>- Favors native perennial emergent vegetation such as bulrush and spikerush species</li> <li>- Strengthens submergent vegetation in remaining inundated areas</li> <li>- Allows floating cattail mat to settle and root to lake bottom</li> <li>- Recovers water levels by late summer to discourage cattail growth and flood rooted cattail mat</li> </ul>

\*Early season drawdown will only be initiated if Prior Lake elevation is below 902.5'

Frequency of the Habitat Management drawdown will be dependent on vegetation response and downgradient watershed conditions. BWSR guidance documents suggest drawdowns for emergent vegetation management every 3-10 years and for submergent vegetation annually.

Table 2 below summarizes the response of wetland vegetation relative to drawdown date.

Response of Wetland Vegetation Relative to Drawdown Date				
Drawdown Timeframe				
Species	Early	Midseason	Late season	Winter season
Rice cutgrass	Excellent response	Fair response		
Crabgrass		Excellent response	Moderate response	
Panic grass		Excellent response	Fair response	
Barnyard grass	Excellent response	Fair response	Fair response	
Spikerush	Excellent response	Fair response	Fair response	
Pennsylvania smartweed	Excellent response			
Curly dock		Excellent response	Fair response	
Cocklebur	Moderate response	Excellent response	Moderate response	
Beggarticks	Fair response	Excellent response	Excellent response	
Aster species	Excellent response	Moderate response	Fair response	
Morning glory	Moderate response	Moderate response		
Bulrush	Excellent response	Moderate response		
Carex species		Moderate response		
Milfoil species				Decreased
Pondweeds				Moderate response
Sandbar willow				Moderate response
Cattails				Moderate response
Wild Celery				Moderate response

Table 1.

Adapted from Cooke et al. 1986 and NRCS 2007

Early drawdown completed within first 45 days of the growing season

Midseason drawdown completed after 45 of growing season and before July 10<sup>th</sup>.

Late season drawdown completed after July 10<sup>th</sup> through October 10<sup>th</sup>

Winter season October 11<sup>th</sup> through until beginning of growing season

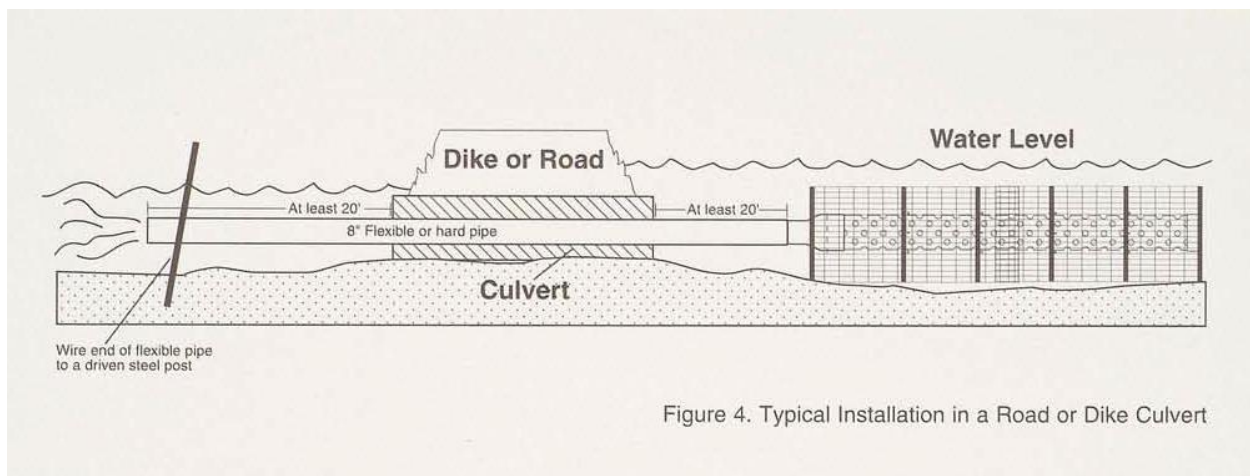
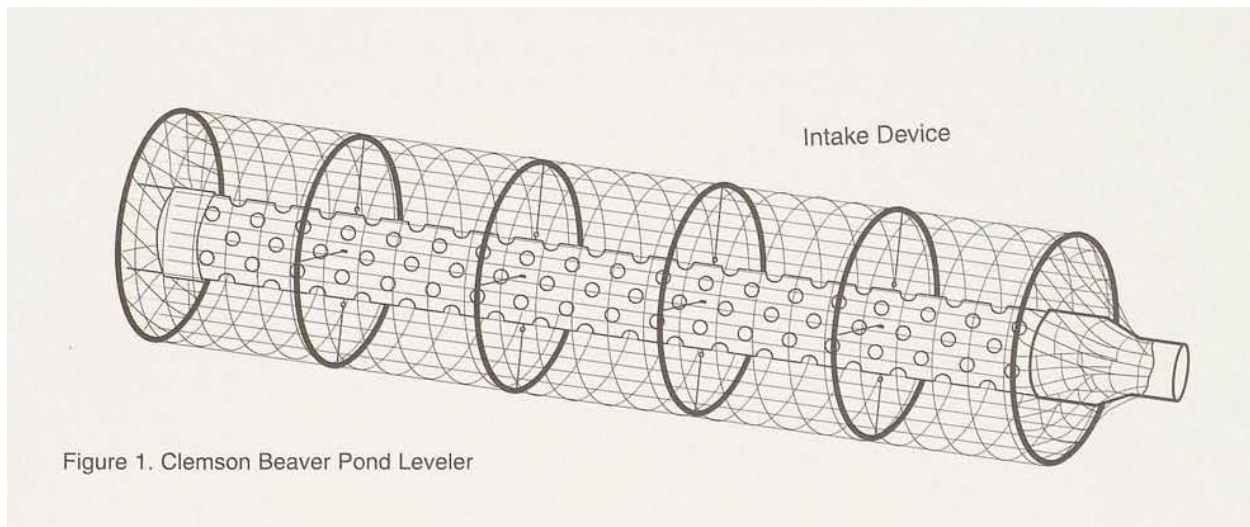
Preferred Foraging Depths for Wetland Birds	
Species	Preferred Depth
Diving Ducks	>13 inches
Northern Shoveler	11-13 inches
Northern Pintail	6-9 inches
Blue-winged Teal	2-7
Great Blue Heron	4-7 inches
Shorebirds	0-7 inches
Mallard	3-6 inches
Little Blue Heron	<1-5 inches
Yellow-crowned Night Heron	1-4 inches
Long-billed Dowitcher	<1-3 inches
Canada Goose	<1-3 inches
Greater Yellowlegs	<1-3 inches
American Bittern	<1-3 inches
Virginia Rail	<1-2 inches
Pectoral Sandpiper	<1-2 inches
Common Snipe	<1-2 inches

Table 3.

Adapted from Fredrickson 1991



## Beaver Baffler Details





## **Sutton Lake & Proposed Outlet Statistics**

Surface Area = 66 acres @ 939.0

Surface Area = 322 acres @ 942.0

Watershed Area = 1,423 acres

Watershed Ratio (watershed area : lake area) = 4.4 to 21.6

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Existing Outlet = 939.0

OHW = 940.5

Existing 100-yr, 24-hr = 941.46

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Proposed Drawdown Outlet = 937.0

Proposed Normal Outlet = 939.0

Proposed EOF Weir = 941.5

Berm Elevation = 942.0

Prior Lake Flood Reduction Benefit = 0.12-feet

Proposed 100-yr, 24-hr = 941.6

Proposed Change in 100-yr, 24-hr = 0



**PRIOR LAKE SPRING LAKE WATERSHED DISTRICT**  
**SUTTON LAKE OUTLET RETROFIT**  
**JORDAN, SCOTT COUNTY, MINNESOTA**

FEATURE	EXISTING	PROPOSED
SILT FENCE		
CONSTRUCTION FENCE		
DELINEATED WETLAND		
OVERHEAD ELECTRIC LINES		
BURIED ELECTRIC LINES		
FIBER OPTIC LINES		
BURIED TELEPHONE		
SPLIT RAIL WOODEN FENCE		
CHAIN LINK FENCE		
SANITARY SEWER LINE		
SANITARY SEWER FORCE MAIN		
SANITARY SEWER MANHOLE		
STORM PIPE LINE		
STORM MANHOLE		
DRAIN TILE		
WATERMAIN		
WATERMAIN MANHOLE		
HYDRANT		
GATE VALVE		
TREE PROTECTION		
MAJOR CONTOUR		
MINOR CONTOUR		
DRAINAGE FLOW ARROW		
TREE		



Sheet List Table	
Sheet Number	Sheet Title
01	TITLE SHEET
02	SEQ AND NOTES
03	PROJECT OVERVIEW
04	EXISTING CONDITIONS & REMOVALS PLAN
05	EROSION AND SEDIMENT CONTROL PLAN
06	GRADING AND DRAINAGE PLAN
07	TRAFFIC CONTROL PLAN
08	RESTORATION PLAN
09	DETAIL SHEET I
10	DETAIL SHEET II

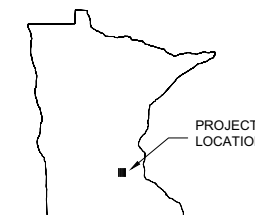
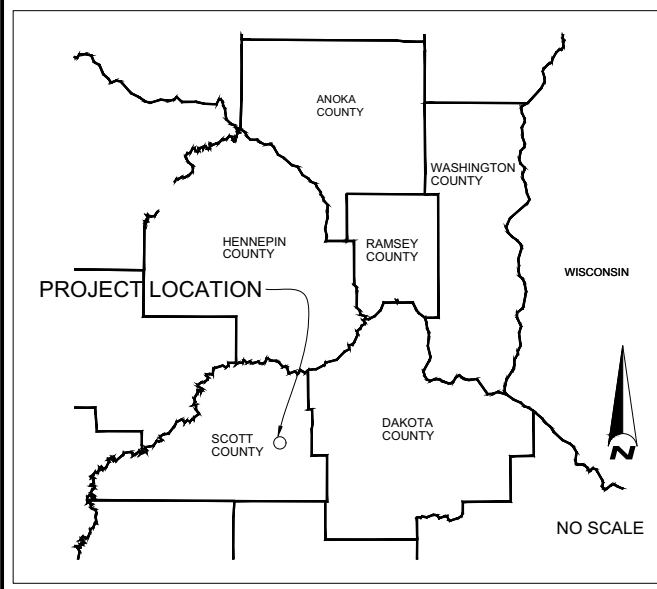
\* THIS PLAN SET CONTAINS 10 PLAN SHEETS

## GOVERNING SPECIFICATIONS

THE 2018 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION  
"STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN

ALL TRAFFIC CONTROL DEVICES AND SIGNING SHALL CONFORM TO MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, INCLUDING FIELD MANUAL FOR TEMPORARY CONTROL ZONE LAYOUTS.

## LOCATION MAP



CLIENT

**PRIOR LAKE SPRING LAKE  
WATERSHED DISTRICT**  
4646 DAKOTA ST SE  
PRIOR LAKE, MN 55372

## ENGINEER

EMMONS & OLIVIER RESOURCES, INC.  
7030 6TH STREET NORTH  
OAKDALE, MINNESOTA 55128-7534  
TELEPHONE: (651) 770-8448  
FAX: (651) 770-2552  
eorinc.com

6			
5			
4			
3			
2			
1	03/21/2019	KDC	60% DRAFT PLANS - NOT FOR CONSTRUCTION
	NO	DATE	BY
			REVISION

SUBMISSION DATE: 03/21/2019	
DESIGN BY KDC	DRAWN BY KDC
EOR PROJECT NO. 0758-0114	

**EOR**  
water  
ecology  
community

**Emmons & Olivier  
Resources, Inc.**  
7030 6th Street North  
Oakdale, MN 55128  
Tel: 651.770.8448  
[www.eorinc.com](http://www.eorinc.com)

PRIOR LAKE  
SPRING LAKE  
WATERSHED DISTRICT

SUTTON LAKE OUTLET RETROFIT  
JORDAN, SCOTT COUNTY, MINNESOTA

STATE PROJECT NO. ----	CITY PROJECT NO. ----
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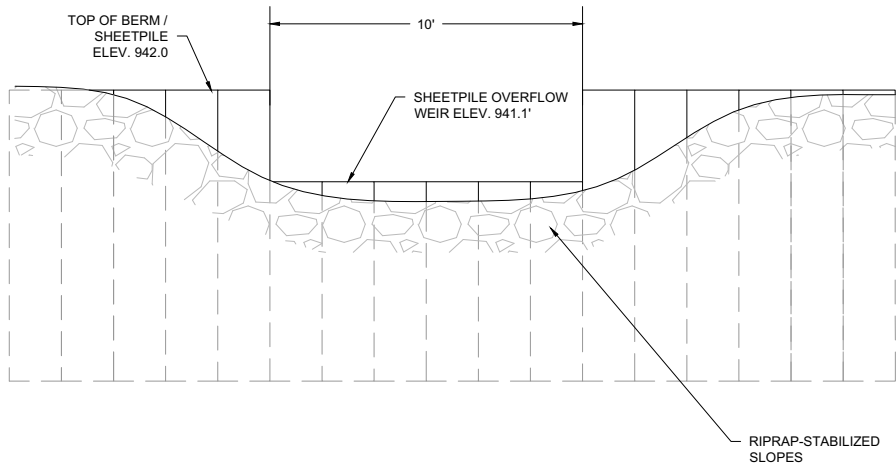
# TITLE SHEET

SHEET 01 OF 10 SHEETS

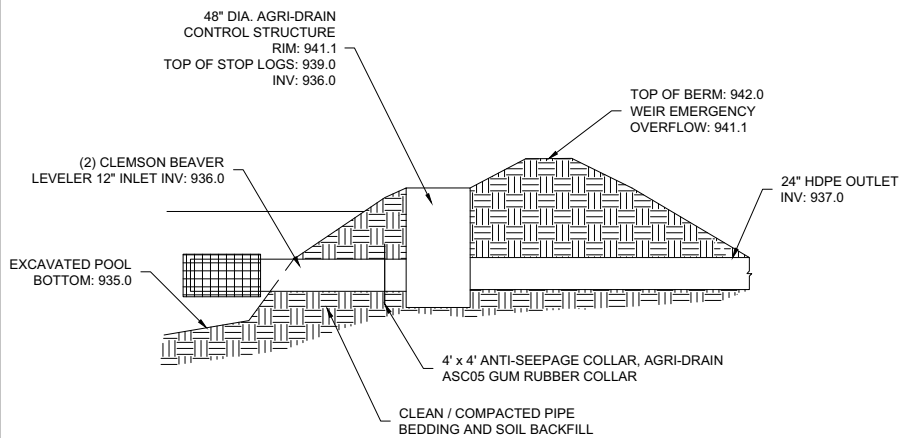








01 SHEETPILE WEIR  
01 NOT TO SCALE



02 CLEMSON LEVELER AGRI-DRAIN OUTLET  
01 NOT TO SCALE



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0758-0114

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**PRIOR LAKE  
SPRING LAKE**  
WATERSHED DISTRICT

SUTTON LAKE OUTLET RETROFIT  
SCOTT COUNTY, MINNESOTA

STATE PROJECT NO. --- CITY PROJECT NO. ---

GRADING AND DRAINAGE PLAN

SHEET 06 OF 10 SHEETS



SHEET 09 OF 10 SHEETS