

INSPECTION, OPERATION AND MAINTENANCE PLAN

DEPERE DAM
(FORMAL NAME)

DEPERE DAM
(LOCAL NAME)

JAMES STREET AND FOX RIVER
(LOCATION INCLUDING STREET AND STREAM SYSTEM)

5.01
DNR FIELD FILE NUMBER

804
DAM KEY SEQUENCE NUMBER (DNR)

COUNTY: BROWN

OWNER: CITY OF DE PERE

TELEPHONE: 920-339-4060

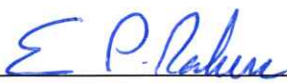
OPERATOR: ERIC RAKERS, CITY ENGINEER

TELEPHONE: 920-339-4061

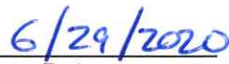
CELL: 920-639-1000

OWNER MAILING ADDRESS: DEPARTMENT OF PUBLIC WORKS
925 SOUTH SIXTH STREET
DE PERE, WI 54115

Plan updated by: Eric Rakers City Engineer City of De Pere



Signature



Date

TABLE OF CONTENTS

Section	Contents	Page(s)
I.	INTRODUCTION/DEFINITION OF GENERAL RESPONSIBILITIES	
	A. Introduction	1
	B. Purpose and Intent	1
	C. Description	1
	D. Key Personnel and Their Responsibilities	2
II.	INSPECTION	
	A. Inspections	4
	B. Equipment	5
III.	OPERATIONAL PROCEDURES	
	A. General Surveillance Procedures	5
	B. Identification of Emergency	6
	C. Emergency Repair Supplies and Resources	6
	D. Coordination of Floodwater Flows	7
IV.	MAINTENANCE	
	A. Maintenance Frequency	7
	B. Budget Considerations	7
IV.	EXHIBITS	
	A. Location Map	
	B. Inspection Plan	
	C. Observation Log	
	D. Maintenance Log	

I. INTRODUCTION AND DEFINITION OF GENERAL RESPONSIBILITIES

A. Introduction

This document describes a plan of inspection, operation and maintenance for the De Pere Dam. This plan should be periodically reviewed and modified to reflect operational and structural changes. The inspection and maintenance forms and other applicable figures are designed for easy revision.

This plan was prepared to conform to Dam Design and Construction Standards – “Hydraulic Design and Safety Requirements (3) Safety Measures Requirements”, Chapter NR 333.07(3), Wisconsin Administrative Code.

B. Purpose and Intent

The purpose of the Inspection, Operations and Maintenance (IOM) plan is to provide the owner/operator of De Pere Dam and other officials with the following:

- Basic Guidelines which assist the operator/officials to:
 - Perform routine/recommended safety inspections;
 - Properly document the inspections;
 - Define and document normal operation procedures;
 - Define operational procedures during extreme events; and
 - Properly document maintenance requirements and activities.
- Guidelines and checklist items for routine inspections; and
- A series of alterable and reproducible master forms which will assist in documenting inspections.

Inspection, operation and maintenance procedures are needed to ensure the overall integrity of the dam and the public's safety. The operator can only reasonably maintain the dam in working order through active inspection. The following sections should be used to guide routine inspection, operation, maintenance, and emergency actions.

C. Description

The De Pere Dam is located on the Fox River. The dam is accessed via James Street. A map showing the location of De Pere Dam and access roads can be found in Exhibit A.

Type of dam: Earthen embankment

Location of dam: Between Shanak powerhouse and FRNSA lock

Height of dam: 17 feet

Max Storage: N/A

Number of gates: N/A

Type of gates: N/A

Primary Use of dam: N/A

Downstream land use: Residential, Recreational, Industrial (A map showing the location of the De Pere Dam and downstream land use is in Exhibit A.)

Downstream zoning in place: No ____ Yes X

Type of zoning: 100-Year Floodplain X Dam Failure ____

Flood Plain Zoning Ordinance: Ord. No. 09-14 (adopted 6/16/2009)

Upstream land use: Residential and Recreational

Hazard Rating: Low ____ Significant X High ____

D. Key Personnel and Their Responsibilities

The City Engineer, Eric Rakers, is the representative for the City of De Pere, Dam Owner. It is the Owner's responsibility to operate, inspect and maintain the dam. The Owner may have an operator who manages the dam on a day-to-day basis, but the owner is ultimately responsible and liable for any damages should the dam not be maintained properly correctly.

The Engineering Department, as the De Pere Dam Owner/Operator, may oversee the dam. The operator shall notify adjacent upstream and downstream dam operators about changes to the embankment condition and resulting pool levels and flows. High water levels in the impoundment may require the operator to request from the Corps of Engineers a change to the level of the pool.

The Engineering Department, as owner/operator of De Pere Dam is responsible for routine daily, monthly and annual inspections, and coordinating routine maintenance (e. g. mowing or burrowing animal removal) and other preventative maintenance of the dam. The Engineering Department is also responsible for day by day monitoring when high or low flow conditions exist. More thorough inspections for changes in seepage are required after high river flow conditions or other emergency conditions have subsided.

The De Pere Dam *does not* have an "Early Warning System Device". The operator from City of De Pere has been trained to identify potentially dangerous flow conditions. Potential flood conditions at the De Pere Dam are characterized by the following:

- Extended periods of greater than average precipitation or combined melting periods with greater than average precipitation;
- Rapidly increasing headwater levels (greater than 2" increase per hour) or other water level issues specific to the dam; or
- Other site specific conditions such as ice jams, etc.

The operator for the De Pere Dam has been trained to identify other conditions indicating a possible emergency situation and the potential for dam failure. These include, but are not limited to:

- Serious rain events with the water level above the dam rising quickly;
- Slumping or sloughing of the dam's embankment;
- Excessive erosion on the embankment;
- Excessive seepage or cloudy seepage through the embankment;
- Settlement or cracking in the embankment;
- Piping or boils in the embankment or immediately downstream;
- Vandalism activity in the vicinity of the dam.

During an emergency, the dam operator will follow the procedures outlined in the De Pere Dam Emergency Action Plan as approved by the DNR on 1/5/2015.

Staff Contact Information

Name/Title	Telephone Numbers	
	Office	Cell
Eric Rakers, City Engineer	920-339-4061	920-639-1000
Scott Thoresen, Director of Public Works	920-339-8095	920-639-1003
Tony Fietzer, Street Superintendent	920-339-8325	920-639-1001

II. INSPECTION

A. Inspections

Routine inspections are a necessary part of owning and operating a dam since early detection of gradual changes can reduce maintenance and repair costs. Routine inspections provide a way to monitor a dam's performance and identify changed conditions at the dam. All routine inspections shall be performed by properly trained persons. Records of completed inspections will be kept on file at the City of De Pere Engineering Department.

Examples of routine inspections include:

- Weekly/Monthly
 - River flow observations
 - Precipitation records
 - Water level readings
 - Seepage monitoring (could be daily if increases in flow are present)
- Yearly or post flooding
 - Embankment condition and seepage

Listed below are the categories of routine inspections and documentation that shall be conducted by the dam owner/operator:

- Weekly/Monthly
- Yearly or post flooding

Periodic detailed inspections of large dams are required under Chapter 31.19 (2)(ag) *Regulation of Dams and Bridges Affecting Navigable Waters*, Wis. Stats. At a frequency determined by the dam's hazard rating as well as after any emergency. All of these required inspections must be performed by a professional engineer licensed in Wisconsin. Copies of these inspections will be submitted to the assigned DNR Water Management Engineer for concurrence.

The following detailed inspections shall be conducted by Eric Rakers:

- Department of Natural Resources required owner inspections under ch. 31.19 (2)(ag), Stats. "An owner of a significant hazard dam shall cause the dam to be inspected at least 2 times between each inspection conducted by the department under par. (a)."
- After all emergencies as per the Emergency Action Plan.

If anything unusual is noted during a post-flood self-inspection, contact should be made with the owner's consultant and the Department Water Management Engineer for the county in which the dam is located.

B. Inspection Equipment

The Dam Owner/Operator and qualified persons should/shall be adequately equipped for inspection. The following are recommended inspection related equipment items:

- Camera with flash or cell phone with built-in camera
- Ruler with graduations large enough to be identified on photos
- Knives for prying cracks and removing materials
- Copy of site map to note locations of problems and changing conditions.
- Life jacket
- Radio/Phone
- Inspection forms
- Other tools or equipment specifically needed to inspect dam

III. OPERATIONAL PROCEDURES

A. General Surveillance Provisions

Dams are part of a dynamic system composed of the river, the dam and precipitation. In order to operate a dam correctly, a dam owner/operator needs to monitor flow conditions and precipitation rates. Under certain conditions, dam owners with multiple owners and regulatory authority will need to notify each other and downstream dams of changes in condition and operation.

The De Pere Dam pool level is controlled by the Army Corps of Engineers to insure it is at required or customary levels for summer vs. winter and that minimum flow levels are being met. The dam's levels and flows are also checked in response to precipitation. The required pool levels for the De Pere Dam are:

Maximum	<u>588.90</u>	(International Great Lakes Datum of 1985)
Minimum	<u>587.40</u>	(International Great Lakes Datum of 1985)

and are based on the water level gage located in the vertical corrugated metal pipe, 10 feet west of gate at the end of James Street.

The De Pere Dam is routinely observed each month and inspected once a year. Thorough inspections also occur after high flow conditions have subsided. Flow conditions are monitored weekly and day by day when high flow conditions exist. Routine and required preventive maintenance is performed by the Public Works Department. Site inspection, operation and flow monitoring records for seepage are kept on file at the Engineering Department.

1. Upstream Dam – Little Kaukauna Lock and Dam

The spillway is controlled by the Army Corps of Engineers. The location map is located in Exhibit A.

B. Identification of Emergency

In the event of an emergency, the City of De Pere will activate their Emergency Action Plan (EAP). The EAP Director is Alan Matzke, De Pere Fire Chief. The EAP Coordinator is Derek Beiderwieden, De Pere Police Chief. The city's EAP is designed to alert Brown County to activate their EAP, and alert the other dam owners. There are three levels of emergencies in the city's plan. Level 1 is urgent dam failure, Level 2 is potential dam failure, and Level 3 is non-emergency unusual event.

C. Emergency Repair Supplies and Resources

The city's EAP has a list of available resources in case of emergency, listed in Exhibit C. The city's Street Department and Parks Department would assist with their limited resources.

D. Coordination of Floodwater Flows

The flow of water between dams is controlled by the Army Corps of Engineers. In the event of an emergency, they would be notified through the EAP, and they could take the necessary action needed with pool levels.

IV. MAINTENANCE

Embankment maintenance should be performed regularly. Routine, annual, and post storm inspection results will dictate how often and to what degree maintenance is required. A record should be kept of all maintenance activities. A maintenance log for The City owned portion of the De Pere Dam can be found in Exhibit D.

Since dams hold back water under pressure, repairs often need to be done differently than at other types of structures. Most items can be repaired by the Dam Owner/Operator. Larger repair items may need to be completed by qualified contractors. Large repairs may also require the submittal of plans and specifications to the Department for approval prior to starting any work. Generally, questionable repair items should be inspected by a qualified engineer and if required, repaired by contractors. All proposed repairs must be presented to the regional DNR water regulation engineer for a determination if any formal approval is required.

A. Maintenance Frequency

The De Pere Dam is an earthen embankment type dam and is constructed of earthen materials.

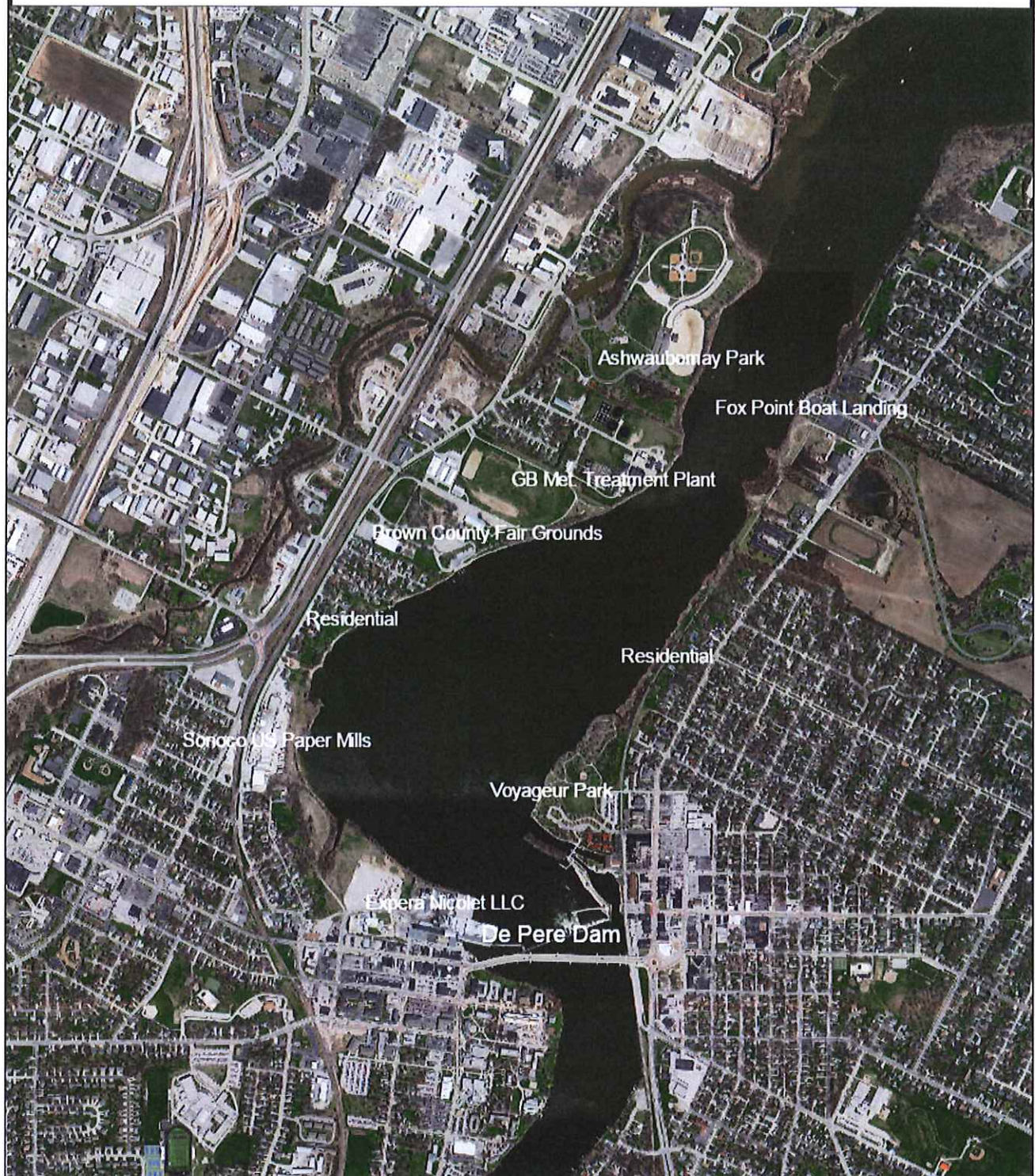
Periodic maintenance is expected and preventative maintenance activities will increase with time. Maintenance should be routinely performed. Some items require more frequent attention than others. Routine maintenance should include activities such as mowing, tree removal, and filling rodent holes.

B. Budget Considerations

Routine maintenance comes out of the City's Street and Parks Department budgets. For major maintenance projects, the city council would have to approve and add it to the capital improvement project.

EXHIBIT A LOCATION MAPS

De Pere Dam - Effected areas downstream



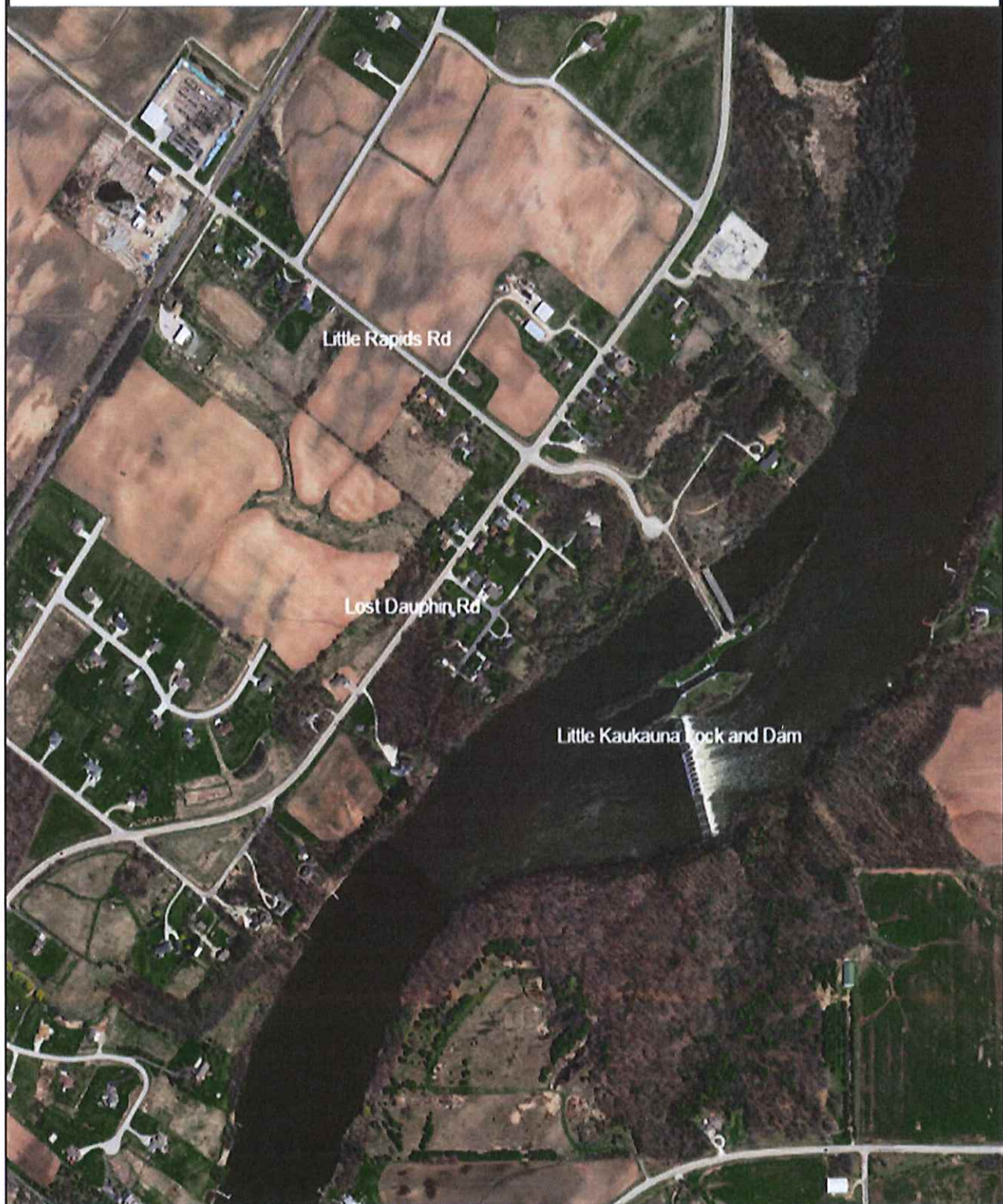
This map was produced utilizing a variety of sources the City of De Pere reasonably believes are reliable, including GIS data, some of which was under development at the time this map was produced. The City of De Pere makes no warranty, either expressed or implied, including no warranty as to fitness for a particular use, of the information contained in or comprising this map.

Map of De Pere, WI Provided By The De Pere Planning/GIS Department 2010



01/06/2015
Scale 1:15840

Map of Little Kaukauna Lock and Dam



This map was produced utilizing a variety of sources the City of De Pere reasonably believes are reliable, including GIS data, some of which was under development at the time this map was produced. The City of De Pere makes no warranty, either expressed or implied, including no warranty as to fitness for a particular use, of the information contained in or comprising this map.

Map of De Pere, WI Provided By The De Pere Planning/GIS Department 2010



01/06/2015
Scale 1:7200

**EXHIBIT B
INSPECTION PLAN**

De Pere Dam Inspection Checklist

OWNER: _____ DNR FIELD FILE NUMBER – 5.01
OWNER'S REPRESENTATIVE: CITY OF DE PERE
DATE: _____
WEATHER/SITE CONDITIONS: _____
INSPECTOR(S): _____
CHECK ITEM AS NOTE CONDITIONS NOTE ACTIONS
INSEPTED ✓ AND OBSERVATIONS REQUIRED

.....

N/A Benchmark

- Check for disturbance/vandalism
- Condition: _____

N/A Headwater Gage (Army Corps of Engineers)

- Condition: _____
- Reading: _____

N/A Signage

- Condition and Visibility: _____
- Action: _____

Upstream Riprap

- Elevation/location/extent of riprap _____
- Condition: _____
- Action: _____

Downstream Riprap

- High flow can cause underwater erosion (scour). Check for stream erosion and for scour hole at outlet of pipe. Use probe to check depth of scour hole.
- Condition: _____
- Action: _____

Earth Embankment

- Check vegetative cover. The embankment should have a suitable cover of grass with no woody vegetation such as brush, shrubs and trees. Mow regularly to maintain a 6-inch grass stand.
- Check for animal burrows. Remove animals and backfill holes with soil.
- Check for surface erosion on grassed slopes and at riprap flumes which intercept roadway drainage.
- Replace riprap as required and topsoil and re-seed eroded areas as required.
- Check for slumps (slides or sloughs). Slow or sudden movement of earth embankment is an indication of instability and requires immediate response. Contact State Dam Safety Engineer for advice.
- Check for settlement of embankment. Settlement may be uniform or at isolated depressions. Settlement indicates loss of material or compression of material either within the dam embankment or the foundation. Settlement should be documented and evaluated by an engineer.
- Check for seepage on the downstream slope. If present, monitor for presence of soil particles. If soil is moving, a piping condition (internal erosion) may exist and requires immediate contact with the State Dam Safety Engineer.
- Condition: _____
- Action: _____

**EXHIBIT C
OBSERVATION LOG**

Monthly Observations Log De Pere Dam				
Date	Time	Inspector	Precipitation	Observations

EXHIBIT D MAINTENANCE LOG

Maintenance Log De Pere Dam				
Activity	Date	Person	Action Taken	Comments
Mowing				This is completed regularly and will only be noted when required due to excessive growth.
Floating Debris Removal				
Trees/Woody Vegetation Removal				
Rodent Removal/Hole Repair				
Rip Rap Replacement				