

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor  
Matthew J. Frank, Secretary  
Gloria L. McCutcheon, Regional Director

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February 25, 2009

Ref. File: 3500

Ms. Sue Black, Director  
Milwaukee County Parks  
9480 Watertown Plank Road  
Wauwatosa, WI 53226

Dear Ms. Black:

The Department will attend the Milwaukee County Parks, Energy and Environment Committee meeting on March 10, 2009, to answer questions regarding the Estabrook Dam. Estabrook Dam has several issues that need discussion and resolution. Each is described below:

**1. Order for Dam Repair (September 26, 2008)**

The September 26, 2008, Order for Dam Repair required Milwaukee County to draw down the impoundment of Estabrook Dam by October 5, 2008. The order specified that the impoundment should not be refilled unless repairs to the stoplog sections of the fixed crest spillway are completed. This order applies only to the stoplog sections of the fixed crest spillway. It does not apply to the outstanding maintenance and repair requirements listed in the October 16, 2007, work schedule, which are discussed in the following sections. Milwaukee County has complied with the draw down order.

**2. Outstanding Maintenance and Repair Requirements (October 16, 2007)**

The following maintenance and repairs were scheduled to be completed in 2005 and 2006. That schedule was extended from the 1995 and the 2004 dam safety inspection reports to accommodate Milwaukee County's budget process. The work was not completed and the needed repairs were listed again in an October 16, 2007, work schedule (copy attached). The following tasks were to be completed during 2008 to ensure safe operation of the Estabrook Dam:

- The debris on the fixed crest spillway reduced the hydraulic capacity of the dam and the dam is not functioning as designed. Photos documenting the debris build up are attached.
- An Inspection, Operation and Maintenance Plan must be completed for Estabrook Dam. An Inspection, Operation and Maintenance Plan is required for all large dams (Wisconsin Administrative Code, Chapter NR 333.07(4)). This plan provides the dam operator with basic guidelines for performing routine and annual safety inspections, documenting the inspections, operating the dam within established water levels, and performing scheduled maintenance. It also provides a more comprehensive estimate of the annual maintenance budget for County staff and officials.
- Substantial concrete repairs are needed on the ice breakers, the dam gate walls, the bridge deck and the stoplog section piers.

**3. Established and Permitted Water Levels for the Estabrook Dam (May 26, 1937 -2-WP-142, Public Service Commission of Wisconsin)**

The Public Service Commission of Wisconsin permit authorized construction, operation, and maintenance of the Estabrook Dam. It established that the water level must be maintained at 36.00 feet Milwaukee County datum. The fixed crest spillway has an elevation of 36.00 feet and the slide gates have an elevation of 36.3 feet. The Public Service Commission full-pool water level established in 1937 (36.00 feet) is still valid. The original construction permit did not authorize the current fill and draw down method of dam operation. The County notifies the Department when the dam gates are opened each fall and closed in the spring. Department file documents indicate that this method of operation was intended to limit ice damage to the dam and associated structures.

Individuals and municipalities have requested Milwaukee County to use different protocols to operate Estabrook Dam. Frequently, these protocols have resulted in environmental impacts to the Milwaukee River.

The Department will work with the County to review the operational water level order for the dam. The new order will clarify and establish water levels and specify operational standards. Depending on the selected operation protocol, other structural work may be required at additional costs. If the selected protocol was year-round full-pool level, the dam would need improvements to withstand ice loads. The County's 2006 evaluation by consultants, STS Inc., determined that the dam is not stable under ice loading and full-pool winter conditions. County staff estimated that the additional cost to stabilize the dam to withstand ice load and winter full-pool operations would be \$2,000,000 to \$5,000,000. The 1937 permit and other Department correspondence relating to the water level are enclosed for your review.

Public health and safety are top priorities. The Department must ensure that Estabrook Dam does not create a risk to life, health, and property. Previously established deadlines for completion of outstanding maintenance items have passed. These repairs must be completed prior to refilling the impoundment. If the work is not completed, a second Repair or Abandon Order may be required. This could extend the drawdown of the impoundment. The needed maintenance and repair activities and the previously established completion deadlines are included on the attached work schedule (revised October 16, 2007).

If you have questions on the conditions of the dam or the needed repair schedule, please contact Dam Safety Engineer Tanya Meyer. Tanya can be reached by phone at 414-263-8641 or by email at Tanya Meyer @Wisconsin.gov. My staff and I are ready to continue working with Milwaukee County on this important issue.

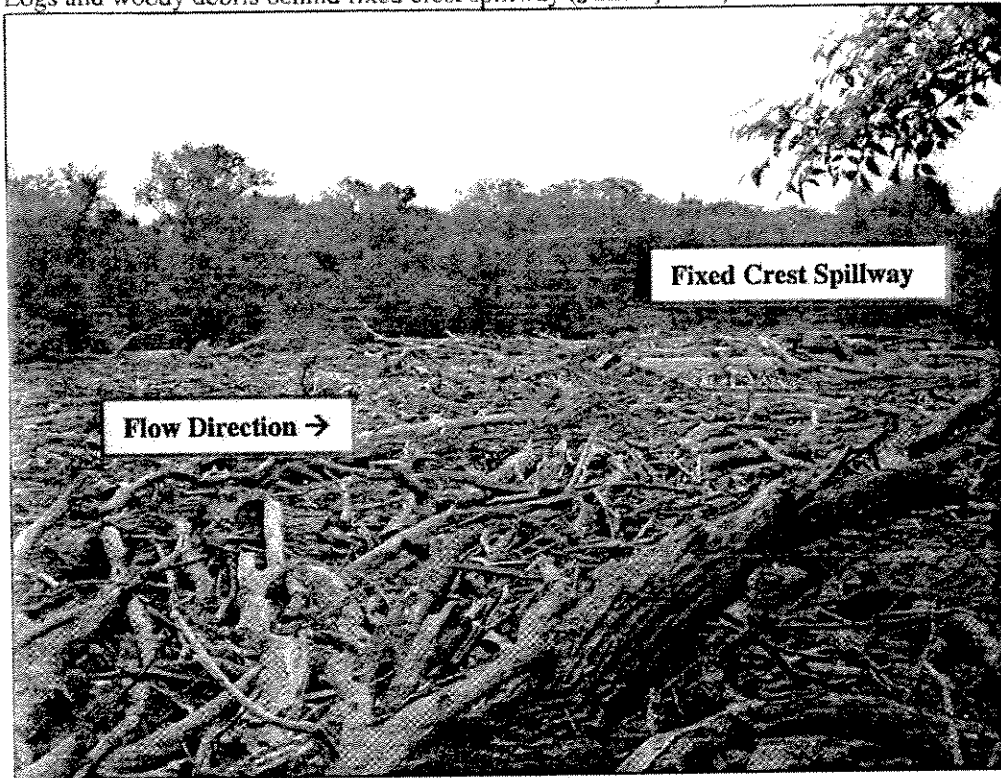
Sincerely,

*Sharon L. Gayan*

Sharon L. Gayan  
Milwaukee River Basin Supervisor

cc: Estabrook Dam Rehabilitation Workgroup (Jim Keegan, Julie Esch, Karl Stave, Kevin Haley, John Schapekahn, Pamela Bryant) – Milwaukee County  
Greg High, Steve Keith – Milwaukee County Architectural, Engineering, and Environmental Services  
Tanya Meyer – DNR SER Milwaukee  
Bill Sturtevant – DNR WT/3  
Meg Galloway – DNR WT/3  
Russ Rasmussen – DNR WT/3

Logs and woody debris behind fixed crest spillway (June 3, 2008):



Logs, woody debris, and man-made materials behind fixed crest spillway (October 27, 2004):



Logs, woody debris, and man-made materials behind fixed crest spillway (November 17, 2000):

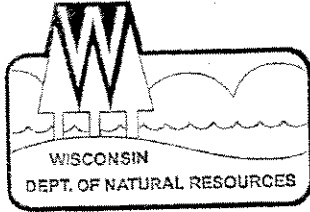


**Estabrook Dam (Field File # 40.08)**  
**Summary of Work Schedule**

ITEM	REFERENCE	PREVIOUS SCHEDULES	REVISED SCHEDULE
Plans and specs to meet required stability for all loading conditions	Department response to 2006 STS Consultants Evaluation	Not established	October 1, 2010
Tree/shrub removal at all abutments	1995 and 2004 Inspection Reports	June 1, 1995 June 1, 2005	May 1, 2008
Emergency Action Plan	Oct 16, 2007 Correspondence	Not established	May 1, 2008
Operation, Inspection & Maintenance Plan	1995 and 2004 Inspection Reports	October 1, 1996 December 31, 2005	May 1, 2008
Repair expansion joints on spillway operating deck	2006 STS Consultants Evaluation	Not established	May 1, 2008
Bank repairs at abutments of control spillway	2004 Inspection Report 2006 STS Consultants Evaluation	June 1, 2005	June 1, 2008
Debris removal from fixed crest spillway	1995 and 2004 Inspection Reports Mar 29, 2005 Correspondence 2006 STS Consultants Evaluation	May 1, 1995 December 31, 2005	October 1, 2008
Repair of ice breakers	2004 Inspection Report 2006 STS Consultants Evaluation	December 31, 2006	October 1, 2008
Replace stoplogs and supports of fixed crest spillway	2004 Inspection Report 2006 STS Consultants Evaluation	December 31, 2005	October 1, 2008
Concrete repairs of piers	1995 and 2004 Inspection Reports 2006 STS Consultants Evaluation	October 1, 1997 December 31, 2006	October 1, 2008 (immediate repairs as recommended by STS) October 1, 2010 (additional repairs)
Concrete repairs of operating bridge deck and walls	2006 STS Consultants Evaluation	Not established	October 1, 2008 (immediate repairs as recommended by STS) May 1, 2012 (additional repairs)
Inspect upstream face of fixed spillway		Not established	November 1, 2008 (One month following debris removal)
Gate repairs	2004 Inspection Report 2006 STS Consultants Evaluation	December 31, 2006	October 1, 2009
Establish benchmarks	1995 Inspection Report	June 1, 1996	October 1, 2009

Rebuild concrete access stairs	2004 Inspection Report	December 31, 2005	November 1, 2010
Concrete repairs of surface deterioration -- abutments	2006 STS Consultants Evaluation	Not established	May 1, 2012
Concrete repairs of surface deterioration -- fixed spillway	2006 STS Consultants Evaluation	Not established	May 1, 2012
Debris removal from ice breakers	2004 Inspection Report Mar 29, 2005 Correspondence	Annual Maintenance (5-yr dredging permit issued 10/19/05)	Continued Annual Maintenance
Seepage monitoring (left abutment)	1995 Inspection Report	Monitor	Continue monitoring
Structural analysis of Estabrook Dam	2005 Inspection Report	December 31, 2005	Complete (2006 STS Consultants Evaluation)
Scour/undermining analysis	2005 Inspection Report	December 31, 2005	Complete (2006 STS Consultants Evaluation)
Installation of dam warning and portage signs	1995 and 2004 Inspection Reports	June 1, 1995 March 1, 2005	Complete
Improve access to south bank (fixed crest spillway)		Not established	
Establish operational order	2005 Inspection Report	Not established	

Note: Additional deadlines may be necessary should conditions at the dam change.



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Tommy G. Thompson, Governor  
George E. Meyer, Secretary  
Gloria L. McCutcheon, Regional Director

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October 19, 2000

Susan Baldwin, Parks Director  
Milwaukee County  
9480 West Watertown Plank Road  
Wauwatosa, WI 53226

Subject: Operation of Milwaukee County Estabrook Park Dam

Dear Ms. Baldwin:

This purpose of this letter is to acknowledge receipt of Mr. Scott Davis' letter, Milwaukee County Parks Northern Region Manager, stating that the gates of the County's Estabrook Park Dam would be opened on October 2, 2000. The opening of the dam was in response to a request by the Milwaukee Metropolitan Sewerage District (MMSD) to facilitate the construction of flood control features along Lincoln Creek. The letter also served as a reminder of our last June 23, 1999 meeting to discuss a number of unresolved issues surrounding the operation and maintenance of the Estabrook Dam. Most of these issues, and others that have since arisen, have not yet been resolved.

1. Through notification of the County, the Department is aware that the dam gates are routinely opened and closed each fall and spring, respectively. Records describing the reasons for these annual events are somewhat lacking. It was speculated that this mode of operation might be an attempt to limit ice damage to the dam structure. Since our last meeting, the Department has reviewed the permit for the dam issued on May 26, 1937 by the Public Service Commission of Wisconsin. The permit requires that the normal water level be maintained at 36.00 feet Milwaukee County dam. The permit makes no mention and our files contain no documentation authorizing the current method of dam operation. The Department would like to meet with the appropriate County staff to develop an operational order for the dam that will improve the Milwaukee River ecosystem in the area affected by the dam and still address County issues.
2. Over the last several years, the Department has observed extreme fluctuations of Milwaukee River discharge and elevations following the annual closure of the dam. These dramatic events appear to be associated with local flash flood warnings. Last year one of these events was coincidental with a very poor recruitment class of smallmouth bass downstream of the dam. These events continue despite two separate studies that concluded that the water elevation of the Estabrook Dam has no impact on floodwater elevations on the Milwaukee River or Lincoln Creek. Therefore, the Department does not agree with the County's current dam operating procedure that opens the dam gates in anticipation of heavy rains or flash flood warnings.
3. The last inspection report for the dam from the Department was dated January 23, 1995. This report required a number of items be addressed as follows:

<u>ITEM:</u>	<u>REQUIRED COMPLETION DATE</u>
A) Signing	June 1, 1995
B) Tree Removal at Concrete Dam Abutments	June 1, 1995
C) Concrete Dam Repairs	October 1, 1997
D) Debris Removal From Fixed Crest Spillway	May 1, 1995
E) Seepage Monitoring	Monitor
F) Establishing Benchmarks	June 1, 1996
G) Operation, Inspection and Maintenance Plan	October 1, 1996

In addition, the structural integrity of the mason stone spillway has never been fully assessed. The Department has no documentation in its files that any of these items have been completed. We understand that the County is planning to automate the remainder of the dam gates this year but have any of these other items been addressed?

4. Greg Young of your staff has contacted Will Wawrzyn regarding the need to remove a large amount of debris which has accumulated behind the dam and spillway. Access from shore is difficult and the County is considering burning these debris. While a large portion of the debris is wood, there may be a fair amount of man-made debris as well. Burning these debris may or may not be appropriate.
5. The Department is in the process of conducting a feasibility study that will assess the magnitude and extent of sediment contaminated by PCB and other contaminants along the lower reaches of Lincoln Creek and the Estabrook impoundment, and to identify a range of costs associated with their remediation. The majority of these contaminated sediment are located on Milwaukee County Park property. Based on a previous study, these sediments are considered heavily polluted by PCBs. As a point of reference, these sediments may contain more PCBs than sediment contained in the Fox River below the De Pere dam. This study has also documented the release of PCBs to downstream reaches of the Milwaukee River when the dam gates are opened.

Following the issues discussed above, I believe it would be worth our while to meet with appropriate staff to discuss these issues. We should have the meeting well in advance of implementing any dam repairs or debris removal. Please contact me at 263-3707 or Will Wawrzyn at 263-8699 to set up the meeting.

Sincerely,



Sharon Gayan  
Milwaukee River Basin Team Leader

Cc: Chip Krohn, Regional Water Leader  
Mike Bruch, Water Regulation Engineer  
Steve Westenbroek, Water Resources Engineer  
Brad Egghold, So. Lake Michigan Fisheries Supervisor  
Will Wawrzyn, Biologist

BEFORE THE  
PUBLIC SERVICE COMMISSION OF WISCONSIN  
- - - -

IN THE MATTER OF THE APPLICATION OF  
MILWAUKEE COUNTY TO CONSTRUCT, OPER-  
ATE AND MAINTAIN A DAM IN THE MILWAU-  
KEE RIVER NEAR THE CITY OF MILWAUKEE,  
WISCONSIN, TO BE KNOWN AS ESTABROOK  
PARK DAM, FOR THE PURPOSE OF FLOOD CON-  
TROL, MAINTAINING NORMAL WATER LEVEL  
UNDER NORMAL CONDITIONS, AND TO PROVIDE  
RECREATIONAL FACILITIES AND TO REMOVE  
ROCK LEDGE IN RIVER BED ABOVE DAM IN  
AID OF FLOOD CONTROL AND NAVIGATION  
- - - - -

2-WP-142

BY THE COMMISSION:

The applicant herein, the County of Milwaukee, requests a permit to construct, operate and maintain a dam in and across the Milwaukee River in that part of the Northwest Quarter of the Northeast quarter of Section 5, Township 7 North of Range 22 East in Milwaukee County, described as follows: approximately 800 feet south of the north line and 800 feet east of the west quarter line of the Northwest Quarter of the Northeast Quarter of said Section 5.

The application was filed on the 10th day of March, 1934. The purpose of the proposed dam is flood control, maintaining normal water level under normal conditions and to provide recreational facilities.

A public hearing on said application was set for and held at the City of Madison on the 16th day of April, 1934. Notice of said hearing, together with direction to the applicant to cause the same to be published pursuant to Section 31.06, Statutes, in the Milwaukee Journal, a daily newspaper published in the City of Milwaukee, Wisconsin, and to serve notice by registered mail as provided by said section on the persons described therein was issued and served on the applicant on the 14th day of March, 1934. At the hearing held, the following appearances were entered:

Present: Adolph Kanneberg, Examiner  
County of Milwaukee, by  
Stanley Perry, Assistant Corporation Counsel  
Town of Milwaukee Civic Alliance, by  
Harry E. Thur  
Eline's Incorporated, by  
Edward F. Byron  
2756 North Downer Ave.,  
Milwaukee

Walter Petzold appeared on his own behalf and on behalf of  
Mrs. Augusta Meiser

F. W. Ullius, Engineer, Milwaukee,  
appearing on his own behalf.

There were no other appearances.

The applicant filed proof of publication of the notice in the Milwaukee Journal once each week for three successive weeks the first publication being on the 19th day of March, 1934. The applicant further submitted proof of the service of said notice as required by the Commission upon all persons whose lands will be affected by the construction and operation of the proposed dam not less than twenty days prior to the hearing.

It is proposed to construct the dam on rock foundation in two sections separated by a small island. The crest or overflow section is to be built in the form of a curved spillway 562 feet long, located on the main channel of the river and will consist of concrete with a stone facing. Five hundred thirteen (513) lineal feet of the spillway will have a crest elevation of 36.00 feet and 22 lineal feet of the dam will be at elevation 35.80 feet the remaining length to consist of concrete and stone faced abutments rising to elevation 40.00 feet. It is proposed to maintain a normal water level at approximately elevation 36.00 feet applicants datum.

The gate section of the dam on the opposite side of the island is located in a channel 155 feet wide with 3-1 slopes on each side. This section of the dam will be of reinforced concrete with 10 vertical sliding steel gates each 11.5 feet wide. At each end of the gate section is a 10'x4' spillway with a crest elevation of 35.90 feet and an abutment containing a stairway leading to the operating bridge extending across the dam. In a lowered position the

gates form an additional spillway with the top at elevation 36.60 feet. Each gate has a separate operating mechanism and is provided with heating elements to prevent freezing. The entrance to the 155' channel is protected with a number of Tripod type reinforced ice guards set 11.6 feet on centers to divert ice flows over the main spillway.

The dam backs water up for approximately  $2\frac{1}{2}$  miles and creates a lake of 103 acres. The dam is designed to pass 14,700 c.f.s. with a flood crest measured in the vicinity of the dam not exceeding elevation 38.00 feet.

Applicant's bench mark is described as the top of fence post on west bank of the river near the dam site, elevation 36.0 feet.

The nearest city or village to the proposed dam is the City of Milwaukee, the boundaries of which are in the center of the Milwaukee River at the site of the dam. The nearest existing dam above said dam site is the Kletzsch Park Dam known also as the Bender dam and is  $3\frac{1}{2}$  miles distant therefrom. The nearest dam below the dam site is the dam in the City of Milwaukee known as the North Avenue dam and is  $2\frac{1}{2}$  miles distant therefrom.

The dam site is owned by the applicant, the County of Milwaukee and Eline's, Incorporated, a corporation, the applicant being the owner of the east bank of the stream and Eline's, Inc., being the owner of the west bank of the stream. Eline's, Inc. has given its consent to the erection and operation of said dam on said site by the applicant, the County of Milwaukee.

The Commission finds that the application complies with all of the requirements of Chapter 31 of the statutes; that the proceedings had thereon also comply with all of the requirements of said chapter; that the applicant has filed with the Commission a map on the scale of not less than four inches to the mile showing the land that may be affected by the construction, operation

and maintenance of the proposed dam or by any flowage that may be caused thereby and approximately the outline of such flowage, which map indicates the ownership of each tract of land within the flowage.

The applicant also proposed in connection with the construction of the proposed dam to excavate the bed of the river for a distance of some 3,000 feet for the purpose of improving flood control and in aid of navigation.

The Commission finds that the proposed dam is not to be built to develop power; that the power which might be developed by the proposed dam will be more than 50 theoretical horse power for 50% of the time, but that the applicant being a municipal corporation is not required to file the proposal under Section 31.09 Statutes.

NOW THEREFORE, THERE DOES HEREBY ISSUE AND IS GRANTED TO THE applicant, the County of Milwaukee, the permit provided for by subsection (3) of section 31.06, Statutes, to construct, operate and maintain said dam as proposed and as hereinbefore described, pursuant to plans submitted to and approved by the Commission.

Dated at Madison, Wisconsin, this 21<sup>st</sup> day of May, 1937.

PUBLIC SERVICE COMMISSION OF WISCONSIN

Chairman

*Fred S. Hunt*

Commissioner

*Robert C. Ripley*

Commissioner

Attest:

*[Signature]*  
Secretary