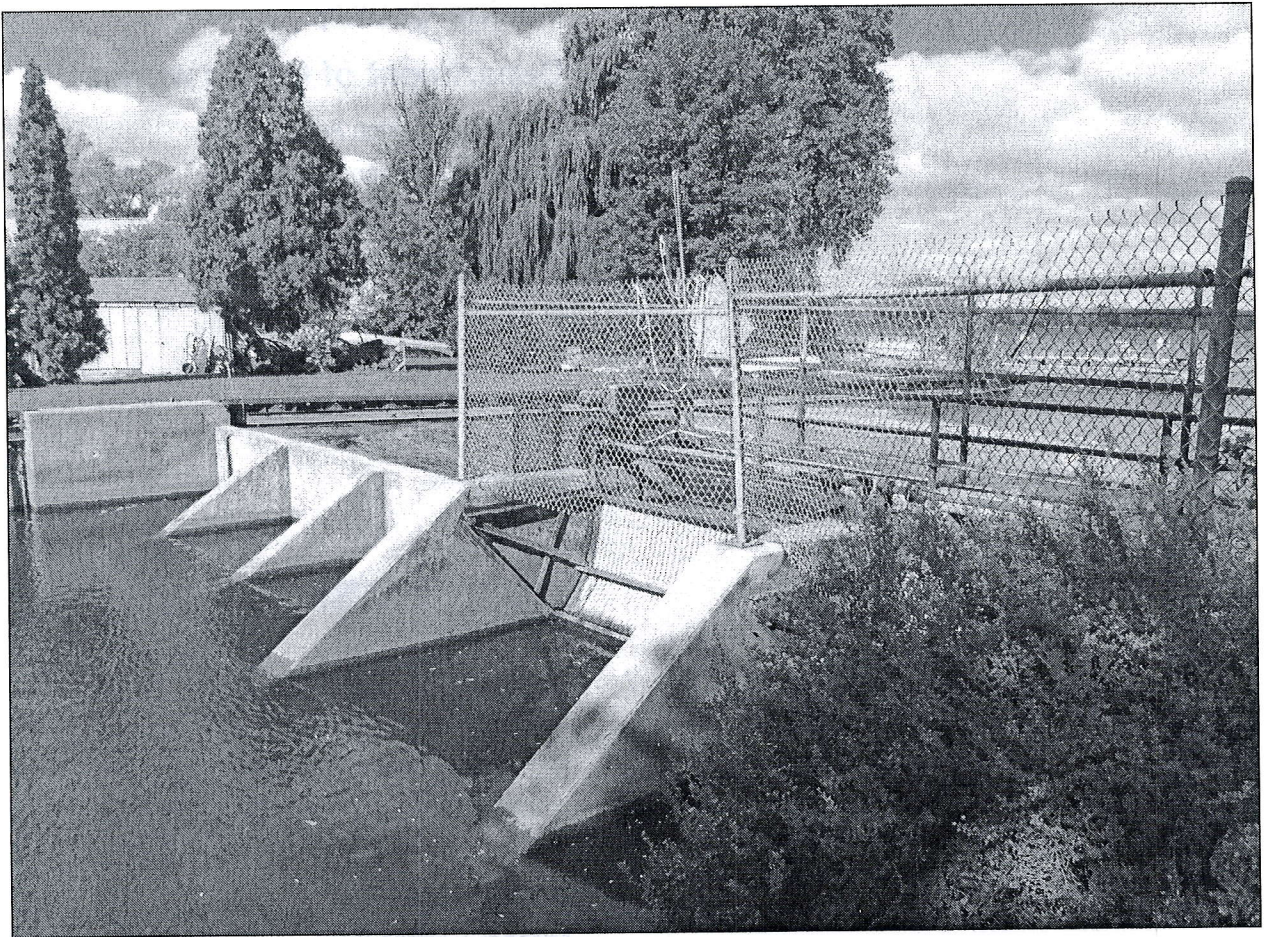




Wind Lake

Water Control Structure Examination Report

October 2015



**Wind Lake
Water Control Structure
Examination Report**

Prepared for

**Racine County
Department of Public works**

14200 Washington Avenue
Sturtevant, Wisconsin 53177

Prepared by

GRÄEF

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Brian Schneider P.E.
Michael J. Horne P.E.

Project No.: 2015-0014.01

Part I. Examination Summary

Structure Name: **Wind Lake Dam**

Structure Status Designation

The condition of this water control structure, or parts thereof, appears safe at the time of inspection, but requires repairs in order to prevent the deterioration noted from compromising the function of the dam or creating unsafe conditions. Structure plans are included in Appendix A.

Recommendation for Future Inspections

Given the hazard rating and condition of the dam the recommended interval for a full inspection is 5 years. This is subject to change based on observations made during routine operation and maintenance activities.

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Part II. General Information

Contacts

Structure Owner: Racine County
Address: 14200 Washington Avenue
Sturtevant, Wisconsin 53117

Contact: Mr. Nathan Plunkett
Racine County Public Works
Telephone: 262-886-8440

Professional: GRAEF - USA Inc.
Address: 125 South 84th Street, Suite 401
Milwaukee, WI 53214-1470

Contact: Brian Schneider P.E.
Telephone: (414) 259-1500

Wisconsin Department of Natural Resources Structure Designation

Dam Key Sequence No.: 1004

Field File No.: 51.06

Size Class: Large

Hazard Rating: Low

Structure Description

Location: South End of Wind Lake

Racine County

Lat/Lon: -89.6394, 44.7615

Structure Age: 1971 per construction drawings

Structure width: 55.5 ft

Structure height: 7 ft per DNR listing

Hydraulic height: 3 ft per DNR listing

Impoundment: Wind Lake

Impoundment Surface Area 936 acres

Max Impoundment Storage: 6,550 acre/feet

Dam Crest Elevation: 768.44

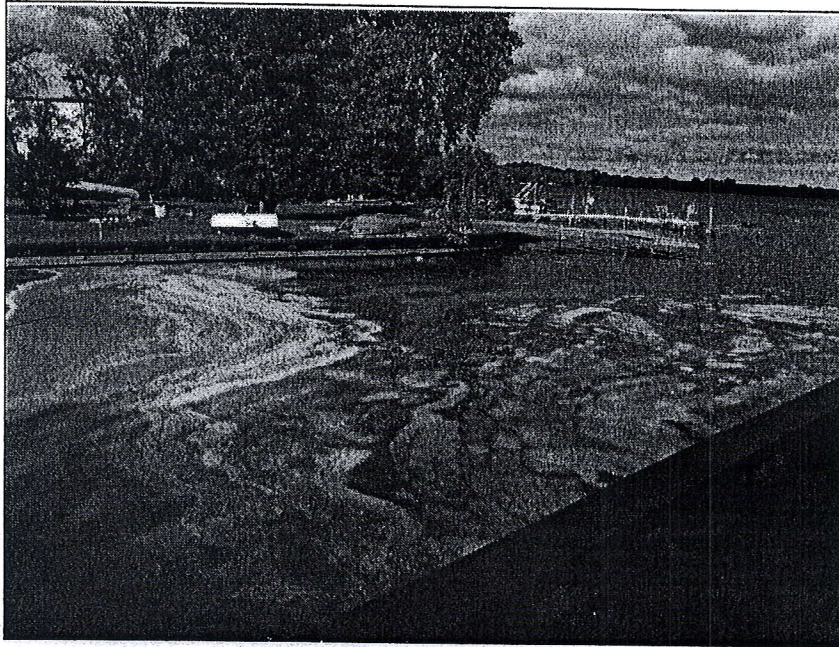
General Features: Concrete spillway with two tainter gates and concrete wing walls.

General Structure Photos



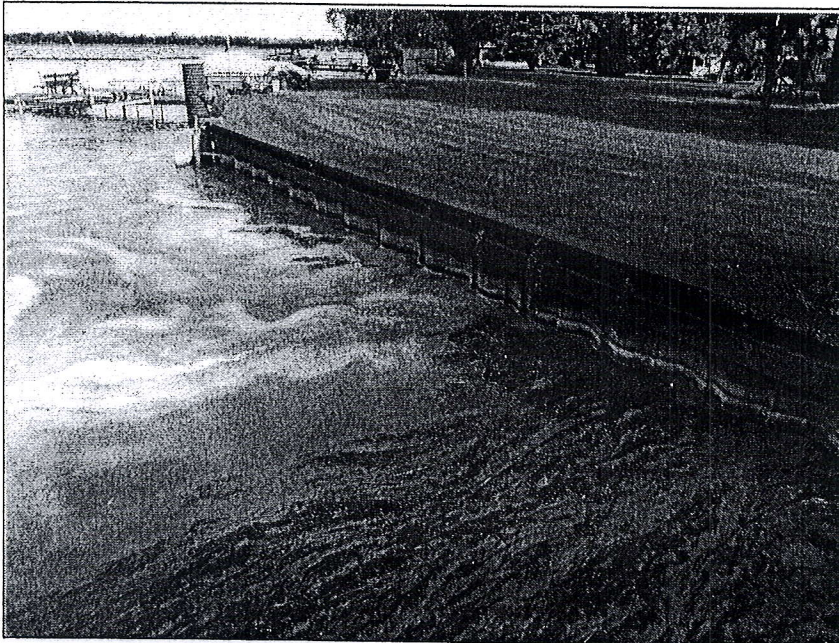
Wind Lake Dam

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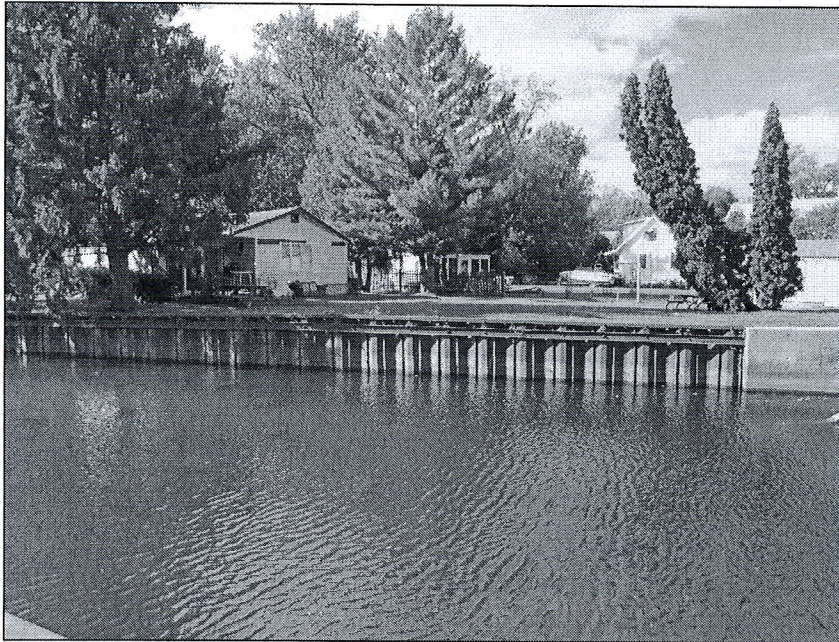
West Upstream Embankment

10040930201502



East upstream Embankment

10040930201503



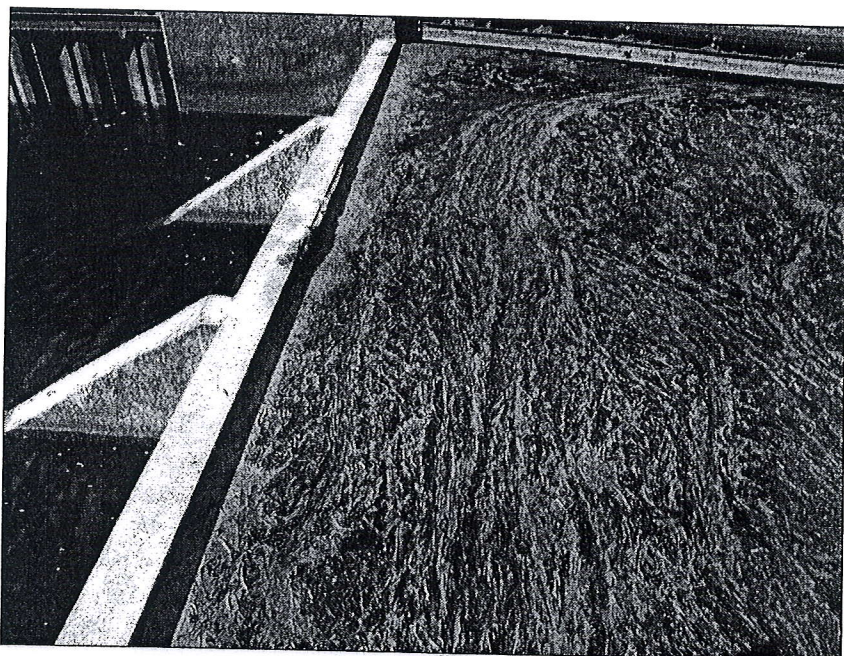
West Downstream Embankment

10040930201504



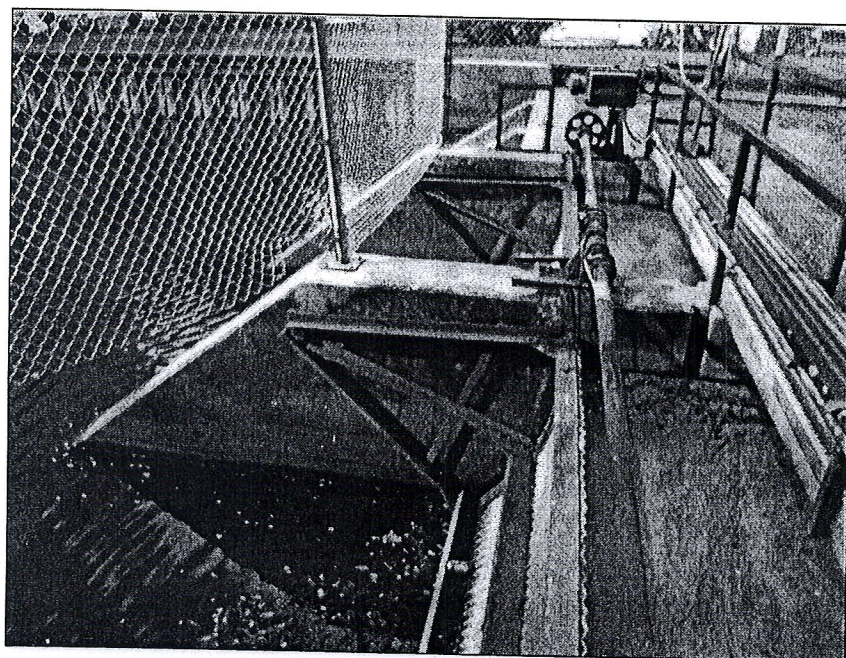
East Downstream Embankment

10040930201505



Fixed crest portion of dam

10040930201506



Gate portion of dam

10040930201507

Part III. Description of Examination

A water control structure examination is to include a review of the available construction and repair documents provided by the owner and a review of previous inspection reports. The Emergency Action Plan and the Inspection, Operation and Maintenance documents are also to be reviewed and updated. A visual inspection of the structure and an evaluation of any changes to the land uses downstream are to be made along with a review of the current dam failure analysis.

Structure Document Reviews

The structure construction documents were reviewed to determine the specific designs of the structure in seeking to detect and determine the cause of any existing conditions of distress and deterioration. The following documents were provided by the owner for review.

Date	Author	Document
10/71	Ruekert & Mielke, Inc.	Construction Plans

Previous Inspection Report Reviews

The previous inspection reports were reviewed to determine the past site and structural conditions and past repairs and upgrades. The following inspection reports were provided by the owner for review

Date	Author
6/25/2007	Tanya Meyer - WDNR

Visual Examinations

The structure was visually examined in July 2015. The examination covered all visible components above the waterline and probing of accessible components below the waterline. All examinations were documented by field notes on the Department of Natural Resources checklists and by photographs. Refer to section IV for the dam inspection checklist. Refer to section V for areas of distress or deterioration found. Please note that certain conditions of distress and/or deterioration cannot be detected by visual examination or probing; therefore, other conditions of distress or deterioration may exist that have not been detected. Refer to Appendix A for a plan of this structure.

Structure Plan and Sections

Refer to Appendix A for plans and sections provided for this structure. Surfaces below the waterline or covered with soil reflect the anticipated construction and should not be construed as verified unless noted.

Part IV. Conditions of Distress or Deterioration

Conditions of significant distress and deterioration that could affect the structural integrity of the structure are summarized below. Representative photographs of the conditions are included. Recommendations for repairs and/or stabilization, if applicable, are provided. Stabilization is temporary measures that can be employed to prevent components from becoming unsafe or an imminently hazardous conditions until permanent repairs are made. A recommended schedule for corrected action is provided.

Conditions of distress and deterioration that were observed are as follows:

Condition #1 Fixed Crest Water Leak

Observations: Deteriorated concrete below steel channel cap leaks

Photographs:



Leak at fixed crest

10040930201508



Leak at fixed crest

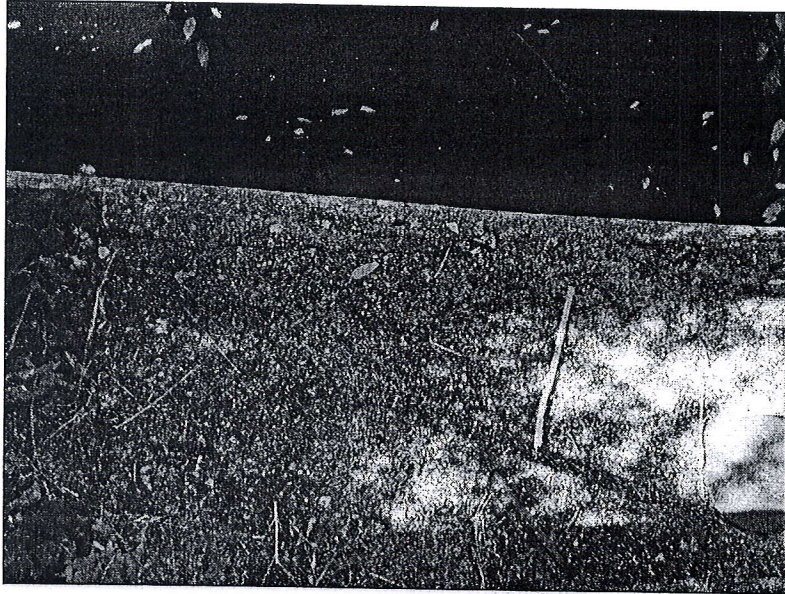
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Repairs: Prepare concrete surface when water levels are down and patch using concrete repair mortar.
Schedule: Repair within one year.

Condition #2 Minor Concrete Deterioration

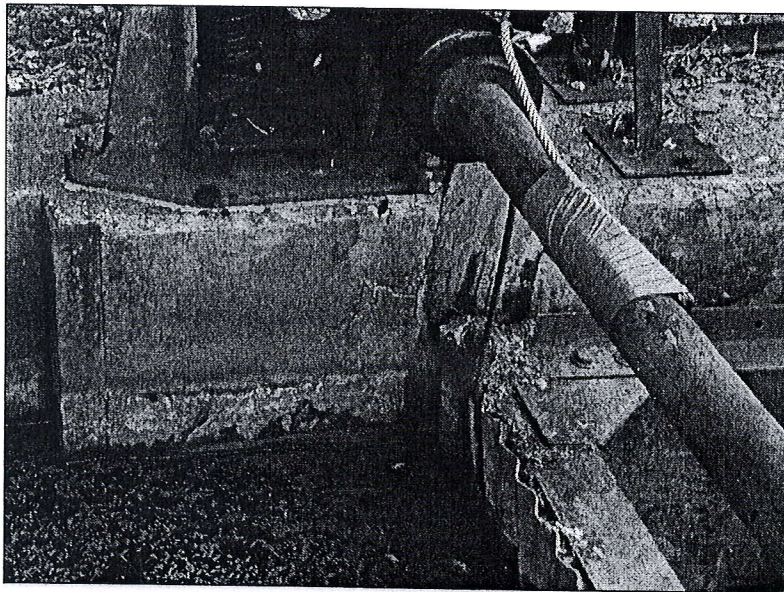
Observations: Cracks in concrete. No loose concrete

Photographs:



Concrete cracks – Future spalls

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Concrete cracks – Future spalls

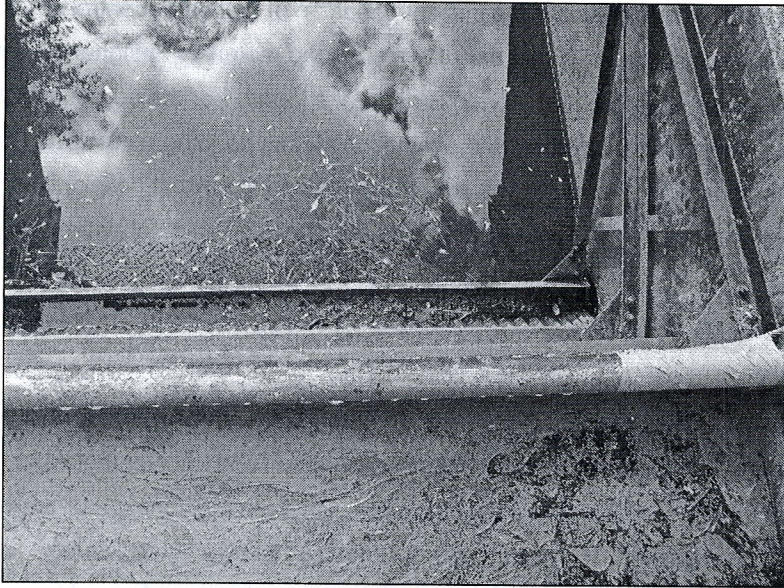
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Repairs Prepare concrete surface and patch using concrete repair mortar when spalls appear.
Schedule: Monitor.

Condition #3 Gate Seal Leaks

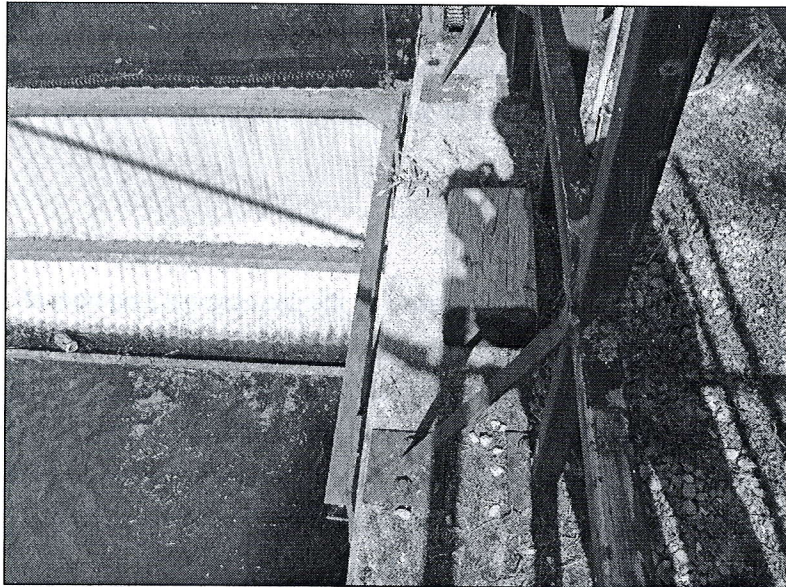
Observations: Deteriorated concrete below steel channel cap leaks

Photographs:



Leak at fixed crest

10040930201512



Bottom gate seal leak

10040930201513

Repairs: Determine gate to base dimensional variations. Readjust or replace seal.

Schedule: Monitor

Part V. Report Preparation and Use

Purpose

The purpose of this project is to observe, document, and evaluate the current condition of the water control structure regarding structural integrity. Dams are typically composed of a number of systems and materials designed to serve three main functions: 1) Water retention, 2) Water release control, and 3) Structural support. For the purpose of this project, visual and probing observations are given for consideration and evaluation. Areas needing repairs as evidenced by visible external distress were identified. Potential repairs are recommended to correct deficiencies, such as potentially unsafe conditions, or conditions that if left uncorrected could result in escalation of deterioration or increased repair costs

Limitations

This report is based on information obtained from reviews of construction documents and from on-site visual examinations as listed in the report. Review of construction documents included pertinent drawings of the water control structure provided by the Owner. The on-site visual observations included visual examinations of all exposed faces and probing of accessible faces below the waterline. The observations, unless otherwise noted, were performed without disassembling or damaging the existing systems. No calculations have been performed to determine the adequacy of the original design, or subsequent alterations and repairs. No physical tests were made, samples taken, or equipment operated to evaluate performance of the existing structures. These are beyond the scope of this project. Additional study may be warranted to fully evaluate conditions of this control structure. The evaluation contained in this report shall not be construed as a warranty or guarantee of the current or future performance, or remaining useful life, of any material, or system.

Reliance and Use Restrictions

The observations, findings, and conclusions contained in this report are based on the professional judgment of a qualified professional experienced in this type of work using that degree of skill and care normally exercised by reputable consultants performing similar services under like assignments and circumstances. This report is intended to be read in its entirety. Information provided in a specific section may be related and clarified by descriptions and discussions in another part of the report. Therefore, interpretations and conclusions drawn by reviewing only isolated statements are the sole responsibility of the reader. This report has been prepared in the present tense as it is intended to only describe conditions at the time of the on-site visual examinations.

Appendix A. Structure Plans and Sections
