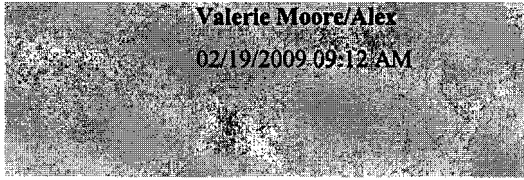


19  
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2-24-09



To Jackie Henderson/Alex@Alex  
cc  
bcc  
Subject Fw: Lake Barcroft docket item

Valerie A. Moore  
Supervisory Administrative Officer  
City Manager's Office  
City of Alexandria, VA

www.laf.org  
Knowledge is power and attitude is everything.

----- Forwarded by Valerie Moore/Alex on 02/19/2009 09:12 AM -----



Michele Evans/Alex  
02/18/2009 08:21 PM

To Valerie Brown/Alex  
cc  
Subject Fw: Lake Barcroft docket item

I learned tonight there may be a memo on this  
Jim Hartmann

----- Original Message -----

**From:** Jim Hartmann  
**Sent:** 02/18/2009 06:24 PM EST  
**To:** City Council  
**Cc:** Rich Baier; Mark Penn; Adam Thiel; Mark Jinks; Michele Evans  
**Subject:** Lake Barcroft

The following is provided by Rich Baier. He and Mark Penn plan to cover this item at the NS monitoring Group meeting tomorrow evening and the LEPC next week. We are also planning a brief presentation on at the next legislative meeting of City Council.

Lake Barcroft is a man-made recreational lake created by a concrete and earthen dam located within Fairfax County, just past the City boundaries. It was originally built in the early 20th century for water supply, and was substantially reconstructed following a failure during Hurricane Agnes in 1972.

The lake and dam operation itself are governed through a separate legal entity known as a Watershed Improvement District (WID), and governed by a board of trustees as appointed by the

Governor.

The dam operates as a "water pass through structure" and therefore it does not detain run-off into the lake during various rainfall events. Water is released from the lake through a concrete dam and flume structure into the upper reaches of Holmes Run. In 2006, City Council received a presentation and report on flooding within the upper and lower reaches of Holmes Run, Backlick Run, Cameron Run as well as unnamed tributaries within these watershed areas. Although the flooding was not attributed to the operation of the dam, the City has tightened communication ties to the WID via real time website notification of dam opening levels, partnership with Fairfax County and the WID on the purchase of a back up generator to ensure appropriate dam operation and monitoring in the event of a power failure and periodic meetings between the County, the WID and the City.

The lake and dam are regulated by the Virginia Department of Conservation and Recreation (DCR) Rules under Title IV of the Virginia Administrative Code, and require an operation and maintenance permit as an impounding structure. As a part of the required permit preparation an inundation analysis was prepared by the WID's consulting engineering firm.

The WID has provided a copy of the inundation analysis for our review. This analysis includes a map which depicts inundation of many low lying properties along Holmes and Cameron Runs, as well as some of their tributaries, in the most extreme scenarios. Significant in-structure flooding would occur in both City and within Fairfax County.

We have reviewed this study, and found that while it is technically correct, it is not useful for emergency management or response. We have written to both the WID and DCR requesting more detailed information, including inundation depth mapping, velocity zone mapping, time to peak analysis, analysis supporting notification levels and listings of affected property addresses. While we maintain a good working relationship with the WID staff and board, the City has been unable to attain these items, which would enable the City's formulation of an appropriate emergency action plan for various inundation scenarios affecting the jurisdiction. Subsequent to several meetings with the CMO, TES, Fire/EM, and CA, these needs were communicated to the WID and subsequently to DCR senior staff (See attached letter).

Currently, the city awaits a response to its letter. The WID, Fairfax County and DCR have all acknowledged receipt of the letter. The City Attorney is reaching out to the DCR counterpart, and the City is receiving cost estimates to complete this analytical work by outside consultant forces this week.



Lake Barcroft Document\_Feb\_9\_2009.pdf

Jim Hartmann  
Alexandria City Manager  
703-838-4300



*City of Alexandria, Virginia*



*Fire Department  
900 Second Street  
Alexandria, Virginia 22314-1395  
(703) 838-4600*

February 6, 2009

Mr. Joseph H. Maroon  
Agency Director  
Virginia Department of Conservation and Recreation  
203 Governor Street, Suite 302  
Richmond, Virginia 23219-2094

Dear Mr. Maroon:

The Lake Barcroft Watershed Improvement District (WID), as the owner and operator of the Lake Barcroft dam, is governed by the terms of Title 4, Agency 50, Chapter 20 of the Virginia Administrative Code. As the owner of an impounding structure, it is obligated to comply with all applicable terms, including, without limitation, the preparation of an Emergency Action Plan ("EAP") pursuant to 4 VAC 50-20-175. In preparing that EAP, the Lake Barcroft WID is required to coordinate with all local jurisdictions that might be impacted by a failure of the impounding structure. Specifically, 4 VAC 50-20-175(H) provides:

The development of the EAP shall be coordinated with all entities, jurisdictions, and agencies that would be affected by an impounding structure failure or that have statutory responsibilities for warning, evacuation, and postflood actions. Consultation with state and local emergency management officials at appropriate levels of management responsible for warning and evacuation of the public shall occur to ensure that there is awareness of their individual and group responsibilities. The owner shall also coordinate with the local organization for emergency management to identify properties that upon failure of the impounding structure would result in economic impacts.

Moreover, the regulations set forth very specific requirements for the content of an EAP. Specifically relevant here is the requirement of 4 VAC 50-20-175(G)(2), which states:

The EAP shall include a discussion of the procedures for timely and reliable detection, evaluation, and classification of emergency situations considered to be relevant to the project setting and impounding features. Each relevant emergency situation is to be documented to provide an appropriate course of action based on the urgency of the situation. Where appropriate, situations should address impounding structure failures that are imminent or in progress, a situation where

the potential for impounding structure failure is rapidly developing and a situation where the threat is slowly developing.

The Lake Barcroft Inundation Mapping Study, as we have reviewed in draft form, does not contain information sufficient to allow the City of Alexandria to prepare for multiple and varying emergency scenarios, as is required by 4 VAC 50-20-175(G)(2). Accordingly, it falls short of being a useful tool for emergency preparation and response. Inundation zones encompass a considerable area which is densely developed and populated. We need the following information in order to formulate a useful emergency action plan. The Lake Barcroft Watershed Improvement District must promptly provide the information set forth below to comply with its responsibility to coordinate with the City pursuant to 4 VAC 50-20-175(H).

#### Inundation Depth Mapping

It is vital to understand which areas will be inundated by several feet of water, and which will merely be covered by inches. Therefore, the study should include maps showing the depth of inundation using contours and/or color ramps for each of the scenarios studied. The report indicates that analyses were prepared using HEC-GeoRAS. This software can generate these maps with little effort.

#### Velocity Zone Mapping

It is also vital to understand which areas experience the highest, most dangerous velocities. The study should include designation of the areas of highest velocity. This could be accomplished by maps showing velocity by contours and/or color ramps, or by use of some modification of the floodway concept. The software used in this study is limited in this capacity, as it is one-dimensional, but the engineer should be able to formulate a method for designating high velocity areas.

#### Time to Peak Analysis

It is necessary to understand the time required for a flood peak to travel from the dam to critical points downstream. This information is contained within the hydrologic model, but has not been interpreted or presented in the report. The engineer needs to provide this interpretation in the form of text, tables and/or charts.

#### Analysis supporting notification levels

There is discussion in the draft EAP of what opening levels define the Stage I, II and III conditions. These levels seem to be chosen arbitrarily, rather than following from the hydrologic and hydraulic analyses. The engineer should use H&H modeling, and other analytical tools to define these levels.

For the City of Alexandria's emergency planning, there are two useful levels to consider.

The first is the level at which City personnel must be activated to monitor flood conditions and to close certain transportation and recreation facilities. This level should correspond with the discharge at which low-lying trails and fair-weather crossings are inundated.

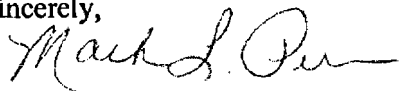
The second level is the level at which the inundation zone must be evacuated. This level should correspond to the discharge at which some lower-lying structures and major roads would be inundated.

#### Listing of affected property addresses

This is explicitly required in DCR's regulations (4 VAC 50-20-54(F)(1)), and is easily generated using GIS.

All of the information described above is needed to properly prepare for and respond to a failure of the Lake Barcroft dam. Please bear in mind that the inundation zone is occupied by tens of thousands of people, with billions of dollars worth of property. Any failure of the Lake Barcroft dam has a high probability of taking human lives, and will inflict large economic damages. Therefore, a thorough analysis is required.

Sincerely,



Mark L. Penn  
Emergency Management Coordinator  
City of Alexandria

c. Richard J. Baier, P.E.  
Director of Transportation and Environmental Services  
City of Alexandria

Christopher Spera  
City Attorney  
City of Alexandria

Adam Thiel  
Fire Chief  
City of Alexandria

Robert J. VanLier, P.E.  
Dam Safety Engineer  
Virginia Department of Conservation and Recreation (Region 1)

Olivia McLean  
Emergency Management Coordinator  
Fairfax County

Davis Grant  
Operations Director  
Lake Barcroft Watershed Improvement District

Charles W. de Seve  
Trustee Chairman  
Lake Barcroft Watershed Improvement District

James K. Hartmann  
City Manager  
City of Alexandria

Mark Jinks  
Deputy City Manager  
City of Alexandria