



State of Vermont

Department of Fish and Wildlife
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State Geologist
RELAY SERVICE FOR THE HEARING IMPAIRED
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AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation
Dam Safety Section

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September 2, 1999

Robert Cowles
Selectman, Town of Londonderry
P.O. Box 118
South Londonderry, VT
05155

Re: Williams Dam, Londonderry

Dear Mr. Cowles,

Enclosed is a report of our inspection of Williams Dam on August 6, 1999.

The report contains several recommendations for the town as owner of the dam which we discussed at the time of the inspection. As described in the report, the generally poor condition of the dam warrants rehabilitation to provide for long term project safety and satisfactory functioning of the dam.

Also enclosed is a packet of material regarding the state statute, 10 VSA Chapter 43 concerning the construction, inspection and safety of dams.

Please give me or Pete Barranco a call if you have any questions on the report.

Thank you for your interest in this project.

Sincerely,

Robert B. Finucane, P. E.
Assistant Dam Safety Engineer

cc: Larry Fitch, P.E., Director, Facilities Engineering Division



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MEMORANDUM

TO: For the Record

FROM: Robert B. Finucane, P.E., Assistant Dam Safety Engineer
A. Peter Barranco, Jr., P.E., Dam Safety Engineer

DATE: September 2, 1999

SUBJECT: Inspection of Williams Dam, Londonderry

RBF
CUB

On August 6, 1999, the writers made an inspection of the Williams Dam in Londonderry in response to the July 28, 1999 request of the Town of Londonderry, the owner of the dam. The inspection was carried out under the provisions of 10 VSA 1105. Permission for the inspection was granted by the Select Board of Londonderry and confirmed in a telephone call with Board Member Bob Cowles on July 28, 1999.

OVERALL CONDITION

As reported in previous years, the dam remains in poor condition and has undergone further deterioration as evidenced by its inability to maintain a pond during low water periods. All dams to some degree and old dams in particular are unpredictable and can fail under conditions as or less severe than they have survived in the past. While no currently hazardous conditions were observed at the site, a project should be undertaken to repair and improve the maintenance and condition of the dam.

RECOMMENDATIONS FOR OWNER

Recommendations for this site include the following:

1) The owner should retain a qualified professional engineer to make a complete detailed examination of the dam with the water level drawn down to prepare plans for the reconstruction or replacement of the dam.

It was also recommended at the time of the inspection that the owner retain an engineer to inspect and design repairs to correct the immediate problem of leakage at the sluice gate structure. It is likely that repairs will not require approval under 10 VSA Chapter 43, however, final determination will depend on the scope of work proposed. A

"1272 Order" will likely be required for dewatering and flow diversion at the sluice gate structure to enable full inspection and repairs.

- 2) The sluice gate should be operated annually to keep it in operating condition.
- 3) Repair or reconstruction of the dam should include improved control of seepage, drainage and erosion at the abutments.

BACKGROUND AND DESCRIPTION OF DAM

A dam at this site dates from at least 1900 and probably earlier. A new sluice gate was installed in 1978 to repair damages caused by the 1976 Flood. The dam is located on the West River in the Village of Londonderry. The dam had been previously inspected by the Department in 1977, 1978, 1979, 1981, 1984, and 1987 and was last inspected on September 4, 1996.

The dam is a stone masonry, gravity, spillway dam founded on ledge for most of its length. It is approximately 20 feet high (16 feet at spillway crest) and 87 feet long including a 73 foot wide straight drop overfall spillway. A short concrete training wall at the right end is connected to a new concrete bridge abutment.

The spillway is stone masonry with a concrete cap and partial upstream concrete facing. There are two openings in the downstream face. One is about 3 feet wide and located at the toe about 10 feet from left end of the dam. The other is about 9 feet below the crest near the angle point and has a concrete patch. The stonework appears that it may have been an old low level outlet. The interior construction of the spillway is unknown. A 13 foot wide sluiceway structure is located at the right abutment. It contains a 6 foot diameter corrugated galvanized metal pipe (CGMP) sluiceway with a vertical aluminum slide gate at the upstream end.

INSPECTION

The inspection of this dam was conducted on August 6, 1999, between 10:12 AM and noon. Present during all or part of the inspection were Select Board members Claire Trask, , Bob Forbes, Clyde Prouty, and Bob Cowles, and Clerk and Treasurer Jim Twitchell. The weather was partly cloudy, and dry. All the flow of the river was passing through the dam as leakage.

The water level in the pond was 8.16 feet below the top of the gate platform at the spillway with the gate closed. The following observations were made.

1. Sluiceway.

a) Approach. The sluiceway approach was clear. No significant debris accumulation was present.

b) Training walls. The right training wall forms the right end of the dam. During the reconstruction of the bridge upstream, a new bridge retaining wall was extended into the right training wall at the sluiceway structure. The existing training wall was in generally good condition but was deeply eroded at the lift lines.

c) Gate. The large aluminum slide gate was reported to have been repaired and operated this year. During the bridge construction, the operating rod had been reported cut off but was in place and operational at the time of the inspection. The gate was leaking about 50 gallons per minute (gpm). The gate was opened during the inspection. The operator equipment was smooth and effective. The gate was examined from the upstream side with the pond drawn down 10.5 feet below the operating platform.

The gate slides down rails onto a metal sill which was bolted or concreted to the face of the dam. Gaps 6 inches wide and 18 inches deep were noted running under the frame and apparently under the barrel of the pipe. The gaps were partially filled with debris that had been washed in by seepage through the dam.

d) Sluice. Although heavily rusted inside, the sluice pipe was in sound condition. At the left downstream side of the sluiceway box at an elevation 2.0 feet above the invert, there was a leak in the concrete flowing about 10 gpm from the joint between the dam and training wall. This leak stopped when the gate was opened and the pond drawn down.

On the right side, about 1.4 feet above the invert, there was a leak flowing about 15 gpm. Both leaks in the concrete appear to have decreased in flow from previous inspections since the pond was drawn down. Comparison with earlier photos indicates that since the 1996 inspection, a block about 2 feet by 2 feet has broken out in this location. Flow did not diminish greatly with the gate open.

e) Right Abutment. Previously noted flow through the riprap in the abutment was not noted on this inspection.

2. Spillway

a) Upstream. The approach to the spillway was clear but shallow due to accumulated sediment including rocks of some size. Water flowing into the pond was noted in a small depression at the toe of the upstream face of the spillway near the center about 5.6 feet below the crest. This spot had been marked by the town with blue flagging.

The inflowing water was likely due to draining of the interior of the dam as the water level was lowered. With the pond up, the water would have more or less direct access to the interior of the dam at this point.

b) Crest. The spillway crest was good for line and grade. A concrete cap has been placed on top. Voids under the cap allow for major leakage when the pond is spilling.

c) Downstream Face. Concentrated leakage was observed on the downstream face of the dam. At the right end of the spillway by the sluice, there was an area of leakage about 3 feet below the crest of the dam from the contact with the training wall. Leakage flows were estimated at about 10 gpm. At the midpoint of the dam also about 3 feet below the crest, there was an area of concentrated leakage flowing through the dam and springing free from the downstream face like the discharge from a garden hose. This was estimated at 5 gpm. Both these leaks stopped as the pond was lowered from 8.2 feet to 10.5 feet below the top of the gate operator platform.

d) Toe. The ledge is exposed in the bed of the stream at the toe of the dam. The strike is roughly straight up and downstream and the dip is more than 45 degrees from the vertical toward the left bank. Near the angle at the middle of the dam about 50 feet from the left end, there appears to be stonework for a pond drain with a void about 1 cubic yard in size. At 10 feet right of the left end of the spillway, there was a void at the toe about 1 cubic yard in size.

e) Abutments. Seepage at the pond level at the time of inspection was not observed at either abutment.

HYDROLOGY AND HYDRAULICS

The drainage area at this site is about 44 square miles. The pond area at the normal pool is 8 acres with storage of 50 acre-feet. At the dam crest, the pool stores 75 acre-feet. The maximum discharge from an unobstructed spillway would be about 1600 cfs. A detailed hydrologic and hydraulic (H&H) study has not been made.

DOWNSTREAM HAZARD CLASSIFICATION

The dam is a Class 3, "low hazard" dam based on available mapping and visual inspection.

JURISDICTION

Since the dam impounds more than 500,000 cubic feet, any alteration,

reconstruction or breaching would require prior approval from the Department under provisions of 10 VSA Chapter 43.

Repairs to the sluice gate will likely not require approval under 10 VSA Chapter 43, however, a final determination will be made after the engineer determines the scope of the repairs. A "1272 Order" for a cofferdam and handling flows will probably be needed.

Attachment;

- 1) Inspection of Dams, DEC 4/95 with Notice, DEC 10/93.
- 2) Brochures, ASDSO