



December 28, 2017

Supervisor Dan Lewza and Milton Town Board
Town of Milton
503 Geysers Road
Ballston Spa, NY 12020

RE: Camp Boyhaven Dam Assessment
3430 Boyhaven Road
Middle Grove, New York

Dear Supervisor and Milton Town Board Members:

M.J. Engineering and Land Surveying, P.C. (MJ) is pleased to provide you this report associated with the structural assessment of the upper and lower dam structures located at Camp Boyhaven, Middle Grove, New York.

PROJECT UNDERSTANDING

The Town of Milton is interested in purchasing the Camp Boyhaven property. The existing property has two (2) dam structures which impound water to create two distinctive ponds. The upper dam structure is located on the eastern side of the upper pond on the west side of Bayhaven Road and the lower dam structure is located on the eastern side of the lower pond that is on the east side of Boyhaven Road. The purpose of the assessment is to determine the overall condition of the dam structure and identify critical maintenance repairs.

Chris Dooley, P.E and TJ Tynan, from our office conducted a structural assessment of the dams on December 20, 2017. At the time of our site assessment water was flowing over the top of the spillway structures at both dams.

DESCRIPTION OF STRUCTURE

Upper Dam Structure

The upper dam is an earthen dam with a concrete spillway structure. The crest of the earthen dam is approximately 200-feet long. The concrete spillway structure is located at approximately the southern third of the earthen dam and has an approximate 16-foot wide spillway crest. There is a steel liftgate weir assembly to control the water cresting the spillway. The sidewalls of the concrete spillway structure are 2-feet thick at the spillway and 1-foot thick at the training walls approximately 20-feet downstream of the spillway crest. The water flows over the spillway crest with a 4-foot spillway drop to a concrete and stone grouted apron slab.

A pedestrian bridge is located over the top of the concrete spillway. The pedestrian bridge is constructed of 3x10 timber deck boards supported by 8-inch deep steel beams connected to the



concrete spillway walls. Steel handrail is provided on each side of the bridge and is connected to the timber deck.

A low level outlet valve is located upstream of the dam with a 30-inch diameter corrugated metal outlet pipe that extends from the dam to approximately 30-feet downstream of the earthen dam crest north of the concrete spillway. There is a wood dock structure to access the low level outlet valve. The low level outlet pipe discharges to a stream with a 12-inch thick concrete headwall on the downstream side of the pipe. Based on the invert of the low level outlet pipe it is assumed that the depth of the upper pond is approximately 10-feet deep.

Lower Dam Structure

The lower dam is an earthen dam with a concrete spillway structure. The crest of the earthen dam is approximately 160-feet long. The concrete spillway structure is located at approximately the southern third of the earthen dam and has an approximate 16-feet wide spillway crest. There is a steel liftgate weir assembly to control the water cresting the spillway. The sidewalls of the concrete spillway structure are 2-feet thick and extend from the spillway crest to approximately 40-feet downstream. The water flows over the spillway crest with a 4-foot spillway drop to a concrete and stone grouted apron slab. Another 4-foot spillway drop is located approximately 50-feet downstream to a combination of concrete and stone grouted apron slab.

A pedestrian bridge is located over the top of the concrete spillway. The pedestrian bridge is constructed of double 2x10 timber deck boards supported by 8-inch deep steel beams connected to the concrete spillway walls. Steel handrail is provided on each side of the bridge and is connected to the timber deck.

A low level outlet valve is located upstream of the dam with a 30-inch diameter corrugated metal outlet pipe that extends from the dam to approximately 20-feet downstream of the earthen dam crest north of the concrete spillway. The low level outlet pipe discharges to a stream with a 12-inch thick concrete headwall and training walls on the downstream side of the pipe. Based on the invert of the low level outlet pipe it is assumed that the depth of the upper pond is approximately 10-feet deep.

DISCUSSION OF FINDINGS

Structural deficiencies and associated photos are listed below. These deficiencies are based on a visual assessment of the dam. Destructive and non-destructive testing was not conducted as part of the scope of this project. Refer to attachment A for the photo log.



Upper Dam Structure

- 1) The dam structure is in good condition overall.
- 2) The earthen dam section is in good condition. No seepage was noted at the downstream sections of the earthen dam.
- 3) The steel liftgate weir assembly has surface corrosion and it is not clear how the assembly is operated as there was no lifting mechanism. (Photo 1)
- 4) There is debris at the crest of the concrete spillway. The debris should be cleared to prevent obstructing the water flowing over the crest. (Photo 1)
- 5) The concrete spillway walls and training walls are in good condition. (Photo 2)
- 6) Vegetation overgrowth is prevalent adjacent to the existing concrete training walls. The vegetation should be cleared within 5-feet of the training wall to prevent damage of the existing concrete. (Photo 3)
- 7) The steel of the pedestrian bridge has surface corrosion. There is no section on the steel girders. The steel should be cleaned and coated to extend the life of the bridge. (Photo 4)
- 8) The handrail paint system on the pedestrian bridge has failed. The handrail should be cleaned and painted to extend the life of the handrail. (Photo 5)
- 9) There are small animal boroughs on the downstream face of the earthen dam. This should be monitored to ensure that the boroughs do not create seepage in the earthen dam section.
- 10) The low level outlet pipe and concrete headwall are in good condition. (Photo 6)
- 11) The low level outlet valve is located approximately 30-feet upstream of the earthen dam spillway with no access platform. An access dock and platform should be constructed from the earthen dam to the low level outlet valve. (Photo 7)

Lower Dam Structure

- 1) The dam structure is in good condition overall. (Photo 8)
- 2) The earthen dam section is in good condition. No seepage was noted at the downstream sections of the earthen dam.
- 3) The steel liftgate weir assembly has surface corrosion and it is not clear how the assembly is operated as there was no lifting mechanism. (Photo 9)
- 4) There is a large section of a tree and debris at the concrete spillway that should be removed prevent obstructing the water flowing over the crest and damaging the concrete. (Photo 10)



- 5) There is a section of handrail in the upper portion of the spillway apron slab that should be removed. (Photo 11)
- 6) The concrete spillway walls and training walls are in good condition. (Photo 12)
- 7) Vegetation overgrowth is prevalent adjacent to the existing concrete training walls. The vegetation should be cleared within 5-feet of the training wall to prevent damage of the existing concrete. (Photo 13)
- 8) A few of the handrail posts are missing bolts connecting to the timber deck. The bolts should be replaced to provide four (4) anchor bolts per post.
- 9) The handrail paint system on the pedestrian bridge is deteriorated. The handrail should be cleaned and painted to extend the life of the handrail. (Photo 14)
- 10) The steel of the pedestrian bridge has surface corrosion. There is no section on the steel girders. The steel should be cleaned and coated to extend the life of the bridge.
- 11) There are small animal boroughs on the downstream face of the earthen dam. This should be monitored to ensure that the boroughs do not create seepage in the earthen dam section.
- 12) Camp Boyhaven personnel reported that there was seepage below the upper concrete and grouted stone apron slab a few years ago. Camp Boyhaven grouted this solid with concrete to eliminate seepage and stabilize the apron slab.
- 13) Erosion was noted at the south eastern corner of the upper concrete and grouted stone apron slab. This area should be repaired with rip rap and grout to prevent further deterioration. (Photo 15)
- 14) The low level outlet pipe, concrete headwall and training wall are in good condition. However, there is a fallen tree at the outlet that should be removed. (Photo 16)
- 15) The low level outlet valve is located approximately 30-feet upstream of the earthen dam spillway with an access platform but no dock to access the platform. An access dock should be constructed from the earthen dam to the low level outlet valve platform. (Photo 17)



RECOMMENDATIONS

The existing dam structures are in overall good condition. The dams need minor improvements as noted above to extend the life of the dam structures and to reduce long term maintenance issues. The steel for the spillway lift gates, pedestrian bridge girders and handrail should be cleaned and painted. The debris at the spillways and low level outlet pipes should be removed to prevent restricting the flow of the spillway and damaging the existing structures. Access docks and platforms should be constructed to assist in providing and maintaining access to the low level valve structures.

MJ would recommend that a dam assessment be performed every couple of years to identify potential concerns and maintenance items to extend the life of the dam structures.

DISCLAIMER

The opinions and recommendations in this report are based on the information provided and the visual structural assessment. This report does not address portions of the structure other than those areas mentioned, nor does it provide any warranty, either expressed or implied, for any portion of the existing structure.

Please contact me at (518) 371-0799 to discuss any questions you have regarding this assessment.

Sincerely,

Christopher M. Dooley, P.E.
Senior Associate

ATTACHMENT A

PHOTO LOG





Photo 1: Upper Dam liftgate weir assembly



Photo 2: Upper Dam concrete walls



Photo 3: Upper Dam vegetation at spillway walls



Photo 4: Upper Dam surface corrosion of steel



Photo 5: Upper Dam handrail paint failure



Photo 6: Upper Dam low level outlet pipe and headwall



Photo 7: Upper Dam valve and platform



Photo 8: Lower Dam structure



Photo 9: Lower Dam liftgate weir assembly



Photo 10: Lower Dam debris at spillway



Photo 11: Lower Dam handrail on apron slab



Photo 12: Lower Dam concrete spillway and training walls



Photo 13: Lower Dam vegetation at training walls



Photo 14: Lower Dam handrail paint deterioration



Photo 15: Lower Dam erosion at apron slab



Photo 16: Lower Dam fallen tree at low level outlet pipe



Photo 17: Lower Dam low level outlet valve