



Stantec Consulting Services Inc.
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May 16, 2024
File: 195602930

Attention: Susie Bresney
Restoration Specialist, Dam Removal Program
Division of Ecological Restoration
MA Department of Fish & Game
100 Cambridge Street, 6th Floor
Boston, MA 02114
susie.bresney@mass.gov

Dear Susie,

Reference: Existing Unsafe Conditions and Recommendation Regarding Dudleyville Pond Dam (MA00512), Unnamed Tributary to Sawmill River, Town of Shutesbury, Massachusetts

This letter was prepared by Stantec Consulting Services Inc. (Stantec) under contract with the Massachusetts Division of Ecological Restoration (DER) for a dam removal reconnaissance and preliminary design study (Study) for Dudleyville Pond Dam (MA00512), which is located on an unnamed tributary to the Sawmill River in the Town of Shutesbury, Massachusetts. The purpose of the ongoing Study includes evaluating opportunities and constraints associated with removal of the dam to support development of a preliminary design approach that would subsequently be used to support future phases of work including potential additional analyses, engineering and design, and regulatory permitting. This letter follows on initial tasks performed as part of the Study, including review of available existing information and two site visits performed by Stantec on January 17 and March 16, 2024.

As described subsequently in this letter, it is our professional opinion that the dam in its current condition represents a public safety hazard and that near-term, expedited measures be taken to substantially remove the dam to reduce or eliminate public safety risks associated with failure of the dam. The primary identified public safety risks associated with failure of the dam include consequent failure of the downstream Montague Road culvert, damage to downstream residential property, and potential for loss of life. The identified cause for failure of the culvert following failure of the dam is occlusion of the culvert with debris. Additional public safety risks associated with failure of the dam would also include the potential for disruption of emergency services following failure of Montague Road culvert.

Dudleyville Pond Dam is an earthen, stone masonry, and concrete dam located just upstream of Montague Road. The earthen embankment section is approximately 80 feet (ft) long and the stone masonry and concrete section is approximately 60 ft long including the approximately 32-ft-wide spillway. The dam has a structural height, as measured from the downstream channel bottom to the top of the dam, of approximately 17 ft. Based on 302 CMR 10.06, the dam is classified as an Intermediate size structure, which is based on the size of the dam and impoundment volume, and has a Significant Hazard Potential (Class II) designation, which is based on the potential for loss of life and damage to homes and nearby infrastructure upon dam failure. The most recent dam safety inspection, which occurred on July 21, 2022, was performed by GZA GeoEnvironmental, Inc., and is documented in the Phase I Inspection/Evaluation Report on record at the Massachusetts Office of Dam Safety (2022 Phase I I/E Report). The 2022 Phase I I/E Report found that

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Dudleyville Pond Dam is Structurally Deficient and in Unsafe condition. During the 2024 site visits, Stantec observed conditions that were similar to those reported in the 2022 Phase I I/E Report. In addition, a large, well-developed beaver dam is located immediately upstream of the dam and is currently impounding water at levels above the primary spillway crest. Flow is currently being conveyed through a “beaver-deceiver” conduit through the beaver dam and into a hole on the upstream side of the dam spillway that discharges flow through the low-level outlet pipe.

Discharge through the low-level outlet pipe is conveyed downstream from the dam through an approximately 4-ft-wide stone masonry channel for approximately 40 ft before reaching a 2.5-ft span by 5-ft tall stone masonry culvert under Montague Road. This culvert appears to be undersized based on measurements in the field of the downstream channel as well as observations made at upstream and downstream infrastructure. Upstream from the residual dam impoundment, there is a 4-ft-diameter culvert that conveys approximately 40% of the drainage area of the dam. Downstream of the dam on Richard Dudley Road, which has no substantial additional drainage contributions compared to the dam location, there is an approximately 7.5-ft-span bridge and a 4-ft-diameter culvert side-by-side. Due to the configuration of the Montague Road culvert immediately downstream from the dam, it is our opinion that this structure would have limited conveyance capacity if occluded with material (e.g., woody material, dam rubble). Occlusion of the culvert would likely occur with failure of the dam during a high-flow event, which would increase the likelihood of subsequent failure of the culvert. Therefore, although the existing structure appears to be undersized, removal of the dam to eliminate the risk of dam failure during a high-flow event would be expected to substantially reduce the likelihood of subsequent failure of the downstream Montague Road culvert.

In addition, review of available information and records as well as observations made during the site visits suggest that this location has a historically high-level of beaver activity and ongoing beaver activity appears to be problematic and challenging to manage along this reach of the river. Due to the dam’s condition, ODS has ordered that the impoundment be maintained in a drained condition through use of the low-level outlet. The existing beaver dam observed at the dam is currently impounding water above the normal pool spillway elevation with it threatening to overtop and spill into a large void that was excavated between the right dam stone-masonry wall and the adjacent driveway. A high-flow event may result in overtopping at this location which could accelerate dam failure and failure of the downstream culvert.

Based on review of existing available information as well as observations made during the site visits, it is our professional opinion that the Structurally Deficient and Unsafe condition of Dudleyville Pond Dam, coupled with the ongoing beaver activity and proximity and configuration of the downstream culvert, represents a risk to public safety. It is therefore our recommendation that expedited measures be taken to substantially remove the dam to reduce or eliminate risks associated with failure of the dam and consequent likelihood of failure of the downstream Montague Road culvert. As part of an effort to improve public safety and increase infrastructure resiliency at this location, we also recommended that the Town consider pursuing replacement of the downstream Montague Road culvert in the future, which appears to be undersized, does not meet the current state recommended design standards for road-stream crossing structures, and appears to be at a higher risk of occlusion and potential failure with or without the dam,. Expedited removal of the dam as part of the first step in a multi-phased approach at this site is therefore recommended to reduce public safety risks and improve infrastructure resiliency at this location in the near term while the Town considers replacement of the culvert.

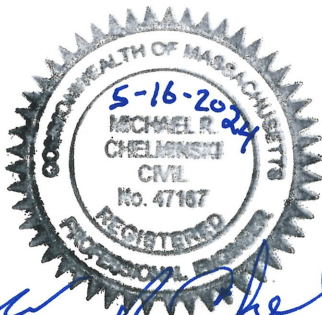
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This letter was prepared by Stantec and provided to DER in accordance with the professional service terms and conditions that are part of our master Services Agreement with DER. Please feel free to contact Michael Chelminski or Gordon Clark at the number below if you have any questions regarding the information presented in this letter.

Regards,

Stantec Consulting Services Inc.



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A handwritten signature in blue ink that reads "Gordon E. Clark" followed by the date "5/16/24".

Gordon E. Clark
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Attachment: Photo Log

Attachment A – Photo Log



Photo 1. Overview of the dam facing upstream from the downstream right upper masonry wall



Photo 2. Overview of the dam facing upstream from the downstream left upper masonry wall

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Photo 3. Overview of the beaver dam from the dam primary spillway facing upstream; note where the beaver deceiver outlet discharges into the low-level outlet pipe



Photo 4. Overview of the dam spillway and beaver dam from the left spillway abutment; note location of void space behind the right dam wall

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Photo 5. Overview of the beaver dam from the spillway upstream end of the spillway facing; note location of potential overtopping during high flow conditions into the excavated void space



Photo 6. Overview of the downstream channel and downstream Montague Road culvert facing downstream from the spillway

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Photo 7. Overview of the excavated void space behind the right dam wall facing upstream; note location of potential overtopping during high flow conditions into the excavated void space



Photo 8. Overview of the excavated void space behind the right dam wall facing downstream