

State of Vermont  
Department of Environmental Conservation  
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Montpelier, VT 05620-3704

AGENCY OF NATURAL RESOURCES

June 3, 2014

Mr. Neil Fulton, Town Manager  
Town of Norwich  
P.O. Box 376  
Norwich, VT 05055

Mr. Fulton:

Thank you for your patience in allowing the Agency time to fully consider the issues raised by the Town of Norwich's (Town) proposal to reconstruct the dam on the Charles Brown brook. This letter is to advise you that the Agency of Natural Resources (Agency) has preliminarily found that your project meets the criteria of 10 V.S.A. § 1023(a)(1), (3), and (4). The Agency is unable to reach a preliminary conclusion that the proposal will meet the requirements of § 1023(a)(2) (no significant impact on fish life and wildlife) based on the preliminary design. The legal and technical concerns related to the project generally and mitigation recommendations if the Town chooses to submit an application for the reconstruction of the dam on the Charles Brown brook are outlined below.

### Background and Site Conditions

The proposed project is the replacement of an in-stream impoundment structure that was originally built in 1944 and reconstructed thereafter. That structure provided a municipal water recreation area until its failure during Tropical Storm Irene in August, 2011. A similar structural failure also occurred as a result of the 1973 flood. The structure consisted of a concrete dam with a timber stoplog spillway and earthen abutments. Both failures occurred as a breach of the right earthen abutment allowing the stream to outflank the concrete portion of the structure.

The impoundment was located at a confined position in the valley immediately above the point of transition to an unconfined broad flood plain with moderately dense residential development and municipal infrastructure. There exists a history of conflict and channel management after dam failures in this downstream reach in attempts to reconcile the active, dynamic depositional nature of the stream and the property and infrastructure investments located in close proximity.

The dam was designed with no emergency spillway and therefore manual removal of the stoplogs was necessary to handle flood flows. Apparently, this action (removal of stoplogs) was not included in the municipal emergency operations plan.

After Tropical Storm Irene, at the recommendation of the Department of Environmental Conservation, the Town did not repair the dam as an emergency response, but rather the Town engaged a consulting engineer to develop conceptual reconstruction plans and began work with the Agency to determine the feasibility of regulatory approval. The Agency set performance standards that the reconstruction design must meet in order to meet the permit standards in 10



V.S.A § 1023. Prior to taking conceptual plans to a design level the Town requested that the Agency provide a preliminary review of the conceptual proposal provided by the Town.

### Legal Standard and Preliminary Agency Findings

The Agency has made the following findings with respect to the project proposed by the Town. These findings do not represent a final decision by the Agency, but rather a preliminary set of findings based on the drawings provided by the Town. The Agency remains open to working with the Town to address the issues presented by this proposed project and encourages the Town to address the following concerns in any formal application the Town may submit.

The reconstruction of the Norwich dam would require a 10 V.S.A. Chapter 41 stream alteration permit. The Department would issue a stream alteration permit for an activity if it meets (a) the statutory criteria in 10 V.S.A. §1023(a); (b) the Stream Alteration Rules, which establish the stream equilibrium and connectivity performance standards used in determining compliance with the statutory criteria; and (c) the Vermont Water Quality Standards.

With regard to 10 V.S.A. § 1023(a)(1), the Agency cannot determine that the project *will not adversely affect public safety*, until the Town can demonstrate the following:

- the facility is able to pass the discharge associated with a 100 year flood without compromising its structural integrity;
- the impoundment does not exceed the volume that existed prior to the 2011 failure; and
- the emergency spillway functions without human intervention in the event of a flood.

With regard to 10 V.S.A. § 1023(a)(2), the Agency will not be able to make positive findings that the project *will not significantly damage fish life*, unless the Town can demonstrate that they've addressed the following issues:

- *Significant Loss or Degradation of Riverine Habitat.* A summer time impoundment will decrease stream channel velocities, promoting deposition of finer stream bed material. Under drawn down conditions, the impoundment channel will re-scour under high flows, re-suspending and transporting fine sediments and changing habitat conditions.
- *Aquatic Organism Passage (AOP).* The current design will not likely meet the connectivity standard by providing adequate aquatic organism passage. The central concerns stem from the Agency's view that neither the bypass channel or gate design will achieve the desired AOP results. The proposed gates for allowing water passage when the river is not impounded for 9.5 months are inadequately sized and may result in excessive velocities and discontinuity within the bed profile.
- *Significant Increases in Downstream River Water Temperature.* In some impoundments, waters are exposed to increased solar radiation and heating. The current design appears to release the majority of the discharge from the impoundment from the surface. It is unclear whether temperatures will be elevated in violation of the Vermont Water Quality Standards.

With regard to 10 V.S.A. § 1023(a)(3), the Agency will determine that the project *will not significantly damage the rights of riparian owners*, provided that the application demonstrates that the facility meets the equilibrium and connectivity performance standards and not alter the hydrologic nor the sediment regime of Charles Brown Brook in such a manner as to increase flood or erosion hazards to downstream property and public infrastructure.

With regard to 10 V.S.A. § 1023(a)(4), this criteria is not applicable because the Charles Brown Brook is not an Outstanding Resource Water.

### Agency Suggestions to any Application

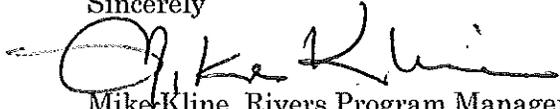
The Agency strongly recommends that the Town consider the concerns raised by the Agency with respect to the factors that must be met to comply with 10 V.S.A. § 1023(a)(2) and consider the following when finalizing the design to mitigate or eliminate the Agency's concerns with respect to the proposed project:

- *Achieving No Significant Loss or Degradation of Riverine Habitat.* A new replacement dam should not exceed the dimensions of the existing dam, and if feasible, they should be reduced. The proposal calls for a 10 ft maximum depth and 300 foot impoundment, while the height of the existing dam crest is 6.5 feet. The method and timing of draw-down to minimize downstream sedimentation impacts and establishing channel conditions though the impoundment area under drawdown conditions will be important. The Town will also need to establish refill and dewatering dates and protocols to insure adequate flows are maintained below the dam during these transition periods. The Town must demonstrate that the impounded reach can be designed to direct and maintain flows into a single channel under drawn-down conditions which maintains habitat features, similar in quality and diversity to the upstream reach.
- *Maintenance of Aquatic Organism Passage (AOP).* To improve the ability of the stream channel to provide aquatic organism passage (AOP) and to transport sediment and debris, i.e. maintain vertical connectivity, under drawn-down conditions will require an alternative gate configuration and dimensions. **Ensuring passage of aquatic organisms in Charles Brown Brook, including the spring and fall spawning periods, is fundamental to ensuring that “all life cycle functions of aquatic organisms, including overwintering and reproductive requirements are maintained and protected” in accordance with the Vermont Water Quality Standards. VWQS § 3-04(b)(4).**
- . The criteria and concepts within the Vermont Guidelines for the Design of Stream/Road Crossings for Passage of Aquatic Organisms (2009) should be used to drive the AOP analysis. In consultation with the ANR Fisheries Biologist, a bypass channel or facility should be redesigned and operated to accommodate passage during the 2.5 months of impoundment, to maximize its usage by resident fish species. Passage through the gate and drawn-down impoundment/channel will also be necessary during the 9.5 months of drawdown.
- *Achieving No Significant Increases in Downstream River Water Temperature.* The Town must demonstrate that any changes in water temperatures will not exceed the cold water limits set in the Vermont Water Quality Standards.

The outstanding issues, based on the current proposal, are design and operational deficiencies that would result in a project that would not meet the connectivity standard, would significantly impact fish life, and would raise concerns with respect to the water quality criteria for temperature and habitat impacts, and therefore the Agency would deny an application for a stream alteration permit based on the current proposal. If a new project proposal addresses these issues to the satisfaction of the Agency as suggested above and meets the 1023(a) statutory criteria, the Agency may then issue a stream alteration permit. The Agency acknowledges that it may be challenging for the Town to adequately address all the issues raised in this letter. **The Agency proposes to meet with Town officials to discuss the letter and the information that the Town would be required to submit to obtain approval to build the dam.**

The Agency will continue to provide technical assistance to the town regarding this proposal through Barry Cahoon, Regional River Management Engineer, and Rich Kirn, District Fisheries Biologist, and will work with representatives of the Town or its consultants to answer any questions or concerns.

Sincerely

A handwritten signature in black ink, appearing to read "Mike Kline". The signature is fluid and cursive, with a large initial "M" and "K".

Mike Kline, Rivers Program Manager  
Department of Environmental Conservation

- cc. Barry Cahoon, DEC River Management Engineer
- Rich Kirn, DFW Fisheries Biologist
- Pete LaFlamme, Director, Watershed Management Division
- Matt Chapman, DEC General Counsel
- David Mears, DEC Commissioner
- Eric Palmer, Director, DFW Fisheries Division
- Catherine Guessing, DFW General Counsel
- Louis Porter, DFW Commissioner
- Jon Groveman, ANR General Counsel
- Deb Markowitz, ANR Secretary