Appendix B - Revised Sediment Management Alternatives Analysis

July 2, 2020

INVESTIGATE

DESIGN

RESTORE

MEPA Office
Attn: Anne
100 Cambridge St., Suite 900
Boston, MA 02114

Re: EEA No. 16226 Becker Pond Dam Removal Project (Mt. Washington) Expanded Environmental Notification Form (EENF) and Request for Waiver of Mandatory Environmental Impact Report (EIR) – Supplemental Information

Dear Ms. Canady,

On behalf of the landowner and Proponent, The Nature Conservancy (TNC), and in partnership with the Massachusetts Division of Ecological Restoration (DER), Inter-Fluve is submitting the following supplemental information to the previously prepared EENF and request for waiver of the mandatory EIR for the Becker Pond Dam Removal Project (Project; EEA No. 16226).

Introduction

As part of the MEPA review process for the proposed project, a virtual site visit was held on June 22, 2020. The consultation session was attended by MEPA staff; the project Proponent; other project partners; federal, state, and local agency staff; and members of the public. A number of questions about the project were raised and answered during the call; however, it was recognized that two particular issues related to sediment management and access would be best addressed through the submission of supplemental information to the MEPA office. The purpose of this document is to expand upon the alternatives analysis submitted with the project EENF and provide more information about site access.

Revised Alternatives Analysis

As stated previously, this project will require numerous local, state, and federal approvals following MEPA review. All Federal Clean Water Act Section 401 activities are subject to an alternatives analysis as part of DEP's review process for the Water Quality Certification. Additionally, alterations to Riverfront Area and Bordering Vegetated Wetlands require the presentation of an alternatives analysis under the Massachusetts Wetlands Protection Act (WPA; Ch. 131, Section 40) and Regulations (Regulations; 310 CMR 10.00 et seq.). The intent of this revised analysis is to identify the full range of options for this Project, and the various issues and opportunities associated with each one. In the original EENF, the Proponent presented three (3) alternatives that represented logical potential approaches for the site. However, a fourth alternative, which was presented to the project team by DEP at a pre-application meeting in October 2019, was unintentionally omitted. The revised alternatives analysis includes this fourth alternative, along with the advantages and disadvantages associated with each.

- No-Action alternative (Alternative 1);
- Full dam removal with passive downstream sediment release (Alternative 2); and
- Full dam removal with full mobile sediment removal (Alternative 3); and
- Full dam removal with partial mobile sediment removal (Alternative 4; Preferred).

It should be noted that the preferred alternative has changed from Alternative 2 to Alternative 4. Given the sensitive receiving areas (i.e., Sages Ravine) located downstream of the site, it has become clear that additional care would be required to meet the WPA regulatory standards for ecological restoration projects, which require that all "practicable" measures be taken to "avoid" or "minimize" impacts (see 310 CMR 10.13(1)(d) and 10.24(a)(3)(d)3). Based on subsequent review and discussion of collected data and other known information, Alternative 4 was selected as the alternative which appears to best reduce the risk of downstream sedimentation and best meet the requirements of the WPA Regulations, while recognizing feasibility and cost limitations of the project as well. Further discussion of Alternative 4 is provided below.

The Proponent and project partners wish to emphasize that no sediment management approach can guarantee with one-hundred percent certainty that downstream sedimentation will not occur, particularly during construction and early in the restoration trajectory. Short-term impacts are expected in order to address the long-term ecological consequences caused by dams. In addition, sediment transport is a natural process. Its restoration is one of the ecological functions that benefit most from small dam removal projects like this one. Regardless of approach, storm events and other stochastic perturbations may mobilize impoundment sediments, even those that have been stabilized. Best management practices will be used to minimize risk throughout construction, and the Proponent has proposed to monitor sediment migration in order to better understand how sediment might move through this type of system. Details of the monitoring plan will be developed and refined based on agency input during the permitting process.

For the majority of dam removal projects undertaken in Massachusetts, the preferred sediment management alternative is not typically identified until review of the project under Section 401 of the Clean Water Act, which is a permit process administered by DEP. The project team will look to work collaboratively with DEP during the permitting process to identify the specifics of any selected approach.

Alternative 1: No-Action Alternative

The No-Action alternative in this case would eliminate the cost of dam removal and stream restoration and would allow project partners to focus their attention on other projects. This alternative would preserve the shallow impoundment environment which would continue to fill in with sediment over time. However, this No-Action alternative would continue to put potential visitors at risk due to the unsafe condition of the dam. This alternative would also continue the long history of passage constraints for aquatic organisms and continued deposition of sediment and organic material within the impoundment. Dam removal, stream restoration, and reduction in safety hazards are the primary goals of this proposed project; the No-Action alternative would not serve the project purpose.

Alternative 2: Full dam removal and passive downstream release of impounded sediment

This alternative includes the removal of the full vertical and lateral extent of the dam and restoration of the adjacent side slopes and channel in the footprint of the dam. With this alternative, approximately 550 cubic yards[1] of impounded sediment would be passively released downstream following dam removal. This sediment would supplement sediment-starved reaches of the stream and Schenob Brook, with finer-grained materials being mobilized well downstream. The stream at the dam would be expected to match the step-pool-riffle structure of the stream observed downstream. The concrete from the dam would be removed to an off-site facility to be recycled, and disturbed valley slopes would be stabilized with biodegradable fabric. Based on previous project experience, the organic nature of the sediments, and abundant seed sources from within the surrounding forest and upstream headwater wetlands, it is anticipated that the former impoundment would revegetate naturally, without need for seeding.

This alternative would result in the conversion of the shallow impoundment to a free-flowing stream with overbank floodplain and bordering wetland. Any time there is a significant change in habitat type, it's important to consider the potential impacts to the various species that utilize the site. Generally, the literature suggests that the restoration of natural ecological processes and associated benefits to native aquatic species though dam removal is expected to outweigh potential negative impacts[2]. Studies have demonstrated increased diversity of both aquatic and native species[3], among other benefits. For this project, removal of the dam and loss of the impoundment would result in improved connectivity allowing fish to utilize the entirety of the brook, from the headwaters to its confluence with Schenob Brook (noting that there may be some natural barriers to movement within Sages Ravine). Generalist, warm-water species (e.g., smallmouth bass) that often exist in dam impoundments (although it's unclear if that is the case here) will have less habitat area, while cold-water species (e.g., brook trout) would benefit from moderated stream temperatures and expansion of accessible habitat. As observed at other similar dam removal project sites in Massachusetts, most waterfowl, mammals, and herpetofauna (e.g., salamanders, turtles, snakes, etc.) would continue to utilize the former impoundment area, or move to other ponds and streams within the upper Becker Pond watershed and surrounding areas (e.g., Lee Pond Brook watershed). However, it is acknowledged that this change may negatively affect certain species dependent on open water systems (and associated habitat types) for all or a portion of their respective life histories. For example, those herpetofauna which have limited dispersal ranges (affecting their ability to find alternative habitat), and require open water for all or a portion of their lifecycle could be negatively affected. Consultation with the Massachusetts Natural Heritage and Endangered Species Program has confirmed that there are no known rare or endangered species with this life history in the impoundment area.

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[1] 550 cubic yards is considered the "mobile portion" of impounded sediment. This is the estimated sediment volume that would be mobilized through natural channel-forming processes shortly after dam removal. This amount represents approximately one-third of the estimated total sediment behind the dam (~1,500 cubic yards). Storm events or other stochastic perturbations may mobilize additional material over time.

[2] American Rivers. (2002). *The Ecology of Dam Removal*. Retrieved 7/1/20 from https://www.americanrivers.org/conservation-resource/ecology-dam-removal/

[3] Hill, M.J., E.A. Long, and S. Hardin. 1993. Effects of Dam Removal on Dead Lake, Chipola River, Florida. Apalachicola River Watershed Investigations, Florida Game and Fresh Water Fish Commission. A Wallop-Breaux Project F-39-R, 12 pp.

This alternative has the lowest associated implementation cost and would likely achieve the maximum ecological benefit of the dam removal. However, it would result in higher risk of sedimentation within Sages Ravine. As such, it has been removed from consideration as the preferred alternative.

Alternative 3: Full dam removal with full impounded sediment removal

Alternative 3 would provide the same level of dam removal as Alternative 2, but would also include mechanical removal of the total 1,500 cubic yards of impounded sediment and disposal in a landfill. The habitat and species use transitions would be identical to those of Alternative 2 with a conversion of the impoundment to a stream with bordering wetlands and floodplain.

The purpose of complete sediment removal would be to minimize potential impacts to downstream receiving areas such as Sages Ravine. Although this is a technically feasible option and would lower the risk of sedimentation downstream, it does not achieve the objective of pursuing an efficient and effective dam removal project that will minimize the construction impact outside of the dam footprint and keep implementation costs reasonable.

This alternative would require extensive water control to re-route the stream during construction and then excavate and haul out the sediment. In order to be safely transported, the sediment dewatering would require an extensive cleared and level space, thus increasing the area of impact in the Riverfront Area. The sediment would then need to be transferred to road-worthy dump trucks and hauled to a landfill. Off-site hauling would cause substantial wear and tear to the access road and on East Street, which is unpaved in the vicinity of the site. Finally, this alternative would also involve extensive seeding and revegetation of the former impoundment area with associated monitoring and maintenance. This additional work would substantially increase costs and could make the project unappealing to potential funders and/or direct funding away from other projects.

Selected Alternative consistent with permitting requirements. (SAW 6/30/2024)

Alternative 4 (Preferred): Full dam removal with partial impounded sediment removal

This alternative would provide the same level of dam removal as Alternatives 2 and 3 and would include mechanical removal of a portion of the 550 cubic yards of impounded sediment that has been determined to be the readily mobile portion[4] in order to create a pilot channel through the impoundment to facilitate channel formation. The excavated impounded sediment would be disposed of at an off-site landfill or (preferably) reused for shaping and grading on site. The benefit of this alternative would be reduced potential for temporary sediment impacts to downstream receiving areas relative to Alternative 2.

This approach, although technically feasible, would be challenging at this site and likely not prevent all sediment movement because the narrow valley bottom, irregular bedrock and boulder pre-dam surface would likely inhibit complete removal of sediment within the pilot channel. The nature (primarily sand and fines) and relatively shallow depth of impounded sediment also make this material easy to displace and mobilize. Extensive water control would be required to re-route the stream during construction and then excavate and haul out the sediment. The limits of disturbance would be substantially greater than the footprint of the excavated channel, and the activity would inevitably

[4] The exact volume and extent of channel excavation will be determined in consultation with the permitting agencies and will reflect a balance of controlling short term impacts in the most feasibility.

mobilize some sediment to benefit the downstream reaches. This Alternative would require a smaller area of active revegetation as compared to Alternative 3.

Similar to Alterative 3, sediment that could not be re-used on site would need to be dewatered, then transferred to road-worthy dump trucks and hauled to a landfill. Off-site hauling of material would cause substantial wear and tear on the access road and on East Street. The final details of the on-site placement in upland areas would need to be discussed with Natural Heritage and Endangered Species Program because the site and surrounding land is within a mapped Priority Habitat. This alternative would result in identical transition of wetland resource areas and habitat uses as described in Alternative 2.

This alternative would provide a reduced potential for sediment impacts to Sages Ravine while avoiding the cost of complete sediment removal (Alternative 3) and providing similar ecological benefit to Alternative 2. As such, this has been selected as the preferred alternative.

Access Road

As noted in the EENF, there is an existing access road extending from East Street to the dam site. Although the majority of this access road is on land controlled by the Proponent, the stretch closest to East Street is held by a private landowner (Parcel ID: Map 7, Lot 5), and the owner has not allowed access across the property. In order to address the site access needs of the project, the Proponent has proposed construction of a temporary access road from East Street to bypass the property (see 75% Design Plans). Temporary and permanent impacts from this access road construction are included in the EENF.

While attempts have been made to limit the amount of disturbance associated with the access, the road would have to be constructed through mature forest, and would increase project costs by up to $25,000. The Proponent's preference is to avoid these impacts and additional costs; therefore, the Proponent has been exploring options for working with the landowner. It is unclear at this time if or when an agreement might be reached; however, the Proponent is committed to exhausting all practicable options to avoid construction of the access road. If the new access road is constructed, it would be narrowed using revegetation techniques following construction and utilized as a permanent hiking trail.

Thank you for your time and consideration of this additional information.

Sincerely,

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