Commonwealth of Massachusetts
Executive Office of Environmental Affairs ■ MEPA Office

ENF Environmental Notification Form

For Office Use Only
Executive Office of Environmental Affairs

EOEA No.: 14306
MEPA Analyst: Aisling Eglington
Phone: 617-626-1024

The information requested on this form must be completed to begin MEPA Review in accordance with the provisions of the Massachusetts Environmental Policy Act, 301 CMR 11.00.

Project Name: Phosphorus Inactivation Project: Lovers Lake and Stillwater Pond, Chatham, MA		
Street: Lovers Lake and Stillwater Pond		
Municipality: Chatham	Watershed: Cape Cod	
Universal Tranverse Mercator Coordinates:	Latitude: 41 N 7 Longitude: 69 W 9	
Estimated commencement date: Oct 2008	Estimated completion date: Oct 2009	
Approximate cost: $250,000	Status of project design: 75 %comple	
Proponent: Town of Chatham Department of Health & Environment		
Street: 261 George Ryder Road		
Municipality: Chatham	State: MA	Zip Code: 02633
Name of Contact Person From Whom Copies of this ENF May Be Obtained: Robert A. Duncanson, Ph.D., Director of Health & Environment		
Firm/Agency: Town of Chatham	Street: 261 George Ryder Road	
Municipality: Chatham	State: MA	Zip Code: 02633
Phone: 508-945-5165	Fax: 508-945-5163	E-mail:rduncanson@chatham-ma.gov

Does this project meet or exceed a mandatory EIR threshold (see 301 CMR 11.03)?
☒Yes ☐No

Has this project been filed with MEPA before?
☐Yes (EOEA No._____) ☒No

Has any project on this site been filed with MEPA before?
☐Yes (EOEA No._____) ☒No

Is this an Expanded ENF (see 301 CMR 11.05(7)) requesting:

a Single EIR? (see 301 CMR 11.06(8))	☐Yes	☒No
a Special Review Procedure? (see 301CMR 11.09)	☐Yes	☒No
a Waiver of mandatory EIR? (see 301 CMR 11.11)	☐Yes	☒No
a Phase I Waiver? (see 301 CMR 11.11)	☐Yes	☒No

Identify any financial assistance or land transfer from an agency of the Commonwealth, including the agency name and the amount of funding or land area (in acres):

Are you requesting coordinated review with any other federal, state, regional, or local agency?
☐Yes(Specify_____) ☒No

List Local or Federal Permits and Approvals: Conservation Commission Order of Conditions

Which ENF or EIR review threshold(s) does the project meet or exceed (see 301 CMR 11.03):

☐ Land	☐ Rare Species	☐ Wetlands, Waterways, & Tidelands
☐ Water	☐ Wastewater	☐ Transportation
☐ Energy	☐ Air	☐ Solid & Hazardous Waste
☒ ACEC	☐ Regulations	☐ Historical & Archaeological Resources

Summary of Project Size & Environmental Impacts	Existing	Change	Total
LAND			
Total site acreage			
New acres of land altered			
Acres of impervious area			
Square feet of new bordering vegetated wetlands alteration			
Square feet of new other wetland alteration			
Acres of new non-water dependent use of tidelands or waterways			
STRUCTURES			
Gross square footage			
Number of housing units			
Maximum height (in feet)			
TRANSPORTATION			
Vehicle trips per day			
Parking spaces			
WATER/WASTEWATER			
Gallons/day (GPD) of water use			
GPD water withdrawal			
GPD wastewater generation/ treatment			
Length of water/sewer mains (in miles)			

State Permits & Approvals

- ☒ Order of Conditions
- ☐ Superseding Order of Conditions
- ☐ Chapter 91 License
- ☐ 401 Water Quality Certification
- ☐ MHD or MDC Access Permit
- ☐ Water Management Act Permit
- ☐ New Source Approval
- ☐ DEP or MWRA Sewer Connection/ Extension Permit
- ☐ Other Permits (*including Legislative Approvals*) – Specify:

CONSERVATION LAND: Will the project involve the conversion of public parkland or other Article 97 public natural resources to any purpose not in accordance with Article 97?

☐Yes (Specify_____) ☒No

Will it involve the release of any conservation restriction, preservation restriction, agricultural preservation restriction, or watershed preservation restriction?

☐Yes (Specify_____) ☒No

RARE SPECIES: Does the project site include Estimated Habitat of Rare Species, Vernal Pools, Priority Sites of Rare Species, or Exemplary Natural Communities?

☒Yes (Specify_Site is in Priority Habitat_____) ☐No

HISTORICAL /ARCHAEOLOGICAL RESOURCES: Does the project site include any structure, site or district listed in the State Register of Historic Place or the inventory of Historic and Archaeological Assets of the Commonwealth?

☐Yes (Specify_____) ☒No

If yes, does the project involve any demolition or destruction of any listed or inventoried historic or archaeological resources?

☐Yes (Specify_____) ☒No

AREAS OF CRITICAL ENVIRONMENTAL CONCERN: Is the project in or adjacent to an Area of Critical Environmental Concern?

☒Yes (Specify_Pleasant Bay ACEC_____) ☐No

PROJECT DESCRIPTION: The project description should include **(a)** a description of the project site, **(b)** a description of both on-site and off-site alternatives and the impacts associated with each alternative, and **(c)** potential on-site and off-site mitigation measures for each alternative (*You may attach one additional page, if necessary.*)

Lovers Lake and Stillwater Pond are two deep kettlehole ponds located in the Town of Chatham on Cape Cod in Massachusetts. These state-designated "Great Ponds" are recreational and ecological resources for the Town of Chatham; featuring one of the two remaining alewife runs in the Pleasant Bay watershed (MA, DEP, 2007).

Currently, the two ponds suffer from poor water quality due to eutrophication (i.e., overabundant nutrient levels) and do not fully support the desired water uses including contact recreation and aquatic life support. Symptoms include low water transparency, frequent and dense algal blooms, loss of oxygen in bottom waters, and degraded ecological habitat. These ponds have been characterized as "highly impacted" and "eutrophic," based on recent assessment studies (CCC, 2003; EcoLogic and S&W, 2003).

In 2006, the Town commissioned an *Eutrophication Mitigation Plan* study of Lovers Lake and Stillwater Pond to identify, design and permit appropriate pond restoration treatments to:

- Eliminate, reduce or mitigate the release of phosphorus from the sediments of Lovers Lake and Stillwater Pond, thus reducing the amount of nutrients available for phytoplankton growth;
- Improve the ecological health of Lovers Lake and Stillwater Pond, including water clarity and dissolved oxygen levels in deeper waters; and
- Enhance the recreational and aesthetic qualities of the ponds.

ENSR Corporation ("ENSR") of Westford, MA was selected to evaluate four potentially applicable pond restoration methods (dredging, aeration, circulation, and nutrient inactivation) to reduce or eliminate the phosphorus recycling from the sediments. The factors used for this evaluation were technical feasibility, expected water quality improvement, longevity, cost-effectiveness, and permitting issues.

The applicability of dredging for restoration of Lovers Lake and Stillwater Pond was evaluated, specifically the potential for dredging to reduce internal recycling. This technique is not well suited for either pond due to the depth involved, the lack of readily accessible dewatering and disposal areas, and residential setting. Dredging could reduce the phosphorus loading but only modest improvements in water quality would be expected. Longevity is expected to be lower than average in these ponds due to lack of knowledge of underlying sediment structure and potential refilling of dredged areas If both ponds were dredged, costs would approach $1.5M or more. Taking these factors together, ENSR does not recommend dredging for restoration of Lovers Lake and Stillwater Pond.

The second of the four in-lake methods selected for evaluation is artificial circulation. Whole lake circulation, like hypolimnetic aeration, involves the introduction of more oxygen into the bottom waters of ponds to limit the amount of phosphorus recycling, thereby controlling phytoplankton blooms.
The technical feasibility review indicates that artificial circulation or destratification would be a potential option for restoring deep water oxygen levels in Lovers Lake and Stillwater Pond and reducing internal phosphorus recycling. However, based on the morphometry, depth, and thermal structure of the two ponds, it was judged

that the conditions of Lovers Lake make it much more conducive to mixing by aeration than Stillwater Pond.

Review of the literature indicates some uncertainty as to how well the water chemistry and ecosystem would respond to this unnatural limnological state and whether it would be beneficial. However, this treatment provides the additional benefit of greatly increasing the amount of habitat for fish and other aquatic organisms and likely shifting the ponds away from dominance by blue-green algae. There is no substantial longevity associated with this technique since the positive benefits start to decline as soon as the diffuser is taken offline. Costs are relatively low compared to other restoration techniques, ranging between $180,000 for Lovers Lake and about $78,000 for Stillwater Pond for operation over a 15 year period. ENSR recommended further consideration of artificial circulation for restoration of Lovers Lake, but does not recommend application of this technique in Stillwater Pond.

The third of the four in-lake methods for reduction of nutrients and algal blooms selected for evaluation is hypolimnetic aeration. Aeration is commonly used to mix shallow lakes, and is sometimes used as a mixing force for artificial circulation and desertification. The technical feasibility review indicates that hypolimnetic aeration would be a good potential option to reduce internal phosphorus recycling in Stillwater Pond. On the other hand, it was judged that Lovers Lake would not be a good candidate as it is shallower and lacks significant hypolimnetic volume during summer.

In addition, this treatment provides the additional benefit of providing an additional amount of habitat for fish and other aquatic organisms. There is no real longevity associated with this technique since the positive benefits start to decline as soon as the aerating device is taken off-line. The cost for operation of a hypolimnetic aerator for Stillwater Pond over a 15 year period was estimated at $165,000, but this assumes that a site near the basins for installing the compressors and ancillary power requirements be secured. Taken these factors together, ENSR recommends further consideration of hypolimnetic aeration for restoration of Stillwater Pond but not for application in Lovers Lake.

The last of the four in-lake methods for reduction of nutrients and algal blooms selected for evaluation in the *Eutrophication Mitigation Study* is nutrient inactivation. Phosphorus inactivation typically involves some amount of short-term phosphorus precipitation (flocculation) during or just after application, but mainly aims to achieve long-term control of phosphorus release from lake sediments. The technical feasibility review indicates that nutrient inactivation by alum treatment would be a very effective option to reduce internal phosphorus recycling in both Lovers Lake and Stillwater Pond. Longevity associated with this technique was conservatively estimated at 15 years but could be longer.

The cost for nutrient inactivation at Lovers Lake was approximately $122,500-$141,000, with a rounded median of $132, 000. Estimated costs for hypolimnetic alum treatment of Stillwater Pond were approximately $76,000-$87,500, with a rounded median of $82,000. ENSR recommends further consideration of nutrient inactivation for restoration of Lovers Lake and Stillwater Pond. The treatment is highly appropriate and should be very effective for both lakes.

Based on the recommendations contained in the *Eutrophication Mitigation Plan* study the Town has chosen to permit nutrient inactivation for both Lovers Lake and Stillwater Pond.