

December 13, 2021

Town of Winchester – Recreation Department  
263 Main Street  
Winchester, MA 02890  
Sent via email: [ncacciolfi@winchester.us](mailto:ncacciolfi@winchester.us)

## Re: Wedge Pond, Winchester, MA – 2021 Year End Report

Dear Mr. Cacciolfi:

It is our pleasure to present a year end summary report to the Town of Winchester - Recreation Department regarding Wedge Pond. Wedge Pond is located in Winchester, MA and is approximately 23 surface acres. The Pond is primarily bordered by sparse woodlands and shrubbery, with properties abutting the eastern and southern shoreline. Borggaard Beach is located on the western shoreline, in addition to condominiums and Elliot Park to the north. Palmer Street, Lake Street, Main Street, and Grassmere Avenue also surround Wedge Pond.



Figure 1: Wedge Pond

Historically, Wedge Pond has battled dense microscopic algae blooms in the past. The goal of the 2021 program was to manage algal densities while monitoring native vegetation species throughout Wedge Pond. This would be accomplished by performing all applicable planning, permitting, surveys, treatments, and reporting. All permitting, treatment, and survey tasks were completed without issue and at the proper times.

The table below provides the specific dates of each task. Below the table, each visit/task performed is described in additional detail.

### Summary Of 2021 Management Activities

Date	Task/Description
June 29, 2021	MA-DEP Permit # WM04-0000613 received
July 7, 2021	Pre-treatment survey conducted to determine vegetation species and algal densities present; initial treatment conducted to target algae
August 10 <sup>th</sup> , 2021	Follow-up algaecide treatment completed
September 23 <sup>rd</sup> , 2021	Monitoring visit / post-treatment survey performed

#### **Pre-Treatment Survey / Initial Algaecide Treatment – July 7, 2021**

On July 7<sup>th</sup>, Co-Owner/Aquatic Biologist, Colin Gosselin, and Senior Environmental Scientist, James Lacasse, completed an algaecide treatment at Wedge Pond. Conditions during the visit were sunny and hot. The beach was closed and therefore no lifeguards were on duty. The fountains were not in the Pond



Figure 2: Water clarity and color within Wedge Pond.

per usual. Prior to the algaecide treatment, the Pond was inspected using visual observation as well as a throw-rake, as necessary. The pre-treatment inspection is used to document baseline pre-treatment conditions, and the need for treatment. Water clarity was below average, likely due to a microscopic algae bloom (see Figure 2). Also documented during the survey was sparse to moderate densities of elodea (*Elodea canadensis* – native species), trace to sparse coontail (*Ceratophyllum demersum* – native species), and scattered patches of waterlilies (*Nymphaeaceae*) with various patches reaching dense densities (see Figure 3).

Prior to treatment, neon green posters were hung around the shoreline warning of the treatment, affiliated water-use restrictions, and Water & Wetland contact information. A MA-DEP WM04 Permit was also obtained prior to treatment and the Conservation Commission was notified, as required in the Order of Conditions. The treatment was conducted from a 12' jon boat equipped with a calibrated sub-surface injection system.

EarthTec copper-based algaecide was applied to half the pond volume (the treatment area is limited per product label on copper-based algaecides and many contact based herbicides). EarthTec is similar to traditional copper sulfate but is a liquid formulation with a surfactant that allows the product to stay suspended longer, providing longer lasting control. We anticipated results very quickly following the treatment.

While on-site, surface temperature and dissolved oxygen readings were collected using a calibrated YSI meter. The temperature was fairly consistent with what we had been seeing at other similar ponds in the area. The dissolved oxygen was sufficient to support fish and wildlife.

Surface Temp (°C)	Surface Dissolved Oxygen (mg/l)
27.5	8.29



Figure 3: Waterlilies documented at Wedge Pond

#### **Follow-Up Algaecide Treatment – August 10, 2021**



Figure 4: Water clarity greatly increased from previous treatment

On August 10<sup>th</sup>, Co-Owner/Aquatic Biologist, Colin Gosselin, and Environmental Scientist, James Lacasse, completed the second algaecide treatment at Wedge Pond. The goal of the treatment program was to reduce microscopic algae while enhancing water quality and clarity. Prior to treatment, the Pond was inspected using visual observation and a standard throw-rake as necessary. The water clarity had noticeably improved drastically since the previous visit/treatment (see Figure 4 on the left). Also observed during the survey were native plant species including elodea, coontail, and waterlilies. None of the native vegetation was observed at a nuisance level which would

impede on the ecosystem or recreation. Waterlilies for instance provide valuable habitat and cover and the density/cover of the waterlilies was at a desirable level. Conditions during the visit were calm and cloudy.

EarthTec, copper-based algaecide was applied to the Pond at label rates using a jon boat equipped with a calibrated pumping system. Prior to treatment, neon posters were hung around the shoreline noting the treatment, affiliated restrictions, and Water & Wetland contact information.



Figure 5: Wedge Pond post first algaecide treatment

While on-site surface temperature and dissolved oxygen profiles were collected using a calibrated meter. The water temperature was consistent with other similar ponds we manage in the area. The dissolved oxygen was sufficient to support fish and wildlife.

Surface Temp (°C)	Surface Dissolved Oxygen (mg/l)
21.6	8.87

#### **Post-Treatment Survey – September 23, 2021**



Figure 6: Elodea on the rake throw

On September 23<sup>rd</sup>, Senior Environmental Scientist, James Lacasse, completed a post-management survey of Wedge Pond. The survey consisted of visual observation paired with a standard throw-rake. Additionally while on-site, basic water quality was assessed including collection of Secchi disk measurement, and a temperature and dissolved oxygen profile. Conditions during the visit started with light rain and transitioned to sunny during the visit.

Noted during the survey were several native species including waterlilies, elodea (Figure 6), and coontail. Waterlilies were primarily located on the western shoreline, including on both sides of the beach, the northern portion of the pond, and scattered in sparse patches in front of abutter properties. Elodea and coontail were found only in the northwestern portion and northern areas of the Pond.

The Secchi disk reading of almost 4 feet (3'11") was collected from the middle of Wedge Pond. A Secchi disk is an 8-inch disk with alternating black and white quadrants. It is lowered into the water of a lake until it can no longer be seen by the observer. This depth of disappearance, called the Secchi depth, is a measure of the transparency of the water. It will be interesting to continually process Secchi data from Wedge Pond over time to compare these results. Overall, the water clarity was much improved compared to the pre-algaecide clarity, and has steadily increased each time we've visited Wedge Pond.

The water temperature and dissolved oxygen readings are shown below (see table). The water temperature was very much consistent with what we were seeing in the field and decreases when moving toward the bottom of the pond. The dissolved oxygen at the surface is very much sufficient to support

fish and wildlife. As you'll see in the table, it decreases to less than 3 mg/L at 6' of depth. Dissolved oxygen can be affected by many outside factors, such as: temperature, time of day, and pollution. Fish and other aquatic organisms typically require a minimum of four to five milligrams per liter (mg/l) of oxygen. Given the depth of Wedge Pond, it is prone to stratification and turnover. Stratification can essentially be defined as the layering of water by temperature and/or chemical properties and density. Turnover can be summed up as the process of a layered pond mixing once the density barrier is no longer present. Cooling events will typically cause the turnover of stratified ponds and sudden turnover can have negative implications on ponds and lakes. This process could potentially fuel algae blooms during the fall months, when nutrients trapped within the bottom layer become mixed into the water column.



Figure 7: Inlet at Wedge Pond

Lastly, while on-site, the shoreline was surveyed for inputs into the pond, such as culverts, etc. Stormwater can drastically increase nutrients, turbidity, etc. and we've been working with products like BioChar filtration to help filter nutrients from stormwater at their input points. While it's possible some of these inputs may be blocked by vegetation and thus not visible, only one inlet was found in the north end of the Pond (see Figure 7).

Depth (ft)	Temperature (°C)	Dissolved Oxygen (mg/l)
Surface	22.5	9.55
1	22.2	9.53
2	21.8	9.47
3	21.7	8.36
4	21.4	7.48
5	21.3	5.61
6	21.1	2.78

## Summary / 2022 Recommendations



Figure 8: Wedge Pond post-treatment

Wedge Pond boasts healthy vegetation, and no submersed or floating invasive species were found. Annual surveys are a great way to monitor for invasive vegetation. The best way to manage invasive aquatic vegetation is by early detection. Based on the assemblage, density, and distribution of the aquatic plants in Wedge Pond, we feel that aquatic weed management is not necessary at this time. Lilies should continue to be heavily monitored, but given the depth of Wedge Pond, they should stay fairly confined to the shoreline, providing beneficial coverage. An early season survey would be able to document colder water invasive species, such as curly-leaf pondweed,



which is known to be present throughout the area. If invasive species are found, they should be managed accordingly.

Algae has been the largest issue at Wedge Pond historically. The EarthTec algaecide treatments at Wedge Pond during the 2021 season proved effective but should likely be started earlier in the season. This would allow us to be slightly more proactive. We typically recommend pairing EarthTec treatments with algae sampling. This will help to guide treatments, insure safety, and gauge treatment efficacy. Treatment and sampling (during the same visit) is recommended in late May/early June, July, and August.

Water quality sampling will be helpful to further recommendations, and at a minimum, a standard suite of water quality parameters including nutrient analysis is recommended for Wedge Pond. A proactive strategy is always recommended and in the case of Wedge Pond, based on the limited water quality data collected in 2021, we would recommend the installation of a submersed aeration system. Submersed aeration consists of an on-shore compressor housed in a sound dampening cabinet. The compressor pumps air through weighted hose to bottom diffuser discs. Aeration can help to proactively limit cyanobacteria from a source perspective. By mixing the water column it can help beneficial algae species to become established, this can limit cyanobacteria from reaching harmful levels. The process of adding oxygen introduced by aeration can assist with limiting nutrients being released from pond sediments, that fuel HAB's (harmful algae blooms). Deep water oxygen can drastically reduce iron bound phosphorus loading. Water & Wetland distributes, installs, and services many major brands of aeration. We have included a custom aeration design within the attachments. The design may change due to electrical sources, but otherwise gives you a great representation of what a properly designed aeration system for Wedge Pond would look like. This specific system would cost approximately \$30,000-\$35,000 which includes the system and the additional supplies needed. During the off-season months, we offer free installation on new aeration systems (does not include getting the proper electrical supply to the shoreline). We recommend that the aeration be installed in either the Spring or the Fall if the Town wishes to pursue this.

Another proactive approach to algae management is using aluminum sulfate (alum). While copper (above) is an algaecide, alum targets source phosphorus, as phosphorus is considered the limiting nutrient driving nuisance plant and algae growth. Alum is commonly used in ponds, lakes and drinking water reservoirs to remove phosphorus through precipitation, forming a heavier than water particulate known as floc. This floc settles to the bottom of the waterbody to create a barrier that slows sediment phosphorus release. Alum dosing can vary greatly. A low dose treatment can be used to strip phosphorus from the water column but may need to be repeated annually or more. Higher doses may be needed to inactivate sediment phosphorus reserves. Higher doses also typically require buffering with sodium aluminate. Some studies have also shown that mixing with aeration systems can improve treatment efficacy and even lower the dose needed. Alum may be applicable in Wedge Pond, given the persistent algae over the years, but water quality testing would confirm this and aid with dosing.

One possible low cost addition to the 2022 program would be use of BioChar socks at the inlet. BioChar, a product similar to activated charcoal, is a natural solution to water filtration. This specially produced, highly absorbent product is placed in porous socks and has the ability to filter nutrients such as phosphorus as water passes through. This of course assumes that the phosphorus within the Pond and



entering the Pond is elevated. It makes most sense to conduct water quality testing during the 2022 season to further hone in on appropriate approaches to phosphorus mitigation, if applicable.

As is always the case, we recommend using best management practices. These practices include not using fertilizers on lawns/turf or using non-phosphorous fertilizers when not fertilizing is not an option. Encouraging beneficial buffers will also help limit nutrient input into the Pond. This can be as simple as not mowing directly up to the shoreline.

We've greatly enjoyed working with Winchester Recreation Department in 2021. We hope that you were impressed with the communication, timeliness, and expertise of Water & Wetland during the season. We look forward to working with you to continue to improve the health of Wedge Pond in 2022 and beyond. Should you have any questions, please do not hesitate to reach out.

Sincerely,

A handwritten signature in black ink, appearing to read "James Lacasse", with a long horizontal flourish extending to the right.

**James Lacasse**  
Project Manager  
Senior Environmental Scientist  
c: 774-276-6098  
o: 888-4WETLAN(D)  
[james@waterandwetland.com](mailto:james@waterandwetland.com)  
[www.waterandwetland.com](http://www.waterandwetland.com)

Attachments Include:  
2021 WM04 Approval  
Aeration Design



Charles D. Baker  
Governor

Karyn E. Polito  
Lieutenant Governor

Kathleen A. Theoharides  
Secretary

Martin Suuberg  
Commissioner

License No.:

**WM04-0000613**

**LICENSE TO APPLY CHEMICALS FOR CONTROL OF  
NUISANCE AQUATIC VEGETATION**

**Applicant: COLIN J GOSSELIN**  
**Name of Waterbody: WEDGE POND**  
**Location of Waterbody: WINCHESTER**  
**Project Proponent: WINCHESTER RECREATION DEPARTMENT**

**AUTHORITY FOR ISSUANCE**

Pursuant to the authority granted to the Department of Environmental Protection, by Massachusetts G.L.c. 111, s5E, the following license is hereby issued to **colin Gosselin, Water and Wetland** (hereinafter called the “licensee”), authorizing the application of chemicals for the control of nutrients, algae or aquatic plants to **WEDGE POND, WINCHESTER**; such authorization being expressly conditional on compliance by the licensee with all terms and conditions of the license hereinafter set forth. This license shall become effective on the date of the Director’s signature and shall expire on the **12/31/2021**.

Sincerely,

License Effective Date: **06/29/2021**

Stephanie Moura  
Director, Division of Wetlands and Waterways  
Department of Environmental Protection



# Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500

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Secretary

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License No.: **WM04-0000613**

## A. Application Condition(s)

### Chemical Information

Product Brand Name/Trade Name	Chemical Form (dry/liquid)	Total Weight/Volume Applied	Units of Measurement (lbs/gallons)	Acres Treated	Application Rate	Planned Maximum Concentration (ppm)
Captain XTR	liquid	84	gal	35	0.6 gal/acrefoot	
Copper Sulfate	Dry	192	pounds	60	0.8 lbs/acrefoot	
Earthtec	liquid	120	gal	60	2 gal/acre	
Alligare Diquat	Liquid	22.5	gal	15	1.5 gal/acre	

**Treatment Method:** The treatments will be conducted using a small jon boat with a subsurface injection system. We are permitting for the use of three different algaecides, the best approach will be used once algae species are identified. Each algaecide works best depending on the algae species present. Given that this is a popular swim area, and were notified that the pond has current small algae blooms, we want to be prepared for all species. Copper sulfate and captain xtr are permitted based off an average depth of four feet. We are permitting up to 3-6 half pond algaecide treatments if necessary, with treatments scheduled 2-4 weeks apart.

## B. Application Report

By December 31st of the year of this treatment, the licensee shall submit a written report to the Department certifying the treatment date, application rate and the total weight/volume for each chemical used in the treatment, in accordance with requirements of Section I.A. of this license.

Please send the report to the Massachusetts Department of Environmental Protection (David.W.Wong@mass.gov).

## C. Modification of Application Conditions

The licensee shall not apply chemicals in a manner contrary to, or inconsistent with, the application conditions set forth in Section I.A. of this license without the prior written approval of the Department.

## General Conditions

- A. The licensee is hereby notified that chemical treatments to control aquatic nuisances in public or private lakes and ponds of the Commonwealth involve the alteration of wetland resource areas protected under both Massachusetts G.L.c. 131, s40, the Wetlands Protection Act and 310 CMR 10.00, Massachusetts Wetlands Protection Regulations.





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- B. The licensee is hereby notified that issuance of this license does not in any way constitute the Department's approval of the chemical treatment as it related to the provisions of the Wetlands Protection Act.
- C. The licensee shall obtain either a final Order of Conditions or a negative Determination of Applicability from the **WINCHESTER** Conservation Commission(s) prior to application of chemicals authorized under this license.
- D. Shoreline areas of the lake or pond must be posted with signs warning the general public of any water use restrictions stated on the chemical label minimum for one week. This is especially important at bathing beaches and other areas of common access. These signs shall clearly state that the chemical treatment is being conducted pursuant to a license issued by the Department of Environmental Protection, "DEP". A new sign shall be posted for each treatment event.
- E. The Department may require the licensee to cease application of chemicals to a body of water at any time following the issuance of a license if the Department determines that the chemical treatment will be ineffective, or will result in unreasonable restrictions on current water uses, or will produce unnecessary adverse side effects on nontarget flora or fauna.
- F. Chemical applications shall be performed in accordance with the manufacturer's label directions, existing pesticide use laws, and any conditions imposed by other local or state agencies.
- G. Chemical treatments to water using general use pesticides shall only be performed by an applicator currently licensed by the Massachusetts Department of Agricultural Resources Pesticide Program in the aquatics category. Chemical treatments to Bordering Vegetated Wetlands (310 CMR 10.55(2)(a)) and Salt Marsh (310 CMR 10.32(2)) using general use pesticides and techniques that insure chemicals are not applied to water shall only be performed by an applicator currently licensed in Massachusetts Department of Agricultural Resources Pesticide Program. Chemical treatments using restricted use pesticides shall only be performed by an applicator currently certified by the Massachusetts Department of Agricultural Resources Pesticide Program.
- H. Issuance of this license does not release the licensee from liability resulting from the use of chemicals or from negligent or reckless application of chemicals specified in Section I.A of this license.
- I. Electronic notification of treatment must be made to the Massachusetts Division of Fisheries and Wildlife (jason.stolarski@mass.gov, jason.carmignani@mass.gov ). Notification that the treatment was performed shall be made within 24 hours of treatment. The notification message should include waterbody, town, license number and chemicals used.
- J. No chemical treatment shall be conducted while a Massachusetts Department of Public Health advisory is in effect.
- K. In general, less than 1/3 of the lake area and less than 1/2 of the littoral zone should be targeted for herbicide treatment when native plants (particularly low growth forms) are dominant.

# Kasco® Robust-Aire™ Proposal

Customer Name: \_\_\_\_\_  
 Phone Number: 508-250-6238  
 Email Address: joe@waterandwetland.com  
 Waterbody Address: Wedge Pond - Winchester, MA  
 Kasco Designer: Matt  
 Date of Proposal: 8/18/21



## Application Details

Surface Acres: 24  
 Average Depth: 7'  
 Max. Depth: 16.4'  
 Total Gallons: 62.6 million  
 Total Acre-feet: 192  
 Diffuser Depth & Flow:

<u>6 @ 6.5'</u>	<u>7.8 million</u>
<u>8 @ 9.8'</u>	<u>17.6 million</u>
<u>2 @ 13.1'</u>	<u>7 million</u>
<u>2 @ 16.1'</u>	<u>10.2 million</u>
_____	_____
_____	_____
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Total Flow / Day: 42.6 million gallons  
 Turnover / Day: once every 36 hours  
 Working PSI: 10.1  
 CFM / Diffuser: 1.6

## Recommended System Details

Recommended System: RA6

### Part Numbers & Quantity Needed

- RA6 x 3, 6 diffuser system, BM
- 773585 x 21, 500' 5/8" tubing
- 773058 x 3, 10 pack connector
- 771018 x 6, extra air filters
- \_\_\_\_\_
- \_\_\_\_\_

### System Specifications:

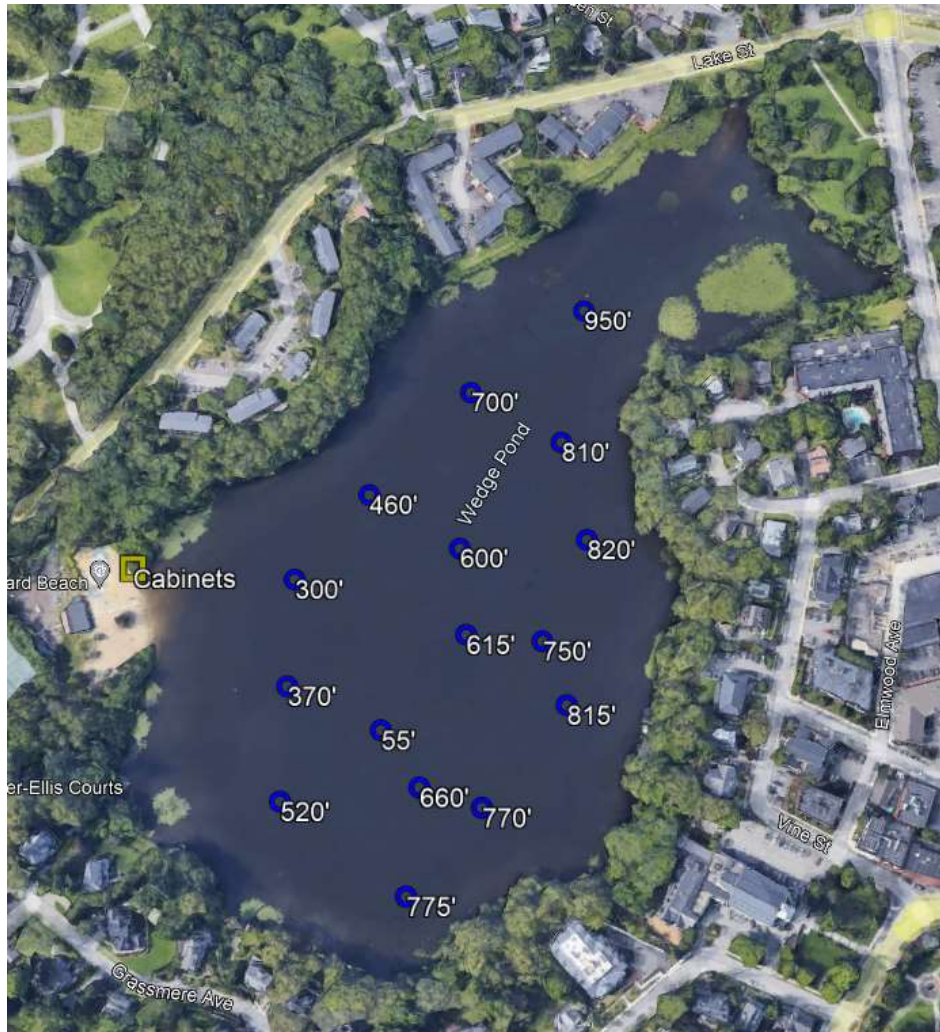
Compressor #: KM-120C x 2  
 Compressor Size & Voltage: 1/2hp 120V  
 Compressor Amp: 3.5 each  
 Cabinet: Base Mount  
 Tubing Size & Length: 10,465' of 5/8"  
 Number of Diffusers: 18

## Warranty Info

Diffusers: Lifetime  
 Teich-Aire™ Compressors: 3 years  
 Cabinet (post or ground): Lifetime  
 SureSink™ Tubing: 15 years  
 Please consult owner's manual for warranty limitations

## Illustration of Proposed Layout

Recommended System: RA6



### Notes:

Tubing runs are approximate and will depend on exactly where the cabinet and diffusers are placed.

Lakes over 5 acres Kasco wants to turn the lake volume in 36 hours or less. Putting 18 diffusers at the depths listed will turn the lake volume every 36 hours.

### Site Specifications

Surface Acres:	24
Volume (gallons):	62.6 million
Acre-feet:	192
Diffusers:	18
CFM / Diffuser:	1.6
Total Flow / 24 hours:	42.6 million
Turnover / Day:	once every 36 hou

### Legend

- Cabinet
- Diffuser
- Tubing
- Remote Manifold