ARTICLE 4:

ARTICLE 4: To see if the Town will vote to raise and appropriate, transfer from available funds or borrow a sum of money for the construction and/or repair and/or purchase and/or lease and/or replacement of departmental buildings and/or equipment and/or capital facilities and/or for feasibility studies and other types of studies for the various departments of the Town, including authorizing lease/purchase agreements for terms of up to or in excess of three years, substantially as follows:

ITEM	DEPARTMENT	PROJECT DESCRIPTION
A	Fire Department	Communications Tower
B	Fire Department	Vehicle Lift System
C	Marine & Environmental	Herring Ponds Watershed Study
D	Marine & Environmental	Engineering & Design for Dam Bypass at Jenney Pond
E	Water Department	Manomet Zone Pipe Upgrades
F	Airport	Taxiway Echo Extension
G	Airport	Purchase NW-26 SRE building

or take any other action relative thereto.
SELECT BOARD

RECOMMENDATION: Approval $8,511,024 Unanimous (11-0-0)
The Advisory & Finance Committee recommends Town Meeting approve the Article 4 appropriations listed below:

ITEM	PROJECT DESCRIPTION	APPROPRIATION
A	Communications Tower	$500,000
B	Vehicle Lift System	$55,000
C	Herring Ponds Watershed Study	$81,024
D	Engineering & Design for Dam Bypass at Jenney Pond	$75,000
E	Manomet Zone Pipe Upgrades	$5,100,000
E	Taxiway Echo Extension	$2,500,000
G	Purchase NW-26 SRE building	$200,000
Total for Article 4 Items		**$8,511,024**

TOWN OF PLYMOUTH CAPITAL IMPROVEMENT PLAN REQUEST FORM
FY21 FALL ANNUAL TOWN MEETING REQUEST FORM

Department: Marine and Environmental Affairs		
Project Title and Description: Herring Ponds Watershed Study	**Total Project Cost:**	**$81,023.50**

Department/Division Head: **David Gould**

Cost estimate was developed: Internally ☐ Externally X

Basis of Estimated Costs (attach additional information if available)			**If project has impact on 5 Year Plan and future operating budgets, insert estimated amounts.**		
Capital:	**Cost**	**Comments**	**Fiscal Year:**	**Capital**	**O & M**
Planning and Design	**$71,023.50**		***FY21***		
Labor and Materials			***FY22***		
Administration			***FY23***		
Land Acquisition			***FY24***		
Equipment			***FY25***		
Other					
Contingency					
Total Capital	**$81,023.50**				

Possible sources and amounts of funding, if known: $71,023.50 from Environmental Affairs Fund and $10,000 from Herring Ponds Watershed Association

Project Justification and Objective: The Herring Pond Watershed is one of the largest watersheds in the Town of Plymouth encompassing Little Herring Pond, Great Herring Pond and Carter's River. The area is within a state listed ACEC (Area of Critical Environmental Concern) and has seen significant growth and development. During the summer of 2020 GHP experienced the first known cyanobacteria bloom impacting residents and businesses like Camp Bournedale.

Justification for Request at Fall Annual Town Meeting: Funding now affords the opportunity to begin the study now and also begin to collect fall, winter and spring water samples. Waiting until the spring precludes this project from being started and collecting seasonal water quality samples.

For Capital Project Requests:
Will this project be phased over more than one fiscal year? If yes, enter it on the next 5 Year Plan Yes ☐ No X
Can this project be phased over more than one fiscal year? Yes ☐ No X

For Capital Equipment Requests:
☐ Check if equipment requested is replacement and enter the year, make & model, VIN and present condition of existing equipment

Attach additional information, estimates, or justification.

School for Marine Science and Technology
706 South Rodney French Blvd.
New Bedford
Massachusetts 02744-1221
Tel 508.999.8193
Fax 508.999.8197
University of Massachusetts Dartmouth

Scope of Work for Technical Services
Support of the Town of Plymouth Pond and Lake Stewardship

Project: Great Herring Pond and Little Herring Pond Water Quality Management Plans

Submitted by:

Brian L. Howes, Ph.D.
Ed Eichner, MS, MPA

Coastal Systems Program
School for Marine Science and Technology
University of Massachusetts Dartmouth

Overview: This Scope of Work is proposed to the Town of Plymouth for technical support and new data collection related to development of a water quality management plans for Great Herring Pond, Little Herring Pond, and Savery Pond. Specifically, this Scope relates to follow-up on the Coastal Systems Program at the School for Marine Science and Technology, University of Massachusetts Dartmouth (CSP/SMAST) findings and associated recommendations during the preparation of the Plymouth Pond and Lake Atlas and the initial year of the Plymouth Pond and Lake Stewardship (PPALS) water quality snapshot during the 2014 summer.[1]

During the preparation of the Plymouth Pond and Lake Atlas, CSP/SMAST staff completed a brief overview of available past data collected by the Town and the Herring Ponds Watershed Association. This data included water quality samples at 19 in-pond sites and 16 stormwater sites, five years of streamflow readings at three locations, and data contained in various historic reports. Discussions with the Association and Town led to a preliminary strategy that would culminate with a pond management plan for the two ponds. The initial tasks to be completed for the management plan were: a) collect, review, and synthesize the available data within the two ponds, b) complete a watershed delineation and use existing land use and water information to develop initial water, nitrogen, and phosphorus budgets for each pond, c) complete stormwater runoff sampling of 7 key sites, and d) identify data gaps and recommendations for next steps. The Town

[1] Eichner, E.M., B.L. Howes, and S. Horvet. 2015. Town of Plymouth Pond and Lake Atlas. Town of Plymouth, Massachusetts. Coastal Systems Program, School for Marine Science and Technology, University of Massachusetts Dartmouth. New Bedford, MA. 138 pp.

funded the completion of the runoff sampling in 2015[2] and recently identified the Massachusetts Environmental Trust (MET) grant program as an opportunity to complete the remaining tasks and expand the effort to address known data gaps (*e.g.*, sediment core collection and incubation, aquatic plant coverage) and develop a combined Great Herring Pond and Little Herring Pond Management Plan.

PROJECT TASKS

In cooperation with the Town of Plymouth, the Herring Ponds Watershed Association (HPWA), and other stakeholders around the ponds, Coastal Systems Program in the School for Marine Science and Technology, University of Massachusetts Dartmouth (CSP/SMAST) staff has been asked to develop water quality management plans for two pond systems Great Herring Pond and Little Herring Pond. Development of the plans will include 1) gathering, organizing, and reviewing available historic data, 2) collection and incubation of sediment cores to quantify nutrient regeneration, 3) updating bathymetric maps with surveys of rooted plants, phytoplankton, and freshwater mussels, and 4) synthesis of all available data to review causes of impairments and assess management options to restore water quality. Final versions of the management plans will be developed through a series of public meetings and regular engagement of all stakeholders.

The overall project (Great Herring Pond/Little Herring Pond Water Quality Management Plans) will be under the direction of Dr. Brian L. Howes, Manager of the Coastal Systems Program at SMAST-UMD. Day-to-day direction of tasks will be conducted by Ed Eichner. The University will serve as the prime contractor for this effort, although technical specialists with proven capabilities and experience within the region will be integrated into the project as required. CSP/SMAST staff will coordinate all tasks with the Town of Plymouth. Any amendments to the contract associated with this scope can be put in place by the designated Town of Plymouth Point of Contact, via an email to the UMD Office of Grants Administration (Michelle Plaud, mplaud@umassd.edu).

The project tasks are:

GREAT HERRING AND LITTLE HERRING PONDS

Task 1: Historic Data Review and Synthesis and preparation of QAPP for additional future sampling

CSP/SMAST staff with the assistance of Town of Plymouth staff will gather, review, and synthesize available historic data for Great Herring Pond and Little Herring Pond and then prepare a Quality Assurance Project Plan (QAPP) for additional sampling to be completed in subsequent tasks. The QAPP will be submitted for MassDEP/EPA approval. Data review will include evaluation and comparison of data collection techniques and laboratory methods, as appropriate. CSP/SMAST staff will meet with HPWA and FOEM members to collect available data and review planned project activities.

Task 1 TOTAL Cost: $6,683.50

[2] CSP/SMAST Technical Memorandum. February 24, 2016. Great Herring Pond Stormwater Monitoring Project results. To: Kim Tower, Environmental Technician, Town of Plymouth.

Deliverable: Spreadsheet with collected data (provided with respective management plans; synthesis/analysis also described in plans)

Task 2: Great Herring Pond and Little Herring Pond Management Plan

Development of a combined management plan for the hydrologically linked Great Herring Pond and Little Pond system will include gathering of historical data, collection of targeted data to address identified data gaps, integration and synthesis of new data with historic data, and use of the subsequent characterization of the pond ecosystems to develop management options and a recommended plan to restore water quality in the ponds. The subtasks to complete the development of the management plan are described below.

Subtask 2a: Pond sediment assessment

CSP/SMAST staff will collect and process a minimum of 15 cores combined in the two ponds. These locations will be based on underwater review of sediment characteristics and will likely be focused in the deepest portions of each pond and the inlet/outlets. GPS coordinates and depth will be collected for each location. Cores will be collected in Apri/May and preserved and incubated to evaluate phosphorus and nitrogen regeneration under a variety of oxidizing and reducing conditions according to procedures approved by the MassDEP. Accompanying water quality samples will be collected in three (3) runs, one each before, during and after the sediment core collection. These sampling runs will include collection of samples throughout the water column, dissolved oxygen and temperature profiles with readings collected every meter in Great Herring Pond and every 0.5 meters in Little Herring Pond, and Secchi clarity readings. Samples will be analyzed for standard freshwater pond constituents, including total phosphorus and total nitrogen, plus ortho-phosphorus and nitrogen component species (NH4, NO3+NO2, TDN, and PON). Data will be retrieved by CSP/SMAST staff in accordance with accepted quality control and quality assurance procedures. Volunteer boats for sampling and core collection and local incubation locations will be secured through coordination with the Town and HPWA members.

Subtask 2a Cost: $24,223
Deliverable: Nutrients released from sediments + water quality results (all described in Management Plan)

Subtask 2b: Aquatic Plant, Mussel, Bathymetric and Phytoplankton Surveys & WQ sampling

Working with the Town and HPWA members, CSP/SMAST staff will collect samples at 1 m increments throughout the water column over the deepest point monthly between May and October. At the same time, temperature and dissolved oxygen profiles and Secchi/clarity measurements will be collected at each location. Vertical phytoplankton tows will also be collected between June and September with samples quantitatively analyzed for species count and biovolume. Water quality samples will be analyzed at the CSP/SMAST Analytical Facility for the following constituents: total phosphorus, total nitrogen, chlorophyll a, pheophytin a, pH, alkalinity, ortho-phosphate, and component nitrogen species.

CSP/SMAST staff will also deploy an autonomous underwater vehicle (AUV) or equivalent to develop density maps of freshwater mussels and submerged aquatic rooted plants and bathymetric maps within each pond. The AUV is GPS-enabled device that can follow a programmed path while collecting underwater video. Collected data will be assessed and analyzed by SMAST staff to produce maps of the mussel distribution and aquatic rooted plant extent, as well as updating the 1970's-era bathymetric maps.

Subtask 2b Cost: $23,136
Deliverable: Bathymetry, aquatic plant, and freshwater coverage maps; Water quality data results (all detailed in Management Plan)

Subtask 2c: Great Herring Pond and Little Herring Pond System Management Plan
CSP/SMAST staff will develop a draft Management Plan for the Great Herring Pond and Little Herring Pond System. The draft will include watershed delineations for both Great Herring Pond and Little Herring Pond based on existing USGS groundwater modeling and use those delineations and the data collected through Task 1 and Subtasks 2a and 2b to develop a preliminary water budget, nitrogen budget, and phosphorus budget for each pond. Development of the nitrogen and phosphorus budgets will include review and synthesis of land uses (*e.g.*, review of ~5,700 parcels) and estimation of nutrient sources within the watersheds using established techniques. These budgets will account for the balance between all nutrient and water inputs to the pond system and their outputs or removal from the pond system.

CSP/SMAST staff will use the developed budgets to evaluate various management alternatives to address water quality impairments in Great Herring Pond and Little Herring Pond. Alternative management strategies to achieve for pond restoration will include both watershed and in-pond restoration approaches and estimated costs for the proposed strategies. The draft Management Plan will include a recommended set of strategies based on a review of the cost and efficacy of the alternatives.

Working with the Town and HPWA members, the draft Management Plan will be distributed and discussed among all stakeholders. The draft Plan will be publicly presented by CSP/SMAST staff at a mutually-convenient meeting with the Town and HPWA members. The Town will post the draft Plan and a meeting notice on the Town's pond website. A final Plan, including finalization of a recommended set of strategies, will be developed by CSP/SMAST working with the Town and the stakeholders. The final plan will be prepared after a one month comment period following the draft report presentation. The draft and final Plans will be submitted to the Town in electronic versions for appropriate distribution.

Task 2c Cost: $26,981
Deliverable: Great Herring Pond and Little Herring Pond System Management Plan

Great and Little Herring Pond
TOTAL Cost: $81,023.50

Listed costs are based on combined mobilization for all Tasks; separation of tasks will require slightly higher costs to account for multiple mobilizations.

Additional Management and Scientific Support

If the Town of Plymouth requires additional management and scientific support as its pond and lake management efforts proceed, any amendments including additions to the present contract can be put in place by the City of New Bedford through an email from Kim Tower, Town Point Of Contact (Plymouth-POC) to the UMD Office of Grants Administration (Michelle Plaud, mplaud@umassd.edu). The email needs to specify the additional work to be performed and the additional funds to be allocated.

Costs for additional support efforts will be negotiated through the UMD P.I. (Dr. B. Howes). The specific effort and cost will be prepared in writing by UMD, forwarded to Plymouth-POC for the Town's written approval and to be sent email to the UMD grants office (Michelle Plaud) as an amendment to the contract associated with this scope.

All technical support will be provided on a not-to-exceed basis. Depending on the nature of the request, Coastal Systems Scientists will summarize additional work completed in the form of a Technical Memorandum or a Project Report.