EcoTec, Inc.

ENVIRONMENTAL CONSULTING SERVICES
102 Grove Street
Worcester, MA 01605-2629
508-752-9666 – Fax: 508-752-9494

March 17, 2021

Kristin Kent, Conservation Chair
Nahant Conservation Commission
Town Hall
334 Nahant Road
Nahant, MA 01908 via email: conservation@nahant.org

Re: 430 Nahant Road: Northeastern University Marine Science Center:
Proposed Seawater System Upgrade
DEP File Number: 047-0582

Subject: Review of Notice of Intent filing: Peer Review Report # SSU-1

Dear Commissioners:

In accordance with EcoTec's February 8, 2021 Environmental Peer Review Services Proposal to the Commission, I am pleased to submit this Peer Review Report # SSU-1 to the Commission under the Massachusetts Wetland Protection Regulations (310 CMR 10.00 – the "WPA Regulations") and the Nahant Wetlands Bylaw and associated local regulations ("the Bylaw") for the proposed Seawater System Upgrade ("SSU") Notice of Intent ("NOI") filed by Northeastern University ("NU"). In accordance with our proposal, tasks to date have included:

- Administrative completeness review of the NOI materials;
- Site inspection to review the applicant's wetland resource area designations and boundaries, and to view the proposed work areas; and
- Review of proposed work, including mitigating measures and construction methodologies, relative to best practices and conformance with state and local regulatory performance standards for each wetland resource area present.

Please note that EcoTec's review is focused on the ecological-related wetlands concerns, while a concurrent peer review of the stormwater design and related engineering considerations of the wetland regulations is being conducted by Hardy+Man Design Group.

Administrative Completeness:

The NOI materials were filed by Pare Corporation ("Pare") on behalf of NU and include:

- Wetlands Protection Act ("WPA") Form 3 (NOI) with associated fee transmittal, abutter notification documents (form of notice, list of abutters, and affidavit of service), and reference mapping;
- Project Narrative by Pare;
- Nahant Seawater Improvements plan set by Jones Architecture Inc., signed and stamped by William Maher, PE; and

- Wetland Resource Analysis Report dated July 31, 2021 by LEC Environmental Consultants, Inc. ("LEC").

I obtained the above documents from the Nahant Conservation Commission ("NCC") website. Please note that the website link to the FEIR, which reportedly contains the landscape plans, was not functional and to date I have not reviewed the landscape plans. The applicant's representatives have subsequently provided the landscape plans.

In addition, based upon my requests for additional information during my site inspection, the applicant's representatives provided me with the following additional information:

- Bordering Vegetated Wetland ("BVW") wetland delineation data plots (provided by LEC);
- July 23, 2019 MassDEP comment letter on the ENF; and
- Seawater influent and effluent laboratory analyses (4/8/2019 AND 4/11/2019).

NOI Form:

The filing is relatively complete, as evidenced by the issuance by MassDEP of a file number with only the following technical comments:

- "Incorporate CZM and Marine Fisheries recommendations" (which includes Time-Of-Year Restriction avoiding in-water work 2/15 to 6/30);
- "Reference NPDES permits into the document."

Notwithstanding, I note the following minor administrative issue with the NOI and recommend that the applicant amend the filing accordingly:

1. The Nahant Wetlands Bylaw Regulations require that for a joint state-local NOI, below the heading on page 1 of the NOI Form 3, the following must be added: "*And Nahant Wetlands Protection Bylaw and Regulations*."

General – Requirement to have Filed for Other Permits:

The Wetlands Protection Act (MGL c.131, s.40) states re NOI filings:

> *"No such notice shall be sent before all permits, variances, and approvals required by local by-law with respect to the proposed activity, which are obtainable at the time of such notice, have been obtained, except that such notice may be sent, at the option of the applicant, after the filing of an application or applications for said permits, variances, and approvals; provided, that such notice shall include any information submitted in connection with such permits, variances, and approvals which is necessary to describe the effect of the proposed activity on the environment."*

The Regulations at 310 CMR 10.05(4)(e) provide additional clarification of this provision:

> "*The requirement under M.G.L. c. 131, § 40 to obtain or apply for all obtainable permits, variances and approvals required by local by-law with respect to the proposed activity shall mean only those which are feasible to obtain at the time the Notice of Intent is filed. Permits, variances, and approvals required by local by-law may include, among others, zoning variances, permits from boards of appeals, permits required under floodplain or wetland zoning by-laws and gravel removal permits. They do not include, among others, building permits under the State Building Code*…."

I recommend that the applicant review this requirement with respect to other necessary permit filings and provide a summary to the NCC which addresses the potential need to file for other local permits.

Abutter Notifications:
The NOI includes:

- a copy of the notice mailed to abutters, which provides a reasonable general description of the project, in my opinion, and a straightforward manner for obtaining documents;
- an affidavit of abutter service, signed and dated 10/2/2020;
- a list of abutters prepared and certified by the Nahant Assessors office on June 18, 2020. The affidavit indicates that abutters were notified on October 2, 2020, approximately 11 weeks after the abutters list was certified. The Regulations and Bylaw do not specify a maximum acceptable age of an abutters list. The Commission should consider whether the 11-week lag between the abutter list certification and mailing is excessive, and if so, the applicant should request a new certified abutters list and provide notification to any property owners not initially notified; and
- the Regulations state that "*Mailing at least seven days prior to the public hearing shall constitute timely notice. The applicant shall present either the certified mail receipts or certificate of mailing receipts for all Abutters at the beginning of the public hearing. The presentation of the receipts for all abutters required to be notified as identified on the tax list shall constitute compliance with Abutter notification requirements*."
  The applicant and NCC should verify that documentation of mailing has been provided.

Filing Fees:
The NOI includes documentation of filing fees under the WPA and Bylaw, based upon the following fee categories:

Category	# of items	WPA unit fee	WPA total fee	Bylaw unit fee	Bylaw total fee
3b.) - Each Building	1	$1,050	$1,050	$525	$525
2.j. other (seawater system)	1	$500	$500	$250	$250
TOTAL PROJECT FEE			$1,550		$775

I note that the Regulations state with respect to category 3b (commercial building) that "Any activities associated with the construction of said building, including associated site preparation… shall not be subject to additional fees if all said activities are reviewed under a single Notice of Intent. In my opinion, the fees paid are sufficient to cover the required NOI fees under the Regulations and the Bylaw.

Plan Scale:
The Bylaw Regulations specify the following minimum plan scale requirements unless a waiver is requested and the Commission determines that strict adherence is not necessary:

- Profile view: Horiz: 1" = 10', Vert: 1" =4' (provided: horiz: 1'=10; vert unspecified);
- Plan view: 1" =10' (provided: 1" = 20', 1 "= 30' and 1" = 40' – does not comply).

A scale of 1" =40' is typical for projects of this nature, with details of critical pertinent structures at larger scales. The applicant should request a waiver of this provision and the Commission should consider if 1" =10' plans are necessary.

Site Inspection and Wetland Resource Areas:
I conducted a site inspection on March 10, 2021. For efficiency, a single comprehensive site inspection was conducted relative to both NOIs under review by the Commission (seawater intake and Coastal Sustainability Institute). Conditions for the inspection were favorable, with warm and dry conditions and no snow cover. The inspection was timed to begin approximately 3-hours before low tide, to allow for viewing of intertidal areas.

Present with me for the site inspection were the Commission's peer review engineers: Shawn Hardy, PE and Chi Man, PE of Hardy+Man Design Group.

Also present for the site inspection were representatives of the applicant:

- Tim MacKay - Northeastern University
- Bob Lambert - Northeastern University
- Dr. Dwight R. Dunk, PWS, BCES - Epsilon Associates
- for the Coastal Sustainability Institute NOI:
    - William Maher, PE - Nitsch Engineering
    - Brian Madden - LEC Environmental
- for the Seawater System Upgrade NOI:
    - Richard E. Galat - TAG Engineering
    - Sarah Pierce - PARE Corporation

At my request, the applicant's representatives described their characterization and delineation of Wetland Resource Areas and the proposed work under both NOIs. I reviewed the wetland resource area delineations with the applicant's representatives.

Wetland Resource Areas at the site are depicted on the NOI plans and described in the Pare Project Narrative and the July 31, 2020 Wetland Resource Area Analysis Report by LEC. I discuss below the delineations of Resource Areas where work is proposed in a resource area or in close proximity.

Land Under the Ocean (LUO"):
The Regulations state that: "*Land Under the Ocean means land extending from the mean low water line seaward to the boundary of the municipality's jurisdiction and includes land under estuaries*" [310 CMR 10.25(2)]. The Regulations state further that:
"*Land Under the Ocean means land extending from the mean low water line seaward to the boundary of the municipality's jurisdiction and includes land under estuaries." Nearshore Areas of land under the ocean means that land extending from the mean low water line to the seaward limit of a municipality's jurisdiction, but in no case beyond the point where the land is 80 feet below the level of the ocean at mean low water*" [310 CMR 10.25(2)].

Coastal Beach:
The Regulations state that: "*Coastal Beach means unconsolidated sediment subject to wave, tidal and coastal storm action which forms the gently sloping shore of a body of salt water and includes tidal flats. Coastal beaches extend from the mean low water line landward to the dune line, coastal bankline or the seaward edge of existing man-made structures, when these structures replace one of the above lines, whichever is closest to the ocean*" [310 CMR

10.27(2)]. The NOI acknowledges that a dynamic Coastal Beach occurs at the site, directly below the seawall (Bank).

Land Containing Shellfish;
The Regulations state that: "Land containing shellfish means land under the ocean, tidal flats, rocky intertidal shores, salt marshes and land under salt ponds when any such land contains shellfish" [310 CMR 10.34(2)]. The NOI acknowledges that Land Containing Shellfish occurs at the site and overlaps LUO.

Coastal Bank:
Coastal Banks are delineated in accordance with the definition at 310 CMR 10.30(2) as:

> *"the seaward face or side of any elevated landform, other than a coastal dune, which lies at the landward edge of a coastal beach, land subject to tidal action, or other wetland"*

The Coastal Bank delineation criteria are further detailed in MassDEP Policy 92-1. In the areas where work is proposed in close proximity to the Coastal Bank, the Bank boundary is abrupt and straightforward in my opinion, consisting of man-made seawall or steep natural terrain and I concur with the Coastal Bank delineation interpretations in the NOI.

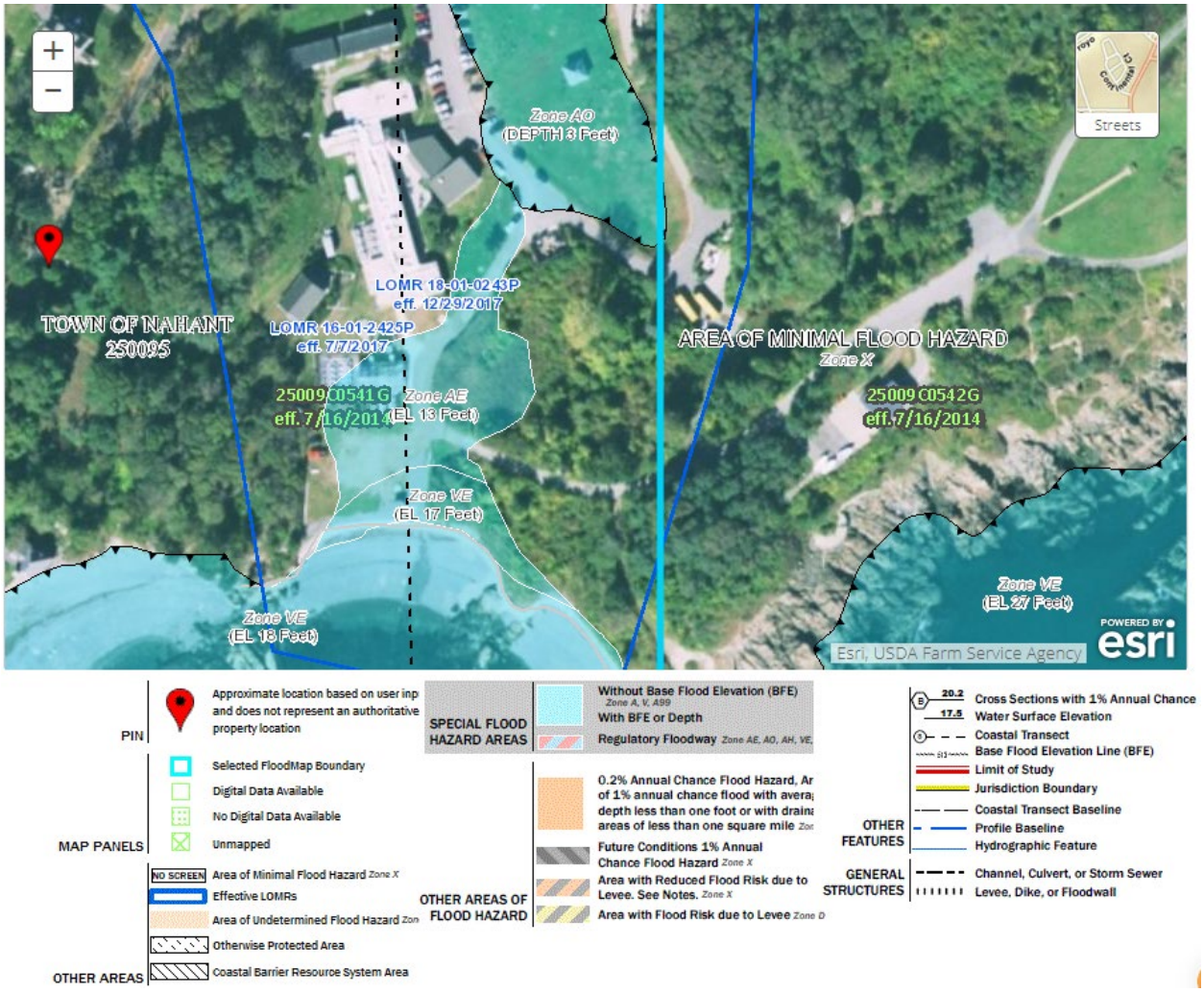
Because site topography, and therefore the Coastal Bank delineation, is complex at the property. A detailed assessment of the Coastal Bank boundary has not been completed. Therefore, I recommend that if the Commission approves the project, such approval contain a clear finding that Coastal Bank delineation is not established by the Order of Conditions.

Land Subject to Coastal Storm Flowage ("LSCSF")
Under state and local regulations, Land Subject to Coastal Storm Flowage ("LSCSF") includes all areas of the site above the Coastal Bank and Beach subject to any inundation, including wave action, from the 100-year storm, surge of record or storm of record, whichever is greater. At the SSU portion of the site property, FEMA flood mapping, including Letters of Map Revision, indicates three zones that are included within the LSCSF boundary of the site:

- Zone AE (Elevation 13) in the southern part of the property;
- Zone AO (Depth 3-feet): located within the low-lying field east of the cluster of buildings near the site entrance in the northern and central part of the property; and
- Velocity Zone VE (Elevation 17 extending landward for a mapped distance from Bathing Beach).

Also, Velocity Zone VE elevation 27 is found associated with much of the perimeter of East Point, outside of the project limits.

The site plans include mapping of these LSCSF areas. The Zone VE boundary and Zone AO boundary are mapped on the site plans based upon the FEMA boundary location, while the Zone AE (Elevation 13) boundary is plotted on the site plans to coincide with the 13-foot contour of actual surveyed site topography. The VE and AO boundaries appear to be accurately transcribed. Based upon the site topography provided, the AE boundary appears to be consistent with state and local LSCSF definitions. Because the FEMA FIRMette maps provided with the NOI do not include all of the above detailed elevations, I include below an image from the FEMA website depicting the project area with complete FEMA flood zone elevation information.



<u>Bordering Vegetated Wetland ("BVW")</u>:
BVW is defined by the Regulations as:
" ...freshwater wetlands which border on creeks, rivers, streams, ponds and lakes. The types of freshwater wetlands are wet meadows, marshes, swamps and bogs…." [310 CMR 10.55(2)(a)].
I conducted a detailed flag-to-flag review of the Bordering Vegetated Wetland ("BVW") boundary with Brian Madden of LEC, who had completed the BVW delineation. I reviewed the BVW boundary in accordance with the definition set forth in the regulations at 310 CMR 10.55(2)(c). Section 10.55(2)(c) states that "The boundary of Bordering Vegetated Wetlands is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist." The methodology used to delineate Bordering Vegetated Wetlands is further described in: (1) the BVW Policy "BVW: Bordering Vegetated Wetlands Delineation Criteria and Methodology," issued March 1, 1995; and (2) "Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act: A Handbook" produced by the Massachusetts Department of Environmental Protection, dated March 1995.

The BVW and immediate surrounding area contains historically disturbed soils and the remnants of a concrete block foundation, but a portion of this disturbed area satisfies the criteria for BVW jurisdiction. The BVW plant community consists of a near monoculture of invasive common reed (*Phragmites australis*). The *Phragmites* is present to some degree outside of the delineated BVW but those areas were reasonably excluded in my opinion due to the lack of wetland hydrology and/or the sufficient presence of upland plant species including cherry (*Prunus* sp) staghorn sumac (*Rhus typhina*) Pokeweed (*Phytolacca americana*) Virginia creeper (*Parthenocissus quinquefolia*) Asiatic bittersweet (*Celastrus orbiculata*) rugosa rose (*Rosa rugosa*) and Climbing Nightshade (*Solanum dulcamara*). In my opinion the BVW delineation is consistent with the Regulations and the DEP BVW delineation Policy.

Inland Bank:
The BVW area borders a small internal intermittent stream which continues as a culvert that discharges through the seawall to the south. The intermittent stream contains the wetland resource area Bank as defined at 310 CMR 10.54(2)(a). The intermittent stream Bank, including the culvert to the seawall, should be identified on the plans and the 100-foot Buffer Zone revised accordingly.

Buffer Zone:
State regulations attach a 100-foot Buffer Zone to all of the above resource areas except LSCSF. Nahant Bylaw regulations state that: "Wetland resource areas, as defined in Section 2 of the Wetlands By-law, include land within 100 feet of the other resources areas identified therein." Therefore, as noted on the site plans, the Bylaw attaches a 100-foot Buffer Zone to LSCSF. As discussed below, under the Bylaw, the Buffer Zone to all of the resource areas including LSCSF is regulated as a jurisdictional wetland resource area.

Based on my site inspection and review of the plans, the NOI, including attachments, accurately describes site conditions and wetlands jurisdiction, except as noted above i.e., intermittent stream Bank). The site includes a wide range of conditions, including sand and cobble beach, retaining walls, rock outcrop, manicured lawn areas, gravel and paved driveway and parking, buildings, scrub-shrub/ woodlands, and *Phragmites*-dominated wetland. As indicated on the NOI plans, a substantial portion of the site property is located within Land Subject to Coastal Storm Flowage and associated state and local Buffer Zone.

Proposed Work and Performance Standards Evaluation – Preliminary Comments:

Proposed work for the Seawater System Upgrade includes activities within the following jurisdictional areas:

- LSCSF (state and local);
- Land Under the Ocean (state and local);
- Land Containing Shellfish (state and local);
- Buffer Zone to Coastal Bank, Inland bank, and BVW (state and local); and
- Buffer Zone to LSCSF (local only).

An important component of the NOI is that the installation of the proposed seawater intake and discharge pipelines is proposed to be completed in large part through horizontal directional

drilling ("HDD"), to install the proposed intake and effluent pipes under the Coastal Bank, Coastal Beach, and most of the Land Under the Ocean and Land Containing Shellfish located along the pipeline routes.

Recommended General Approach to Review:

In reviewing the NOI for the proposed SSU, I recommend that the Commission consider three aspects of the proposed project, each requiring a separate analysis:

1. Installation/ construction of the proposed structures and removal of existing structures;
2. Long-term existence of permanent physical structures within jurisdictional areas; and
3. Long-term operation of the proposed intake and effluent systems.

As outlined below, I recommend that the applicant provide additional information concerning each of these aspects. I summarize below the regulatory performance standards for each wetland resource area where work is proposed.

Performance Standards: LSCSF:

State regulations at 310 CMR 10.00 do not currently contain regulatory performance standards for work in LSCSF. The Nahant Regulations Section V.B provides regulatory presumption that LSCSF is significant to the protection of the Bylaw interests and states that:

> *"If the following activities, when combined, alter a total of 5,000 or more square feet in LSCSF (with the exception of the construction of a single-family home) they shall be presumed to have unacceptable significant or cumulative effects upon the protection of wildlife habitat: construction of new or proposed expansions of roads, driveways or parking lots; construction of impermeable paving for existing unpaved roads, driveways or parking lots; and/or any activities which will result in the building within or upon, removing, filling and/or altering (as defined in Section 2 of the Wetlands By-law) of any vegetated area(s)."*

The SSU NOI proposes permanent alteration of 210 sf of LSCSF and 4,095 sf of temporary LSCSF alteration. This does not include work associated with the proposed NU Coastal Sustainability Institute. Notwithstanding the SSU footprint of less than the Bylaw's 5,000 threshold, I recommend that the applicant provide a detailed summary table that indicates the major categories of work proposed (e.g., driveway/parking, building, stormwater structures, utilities) and tabulates the size (sf) and condition (e.g., paved, type of vegetative cover, etc.) of each category under existing and proposed conditions. Due to possible overlap of work zones, it may be appropriate to combine proposed SSU alterations with alterations proposed for the CSI. With the recommended table as a reference, the applicant should then provide an analysis of how the proposed project satisfies the Bylaw performance standards for work in LSCSF. A similar analysis is recommended for state and local Buffer Zones (discussed below).

The Bylaw Regulations Section V.C identifies eight performance standards for work in LSCSF. The NOI discusses these performance standards in the Pare Project Narrative (section V. Regulatory Compliance). It is my opinion however, that the Regulatory Compliance analysis lacks an appropriate level of detail to reach the conclusions contained therein. I briefly summarize below the Pare LSCSF conformance analysis:

1. The analysis concludes that "aside from proposed impervious areas, the proposed work will not reduce the land's ability to absorb and contain waters." COMMENT: This

statement acknowledges that some of this function will be lost. This should be quantified and mitigation developed as necessary;

2. Buffer from flooding: The pare analysis states that the project "will not limit …" this function. COMMENT: FEMA mapping and photos during storms document the high energy nature of the proposed work area. The area is clearly significant to this interest and in my opinion, the applicant's conclusion that the project will have no negative effect to this interest should be better substantiated;
3. Displacement and diversion of flood waters: "negligible…": …" COMMENT: This should be tabulated relative to some meaningful benchmark for the Commission's determination of what constitutes a "negligible" change, and mitigation sought;
4. Damage to other structures: …" COMMENT: similar to #3;
5. Pollution of groundwater, surface water, or saltwater: "no pollutants will be introduced…." COMMENT: This statement should be substantiated. The limited two days of influent and effluent sampling from 2019 were provided by the applicant. At a minimum, these data should be tabulated with a comparison between influent and effluent concentrations and a comparison to appropriate ecological benchmarks.
6. Wildlife habitat: The Pare analysis concludes that the LSCSF work area is developed and provides no substantial wildlife habitat. …" COMMENT: This is a reasonable finding in my opinion relative to most habitat attributes, although the NOI acknowledges that fencing during the project may impede wildlife migration through the site during construction.
7. Increase in elevation or velocity of flood waters: The Pare analysis concludes that "the small amount of impervious areas within the LSCSF will not increase the horizontal or vertical extent of flooding nor alter the flow of velocity of floodwaters. …" COMMENT: In my opinion, this conclusion should be better substantiated (quantified).
8. Prevention of migration of resource areas: The analysis concludes, based on existing conditions including the presence of the vertical seawall, that salt marsh is not present or likely to occur. …" COMMENT: I concur.

<u>Performance Standards: Land Under the Ocean ("LUO")</u>

Performance Standards for LUO are found at 310 CMR 10.25(3) through (7). The Pare analysis addresses each performance standard briefly, as summarized below with commentary:

- 10.25(3) & (4) are not applicable;
- 10.25(5): Nearshore projects shall not cause adverse effects on beaches, banks, dunes or marshes: Pare states simply that no such adverse effects will occur. COMMENT: While this may be the case, I recommend that the applicant provide justification for this conclusion;
- 10.25(6): Water-dependent projects (in my opinion, the project is "water dependent") "shall be designed and constructed using best available measures, to <u>minimize</u> adverse effects" (emphasis added) caused by:
    - Alterations in water circulation. Pare concludes that no effects on water circulation will occur, and cites depth of intake and discharge, as well as project designs to minimize flow velocity at intake and discharge. COMMENT: In my opinion, this is a reasonable conclusion;
    - Destruction of eelgrass or widgeon grass beds. Pare concludes that these resources are not present and cites a lack of mapping of the above species and a dive survey showing their absence. COMMENT: It is unclear whether the dive

survey sample locations and precise influent and effluent locations match. I recommend that the applicant clarify;

- Alterations in the distribution and sediment grain size. Pare concludes that there will be no effect on sediment grain size. COMMENT: I note that the plans call for removal of sand substrate and placement of cobbles under the ballast blocks "to protect precast pads from scouring." This requirement would seem to suggest that scouring is possible and should be reconciled with the above statement.
- Alterations of shallow submerged lands with high densities of polychaetes, mollusks or macrophytic algae. Pare concludes that based on benthic survey of the proposed project area, it is unlikely that disruption of the benthic community as a result of the project will have long-term or broad-scale impact on seafloor biota. Comment: The Pare response does not address the prohibition of such alterations, however I note that the Regulations protect such areas because "*Nearshore areas of land under the ocean also provide important food for birds. For example, waterfowl feed heavily on vegetation (such as eel grass, widgeon grass, and macrophytic algae) and invertebrates (such as polychaetes and mollusks) found in estuaries and other shallow submerged land under the ocean*." Based upon the depth of the influent and effluent pipes, I do not believe that the LUO functions in the manner that the Regulations aim to protect by this provision.

<u>Buffer Zone Performance Standard: State Regulations</u>

State Regulations at 310 CMR 10.53(1) provide a narrative standard for work in the Buffer Zone and state:

> *"…If the issuing authority determines that a resource area is significant to an interest identified in M.G.L. c. 131, § 40 for which no presumption is stated in the Preamble to the applicable section, the issuing authority shall impose such conditions as are necessary to contribute to the protection of such interests. For work in the buffer zone subject to review under 310 CMR 10.02(2)(b)3., the issuing authority shall impose conditions to protect the interests of the Act identified for the adjacent resource area. The potential for adverse impacts to resource areas from work in the buffer zone may increase with the extent of the work and the proximity to the resource area. The issuing authority may consider the characteristics of the buffer zone, such as the presence of steep slopes, that may increase the potential for adverse impacts on resource areas. Conditions may include limitations on the scope and location of work in the buffer zone as necessary to avoid alteration of resource areas. The issuing authority may require erosion and sedimentation controls during construction, a clear limit of work, and the preservation of natural vegetation adjacent to the resource area and/or other measures commensurate with the scope and location of the work within the buffer zone to protect the interests of the Act. Where a buffer zone has already been developed, the issuing authority may consider the extent of existing development in its review of subsequent proposed work and, where prior development is extensive, may consider measures such as the restoration of natural vegetation adjacent to a resource area to protect the interest of the Act. The purpose of preconstruction review of work in the buffer zone is to ensure that adjacent resource areas are not adversely affected during or after completion of the work*."

Buffer Zone Performance Standard: Bylaw Regulations

The Nahant Wetland Bylaw identifies the land within 100-feet of other wetlands resource areas (including LSCSF) as a jurisdictional resource and states: "*The intent of the Wetlands By-law and these regulations is to supplement the state review and provide review of additional resource areas not covered under G.L. c. 131, § 40, the Wetlands Protection Act*." The Bylaw does not provide detailed regulatory performance standards for work in the 100-foot Buffer Zone; however, the applicant must demonstrate that the interests of the Bylaw are protected by all such work. I recommend that the applicant provide such an analysis that is modelled on the Bylaw LSCSF performance standards and considers all of the Bylaw Interests.

Bylaw Regulations Section XIII. Standards of Review for Wetland Alteration

These provisions appear to be related to proposed filling/ alteration of a vegetated wetland; however, the Commission should advise if otherwise.

Construction Phase and Erosion and Sediment Control:

The NOI includes a perimeter erosion control barrier and multiple plan details for possible erosion control best management practices ("BMPs") but does not provide adequate information, in my opinion, concerning how the project would be constructed in a manner that does not result in erosion impacts to nearby wetland resource areas (work is proposed in very close proximity to the BVW). The NOI states that the contractor will be required to comply with NPDES requirements to develop a Stormwater Pollution Prevention Plan ("SWPPP"). While this is true, it is my opinion that the NOI should detail minimum requirements and methods of erosion and sediment control. For example, the NOI should:

- Specify the construction detail of the minimum proposed perimeter erosion control barrier (the site plans include details for several types of erosion control barriers);
- Evaluate the suitability of the perimeter barrier at its most susceptible points where runoff will concentrate, by identifying the size and nature of sub-watersheds that drain to low points in the barrier;
- Specify minimum monitoring and repair frequencies and thresholds for all erosion and sediment control BMPs;
- Determine the need for and sizing of temporary sediment basins, based upon the size and shape of sub-watersheds within the work footprint;
- Identify project phasing, including staging and stockpiling, to minimize the amount of exposed soil;
- Identify measures to react to possible large storms during construction;
- Specify when and where the various BMPs on Sheets 400 and 401 would be implemented.

Comments Regarding Horizontal Directional Drilling:

Horizontal Directional Drilling ("HDD") provides a means of installing the proposed piping underground rather than the alternative of open trenching through the bank, intertidal, and subtidal areas leading to the locations where the pipes emerge into the water. While this methodology provides a substantial reduction in physical disturbance to wetland resources when compared to open trenching, it still presents a significant opportunity for construction period impacts. In my opinion, the methodology and control measures associated with the proposed HDD pipe installations should be more thoroughly developed, for regulatory review

and commitment by the applicant. This should include, at a minimum information should be provided to allow the Commission to understand:

- How the boring entry will be made and controlled through the overburden soils above bedrock – will some form of solid pipe be required to maintain and open bore hole?
- How drill cuttings and drilling mud will be managed at the entry holes; what is the volume and nature of the drill cuttings?
- How the borehole will be constructed as proposed without breakthrough at the seaward terminus until the remainder of the boring is completed;
- An understanding of how much (and of what nature) sediment (borehole cuttings and drilling mud) will be released at breakthrough on the seaward end of each bore hole;
- How will the sediments under the proposed ballast blocks be replaced as proposed?

Comments Regarding Long Term Operation:

The applicant has provided analyses of the thermal effects of the proposed effluent, based upon a modelled discharge in excess of the average rate of discharge and temperature. MassDEP concluded that the project would be compliant with water quality standards for temperature. Notwithstanding, I recommend that the conservative modelling be compared to a realistic worst-case scenario (rather than average flows), considering both flow rate and temperature assuming anticipated increase in use under full buildout of the CSI project. A limited two days of influent and effluent sampling data from 2019 were provided by the applicant. I recommend that these data be tabulated with a comparison of influent and effluent concentrations and reference to appropriate ecological benchmarks.

The NOI notes that the system will have the capacity to pump much more than the 600-gpm proposed as a maximum. The applicant's rationale for a lack of impacts from the long-term operation of the system with regard to entrainment of marine life at the intake and thermal or other pollution effects at the discharge is premised, at least in part, on this limitation. I recommend that the applicant describe how the flow rate will be managed, monitored, and documented to ensure that this limitation will be upheld in the long term, assuming the full buildout of the CSI project.

I hope that this information is helpful and look forward to providing further review. Please do not hesitate to contact me if you have any questions concerning this or other matters.

Sincerely,

Paul J. McManus, PWS
President

c: Hardy+Man Design Group
Applicant, c/o Tim MacKay - Northeastern University