Public Comment Period Begins 9/16/20
Public Comment Period Ends 10/15/20 at 4 pm

This Draft 401 Water Quality Certification (WQC or Certification) documents laws, regulations, determinations and conditions related to the Activity for the attainment and maintenance of New Hampshire (NH) surface water quality standards. Based on the facts, findings and conditions noted below, the New Hampshire Department of Environmental Services (NHDES or DES) has preliminarily determined that Certification should be issued for this Activity because there is reasonable assurance that construction and operation of the Activity will not violate State surface water quality standards. Comments regarding this draft Certification are now being accepted until the end of the public comment period noted above.

INSTRUCTIONS FOR SUBMITTING COMMENTS:
Only written comments will be accepted. Comments may be sent by postal mail or email however email is preferred due to the pandemic. Please include the project name/number, your name, organization, mailing address, email address and telephone number with your submittal.
By Mail: 401 Certification Program
NHDES Watershed Management Bureau
P.O. Box 95
Concord, NH 03301-0095
Attention: Gregg Comstock, P.E.
By email: Gregg.Comstock@des.nh.gov (Due to the pandemic, email is preferred).

John J. Boisvert, Chief Engineer
Pennichuck East Utility (PEU)
25 Manchester Street
Merrimack, NH 03054

WATER QUALITY CERTIFICATION
In Fulfillment of
Section 401 of the United States Clean Water Act (33 U.S.C 1341)
And NH RSA 485-A:12, III

WQC # 2020-404P-001

Activity Name	Webster Stream Intake
Activity Location	Basin Lane Barnstead, New Hampshire
Affected Surface waters	Webster Stream (NHRIV700060402-14) Unnamed Wetlands
Owner/Applicant	Pennichuck East Utility (PEU)

DRAFT

Applicable Federal and State permit(s):	• U.S. Army Corps of Engineers General 404 Permit for NH • New Hampshire Department of Environmental Services (NHDES) Wetlands Permit • NHDES Shoreland Impact Permit
Date of Approval (subject to Conditions below)	Month, day, 2020

A. INTRODUCTION

The Pennichuck East Utility (PEU or Applicant) is proposing to construct a water intake system (IS) within Webster Stream and a new water main within the roadway of Basin Lane to connect the proposed water intake structure to the PEU pump station on the south side of Peacham Road. A more complete description of the Activity is provided in Finding D-1. The purpose of Activity is to provide a secondary drinking water source during the winter months to allow for more robust recharge of the existing wells. The activity is proposed to occur from October through May every year when flows are higher. In wet years, the applicant intends extended withdrawals into June, and in dry years switch to ground water when the streamflow falls below critical low flow conditions. It is anticipated that construction will begin in the fall of 2020.

This 401 Water Quality Certification (WQC or Certification) documents laws, regulations, determinations and conditions related to the Activity for the attainment and maintenance of New Hampshire (NH) surface water quality standards, including the provisions of NH RSA 485-A:8 and NH Code of Administrative Rules Env-Wq 1700, for the support of designated uses identified in the standards.

B. 401 CERTIFICATION APPROVAL

Based on the facts, findings and conditions noted below, the New Hampshire Department of Environmental Services (NHDES or DES) has determined that there is reasonable assurance that construction and operation of the Activity will not violate surface water quality standards. NHDES hereby issues this Certification, subject to the conditions in Section E of this Certification, in accordance with Section 401 of the United States Clean Water Act (33 U.S.C. 1341) and RSA 485-A:12, III.

C. STATEMENT OF FACTS AND LAW

C-1. Section 401 of the United States Clean Water Act (33 U.S.C. 1341) states, in part: "Any applicant for a federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate…that any such discharge will comply with the applicable provisions of sections 301, 302, 303, 306, and 307 of this title… No license or permit shall be granted until the certification required by this section has been obtained or has been waived… No license or permit shall be granted if certification has been denied by the State..."

C-2. §401(d) of the CWA provides that: "Any certification provided under this section [401] shall set forth any effluent limitations and other limitations, and monitoring requirements necessary to assure that any applicant for a Federal license or permit will comply with [enumerated provisions of the CWA]… and with any other appropriate requirement of State law set forth in such certification, and shall become a condition on any Federal license or permit subject to the provisions of this section."

The U.S. Supreme Court has stated that, once the threshold of a discharge is reached (necessary for §401 certification to be applicable), the conditions and limitations in the certification may address the permitted

activity as a whole." [1]

C-3. NH RSA 485-A:12, III, states: "No activity, including construction and operation of facilities, that requires certification under section 401 of the Clean Water Act and that may result in a discharge, as that term is applied under section 401 of the Clean Water Act, to surface waters of the state may commence unless the department certifies that any such discharge complies with the state surface water quality standards applicable to the classification for the receiving surface water body. The department shall provide its response to a request for certification to the federal agency or authority responsible for issuing the license, permit, or registration that requires the certification under section 401 of the Clean Water Act. Certification shall include any conditions on, modifications to, or monitoring of the proposed activity necessary to provide assurance that the proposed discharge complies with applicable surface water quality standards. The department may enforce compliance with any such conditions, modifications, or monitoring requirements as provided in RSA 485-A:22."

C-4. NH RSA 485-A: IV states: "No activity that involves surface water withdrawal or diversion of surface water that requires registration under RSA 488:3, that does not otherwise require the certification required under paragraph III, and which was not in active operation as of the effective date of this paragraph, may commence unless the department certifies that the surface water withdrawal or diversion of surface water complies with state surface water quality standards applicable to the classification for the surface water body. The certification shall include any conditions on, modifications to, or monitoring of the proposed activity necessary to provide reasonable assurance that the proposed activity complies with applicable surface water quality standards."

C-5. NH RSA 485-A:8 and Env-Wq 1700 (Surface Water Quality Standards), together fulfill the requirements of Section 303 of the Clean Water Act that the State of New Hampshire adopt water quality standards consistent with the provisions of the Act.

C-6. Env-Wq 1701.02, entitled "Applicability," states that these rules shall apply to:

"(a) All surface waters; and
(b) Any person who:
  (1) Causes any point or nonpoint source discharge of any pollutant to surface waters;
  (2) Undertakes hydrologic modifications, such as dam construction or water withdrawals; or
  (3) Undertakes any other activity that affects the beneficial uses or the water quality of surface waters."

C-7. Env-Wq 1703.01 entitled "Water Use Classifications; Designated Uses," states the following:

"(a) All surface waters shall be classified as provided in RSA 485-A:8, based on the standards established therein for class A and class B waters. Each classification shall identify the most sensitive use it is intended to protect.
(b) All surface waters shall be restored to meet the water quality criteria for their designated classification including existing and designated uses, and to maintain the chemical, physical, and biological integrity of surface waters.
(c) All surface waters shall provide, wherever attainable, for the protection and propagation of fish, shellfish and wildlife, and for recreation in and on the surface waters.
(d) Unless high or low flows are caused by naturally-occurring conditions, surface water quantity shall be maintained at levels that protect existing uses and designated uses."

C-8. Env-Wq 1702.44 defines surface waters as "surface waters of the state" as defined in NH RSA 485-A:2, XIV and waters of the United States as defined in 40 CFR 122.2.

[1] *PUD No. 1 of Jefferson County v. Washington Department of Ecology*, 511 U.S. 700, 712 (1994).

NH RSA 485-A:2, XIV defines “surface waters of the state” as “perennial and seasonal streams, lakes, ponds and tidal waters within the jurisdiction of the state, including all streams, lakes, or ponds bordering on the state, marshes, water courses and other bodies of water, natural or artificial.”

40 CFR 122.2 defines “waters of the United States.”

C-9. NH RSA 482-A:2, X. defines "Wetlands'' as “[a]n area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions.”

C-10. Env-Wq 1702.07 states that ““Best management practices” means those practices that are determined, after problem assessment and examination of all alternative practices and technological, economic and institutional considerations, to be the most effective practicable means of preventing or reducing the amount of pollution generated by point or nonpoint sources to a level compatible with water quality goals.”

C-11. Env-Wq 1702.05 states that ““Benthic community” means the community of plants and animals that live on, over, or in the substrate of the surface water.”

C-12. Env-Wq 1702.06 states that ““Benthic deposit” means any sludge, sediment, or other organic or inorganic accumulations on the bottom of the surface water.”

C-13. Env-Wq 1702.08 states that ““Biological integrity” means the ability of an aquatic ecosystem to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of a region.”

C-14. Env-Wq 1702.26 states that ““Mixing zone” means a defined area or volume of the surface water surrounding or adjacent to a wastewater discharge where the surface water, as a result of the discharge, might not meet all applicable water quality standards.”

C-15. Env-Wq 1702.15 states that ““Cultural eutrophication” means the human-induced addition of wastes that contain nutrients to surface waters, resulting in excessive plant growth or a decrease in dissolved oxygen, or both.”

C-16. Env-Wq 1702.17 states that ““Designated uses” means those uses specified in water quality standards for each water body or segment whether or not such uses are presently occurring. The term includes the following:

(a) “Swimming and other recreation in and on the water, meaning the surface water is suitable for swimming, wading, boating of all types, fishing, surfing, and similar activities;
(b) Fish consumption, meaning the surface water can support a population of fish free from toxicants and pathogens that could pose a human health risk to consumers;
(c) Shellfish consumption, meaning the tidal surface water can support a population of shellfish free from toxicants and pathogens that could pose a human health risk to consumers;
(d) Aquatic life integrity, meaning the surface water can support aquatic life, including a balanced, integrated, and adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of the region;
(e) Wildlife, meaning the surface water can provide habitat capable of supporting any life stage or activity of undomesticated fauna on a regular or periodic basis; and
(f) Potential drinking water supply, meaning the surface water could be suitable for human intake and meet state and federal drinking water requirements after adequate treatment.”

C-17. Env-Wq 1702.18 states that ““Discharge” means

(a) "The addition, introduction, leaking, spilling, or emitting of a pollutant to surface waters, either directly or indirectly through the groundwater, whether done intentionally, unintentionally, negligently or otherwise; or
(b) The placing of a pollutant in a location where the pollutant is likely to enter surface waters."

C-18. Env-Wq 1702.22 states that ""Existing uses" means those uses, other than assimilation waste transport, that actually occurred in the waterbody on or after November 28, 1975, whether or not they are included in the water quality standards."

C-19. Env-Wq 1702.33 states that ""Nuisance species" means any species of flora or fauna living in or near the water whose noxious characteristics or presence in sufficient number or mass prevent or interfere with a designated use of those surface waters."

C-20. Env-Wq 1702.38 states that ""Pollutant" means "pollutant" as defined in 40 CFR 122.2." According to 40 CFR 122.2, "pollutant" means "dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water."

C-21. The term "discharge," as applied under section 401 of the Clean Water Act means the potential for a discharge. It does not need to be a certainty, only that it may occur should the federal license or permit be granted. Further, the discharge does not need to involve the addition of pollutants (such as water released from the tailrace of a dam). As the U.S. Supreme Court has stated "[w]hen it applies to water, 'discharge' commonly means a 'flowing or issuing out'" and an addition of a pollutant is not "fundamental to any discharge." [2]

C-22. Env-Wq 1703.01 entitled "Water Use Classifications; Designated Uses" includes the following regarding flow quantity:

"(d) Unless high or low flows are caused by naturally-occurring conditions, surface water quantity shall be maintained at levels that protect existing uses and designated uses."

C-23. Env-Wq 1703.03 entitled "General Water Quality" includes the following:

(c)(1) "All surface waters shall be free from substances in kind or quantity that:
a. Settle to form harmful benthic deposits;
b. Float as foam, debris, scum or other visible substances;
c. Produce odor, color, taste or turbidity that is not naturally occurring and would render the surface water unsuitable for its designated uses;
d. Result in the dominance of nuisance species; or
e. Interfere with recreational activities."

C-24. Env-Wq 1703.06 includes water quality criteria for bacteria.

C-25. Env-Wq 1703.07 includes water quality criteria for dissolved oxygen.

C-26. Env-Wq 1703.08 entitled "Benthic Deposits" states the following:

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[2] The Supreme Court case that is referred to is *S.D. Warren Co. v. Maine Board of Environmental Protection et al*, 547 U.S. 370, 126 S. Ct. 1853 (2006).

"(a) Class A waters shall contain no benthic deposits, unless naturally occurring.
(b) Class B waters shall contain no benthic deposits that have a detrimental impact on the benthic community, unless naturally occurring."

C-27. Env-Wq, 1703.09, 1703.10 and 1703.12 include water quality criteria for oil and grease, color and slicks, odors, and surface floating solids respectively.

C-28. Env-Wq 1703.11 entitled "Turbidity" states the following:

"(a) Class A waters shall contain no turbidity, unless naturally occurring.
(b) Class B waters shall not exceed naturally occurring conditions by more than 10 NTUs.
(c) Turbidity in waters identified in RSA 485-A:8, III shall comply with the applicable long-term combined sewer overflow plan prepared in accordance with Env-Wq 1703.05(c).
(d) For purposes of state enforcement actions, if a discharge causes or contributes to an increase in turbidity of 10 NTUs or more above the turbidity of the receiving water upstream of the discharge or otherwise outside of the visible discharge, a violation of the turbidity standard shall be deemed to have occurred."

C-29. Env-Wq 1703.13 entitled "Temperature" states the following:

"(a) There shall be no change in temperature in class A waters, unless naturally occurring.
(b) Temperature in class B waters shall be in accordance with RSA 485-A:8, II, and VIII."

NH RSA-A:8, II states the following for Class B waters "[A]ny stream temperature increase associated with the discharge of treated sewage, waste or cooling water, water diversions, or releases shall not be such as to appreciably interfere with the uses assigned to this class."

NH RSA-A:8, VIII states the following: "In prescribing minimum treatment provisions for thermal wastes discharged to interstate waters, the department shall adhere to the water quality requirements and recommendations of the New Hampshire fish and game department, the New England Interstate Water Pollution Control Commission, or the United States Environmental Protection Agency, whichever requirements and recommendations provide the most effective level of thermal pollution control."

C-30. Env-Wq 1703.14, entitled "Nutrients" states the following:

"(a) Class A waters shall contain no phosphorous or nitrogen unless naturally occurring.
(b) Class B waters shall contain no phosphorous or nitrogen in such concentrations that would impair any existing or designated uses, unless naturally occurring.
(c) Existing discharges containing either phosphorous or nitrogen which encourage cultural eutrophication shall be treated to remove phosphorus or nitrogen to ensure attainment and maintenance of water quality standards.
(d) There shall be no new or increased discharge of phosphorous into lakes or ponds.
(e) There shall be no new or increased discharge(s) containing phosphorous or nitrogen to tributaries of lakes or ponds that would contribute to cultural eutrophication or growth of weeds or algae in such lakes and ponds."

C-31. Env-Wq 1703.18, entitled "pH" states the following:

"(a) The pH of Class A waters shall be as naturally occurs.
(b) As specified in RSA 485-A:8, II, the pH of Class B waters shall be 6.5 to 8.0, unless due to natural causes.

(c) As specified in RSA 485-A:8, III, the pH of waters in temporary partial use areas shall be 6.0 to 9.0 unless due to natural causes."

C-32. Env-Wq 1703.19, entitled "Biological and Aquatic Community Integrity" states the following:

"(a) All surface waters shall support and maintain a balanced, integrated and adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of a region.
(b) Differences from naturally-occurring conditions shall be limited to non-detrimental differences in community structure and function."

C-33. Env-Wq 1703.21 entitled "Water Quality Criteria for Toxic Substances" states the following:

"(a) Unless naturally occurring or allowed under part Env-Wq 1707, all surface waters shall be free from toxic substances or chemical constituents in concentrations or combinations that:

(1) Injure or are inimical to plants, animals, humans or aquatic life; or
(2) Persist in the environment or accumulate in aquatic organisms to levels that result in harmful concentrations in:
a. Edible portions of fish, shellfish, or other aquatic life; or
b. Wildlife that might consume aquatic life."

C-34. Antidegradation provisions are included in Env-Wq 1702 and Env-Wq 1708.

a. Env-Wq 1702.03 states that ""Antidegradation" means a provision of the water quality standards that maintains and protects existing water quality and uses."
b. Env-Wq 1708.02 states that "Antidegradation shall apply to: (a) Any proposed new or increased activity, including point source and nonpoint source discharges of pollutants, that would lower water quality or adversely affect the existing or designated uses; (b) Any proposed increase in loadings to a waterbody when the proposal is associated with existing activities; (c) Any increase in flow alteration over an existing alteration; and (d) Any hydrologic modifications, such as dam construction and water withdrawals."
c. Antidegradation applies to all parameters as evidenced by Env-Wq 1708.08 (Assessing Waterbodies) which states "The applicant shall characterize the existing water quality and determine if there is remaining assimilative capacity for each parameter in question."
d. According to Env-Wq 1708.03 (b), "A proposed discharge or activity shall not eliminate any existing uses or the water quality needed to maintain and protect those uses."
e. Env-Wq 1702.04 states that ""Assimilative capacity" means the amount of a pollutant or combination of pollutants that can safely be released to a waterbody without causing violations of applicable water quality criteria or negatively impacting uses."
f. Env-Wq 1708.08 describes the process for assessing waterbodies to determine if there is remaining assimilative capacity for each parameter in question.
g. Env-Wq 1708.09 entitled "Significant or Insignificant Determination" states the following: "(a) Any discharge or activity that is projected to use 20% or more of the remaining assimilative capacity for a water quality parameter, in terms of either concentration or mass of pollutants, or volume or flow rate for water quantity, shall be considered a significant lowering of water quality.
(b) The department shall not approve a discharge or activity that will cause a significant lowering of water quality unless the applicant demonstrates, in accordance with Env-Wq 1708.10, that the proposed lowering of water quality is necessary to achieve important economic or social development in the area where the waterbody is located."

h. Env-Wq 1708.01(b)(1), in general, states that: For significant changes in water quality, where the quality of the surface waters exceeds levels necessary to support propagation of fish, shellfish, and wildlife, and recreation in and on the water, that quality shall be maintained and protected unless the department finds, after full satisfaction of the intergovernmental coordination and public participation provisions and the analysis required by Env-Wq 1708.10, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the surface waters are located. In allowing such degradation or lower water quality, the department shall assure water quality adequate to fully protect existing uses. Further, the department shall assure that the highest statutory and regulatory requirements shall be achieved for all new and existing point sources and that all cost effective and reasonable best management practices for nonpoint source control shall be implemented.

i. Env-Wq 1708.01(b)(2), in general, states that: The department shall not approve any proposed discharge or activity that might cause degradation or lower water quality, without such conditions as are necessary to ensure that:
a) Water quality will be adequate to protect existing uses; b) The highest statutory and regulatory requirements will be achieved for all new and existing point sources; and c) All cost effective and reasonable best management practices for nonpoint source control will be implemented.

C-35. Env-Wq 1708.04 entitled "Protection of Water Quality in ORW" states that the following:

"(a) Surface waters of national forests and surface waters designated as natural under NH RSA 483:7-a, I, shall be considered outstanding resource waters (ORW).
(b) Subject to (c), below, water quality shall be maintained and protected in surface waters that constitute ORW.
(c) The department shall allow a limited point or nonpoint source discharge to an ORW only if:
    (1) The discharge will result in no more than temporary and short-term changes in water quality, wherein "temporary and short-term" means that degradation is limited to the shortest possible time;
    (2) The discharge will not permanently degrade water quality or result at any time in water quality lower than that necessary to protect the existing and designated uses in the ORW; and
    (3) All practical means of minimizing water quality degradation are implemented."

C-36. "Protection of Class A Waters" states the following:

"(a) As specified in RSA 485-A:8, I, discharges of sewage or waste to class A waters shall be prohibited.
(b) Proposed new or increased activities that the department determines do not involve the discharge of sewage or waste shall be reviewed in accordance with this part."

C-37. Env-Wq 1708.06 entitled "Protection of Water Quality in High Quality Waters" states the following:

"(a) Subject to (b) through (d) below, high quality waters shall be maintained and protected.
(b) The department shall evaluate and authorize insignificant changes in water quality as specified in Env-Wq 1708.09.
(c) The department shall allow degradation of significant increments of water quality, as determined in accordance with Env-Wq 1708.09, in high quality waters only if the applicant can demonstrate to the department, in accordance with Env-Wq 1708.10, that allowing the water quality degradation is necessary to accommodate important economic or social development in the area in which the receiving water is located.
(d) If the waterbody is Class A Water, the requirements of Env-Wq 1708.05 shall also apply."

C-38. Env-Wq 1708.12 states the ""transfer" means the intentional conveyance of water from one surface water to another surface water for the purpose of increasing volume of water available for withdrawal from the receiving surface water. The term does not include the transfer of stormwater, for the purpose of managing stormwater during construction, between basins created or otherwise lawfully used for stormwater detention or treatment, or both, and does not include the discharge of stormwater from a detention or treatment basin to a surface water."

C-39. NH RSA 488:3 regarding registration of withdrawals and discharges states the following:

I. "No person shall withdraw or discharge a cumulative amount of more than 20,000 gallons of water per day, averaged over any 7-day period, or more than 600,000 gallons of water over any 30-day period, at a single real property or place of business without registering the withdrawal or discharge with the department. Transfers of such volume of water shall also be registered. Registration shall be in addition to any required permits.
II. No registration shall be transferred to another person without written notification to the commissioner."

C-40. Env-Wq 2102 includes requirements for Water Use Registration and Reporting (WURR). On August 19, 2020, NHDES staff from the WURR program indicated that the proposed withdrawal will need to be registered in the WURR program.

C-41. NH RSA 485:61 regarding Rules for Water Conservation, states the following:

"I. The department shall adopt rules, pursuant to RSA 541-A, for water conservation practices for water users. These rules shall strike a reasonable balance between environmental, energy, and economic impacts and be consistent with current industry standards and practices for different types of water users.
II. The water conservation rules in paragraph I of this section shall apply to all new permit applicants and applications for water withdrawals subject to the provisions of RSA 485:3, RSA 485:48, RSA 485-C:21 and section 401 of the Clean Water Act.
III. Water conservation rules shall be consistent with applicable state or federal rules and regulations. Water Conservation Rules were adopted May 14, 2005 codified as Env-Wq 2101."

C-42. Env-Wq 2101.24 entitled "Water Conservation Plan Required," states that

"(a) The applicants for approval of a source that would be a conservation source shall submit a water conservation plan that demonstrates compliance with the applicable provisions of Env-Wq 2101.05 through Env-Wq 2101.22 in accordance with the following:"

"(5) For a new withdrawal from a surface water associated with a project requiring a 401 Water Quality Certification, the water conservation plan shall be submitted prior to or in conjunction with the application for a 401 Water Quality Certification pursuant to Section 401 of the federal Clean Water Act;
(6) For a new withdrawal from a surface water that requires water quality certification pursuant to RSA 485-A:12, IV, the water conservation plan shall be submitted prior to or in conjunction with the certification request."

Env-Wq 2101.23, entitled Waivers, allows DES to grant waivers of certain provisions in Env-Wq 2101 provided the person requesting the waiver submits a written request to DES that includes the information specified in Env-Wq 2101.23(d).

On August 19, 2020, staff in the NHDES Water Conservation Program indicated that the Applicant will need to

update the 2007 Water Conservation Plan for the Locke Lake system.

C-43. In 2010, DES published guidance (hereinafter called the 2010 instream flow guidance or 2010 ISF guidance) for estimating instream flow requirements for the protection of aquatic life.

C-44. Section 303(d) of the Clean Water Act (33 U.S.C. 1313(d)) and the regulations promulgated thereunder (40 C.F.R. 130.0 – 40 C.F.R. 130.11) require states to identify and list surface waters that are violating state water quality standards (i.e., Section 303(d) List) that do not have an approved Total Maximum Daily Load (TMDL) for the pollutants causing impairment. For these water quality-impaired waters, states must establish TMDLs for the pollutants causing the impairments and submit the list of impaired surface waters and TMDLs to EPA for approval. TMDLs include source identification, determination of the allowable load and pollutant reductions (by source) necessary to meet the allowable load. Once a TMDL is conducted, the pollutant/surface water is transferred to the list of impaired waters with approved TMDLs (known as Category 4A waters). The Section 303(d) List is, therefore, a subset of all impaired waters. The most recent Section 303(d) list of impaired waters submitted to EPA is the 2018 Section 303(d) List. A list of all impaired waters is available through the NHDES website.

C-45. On December 20, 2007, EPA approved the Northeast Regional Mercury TMDL which addressed mercury impairments in all New Hampshire fresh surface waters.

C-46. On September 21, 2010, EPA approved the Statewide Bacteria TMDL for 394 surface waters listed as impaired on the 2008 303(d) List of impaired waters.

C-47. When a surface water does not meet water quality standards (i.e., when it is impaired), the addition of pollutants causing or contributing to impairment should be avoided as indicated in the following regulation and statute:

> Env-Wq 1703.03 (a) states that "The presence of pollutants in the surface waters shall not justify further introduction of pollutants from point or nonpoint sources, alone or in any combination."
>
> NH RSA 485-A:12 (I) (Enforcement of Classification) states that "After adoption of a given classification for a stream, lake, pond, tidal water, or section of such water, the department shall enforce such classification by appropriate action in the courts of the state, and it shall be unlawful for any person or persons to dispose of any sewage, industrial, or other wastes, either alone or in conjunction with any other person or persons, in such a manner as will lower the quality of the waters of the stream, lake, pond, tidal water, or section of such water below the minimum requirements of the adopted classification."

C-48. NHDES Alteration of Terrain regulations (Env-Wq 1500) include design criteria for stormwater best management practices (BMPs) as well as criteria for minimizing the hydrologic impacts of stormwater runoff both during and after construction. Further, BMP design details as well as guidance for preparing pollutant loading analyses using the "Simple Method" are provided in the New Hampshire Stormwater Manual.
On August 18, 2020, the Applicant confirmed that a NHDES Alteration of Terrain permit is not needed for this Activity.

C-49. In accordance with §402 of the federal Clean Water Act, EPA issued the federal National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) on May 14, 2019 with an effective date of June 27, 2019. According to the Applicant on August 17, 2020, the Activity disturbs less than one acre and, therefore, is not subject to the requirements of the CGP.

C-50. On July 13, 2020, the NHDES Wetlands Bureau received an application from the Applicant for a NHDES

Wetlands Permit. On September 2, 2020, NHDES issued Wetlands permit 2020-01648 On July 13, 2020, NHDES received an application for a Shoreland Impact Permit (file # 2020-01644). On August 5, 2020, NHDES issued a Shoreland Impact Permit for the Activity.

C-51. On August 18, 2020, staff from the New Hampshire Fish and Game Department stated that Webster Stream is a warmwater fishery.

C-52. On July 8, 2020, NHDES received a draft application from the Applicant for Water Quality Certification for the Activity. Supplemental information was provided by the Applicant through August 13, 2020. On August 17, 2020, NHDES received a final signed application for Water Quality Certification.

C-53. The U.S. Army Corps of Engineers has issued a Clean Water Act (CWA) section 404 General Permit for New Hampshire (ACOE# NAE-2016-02415), which became effective August 18, 2017 (i.e., general 404 permit or State Programmatic General Permit or SPGP). On August 17, 2017, NHDES issued section 401 Water Quality Certification 2017-404P-001 for the general 404 permit. When the NHDES Wetlands Permit was issued for the proposed Activity (see C-50) it included a notice stating that the the U.S. Army Corps of Engineers will review the project for possible approval under the SPGP and that if the Army Corps does not respond within 30 days, and if the Project meets the requirements of the SPGP, the Project will be automatically approved under the SPGP. As of the date of this draft WQC, the 30 day period has not ended and the Army Corps has not responded to the Applicant.

C-54. NHDES issued a draft section 401 Water Quality Certification for public comment from (*to be completed in the final certification*).

D. FINDINGS

D-1. *Activity Description:* The proposed Activity is described in the text and plans provided in the application for Section 401 Water Quality Certification filed by the Applicant (see Fact C-52). In general, the Activity includes construction and operation of an infiltration gallery and associated equipment to withdraw water from Webster Stream in Barnstead, New Hampshire and pump it to the Applicant's water treatment plant. The withdrawal is needed to allow the Applicant's water supply production wells to recharge through the winter months in preparation for summer withdrawals which exceed their capacity when pumped 12-months per year. Currently, with full outdoor water use restrictions in place, the Applicant occasionally needs to truck-in water (i.e., up to 10 trucks per week) to augment water supply in the summer.

As shown in Figure 1 the proposed withdrawal is located a short distance downstream of Locke Lake. The infiltration gallery will be installed in the bed of Webster Stream and will be made of crushed stone and screened pipe excavated 3.8 feet into the bottom of the streambed to withdraw water from the stream (Figure 2 and Figure 3). The crushed stone will be covered with sediment to match the existing stream bottom. Stream depth in the area of the withdrawal is typically 6-12 inches.

Water from the infiltration gallery will be conveyed by gravity through a pipe to a stilling pump vault chamber on the east side of the stream where water is then pumped and conveyed via a forcemain along Basin Lane to a treatment facility in Barnstead, New Hampshire. Primary components of the new withdrawal facility include the following:

- An infiltration gallery installed in the bed of Webster Stream;
- a new pump vault chamber to the east side of the stream;
- a new pumping station/control building located to the east of the infiltration gallery; and
- associated piping and other ancillary equipment.

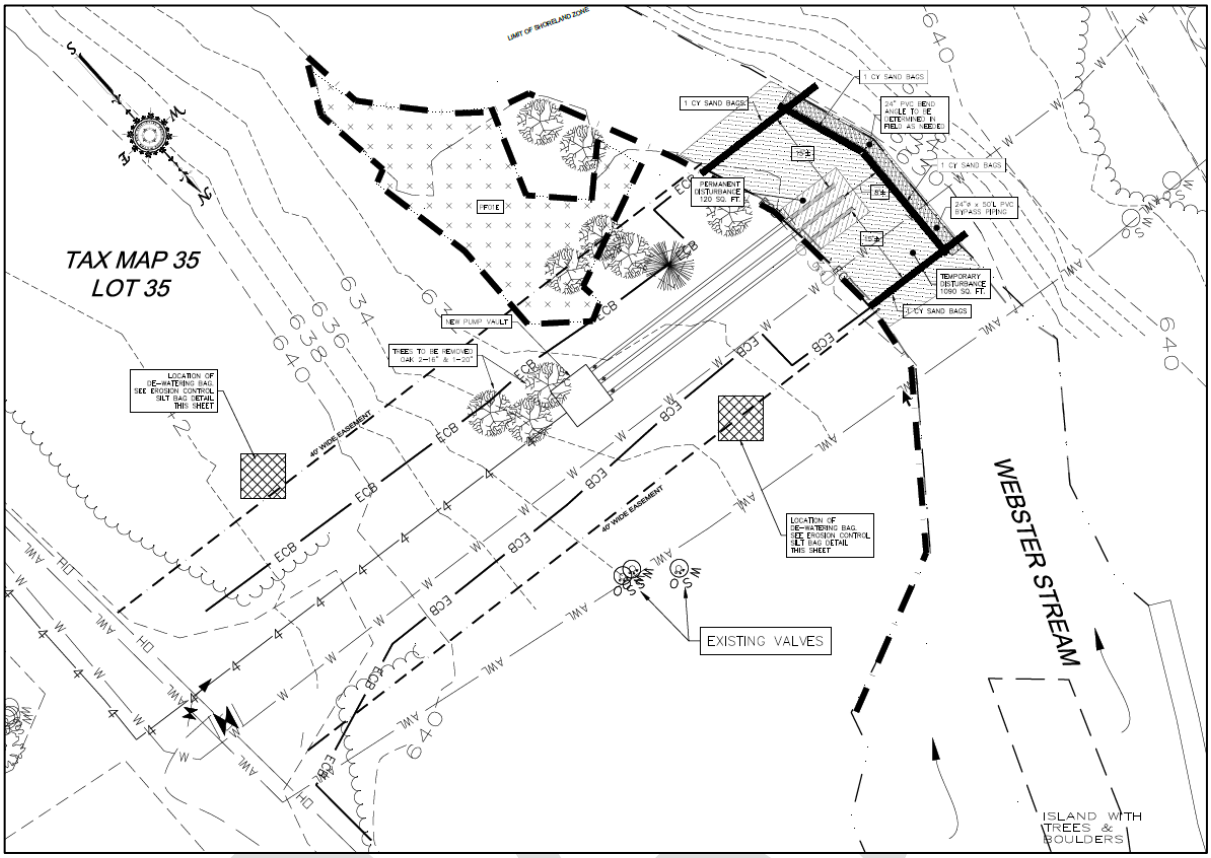
A maximum of 150 gallons per minute (gpm) [which is equivalent to 0.334 cubic feet per second (cfs)] is requested to be withdrawn from Webster Stream from October through June. The Applicant plans to continuously measure and record river stage and river flow just upstream of the proposed withdrawal location and to adjust operations based on a multi-daily (i.e., three day) average of streamflow to maintain the established withdrawal limits based on the stream flow measurements.

Pending receipt of all necessary approvals, the Applicant proposes to complete construction in September or October of 2020 when flows are still relatively low. A cofferdam and bypass pipe will be utilized during construction of the infiltration gallery.

The proposed withdrawal is not a total "consumptive" use, meaning that some of the withdrawn water is expected to be eventually returned to the stream upstream of the proposed withdrawal. According to information provided by PEU, in 2019 there were 913 customers on the PEU system, 90% of whom are upstream of the intended withdrawal point. All users of the system discharge wastewater to septic systems. Therefore, while there is an offset in time and space, a significant portion of the withdrawn water (e.g., that which is not lost to evaporation or evapotranspiration) may be returned to the point of withdrawal via shallow groundwater and upwelling into surface waters.

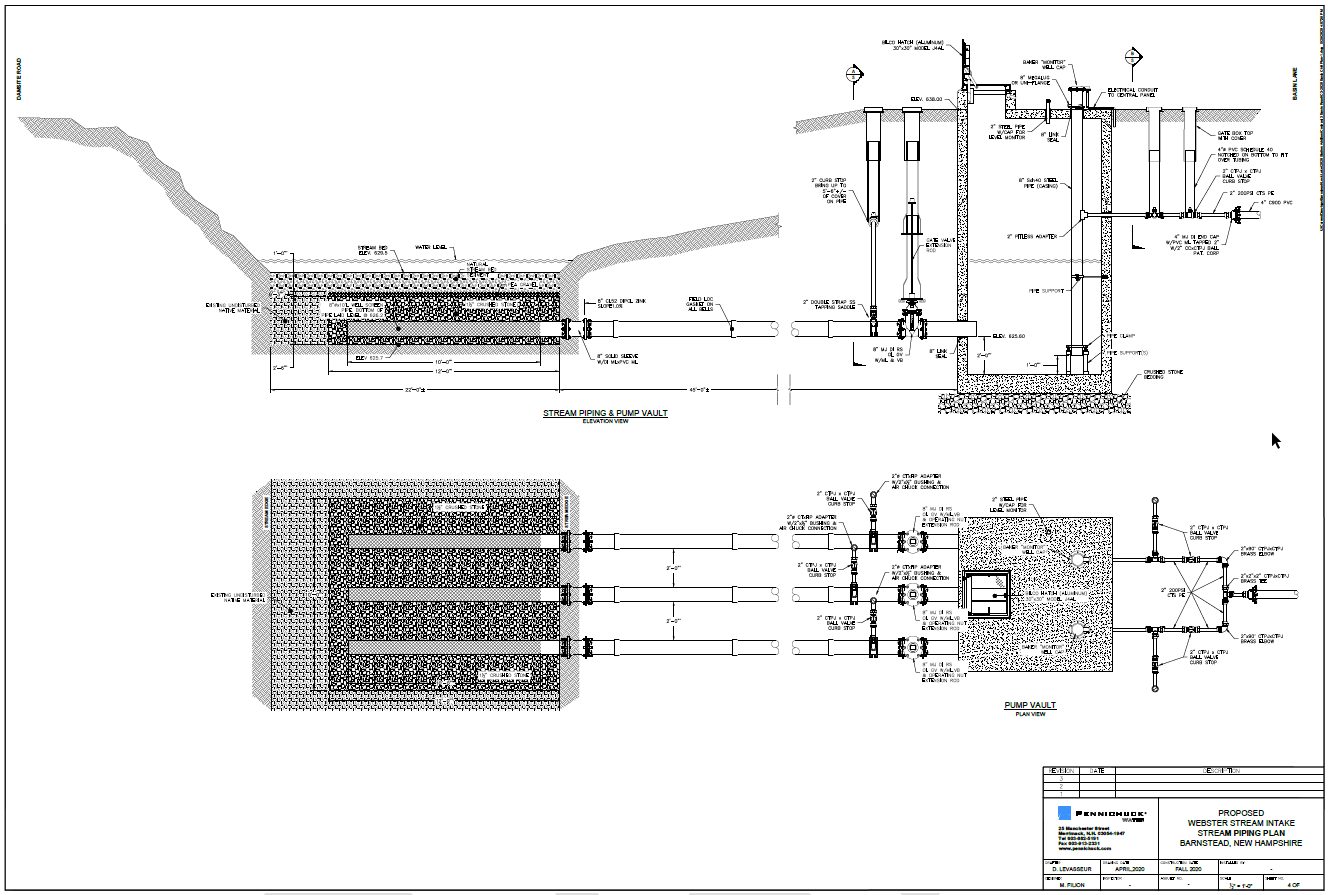
Figure 1 – Withdrawal location

Figure 2 – Site Plan overview of infiltration gallery and pump vault [3]



[3] From the June 4, 2020 conversations with NHDES submitted to NHDES by Tighe & Bond Inc.

Figure 3 – Infiltration gallery and pump vault plan [4]



D-2. *Background – 2019 Treatment Pilot Study:* For approximately three months in the spring of 2019, the Applicant conducted a pilot study to investigate the treatability of water in Webster Stream using three different treatment technologies: a packaged clarification system, a media filtration system and an ultrafiltration membrane system including an adsorption clarification and granular filtration process. With NHDES approval, a maximum of 70 gpm of water was withdrawn from the stream for the pilot study. The Applicant installed a pressure transducer in the stream to record water depth hourly beginning January 29, 2019 and took instream flow measurements during the study. The withdrawal represented less than two percent of stream flow for the duration of the test period and concluded that the water was treatable.

D-3. The Applicant is responsible for the Activity.

D-4. Surface waters are navigable waters for the purposes of certification under Section 401 of the Clean Water Act. Surface waters include jurisdictional wetlands for the purposes of wetlands permitting under RSA 482-A.

D-5. The named and unnamed streams and wetlands affected by the Activity are surface waters under Env-Wq 1702.44 (see Fact C-8) and are therefore subject to New Hampshire Surface Water Quality Standards (Env-Wq 1700 – see Fact C-5). NHDES has assigned Assessment Unit (AU) identification numbers to many, but not all surface waters. Surface waters that do not have an AU number are considered surface waters of the State in accordance with Env-Wq 1702.44 (see Fact C-8). Surface waters that could be potentially affected by the Activity and their associated AU numbers (where available) include, but are not limited to the following:

[4] From the June 4, 2020 conversations with NHDES submitted to NHDES by Tighe & Bond Inc.

Assessment Unit ID	Description
NHRIV700060402-14	Webster Stream
	Unnamed wetlands

D-6. Webster Stream and its tributaries from the headwaters downstream to the Whites Dam, just above the Village of Pittsfield, are Class B.[5] This includes the portion of the river where the withdrawal is proposed. The goal of Class A and B surface waters is to support aquatic life, primary and secondary contact recreation, fish consumption, wildlife, and, after adequate treatment, as a water supply (see Fact C-16).

D-7. The Applicant must comply with New Hampshire surface water quality standards (see Fact C-5). Surface water quality standards include designated uses (such as aquatic life, recreation, etc. – see Fact C-16), the criteria to protect the designated uses and antidegradation provisions. Designated uses apply "…whether or not such uses are presently occurring" (Env-Wq 1702.17 – see Fact C-16).

D-8. Stormwater runoff during construction and/or operation of the Activity, including snowmelt runoff, and groundwater flow from within the area affected by the Activity are discharges as defined in Env-Wq 1702.18 (see Fact C-17). They are also discharges as applied under Section 401 of the Clean Water Act (see Fact C-21). If not properly controlled, such discharges may cause the permanent alteration of, or temporary impacts to surface water quality, quantity, or both.

D-9. If not properly controlled, withdrawals from rivers and streams can result in impairment of designated uses, including, but not limited to, aquatic life. Examples of how aquatic life can be adversely impacted by withdrawals include, but are not limited to, reductions in wetted habitat, reductions in river velocity due to less water which can cause higher water temperatures and lower dissolved oxygen levels, all of which can contribute to violations of the Biological and Aquatic Community Integrity (see Fact C-32) criterion in the surface water quality regulations. As stated in Finding D-7, all designated uses (including but not limited to aquatic life) apply whether or not the uses are presently occurring.

D-10. The Activity includes dredge and fill of jurisdictional wetlands in New Hampshire for installation of the new water intake in Webster Stream and therefore requires a NHDES Wetlands Permit (or permits) under NH RSA 482-A. This 401 Certification decision relies, in part, on an approved permit (or permits) from the NHDES Wetlands Bureau for the potential impacts to jurisdictional wetlands. Through its processing and issuance, NHDES wetlands permits issued for the Activity will address the dredge and fill impacts to jurisdictional wetlands. In September, 2020, NHDES issued a Wetlands Permit for the Activity (see Fact C-50).

It is anticipated that work associated in the wetlands for the Activity will also be covered under the U.S. Army Corps of Engineers Clean Water Act (CWA) section 404 General Permit for New Hampshire, which became effective August 18, 2017 (i.e., General 404 Permit) (see Fact C-53).

D-11. On August 17, 2017, NHDES issued section 401 Water Quality Certification (WQC) 2017-404P-001 for the General 404 Permit (see Fact C-53). Condition E-3 of that WQC states the following:

> "… If NHDES determines that surface water quality standards are being violated by a specific project or there is reasonable potential to expect that water quality standards will be violated, NHDES may modify this 401 Certification or issue an individual 401 Certification for the specific project to include

[5] 1951, 41:1, I. Suncook River and its tributaries, in the towns of Alton, Barnstead, Farmington, Gilford, Gilmanton, Loudon, New Durham, Northwood, Pittsfield and Strafford, from their sources to Whites Dam, just above the Village of Pittsfield, Class B-1. *Reclassification. 1967, 147:15. All surface waters of the state heretofore or hereafter classified as Class B-1 or Class B-2 waters are hereby reclassified to Class B waters.

additional conditions to ensure compliance with surface water quality standards when authorized by law, and after notice and opportunity for hearing."

NHDES has decided that an individual 401 Certification for the Activity with additional conditions, as authorized by the WQC 2017-404P-001 and state statute RSA 485-A:12, III (see Fact C-3), is necessary to help ensure that the discharges and withdrawal associated with the Activity will comply with state surface water quality standards. NHDES has received an application from the Applicant for 401 Water Quality Certification (see Fact C-52).

D-12. A NHDES Alteration of Terrain permit is not needed for this Activity (see C-48).

D-13. The shoreland of Webster Stream is protected under the Shoreland Water Quality Protection Act (SWQPA) in accordance with RSA 483-B. Because the Activity includes work within 250 feet of the shoreline of Webster Stream, the Applicant will need a NHDES SWQPA permit (i.e., Shoreland Impact Permit or SIP). The SWQPA includes limitations on impervious surfaces, vegetation maintenance requirements and the establishment of a permit requirement for many, but not all, construction, excavation and filling activities within the protected shoreland. This 401 Certification decision relies, in part, on an approved NHDES SIP for the potential impacts on water quality in Webster Stream due to work on the shoreland. Through its processing and issuance, the NHDES SIP issued for the Activity will help to prevent potential water quality impacts in Webster Stream. In August 2020, NHDES issued a SIP for the Activity (see Fact C-50).

D-14. The Activity is not within ¼ mile of a Designated River under the Designated Rivers Program (RSA 483). As such, the Activity is not within the jurisdiction of the Designated Rivers Program.

D-15. The surface waters in the vicinity of the Activity are not Outstanding Resource Waters (Env-Wq 1708.04).

D-16. The Activity does not involve an interbasin transfer as defined in RSA 483:4.

D-17. The Activity does not involve a "transfer" of water as defined in Env-Wq 1708.12(a).

D-18. According to the Applicant, the Activity disturbs less than one acre and, therefore, is not subject to the requirements of the federal EPA Construction General Permit (see Fact C-49).

D-19. The Applicant must register the proposed withdrawal in Webster Stream with the NHDES Water Use Registration and Reporting (WURR) program and update the 2007 Water Conservation Plan in accordance with Env-Wq 2101 (see Fact C-41 and C-42).

D-20. If not properly controlled, the disturbance of earth during construction may temporarily increase turbidity levels in surface waters adjacent to and downstream from the area affected by the Activity, particularly during instream work or wet weather events, and may contribute to long-term sediment retention in and/or transport through the surface water adjacent to and downstream from the Activity site. Details regarding proposed erosion and sediment control measures that will be employed during construction are included in the NHDES wetlands permit application.

D-21. With regards to rare, threatened and endangered species, the Applicant's Wetlands Permit application (see Fact C-50) reported the following: "A rare species review was completed by the NH Natural Heritage Bureau (NHB) on April 1, 2020 (NHB20-0930), and it was determined that there were no recorded occurrences for sensitive species near the project area. NH Fish & Game were consulted on this project and no rare species or exemplary plant communities were noted within 50 feet of the project area during the field review. Mussel and fish surveys were completed within Webster Stream, with no rare species observed."

D-22. Webster Stream is a warm water fishery (see Fact C-51).

D-23. Many amphibians and reptiles (such as turtles and frogs) hibernate underwater in the winter, with some (such as turtles) burying themselves in the sediment. To protect these organisms, the Activity's withdrawal from Webster Stream (and adjacent wetlands) should be prevented from lowering the river level below that which would cause the hibernating organisms to freeze and die. NHDES expects the withdrawal restrictions discussed in Finding D-26 and required in Condition E-14 will be protective of hibernating aquatic organisms. This is because withdrawals must essentially stop (with the exception of *de minimis* withdrawals) in the winter and spring at flows which are greater than the flow in the fall (October/November) when aquatic organisms begin to hibernate (see Finding D-26, Table 2, Q tier 1).

D-24. According to the 2018 305(b)/303(d) lists of impaired waters (see Fact C-44), the following surface waters in the vicinity of the proposed Activity are listed as impaired. All impairments, with the exception of those highlighted in bold (which have approved TMDLs) and "Habitat Assessment," are on the Section 303(d) List:

Assessment Unit (AU)	Waterbody Name	Cause of Impairment (Designated Use Impaired)
NHRIV700060402-14	Webster Stream (from the outlet of the Locke Lake dam downstream to where the stream enters Brindle Pond)	**Mercury (FC)** pH (AL)
Notes: AL = Aquatic Life, PCR = Primary Recreation, SCR = Secondary Recreation, FC = Fish Consumption, SFC = Shellfish Consumption Impairments highlighted in bold have approved TMDLs. All other impairments are on the Section 303(d) List. All fresh surface waters are impaired mercury due to elevated levels of mercury in fish tissue which has resulted in statewide fish consumption advisory.		

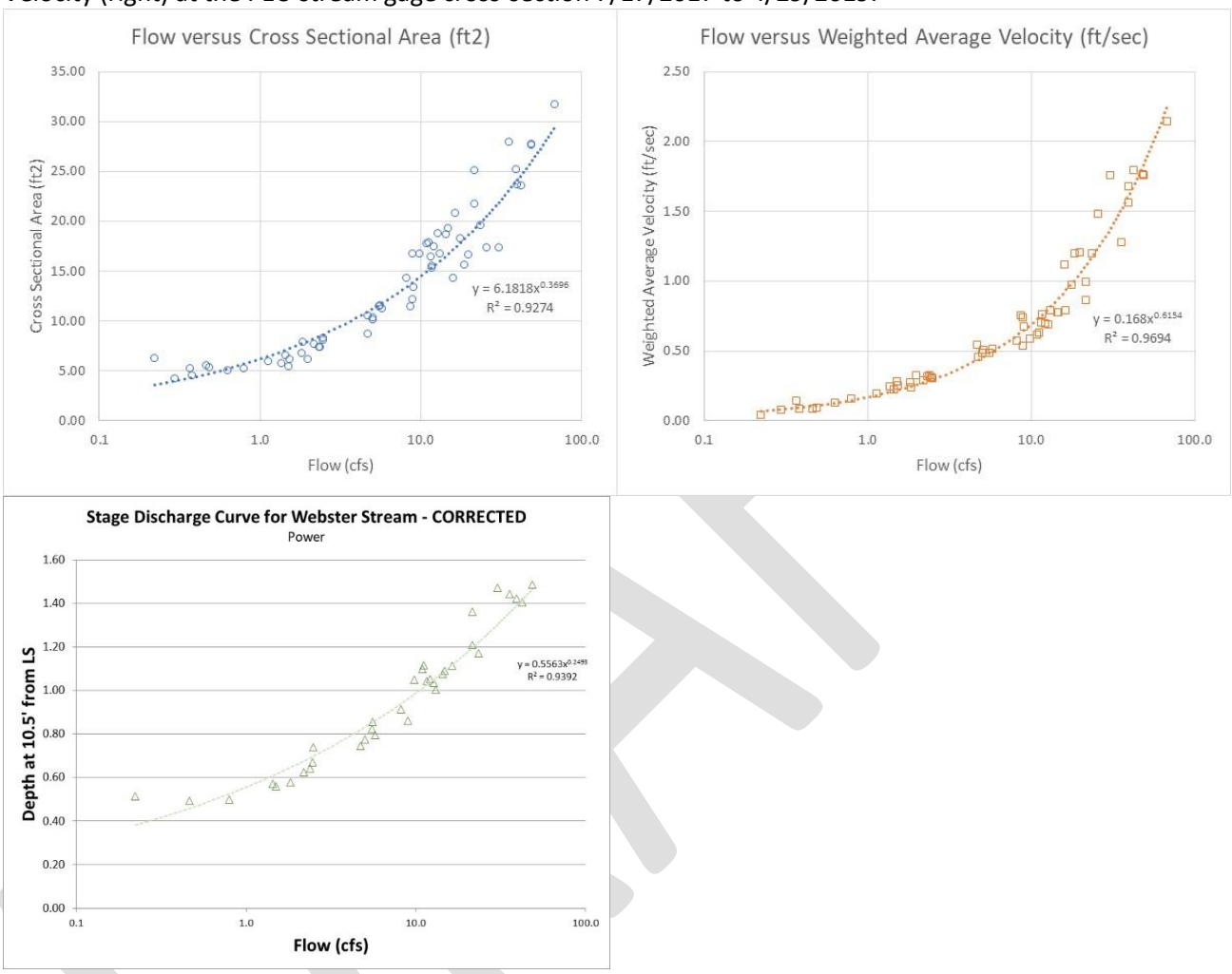
When a surface water does not meet water quality standards (i.e., when it is impaired), the addition of pollutants causing or contributing to impairment should be avoided (see Fact C-47). As noted above, all fresh surface waters in New Hampshire are impaired for mercury due to concentrations found in fish tissue which have resulted in a statewide fish consumption advisory. On December 20, 2007, EPA approved the Northeast Regional Mercury TMDL which addressed mercury impairments in all New Hampshire fresh surface waters (see Fact C-45). The primary source of mercury is atmospheric deposition from in-state and out-of-state emissions. The proposed Activity is not expected to have a significant impact on mercury levels in fish tissue or on the pH levels in the river.

D-25. The Applicant measured flows on 61 dates from 7/7/2017 to 4/29/2020 at a single cross-section located approximately 440 feet downstream of where the planned withdrawal will occur and just upstream of the Peacham Road crossing.[6] Information from those gaging events illustrate the influence of reduced flows on aquatic habitat in terms of cross-sectional area, water depth and velocity (Figure 4). As shown, the cross sectional area, depth and velocity in Webster Stream decrease as flow decreases. As river flow, depth and

[6] According to the Applicant on August 19, 2020, the proposed monitoring/level recording location is to be just upstream of the infiltration gallery. The transition from the existing location to the new location will be gradual and will include periods of overlap.

velocity decrease, dissolved oxygen levels in the surface water may decrease due to less aeration (i.e. fewer or smaller falls, rapids and riffles), longer residence times (which can result in higher temperatures), and higher concentrations of oxygen demanding and other pollutants due to lower dilution. In addition, low river flows may result in areas where available habitat or fish passage is limited due to insufficient depth.

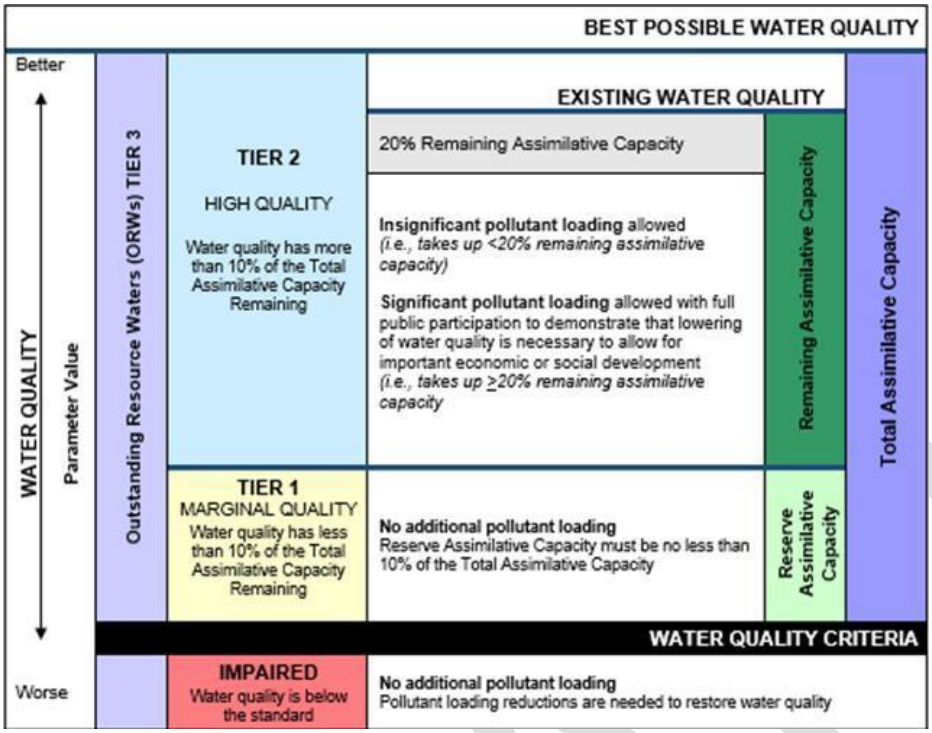
Figure 4 – Relationship of Flow versus Cross Sectional Area and Depth (left) and versus Weighted Average Velocity (right) at the PEU stream gage cross-section 7/17/2017 to 4/29/2019.



D-26. Antidegradation provisions of the NH surface water quality standards are included in Env-Wq 1708 and apply to water withdrawals [Env-Wq 1708.02(d)].[7] According to Env-Wq 1702.03 ""Antidegradation" means a provision of the water quality standards that maintains and protects existing water quality and uses." Figure 5 shows how the various antidegradation terms (i.e., total assimilative capacity, water quality criteria, reserve and remaining assimilative capacity, etc.) relate to one another. The following describes how antidegradation was applied to determine flows that would be protective of the aquatic life designated use and allowable withdrawals from Webster Stream that would be considered "insignificant" as defined in the antidegradation regulations.

[7] Env-Wq 1708.02: Antidegradation shall apply to: (a) Any proposed new or increased activity, including point source and nonpoint source discharges of pollutants, that would lower water quality or adversely affect the existing or designated uses; (b) Any proposed increase in loadings to a waterbody when the proposal is associated with existing activities; (c) Any increase in flow alteration over an existing alteration; and (d) Any hydrologic modifications, such as dam construction and water withdrawals."

Figure 5 – Antidegradation Schematic



a. Equations for Determining Total, 10% Reserve (Tier 1) and Remaining Assimilative Capacity.

Rules for assessing surface waters to determine the total, 10% reserve and remaining assimilative capacity are included in Env-Wq 1708.08, Assessing Waterbodies. Applicable regulations are provided below.

> Env-Wq 1708.08 (a) "The applicant shall characterize the existing water quality and determine if there is remaining assimilative capacity for each parameter in question."
>
> Env-Wq 1708.08 (c) "Where flows will or might be altered, existing conditions shall be established based on the existing maximum allowed water withdrawals or impoundment, diversion, or fluctuation of streamflow, as applicable."
>
> Env-Wq 1708 (d) "Remaining assimilative capacity shall be evaluated by comparing existing water quality, as specified in (b) and (c) above, to the state's water quality criteria."
>
> Env-Wq 1708.08 (f): "Subject to (h) below, if the department determines, based on the information submitted, that there is no remaining assimilative capacity for a specific parameter, no further degradation with regard to that parameter shall be allowed."
>
> Env-Wq 1708.08(g): "Subject to (h) below, if the department determines that there is some remaining assimilative capacity, then the department shall proceed in accord with Env-Wq 1708.09."
>
> Env-Wq 1708.08 (h): "Determinations made pursuant to (f) or (g), above, shall account for Env-Wq 1705.01, which requires the department to reserve no less than 10% of the surface water's assimilative capacity."
>
> (Env-Wq 1705.01(a): "Subject to (b) below, the department shall hold not less than 10

> percent of the assimilative capacity of each surface water in reserve to provide for future needs.")

Env-Wq 1703.01 entitled "Water Use Classifications; Designated Uses" includes the following regarding flow quantity:

> (d) Unless high or low flows are caused by naturally-occurring conditions, surface water quantity shall be maintained at levels that protect existing uses and designated uses.

As shown in Figure 5 and the following equation, the Total Assimilative Capacity (TAC) is equal to the "Best Possible Water Quality" (or in this case the Best Possible Flow or Q best) minus the Water Quality Criteria flow or Q wqc.

Equation 1: TAC = Q best – Q wqc

Referring once again to Figure 5, the flow corresponding to 10% reserve assimilative capacity (10%RESAC, Tier 1) can be determined by the following equation:

Equation 2: Q (10%RESAC or tier 1) = Q wqc + (0.10 x TAC)

According to Figure 5 and the following equation, the remaining assimilative capacity (REMAC), is equal to the Existing Water Quality (or in this case the Existing Flow or Q exist) minus the Q tier 1.

Equation 3: REMAC = Q exist – Q tier 1.

According to Env-Wq 1708 (d), the Remaining Assimilative Capacity (REMAC) is evaluated "… by comparing existing water quality, as specified in (b) and (c) above, to the state's water quality criteria." Env-Wq 1708 (c) states that "Where flows will or might be altered, existing conditions shall be established based on the existing maximum allowed water withdrawals or impoundment, diversion, or fluctuation of streamflow, as applicable." As discussed later, existing flows for this Activity will be based on near-continuous, real-time instream flow measurements made by the Applicant so that existing flows will always be representative of what is actually occurring upstream, both now and in the future. Whenever upstream river flows fall below specified thresholds, withdrawals will need to be reduced to *de minimis* levels (with the possible exception of temporary, relatively infrequent and short-term excursions associated with situations beyond the control of the Applicant that may adversely impact human health).

b. Equation for Withdrawal to be "Insignificant"

Conditions that will allow the withdrawal to be considered "insignificant" are described below.

According to Env-Wq 1708.09 "Significant or Insignificant Determination":

> "(a) Any discharge or activity that is projected to use 20% or more of the remaining assimilative capacity for a water quality parameter, in terms of either concentration or mass of pollutants, or volume or flow rate for water quantity, shall be considered a significant lowering of water quality."
>
> "(b) The department shall not approve a discharge or activity that will cause a significant lowering of water quality unless the applicant demonstrates, in accordance with Env-Wq 1708.10, that the proposed lowering of water quality is necessary to achieve important economic or social development in the area where the waterbody is located."

Therefore, in terms of flow, withdrawals can be considered "insignificant" for antidegradation purposes, if the withdrawals use no more than 20% of the remaining assimilative capacity (REMAC). This can be accomplished by installing an upstream river gage and a pumping system that can automatically vary the rate of withdrawal based on the upstream river flow. The rate of withdrawal at any time would be calculated in accordance with the following equation:

Equation 4: WD insig = 0.20 x [Q exist – Q tier 1]

Where:

WD insig = the maximum that can be withdrawn to be considered "insignificant" [i.e., without exceeding 20% of the remaining assimilative capacity (REMAC)],

Q exist = Q up = the river flow measured at a gage upstream of the withdrawal or the river flow measured just downstream of the withdrawal plus the current rate of withdrawal.

Q tier 1 = Tier 1 (see Equation 2)

This certification is focused on withdrawals that are considered "insignificant" in terms of the antidegradation regulations. By doing so, the Applicant is not required to go through a full antidegradation review as described in the next section.

c. Additional Antidegradation Requirements If Withdrawal is "Significant"

If the Applicant wants to withdraw more than 20% of the remaining assimilative capacity in Webster Stream, the withdrawal would be considered "significant" and the Applicant would need to demonstrate, in accordance with Env-Wq 1708.10, that

- the proposed additional withdrawal is necessary to accommodate the Activity;
- the Activity will provide net economic or social development in the area in which the waterbody is located; and
- that net social and economic benefits outweigh the environmental impact.

To determine if the above criteria are met, the Applicant would need to submit an Alternative Analysis as described in Env-Wq 1708.10(d), (e), and (f). If, after reviewing the information provided by the Applicant, NHDES makes a preliminary determination to approve the request, NHDES must provide opportunity for public comment (including a public hearing if requested) in accordance with Env-Wq 1708.11. Following the public participation process, NHDES would then make a final decision to allow or deny the request. Note that in this case, NHDES may also require a site specific study to determine flows necessary to protect select fish/macroinvertebrate species and life stages (such as a study based on the Instream Flow Incremental Method or IFIM).

d. Methodology for Determining "Insignificant" Withdrawals

As previously discussed, the allowable withdrawal is dependent on the existing upstream flow (Q exist) and Q tier 1 (see Equation 4). Q tier 1 is dependent on the TAC which is dependent on knowing Q wqc and Q best (see Equation 1 and Equation 2 above).

Ideally, a Water Management Plan (WMP), such as the one for the Lamprey River watershed (see Finding D-28) would be prepared to determine the magnitude, frequency, duration and timing of flows necessary to support

designated uses such as aquatic life in the river (i.e., Q wqc). The WMPs include biological studies and models to determine protective instream flows (PISFs) for various species and life stages of fish, macroinvertebrates and other species of aquatic life. Such studies, however, are very expensive and typically take several years to complete. In lieu of a WMP or biological study, for this certification NHDES relied on a hydrologic approach to determine protective instream flows (PISFs) (i.e., Q wqc). Hydrologic analyses have been developed and used by others such as the U.S. Fish and Wildlife Service's New England Aquatic Base Flow Policy[8] to estimate protective flows for aquatic life. To help validate the selection of a hydrologic-based Q wqc as well as other flows used in the antidegradation analysis, NHDES then compared the results to the Lamprey River WMP watershed yields (see Finding D-28, Table 4).

NHDES believes it is important to be as consistent as possible with the Natural Flow Paradigm (NFP) (see Finding D-28). As discussed in Finding D-28, utilizing this approach, the protective instream flows (PISFs) for the Lamprey River WMP were based on a long-term hydrograph that was adjusted to reflect natural conditions (i.e., without human influence). The following describes the process used to develop a "natural" hydrograph and flow statistics for Webster Stream and how this information was used to determine PISFs (i.e., Q wqc) and withdrawals that would be considered "insignificant" (i.e., withdrawals that will use no more than 20 percent of the remaining assimilative capacity of the river in terms of flow).

Webster Stream does not have a long-term gage but the Applicant did install a pressure transducer to record water depth hourly beginning January 29, 2019 and provided that data to NHDES through April 28, 2020. Within that period of pressure transducer depth recordings, the Applicant measured Webster Stream flows on 35 dates which resulted in a robust rating curve and a 15-month period of continuous flow measurements.

NHDES used the 15-month period of daily data to investigate which nearby long-term stream gages with minimal regulation behaved most similarly to Webster Stream on a cubic foot per second per square mile of watershed (cfsm) basis. When a river does not have a long-term gage, a synthetic hydrograph for the ungaged river can be developed using a regression analysis based on the period of overlap with a long-term gage and then using that regression to calculate a long-term, "natural" record for the ungaged river. Although the drainage area of the nearby Soucook River, as represented by the USGS gage # 01089100, is larger (81.9 square miles) than the Webster Stream drainage area (9.29 square miles), the USGS gage on the Soucook River provides a robust day-to-day flow relationship. NHDES also compared flows to the Oyster River gage (USGS gage # 01073000 – drainage area of 12.1 square miles) and found that based on daily linear relationships the Soucook River gage better describes the yield from Webster Stream ($r^2 = 0.87$) than the Oyster River gage ($r^2 = 0.57$) and had a more similar yield (slope of 1.12 verses 0.59). In this case, it appears that the similarities in local elevation and precipitation dynamics of the Soucook River and Webster Stream outweigh the similarities in watershed size between the Oyster River and Webster Stream. While it is likely that some of the underlying hydrologic mechanisms differ between the Soucook yield (which has a thicker/higher yield aquifer) and the Webster Stream yield (which has a higher percent of impounded water), those two mechanisms in conjunction with the local similarities generate a similar daily streamflow yield.

To develop the final relationship between the Soucook River and Webster Stream flows, several periods were excluded as described below.

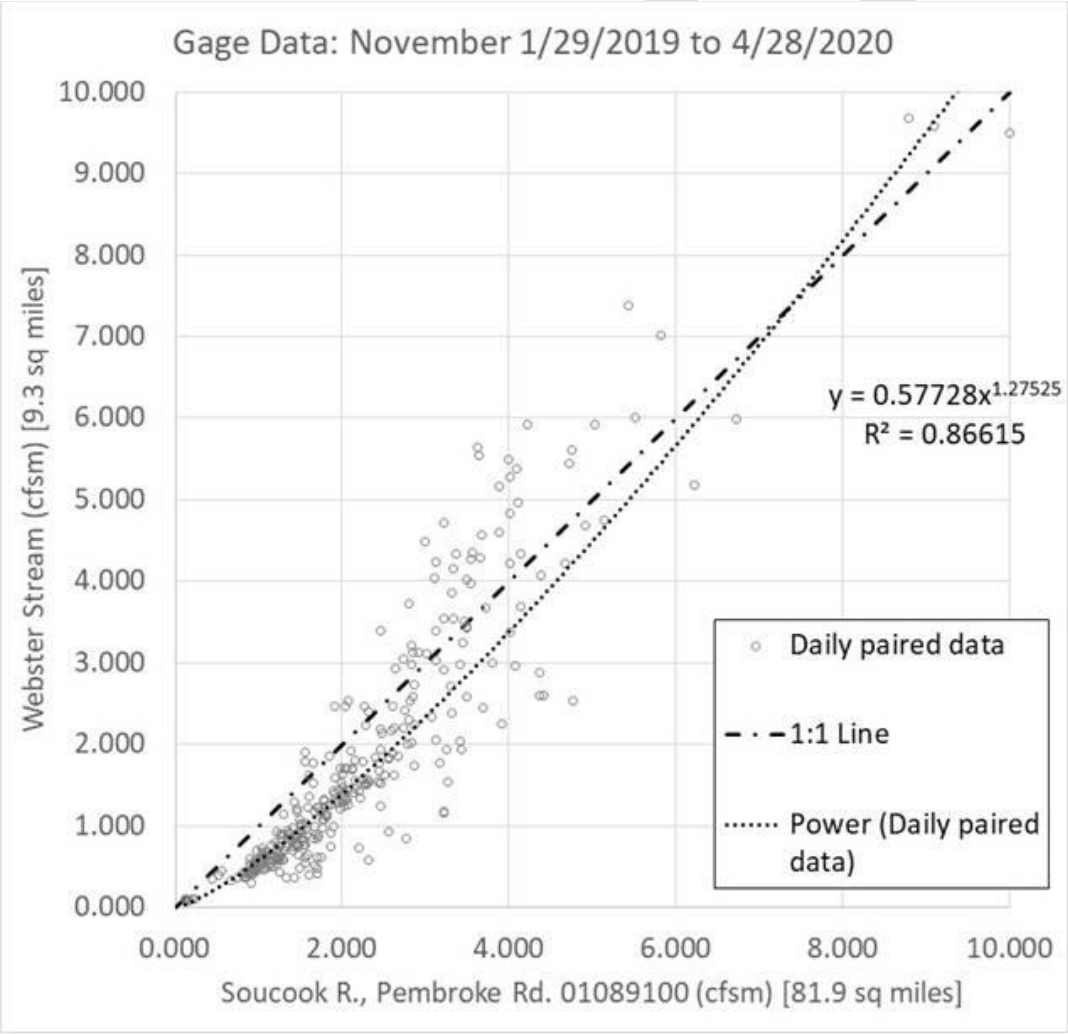
- 7/1/2019-8/31/2019 – During this period, Webster stream was unresponsive to even the small rainfalls that influenced the larger Soucook River. This is commonly seen immediately below dams that are trying to maintain a summer recreational pool.
- 9/7/2019-10/9/2019 – During this period, Webster Stream flow appeared to increase even while the larger Soucook River, with its more extensive aquifer and base-flow capacity, decreased. After Labor Day, active dam management to maintain full pool diminished.

[8] U.S. Fish and Wildlife Service's New England Aquatic Base Flow Policy

- 10/17/2019-11/11/2019 - It appears that the fall drawdown, which would increase the Webster Stream flow, corresponded with a sizable rainfall that increased the flow in the Soucook. This is believed to be true because during this period, the Webster Stream cfsm exceeded that of the Soucook River for nearly the only time in the paired data record.
- 11/15/2019 - 11/24/2019 – Starting on 11/15, there was a sudden drop in Webster Stream flow. This is commonly the case when the drawdown rate is so aggressive that when the stop-logs are replaced to maintain the winter pool, flow over the dam is severely restricted for a period, in this case approximately 5-days, after which flows began to slowly rise until nearly equaling inflow on 11/24.

Fortunately, the majority of the Webster Stream flow anomalies were outside the October to June period during which the Applicant is requesting to withdraw water. The relationship between the Soucook River and Webster Stream is provided in Figure 6 below:

Figure 6 – Final Regression between Soucook River and Webster Stream Flows



Statistics were then run on the "natural" hydrograph for the period covering 1990-2020 to determine flow percentiles for each month (i.e., the percent of time flows were less than a given flow in each month, which is the same as the percent of time a flow is not exceeded). Monthly statistics were selected because flows can change significantly by month, different aquatic species and life stages are more dependent on flows during various months, and it is important to retain as much natural variability as possible according to the concept of the Natural Flow Paradigm (see Finding D-28).

Percentile flows are often noted as Q20, Q30, etc. For instance, Q25 represents the 25th percentile of all flows in the month and is the flow that is not exceeded 25 percent of the time in that month [or, conversely, the flow that is exceeded 75% of the time (i.e., 100-25)]. This would be considered a relatively low flow. Likewise, Q75, represents the 75th percentile of all flows and is the flow that is not exceeded 75 percent of the time (or is exceeded 25 percent of the time). This would be representative of a relatively high flow. Q50 is the middle flow meaning it is the flow that is both exceeded and not exceeded 50 percent of the time (i.e. the median flow). Estimated monthly and seasonal statistics for the Webster Stream in the "natural" condition are shown in Table 1.

Table 1– Estimated "natural" flow percentiles by month in Webster Stream (based on regression against the Soucook River gage from 1990 through 2020)

Month	Q10	Q20	Q25	Q30	Q40	Q50	Q60	Q70	Q75	Q80	Q90
1	3.00	3.92	4.39	5.08	6.32	7.36	8.75	11.15	12.60	14.64	23.38
2	2.73	3.36	3.92	4.23	5.04	5.87	7.36	9.29	10.63	13.71	23.66
3	4.23	5.83	6.81	8.08	11.11	14.12	18.25	24.20	27.01	30.98	43.52
4	6.88	10.43	11.53	12.70	16.38	20.29	24.71	30.61	34.49	39.70	63.54
5	3.01	4.39	5.07	5.93	7.45	9.01	11.31	14.40	16.21	18.80	29.00
6	1.14	1.75	2.08	2.29	3.00	4.23	5.43	7.10	8.43	10.80	20.19
7	0.48	0.64	0.73	0.85	1.12	1.52	2.07	3.10	3.85	5.38	12.76
8	0.33	0.51	0.57	0.67	0.83	1.10	1.49	2.37	3.07	4.21	8.72
9	0.29	0.37	0.41	0.47	0.63	0.89	1.30	1.94	2.36	2.98	6.91
10	0.44	0.72	0.94	1.18	1.81	2.36	3.51	6.22	7.18	9.72	17.70
11	1.55	2.36	2.81	3.31	4.43	6.13	8.27	11.77	13.79	16.51	26.61
12	2.75	4.04	4.74	5.29	6.92	8.78	11.17	14.74	17.50	20.57	31.96
Annual	0.67	1.49	2.02	2.64	3.99	5.71	7.90	11.50	13.81	17.17	29.16
All flows are in cubic feet per second (cfs)											

For the proposed Activity, Q75 was selected as Q best and Q25 was initially selected as Q wqc for each month (from Table 1). With regards to frequency of occurrence, these flows equally bracket the Q50 flow (i.e., the median or middle flow). NHDES believes that if the Q wqc is set below the median, Q best should be set above the median to minimize the impact of the withdrawals on the "natural" median value for each month.

Before proceeding, it is important to note that whatever flow is selected for Q wqc for each month, NHDES is not implying that it is appropriate to withdraw water down this flow for the entire month. Rather, selection of Q wqc and Q best allows one to calculate Q tier 1 which sets the threshold for antidegradation purposes, above which some limited withdrawals may be allowed as long as there are no violations of surface water quality standards and the withdrawals do not appreciably affect the natural variability of flows by "flatlining"[9] the hydrograph.

Upon further analysis, it was realized that setting Q wqc equal to Q25 for all months may unnecessarily limit the amount of water that could be withdrawn during months of high flow (such as during the spring). If withdrawals are necessary, it's generally best to allow them when river flows are relatively high. It was therefore decided to lower the Q wqc depending on the maximum percentage of water that the proposed Activity could withdraw. This is based on the following theory:

> As the maximum percent of river flow withdrawn increases, the frequency that it is allowed to occur should decrease to minimize the impact on the resource and the monthly median flow.

[9] Flatlining the hydrograph means the downstream river flow remains constant or at a near-constant level for a substantial amount of time (hours) due to the withdrawal.

Based on the above theory, the following criteria were selected to guide the selection of Q wqc for the proposed withdrawal. As indicated in Table 2 below, during the requested withdrawal period of October through June, these criteria allow a maximum of approximately 10 percent of the water to be withdrawn (which occurs in October). This percentage is relatively high but less frequent and is considered appropriate for this Activity (provided it does not cause or contribute to water quality standard violations) because it involves a public water supply that is currently unable to keep up with demand without trucking-in water (see Finding D-1). For other projects involving withdrawals or diversions, different criteria may apply.

> Monthly Q wqc = Monthly Q10 if the maximum percent of upstream river flow withdrawn is no more than 5%.
>
> Monthly Q wqc = Monthly Q20 if maximum percent of upstream river flow withdrawn is greater than 5% and no more than 10%.
>
> Monthly Q wqc = Monthly Q25 if maximum percent of upstream river flow withdrawn is greater than 10% and no more than 15%.

Knowing Q wqc and Q best for each month, Equation 1, Equation 2, Equation 3 and Equation 4 (see sections a. and b. of this Finding) were then used to determine the monthly TAC, Q tier 1, REMAC and withdrawal that would not exceed 20% of the REMAC, respectively. The maximum percent of river that could be withdrawn each month was determined by setting Equation 4 equal to the maximum proposed withdrawal of 0.334 cfs (150 gpm), solving for Q up, and then dividing 0.334 cfs by Q up.

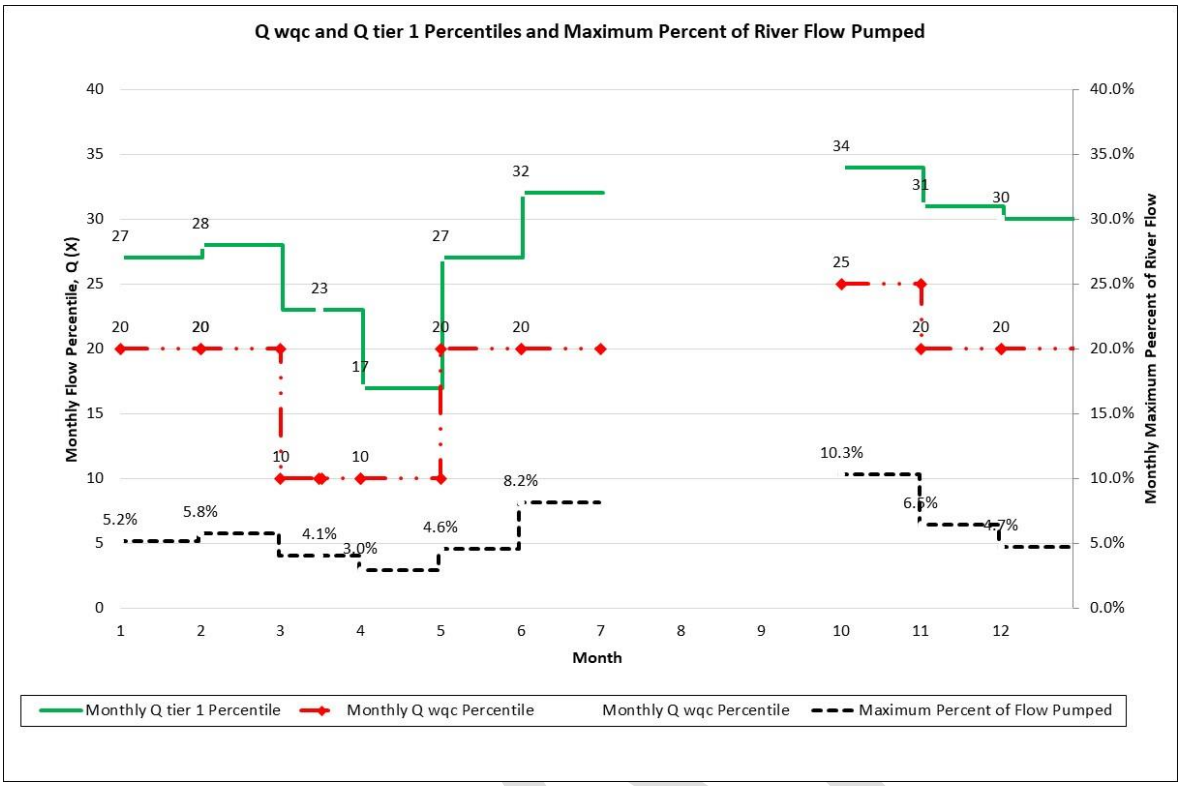
Final monthly values of Q wqc, Q best, and Q tier 1 that will result in withdrawals that are considered "insignificant" (i.e., will use no more than 20 percent of the remaining assimilative capacity), for the requested withdrawal months of October through June, are shown in Table 2. The maximum percent of river withdrawn each month by the proposed Activity is also presented.

Table 2– Monthly Values of Q wqc, Q best, and Q tier 1 (or October through June) to be "Insignificant"

Month	Qwqc (cfs)	Approximate Percentile for the month of Qwqc	Q best = Q75 for month (cfs)	Maximum % used of Remaining Assimilative Capacity (REMAC)	Q tier 1	Approximate Percentile of Q tier 1	Maximum Pump Rate (cfs)	Min Qup to pump 0.334 cfs and be less than 20% REMAC (cfs)	Max Pump Rate / Min Qup (%)
1	3.9	Q20	12.6	20%	4.8	Q27	0.334	6.5	5.2%
2	3.4	Q20	10.6	20%	4.1	Q28	0.334	5.8	5.8%
3	4.2	Q10	27.0	20%	6.5	Q23	0.334	8.2	4.1%
4	6.9	Q10	34.5	20%	9.6	Q17	0.334	11.3	3.0%
5	4.4	Q20	16.2	20%	5.6	Q27	0.334	7.2	4.6%
6	1.7	Q20	8.4	20%	2.4	Q32	0.334	4.1	8.2%
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
10	0.9	Q25	7.2	20%	1.6	Q34	0.334	3.2	10.3%
11	2.4	Q20	13.8	20%	3.5	Q31	0.334	5.2	6.5%
12	4.0	Q20	17.5	20%	5.4	Q30	0.334	7.1	4.7%

As shown in Table 2 and in Figure 7, the monthly percentile for the monthly Q wqc (as well as for the monthly Q tier 1 flows) increases as the maximum percent of the river flow pumped [Max Pump Rate/ Min Q up (%)] increases. This is in accordance with the previously presented theory and criteria for establishing Q wqc.

Figure 7 – Monthly Q wqc and Q tier 1 Percentiles and Maximum Percent of River Flow Pumped for October through June



e. De minimis Withdrawal

In studies such as the Lamprey River WMP (see Finding D-28), a *de minimis* withdrawal equal to 5 percent of the 7Q10 flow[10] is allocated to water users regardless of inflow. If new water users are added, the *de minimis* amounts are reapportioned as needed. For this Activity, NHDES has decided to set the *de minimis* withdrawal equal to 1% of Q up, provided they do not result in any surface water quality violations and provided there are no new water users that require a portion of this *de minimis* flow. Having a *de minimis* based on the percent of upstream flow allows less water to be withdrawn during low flow periods and more water to be withdrawn as flows increase. This is expected to be protective of aquatic life and allow at least some volume of water to be withdrawn in each of the requested months.

f. Summary of Allowable Withdrawals

The amount of withdrawal that can be withdrawn at any time to be considered "insignificant" in terms of antidegradation (WD insig) is equal to Equation 4 (see section b. of this Finding). Equation 4 indicates that when the upstream river flow (Q up) is at or below the monthly Q tier 1 flow, no withdrawals are allowed. Because of the importance of maintaining even a minimal withdrawal, the Applicant will be allowed to withdraw 1% of the upstream river flow (which, for this Activity, NHDES considers to be *de minimis*) or WD insig, whichever is greater, up to a maximum of 0.334 cfs (150 gpm) from October through June. This assumes the withdrawals do not cause or contribute to any surface water quality violations and that there are no new withdrawals that require a portion of the *de minimis* withdrawal.

[10] The 7Q10 in Webster Stream at the point of withdrawal is estimated to be approximately 0.8 cfs which is based on applying the DFLOW program to the Soucook River gage for the years 1998-2015, and then applying the regression equation shown in Figure 6 to determine the corresponding 7Q10 flow in Webster Stream. Five percent of the 7Q10 is 0.04 cfs or 18 gpm.

In summary, the allowable withdrawal is equal to the greater of the following with a maximum of 0.334 cfs (150 gpm) for the months of October through June:

WD insig = 0.20 x (Q up – Monthly Q tier 1) Where:

Q up is equal to the river flow measured at a gage upstream of the withdrawal or the river flow measured just downstream of the withdrawal plus the current rate of withdrawal,

and

Monthly Q tier 1 is from Table 2 (varies monthly).

Or

WD demin = 1% of Q up.

g. Examples

Figure 8 and Figure 9 show the maximum withdrawal, Q tier 1 and Percent of River Withdrawn (shown as Max Pump Rate/Qup) as a function of the upstream river flow (Q up) for a low flow month (October) and a high flow month (April).

Figure 8 – Maximum Withdrawal, Q tier 1 and Percent of River Withdrawn – October

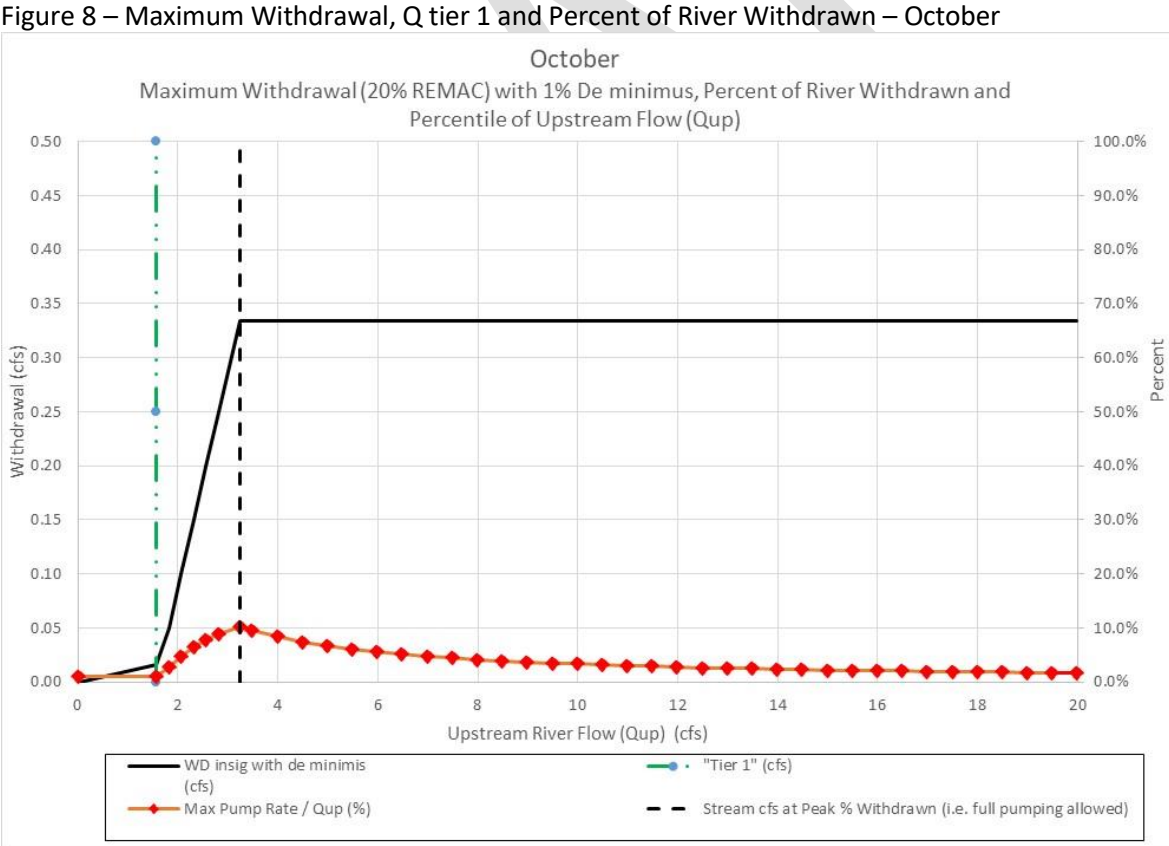


Figure 9 – Maximum Withdrawal, Q tier 1 and Percent of River Withdrawn – April

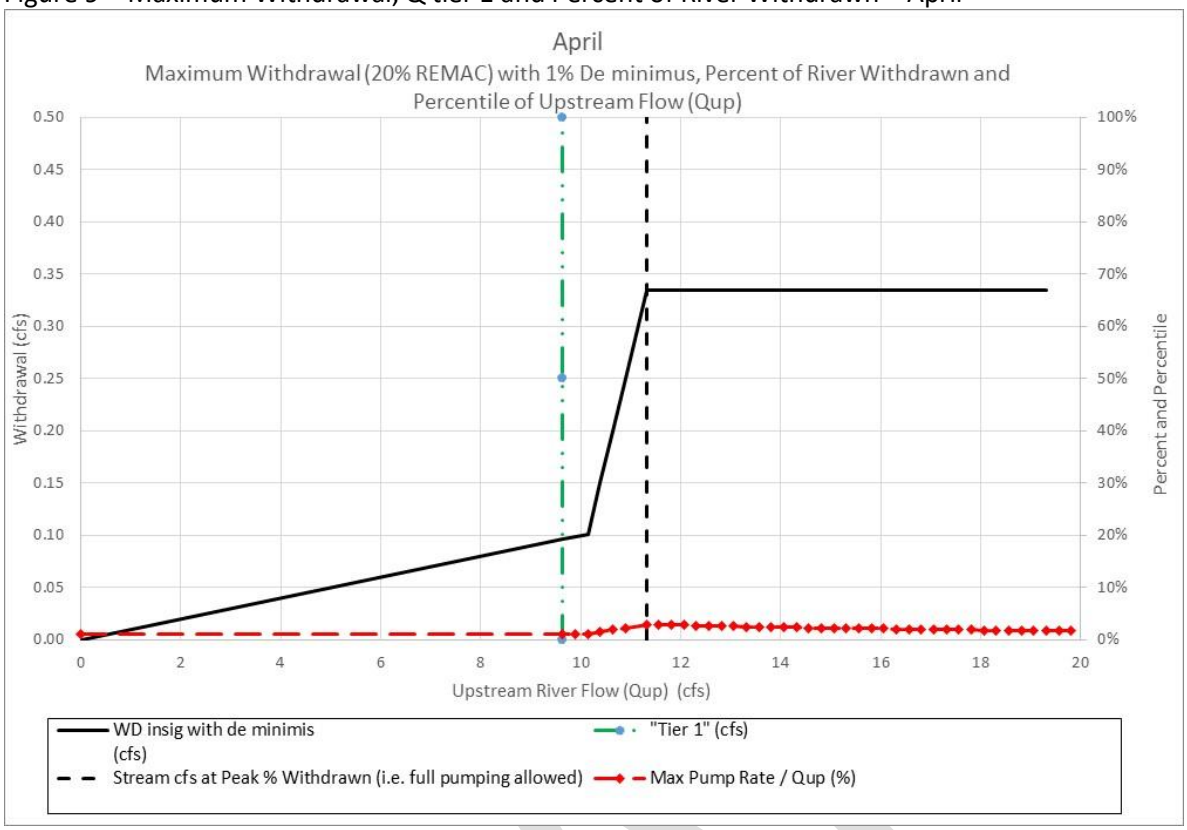


Figure 10 and Figure 11 provide an example of how much water could have been withdrawn each month during the period for which the Applicant's pressure transducer was in place based on the withdrawal conditions presented in section f. above. River flow was based on river flows measured by the Applicant in Webster Stream for the period January 29, 2019 through April 28, 2020. This monitoring station was located just upstream of the Peacham Road crossing which is approximately 440 feet downstream of the planned withdrawal. Figure 10 and Figure 11 assume the following:

- The withdrawal criteria in section f. above;
- Upstream gage installed by the Applicant to record stage and river flow on a near-continuous basis; and
- Variable speed pumps which can adjust pumping rate on a real-time basis based on river flow.

Figure 10 shows the upstream river flow (light blue), the Q75 flow (green), Q tier 1 (red), and the allowable pumping rate (dark blue) for this example. Figure 11 shows that, for this example, the average number of gallons pumped per day per month (blue) would vary from approximately 103,000 gallons per day (gpd) to 216,000 gpd and that the highest monthly average (red) and maximum (orange) percent of river flow pumped would be approximately 6 and 8 percent respectively. Overall, for the 12 months that withdrawals are requested (October through June) of the 15-month period of flow data, approximately 57.5 million gallons could have been pumped.

Figure 10 – Predicted Daily Pumping Rates (January 29, 2019 – June 30, 2019 and October 1, 2019 through April 28, 2020)

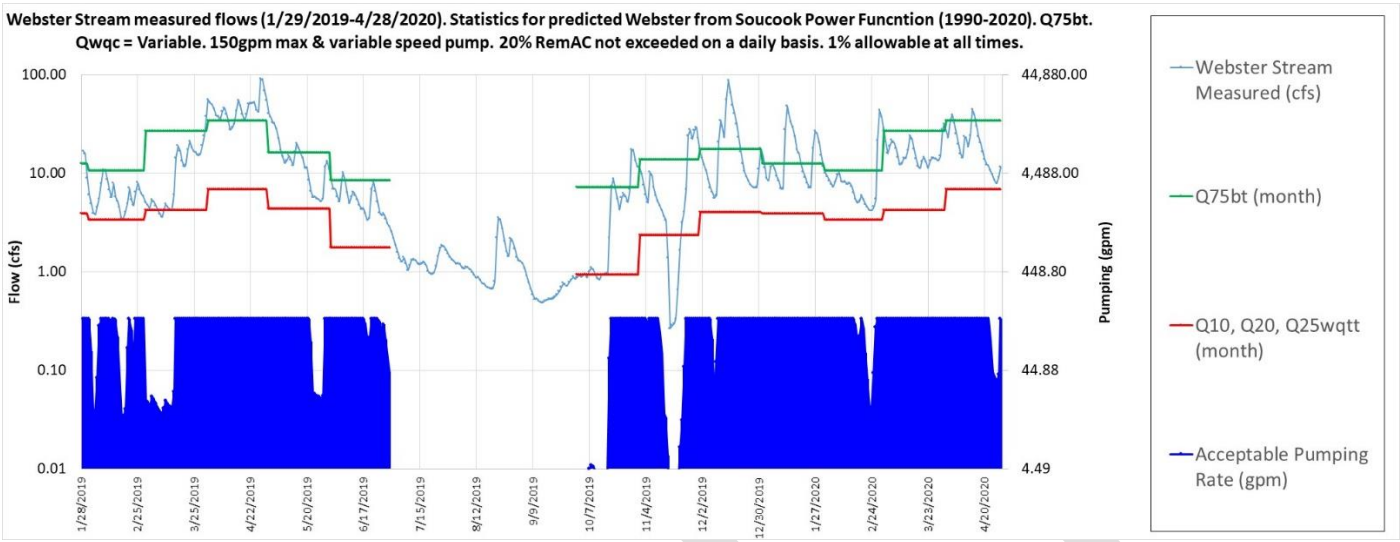
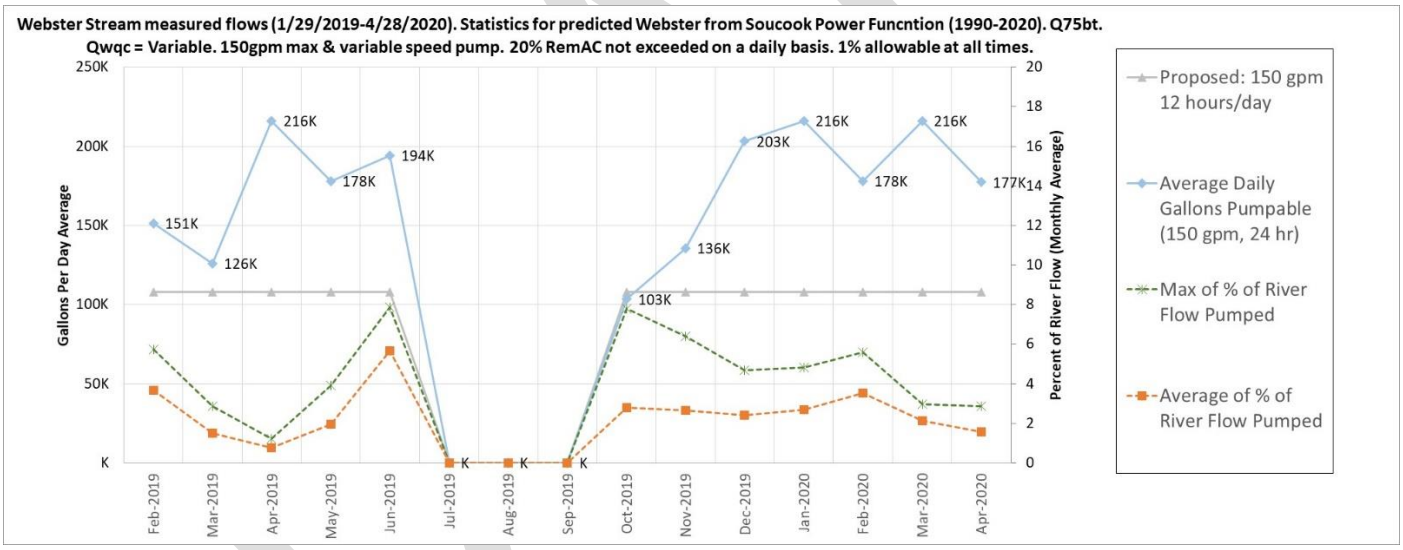


Figure 11 – Predicted Average Daily Pumping Rate, and Average Daily and Maximum Percent of River Flow Pumped in each month (February 2019 through June 2019 and October 2019 through April 2020)



D-27. Fact C-34.h and C-34.i of this Certification includes excerpts from Env-Wq 1708 regarding antidegradation which state that "the department shall assure that the highest statutory and regulatory requirements shall be achieved for all new and existing point sources and that all cost effective and reasonable best management practices for nonpoint source control shall be implemented." In addition to being cost effective and reasonable, best management practices must be selected to ensure attainment of water quality standards in receiving waters as evidenced by the following:

As stated in Fact C-10 of this Certification, "Best Management Practices" (BMPs) are defined in Env-Wq 1702.07 as "those practices which are determined, after problem assessment and examination of all alternative practices and technological, economic and institutional considerations, to be the most effective practicable means of preventing or reducing the amount of pollution generated by point or nonpoint sources to a level compatible with water quality goals."

Env-Wq 1708.01 (b)(2) (see Fact C-34.i) in general states that the department shall not approve any proposed discharge or activity that might cause degradation or lower water quality, without such conditions as are necessary to ensure that a) water quality will be adequate to protect existing uses; b) the highest statutory and regulatory requirements will be achieved for all new and existing point sources; and c) all cost effective and reasonable best management practices for nonpoint source control will be implemented. NHDES has determined that, if properly constructed and maintained, the BMPs required to satisfy the conditions of this Certification, satisfy the above regulations.

D-28. *Validation of flows with Lamprey River Watershed Management Plan*: As a validation step, the protective flows developed for this certification were compared to the Lamprey River Watershed Management Plan (WMP).[11]

Development of protective instream flows to support the designated uses in a river are complex and resource intensive. In recognition of this, the state legislature created a pilot instream flow program through Chapter 278 (HB 1449-A) which directed NHDES to study and establish protected instream flows and watershed management plans (WMPs) for the designated portions of the Lamprey and Souhegan Rivers. A protected instream flow is defined as the amount of water needed to support the human and natural uses that depend on the river; the management plans detail the action to be implemented to maintain the protected flows. Adherence to the WMPs is expected to allow attainment of water quality standards in these two rivers.

To date, two WMPs have been developed in New Hampshire, and the development of protected instream flows has begun on two more rivers. Development of protective instream flows in the WMPs reference the Natural Flow Paradigm (NFP) and are based on the river in its "natural" condition (i.e., flows without human modification). The NFP recognizes that the description of protective flows requires the use of the following stream flow components: flow magnitude, frequency, duration, timing, and rate of change. Compliance with the WMPs and protective instream flows is expected to result in attainment of surface water quality standards.

The Lamprey River WMP implements the protected flows described in the Lamprey River Protected Instream Flow report[12] with input from the affected users and from lakefront property owners. The protected instream flows (PISFs) recognize that wildlife, plants and habitats, and most human uses are best supported by maintaining natural river flows. The PISFs for humans consider instream dependent public uses of the river. The PISFs for aquatic life take into account: native fish; introduced fish; fish that travel back and forth between fresh and saltwater to lay their eggs; mussels; insects; and rare, threatened or endangered fish species. PISFs were calculated for six distinct biological periods, or "bioperiods," that describe different times of the year when various species of fish have critical flow needs.

To develop PISFs for fish in the Lamprey River WMP, the flows used in modeling (MesoHABSIM[13]) were based on a "naturalized" 30-year hydrograph. That is, the 30-year hydrograph for the USGS Packers Falls gage on the Lamprey River was adjusted to reflect flows in the river without human modification. This was done by adjusting recorded stream flow for net water use (withdrawal minus return flow), storage and release of water from lakes and reservoirs, and major physical modifications of the river channel. To determine the protected flow magnitude, as well as the duration and frequency for a bioperiod, the natural availability of habitat was

[11] Lamprey River Watershed Management Plan. New Hampshire Department of Environmental Services with contractor assistance from Normandeau Associates, Inc., University of New Hampshire, and Rushing Rivers Institute. NHDES-R-WD-11-9. August 28, 2013.

[12] Final Lamprey River Protected Instream Flow Report. Normandeau Associates, Inc., Rushing Rivers Institute, and University of New Hampshire. NHDES-R-WD-08-26. July 13, 2009.

[13] The MesoHABSIM model establishes the river-specific relationship between stream flow and habitat availability. The model evaluates the time distribution of habitat availability to identify significant changes in habitat frequency and duration. Protection is identified that will limit stream flow below these significant changes in habitat frequency and duration.

determined using the MesoHABSIM model and the "naturalized" hydrograph.

An example of PISFs developed for fish from the Lamprey River WMP is shown in shown Table 3. As shown, PISFs were developed for six bioperiods. For each bioperiod, the flow magnitude and duration is specified for three categories "Common Flow," "Critical Flow" and "Rare Flow" with "Allowable" and "Catastrophic" durations specified for each category. Common, Critical and Rare Flows are defined in the WMP as follows:

> "Common flow is the flow corresponding to the optimal habitat conditions, above which the frequency of occurrence begins to decline significantly."
>
> "Critical flow is the flow corresponding to the second lowest habitat state. Critical flow magnitudes result in less habitat availability than that provided by the common flow, but this habitat magnitude is not unusual."
>
> "Rare flow is the flow corresponding to the lowest of habitat states. Rare flow habitat is severely reduced and very uncommon."

As river flows reach certain flow and duration thresholds, more actions under the WMP take effect. Also of note is that the common, critical and rare flows in Table 3 are also expressed in terms of watershed yield (cubic feet per second per square mile). The Lamprey River WMP also specifies a *de minimis* amount of water use at any river location equal to 5 percent of the 7Q10 flow at that location. The *de minimis* amount is apportioned between users with surface water impacts.

Table 3 – Protected Instream Flows for the Lamprey River (based on table in footnote 11)

Lamprey Protected Flows For Fish		**Common Flow**			**Critical Flow**			**Rare Flow**		
Time of Year / Bioperiod	**Protected Entity Controlling Flows**	**Common Flow (cfsm)**	**Allowable Duration (days)**	**Catastro-phic Duration (days)**	**Common Flow (cfsm)**	**Allowable Duration (days)**	**Catastro-phic Duration (days)**	**Common Flow (cfsm)**	**Allowable Duration (days)**	**Catastro-phic Duration (days)**
Dec 9 – Feb 28 Overwintering	Flow	1.3	20	57	0.6	10	37	0.4	7	30
Mar 1 – May 4 Spring Flood	Flow	3.4	14	42	1.3	10	19	0.8	3	9
May 5 – Jun 19 Clupeid Spawning	Shad spawning	0.78	13	28	0.34 / **0.85**	5	13	0.31 / **1.3**	4	10
June 20 – Jul 4 GRAF Spawning	GRAF spawning	0.55 / **0.55**	-- / **11***	15*	0.10 / **0.85**	5*	10*	0.87 / **1.3**	2*	3*
Jul 5 – Oct 6 Rearing & Growth	Common Shiner	0.57	46	82	0.1	15	32	0.087	5	15
Oct 7 – Dec 8 Salmon Spawning	Atlantic Salmon	0.49	17	55	0.22	11	33	0.11	6	11

Bold values are upper limits for instream flow for protection of clupeid and GRAF spawning. Management activities should not create flows that exceed these magnitudes and durations.
Watershed area for calculating cfsm is 183 square miles at the index location used. Index location is the gage USGS 01073500 LAMPREY RIVER NEAR NEWMARKET, NH.
-- No Common Flow Allowable duration is described for this bioperiod because high flows and catastrophic durations are limiting.
* GRAF spawning and Clupeid spawning partly overlap, so durations during the GRAF Spawning bioperiod begin counting May 5 (previous bioperiod) but apply only during this bioperiod.

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To get an idea of how the selected flow values used in this certification compare to flows used in the Lamprey River WMP, the yields (expressed in cubic feet per second per square mile of drainage, or "cfsm") were compared. More specifically, the yields from the Lamprey River WMP for "Rare," "Common" and "Critical" flows presented in Table 3 above were compared to the yields for Webster Stream based on the flows for Q wqc, Q tier 1, the minimum flow upstream before the maximum requested withdrawal of 0.334 cfs can be pumped (Q up min), and Q best (in cfs) divided by drainage area at the point of withdrawal (9.29 square miles) for the requested withdrawal months of October through June (Table 4). The analysis assumes that the six bioperiods and associated yields shown in Table 3 from the Lamprey River WMP are applicable to Webster Stream, which may or may not be true. To determine which is true, a WMP and associated PISFs for Webster Stream would need to be conducted for Webster Stream.

For watersheds that have similar characteristics and biota, the following would be anticipated:

- Q best would have a yield similar to the "Common" flow yield, and
- Q wqc and Q tier 1 and Q up min would have yields greater than the "Rare flow" yield and preferably closer to the "Critical" flow yield.

As shown in Table 4, the above is true.

- for Q best (i.e., yields are similar to the "Common" flow yield);
- for Q up min (i.e., yields are similar to the "Critical" flow yield);
- for Q tier 1 (i.e., yields are similar to the "Critical" flow yield with the exception of March and June; and
- for Q wqc (i.e., yields are greater than the "Rare" flow yield with the exception of March and June.

In general, there is relatively good agreement. Differences are likely due to differences in watershed characteristics and the fact that a WMP and associated PISFs for Webster Stream have not been conducted on Webster Stream as they have for the Lamprey River. With regards to the Q tier 1 and Q wqc yields being lower than the "Rare" flow yields from the Lamprey River for the months of March and June, the maximum percent of water that can be withdrawn from Webster Stream in each of these months is 4.1 and 8.2 percent (Table 2). These percentages correspond to when the maximum of 0.334 cfs is pumped. For this to happen, the minimum river flow (Q up min) must be equal to 8.2 and 4.1 cfs in March and June respectively, which correspond to the Q30 and Q48 respectively. Consequently, these maximum withdrawal percentages are not likely to occur that frequently. In fact, if the river flow is lower or higher than these flows, the percent that can be withdrawn decreases. This trend, which is true for all months, can be visually seen in Figure 8 and Figure 9 for the months of October and April.

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Table 4 – Comparison of Yields (cfsm) from the Lamprey River WMP to Webster Stream (October through June)

Month	Yield for Q wqc for Webster Stream (cfsm)	Yield for Q tier 1 for Webster Stream (cfsm)	Yield for Q up min (Minimum Q up to pump 0.334 cfs from Webster Stream) (cfsm)	Yield for Q best for Webster Stream (cfsm)	"Rare" Yield from Lamprey River WMP (cfsm)	"Critical" Yield from Lamprey River WMP (cfsm)	"Common" Yield from Lamprey River WMP (cfsm)
1	0.42	0.51	0.69	1.36	0.4	0.6	1.3
2	0.36	0.44	0.62	1.14	0.4	0.6	1.3
3	0.46	0.70	0.88	2.91	0.8	1.3	3.4
4	0.74	1.04	1.22	3.71	0.8	1.3	3.4
5	0.47	0.60	0.78	1.75	0.31	0.34	0.78
6	0.19	0.26	0.44	0.91	0.31	0.34	0.78
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
10	0.10	0.17	0.35	0.77	0.11	0.22	0.49
11	0.25	0.38	0.56	1.48	0.11	0.22	0.49
12	0.44	0.58	0.76	1.88	0.4	0.6	1.3

E. WATER QUALITY CERTIFICATION CONDITIONS

Unless otherwise authorized or directed by NHDES, the following conditions shall apply:

E-1. **Compliance with Certification Conditions:** The Applicant shall construct and operate the Activity to comply with this Certification.

E-2. **Compliance with Water Quality Standards:** The Activity shall not cause or contribute to a violation of New Hampshire surface water quality standards.

E-3. **Modification of Certification**: The conditions of this Certification may be amended and additional terms and conditions added as necessary to ensure compliance with New Hampshire surface water quality standards, when authorized by law, and, if necessary, after notice and opportunity for hearing.

E-4. **Proposed Modifications to the Activity:** The Applicant shall consult with and receive prior written approval from NHDES regarding any proposed modifications to the Activity that could have a significant or material effect on the conditions of this Certification including any changes to project operation or approved plans required by this Certification. If necessary, NHDES may modify the Certification in accordance with condition E-3 of this Certification.

E-5. **Compliance Inspections:** In accordance with applicable laws, the Applicant shall allow NHDES to inspect the Activity and affected surface waters to monitor compliance with the conditions of this Certification.

E-6. **Transfer of Certification:** Should this Certification be transferred to a new owner, contact information for the new owner (including name, address, phone number and email) shall be provided to NHDES within 30 days of the transfer.

E-7. **Compliance with Other Permits:** The Applicant shall comply with all applicable permits associated with the Activity, and any amendments or reissuances including, but not limited to, the following:

- U.S. Army Corps of Engineers General 404 Permit for NH (see Fact C-53)
- NHDES Wetlands Permit (see Fact C-50)
- NHDES Shoreland Impact Permit (see Fact C-50)

The conditions of these permits shall become conditions of this Certification upon issuance of this Certification. Should there be any discrepancies between permit requirements, the more stringent requirement as it relates to compliance with New Hampshire surface water quality standards shall apply.

E-8. **Water Use Registration and Reporting:** Prior to operation, the Applicant shall register the withdrawal from Webster Stream with the NHDES Water Use Registration and Reporting Program (WURRP) and comply with all WURRP requirements.[14]

E-9. **Water Conservation Plan**: Prior to operation, the Applicant shall submit a Water Conservation Plan (WCP) that complies with Env-Wq 2101 to NHDES for approval. The Applicant shall then implement the approved WCP.

E-10. **Turbidity / Sediment Control Plan**: Prior to construction, the Applicant shall submit a Turbidity / Sediment Control Plan (TCSCP) to NHDES that describes measures that will be used during construction to prevent violations of turbidity and sediment water quality criteria. Depending on the proposed measures, NHDES may require submittal and implementation of a NHDES approved turbidity monitoring and reporting plan to ensure turbidity levels in Webster Stream during construction comply with state surface water quality criteria for turbidity (see C-28).

E-11. **River Stage and Flow Monitoring:** Prior to withdrawing water from the proposed water intake structure in Webster Stream, the Applicant shall submit a plan to NHDES for approval to automatically measure and record river stage (i.e., elevation) and river flow on a near-continuous basis (preferably at least every 30 minutes) at a location (hereinafter called river flow monitoring station 1 or RFMS1) in Webster Stream to evaluate the flows upstream of the proposed withdrawal relative to the withdrawal criteria set forth in Finding D-26, section f. If requested by NHDES, the Applicant shall also submit a plan for NHDES approval to automatically measure and record river stage at a location to be established downstream of both the proposed withdrawal and RFMS1. The Applicant shall then implement the approved plan(s). The plan(s) shall include, but not be limited to, the following:

a. monitoring location,
b. methods used,
c. equipment make and accuracy,
d. installation of river staff gages tied to a permanent benchmark (to facilitate manual readings),
e. recalibration of the stage/discharge relationship on an annual basis (or other frequency

[14] For information regarding the NHDES Water Use Registration and Reporting program, see the Water Use Registration and Reporting Program webpage.

acceptable to NHDES), and

f. the ability to automatically monitor and record stage/flow and to transmit that information on a near-real time continuous basis to the automated system controlling the pumps and rate of water withdrawal.

E-12. **Water Temperature and Dissolved Oxygen Monitoring:** Prior to withdrawing water from Webster Stream, the Applicant shall prepare and obtain NHDES approval of a detailed Monitoring Plan (MP or Plan) to collect dissolved oxygen and water temperature data on a near-continuous basis (i.e., preferably every 15 minutes but no more than every 30 minutes) that is representative of conditions upstream and downstream of the proposed intake within the Webster Stream in June and October for at least one year, and possibly additional years depending on if the data adequately addresses the monitoring purpose. The purpose of the monitoring is to determine the impact of the proposed withdrawal on dissolved oxygen levels in Webster Stream and if additional withdrawal restrictions need to be imposed to prevent violations of dissolved oxygen criteria. The plan shall include, but not be limited to, the following to help ensure that high quality data is collected:

a. Purpose of monitoring;
b. qualifications of those conducting the work;
c. parameters that will be sampled;
d. a plan showing where samples will be collected (including latitude and longitude);
e. the monitoring frequency and duration;
f. the make, model, accuracy, precision and range of all field monitoring equipment;
g. how field monitoring equipment will be deployed;
h. how field measuring equipment will be calibrated and the frequency of calibration (especially for long term, near continuous datasonde deployments);
i. QA/QC procedures including, but not limited to, measurement performance criteria, a description of the QC sample and/or activity that will be used to assess measurement performance, field checks of datasondes using handheld meters, etc.;
j. a copy of field data sheets;
k. when data will be entered into the NHDES Environmental Monitoring Database (EMD)[15]; and
l. how data will be summarized and reported.

The Applicant shall then implement the NHDES approved MP. Results shall be included in the Annual Report (see Condition E-17). The data shall be summarized and presented in a manner that clearly shows, via text, tables and plots, the spatial and temporal effect of the proposed withdrawal on river flow and dissolved oxygen (concentration and percent saturation) and if New Hampshire surface water quality criteria for dissolved oxygen are met. Any deviations from the MP (including QA/QC objectives) shall be clearly identified. All valid data shall be entered in the NHDES Environmental Monitoring Database (EMD). In addition to the report, data shall also be provided to NHDES in a MS Excel workbook, or other approved format.

After the first year of monitoring, NHDES will determine if additional monitoring is necessary. If NHDES determines that additional monitoring is necessary, the Applicant shall conduct the additional monitoring. If NHDES determines that the proposed withdrawal is causing or contributing to violations of dissolved oxygen water quality criteria, the Applicant shall submit a plan to NHDES for approval within 60 days (or other time period acceptable to NHDES) to prevent withdrawals from

[15] Instructions for entering data into the NHDES Environmental Monitoring Database (EMD), and contact information, are provided on the NHDES Environmental Monitoring Database website.

causing or contributing to violations of dissolved oxygen. The Applicant shall then implement the NHDES approved plan.

E-13. **Maintain Natural Variability in River Flows:** The river hydrograph just downstream of the withdrawal shall mimic the shape of the upstream river hydrograph to the maximum extent practicable. Flatlining[9] of the downstream river hydrograph due to the withdrawal shall be avoided.

E-14. **Withdrawal Conditions:** Withdrawals from Webster Stream for the proposed Activity shall comply with the following:

a. Withdrawals shall not cause or contribute to surface water quality violations (including, but not limited to, dissolved oxygen, see Condition E-11 regarding dissolved oxygen).
b. The magnitude, duration and frequency of withdrawals shall be minimized to the maximum extent practicable.
c. The withdrawal shall not cause flatlining of the river hydrograph downstream of the withdrawal.
d. The withdrawal rate shall comply with Finding D-26.f. and not exceed 150 gallons per minute (gpm) at any time.
e. Withdrawals shall only occur from October 1 through June 30.
f. Withdrawals shall not prevent fish passage.
g. Temporary, relatively infrequent and short-term excursions from the above withdrawal conditions may be allowed for situations beyond the control of the Applicant that may adversely impact human health, provided the Applicant receives prior approval from NHDES of a written request submitted by the Applicant that includes, but is not limited to, the reason for the requested withdrawal, the conditions of this Certification that will not likely be met if the withdrawal is allowed to occur, the requested withdrawal rate, volume and duration and the predicted impact on the river and a description of water conservation measures that will be enforced by the Applicant (such as water use restrictions and bans) to minimize the magnitude and duration of the withdrawal excursions.

E-15. **Operations, Maintenance and Reporting Plan (OMRP):** Prior to withdrawing water from Webster Stream, the Applicant shall prepare and obtain NHDES approval of an Operations, Maintenance and Reporting Plan (OMRP) that describes, in detail, how the withdrawal will be automated, how the system will be operated and results recorded so that it complies with Condition E-14 of this Certification. The OMRP shall also describe how the results will be reported to comply with Conditions E-16 and E-17 of this Certification. The OMRP shall also describe the frequency and methods that will be used to maintain the infiltration gallery. The Applicant shall then implement the NHDES approved plan. If, at any time, revisions to the conditions in this Certification that affect the ORP are directed by or approved by NHDES, the Applicant shall update the OMRP as necessary within 60 days (or other time period acceptable to NHDES) of being notified by NHDES, submit the revised OMRP to NHDES for approval, and then implement the most recently approved OMRP.

E-16. **Notification:** The Applicant shall notify NHDES within 48 hours of any non-compliances of the NHDES approved Operations and Reporting Plan (see Condition E-15 of this Certification). Such notification shall include, but not be limited to, the reasons for non-compliance and corrective actions taken to prevent such non-compliances from reoccurring.

E-17. **Annual Report:** By August 1st of each year beginning the year after this Certification is issued, the Applicant shall prepare and submit a report to NHDES demonstrating compliance (via text, tables and plots) with each of the conditions in this Certification for the previous nine months of operation (October through June). Should there be any non-compliances, the Applicant shall provide a summary of the non-compliances including the reasons for the non-compliance and corrective

actions taken to prevent such non-compliances from reoccurring.

E-18. **Antidegradation – Request for Change in "Insignificant" Withdrawal:** No sooner than three years from the date of issuance of this Certification, the Applicant may, based on historical experience and other information if requested by NHDES, submit a written request with supporting information, to withdraw more water but still be considered an "insignificant" withdrawal per the antidegradation requirements specified in Env-Wq 1708 (see Finding D-26). If NHDES approves the request, the revised criteria for "insignificant" withdrawal and any conditions associated with it, shall become conditions of this Certification. Further, the Applicant shall revise the ORP in accordance with Condition E-15 to reflect the revised withdrawal conditions.

E-19. **Antidegradation – Request for "Significant" Withdrawal:** If the Applicant requests an increase in withdrawals that are "significant" in accordance with Env-Wq 1708 [i.e., represent more than 20 percent of the remaining assimilative capacity (REMAC)], and, after completing the antidegradation requirements specified in Env-Wq 1708 and any other analyses or studies requested by NHDES (e.g. biological studies), and, if NHDES approves the "significant" withdrawal, the "significant" withdrawal and any conditions associated with it, shall become conditions of this Certification. Further, the Applicant shall revise the ORP in accordance with Condition E-15 to reflect the revised withdrawal conditions.

F. APPEAL

Any person aggrieved by this decision may appeal to the N.H. Water Council ("Council") by filing an appeal that meets the requirements specified in RSA 21-O:14 and the rules adopted by the Council, Env-WC 100-200. The appeal must be filed directly with the Council within 30 days of the date of this decision and must set forth fully every ground upon which it is claimed that the decision complained of is unlawful or unreasonable. Only those grounds set forth in the notice of appeal can be considered by the Council. Information about the Council, including a link to the Council's rules, is available on the New Hampshire Environmental Council website (or more directly at the Water Council page). Copies of the rules also are available from the NHDES Public Information Center at (603) 271-2975.

If you have questions regarding this Certification, please contact Gregg Comstock at (603) 271-2983 or Gregg.Comstock@des.nh.gov.

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Thomas E. O'Donovan, P.E., Director
NHDES Water Division

cc via email:
Michael Hicks, US Army Corps of Engineers
Carol Henderson, NHFGD
Karen Montgomery, Barnstead Town Administrator

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