Water Quality Certification
(33 U.S.C. §1341)

In the matter of: Killington / Pico Ski Resort Partners, LLC
Killington Road Killington,
Vermont 05751

APPLICATION FOR SNOWMAKING EXPANSION AND INTERCONNECTION OF KILLINGTON & PICO SNOWMAKING SYSTEMS

Section 401 of the federal Clean Water Act requires that 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 that any such discharge will comply with other substantive provisions of the Clean Water Act. 33 U.S.C. § 1341(a)(1). The certifying state may set forth any effluent limitations and other limitations, and monitoring requirements necessary to assure that any applicant for a federal license will comply with the Clean Water Act and with any other appropriate requirement of state law. 33 U.S.C. § 1341(d). The Secretary of Natural Resources has delegated the authority to make certification determinations to the Department of Environmental Conservation (Department).

The Vermont Department of Environmental Conservation (the Department) has reviewed a water quality certification application dated May 14, 2019, and filed by Vanasse Hangen Brustlin, Inc. (VHB) on behalf of Killington / Pico Ski Resort Partners, LLC (the applicant). The application for certification is in connection with a permit application filed with the Army Corps of Engineers pursuant to Section 404 of the Federal Clean Water Act (NAE-2019-00260). The supporting documentation for the application includes a stream alteration permit application dated October 25, 2018 and filed pursuant to V.S.A. Title 10, Chapter 41; a wetlands conditional use determination application dated January 15, 2019 and an approved permit issued March, 29, 2019 pursuant to V.S.A. Title 10, Chapter 37, a final snowmaking needs and alternatives analysis dated March 8, 2019; a shoreland encroachment permit application dated July 2, 2019 and filed pursuant to V.S.A. Title 29, Chapter 11; a pending land use permit application (V.S.A. Title 10, Chapter 151; permit no. 1R0813-9), and other documents related to the project filed through July 31, 2019 were available to the Department for consideration in this matter. Collectively, these materials are referred to as the "application." The alternatives analysis was the subject of an informal public conference noticed on April 19, 2019 and held in Killington on May 6, 2019 pursuant to the Agency of Natural Resources *Environmental Protection Rules: Water Withdrawals for Snowmaking* (February 15, 1996).

The current application is subject to review under the Vermont Water Quality Standards promulgated by the Agency of Natural Resources and effective beginning January 15, 2017 (Standards). (Standards, § 29A1-01(a) Applicability).

The Department, based on the application and record before it, makes the following findings and conclusions:

I. Applicable Statutes and Regulations

A. Applicable provisions of the Vermont Water Quality Standards

1. The applicable 2017 Vermont Water Quality Standards (Standards) were adopted by the Secretary of the Agency of Natural Resources pursuant to 10 V.S.A., Chapter 47, Water Pollution Control. Section 1252 of this chapter provides for the classification of designated uses as either Class A(1), A(2), B(1) or B(2) and authorizes the adoption of standards of water quality to achieve the purpose of classification.

2. All waters of the State shall be managed to support their designated and existing uses. (Standards, § 29A-104(a)).

3. The designated uses are: aquatic biota and wildlife that may utilize or are present in the waters; aquatic habitat to support aquatic biota, wildlife, or plant life; the use of waters for swimming and other primary contact recreation; the use of waters for boating and related recreational uses; the use of waters for fishing and related recreational uses; the use of waters for the enjoyment of aesthetic conditions; the use of the water for public water source; and the use of water for irrigation of crops and other agricultural uses.

4. All waters above elevation 2,500 feet msl (mean sea level) are designated Class A by statute. The proposed project affects reaches of Mendon Brook that are above this elevation and are classified as Class A(1) for all uses.

5. The management objectives for waters classified as Class A(1) for aquatic biota and wildlife are "to achieve and maintain excellent biological integrity and aquatic biota and wildlife consistent with waters in their natural condition." (Standards, § 29A-306(a)(1)(A)). The associated biological criteria with this use classification are "Measures of biological integrity for aquatic macroinvertebrate and fish assemblages consistent with waters in their natural condition." (Standards, § 29A-306(a)(1)(B)). The associated nutrient criteria with this use classification are Total Phosphorous concentrations not exceeding 10 µg/L in Small, High-Gradient rivers and streams and not exceeding 9 µg/L in Medium, High-Gradient rivers and streams, with a pH limit of 8.5 standard units applicable to both size classes. (Standards, § 29A-306(a)(1)(C)).

6. The management objectives for waters classified as Class A(1) for aquatic habitat are "to achieve and maintain excellent quality aquatic habitat. The physical habitat structure, stream processes, and flow characteristics of rivers and streams and the physical character and water level of lakes and ponds shall be managed consistent with waters in their natural condition." (Standards, § 29A-306(b)(1)(A)). The associated criteria with this use classification for rivers and streams are "no change in flow characteristics, physical habitat structure, and stream processes outside the range of the natural condition." (Standards, § 29A-306(b)(1)(B)(i)). Additionally, "waters shall comply with the Hydrology Criteria in § 29A-304" of the Standards. (Standards, § 29A-306(b)(B)(iii)).

7. The management objectives for waters classified as Class A(1) for aesthetics are "to achieve and maintain excellent aesthetic quality." (Standards, § 29A-306(c)(1)(A)). The associated criteria for this use classification in rivers and

streams are "water character, flows, water level, bed and channel characteristics, and flowing and falling waters in their natural condition." (Standards, § 29A-306(c)(1)(B)(i)).

8. The management objectives for waters classified as Class A(1) for boating and related recreational uses are "to achieve and maintain excellent quality boating as compatible with the natural condition." (Standards, § 29A-306(d)(1)(A)). The associated criteria with this use classification are "Boating to the full extent naturally feasible without degradation due to artificial flow and water level management or artificial physical impediments." (Standards, § 29A-306(d)(1)(B)).

9. The management objectives for waters classified as Class A(1) for fishing and related recreational uses are "to achieve and maintain excellent quality fishing consistent with the natural condition." (Standards, § 29A-306(e)(1)(A)). The associated criteria with this use classification are "measures of wild salmonid densities, biomass, and age composition consistent with those expected in waters in their natural condition." (Standards, § 29A-306(e)(1)(B)(i). An Additional criterion is compliance with the temperature criteria in § 29A-302(B) of the Standards. (Standards, § 29A-306(e)(1)(B)(ii)).

10. The management objectives for waters classified as Class A(1) for swimming and related recreational uses are "to achieve and maintain a level of water quality compatible with good quality swimming and other primary contact recreation with very little risk of illness or injury from conditions that are a result of human activities." (Standards, § 29A-306(f)(1)(A)). The associated criteria with this use classification are Escherichia coli levels not exceeding "a geometric mean of 126 organisms/100ml obtained over a representative period of 60 days, and no more than 10% of samples above 235 organisms/100ml. None attributable to the discharge of wastes." (Standards, § 29A-306(f)(1)(B)).

11. The proposed project affects reaches of Falls Brook, Roaring Brook, and the Ottauquechee River, as well as Woodward Reservoir, which are classified as Class B(2) for all uses.

12. The management objectives for waters classified as Class B(2) for aquatic biota and wildlife are "to achieve and maintain good biological integrity. (Standards, § 29A-306(a)(3)(A)). The associated biological criteria with this use classification are "change from the natural condition for aquatic macroinvertebrate and fish assemblages not exceeding moderate changes in the relative proportions of taxonomic, functional, tolerant, and intolerant aquatic organisms." (Standards, § 29A-306(a)(3)(B)). The associated nutrient criteria with this use classification are Total Phosphorous concentrations not exceeding 12 µg/L in Small, High-Gradient rivers and streams and not exceeding 15 µg/L in Medium, High-Gradient rivers and streams, with a pH limit of 8.5 standard units applicable to both size classes. (Standards, § 29A-306(a)(3)(C)).

13. The management objectives for waters classified as Class B(2) for aquatic habitat are "to achieve and maintain high quality aquatic habitat. The physical habitat structure, stream processes, and flow characteristics of rivers and streams and physical character and water level of lakes and ponds necessary to fully support all life-cycle functions of aquatic biota and wildlife, including overwintering and

reproductive requirements, are maintained and protected." (Standards, § 29A-306(b)(3)(A)). The associated criteria with this use classification for rivers and streams are "Changes to flow characteristics, physical habitat structure, and stream processes limited to moderate differences from the natural condition and consistent with the full support of high quality aquatic habitat." (Standards, § 29A-306(b)(3)(B)(i)). The associated criteria with this use classification for lakes, ponds, and reservoirs are "changes in aquatic habitat limited to moderate differences from the natural condition and consistent with high quality aquatic habitat. When such habitat changes are a result of water level fluctuation, compliance may be determined on the basis of aquatic habitat studies. (Standards, § 29A-306(b)(B)(3)(ii)). Additionally, "waters shall comply with the Hydrology Criteria in § 29A-304" of the Standards. (Standards, § 29A-306(b)(3)(B)(iii)).

14. The management objectives for waters classified as Class B(2) for aesthetics are "to achieve and maintain good aesthetic quality." (Standards, § 29A-306(c)(3)(A)). The associated criteria for this use classification in rivers and streams are "water characteristics, flows, water level, bed, and channel characteristics, and flowing and falling waters of good aesthetic value." (Standards, § 29A-306(c)(3)(B)(i)). The associated nutrient criteria for this use classification in lakes, ponds, and reservoirs are Total Phosphorous concentrations not exceeding 18 µg/L, Secchi Disk Depths not less than 2.6 meters, Chlorophyll-a concentrations not exceeding 7 µg/L, and pH not exceeding 8.5 standard units. (Standards, § 29A-306(c)(3)(B)(ii)).

15. The management objectives for waters classified as Class B(2) for boating and related recreational uses are "to achieve and maintain a level of water quality compatible with good quality boating." (Standards, § 29A-306(d)(3)(A)). The associated criteria with this use classification are "Waters shall comply with the Hydrology Criteria in § 29A-304 of these rules." (Standards, § 29A-306(d)(3)(B)).

16. The management objectives for waters classified as Class B(2) for fishing and related recreational uses are "to achieve and maintain a level of water quality compatible with good quality fishing." (Standards, § 29A-306(e)(3)(A)). The associated criteria with this use classification are "measures of wild salmonid densities, biomass, and age composition indicative of good population levels." (Standards, § 29A-306(e)(3)(B)(i). An Additional criterion is compliance with the temperature criteria in § 29A-302(B) of the Standards. (Standards, § 29A-306(e)(3)(B)(ii)).

17. The management objectives for waters classified as Class B(2) for swimming and related recreational uses are "to achieve and maintain a level of water quality compatible with good quality swimming and other primary contact recreation with very little risk of illness or injury from conditions that are a result of human activities." (Standards, § 29A-306(f)(3)(A)). The associated criteria with this use classification are Escherichia coli levels not exceeding "a geometric mean of 126 organisms/100ml obtained over a representative period of 60 days, and no more than 10% of samples above 235 organisms/100ml. In waters receiving combined sewer overflows, the representative period shall be 30 days." (Standards, § 29A-306(f)(3)(B)).

18. The management objectives for waters classified as Class B(2) for public water source use are "to achieve and maintain a level of quality that is suitable for use as a public water source with filtration and disinfection or other required treatment.

(Standards, § 29A-306(g)(2)(A)). The associated criterion with this use classification is compliance "with the Escherichia coli Criteria in subsection (f)(2)(B)" of the Standards. (Standards, § 29A-306(g)(2)(B)).

19. The management objectives or waters classified as Class B(2) for irrigation of crops and other agricultural uses are "to achieve and maintain a level of quality that is suitable, without treatment, for irrigation of crops used for human consumption without cooking and suitable for other agricultural uses. (Standards, § 29A-306(h)).

20. The proposed project also affects reaches of Mendon Brook that are classified as Class A(2) for all uses, specifically the reaches of Mendon Brook below 2500' in elevation.

21. For the designated uses of aquatic biota and wildlife, aquatic habitat, boating and related recreational uses, as well as fishing and related recreational uses, the management objectives and associated criteria with the A(2) use classification are the same as those enumerated for the B(2) use classification (Findings 12, 13, 15, & 16).

22. The management objectives for waters classified as Class A(2) for aesthetics are "to achieve and maintain very good aesthetic quality." (Standards, § 29A-306(c)(2)(A)). The associated criteria with this use classification in rivers and streams are "water character, flows, water level, bed and channel characteristics, and flowing and falling waters of very good aesthetic value." (Standards, § 29A-306(c)(2)(B)).

23. The management objectives for waters classified as Class A(2) for swimming for swimming and related recreational uses, "Waters shall be managed, as necessary, for consistency with use as a public water source. Where sustained direct contact with the water occurs, waters shall be managed to achieve and maintain a negligible risk of illness or injury from conditions that are a result of human activities. (Standards, § 29A-306(f)(2)(A)). The associated criteria with this use classification are Escherichia coli levels not exceeding "a geometric mean of 126 organisms/100ml obtained over a representative period of 60 days, and no more than 10% of samples above 235 organisms/100ml" with none attributable to the discharge of wastes." (Standards, § 29A-306(f)(2)(B)).

24. The management objectives for waters classified as A(2) for public water sources use are "to achieve and maintain a uniformly excellent character and a level of water quality highly suitable for use as a public water source with filtration and disinfection or other required treatment. (Standards, § 29A-306(g)(1)(A)). The associated criteria with this use classification are Escherichia coli levels not exceeding "a geometric mean of 126 organisms/100ml obtained over a representative period of 60 days, and no more than 10% of samples above 235 organisms/100ml. None attributable to the discharge of wastes." (Standards, § 29A-306(g)(1)(B)).

25. The Anti-Degradation Policy in the Standards requires that "[a]ll waters shall be managed in accordance with [Standards] to protect, maintain, and improve water quality." (Standards, § 29A-105).

26. All waters affected by the proposed project are designated as cold water fishery habitat. (Standards, § 29A-308).

27. The general temperature standard for waters is "change or rate of change in temperature, either upward or downward, shall be controlled to ensure full support of aquatic biota, wildlife, and aquatic habitat uses." (Standards, § 29A-302(1)(A)).

28. In waters designated as cold water fish habitat and classified as Class A(1) for the fishing use, no increase in ambient temperature from the natural condition is allowable. (Standards, § 29A-302(1)(B)(i)).

29. In waters designated as cold water fish habitat and classified as Class A(2) or B(2) for the fishing use, the total increase from ambient temperature due to all discharges and activities shall not exceed 1.0° F. (Standards, § 29A-302(1)(B)(iii)).

30. In all waters, total phosphorous loadings and nitrates shall be limited so that they will not contribute to the acceleration of eutrophication or the stimulation of the growth of aquatic biota in a manner that prevents the full support of uses. (Standards, § 29A-302(2)(B) & § 29A-302(3)(B)).

31. The turbidity standard for waters classified as Class A(1) or A(2) for any use or cold water fish habitat is 10 NTU as an annual average under dry weather base-flow conditions. (Standards, § 29A-302(4)(A)).

32. In waters designated as cold water fish habitat, the dissolved oxygen (D.O.) standard is not less than 7mg/L and 75 percent saturation at all times, nor less than 95 percent saturation during late egg maturation and larval development of salmonids in areas that the Secretary determines are salmonid spawning or nursery areas important to the establishment or maintenance of the fishery resource. In all other waters designated as a cold water fish habitat, the standard is not less than 6 mg/L and 70 percent saturation. (Standards, § 29A-302(5)(A)).

33. The Hydrology Policy in the Standards requires that "[t]he proper management of water resources now and for the future requires careful consideration of the interruption of the natural flow regime and the fluctuation of water levels resulting from the construction of new, and the operation of existing, dams, diversions, and other control structures." (Standards, § 29A-103(f)(1)).

34. To effectively implement the hydrology policy, hydrology criteria shall be achieved and maintained, where applicable. The hydrology criteria include high flow regime criteria and streamflow protection criteria for rivers and streams and water level fluctuation criteria for lakes, ponds, and reservoirs that differ by use classification.

35. The high flow regime criteria for waters classified as Class A(1) for aquatic habitat require "no change from the natural flow regime that would result in more than a minimal impact upon these waters." (Standards, § 29A-304(e)(1)).

36. The streamflow protection criteria for waters classified as Class A(1) for aquatic habitat require that "change from the natural flow regime shall not cause the natural flow regime to be diminished, in aggregate, by more than 5% of 7Q10 at any time." (Standards, § 29A-304(b)(1).

37. The water level fluctuation criteria for lakes, ponds, reservoirs, riverine impoundments, and any other waters classified as B(2) for aquatic habitat or boating establish that "waters may exhibit artificial variations in water level when subject to water level management, but only to the extent that such variations ensure full support of uses." (Standards, § 29A-304(d)(2)).

38. The high flow regime criteria for waters classified as Class A(2) and B(2) for aquatic habitat or boating require "no change from the natural flow regime that would result in runoff causing an increase in the frequency, magnitude, or duration of peak flows adversely affecting channel integrity or prevent the full support of uses." (Standards, § 29A-304(e)(2)).

39. The streamflow protection criteria for waters classified as Class A(2) and B(2) for aquatic habitat or boating require that "any change from the natural flow regime shall provide for maintenance of flow characteristics that ensure the full support of uses and comply with the applicable water quality criteria." Further, the Standards establish "the preferred method for ensuring compliance with this subsection is a site-flow study. In the absence of a site-specific study, the Secretary may establish hydrologic standards and impose additional hydrologic constraints, consistent with any applicable Agency of Natural Resources rule or procedure, to ensure compliance with the requirements of this subsection." (Standards, § 29A-304(b)(3)).

40. Elements of the applicant's proposal warrant review under two Agency of Natural Resources rules or procedures, the *Agency Procedure for Determining Minimum Stream Flows (*July 14, 1993) and *Environmental Protection Rule: Chapter 16 - Water Withdrawals for Snowmaking* (February 15, 1996). The requirements of this procedure and rule are discussed in detail in the following subsections.

B. Agency Procedure for Determining Acceptable Minimum Flows

41. Elements of the applicant's proposal are subject to review under the *Agency Procedure for Determining Minimum Streamflows* (July 14, 1993). Conservation flows below the diversion on the Ottauquechee River outside of the period October 1 through March 31 are subject to review under this procedure.

42. The Agency Procedure for Determining Minimum Streamflows sets forth four methods to determine acceptable conservation flows: regional or site-specific seasonal median flows, stream hydrologic analysis, the Instream Flow Incremental Method, and other methods.

C. Environmental Protection Rules: Water Withdrawals for Snowmaking

43. Elements of the applicant's proposal are subject to review under the Agency of Natural Resources *Environmental Protection Rule: Chapter 16 - Water Withdrawals for Snowmaking (Rule)*. Specifically, conservation flows below the diversions on Falls Brook, Roaring Brook, Ottauquechee River, Woodward Reservoir, and Mendon Brook for the period October 1 through March 31 are subject to review under this rule.

44. Section 16-05 of the rule provides for the completion of an alternatives analysis that demonstrates an applicant's need for water and identifies the best practicable alternative for supporting that need while protecting the environment.

45. Section 16-03 of the rule establishes the February median flow as a general flow standard for fall/winter withdrawals for snowmaking. Where a stream-specific value is unavailable, the statewide average value of 0.80 csm is used.

46. Section 16-06 of the rule defines the water use limitation for new systems. The limitation is 50 percent of the portion of the water between 0.80 csm (or the site-specific February median flow) and 1.4 csm from October 1 to November 30 and 50 percent of the portion of the water between 0.80 csm (or the site-specific February median flow) and 1.1 csm from December 1 to March 31, plus any portion of the river flow in excess of the 1.4 csm or 1.1 csm. After ten years of collecting hydrologic data at the withdrawal point, the site-specific February median flow is to be calculated and instituted as the conservation flow requirement to assure that "the applicant shall not withdraw any water that would cause the stream to be below the site specific FMF at the point of the outtake."

47. Section 16-07 of the rule defines expanded existing systems and sets forth the goal of increasing existing permitted flow limits for withdrawal systems that are less than FMF to FMF. To attain this goal, a schedule shall be included as a condition of approving the expansion that shall provide (1) for existing systems that have permitted flow limits of 0.5 csm and above, compliance with the FMF, but no sooner than is determined to be reasonable and feasible based on the results of the alternatives analysis and (2) for existing systems that have permitted flow limits below 0.5 csm, the incremental implementation of alternatives and restoration of higher conservation flows to a minimum of 0.5 csm within five years after permit approval and to the FMF within a reasonable period of time, but to neither flow level any sooner than is determined to be reasonable and feasible based on the results of the alternatives analysis.

48. Section 16-03(4) of the rule provides for periodic review of alternatives analyses, after the initial permit is issued, in order to determine if an opportunity exists to improve the conservation flow requirements. Such reviews benefit from having better records available as to actual water use characteristics for the system that was permitted, allowing refinement of the water demand model.

49. Section 16-09 of the rule provides for an informal public conference to be held when the Agency must make a conservation flow determination. Such a meeting was held in Sherburne on May 6, 2019 for the proposed snowmaking expansion.

II. Factual Findings

A. Background

Killington Mountain Resort

50. Killington Mountain Resort is located in the headwaters of the Ottauquechee River drainage basin. The mainstem of the Ottauquechee is roughly 38 miles long and

drains approximately 223 square miles.

51. Killington Mountain has a summit elevation of 4,241 feet, which makes Killington Peak the second highest peak in Vermont.

52. Killington Mountain Resort has 722 acres of trails, serviced by 21 lifts. Killington is also known to be the first resort to open and the last to close each year.

53. The original Ottauquechee intake was constructed in 1969**.** The intake was relocated in 1986 and was authorized under Stream Alterations permit (SA-1-00510, dated February 19, 1986). An increase in pumping capacity was authorized for the winter of 1997-98 by Land Use Permit No. 1R0813-3.

54. The construction of Snowshed Reservoir was permitted by a dam order issued by the Water Resources Board on December 1, 1969.

55. In the mid 1990's, Killington began to explore various permitting and engineering options to bring the existing water withdrawals into compliance and find additional water sources to meet water demand. At that time a Memorandum of Agreement (MOA) was signed between Vermont Agency of Natural Resources, the American Ski Company, and Farm and Wilderness to gather the necessary information required for permitting, including a needs and alternatives analysis (NAA).

56. Included in the MOA were amendments to various Act 250 permits (1R0813-2, 1R0600, 1R0804-1) to extend deadlines, alter the placement of ski trails, pipeline corridor, and install snowmaking/firefighting facilities.

57. As a result of this process, it was determined that the use of Woodward Reservoir would allow Killington to meet its water demand, expand ski trails to create an 'Interconnect' between Killington and Pico mountain, and bring the current water sources into compliance with applicable regulations.

58. In 1997, Killington applied for a permit issued under Section 404 of the Clean Water Act (Permit No. 1997-01044) from the US Army Corps of Engineers for the dredging and filling of waters and wetlands effected by the proposed Interconnect Project. The Interconnect project included the construction of ski lifts and trails on Killington and Pico mountains, the construction of a water intake in Woodward Reservoir, and physical modifications and changes to the operation of water withdrawals on the Ottauquechee River, Roaring Book, and Falls Brook.

59. As a result of issuance of a federal permit, the state had an obligation to certify that the project would not violate Vermont Water Quality Standards pursuant to Section 401 of the federal Clean Water Act. A water quality certification (WQC-97-10) was issued by the State of Vermont's Agency of Natural Resources and was appealed to the Water Resources Board, who affirmed the Agency's certification. The decision of the Water Resources Board was then appealed to the Windsor Country Superior Court, which upheld the Water Resource Board's decision in 1999. The certification allowed for withdrawals for snowmaking from Woodward Reservoir, a proposed intake on Reservoir Brook, established new conservation flows below the intakes on the Ottauquechee River, Roaring Brook, and Falls Brook, and allowed for the construction of new trails in the 'Interconnect' area.

60. The section 404 permit was amended in 2000 to construct measurement stations at Falls Brook and Roaring Brook.

61. In addition to the section 404 Army Corps permit and associated water quality certification, the construction of the intake at Woodward reservoir required an Agency Shoreline Encroachment Permit (#97-26). The project was also issued a Land Use Permit #1R0813-2 which adopted the Agency's certification conditions.

62. Both the Water Quality Certification and Shoreland Encroachment Permit issued by the Water Resources Board included an expiration date of August 14, 2013. While this date has passed, these permits have remained in effect until a final determination on the pending applications could be made by the Agency pursuant to 3 V.S.A Section 814(b) and described in an extension letter dated August 29, 2013 issued by Vermont DEC.

Pico Mountain

63. Pico mountain is located in the headwaters of the Otter Creek, specifically in tributaries of Mendon Brook. The Otter Creek watershed drains roughly 963 square miles, and the mainstem is approximately 100 miles long, running from its headwaters in Bennington County in the Green Mountain National Forest to its terminus in Vergennes where it drains to Lake Champlain.

64. Pico Mountain has a summit elevation of 3,967 feet. The skiable terrain totals of 252 acres and is serviced by seven ski lifts.

65. Pico mountain was acquired by Killington in 1996, at which time Killington began to acquire permitting for trails interconnecting the two resorts.

66. The first Land Use Permit (1R0138-1) for snowmaking was issued in 1974, which authorized construction of an instream withdrawal and an earthen pond and dam.

67. An additional Land use Permit (1R0233) issued in 1976 allowed for the construction of the second earthen dam and reservoir.

68. Land Use Permit (1R0265-4) issued in 1985 authorized the construction of a second intake on Mendon Brook and associated infrastructure, including a pump station and piping near the entrance of the ski area.

69. Additional ski trails and snowmaking coverage on approximately 6 acres was permitted by Land Use Permit (1R0265-12) issued in 1994. This permit included withdrawal rates and maximum water withdrawal amounts for the snowmaking season, in addition to monitoring flows downstream of the Mendon Brook withdrawal location.

70. Land Use Permit 1R0265-12 was amended in 1995 by the Vermont Environmental Board to include a condition requiring Pico to complete an NAA with any future proposal to expand snowmaking. A draft NAA was submitted in 2000, however the NAA was not finalized because development plans were uncertain.

B. Existing Snowmaking Systems

Killington Mountain Resort

71. The existing Killington snowmaking system provides snowmaking coverage on 555 acres of terrain.

Falls Brook System

72. The withdrawal is constructed of a concrete weir, grade beam and 12-inch stoplogs, with a bypass orifice calibrated to pass the required conservation flow. The withdrawal is located above the Bear Mountain base area. The watershed area at the intake is approximately 1 square mile.

73. The orifice plate and stoplogs are currently installed no earlier than November 1 and removed prior to March 31. The withdrawal operates with a conservation flow of 0.8 csm, which is the statewide average February median flow (FMF). Flows above this level are gravity fed into Bear Mountain Pond, unless the reservoir is full.

74. Bear Mountain Pond has a storage capacity of approximately 1.5 Mgal. Water stored in Bear Mountain Pond is either pumped directly to the mountain for snowmaking or to Snowshed Pond.

75. The pumphouse for Bear Mountain Pond has three pumps with a total maximum capacity of 2,100 gallons per minute.

Roaring Brook System

76. The Roaring Brook withdrawal is located adjacent to the Rams Head base area. The Roaring Brook intake is constructed of a concrete weir, grade beam and 12-inch stoplogs, with a bypass orifice calibrated to pass the required conservation flow. Water flows by gravity through a 24-inch diameter pipe to Snowshed Reservoir.

77. The orifice plate and stoplogs are currently installed no earlier than October 15 and removed prior to March 31. The withdrawal operates with a conservation flow of 0.8 csm, the statewide average FMF. Flows above this level are gravity fed into Snowshed Reservoir, unless the reservoir is full.

78. Snowshed Reservoir has a capacity of 24 million gallons. The snowmaking intake is set 13 feet below full pond, and a fire pump intake is set 14 feet below full pond. The lower elevation of the invert of the fire pump intake provides approximately 2.5 million gallons for fire suppression.

Ottauquechee River System

79. The Ottauquechee River intake is located adjacent to the Gondola base area.

80. Withdrawal of water can begin on November 1 and occur through March 31. The current conservation flow as permitted is 0.98 csm.

81. The Ottauquechee River system does not have a separate storage reservoir, but water can be pumped to either the Snowshed or Bear Mountain reservoirs or used directly for snowmaking.

82. The pump house for the Ottauquechee River is located along Vermont Route 4. This pumphouse has two pumps with a maximum withdrawal rate of 1,000 gpm.

83. The withdrawal is regulated using real-time data from the U.S. Geological Survey Ottauquechee River gage, which is located a short distance upriver. This ensures downstream conservation flows are met.

84. More recently, operation of the Ottauquechee system has been less reliable due to excessive sediment deposition, ice, and other maintenance issues related to the age of the system.

Woodward Reservoir System

85. The Woodward Reservoir water intake and below-grade siphon house is located on the west shore of the reservoir adjacent to Vermont Route 100, between the Department of Fish and Wildlife access area and the dam.

86. The Woodward Reservoir intake consists of a 24-inch diameter welded steel pipe (inlet invert at 1328 feet msl), a 2-inch steel pipe for priming the system, and a 12-inch steel pipe to supply water to a fire hydrant located beside Vermont Route 100 for municipal firefighting purposes.

87. An intake filter box is located at the end of the pipes, constructed as an angle iron frame with the five open sides covered with an expanded metal screen with 2-inch by 3-inch openings. The intake is 8-feet wide by 4-feet long by 3-feet high. The top of the intake is approximately 15 feet below the normal summer water level. The intake operates via siphon and gravity, though a small pump exists to prime the system.

88. The intake is connected to the existing Killington snowmaking system by 10,300 feet of 24-inch diameter steel pipe that delivers water to the Woodward Reservoir Pumphouse, located along Route 100 in West Bridgewater. Four, 600-horsepower pumps provide a withdrawal rate up to 6,000 gpm (gallons per minute). This pumphouse pumps water to the Falls Brook and Roaring Brook snowmaking systems.

89. From the pumphouse, water is transferred over an approximately 5-mile route to Killington's snowmaking system, where it can be used to refill the Bear Mountain Pond or Snowshed Pond storage reservoirs.

90. The current required conservation flow out of Woodward Reservoir into Reservoir Brook is 0.8 csm, the statewide average FMF. An outlet structure in Woodward Reservoir ensures the release of the 0.8 csm conservation flow. Killington records

the water level of Woodward Reservoir with a pressure transducer.

91. The reservoir is drawn down annually via the snowmaking intake. Current permits restrict use of Woodward Reservoir until after November 1.

92. As currently permitted, Woodward can be drawn down up to 12 feet, with ranges of drawdown depth to not exceed prescribed frequencies. The magnitude and frequency of drawdown allowed is shown in the table below:

Table 1. Magnitude of drawdown and frequency of occurrence as permitted (WQC-97-10).

Drawdown Range (feet)	Frequency of Occurrence
-0.0 to -2.0	100%
-2.1 to -4.0	67%
-4.1 to -6.0	53%
-6.1 to -8.0	40%
-8.1 to -10.0	27%
-10.1 to -12.0	13%

93. Winter use of the reservoir for snowmaking occurs under the terms of a lease agreement executed between the applicant and the dam owner, the Farm and Wilderness Foundation, Inc. on August 18, 1997. Under the terms of the agreement, the applicant will have lease rights through December 31, 2012 and an option to renew the agreement for up to three terms of 25 years each. The lease agreement between Farm and Wilderness and the applicant dictates the March 15 deadline for suspension of snowmaking withdrawals from the reservoir, but does not specify the date for commencement of snowmaking withdrawals. It does not obligate Farm and Wilderness to provide the applicant with a full reservoir at the beginning of the snowmaking season. The agreement allows Farm and Wilderness to require the applicant to cease use up to 15 days earlier than March 15 in specific years when refill to elevation 1345.5 feet mean sea level (the crest of the principal spillway) by June 1 is expected to be a problem without an earlier start. June 1 is considered by Farm and Wilderness to be the beginning of the summer camp season. Under the lease, Farm and Wilderness may also allow use to extend past March 15 in any given year. The lease does not appear to be clear with respect to whether the applicant's management of the dam would start on a fixed date each year or start on the first date of snowmaking water withdrawals.

Pico Mountain Snowmaking System

94. The existing Pico snowmaking system provides snowmaking coverage on 162 acres of terrain.

Mendon Brook System

95. There are two withdrawal structures located on Mendon Brook, an upper intake and a lower intake.

96. The upper intake weir is located below the first culvert and behind the triple chair lift. The upper intake is a gravity flow through structure. It has an 8-inch steel pipe that conveys flow through a splitter box. This box allows water to be directed to either the Upper Pond or Lower Pond.

97. The upper intake has a required conservation flow of 0.12 csm. Currently there is no mechanism in place structurally to assure a continuous bypass of 0.12 csm. This is done by manual observation and operation of the intake.

98. The lower intake is located near the entrance driveway to Pico Mountain and is outfitted with a pipe installed at the withdrawal structure to pass the conservation flow. As permitted, the pumphouse was to have seven trees panted around it for partial screening.

99. The lower intake as currently permitted requires a conservation flow of 0.5 csm.

100. The lower intake has two pumps installed. The maximum combined rate for the two pumps is 500 gpm. From the pumps the water is either sent directly to on mountain snowmaking or to one of the two existing reservoirs, Upper Pond and Lower Pond.

101. The upper pond is the most western pond, and the lower pond is the more eastern pond. The reservoirs were constructed in the 1970's and have a combined approximate storage of 6 Mgal.

102. The reservoirs are fed by both the natural runoff from the upslope land (approximately 0.5 square miles) in addition to the withdrawal structures located on Mendon Brook.

103. The upper pond contains an 18-inch diameter culvert where overflow water can flow to the lower pond. The lower pond also has an outlet structure for conveying overflows.

C. Project Proposed by the Applicant

104. The applicant proposes to improve the reliability of the Killington snowmaking system by relocating the existing intake on the Ottauquechee River and increasing snowmaking coverage; supplement irrigation needs by withdrawing water outside of the winter period; and increase access to water for snowmaking at Pico by constructing a pipeline that would interconnect the Killington and Pico snowmaking systems.

105. The proposed project is intended to service existing terrain with snowmaking coverage and support a near term build out scenario that would provide snowmaking coverage on additional 110 acres at Killington Mountain Resort. The near term build out scenario does not propose to expand the acreage of terrain covered by snowmaking at Pico Mountain.

106. As part of the proposed snowmaking system expansion and interconnection, the applicant proposes to maintain or increase conservation flows at the existing

snowmaking water sources. The applicant also proposes to modify the previously permitted water level management regime for Woodward Reservoir. These changes are described in detail below:

Killington Mountain Resort

Falls Brook System

107. The applicant proposes to maintain a conservation flow below the intake equal to the site-specific February median flow, calculated to be 1.52 csm (1.91 cfs) beginning with the next snowmaking season.

108. The applicant proposes to allow a withdrawal start date of October 15.

Roaring Brook System

109. The applicant proposes to maintain a conservation flow below the intake equal to the site-specific February median flow, calculated to be 1.91 csm (2.85 cfs) beginning with the next snowmaking season.

110. The applicant proposes to maintain the current withdrawal start of October 15.

Ottauquechee River System

111. The applicant proposes to relocate and reconstruct the intake. The intake would be located approximately 300 feet downstream of the current location in an area more conducive to sediment transport that would reduce deposition and the associated maintenance needed to improve dependability.

112. The proposed intake structure would be set on a pre-cast trapezoidal concrete slab approximately 15 feet long, 5 feet wide, and 12-inches thick on top of a compacted crushed stone bed. The concrete slab will sit slightly above the stream bed elevation. The proposed intake structure is approximately 6 feet long by 2 feet wide and would include a 12-inch intake pipe and a 1.5-inch air blast pipe to dislodge any accumulated material from the screen. A 4-inch air bubbler line would be installed around the perimeter of the concrete slab to prevent the river from freezing around the immediate area of the intake.

113. The applicant proposes to operate the relocated intake outside of the snowmaking season to augment irrigation needs. The applicant has proposed to maintain a conservation flow equal to the site-specific seasonal median flow below the intake when it is in operation. These seasonal conservation flows are identified in the table below:

Table 2. Applicant proposed conservation flows below the Ottauquechee River intake.

Season	Conservation Flow (csm)
Winter (October 1- March 31)	1.03
Spring (April 1- May 31)	3.46
Summer (June 1- September 30)	0.57

114. The applicant proposes to remove the existing intake from the river and existing piping will be removed to a minimum of five feet beyond the top of bank.

Woodward Reservoir System

115. The applicant proposes to commence use of Woodward Reservoir beginning on October 15th of each year.

116. The applicant proposes to modify the currently permitted drawdown regime to aim to observe the magnitudes and frequencies of drawdown specified below:

Table 3. Proposed Normal Drawdown Regime

Maximum Drawdown Magnitude	Frequency
2 feet	100% of years
4 feet	50% of years

117. In cases where these magnitudes and frequencies are not observed, the applicant proposes to conduct the following actions:

Table 4. Proposed Action for Drawdowns outside of Normal Drawdown Regime

Drawdown (ft)	Frequency	Action Item
More than 2, but less than 4	> 50% of years	Drawdown Assessment
More than 4, but less than 5	Each occurrence	Drawdown Assessment
More than 5	Once	Drawdown Assessment and NAA

118. The applicant proposes to incorporate information collected from any drawdown assessments conducted pursuant to Finding 117 into an Adaptive Management Protocol that could modify allowed drawdown depths the reservoir either upward or downward in half-foot intervals after two consecutive positive or adverse findings.

119. The applicant proposes to maintain the current conservation flow below Woodward Reservoir into Reservoir Brook of 0.8 csm, the statewide average FMF.

120. The applicant proposes to develop a method to estimate inflows into Woodward Reservoir. This will be used to create a site-specific February median flow for Reservoir Brook in the future.

Pico Mountain

121. The applicant is proposing to utilize additional water that is available at Killington Mountain Resort and transfer it to Pico Mountain on an as needed basis. This

requires the construction of a pipeline between the two snowmaking systems.

Mendon Brook

122. The applicant is proposing a schedule for increasing the conservation flow below the intakes on Mendon brook, however, the NAA was silent on flow monitoring in Mendon Brook, which will be necessary to calculate a site-specific FMF at the time of the next NAA.

123. The applicant proposes implementing a 0.5 csm conservation flow below the upper intake on Mendon Brook within five years of permit issuance. The applicant proposes to remove the Upper Mendon Brook intake once the new connected pipeline is constructed and operational. This will increase the water available at the lower intake and reduce the number of locations where flow alteration occurs and where flow monitoring is necessary. For the lower intake, once the interconnected pipeline is built and operational, the conservation flow below Lower Mendon Brook intake will increase to 0.8 csm, the statewide average FMF.

Interconnection of the Snowmaking Systems

124. The applicant proposes to construct a pipeline that would 'interconnect' the Killington and Pico snowmaking systems. As proposed, approximately 17,000 feet of 8-inch diameter steel pipe will carry water from the Killington resort to the Pico resort via the Killington/Pico Interconnect trail.

Other Proposed Changes

125. The applicant will agree to remove any infrastructure when it is no longer used for snowmaking.

126. Given the movement of transferring water between basins, the applicant is willing to consider additional measures should a new aquatic invasive species, or disease organism become established in Ottauquechee River, Falls Brook, Roaring Brook, or Woodward Reservoir, and have the potential to survive the snowmaking process.

127. The previous 401 included conditions regarding water source prioritization. The applicant is proposing to continue to assign a higher use priority to Falls Brook, Roaring Brook, and the Ottauquechee River relative to Woodward Reservoir to the extent feasible given conservation flow requirements, pumping limitations, operational constraints/status, and inflow conditions.

D. Hydrology and Flow Regulation

Rivers and Streams

128. With the exception of the applicant's snowmaking water withdrawals, the flow of the Ottauquechee is unregulated above West Bridgewater. The flow of Reservoir Brook is unregulated between the completion of the reservoir refill in the spring and the commencement of the drawdown in the fall.

129. Aside from Killington's water withdrawal, other flow altering activities include sewage treatment plants in Woodstock, Taftsville, Quechee, and South Woodstock, as well as the North Hartland Flood control dam. Several other dams are located on the Ottauquechee River including the Taftsville, Quechee Mills, and Dewey Mills hydroelectric projects.

130. Several streams are directly affected by the applicant's proposal. These streams are in the headwaters of the Ottauquechee River basin in the case of Killington Mountain Resort and Otter Creek in the case of Pico Mountain, originating in upland areas that are either forested or developed for alpine skiing. Hydrologic statistics were collected from USGS gage 01150900 on the Ottauquechee River and prorated for each intake location and are enumerated below:

Table 5. Hydrologic statistics for the streams affected by Killington/Pico snowmaking system operations.

	Killington Mountain				Pico Mountain	
	Roaring Brook	**Falls Brook**	**Ottauquechee River**	**Reservoir Brook**	**Upper Mendon Brook**	**Lower Mendon Brook**
Drainage Area (Sq. miles)	1.49	0.95	23.7	2.92	0.37	1.21
Annual Runoff (inches)	2.2	1.4	35.3	4.3	0.6	1.8
10% Exceedance Flow (cfs)	8.3	5.3	131.7	16.2	2.1	6.7
50% Exceedance Flow (cfs)	2.2	1.4	34.2	4.2	0.5	1.7
90% Exceedance Flow (cfs)	0.6	0.4	10.1	1.2	0.2	0.5
7Q10 (cfs)	0.2	0.1	3.2	0.4	0.0	0.2

131. The applicant has proposed the following schedule of conservation flow values:

Table 6. Conservation Flows Proposed for all intakes

Source	**Drainage Area (sq. mi.)**	**Conservation flow (csm)**	
		Current	**Proposed**
Killington			
Roaring Brook	1.6	0.8	1.52
Falls Brook	1.5	0.8	1.91
Ottauquechee (Winter)	23.7	0.98	1.03
Ottauquechee (Spring)	23.7	NA	3.46
Ottauquechee (Summer)	23.7	NA	0.57
Reservoir Brook (Woodward)	2.9	0.80	0.8
Pico			
Mendon- Lower		0.50	0.8

Lakes, Ponds, and Reservoirs

132. Off stream reservoirs are not subject to Vermont Water Quality Standards per section 29A-101 (d)(1). The only on-stream reservoir that is part of the Killington /Pico snowmaking system is Woodward Reservoir.

133. Woodward Reservoir was originally known as Bishops Pond. The natural pond was enlarged through the construction of a dam as early as the mid- 1800s. A dam was constructed around the turn of the century to store water for use by the Bridgewater Woolen Company, located on the Ottauquechee River in the town of Bridgewater. This dam was a stone and earthfill structure, and a concrete face was added on the upstream side in the 1920s.

134. The dam described above was acquired by Farm and Wilderness Camps about 50 years ago, along with much of the shoreline property on the east side of the reservoir. In 1983, the dam was rebuilt as a zoned earthfill structure. The project was authorized by Dam Order No. 82-5 issued by the Department on June 13, 1983.

135. Woodward Reservoir has a surface area of about 110 acres, a maximum depth of 48 feet and a mean depth of 22 feet. The estimated volume is approximately 690 Mgal. The drainage area at the outlet is 2.9 square miles.

136. The applicant has developed the reservoir stage/storage relationship in the Table 7. “Depth” is the vertical distance from the spillway crest (elevation 1345.5 feet msl at full pool) to the drawdown water surface.

Table 7.Woodward Reservoir Stage/Storage Relationship

Depth Below Full (feet)	Surface Area (acres)	Cumulative Volume (Mgal)
0	110	812
1	107	788
2	103	743
3	102	710
4	99	677
5	98	644
6	96	613
7	95	582
8	93	551
9	92	522
10	89	493
11	79	465
12	77	438

137. Killington began using the reservoir for snowmaking after issuance of the 1997 Water Quality Certification. During the snowmaking period, the reservoir level varies based on Killington’s snowmaking water demand, water availability from other sources, and natural inflows to the reservoir.

138. Over the past 18 snowmaking seasons (years 2000-2018), Killington has used less water than is currently permitted. The maximum drawdown utilized by Killington and the frequency of occurrence is shown below:

Table 8. Magnitude of maximum drawdown that has occurred in Woodward Reservoir between 2000-2018.

Drawdown Range (feet)	Frequency of Occurrence
-0.0 to -0.5	100%
-0.5 to -1.0	62%
-1.0 to -1.5	34%
-1.5 to -2.0	23%
-2.0 to -2.5	17%
-2.5+	6%

139. Refill of the reservoir begins when snowmaking use ends and inflows to the reservoir exceed the downstream conservation flow release. The last 18 snowmaking seasons, and Killington's last day of water withdrawal from Woodward are listed below:

Table 9. Date of last Woodward Reservoir withdrawal for the last 18 snowmaking seasons.

Snowmaking Season	Last Date of Water Withdrawal
2000-2001	3/4/2001
2001-2002	3/23/2002
2002-2003	2/7/2003
2003-2004	3/12/2004
2004-2005	3/5/2005
2005-2006	3/20/2006
2006-2007	2/5/2007
2007-2008	1/4/2008
2008-2009	2/25/2009
2009-2010	2/23/2010
2010-2011	1/30/2011
2011-2012	2/20/2012
2012-2013	2/17/2013
2013-2014	2/26/2014
2014-2015	2/28/2015
2015-2016	2/23/2016
2016-2017	2/17/2017
2017-2018	3/17/2018

140. Refill is an important consideration of the water level fluctuation regime due to the presence of spring spawning species, including rainbow smelt, which spawn early in the spring. Spawning periodicity for smelt is normally associated with the timing of ice out, which can vary substantially from year to year and in different climatic zones of the state.

Alternatives Analysis

141. The applicant submitted a Needs and Alternatives Analysis (NAA) to identify the preferred alternative for changes sought to the Killington/Pico snowmaking system. The final analysis was filed with the Department on March 8, 2019. To supplement the NAA additional memos were filed including Woodward Reservoir Habitat Assessment (February 15, 2019) and Mendon Brook Channel Integrity Assessment and Snowmaking Meltwater Runoff Analysis (February 15, 2019).

142. The NAA was created to support increased conservation flows for Killington Resort and improve the viability of both Killington and Pico ski areas. For the purposes of determining seasonal conservation flows for the Ottauquechee River intake, data from U.S. Geological Survey gaging stations for Ottauquechee River near West Bridgewater, Vermont (Gage No. 01150900) was used.

143. The Ottauquechee River gage has a period of record from 1985 to the present, the most recent 30 years from the gage were used. The watershed area at the gaging station is 23.4 square miles, therefore the flows were prorated to the slightly larger watershed at the intake of 23.8 square miles.

144. For both intakes at Falls Brook and Roaring Brook, site-specific FMFs were determined using measured flows above the intake for years 2001-2018. These flows were required to be measured by Condition C, I, and K of the 1997 water quality certification.

145. Acceptable gaging data to determine a site-specific FMF for Mendon Brook does not exist, so the statewide FMF was recommended. The applicant proposes to implement the statewide FMF in two steps. First increasing the lower intake to 0.5 csm for the 2019-2020 snowmaking season, and in the second step increasing both intakes to the statewide average of 0.8 csm once the snowmaking systems are connected and operational.

146. As part of the NAA the applicant also completed a Mass Hydrograph analysis which included the updated FMF's for all intake structures and resulting available water to evaluate different scenarios that may meet the anticipated water needs for Killington and Pico.

147. Historic water use from 2005 to 2015 was on average 0.83 Mgal/acre and 0.23 Mgal/acre for Killington and Pico respectively. The maximum water use occurred in the 2013/2014 snowmaking season which was 1.0 Mgal/acre for Killington and 0.3 Mgals for Pico. This coverage was for 555 acres of ski terrain on Killington and 162 acres of ski terrain on Pico. The applicant used the maximum water used 1.0 Mgal/acre in the remainder of the Hydrograph analysis to estimate water need

for Killington and Pico.

148. The applicant in the Mass Hydrograph analysis also included a near term buildout scenario for Killington that would provide snowmaking coverage on an additional 110 acres. No additional snowmaking coverage is proposed for Pico in the near-term buildout scenario. As a result, the proposed near-term total snowmaking coverage for Killington and Pico is 827 acres of ski terrain.

149. The applicant had previously evaluated a variety of other water sources on Pico. These included, nearby lakes and ponds, groundwater and public water systems, in addition to 19 other storage reservoir development sites. It was determined that the most feasible option would have been an estimate 79 Mgal reservoir located on the Rutland City Forest/VTrans garage site. This however was found to be limited in feasibility. Therefore, the applicant has proposed interconnecting the Pico and Killington Snowmaking Systems.

150. The applicant evaluated use of Roaring Brook, Falls Brook, Woodward Reservoir, Ottauquechee River, and Mendon Brook. The preferred alternative identified in the analysis is to continue to utilize the current intakes on the above-mentioned streams and Woodward Reservoir, and a pipeline connecting the two snowmaking systems. Under the preferred alternative, Killington and Pico as modeled by the applicant is predicted to nearly meet the 80/80 target with the estimated water demand, and increased conservation flows.

Killington Mountain Resort

Falls Brook System

151. The Falls Brook system is also an expanded existing system under Section 16-07 of the rule.

152. The flow monitoring conducted by the applicant provides acceptable flow data to calculate a site-specific February median flow. The site specific FMF from the data collected at the site is 1.52 csm. The applicant proposes to implement this new conservation flow 2019-2020 snowmaking season.

Roaring Brook System

153. The Roaring Brook system is another expanded existing system under Section 16-07 of the rule.

154. The flow monitoring conducted by the applicant provides acceptable flow data to calculate a site-specific February median flow. The site specific FMF from the data collected at the site is 1.91 csm. The applicant proposes a site-specific conservation flow standard of 1.91 csm. The applicant proposes to implement this new conservation flow 2019-2020 snowmaking season.

Ottauquechee River System

155. The Ottauquechee River system is an expanded existing system under Section 16-07 of the rule.

156. The USGS gage in West Bridgewater provides acceptable flow data to calculate a site-specific February median flow. The applicant has calculated the site-specific FMF to be 1.03 csm. The applicant proposes to implement a conservation flow equal to the site-specific FMF for 2019-2020 snowmaking season.

Woodward Reservoir System

157. The Woodward Reservoir system is categorized as an expanded existing system under Section 16-07 of the rule.

158. The applicant's proposal includes a provision to maintain a guaranteed flow of 0.80 csm, the statewide average FMF, into Reservoir Brook.

159. The applicant is proposing to monitor inflows to estimate a new site specific FMF after 10 years for Reservoir Brook.

Pico Mountain

Mendon Brook System

160. The Mendon Brook System is an expanded existing system under Section 16-07. The applicant proposes to increase conservation flows to the statewide average in two steps.

161. The first is to increase the upper intake to 0.5 csm starting snowmaking year 2019-2020. Once the interconnect pipeline is complete and operational both the upper and lower intakes on Mendon Brook will increase to a conservation flow of 0.8 csm. The applicant did not speak to continued monitoring of flows on Mendon Brook for an updated site specific FMF.

E. Current Status

162. The Department concurrently issued as six-part list, List of Priority Surface Waters in 2018.Waters affected by the project are identified on the 2018 State of Vermont Priority Waters Lists.

163. Roaring Brook River mile 3.5 to river mile 4.2 is listed on Part A of the List of Priority Surface Waters as impaired. Part A of the 2018 list identifies impaired surface waters where a total maximum daily load (TMDL) is required. This segment of Roaring Brook is identified as impaired for aquatic life use support and aesthetics due to stormwater from stormwater runoff, land development, and erosion.

164. East branch Roaring Brook from River mile 0.1 to river mile 0.6 is listed on Part A of the List of Priority Surface Waters as impaired. Part A of the 2018 list identifies impaired surface waters where a total maximum daily load (TMDL) is required. This segment of East branch of Roaring Brook is identified as impaired for aquatic life use support and aesthetics due to stormwater and iron from stormwater runoff, land development, and erosion.

165. 3.3 miles of Mendon Brook is listed on Part F of the List of Priority Surface Waters. Part F of the 2018 list identifies surface waters where aquatic habitat and/or other designated are not fully supported due to flow regulation. This segment of Mendon Brook for is listed as altered for aquatic life use support due to insufficient flow below Pico's snowmaking water withdrawals.

166. The Department issued a Stressed Waters List in 2016. The Stressed Waters List includes waters where a stressor prohibits the waters from attaining a higher water quality. Waters affected by the project are identified on the 2016 State of Vermont Stressed Waters List.

167. Upper Roaring Brook and the West branch are identified on the 2016 State of Vermont Stressed Waters List. These segments are listed as stressed for aquatic life use support and aesthetics due to sediment with land development, erosions, and road runoff identified as the surface water quality problem.

168. Tributary #4 of Falls Brook (0.4 miles) is identified on the 2016 State of Vermont Stressed Waters List. This segment of Falls Brook is listed as stressed for aquatic life use support due to sediment with land development, erosion, and streambank destabilization identified as the surface water quality problem.

F. Water Chemistry

Killington Mountain Resort

Falls Brook

169. Water chemistry metrics have been collected on Falls Brook by the Department. In the upper portion of Falls Brook located just upstream of the water withdrawal location three years of data have been collected and are displayed below:

Table 10. Metrics recorded from upper portion of Falls Brook. These metrics were recorded for 3 years by the Vermont Department of Environmental Conservation's Biomonitoring program

Year	Conductivity (umho/cm)	pH
1997	59.1	7.51
1998	58.8	7.51
1999	63.6	6.92

170. Shortly upstream of the confluence with the Ottauquechee River several sampling events occurred from 2010 -2015. A summary of those metrics is provided below:

Table 11.Metrics recorded from Falls Brook at various times between 2010 and 2015 by the Vermont Department of Environmental Conservation's Biomonitoring program

Characteristic	Description	Maximum Recorded	Mean	Minimum Recorded
Phosphorus (ug/L)	Nutrient that may fuel algae blooms	23.1	9.8	5.0
Chloride (mg/L)	At elevated values mostly from deicing	37.9	17.8	9.4
E. Coli (#/100ml)	Indicator of pathogens	1553.0	97.7	2.0
Nitrogen (mg/L)	Nutrient that may fuel algae blooms	0.6	0.4	0.3
Turbidity (NTU)	Measure of suspended sediment	5.0	1.3	0.4

Roaring Brook

171. There has been data collection on Roading Brook at a variety of sampling locations since 1989. This data was retrieved from the Vermont Integrated Watershed Information System. The most recent data, collected in 2014 in the headwaters, were as follows: Conductivity 57.9 umho/cm; pH of 7.67; <2 mg/l Chloride; Total nitrogen 0.38 (ug/L); total phosphorus 9.03 (ug/L); and turbidity levels of 0.2 NTU.

172. Slightly further downstream on the Roaring Brook a site was sampled in 2016. The water chemistry parameter and values were: chloride 74.0 mg/L, conductivity 437.6 (umho/cm), nitrogen 0.5 (mg/L), phosphorus 9.4 (ug/L) and turbidity of 0.2 (NTU).

Ottauquechee River System

173. On the Ottauquechee River downstream of the intake at Rabeck Rd. numerous sampling occasions have occurred between 2010 and 2016. Except for 2012 the site was visited at least 5 times. A summary of those metrics is provided below:

Table 12. Metrics recorded from the Ottauquechee River at Rabeck Rd. between 2010 and 2016 by Vermont department of Environmental Conservation Monitoring program.

Characteristic	Description	Maximum Recorded	Mean	Minimum Recorded
Phosphorus (ug/L)	Nutrient that may fuel algae blooms	114.0	24.9	10.1
Chloride (mg/L)	At elevated values mostly from deicing	54.0	34.0	15.9
E. Coli Bacteria (#/100ml)	Indicator of pathogens	2420.0	216.5	10.0
Nitrogen (mg/L)	Nutrient that may fuel algae blooms	0.5	0.3	0.2
Turbidity (NTU)	Measure of suspended sediment	10.5	2.4	0.6

Woodward Reservoir

174. Woodward Reservoir has been monitored at various times since 1979. More recent data, since the last issuance a Water Quality Certificate in 1997, has been collected at a station in the venter of the northern half of the reservoir. The following metrics were available and a shown in table 9 below.

Table 13. Metrics recorded from Woodward Reservoir at various times since 1997 the center of the northern portion of the reservoir by Vermont Department of Environmental Conservation Monitoring program.

Characteristic	Description	Maximum Recorded	Mean	Minimum Recorded
Total Phosphorus (ug/L)	Nutrient that may fuel algae blooms	11.0	8.55	6.70
Secchi Transparency (m)	Measurement of transparency in lakes	5.3	4.54	1.20
Total Nitrogen	Nutrient that may fuel algae blooms	0.37	0.34	0.32

Pico Mountain

Mendon Brook

175. Mendon Brook, identified as Pico West in the Vermont Department of Environmental conservation monitoring program, has collected various metrics in the years 1997-1999. Table 14 lists these metrics and values for each sampling year.

Table 14. Metrics recorded from Pico West (Mendon Brook) located below ski lift line. These metrics were recorded for 3 years as part of the Monitoring Program.

Year	Conductivity (uS/cm)	pH
1997	30.1	7
1998	29.8	7.28
1999	35.1	6.86

Interconnect Pipeline

176. The interconnect pipeline will transfer water from the Ottauquechee River in the Connecticut River drainage basin to Otter Creek in the Lake Champlain drainage basin.

177. The concern of the transferring phosphorous to the Lake Champlain drainage basin along with the water was raised at the informal flow conference. In response, the applicant prepared a memorandum addressing this concern.

178. In a memo to supplement the 2019 Needs and Alternatives Analysis, dated May 15, 2019, the applicant addressed the concern of additional phosphorus into the Otter Creek basin. The applicant concluded that with the anticipated amount of water being transferred (51.2 Mgals) would result in an increase of 3.98 pounds or a

0.001% increase in the annual phosphorus budget of the Otter Creek watershed.

G. Aquatic Biota

179. "Aquatic biota" means all organisms that, as part of their natural life cycle, live in or on waters. (Standards § 29A-102(5). For example, fish, aquatic insects, amphibians, and some reptiles, such as turtles.

Killington Mountain Resort

Falls Brook

180. Brook, brown and rainbow trout are found in the lower reach of Falls Brook.

181. Falls Brook was identified in the 2018 Tactical Basin Plans as having a very high quality recreational trout fishery and is considered a cold water fishery.

182. Vermont Department of Environmental Conservation's biomonitoring program has collected Macroinvertebrate assessment data between 1997-1999 on Falls Brook. The assessment had a metric of very good for all years the location was assessed.

Roaring Brook

183. The Department of Fish and Wildlife has documented wild brook trout populations in Roaring Brook, and it is considered a cold water fishery. Brown and rainbow trout are found near its confluence with the Ottauquechee River, and spawning takes place in the lower reach.

184. Roaring Brook was identified in the 2018 Tactical Basin Plans as having a very high quality recreational trout fishery.

185. In the most recent Tactical basin Plan, Roaring Brook has been recommended for further assessment to verify conditions for reclassification from Class B(2) to Class B(1) for the fishing designated use.

186. There have been data collections on Roaring Brook at a variety of sampling locations since 1989 and these sampling results were retrieved from the Vermont Integrated Watershed Information System and reviewed by the Department.

187. Recent data collected in 2014 in the West tributary of Roaring Brook resulted in a macroinvertebrate community assessment of good, although the assessment report indicates that the percent Oligochaeta were moderately elevated indicating sediment stress. A concurrent fish assessment had a poor assessment outcome due to low densities.

188. More recent data on the macroinvertebrate community assessment from the East Tributary of Roaring Brook indicated good to very good for the lower area of the tributary within the Killington golf course in 2014. However, a 2018 assessment in the mid area of the Killington golf course resulted in an assessment of Fair for the macroinvertebrate community due to the lack of functional feeding groups.

189. Further downstream on Roaring Brook, and below the resort, a location off Dean Hill Road was sampled in 2016 based on a random probabilistic selection. The macroinvertebrate community assessment was rated good-fair.

Ottauquechee River

190. Brook, brown, and rainbow trout are found in the Ottauquechee River within the project area, with brown trout being most abundant.

191. The Ottauquechee basin supports a wide variety of fish species including both cold and warm water species. Specifically, in the headwaters the Ottauquechee supports rainbow smelt, and wild brook trout, species indicative of a cold water fishery. Lower in the mainstem of the Ottauquechee Vermont Fish and Wildlife Department stocks trout as part of a put and take fishery.

192. Two macroinvertebrate assessments were done on the Ottauquechee upstream of the confluence with Roaring Brook in 2010. Both samples resulted in a macroinvertebrate community assessment rating of Very Good.

Woodward Reservoir and Reservoir Brook

193. Woodward Reservoir is populated by brown and rainbow trout, yellow perch, rainbow smelt, largemouth and smallmouth bass, northern pike, chain pickerel, and several non-game fish species. Yellow perch are the dominant species but are generally small in size. The other warm-water game fish are only present in small numbers. Brown and rainbow trout are stocked annually by the Department of Fish and Wildlife to provide a put-grow-and- take fishery. Records indicate that the Department of Fish and Wildlife has stocked rainbow trout since at least 1964 and brown trout since 1977. Smelt were introduced by the Department of Fish and Wildlife in 1972-74. The smelt are an important food source for other species, with the potential to contribute significantly to the survival and growth rates of brown and rainbow trout.

194. Smelt spawn in the tributaries of lakes and ponds, usually shortly after ice- out. In some locations, smelt are known to spawn along lakeshores; however, there is no documented shoreline smelt spawning in Woodward Reservoir. Ice-out timing varies from year to year, but generally can be expected to occur sometime between mid-April and early May. Smelt spawn over a one or two week period, and the eggs incubate for about 7 to 10 days, depending on water temperature. Smelt spawn in the main reservoir tributary, an unnamed brook which enters the reservoir from the west after crossing Vermont Route 100. It is also possible that another small tributary on the east side of the reservoir is used, but observations have not been made by the Department of Fish and Wildlife, mostly due to difficult access. Observations of smelt spawning and egg incubation by the Department of Fish and Wildlife indicate that most smelt spawning occurs in the main tributary from late April to early May. When reservoir levels have been low as a result of past drawdowns during the smelt spawning period, smelt have spawned in the remnant stream channel that is then inundated upon refill of the reservoir. Eggs were killed by sunlight because they were laid in the unshaded portion of the reservoir, or by silt deposited on the eggs as the reservoir refilled.

195. Woodward Reservoir does not support extensive aquatic plant communities throughout the entire littoral area, however, robust plant growth generally occurs near tributary inlets and coves. A sonar survey conducted by the Water Quality Division in 2018 documented the presence of vegetation. Of the 8902 collected points, 14% indicated that some type of vegetation was present. Another survey conducted by the applicant in 2018 and submitted in a report in 2019 (Woodward Reservoir Habitat Assessment) encountered few macrophytes.

196. Reservoir Brook is a productive brown trout stream and is one of the two best brown trout fisheries in the Ottauquechee basin. The stream also supports brook trout and rainbow trout; rainbow trout are known to use the lower reach of Madden Brook for spawning. Brown trout from the Ottauquechee River run up Reservoir Brook to spawn.

Pico Mountain

Mendon Brook

197. Mendon Brook is classified by the state of Vermont as Class A(1) for the portion that is above 2,500 feet, and Class A(2) for the portion that is below 2,500 feet for the aquatic habitat designated uses.

198. It is anticipated that Mendon Brook would have a similar fishery as other high gradient mountain stream (i.e. Brook Trout).

199. Mendon Brook, identified as Pico West in the Vermont Department of Environmental conservation monitoring program, has collected macroinvertebrate assessment data between 1997-1999. The assessment had the following metrics for each year; very good, excellent, and fair for each year 1997, 1998, 1999 respectively.

Protection Measures for Aquatic Biota

200. The intake screen for the Ottauquechee withdrawal pipe will be ¼ inch slats.

201. As raised by the Fish and Wildlife Department in the course of reviewing the applicants proposal and also raised by stakeholders at the flow conference and in subsequent comments, the applicant's proposal to transfer water from the Connecticut River Basin into the headwaters of the Lake Champlain Basin, poses risk that the activity may act as a vector for moving unwanted organisms (fish pathogens and/or invasive species that may adversely affect aquatic biota) from one drainage basin to the headwaters of another.

202. The applicant contends pathogens and aquatic invasive species are unlikely to survive the snowmaking process, which involves freezing during the snowmaking process, followed by exposure to sub-freezing temperatures for weeks to months on a ski trail, prior to melting and infiltrating to soils and/or running off into the Mendon Brook. Though the applicant recognizes if in the future, new aquatic invasive species or disease organisms become established in the Ottauquechee River, Falls Brook, Roaring Brook, or Woodward Reservoir that have the

potential to survive the snowmaking process, it may be necessary for the resort to implement additional measures to prevent their spread to the Mendon Brook watershed.

203. The Fish and Wildlife Department expects the risk of introducing invasive and/or pathogens to be low if (i) water movement is confined to winter only and (ii) all water moved to Pico Peak is aerosolized/frozen and applied directly as snow during the ski season, rather than allowed to drain into Mendon Brook. The Fish and Wildlife Department believes the risk can be virtually eliminated through a combination of seasonal and operational restrictions (i and ii noted above) and monitoring and containment/treatment measures focused on the ponds.

H. Aquatic Habitat

204. "Aquatic habitat" means the physical, chemical, and biological components of the water environment (Standards § 29A-102(6)). For example, aquatic plants, woody debris, and an adequate flow or water level fluctuation regime.

Hydrologic Conditions Necessary to Support Aquatic Habitat

Streamflow Protection

Falls Brook and Roaring Brook

205. These water sources have acceptable flow records for calculating site-specific February median flows. Pursuant to Section 16-03 of the Rule, conservation flows equal to site-specific February median flows would be needed to attain the general standard established by the Rule.

Ottauquechee River

206. This water source has an acceptable flow record for calculating site-specific February median flows. Pursuant to Section 16-03 of the Rule, the site-specific median flow would be needed to attain the general standard established by the Rule.

207. Outside of the fall/winter snowmaking period, flows equal to the summer and spring medians would be acceptable pursuant to the *Agency Procedure for Determining Minimum Flows*.

Reservoir Brook

208. This water source does not have acceptable flow records for calculating site-specific February median flows. Pursuant to Section 16-03 of the Rule, conservation flows equal to the statewide average February median flow of would be needed to attain the general standard established by the Rule.

209. Methods for creating an acceptable flow record will be needed to calculate a site-specific February median flow in the future.

Mendon Brook

210. This water source does not have acceptable flow records for calculating site-specific February median flows. Pursuant to Section 16-03 of the Rule, conservation flows equal to the statewide average February median flow of would be needed to attain the general standard established by the Rule.

211. The upper intake currently has a conservation flow below 0.5 csm and the lower intake has a conservation flow of 0.5 csm or greater.

212. The Rule provides a means to attain the February median flow on a schedule that must be included in any expansion. For systems with a permitted conservation flow below 0.5 csm, a conservation flow of a minimum of 0.5 csm must be attained within 5 years after permit approval and to the FMF within a reasonable period of time, but to neither flow level any sooner than is determined to be reasonable and feasible based on the results of the alternatives analysis. For existing systems that have permitted flow limits of 0.5 csm and above, compliance with the FMF, but no sooner than is determined to be reasonable and feasible based on the results of the alternatives analysis.

213. Methods for creating an acceptable flow record will be needed to calculate a site-specific February median flow in the future.

High Flow Regime

Mendon Brook

214. For Pico Mountain, this project aims to increase snowmaking capacity by a factor of more than three times (i.e., from 0.30 Mgal/ac to 0.95 Mgal/ac).

215. The applicant calculated the total annual amount of meltwater anticipated to reach Mendon Brook in acre feet. There is an expected increase over current conditions of 28% for the Class A(1) reach and an increase in 21% of existing conditions for the Class A(2) reach. The applicant assumed a relationship that 10 inches of natural snow is approximately 1 inch of liquid water. While this is generally true, that relationship can vary greatly.

216. The applicant provided an initial assessment of additional melt water to Mendon Brook The applicant assumed and average seasonal melt rate of 0.5 inches of meltwater in liquid form per day. The amount of additional snow delivered to the Mendon Brook watershed was multiplied by the 0.5 inches of water per day and compared to peak flow rates as estimated by StreamStats to evaluate the potential increase in flow rates.

217. The initial analysis estimated the proposal would not increase peak flows to Mendon Brook from the current snowmaking conditions, but rather would increase the duration of runoff. The applicant does estimate that the number of days meltwater will contribute to Mendon Brook will increase by 48 days, under the average seasonal melt rate of 0.5 inches liquid water per day. The applicant calculated the increase from baseline conditions (i.e. no snowmaking) to be 118% for the Class A(1) reach and 87% for the Class A(2) reach.

218. To better understand what conditions may occur on the extremes for Mendon Brook (i.e. days where snowmelt is high), the applicant reviewed local data and determine what peak flows may occur as a result of additional snow in the Mendon Brook watershed.

219. An additional analysis submitted by the applicant[1]. used a degree day method and regional data (Lye Brook Soil Climate Analysis Network station) to estimate the 90th percentile amount of liquid meltwater. This value was estimated to be 1.15 inches per day. This resulted in an estimate for increase in flow from baseline conditions of 0.58 cfs to 1.33 cfs for Class A(1) and an increase from 1.96 cfs to 4.5 cfs for Class A(2) reach.

Water Level Fluctuation

Woodward Reservoir

220. The applicant proposes to continue to fluctuate the water level of Woodward Reservoir during the winter, but on a modified schedule. The applicant's proposal, described in findings 116 through 118 incorporates three components: a proposed regime that reduces the magnitude of drawdown from currently permitted levels, monitoring protocols for any deviations from the proposed regime, and an adaptive management approach that would incorporate monitoring data into the management of water levels in the reservoir.

221. The applicant estimates that the magnitude of the winter drawdown in the modelled 80/80 design year for the interconnect pipeline and proposed FMF's would be 4.8 feet.

222. In general, winter is a stressful time for aquatic biota, where low temperatures and freezing conditions exert additional physiological stress on organisms. Additionally, for aquatic species that rely on these areas for overwintering, such as plants, invertebrates, and herptiles, water level drawdown dewaters these areas, exposing organisms to desiccation, which may negatively affect the survival of aquatic biota overwintering in the littoral zone. As a result, the overall productivity of the reservoir may be negatively affected.

223. The near shore area acts as the "breadbasket" of lentic systems because of their high productivity and physical complexity. The penetration of sunlight into the shallow waters can produce abundant plant growth. These plants provide food for other aquatic life, serve as spawning substrate for fish and provide cover for juvenile fish, forage fish and predator fish. Aquatic invertebrate production is also greatest in this area.

224. Water level fluctuation may also affect reproduction of spring spawning species. At Woodward Reservoir, smelt utilize the main tributary for spawning, generally beginning during the last week of April. Pickerel and Northern pike utilize littoral zone habitat in the spring for spawning, generally beginning after mid-April.

225. As currently permitted, refill of the reservoir must be completed by April 23rd. The applicant's modeling explicitly considered the refill date as an output of the model.

[1] Snowmaking Meltwater Runoff Analysis, VHB Memorandum, April 2019

For scenario 5, the interconnect scenario, in 28 of 30 years modeled (93% of years), refill was complete by April 23rd, with refill in the other two years occurring on April 24th and April 26th. Refill in the 80/80 design year would occur by April 7th.

Stream Processes

226. Stream processes are defined as the hydrologic, bed-load sediment, and large woody debris regimes of a particular stream reach and is a term used to describe stream channel hydraulics, or the erosion, deposition, sorting, and distribution of instream materials by the power of flowing water. Stream processes work toward an equilibrium condition, are governed by flow characteristics, stream morphology, channel roughness, and floodplain connectivity and, in part, determine physical habitat structure and aquatic habitat quality (Standards § 29A-102 (43)).

227. The applicant proposes to remove the infrastructure associated with the current Ottauquechee intake upon construction of the new, relocated intake 5 feet from the bank.

228. The applicant also proposes to remove the upper intake on Mendon Brook. The applicant proposes to submit a plan for removal of this intake within one year of completion of construction of the interconnection pipeline. This plan would include detailed information on removal of the existing instream structure and restoration of topographic contours to approximate those of the surrounding natural terrain at the time of removal, deconstruction procedures and a removal schedule not to exceed three years following the completion of construction.

229. At the flow conference and in subsequent comments, interested parties expressed support for a condition ensuring that the applicant be obligated to remove new and existing in-stream infrastructure when it is no longer used for snowmaking and restore the natural condition of the stream. By letter dated, June 18, 2019, the applicant agreed with including such a condition in permits associated with the project. By letter dated, July 12, 2019, the applicant further affirmed their support for such a condition.

Mendon Brook

230. The applicant conducted a channel integrity assessment of Mendon Brook to evaluate the potential for hydrologic change associated with the interconnect would affect channel stability and aquatic habitat quality.[2]

231. Two representative reaches were assessed, one representing the reach classified as A(1) for aquatic habitat and one representing the reach classified as A(2) for aquatic habitat. Siting these representative reaches included a walkover. For the A(1) reach approximately 1,600 feet of stream channel above elevation 2,500 feet. In selecting the reach for the Class A(2) evaluation, VHB examined the reach between the inlet of the culvert that carries Mendon Brook past the Pico Resort and the bedrock waterfall located upgradient at approximate elevation 2,150 feet.

[2] Mendon Brook Channel Integrity Assessment and Snowmaking Meltwater Runoff Analysis, VHB Memorandum, February 2019

232. The Class A(1) reach ends approximately at a culvert below the Mid Pike Ski Trail. Immediately upstream of the culvert, the brook appears to be partially channelized. Farther upgradient, a channel constriction associated with an undersized culvert resulted in a scoured reach.

233. For the representative A(1) reach, the D50 particle size was found to be 107 mm, corresponding to a medium cobble. Roughly 20% of the particles observed were bedrock, which is not factored into the D50 calculation, so the overall stability of this reach is higher than the D50 indicates. The entrenchment ratio was found to be 4.3, indicating that the reach is only slightly entrenched and had good access to its floodplain.

234. The Class A(2) reach, consists of approximately 75 feet of straightened reach immediately downgradient from the waterfall and then approximately 400 feet of unconfined, meandering channel with good access to a floodplain terrace. Deposition was also observed in front of the 60-inch culvert inlet at the downstream end of the reach, as is typical for culverts that are narrower than the bankfull channel width.

235. A walkover of Mendon Brook between the A(2) representative reach and the lower intake was also completed during the field investigation. Two culverted reaches were observed between the on-mountain ski trails and the base area parking lot. Downstream from these culverts, the channel returns to open channel flow along the west and north sides of the base area parking lot.

236. For the representative A(2) reach, the D50 particle size was found to be 99 mm, corresponding to a medium cobble. None of the particles observed in this reach were very large boulders or bedrock, so the D50 metric gives a good approximation of the channel roughness and active bed materials. The entrenchment ratio was found to be 1.6, indicating that the reach is moderately entrenched but can still access its floodplain.

237. The applicant acknowledges localized impacts associated with roadway or ski trail culverts were observed but believes that it can be assumed that these impacts will be mitigated over time as culvert replacements are made that conform to the requirements of the Stream Alteration General Permit.

Physical Structure

238. Physical habitat structure is defined as the diverse combination and complexity of instream forms created within substrate and woody debris on and within the bed and banks of the channel by stream processes and flow characteristics. Physical habitat structure, in part, determines aquatic habitat quality at the stream reach and stream network scales by providing for all life cycle functions, which include the full set of forms necessary for the provision of and access to cover, overwintering, and temperature refuge and the substrates necessary for feeding and reproduction of aquatic biota and wildlife (Standards § 29A-102 (34)).

239. In addition to stream processes and flow characteristics, physical habitat structure is influenced by the riparian area, which is the zone of interaction and influence between aquatic and terrestrial ecosystems. These areas play important physical,

hydrologic, and ecological functions including water temperature moderation; sediment and nutrient filtration and retention; large wood and organic material recruitment and retention; streambank, shoreland, and floodplain stability; and the provision of habitat and corridors for a wide variety of species.

240. The physical habitat structure and condition of the riparian areas of Mendon Brook are largely unknown at present.

I. Wildlife

241. The change in the drawdown regime from past practices are not anticipated to results in increased impacts to wildlife that inhabit the reservoir and shoreline areas.

242. The shoreline areas of reservoirs are, in general, important overwintering habitat for reptiles and amphibians. In addition, beaver and muskrats are known to use shoreline areas as refuge.

243. Other impacts to wildlife including those due to increased snowmaking and building of the pipeline to connect the snowmaking systems are expected to be minimal.

244. The riparian zone adjacent to the Ottauquechee River provides habitat and cover for various species of wildlife.

245. The disturbance of this area will be limited to an area already impacted by infrastructure and is therefore not anticipated to have any increased impacts to wildlife.

J. Rare, Threatened and Endangered Species

246. According to the Natural Heritage Program of Vermont Fish and Wildlife Department, Wood Turtle (*Glyptemys insculpta*) have been located on the west side of Woodward Reservoir. Wood Turtle is listed as an S3 species (at moderate risk) and uncommon in Vermont. The Federal status of the Wood Turtle is currently under review[3]. Wood Turtles overwinter in deeper waters of rivers and streams that are protected from ice scour. However, the extent to which Wood Turtle use Woodward Reservoir is uncertain.

247. The project area is also within the range of the Northern Long-eared Bat (*Myotis septenrionalis*) which is listed as Federally threatened. However, there is no listing of critical habitat in the area and tree cutting is not being proposed.

248. Other rare and threatened species are located near the top of the ski trails at both Killington and Pico resorts.

249. Upper elevations in Vermont, such as Killington and Pico provide for a variety of natural areas, including those where high quality examples are uncommon. However, there are no known occurrences of rare or irreplaceable natural areas in the proposed project area.

[3] https://ecos.fws.gov/ecp0/profile/speciesProfile?sId=6997

K. Wetlands

250. The Vermont Water Quality Standards require the Secretary of the Agency of Natural Resources to identify and protect existing uses of state waters, which include surficial wetlands. Existing uses include habitat (Standards § 29A-105(B)(2)). Wetland habitat is present at the site of the Ottauquechee intake relocation and Woodward Reservoir.

251. Wetlands and their contiguous areas that appear on the Vermont Significant Wetland Inventory maps have been designated Class One or Two wetlands, unless determined otherwise by the Secretary pursuant to Section 4 of the Vermont Wetlands Rule. Any activity in a Class Two wetland or associated 50-foot buffer zone, other than allowed uses specified in Section 6 of the Vermont Wetland Rules, requires a permit authorizing such an activity from the Agency of Natural Resources (10 V.S.A. § 913). The Agency may only grant such a determination if the applicant demonstrates that the proposed activity will not have undue adverse impacts on protected wetland functions. In making this determination, the conditional use shall be assessed on the basis of both its direct and immediate effects as well as on the basis of any cumulative or on-going effects on the significant wetland (Section 9.5). Section 5 of the Rules lists the criteria for determination of the significance of wetland functions and values. Applicants are required to apply the criteria under pre- and post-project conditions to determine if a significant impact is to be expected.

    All wetlands, Class One, Two and Three, are considered waters of the State for review under the Vermont Water Quality Standards. The Standards prohibit activities that degrade the existing uses of wetlands. The uses can include aquatic habitat, fish and wildlife habitat, fishing, swimming, recreation, water quality maintenance and others. Wildlife habitat can be evaluated using criteria similar to that used in the Vermont Wetland Rules.

    Ottauquechee River

252. Several Class Two wetlands and associated buffers will be impacted by the relocation of the Ottauquechee intake. A permit application (#2018-763) was submitted by the applicant with site plans and proposed activities for the wetland and buffers associated with the relocation of the intake. The application was approved by VT DEC on March 29, 2019, with conditions to minimize the impacts from construction and the loss of wetland values.

    Woodward Reservoir

253. One Class Two wetland will be affected by change in water level management at Woodward Reservoir:

    The floating mat wetland at Woodward Reservoir is identified as a saturated broad-leaved evergreen shrub-scrub palustrine wetland (PSS3B) on the Vermont Significant Wetland Inventory map (Map No. 26D) and is designated as a Class Two wetland by the Water Resources Board in the Vermont Wetland Rules. The wetland is in a cove in the northeast area of the reservoir; construction of the

original dam probably flooded the peat bog that had formed at this site, creating the floating mat. It is dominated by peat moss (*Sphagnum* spp.) and leather leaf. It is approximately 700 feet long and 100 feet wide or 1.6 acres. Surrounding the bog are the submerged plants--bushy pondweed, bladderwort, bur reed, water weed and pondweed (*Potamogeton* spp.). Approximately 2 to 6 feet of water is below this bog.

Contiguous to the mapped wetland area are shrub/scrub and forested wetland areas along the northern and eastern edges of the cove. A sandbar across the mouth of the cove has a maximum depth of about 5 feet. Due to the sandbar's shallower depth relative to the cove, water remains in the cove area during winter drawdown periods. The wetland is significant for the functions of hydrophytic vegetation habitat, fish, wildlife, and migratory bird habitat, education and research in natural sciences, recreational value, and open space and aesthetics. If accessible early in the spring, it may be useable for spawning by pike and pickerel.

Prior to Killington's use of Woodward Reservoir, the cove would become isolated from the main reservoir prior to the formation of surface ice. Until the refill, the cove was, independent of the reservoir and not subject to variable water levels. At the time of the prior certification, it was unclear how the modified drawdown regime would affect the floating mat wetland, so monitoring was required. The Department does not have records of this monitoring occurring, so it still be an open question of how more variable water levels in the cove (i.e. above the point of disconnection from the reservoir) would affect the floating mat wetland.

L. Recreation and Aesthetics

254. Summer recreational uses of Woodward Reservoir include swimming, boating and fishing. In the winter, the reservoir is used for skating, ice fishing, cross-country skiing, and snowmobiling. Fishing is the primary recreational use of streams in the area.

255. There is a public fishing access operated by the Department of Fish and Wildlife on the western shore of Woodward Reservoir.

256. There are several docks and other relatively small structures located on the reservoir. Several are owned by Farm and Wilderness Camps, which owns much of the shoreline. Others are associated with several private homes and camps located mostly along the west shoreline. One camp on the south end of the reservoir is built out on piers over the reservoir.

257. The applicant has an ongoing agreement to monitor and repair or replace structures along the shoreline that are not owned by Farm and Wilderness Camps if they are damaged by ice as a result of the drawdown regime.

M. Construction and Erosion

Ottauquechee River

258. During construction of the new intake site on the Ottauquechee various sediment control measures will be used. These include using a coffer dam around the intake site; an erosion control blanket on the slopes; and a heavy duty silt fence barrier.

259. The coffer dam will be constructed with gravel bags or something similar, and the dam will not restrict more than half of the natural river channel. Once the coffer dam is in the place, the area of excavation will be dewatered into a dewatering basin.

260. The applicant has developed a riparian buffer management plan for the relocation of the Ottauquechee intake. This plan includes; minimization of grading within the riparian buffer; limiting bank penetrations to the removal and installation of the existing and proposed intakes; revegetation of the riparian buffer disturbed by the removal of the existing intake and the installation of the proposed intake; and locating the proposed intake in an area with existing bank armoring that will be reset after intake is installed. The plan also provides for additional revegetation between the existing intake and southern extent of the parcel on which intake relocation would occur.

Woodward Reservoir

261. Erosion is limited on the shorelines of the reservoir. The only location of erosion noted in the applicant's evaluation of littoral habitat was near a downed tree in one location along the shoreline.

Mendon Brook

262. The applicant proposes instream work on Mendon Brook at some time in the future to remove the upper intake on Mendon Brook. The applicant proposes to submit a plan within one year of construction of the interconnection that will address deconstruction procedures.

Interconnect Pipeline

263. Killington proposes to follow all the best management practices for erosion prevention and sediment control measures when the pipeline is constructed.

III. Analysis and Determination

264. A state's 401 certification determination shall include a statement from the state that "there is a reasonable assurance that the activity will be conducted in a manner which will not violate applicable water quality standards." 40 C.F.R. § 121.2(a)(3); Environmental Protection Chapter § 13.11(g). Accordingly, the Department may set forth limitations and other requirements necessary for it to find that there is reasonable assurance that the proposed activity will not violate the Vermont Water Quality Standards. A segment of the East Branch of Roaring Brook and a segment of Roaring Brook are listed as impaired due to stormwater, while a reach of Mendon Brook is listed altered due to insufficient conservation flows below the Pico snowmaking intake. A goal of the Standards and the Clean Water Act is to restore the biological integrity of waters such that aquatic biota and wildlife are sustained by high quality habitat.

265. The potential for impacts associated with the proposed project can be largely grouped into three categories: (1) potential impacts associated with the applicant's water withdrawals; (2) potential impacts associated with the transfer of water from the Ottauquechee basin to the Otter Creek basin; (3) potential impacts associated with proposed construction activities. They are addressed for each category below (where applicable), in turn.

A. Water chemistry

266. The proposed use of a portion of the flow from Falls Brook, Roaring Brook, Woodward Reservoir/Reservoir Brook, and Mendon Brook would be limited to the late fall/winter snowmaking period, current conservation flows would be maintained or increased, and full conservation flow standards will be met. The winter period characteristically is one of high-quality water conditions. As a result, the impact of reduced flows on the chemical/physical water quality of the brooks will not be significant. The levels of the following parameters for which standards exist will not significantly change from background conditions as a result of the water diversion, if at all: Dissolved oxygen; Temperature; Nitrates; Phosphorous; Alkalinity; pH; Toxics; Escherichia coli; Turbidity; Color, Taste and odor; Oil, grease, and scum; Settleable, floating or suspended solids.

267. The proposed use of a portion of the flow from the Ottauquechee River would occur year round. While the finding above is applicable to the winter period, the spring and summer periods can be characterized at times by relatively lower water quality. However, full conservation standards will be met and withdrawal will only occur above the seasonal median flows, so diversion would not exacerbate lower flow conditions that may be more prone to lower levels of water quality. As a result, the impact of reduced flows on the chemical/physical water quality of the brooks will not be significant. The levels of the following parameters for which standards exist will not significantly change from background conditions as a result of the water diversion, if at all: dissolved oxygen; temperature; nitrates; phosphorous; alkalinity; pH; toxics; Escherichia coli; turbidity; color, taste and odor; oil, grease, and scum; settleable, floating or suspended solids.

268. The proposed use of a portion of flow from the Ottauquechee River basin and

transfer to the Otter Creek basin would only occur during the late fall and winter period. The winter period characteristically is one of high-quality water conditions. As a result, the impact of additional water added in the form of manmade snow on the chemical/physical water quality of the brooks during runoff will not be significant. The levels of the following parameters for which standards exist will not significantly change from background conditions as a result of the water diversion, if at all: Dissolved oxygen; Temperature; Nitrates; Alkalinity; pH; Toxics; Escherichia coli; Turbidity; Color, Taste and odor; Oil, grease, and scum; Settleable, floating or suspended solids.

269. The proposed use of a portion of flow from the Ottauquechee River basin and transfer to the Otter Creek basin would result in an incremental increase in phosphorous loading to the Lake Champlain drainage basin. While the applicant correctly points out that the loading would be a fraction of the phosphorous budget of the Otter Creek watershed on an annual basis, the activity is estimated to result in approximately 4 pounds per year of additional phosphorous loading. In all waters, total phosphorous loadings shall be limited so that they will not contribute to the acceleration of eutrophication or the stimulation of the growth of aquatic biota in a manner that prevents the full support of uses. Current conditions in Lake Champlain prevent the full support of uses and the water is subject to a TMDL to reduce phosphorous loading, which underlines the importance of ensuring phosphorous loading is limited in the basin. While the Department agrees with the Applicant's assessment that this loading estimate is likely high, given it assumes that all of the phosphorous would runoff into the stream rather than infiltrate and or sorb to the soil, the applicant's runoff management strategies on Pico mountain are largely unknown. To limit phosphorous loading in the Lake Champlain, this certification is being conditioned to require the applicant to develop a runoff management plan for Pico Mountain.

270. Some elements of the applicant's proposal will involve construction that will or may include instream disturbance including the relocation of the Ottauquechee intake, construction of the interconnect pipeline, and removal of the upper intake on Mendon Brook. The applicant has proposed sediment control measures for the relocation of the Ottauquechee intake and has proposed to follow best management practices for erosion prevention and sediment control when the pipeline is constructed, while means and methods for removal of the upper intake have yet to be discussed. Accordingly, this certification is being conditioned such that all instream work follows accepted and established erosion and sediment control procedures to ensure construction activities will not violate water chemistry standards.

B. Aquatic Biota

271. Woodward Reservoir is a relatively deep waterbody with dissolved oxygen and temperature conditions that favor the support of a mixed warm and cold water fishery. A put-grow-and-take fishery is maintained through stocking. Brown and rainbow trout are not known to use the reservoir tributaries for spawning. The warm water fishery, consisting mainly of yellow perch, is self-sustaining. Smelt have been successfully introduced and depend on the lower reach of the main tributary for spawning. Protection of smelt spawning and incubation is important to the trout fishery, as the smelt provide a forage base when other food sources,

such as insects, may be limited.

Protection Measures for Aquatic Biota

272. The applicant proposes to cover the intake with screening that will be ¼ inch slats. Openings that size would prevent fish from being entrained. Expected water velocities in front of the intake are not expected to cause impingement.

273. The applicant's proposal to transfer water from the Connecticut River Basin into the headwaters of the Lake Champlain Basin, poses some risk that it may act as a vector for moving unwanted organisms (fish pathogens and/or invasive species that may adversely affect aquatic biota) from one drainage basin to the headwaters of another. The Fish and Wildlife Department has proposed actions that would virtually eliminate this risk, and the applicant has acknowledged that measures may be needed. This certification is being conditioned such that the applicant shall develop a plan outlining operation of the interconnect pipeline, measures to ensure transported water is aerosolized by snowmaking operations, and a protocol for if, in the future, other aquatic invasive species or disease organisms become established in the Ottauquechee River watershed, it may be necessary to implement additional measures to prevent their spread.

C. Aquatic Habitat

Hydrologic Conditions Necessary to Support Aquatic Habitat

Streamflow Protection

Falls Brook and Roaring Brook

274. As described in findings 107 through 110, as well as finding 205, the applicant is proposing to implement site-specific February median flows at these withdrawals during the fall/winter period, which complies with the general standard set forth in the Snowmaking Rule promulgated by the Agency of Natural Resources. Pursuant to Section § 29A-304(3) of the Standards, hydrologic standards consistent with an Agency of Natural Resources rule may be used to ensure compliance with this subsection. Accordingly, this certification will adopt the conservation flows proposed by the applicant for Falls Brook and Roaring Brook during the winter period.

Ottauquechee River

275. As described in findings 113 and 206, the applicant is proposing to implement site-specific February median flows at this withdrawal during the fall/winter period, which complies with the general standard set forth in the Snowmaking Rule promulgated by the Agency of Natural Resources. Pursuant to Section § 29A-304(3) of the Standards, hydrologic standards consistent with an Agency of Natural Resources rule may be used to ensure compliance with this subsection. Accordingly, this certification will adopt the conservation flows proposed by the applicant for the Ottauquechee River during winter period.

276. As described in findings 113 and 207, the applicant is proposing to implement site-

specific spring and summer median flows at this withdrawal outside of the snowmaking period, which complies with default method set forth in the *Agency Procedure for Determining Minimum Streamflows* promulgated by the Agency of Natural Resources. Pursuant to Section § 29A-304(3) of the Standards, hydrologic standards consistent with an Agency of Natural Resources procedure may be used to ensure compliance with this subsection. Accordingly, this certification will adopt the spring and summer conservation flows proposed by the applicant.

Reservoir Brook

277. As described in findings 119 and 208, the applicant is proposing to implement the statewide average February median flows at this withdrawal during the fall/winter period, which complies with the general standard when site specific data is not available as set forth in the Snowmaking Rule promulgated by the Agency of Natural Resources. Pursuant to Section § 29A-304(3) of the Standards, hydrologic standards consistent with an Agency of Natural Resources rule may be used to ensure compliance with this subsection. Accordingly, this certification will adopt the conservation flows proposed by the applicant for Reservoir Brook during the winter period.

278. As described in finding 120 and, the applicant is proposing to develop methods for flow monitoring for Reservoir Brook that will allow calculation of a site-specific February median flow in the future. Accordingly, this certification will adopt the applicant's proposal, so that a site-specific February median flow can be calculated after a ten-year period.

279. While this data collection occurs, the 0.8 csm conservation flow will be provided as a guaranteed flow.

Mendon Brook

280. As described in findings 123 and 210, the applicant is proposing to attain the statewide average February median flows at the lower withdrawal during the fall/winter period, which complies with the general standard when site specific data is not available as set forth in the Snowmaking Rule promulgated by the Agency of Natural Resources. Pursuant to Section § 29A-304(3) of the Standards, hydrologic standards consistent with an Agency of Natural Resources rule may be used to ensure compliance with this subsection. Accordingly, this certification will be conditioned to adopt the conservation flows proposed by the applicant below the intakes on Mendon Brook for the winter period.

281. As described in findings 123, 211, and 212, the applicant is proposing to include a schedule for attaining the general standard on Mendon Brook that is consistent with the Rule. For the upper intake, which has a current conservation flow of 0.12 csm, the applicant proposes to increase the conservation flow to 0.5 csm within five years of permit issuance, but to the statewide FMF once the interconnect is operational. For the lower intake, which has a current conservation flow of 0.5 csm, the applicant proposes to increase the conservation flow to the statewide FMF once the interconnect is operational. This schedule complies with Section 16-07(3) of the Snowmaking Rule promulgated by the Agency of Natural Resources. Pursuant to Section § 29A-304(3) of the Standards, hydrologic standards consistent with an

Agency of Natural Resources rule may be used to ensure compliance with this subsection. Accordingly, this certification will be conditioned to include the schedule proposed by the applicant for Reservoir Brook for the winter period. Therefore, these withdrawals will be brought into compliance with the Snowmaking Rule and the Streamflow Protection Criteria of the Vermont Water Quality Standards.

282. As described in findings 122 and 213, the applicant's proposal is silent on flow monitoring at its withdrawals on Mendon Brook, which will be necessary to calculate a site-specific February median flow in the future. Accordingly, this certification will be conditioned to include a flow monitoring requirement for Mendon Brook, such that a site-specific February median flow can be calculated after a ten year period.

High Flow Regime

Mendon Brook

283. The applicant's proposal would increase runoff volumes, peak flows, and elongate the duration of snowmelt in the A(1) reach of Mendon Brook (findings 214 through 219). Further, undersized instream structures in this reach are causing localized disequilibrium in this reach (finding 232). Given the combination of localized disequilibrium caused by undersized instream structures and increased runoff associated with the proposed activity, it is likely that impacts would be more severe without upgrading the instream structures. For those reaches of Mendon Brook classified as A(1) for aquatic habitat, changes to the high flow regime must not cause more than a minimal impact upon these waters. Due to the substrate present in this reach and the stability it provides (finding 233), the Department finds the impacts would be minimal, if the structures causing localized disequilibrium were addressed. Accordingly, this certification is being conditioned to include an instream restoration plan to address structures causing localized disequilibrium in the A(1) reach of Mendon Brook. Additionally, the runoff management plan will also ensure hydrologic impacts upon the high flow regime are minimized.

284. The applicant's proposal would increase runoff volumes, peak flows, and elongate the duration of snowmelt (findings 214 through 219). As in the A(1) reach, undersized instream structures, in particular an undersized culvert that carries the brook under the Swinger ski trail interrupts the sediment regime of the reach causing localized disequilibrium (finding 234). For those reaches of Mendon Brook classified as A(2) for aquatic habitat, changes to the high flow regime must not result in runoff causing an increase in the frequency, magnitude, or duration of peak flows adversely affecting channel integrity or prevent the full support of uses. While the substrate present in this reach (finding 236) provides less stability than that of the A(1) reach, changes to the high flow regime are not likely to adversely affect channel integrity, if the structures causing localized disequilibrium are addressed. Accordingly, this certification is being conditioned to include the structures be evaluated as part of an overall water management plan for the base area to determine if replacement is needed in the A(2) reach of Mendon Brook. Additionally, the runoff management plan will ensure hydrologic impacts upon the high flow regime are minimized.

Water Level Fluctuation

Woodward Reservoir

285. The applicant proposes to continue to fluctuate the water level of Woodward Reservoir during the winter, but on a modified schedule.

286. The drawdown regime proposed by the applicant would allow for a drawdown of two feet or less every year and drawdowns of between two and four feet every other year. While it does not preclude more frequent drawdowns in the two to four foot range or deeper drawdowns, these events would necessitate assessments that will inform future management decisions and ensure water quality standards are attained.

287. The drawdown regime proposed by the applicant will reduce the magnitude and frequency of drawdown relative to the regime that currently permitted, however, because this permitted regime has not been utilized to its full extent, the frequency of more moderate drawdowns in the one to four foot range are likely to increase.

288. Waters may exhibit artificial water level to the extent uses are supported. For aquatic habitat, this means the fluctuation regime ensures that the physical character and water levels fully support all life-cycle functions of aquatic biota and wildlife, including overwintering and reproductive requirements, are maintained and protected. Further any changes must be limited to moderate and be consistent with the previously stated objectives.

289. To analyze whether the Applicant's proposal meets these criteria, two concerns must be assessed: whether the drawdown in the winter months will protect the overwintering of aquatic biota and whether the drawdown will allow refill to occur in a manner that will support spring spawning species.

290. The Department expects that a regime in which normal drawdowns occurred to a depth two feet annually and to a depth of four feet every other year would protect the ability of aquatic biota to overwinter, given the site-specific characteristics of Woodward Reservoir. While the regime proposed by the Applicant would allow for deeper drawdowns on occasion, drawdowns outside of the normal regime (i.e. that exceed the magnitudes or frequency of the normal regime) are likely to be of shorter duration, as some refill occurs throughout the winter. To minimize the magnitude and frequency of drawdowns outside of the normal range, the applicant proposes to assign higher use priority to its other water sources. Further, the applicant has proposed to conduct monitoring according to a plan approved by the Department and allow those findings to inform water level fluctuation in the reservoir through an adaptive management protocol. These actions will ensure that applicant's use of the reservoir will allow water quality standards to be attained. Accordingly, this certification is being conditioned such that that the applicant will be required to develop a monitoring protocol, an adaptive management plan, and implement the monitoring protocol to establish baseline condition before the proposed regime is implemented.

291. To assure that spring spawning species have access to their spawning habitats, the reservoir refill must be completed before the onset of spawning. The applicant's modelling demonstrates that refill consistently occurs before April 23rd and at the

latest by April 26th. Due to some intricacies of the modelling, these are likely to be overestimates, so the Department considers the proposal to be protective of spawning in Woodward Reservoir.

292. Given that the regime described herein, will be protective of overwintering aquatic biota and the reproduction of spring spawning species, the Department will adopt the water level fluctuation regime, monitoring requirements, and adaptive management protocol proposed by the applicant.

293. The applicant proposes to commence use of Woodward Reservoir beginning on October 15th. Per this proposal, the applicant is responsible for gate management on October 15th of each year until the completion of the refill. This certification will be conditioned accordingly.

Stream Processes

294. The applicant has proposed removing infrastructure that no longer serves its intended purpose as part of this application (e.g. former Ottauquechee intake, upper intake on Mendon Brook), and has proposed a condition that requires removal of any instream structures and restoration of the natural condition of the stream when it is no longer used for snowmaking. To ensure stream processes will be maintained after the infrastructure is no longer being utilized for its intended purpose, this certification will adopt the applicant's proposed condition.

Mendon Brook

295. Localized geomorphic impacts associated with roadways or ski trail culverts were observed in both the A(1) and A(2) reaches of Mendon Brook, however the applicant maintains that it can be assumed that these impacts will be mitigated over time as culvert replacements are made that conform to the requirements of the Stream Alteration General Permit. While this may be true, the fact that the proposed activity is likely to exacerbate current impacts, these are properly addressed by this certification.

296. The downstream extent of the A(1) reach ends approximately at a culvert below the Mid Pike Ski Trail. The reach above this culvert was described as partially channelized and further up the A(1) reach, an undersized culvert creates a channel constriction resulting in scour downstream of the culvert. In A(1) waters, stream processes are to be managed consistent with waters in their natural condition with no change outside the range of natural condition permitted. In order to meet these criteria, this certification is being conditioned to require the applicant to develop and submit an instream restoration plan with the goal of restoring the natural condition of this reach.

297. The applicant operates two intakes are on the A(2) reach of Mendon Brook. The applicant proposes a schedule for removal of the upper intake and restoration of the natural stream channel in the area of the upper intake. The A(2) reach includes an undersized culvert that carries the brook under the Swinger ski trail. This structure will be addressed by the instream restoration plan required to attain the high flow regime criteria. In A(2) waters, changes to stream processes are limited to moderate differences from natural condition. Together, the restoration activities proposed by the applicant and those required to attain the high flow regime criteria

required by condition J will ensure that the stream processes criteria are attained in this reach.

Physical Habitat Structure

Mendon Brook

298. As described in finding 239, riparian conditions play an important role governing instream physical, hydrologic, and ecological conditions.

299. The condition of the riparian area and physical habitat structure of the A(1) reach of Mendon Brook is not known. However, the runoff management plan required by condition K to address water quality and hydrologic concerns will include an evaluation of riparian condition, which are crucial to the provision of physical habitat structure. In this reach, physical habitat structure shall be managed consistent with waters in their natural condition and no change in physical habitat structure outside the range of natural condition is permitted. Minimal impact to the natural riparian area is necessary to attain these criteria and underlines the necessity of including these observations as a component of the runoff management plan.

300. Similar to the A(1) reach of Mendon Brook, the condition of the riparian area and physical habitat structure of the A(2) reach of Mendon Brook is not known. However, unlike the A(1) reach, changes to stream processes in the A(2) reach may exhibit moderate differences from natural condition, so some encroachments into the riparian area may allow the physical habitat structure criteria to be attained. Given the unknown condition of the physical habitat structure in the reach, the runoff management plan will provide assurance that the physical habitat structure criteria will be attained.

D. Wildlife

301. The change in the drawdown regime from past practices are not anticipated to result in increased impacts to wildlife that inhabit the reservoir and shoreline areas.

302. Other impacts to wildlife including those due to increased snowmaking and building of the pipeline to connect the snowmaking systems are expected to be minimal.

303. Impacts to wildlife from the relocation of the Ottauquechee intake are not anticipated to have any increased impacts to wildlife due to the disturbance being limited to areas that are already impacted.

E. Rare, Threatened, and Endangered Species

304. While there are species of concern in the general area of the project. The activities proposed by the applicant are not expected to affect these species.

F. Wetlands

Ottauquechee River

305. Apart from this application, Killington applied for and received a conditional use determination for impacts to several Class Two wetlands and associated buffers related to the relocation of the intake on the Ottauquechee River. The conditions contained within this permit are assumed to be adequate to minimize the impacts from construction and the loss of wetland values associated with relocation of the intake.

Woodward Reservoir

306. The drawdown regime at Woodward Reservoir will change the ice formation process and ice dynamics in the cove containing the Class Two wetland. As there is some uncertainty with respect to how this change will affect the peat mat and the wetland in general, this certification is being conditioned to require follow up monitoring to assess the peat mat in connection with the drawdown assessments.

G. Recreation Use and Aesthetics

307. The applicant's proposal has the potential to affect recreation use of the reservoir, in particular during the winter when it is drawn down and during spring when it is being refilled. Winter use of the reservoir includes ice fishing and skating, however the magnitude of the drawdowns proposed are not expected to adversely affect ice safety.

308. The revised magnitude of the winter drawdown and earlier start date to October 15th is not expected to impact aesthetics.

H. Construction and Erosion

Ottauquechee River

309. Apart from this application, Killington applied for a stream alteration permit in connection with the relocation of the Ottauquechee intake. The stream alteration application includes a variety of erosion and sediment control measures including use of a cofferdam and a riparian buffer management plan that the Department expects to be adequate to prevent any erosion associated with construction or relocation of the intake.

Woodward Reservoir

310. The change in water level management is not expected to exacerbate shoreline erosion, which is not currently a problem at Woodward Reservoir. The reservoir bed in the drawdown zone is generally made up of coarser substrates that provide stability.

Mendon Brook

311. The applicant proposal to removal of the upper intake on Mendon Brook will

involve instream construction. Based on the applicant's proposal to submit a deconstruction plan before beginning work and that this certification is being conditioned such that any instream work utilize accepted erosion and sediment control techniques, this activity is not seen as a risk to water quality.

Interconnection Pipeline

312. While no instream work is expected to be associated with construction of the interconnect pipeline, Killington proposes to follow all the best management practices for erosion prevention and sediment control measures when the pipeline is constructed. The applicant's proposal is consistent with how this certification is conditioned.

I. Anti-Degradation

313. Pursuant to the Anti-Degradation Policy set forth in Section 29A-105 of the Standards and the Agency's 2010 Interim Anti-Degradation Implementation Procedure (Procedure), the Secretary must determine whether a proposed discharge or activities are consistent with the Policy by applying the Procedure during the review of applications for any permit for a new discharge if during the application review process compliance with the Standards is evaluated pursuant to applicable state or federal law. (Procedure III(A)). This includes water quality certifications required by Section 401 of the federal Clean Water Act for a federal license or permit for flow modifying activities. (Procedure III(B)(3)).

314. In making the determination that proposed activities are consistent with the Policy, the Secretary is required to use all credible and relevant information and the best professional judgement of Agency staff. (Procedure III(D)). Section VIII of the Procedure governs the Agency's review of Section 401 applications for flow modifying activities. (Procedure VIII(A)(1)). The Secretary may have to review a single waterbody under multiple tiers of review depending on whether a waterbody is impaired or high quality for different parameters.

315. Tier 3 review is required if the project will discharge to an Outstanding Resource Water. (Procedure VIII(D)). This project does not affect any Outstanding Resource Waters and therefore does not trigger a Tier 3 review under Section VIII of the Procedure.

316. This project affects waters classified as A(1), A(2), and B(2) waters for designated uses and criteria, which are high quality waters for certain parameters that trigger a Tier 2 review under Section VIII of the Procedure. (Procedure VIII(E)(1)(c)). Under Tier 2, the Secretary must determine whether the proposed discharge will result in a limited reduction in water quality in a high quality water by utilizing all credible and relevant information and the best professional judgment of Agency staff. (Procedure VIII(E)(2)(b)).

317. When conducting a Tier 2 review, the Secretary may consider, when appropriate, one or more of the following factors when determining if a proposed new discharge will result in a reduction in water quality: (i) the predicted change, if any, in ambient water quality criteria at the appropriate critical conditions; (ii) whether there is a change in total pollutant loadings; (iii) whether there is a reduction in available assimilative capacity; (iv) the nature, persistence and potential effects of the pollutant; (v) the ratio of stream flow to discharge flow (dilution ratio); (vi) the duration of discharge; (vii) whether there are impacts to aquatic biota or habitat that

are capable of being detected in the applicable receiving water; (viii) the existing physical, chemical and biological data for the receiving water; (ix) degree of hydrologic or sediment regime modifications; and (x) any other flow modifications. (Procedure VIII(E)(2)(d)).

318. The Secretary considered the foregoing factors during the review of the project to determine if the project will result in a reduction of water quality at each of the waters on the Killington Mountain side. The principal impacts of the project at the Ottauquechee River, Roar Brook, and Falls Brook are the flows below the diversion intakes, and the winter water level management Woodward Reservoir. The changes in operations on the Killington Mountain side will not result in a discharge of additional pollutants or reduce other ambient water quality criteria. As a result, factors (i), (ii), (iii), (iv), (v), and (vi) are not an issue. The intakes on Ottauquechee River, Roaring Brook, and Falls Brook have been operating to pass the general standard for winter conservation flows, therefore have not impacting the aquatic biota or habitat Additionally, the water level management practices implemented at Woodward Reservoir have resulted in less of a drawdown then permitted, therefore in practices the drawdown has not impacted aquatic biota or habitat. Further, Condition C requires the conservation flows below of the intake be increased to the site-specific February median flow value. Additionally, the permitted magnitude of the drawdown of will be reduced and monitoring will be required to ensure operations are not impacting aquatic biota and habitat. Further, the operational conditions require reduced the degree of hydrologic and flow modification.

319. The Secretary considered the foregoing factors during the review of the project to determine if the project will result in a reduction of water quality at each of the waters on the Pico Mountain side. The principal impacts of the project at Mendon Brook are the flow below the diversion and the increase in peak and duration flows during the spring melt. The diversion of water from Mendon Brook has been impacting aquatic habitat through inadequate conservation flows. Condition C requires the conservation flow at the lower intake to be increased to the statewide average February median flow of 0.8 csm. Additionally, Condition M requires removal of the upper intake, restoring the flow to upper reach of Mendon Brook. Further, under Condition O the applicant is required to develop a runoff management plan to manage the additional runoff from the increase in water resulting from the interconnect pipeline. These requirements will reduce the impacts to aquatic habitat of Mendon Brook.

320. This Certification does not authorize any activities that would result in a lowering of water quality for those parameters that are exceeding water quality standards.

321. For those parameters for which project waters do not exceed water quality standards, the Secretary must conduct a Tier 1 review. (Procedure VIII(F)).

322. Under Tier 1 review, the Secretary may identify existing uses and determine the maintenance necessary to protect these uses. (Procedure VIII(F)). In determining the existing uses to be protected and maintained, the Secretary must consider the following factors: (a) aquatic biota and wildlife that utilize or are present in the waters; (b) habitat that supports existing aquatic biota, wildlife, or plant life; (c) the use of the waters for recreation and fishing; (d) the use of the water for water supply, or commercial activity that depends directly on the preservation of an existing high level of water quality; and (e) evidence of the uses' ecological significance in the functioning of the ecosystem or evidence of the uses' rarity. (Procedure VIII(F)(2)).

323. The Secretary considered all of the factors listed in Finding 322 above and, based on information supplied by the Applicant and Agency staff field investigations, identify the following existing uses at the Ottauquechee River, Roaring Brook, and Falls Brook: aquatic biota and wildlife; aquatic habitat; aesthetics; and recreation.

324. Currently, the diversions are required to pass the general standard for winter conservation flows below each intake when operating. These flow conditions would protect and maintain the existing uses downstream of the diversions. The Certification will require an increase on the conservation flow to the site-specific February median flow which results in an increase the conservation flow. This modification in operations will result in improvements to water quality and will protect and maintain conditions to support existing uses. Additionally, when the Ottauquechee intake operated outside the winter periods the conservation flows will be equal to the default hydrologic standards.

325. The Secretary considered all the factors listed in Finding 322 above and, based on information supplied by the Applicant and Agency staff field investigations, identify the following existing uses at the Woodward Reservoir: aquatic biota and wildlife; aquatic habitat; aesthetics; and recreation.

326. The operation of the existing intake at Woodward Reservoir is permitted to drawdown 12 feet in elevation which has the potential to impact aquatic biota and wildlife, and aquatic habitat. However, the modifications to the operations conditioned under this certification will result in improvements to water quality and will protect and improve conditions for existing and designated uses. The modifications include decreasing the magnitude and frequency of the drawdown at Woodward Reservoir.

327. The Secretary considered all of the factors listed in Finding 322 above and, based on the information supplied by the Applicant and Agency staff field investigations, identified the following existing uses at Mendon Brook: aquatic biota and wildlife; aquatic habitat; use of water for public water supply; aesthetics; and recreation.

328. The existing lower intake has changed the natural condition of the brook below the diversion. Currently, aquatic biota and wildlife and aquatic habitat are impacted by the operation of the intake with insufficient flows during the winter. However, modifications to the operation of the intake conditioned by this Certification will result in improvements to water quality, which will protect and improve conditions for existing and designated uses. Those modification include increasing the conservation flow to 0.8 csm below the intake to meet the rule for water withdrawals for snowmaking.

329. The Secretary finds that development and operation of the project as conditioned by this Certification will comply with the Vermont Water Quality Standards and other applicable rules. Accordingly, the Secretary finds that the project, as conditioned, meets the requirements of the Policy and Procedure relating to the protection and maintenance of high quality waters.

IV. Applicant's Proposed Conditions

Conservation Flows

i. As part of the proposed snowmaking system expansion and interconnection, the applicant proposes to maintain or increase conservation flows at the existing water sources during the snowmaking season, modify the dates of operation, and expand use of the Ottauquechee outside of the snowmaking season. The applicant's proposed conservation flow conditions are identified in the table below:

Table 15. Conservation Flow standards

Source	Period	Conservation Flow (csm)[1]
Killington		
Falls Brook	October 15 – March 31	1.52
Roaring Brook	October 15 – March 31	1.91
Ottauquechee River	October 15 – March 31	1.03
Ottauquechee River	April 1 – May 31	3.46
Ottauquechee River	June 1 – September 30	0.57
Reservoir Brook (Woodward)	October 15 – March 15	0.8
Pico		
Mendon Brook – Lower	November 1 – March 31	0.8[2]
Mendon Brook – Upper	November 1 – March 31	0.12[3]

[1] Or instantaneous inflow if less than standard, except for Reservoir Brook (Woodward Reservoir), which has a guaranteed flow of 0.80 csm until March 15.
[2] Once the interconnect pipeline is operational
[3] Subject to the schedule described in finding 123

ii. The applicant proposes to develop a method to estimate inflows into Woodward Reservoir. This will be used to create a site-specific February median flow for Reservoir Brook in the future.

Ottauquechee Intake Relocation

iii. The applicant proses to relocate and reconstruct the intake approximately 300 feet downstream of the current location.

iv. The applicant proposes an intake screen for the Ottauquechee withdrawal pipe that would be ¼ inch slats.

v. The applicant proposes to remove the existing intake and piping from the river to a minimum of five feet beyond the top of bank.

vi. The applicant has proposed a riparian buffer management plan for the relocation of the Ottauquechee intake

Woodward Reservoir Water Level Fluctuation

vii. The applicant proposes to modify the currently permitted drawdown regime to aim to observe the magnitudes and frequencies of drawdown specified below:

Table 16. Proposed Normal Drawdown Regime

Maximum Drawdown Magnitude	Frequency
2 feet	100% of years
4 feet	50% of years

viii. In cases where these magnitudes and frequencies are not observed, the applicant proposes to conduct the following actions:

Table 17. Proposed Action for Drawdowns outside of Normal Regime

Drawdown (ft)	Frequency	Action Item
More than 2, but less than 4	> 50% of years	Drawdown Assessment
More than 4, but less than 5	Each occurrence	Drawdown Assessment
More than 5	Once	Drawdown Assessment and NAA

ix. To implement the condition above, the applicant proposes to develop a drawdown monitoring plan that would be subject to Department approval. This monitoring plan would be implemented in the growing season before the pipeline becomes operational for the purpose of determining baseline condition.

x. The applicant proposes to incorporate information collected from any drawdown assessments conducted pursuant to the previous finding into an Adaptive Management Protocol, subject to Department approval.

Prioritization

xi. The applicant proposes to assign a higher use priority to Falls Brook, Roaring Brook, and Ottauquechee River relative to Woodward Reservoir to the extent feasible given conservation flow requirements, pumping limitations, operational constraints/status, and inflow conditions.

Removal of Pico Upper Intake

xii. The applicant proposes that within one year of the completion of construction of the interconnection pipeline, Killington will submit a plan with the Department for the decommissioning of the existing Pico Upper Intake. The plan shall include detailed information on removal of the existing instream structure and restoration of topographic contours to approximate those of the surrounding natural terrain at the time of removal, deconstruction procedures and a removal schedule not to exceed three years following the completion of construction. The plan shall be subject to Department approval prior to implementation.

Interconnect Pipeline

xiii. The applicant is proposing to utilize additional water that is available at Killington Mountain Resort and transfer it to Pico Mountain on an as needed basis. This requires the construction of a pipeline between the two snowmaking systems.

xiv. The applicant proposes to construct the interconnect pipeline. As proposed, approximately 17,000 feet of 8-inch diameter steel pipe will carry water from the Killington resort to the Pico resort via the Killington/Pico Interconnect trail.

Invasives/Pathogens

xv. The applicant proposes that in the event a fish pathogen or aquatic invasive species is found the following steps shall be completed by the applicant and the Agency:

1. The applicant shall immediately cease the transfers of water from the subject intake(s) to Pico.
2. The Agency shall complete an evaluation and risk assessment to determine if the pathogen or species in question could reasonably be expected to be transferred to the Mendon Brook watershed in a viable manner via the interconnection pipeline and survive snowmaking operations and subsequent melt.
3. If so, a Control Plan shall be developed in cooperation with Agency.
4. The Agency shall review and provide comment on the Control Plan within 10 days.
5. Following agreement on the Control Plan between the Agency and Applicant, the Plan shall be implemented to eliminate the risk, at which point the continuation of water withdrawals from the subject intake(s) for transfer to Pico may resume.

Decommissioning

xvi. The applicant proposes any in-stream infrastructure be removed to the satisfaction of the Department when it is no longer serving its intended purpose. If a structure has not been operated for two consecutive seasons, the structure shall be considered as no longer serving its intended purpose. Within two months following the second consecutive season of non-use, a removal plan shall be filed with the Department. The plan shall include detailed information on removal of all instream structures and restoration of topographic contours to approximate those of the surrounding natural terrain at the time of removal, deconstruction procedures and a removal schedule not to exceed three years. The plan shall be subject to Department approval prior to implementation.

V. Decision and Certification

The Department has examined the project application and other pertinent information deemed relevant by the Department in order to issue a decision on this Certification application pursuant to the Department's responsibilities under Section 401 of the federal Clean Water Act. After examination of these materials, the Department certifies that there is reasonable assurance that construction of the interconnect pipeline and operation of the withdrawals at Woodward Reservoir, the Ottauquechee River, Roaring Brook, Falls Brook, and Mendon Brook, when done in accordance with the following conditions will not violate applicable water quality standards; will not have a significant impact on use of the affected waters by aquatic biota, fish or wildlife, including their growth, reproduction, and habitat; will not impair the viability of the existing populations; will not result in a significant degradation of any use of the waters for recreation, fishing, water supply or commercial enterprises that depend directly on the existing level of water quality; and will be in compliance with sections 301, 302, 303, 306, and 307 of the Federal Clean Water Act, 33 U.S.C. §1341, and other appropriate requirements of state law:

A. The Applicant shall construct, operate and maintain this project consistent with the findings and conditions of this certification, where those findings and conditions relate to protection of water quality and support of designated and existing uses under Vermont Water Quality Standards and other appropriate requirements of state law.

B. This certification adopts the Applicant's proposed conditions as enumerated Section IV, except where modified below.

Conservation Flows

C. The applicant shall maintain conservation flows below each intake in accordance with the table in Section IV(i). No withdrawals shall occur during periods when these source streams are flowing at less than the specified conservation flow rates.

D. After the tenth year of flow recording at the diversions on Falls Brook, Roaring Brook, the Ottauquechee River the site-specific February median flow shall be recalculated, subject to Department approval, and that value shall become the minimum conservation flow for those sources.

E. After the tenth year of flow recording at the diversions on Woodward Reservoir (Reservoir Brook) and Mendon Brook, the site-specific February median flow shall be determined, subject to Department approval, and that value, if higher than 0.80 csm, shall become the minimum conservation flow for those sources. If the revised February median flow is less than 0.80 csm, the applicant may request a permit amendment to reduce the flow standard, subject to a demonstration of water need in accordance with Section 16-05 (Alternatives Analysis) of the rules for snowmaking water withdrawals, or any applicable regulations in place at that time.

F. The snowmaking alternatives analysis shall be updated, and the updated analysis filed with the Department at intervals of 10 years or less. The first updated analysis

will be due August 1, 2029.

G. A revised snowmaking alternatives analysis shall be submitted to the Department any time there are proposed material changes to the system design beyond those specified in the alternative analysis submitted for this certification., such as an additional water source, an increase in pump capacity, or an increase in snowmaking acreage in excess of 15% of the near term buildout scenario described in the findings of this certification.

Woodward Reservoir Water Level Fluctuation

H. The applicant shall manage the reservoir in accordance with the regime proposed in Sections IV.vii and IV.viii.

I. The drawdown assessment monitoring plan proposed by the applicant in Section IV.ix shall include methodologies for monitoring macrophytes, macroinvertebrates, and the class two floating wetland, proposed analyses, and thresholds for determining impact. The plan shall be submitted to the Department for review and approval before the baseline monitoring commences.

J. The drawdown magnitudes and frequencies and follow-up actions adopted by Condition H may be amended based on the results of monitoring required by condition I pursuant to an adaptive management protocol proposed in Section IV.x. The adaptive management protocol shall include a means for determining the maximum drawdown, drawdown magnitudes and frequencies necessitating assessment, a framework for how assessment outcomes modify condition G, and require the applicant to develop an NAA evaluating the feasibility of off-stream storage if a drawdown exceeds five feet.

When amending the regime adopted by condition H pursuant to the approved adaptive management protocol, two consistent findings will be needed for management action and management action shall be limited to modifying the fluctuation (increase/decrease) by half foot increments upon management action. If the Department concurs with the findings, it shall amend condition G according to the adaptive management protocol.

Mendon Brook

K. Within one year of the completion of construction of the interconnect pipeline, the applicant shall submit a plan for addressing any infrastructure owned or maintained by the applicant that is causing localized disequilibrium in Mendon Brook in the A(1) reach with the Department for review and approval. The plan shall include detailed information on the removal and/or replacement of infrastructure, any restoration proposed, and an implementation schedule. The schedule for removal and/or replacement shall not exceed three years in the reach classified as A(1) for aquatic habitat. The infrastructure in reach classified as A(2) for aquatic habitat shall be evaluated as part of an overall stormwater management plan for the base area. If replacement is determined necessary, the applicant shall consult with the Department on the design of the structure.

L. Within one year of the completion of construction of the interconnect pipeline, the

applicant shall submit a runoff management plan with the Department for review and approval. The objectives of plan shall include: (1) document how runoff is currently managed on Pico Mountain ski trail network, which may include artificial (i.e. water bars) and natural means (i.e. riparian buffer restoration), and describes best management practices employed, (2) identify opportunities to improve runoff management, including strategies that may increase the dissipation of runoff to minimize erosion, increase nutrient retention, and ensure the physical habitat structure consistent with the aquatic habitat use classification of the reach are met, and (3) include an implementation schedule.

Interconnect Pipeline

M. The transfer of water from Killington to Pico through the interconnect pipeline shall only occur during the snowmaking season between November 1 to March 1. The transfer of water from Killington to Pico outside this time period shall not occur without written approval from the Department.

Flow Monitoring

N. For all stream sources, gaging and metering systems adequate to meet the following compliance record keeping requirements shall be designed and installed. For each day that the diversion of water occurs, the hourly rate of diversion, daily maximum diversion rate, and total daily volume with daily average rate; minimum instantaneous below-diversion flows and corresponding natural stream flows; hourly reservoir levels; and hourly and daily average natural flows shall be recorded. For days when no diversion occurs, only daily average flow data must be recorded.

O. The applicant shall continue the existing gaging system for the Ottauquechee River (Gondola) intake, which utilizes data from the U.S. Geological Survey Ottauquechee River gage (Gage No. 01150900). If the applicant elects to change to an alternate gaging system, the system shall be subject to Department approval.

P. At all withdrawal locations, civil and hydraulic works designs and instrumentation specifications for flow and water use monitoring shall be reviewed and certified by a registered professional engineer as consistent with the approved conservation flow standards. A copy of the certification along with the basis of design and equipment specifications shall be provided to the Department prior to the start of construction. The final design shall be subject to Department approval prior to initial operation.

Q. Technicians who collect and maintain records shall be trained by a registered professional engineer. For any diversion that is materially modified to comply with this certification, calibration of the gages and measurement devices shall be done under the supervision of a registered professional engineer and certified by the same. The gages shall be rated prior to the first season of use, and the rating measurements analysis filed with the Department. Rating measurements shall be repeated as necessary in subsequent years to account for any changes in the gage control characteristics, due to scour, sedimentation or other causes. A second set of rating measurements shall be taken before the second season to determine general stability of the rating; the rating information and a brief comparison report shall be

filed with the Department before the start of that season.

System Maintenance

R. If the gage stations or flow devices are malfunctioning or are not functioning because of lack of power or for any other reason, diversion of flow shall be discontinued until the malfunctions or non-functioning has been corrected, unless a backup monitoring plan has been developed and approved by the Department. The Department shall be notified within 24 hours of any malfunctioning or non-functioning.

S. Flow diversion devices shall be checked and cleared of ice and debris on each day that diversion of water occurs and as necessary on other days to assure collection of accurate streamflow records. Additional monitoring and maintenance shall be conducted as needed to maintain the flow diversion devices free of obstructions. If the system has been dormant for more than 24 hours, the diversion shall be checked for obstructions before activating the withdrawal. A daily log shall be maintained noting work that is performed to keep the systems functioning as designed. Chronic problems shall be brought to the attention of the Department, and alternatives to correct the problems proposed for approval and implementation.

T. For any diversion that is altered to comply with this certification, the flume and intake spillway shall be surveyed by a registered land surveyor or registered professional engineer to confirm that the conservation flow standards will be attained.

U. If a structure is damaged due to flood or other causes, the structure shall be resurveyed, and the results filed with the Department prior to recommencing withdrawal of water.

Reporting Requirements

V. Streamflow, reservoir level data, and the volume of water passed through the interconnect pipeline shall be provided to the Department in whatever digital format the Department requires. For each month water is withdrawn from the brooks or reservoirs, within 21 days of the end of the month, a report shall be filed with the Department including the data specified above and in Condition N. A narrative description of flow and water use conditions throughout the month, as well as any operational problems encountered or corrective actions taken, shall also be included.

W. A report shall be filed annually with the Department which includes the daily pumping rates and volumes; seasonal water use volume; reservoir refill completion date, trail coverage; compliance with existing conservation flow requirements; available data on streamflow, temperature, and precipitation (rainfall and snowfall); known expansion plans; and projections for future water use. The report shall be filed by the July 1 following the end of the snowmaking season.

Aquatic Invasive Species / Pathogens

X. Fish shall not be introduced or propagated in the snowmaking reservoirs.

Y. The Applicant shall monitor the snowmaking reservoirs annually for the presence of aquatic invasive species. If an aquatic invasive species is found in reservoirs or if the applicant is notified by the Agency that a fish pathogen or aquatic invasive species is present in Killington source waters and not present in Mendon Brook watershed, transfer of water to Pico shall be ceased and a control plan shall be developed in cooperation with the Agency. The plan shall be subject to review and approval by the Department prior to its implementation.

Erosion and Sediment Control

Z. All instream work shall be undertaken and completed between June 1 and October 1, unless the work area is isolated, or an extension is granted by the Department following a written request.

AA. All instream work shall follow accepted and established erosion and sediment control procedures to ensure construction activities will not violate standards.

General Conditions

BB. Debris associated with project construction and operation shall be disposed of properly.

CC. Any proposal to desilt the intakes shall occur based on established procedures developed in consultation with the District River Management Engineer. If desilting deviates from these procedures, desilting shall be subject to prior review and written approval by the Department.

DD. Any change to the project that would have a significant or material effect on the findings, conclusions, or conditions of this certification, including project operation, must be submitted to the Department for prior review and written approval.

EE. The applicant shall allow public access to the project area for utilization of public resources, subject to reasonable safety and liability limitations.

FF. The applicant shall allow the Department to inspect the project area at any time to monitor compliance with certification conditions.

GG. The Department shall maintain continuing jurisdiction over the interconnect construction and the snowmaking system, including use of Woodward Reservoir, with respect to the Vermont Water Quality Standards and may amend the conditions of this certification as necessary to assure future compliance.

HH. This water quality certification is limited to the use of these public waters solely for the purposes of snowmaking, irrigation, and fire suppression. If water is proposed to be withdrawn for any other purpose, prior approval is required.

Effective Date and Expiration of Certification

This certification shall become effective on the date of issuance, and the condition of any certification shall become conditions of the federal permit (33 U.S.C. § 1341(d)). If the federal authority denies a permit, the certification becomes null and void. Otherwise, the certification runs for the terms of the federal license or permit.

Enforcement

Upon receipt of information that water quality standards are being violated as a consequence of the project's construction or operation or that one or more certification conditions has not been complied with, the Secretary, after consultation with the applicant and notification of the appropriate federal permitting agency, may, after notice and opportunity for a public hearing, modify the Certification and provide a copy of such modification to the applicant and the federal permitting agency.

Certification conditions are subject to enforcement mechanisms available to the federal agency issuing the license and to the state of Vermont. Other mechanisms under Vermont state law may also be used to correct or prevent adverse water quality impacts from construction or operation of activities for which certification has been issued.

Appeals

Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Division of the Superior Court within 30 days of the date of the decision. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Division; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and description of the property, project, or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available online at www.vermontjudiciary.org. The address for the Environmental Division is 32 Cherry Street, 2nd Floor, Suite 303; Burlington, VT 05401 (Tel. 802.951.1740).

Dated at Montpelier, Vermont this
XXth day of XX, 20XX

Emily Boedecker, Commissioner
Department of Environmental Conservation

By _____
Peter LaFlamme, Director
Watershed Management Division
Department of Environmental Conservation