

VERMONT ENVIRONMENTAL BOARD
10 V.S.A. Ch. 151

Re: Village of Ludlow

Land Use Permit Amendment #2S0839-2-EB

FINDINGS OF FACT, CONCLUSIONS OF LAW, AND ORDER (ALTERED)

Mount Holly Mountain Watch (MHMW) appeals the decision of the District 2 Environmental Commission (Commission) to issue Land Use Permit #2S0839-2 to the Village of Ludlow. This permit authorizes the construction of improvements to the Ludlow Waste Water Treatment Facility (WWTF) to increase its capacity from 700,000 gallons per day to 1,050,000 gallons per day, including a 1.2-mile extension of the Ludlow WWTF's Waste Management Zone (WMZ) in the Black River, and the construction of a building addition for storage, on 33.3 acres of involved land located in Ludlow, Vermont (Project). As set forth below, the Board finds that MHMW has not provided sufficient evidence to rebut the presumption of compliance afforded to the Village of Ludlow upon the issuance of a discharge permit for a wastewater treatment facility.

I. Procedural History

On October 14, 2002, the Village of Ludlow filed Land Use Permit Amendment Application # 2S0839-2 with the Commission seeking authorization for the Project. The Commission issued Land Use Permit #2S0839-2 (Permit) and supporting Findings of Fact, Conclusions of Law, and Order (Decision) on February 7, 2003, and a Memorandum of Decision on Motion to Alter (MOD) on March 13, 2003.

On April 3, 2003, MHMW filed an appeal with the Environmental Board (Board) from the Permit, the Decision, and the MOD, alleging that the Commission erred in its conclusions with respect to party status under Environmental Board Rules (EBR) 14(B)(1) and 14(B)(2), and on the merits with respect to Criteria 1 (air pollution), 1(B) (waste disposal), 1(E) (streams), 8(A) (necessary wildlife habitat), and 9(A) (impacts of growth). The appeal was filed pursuant to 10 V.S.A. § 6089(a) and EBR 6 and 40.

On April 28, 2003, Board Chair Patricia Moulton Powden convened a Prehearing Conference with the following participants: MHMW, by Peter Berg; and the Village of Ludlow, by J. Christopher Callahan, Esq., with Frank Heald. MHMW filed its petition for party status on the same date.

On April 29, 2003, a Prehearing Conference Report and Order was issued, setting the matter for hearing and setting preliminary filing deadlines, among other things.

The Board deliberated on May 21, 2003 on preliminary issues and motions. On May 28, 2003, the Board issued a Memorandum of Decision which, among other things, granted MHMW party status on Criterion 1(B) and dismissed the rest of the appeal.

On June 2, 2003, MHMW filed a Motion to Continue the June 4, 2003 deadline for prefiling direct evidence to June 24, 2003. The Village of Ludlow informed Board counsel that it would agree to a continuance to June 18, 2003 but no later, as long as the hearing date was not delayed. On June 3, 2003, the Chair issued the Continuance Order, continuing the June 4, 2003 deadline to June 20, 2003, and adjusting other prehearing deadlines, but keeping the July 23, 2003 hearing as originally scheduled.

On June 9, 2003, MHMW objected to the Continuance Order, again asking that the deadline for prefiling direct evidence be continued to June 24, 2003. The Village of Ludlow opposed MHMW's objection. The Board deliberated on June 18, 2003, and denied MHMW's objection by Memorandum of Decision issued the same date.

On June 26, 2003, MHMW filed a Motion to Continue the deadline for prefiling rebuttal evidence. The Village of Ludlow's opposition was filed the same day. The Chair issued an Order denying the motion on the same day.

On July 9, 2003, MHMW filed a Motion to Continue the deadline for prefiling proposed findings and conclusions. The Chair issued an Order extending the deadline from July 11, 2003 to July 17, 2003.

The Chair convened a second prehearing conference on July 21, 2003, to go over the hearing schedule and site visit itinerary, etc.

On July 23, 2003, the Board convened a public hearing, Chair Moulton Powden presiding. The Board conducted a site visit, admitted exhibits, and heard testimony from the parties. Immediately after the hearing, the Board commenced deliberations.

On August 5, 2003, MHMW filed Supplemental Proposed Findings and Conclusions. On August 18, 2003, the Village of Ludlow filed a Partial Objection to Appellant's Supplemental Proposed Findings and Conclusions. Also on August 18, 2003, MHMW filed a Motion to Dismiss the Village of Ludlow's Objection.¹

On September 17, 2003, the Board deliberated.

Based on a thorough review of the record, related argument, and the parties' proposed findings of fact and conclusions of law, the Board declared the record complete and adjourned. On September 18, 2003, the Board issued Findings of Fact, Conclusions of Law, and Order, in which it concluded that the Project complies

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As set forth herein, MHMW's "Motion to Dismiss" is being treated as a memorandum in opposition to the Village of Ludlow's partial objection.

with criterion 1(B), the only criterion on appeal, and issued Land Use Permit #2S0839-2-EB.

On October 14, 2003, MHMW filed a Motion to Alter. On October 28, 2003, the Village of Ludlow filed an Objection to MHMW's Motion to Alter. Also on October 28, 2003, ANR filed a Response to MHMW's Motion to Alter. The Board deliberated on November 12, 2003. On November 26, 2003, the Board issued a Memorandum of Decision denying MHMW's Motion to Alter, and altered the Decision and Permit *sua sponte* to clarify the distance to the CVPS swimming hole in Finding #34.

II. Ludlow's Objection to MHMW's Supplemental Proposed Findings

The Village of Ludlow objects in part to MHMW's Supplemental Proposed Findings and Conclusions, arguing that part of this filing exceeds the permitted scope of supplemental proposed findings. According to the Village of Ludlow, supplemental proposed findings were limited to "new matters and/or testimony raised during the hearing." (Partial Objection, at 1.)

MHMW has filed a Motion to Dismiss Ludlow's objection, but makes no argument that would warrant dismissal. Because this "Motion to Dismiss" is in fact opposition to Ludlow's objection, the Board considers it as such.

MHMW's original Proposed Findings and Conclusions were stricken because they were filed a day late. The Village of Ludlow asks the Board to strike portions of MHMW's Supplemental Proposed Findings and Conclusions that were included in the original, stricken filing.

The Chair ruled after the hearing that the parties could file supplemental proposed findings concerning the surrebuttal evidence, Board questions, and testimony taken at the hearing. No party challenged that ruling and it is final. This range of permissible material goes beyond "new" matters or testimony raised at the hearing because testimony at the hearing addressed issues covered in MHMW's original proposed findings. The Village of Ludlow has failed to identify any portion of MHMW's supplemental proposed findings that does not relate to surrebuttal, answers to Board questions, or other testimony taken at the hearing. Therefore, the Board DENIES the Village of Ludlow's objection and considers MHMW's Supplemental Proposed Findings of Fact and Conclusions of Law.

III. Issue

The merits issue in this case is whether the Project "will meet any applicable health and environmental conservation department regulations regarding the disposal of wastes, and will not involve the injection of waste materials or any harmful or toxic substances into ground water or wells," in compliance with 10 V.S.A. § 6086(a)(1)(B).

IV. Findings of Fact

To the extent that any proposed findings of fact are included herein, they are granted; otherwise, they are denied. See *Secretary, Agency of Natural Resources v. Upper Valley Regional Landfill Corp.*, 167 Vt. 228, 241-242 (1997); *Petition of Village of Hardwick Electric Department*, 143 Vt. 437, 445 (1983). Topic headings are for organizational purposes only. Facts stated and terms defined in the procedural summary are incorporated herein.

Criterion 1(B) - General

1. The Village of Ludlow (Ludlow) owns and operates a wastewater treatment facility (WWTF) located on the Black River.
2. Ludlow seeks to upgrade and expand its WWTF with the construction of a building for storage, an increase in capacity from 700,000 gallons per day to 1,050,000 gallons per day, and a 1.2 mile extension of the Waste Management Zone (WMZ) for the facility.
3. In September, 2001, Discharge Permit 3-1208 (Permit) was issued by the Agency of Natural Resources (ANR), Department of Environmental Conservation (Department), Wastewater Management Division.
4. The Black River is classified under the Vermont Water Quality Standards as a Class B waterway.

Dissolved Oxygen and Assimilative Capacity (ASCAP)

5. In determining whether a discharge will meet the Dissolved Oxygen standard contained in the Vermont Water Quality Standards (VWQS), the ultimate oxygen demand (UOD) must be evaluated for certain discharges.
6. UOD is the measure of the total amount of oxygen that is consumed during the process of the breakdown of organic compounds contained in wastewater effluent.
7. The ability of a stream to balance the deleterious effects of oxygen depletion (waste stabilization) with sufficiently proportional atmospheric re-oxygenation (reaeration) is defined as its assimilative capacity (ASCAP).
8. Free-flowing rivers in Vermont typically have relatively high natural reaeration rates.

9. In the late 1980's, the Department determined the ASCAP for the Black River below the Ludlow WWTF using computer modeling and limited field data from the Black River.
10. Based on this estimate of the Department, the prior discharge permit for the Ludlow WWTF contained a conservative UOD limitation of 650 pounds per day, maximum, for the period of June 1 through September 30. This limitation was developed to ensure that the dissolved oxygen of the receiving water would not drop below 6.0 mg/l (milligram/liter).
11. In the summer of 2000, Ludlow's consultant, Aquaterra, collected more extensive field data in the Black River. Based on these expected conditions, the actual assimilative capacity of the Black River downstream of the Ludlow WWTF was determined to be between 860 and 1200 pounds per day.
12. Of the equations available in EPA's state of the art QUAL2E computer model to determine assimilative capacity, Aquaterra selected formulae with K_2 (reaeration) coefficients that were derived from field data and were appropriate for the expected conditions.
13. The Permit established an UOD limit of 850 pounds per day. While this increase may result in a theoretical decrease in the dissolved oxygen of the river during worst case conditions, the Department nonetheless concluded that this would not have any adverse impacts on the use of the river by aquatic biota or wildlife that utilize or are present in the water. Specifically, the dissolved oxygen of the Black River will remain in compliance with water quality standards.
14. The model used to determine UOD takes ammonia loading and its effect on dissolved oxygen concentrations in the Black River into account. A value of 10 milligrams per liter (mg/l) was used for total Kjeldahl nitrogen (TKN), which consists of organic nitrogen and ammonia nitrogen. For wastewater discharges with significant TKN concentrations, typically the majority of TKN is in the form of ammonia.
15. TKN will not exceed 10 mg/l.

Anti-Degradation/Higher Quality Waters

16. In conjunction with the issuance of the Permit, the Department made anti-degradation findings, which include the following:
 - a. The proposed increased discharge from the Ludlow WWTF will have a limited effect on the quality of the receiving water.

- b. The permitted discharge of UOD has been increased from 650 pounds per day to 860 pounds per day. However, [the corresponding] reduction of dissolved oxygen [from this increased loading] will not impact the existing and designated uses of the river nor will it violate the applicable water quality criteria.
- c. Based on the information contained in the application, the Ludlow WWTF is rapidly reaching its design capacity. Failure to expand and upgrade the WWTF will prohibit future connections to the WWTF within the existing sewer service area, and hence inhibit the future ability of Ludlow to provide economic opportunity.
- d. Constructing the additional treatment necessary to limit the discharge to the currently permitted effluent limitations (650 lbs/day of UOD) would cost a minimum of an additional \$600,000 above the current upgrade cost.
- e. Considering the only reduction in the higher quality of the receiving water may be a theoretical decrease in the river's dissolved oxygen at worst case conditions, all existing and designated uses will continue to be maintained and protected, and all applicable water quality criteria will continue to be met, this reduction is allowable.
- f. The VWQS allow for a limited reduction in water quality if the balancing test outlined in Section 1-03(C)(2) can be met.

Aquatic Biota/Phosphorous

- 17. Biological monitoring data obtained in 1987 and 1991 demonstrated that the effluent from the Ludlow WWTF was adversely affecting the aquatic community in the Black River. Specifically, phosphorous loading was causing the growth of algae in the river.
- 18. Phosphorous loading causes an overgrowth of algae during warm, sunny periods, which in turn adversely affects the aquatic biota, in particular, macroinvertebrates.
- 19. Based on two years of biomonitoring data showing similar and consistent results, the portion of the Black River below the Ludlow WWTF was listed on the EPA's 1998 303(d) List of Impaired Waters due to nutrient enrichment.
- 20. The discharge from the Ludlow WWTF was identified as a significant contributor to this phosphorous impairment.
- 21. To achieve compliance with the VWQS, a Total Maximum Daily Load (TMDL) was established for the portion of the Black River below the Ludlow WWTF. The

- TMDL was completed by the Department in February 2001 and was approved by the U.S. EPA in May of 2001.
22. The purpose of a TMDL is to prescribe the maximum amount of a given pollutant that an impaired waterbody segment can receive and still comply with the criteria and uses set forth in the VWQS. The total prescribed pollutant amount is then allocated between point and nonpoint sources.
 23. The TMDL for the segment of the Black River below the Ludlow WWTF establishes a total phosphorous wasteload allocation of 7.0 lbs/day. This limit has been included in the current discharge permit and was also imposed in the prior permit.
 24. In early 1999, a monitoring plan was developed to better characterize the conditions of the Black River and the effluent of the WWTF.
 25. The 1999 plan included three distinct areas of investigation: (1) chemical sampling of both the Ludlow WWTF effluent and the river upstream of the WWTF, with a focus on nutrients; (2) biomonitoring above and below the WWTF including fish and macroinvertebrate communities; and (3) a mixing study to determine the point at which phosphorous from the WWTF was completely mixed in the river.
 26. The Department requested a mixing study because there was a concern about the proximity of the biomonitoring site to the WWTF. If effluent is not completely mixed at the sampling station, the biomonitoring results can be inaccurate.
 27. The mixing study showed that at a distance of 2500 feet downstream, the effluent was completely mixed.
 28. The 1999 biomonitoring indicated that the Class B water quality standards and criteria were being met. The study also showed that the current level of phosphorous loading from the Ludlow WWTF was not likely to cause an enrichment impairment and was at, or below, the phosphorous loading capacity for this portion of the Black River.
 29. Even though the results of the 1999 biomonitoring showed that there were no impairments due to enrichment (through phosphorous), the portion of the Black River below the Ludlow WWTF was not de-listed on the 2000 303(d) list. Several years' worth of data meeting biological criteria are necessary to show consistent improvement before de-listing can occur.

Waste Management Zone (WMZ)

30. A waste management zone is a reach of river below a wastewater treatment facility where there is a greater health risk due to the treated discharge.
31. To establish a WMZ, the Department applies the mathematical model contained in the Department's "Waste Management Zone Designation Procedure." Under this model, the Department inputs a discharge concentration 20 times the normal permitted effluent concentration of Escherichia coli (E.coli) bacteria, the stream flow at the seven-day low flow over a ten-year return period, or 7Q10, stream velocity data, and the natural die-off rate of the E.coli to determine the distance downstream from the discharge where the concentration of E.coli in the stream would meet the VWQS.
32. The existing WMZ begins at the outfall of the Ludlow WWTF and extends downstream for 4.4 miles. Upon increasing the discharge to 1,050,000 gallons per day, a waste management zone of 6.2 miles would be needed to accommodate this discharge, according to the WMZ Procedure.
33. Section 3 of the WMZ Designation Procedure provides:
- The VTDEC will use the WMZ length determination model as a tool to calculate a base length for the proposed waste management zone. In most cases the resulting length will be recommended for adoption in the NPDES permit. However, in certain situations where existing downstream uses preclude the adoption of a sufficiently long waste management zone, other appropriate risk management alternatives may be recommended in addition to adoption of the maximum practical WMZ length. These may include additional treatment processes, increased treatment reliability, alternative discharge locations, or other options deemed appropriate by the Secretary. Any such additional measures that are required will be included as part of the final NPDES permit requirements.
34. MHMW submitted an ortho photograph into evidence with the distance from the Ludlow effluent outfall to the CVPS swimming hole marked as 5.36 miles. However, this measurement is inaccurate in several respects and the actual distance is at least 5.59 miles. *ANR made a technical determination in issuing the discharge permit, and the Board now finds, that the distance from the Ludlow WWTF outfall to the CVPS swimming hole is approximately 5.7 miles.*

Anti-Degradation/Existing Uses

35. During the summer of 1999, the Southern Windsor County Regional Planning Commission prepared a report entitled "Existing Use Determination for the Black River." This study indicated that recreational uses occur in the Black River that would be within the expanded 6.2-mile waste management zone.

36. The report found evidence of significant recreational use at only one site, commonly known as the “CVPS” swimming hole, which the report estimated to be 5.5 miles downstream from the WWTF.
37. Given the location of the CVPS site within the expanded WMZ, the Department required that the wastewater treatment facility design meet the following requirements in accordance with WMZ Designation Procedure:
 - a. The expanded WWTF must meet an E.coli bacteria effluent limitation of 65/100 ml. This limitation is derived by factoring the flow increase and greater downstream travel distance and time such that the proposed increase in discharged flow would not increase the current E.coli risk at the CVPS site.
 - b. The expanded WWTF must include redundancy in the disinfection and associated treatment systems necessary to ensure disinfection remains at optimum levels even during adverse conditions. Improved alarm systems must also be included as an integral part of the WWTF design to ensure a quick response time should unforeseen operational problems occur.
 - c. The expanded WWTF must be designed such that the expanded WWTF is significantly better at removing all types of pathogens than the current WWTF.
38. If the Ludlow facility complies with these additional criteria, the level of risk at the CVPS site due to the potential concentrations of bacteria and other pathogens stemming from the expanded discharge would not be increased from current conditions.
39. Based on a review of the supporting material submitted as part of the renewal application, specifically the “Basis of Final Design Report of the NPDES Application Ludlow WWTF,” Dufresne-Henry, Inc., August 2000, the Department concluded that the three additional requirements cited above have been met in the following manner:
 - a. The Department concluded that the expanded design of the facility will be able to reliably achieve an effluent with an E.coli bacteria of 65/100 ml or less. This will be accomplished because the improvements to the chlorination system will provide much greater contact time than what currently exists.
 - b. The expansion design includes adequate redundancy in the disinfection and associated systems to ensure that the optimum disinfection will occur during even adverse conditions and improved alarm systems have been incorporated as an integral part of the WWTF’s design.
 - c. The expanded design has the ability to remove all types of pathogens at a greater efficiency than the existing WWTF such that the pathogens in the increased discharge will be no greater than, and in all probability less, than the pathogens being discharged from the existing WWTF. Based on

increased treatment the expanded WWTF will be able to remove pathogens at a minimum of approximately 0.68 log greater efficiency than the current WWTF.

40. Based on the inclusion of these additional measures for risk reduction, the Discharge Permit established a WMZ of 5.6 miles, which ends just upstream of the CVPS swimming hole.

Groundwater

41. The Agency made no technical determination on the injection of waste materials or other harmful substances into ground water or wells.
42. On April 26, 1991 the Vermont Department of Health notified the Agency that it was refusing to allow disinfection of the Ludlow WWTF to be seasonal. In the letter, the Department of Health cited the presence of nine wells downstream from the WWTF, some of which might serve as Public Community Water Supplies.
43. Since that time, jurisdiction over public community water supplies and related issues has been transferred to the Agency, specifically, the Department.
44. Generally, streams are fed by, rather than feed into, groundwater. These surface water/groundwater relationships are complex and can change with varying precipitation conditions.
45. Based on the testimony of the Agency's witness, the Board finds that the relevant portion of the Black River is most likely fed by groundwater.

V. Conclusions of Law

As set forth below, the Board concludes that the Project complies with Criterion 1(B), the only criterion on appeal.

Criterion 1(B) (Waste Disposal) provides that:

A permit will be granted whenever it is demonstrated by the applicant that, in addition to all other applicable criteria, the development or subdivision will meet any applicable health and environmental conservation department regulations regarding the disposal of wastes, and will not involve the injection of waste materials or any harmful or toxic substances into ground water or wells.

10 V.S.A. § 6086(a)(1)(B). The applicant bears the burden of proving compliance with Criterion 1(B). *Id.* at § 6088(a).

In the case at hand, the applicable statutory and regulatory provisions under Criterion 1(B) are Title 10 Chapter 47 and the Vermont Water Quality Standards (VWQS) effective July 2, 2000.

A. Presumptions

Under Board rules, once a discharge permit for a wastewater treatment facility is entered into the record, a rebuttable presumption arises that waste materials and wastewater can be disposed of without undue water pollution. EBR 19(E)(1)(b). In the present case, the Village of Ludlow has submitted a wastewater discharge permit in order to demonstrate compliance with Criterion 1(B). This presumption shifts the burden of proof to MHMW to rebut the presumption by demonstrating, by a preponderance of the evidence, that undue water pollution is likely to result. EBR 19(F)(2).

Furthermore, technical determinations made by ANR in issuing this discharge permit are entitled to substantial deference. 10 V.S.A. § 6086(d); EBR 19(F)(1). In order for MHMW to rebut any technical determination made by ANR, it must provide clear evidence, which is a higher standard than the preponderance required to rebut the straight presumption, that undue water pollution is likely to result. *Re: Pittsford Enterprises, LLP, and Joan Kelley, #1R0877-EB, Findings of Fact, Conclusions of Law, and Order (Dec. 31, 2002).*

As set forth below, the Board concludes that MHMW has not presented persuasive evidence to rebut the presumptions created by the issuance of the discharge permit to the Village of Ludlow.

B. Dissolved Oxygen and Assimilative Capacity (ASCAP)

The VWQS set minimum dissolved oxygen levels for Class B waters. See VWQS §3-04(B)(2)(a). Bacteria consume dissolved oxygen during the course of the breakdown of the organic compounds contained in wastewater effluent. The amount of oxygen used during this process is called the Ultimate Oxygen Demand (UOD). The ability of a waterbody to balance the deleterious effects of this oxygen consumption is referred to as its assimilative capacity.

Assimilative capacity for the Black River at the Ludlow WWTF was initially determined based on a conservative estimate made by the Department in the late 1980's using computer modeling and limited actual field data. Based on this estimate, the previous discharge permit contained an UOD limitation of 650 pounds per day. However, in the summer of 2000, the Village of Ludlow hired Aquaterra to conduct a more extensive field study. Based on this study, Aquaterra concluded that the actual rate of reoxygenation (K_2) was greater than originally estimated by

ANR, and that the assimilative capacity of the Black River downstream from the Ludlow WWTF is between 860 and 1200 pounds per day. Based on this estimate, ANR stated that the dissolved oxygen of the Black River would not drop below 6.0 mg/l, the standard in the VWQS. *See id.*

MHMW has not presented clear evidence to rebut this technical determination of the Agency. Thus, the Board concludes that the increase in permitted effluent limitation for UOD from 650 pounds per day to 850 pounds per complies with the VWQS.

In addition, MHMW challenged the lack of a limit on ammonia in the discharge permit. However, the model used by the Department in determining the assimilative capacity takes into account ammonia loading. Therefore, the permit in fact contains a built-in limitation on the amount of ammonia that can be discharged.

C. Anti-Degradation Policy

MHMW alleges that the Project would violate the antidegradation policy of the VWQS. § 1-03 of the VWQS requires the maintenance, protection and improvement of water quality. A limited reduction in water quality is allowed, but only when it is shown that:

- a. **the adverse economic or social impacts on the people of the state** specifically resulting from the maintenance of the higher quality waters would be substantial and widespread;
- b. these adverse impacts would exceed the environmental, economic, social, and other benefits of maintaining the high water quality; and
- c. there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources, and all cost effective and reasonable accepted agricultural practices and best management practices, as appropriate for nonpoint source control, consistent with state law.

See VWQS at §1-03(C)(2).

In conjunction with the issuance of the discharge permit, the Department made anti-degradation findings, which are entitled to substantial deference by the Board.

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V.S.A. §6086(d). The Department's findings and analysis concluded that the

increased discharge would in fact have a limited effect on the quality of the Black River. Specifically, the Department found that the increase in the permitted discharge of UOD from 650 pounds per day to 860 pounds per day could result in a decrease in the river's dissolved oxygen at worst case conditions. However, the effects would be minimal and more importantly would not violate the VWQS. Further, the Department found that constructing the additional treatment necessary to limit the discharge to the currently permitted level of 650 pounds per day would cost a minimum of an additional \$600,000 above the current upgrade cost.

Furthermore, the Department determined that many benefits will result from the upgrade of the WWTF that would offset any potential adverse impacts. E.coli concentrations will be reduced, the removal of other pathogens will be improved, and the upgrade will enable future connections to the WWTF within the existing sewer service area. Therefore, because MHMW has not produced clear evidence to rebut these technical determinations of the Department, the Board concludes that the adverse impacts from the increased discharge and the expanded WMZ will be minimal and will be outweighed by the environmental, economic, social and other benefits of the limited reduction in water quality. All existing and designated uses will be maintained and protected, and all applicable water quality criteria will continue to be met.

D. Aquatic Biota/Phosphorous

In terms of phosphorous impacts, the VWQS impose the following requirement:

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.

VWQS, §3-01(B)(2). Phosphorous loading can be detrimental because it causes an excessive growth of algae during warm periods, which in turn affects the aquatic biota. Thus, instead of a specific target for phosphorous loading or a target concentration, the VWQS look to the use of biological criteria to determine possible impairments.

Biomonitoring conducted in 1987 and 1991 indicated that the portion of the Black River below the Ludlow WWTF was impaired due to phosphorous; thus, this

portion of the river was listed on the EPA's 1998 §303(d) List of Impaired Waters. This impairment was determined to be a result of phosphorous loading from the Ludlow WWTF.

To establish compliance with the VWQS, a Total Maximum Daily Load (TMDL) was established for the portion of the Black River below the Ludlow WWTF. This TMDL was completed by the Department in February 2001 and was approved by the EPA in May of 2001. The TMDL establishes a total phosphorous wasteload allocation for the segment of the Black River below the Ludlow WWTF of 7.0 pounds per day.

The Department has included this limit of 7.0 pounds per day in the current discharge permit. This is consistent with the TMDL, and this determination of the Department is entitled to substantial deference from the Board. As MHMW has failed to produce clear evidence to overcome this substantial deference, the Board concludes that the phosphorous limitations contained within the permit are consistent with the TMDL and will comply with the VWQS.

E. Waste Management Zone /Existing Uses

The VWQS define a waste management zone as a "specific reach of Class B waters designated by permit to accept the discharge of properly treated wastes that prior to treatment contained organisms pathogenic to human beings. Throughout the receiving waters, water quality criteria must be achieved, but increased health risks exist in a waste management zone due to the authorized discharge." VWQS, §1-101(B)(48).

Under the VWQS, the Secretary of ANR must insure that, in addition to complying with all other applicable provisions of the WPC Act and the VWQS, any WMZ meets the following criteria:

4. It shall be the minimum length necessary to accommodate the authorized discharge.
5. It shall be consistent with the Anti-Degradation Policy (Section I-03) of VWQS, including but not limited to the provisions of that policy pertaining to the maintenance and protection of all existing and beneficial values and uses.
6. It shall not create a significantly increased risk to public health within the zone.
7. It will be located and managed so as to not result in more than a negligible increased risk to public health adjacent to or downstream of the waste management zone.

8. It will not constitute a barrier to the passage or migration of fish or result in an undue adverse effect on fish, aquatic biota or wildlife.

VWQS § 2-04(B)(2).

To establish a WMZ, the Department applies a mathematical model contained in the Department's "Waste Management Zone Designation Procedure." Applying this model to the increase in wasteload proposed here, the Department came up with a 1.2-mile increase in the WMZ, from 4.4 miles to 5.6 miles.

In the summer of 1999, the Southern Windsor County Regional Planning Commission prepared a report entitled "Existing Use Determination for the Black River." This report found evidence of significant recreational use at only one site, commonly known as the "CVPS" site, which was estimated to be within the proposed extension of the WMZ, as originally calculated.

As the Board stated in the *Town of Stowe* case:

Prior to the expansion of an existing WMZ, in order to accommodate an increased discharge, the Secretary of ANR, and, in this case, the Board, is required to determine that such expansion will not: (i) interfere with those uses which have actually occurred on or after November 28, 1975, in or on a water body, whether or not the uses are included in the standard for classification of the particular body; or (ii) be inconsistent with the anti-degradation policy in the VWQS. 10 V.S.A. §1252(d)(7)(C) & (D).

Re: Town of Stowe, #100035-9-EB, Findings of Fact, Conclusions of Law, and Order at 29 (May 22, 1998). The *Town of Stowe* decision was issued before Act 250 was amended to require that the Board afford substantial deference to such technical determinations of ANR, but otherwise remains good law.

In this case, the Department required that the WWTF design meet the following requirements in accordance with WMZ Designation Procedure:

- (a) The expanded WWTF must meet an E.coli bacteria effluent limitation of 65/100 ml.²
- (b) The expanded WWTF must include redundancy in the disinfection and associated treatment systems necessary to ensure disinfection remains at optimum levels even during adverse conditions.

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By comparison, the VWQS limit for E.coli in Class B waters is 77 organisms per 100 ml. VWQS § 3.04(B)(3).

- (c) The expanded WWTF must be designed such that the expanded WWTF is significantly better at removing all types of pathogens than the current WWTF.

The Department determined that imposition of these conditions would allow the WMZ to be reduced to end just upstream of the CVPS site. In other words, the extended WMZ would not interfere with the existing use and would comply with the VWQS.

Again, MHMW has failed to persuade the Board, by clear evidence, that this technical determination should be disturbed. Therefore, the Board concludes that the Project will not result in an increased risk to the existing uses, and complies with § 2-04(B) of the VWQS.

F. Groundwater

Criterion 1(B) also prohibits projects which “involve the injection of waste materials or any harmful or toxic substances into ground water or wells.” 10 V.S.A. §6086(a)(1)(B).

MHMW’s expert witness, Lori Barg, testified that the proposed extension of the WMZ could result in waste materials or harmful/toxic substances flowing into downstream water supplies. In support of this argument, MHMW cited a letter from the Vermont Department of Health to the Agency, dated April 26, 1991, in which the Department of Health refused to allow disinfection of the Ludlow WWTF to be seasonal. In the letter, the Department of Health cited the presence of nine wells downstream from the WWTF, some of which might serve as Public Community Water Supplies.

Generally, streams are fed by, rather than feed into, groundwater. Of course, these surface water/groundwater relationships are complex and can change with varying precipitation conditions. However, no party submitted evidence on this stretch of the Black River on this issue, or any other evidence that groundwater downstream of the WWTF would be contaminated by the Project. Since the Department of Health letter was written, over twelve years ago, jurisdiction over water quality and water supplies was transferred to the Department, which supports the Project. In fact, there was credible evidence that the Project would reduce any actual risk to drinking water by increasing redundancy, disinfection, and pathogen removal. Also, the Agency's witness testified that this stretch of the Black River is most likely fed by groundwater.

Although ANR did not make any technical determinations with respect to groundwater in issuing the discharge permit, a preponderance of the evidence

demonstrates that the Project will not involve the injection of waste materials or other harmful substances into ground water or wells.

Therefore, the Board concludes that Project complies with Criterion 1(B).

VI. Order

1. The Project complies with 10 V.S.A. § 6086(a)(1)(B) and the merits issue is answered in the affirmative.
2. Land Use Permit #2S0839-2-EB is issued herewith.
3. The Village of Ludlow's Partial Objection to MHMW's Supplemental Proposed Findings of Fact and Conclusions of Law is DENIED.
4. Jurisdiction is returned to the District 2 Environmental Commission.

DATED at Montpelier, Vermont this 26th day of November, 2003.

VERMONT ENVIRONMENTAL BOARD

/s/ Patricia Moulton Powden
Patricia Moulton Powden, Chair
George Holland
Samuel Lloyd
William Martinez
Patricia Nowak*
Alice Olenick
A. Gregory Rainville
Jean Richardson

* Board Member Patricia Nowak did not participate in the Board's September 17, 2003 deliberations, but has reviewed and joins in this decision and permit.